No.

PHILIPPNE FISHERIES DEVELPOMENT AUTHORITY
DEPARTMENT OF AGRICULTURE
REPUBLIC OF THE PHILIPPINES

THE PREPARATORY SURVEY
(STAGE 2)
FOR
THE NATIONWIDE FISH PORTS PROJECT
(PACKAGE III)

FINAL REPORT

VOLUME 1

JULY 2010

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS CO., LTD.

OVERSEAS AGRO-FISHERIES CONSULTANTS CO., LTD.

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Exchange Rate
1US$ = ¥ 90.520 = PHP 46.312
(As of April 2010)

PREFACE

In response to the request from the Department of Agriculture (DA) and the Philippine Fisheries Development Authority (PFDA) of the Philippines Government, the Government of Japan decided to conduct the Preparatory Survey (Stage 2) for the Nationwide Fish Ports Project (Package III) in the Republic of the Philippines and entrusted the Survey to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a survey team headed by Mr. Masaaki GOSHIMA of JV Oriental Consultants Co., Ltd. and Overseas Agro-Fisheries Consultants Co., Ltd. The survey was conducted in three (3) occasions covering the period from November 8, 2009 to June 16, 2010.

The team held a series of discussions with the officials concerned of the DA as well as PFDA and conducted the Survey with the counterpart agencies at the candidate survey area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of the Nationwide Fish Ports Project and the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of DA as well as PFDA for their close cooperation extended to the Survey.

July 2010

Mr. Izumi TAKASHIMA
Vice President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

July 2010

Mr. Izumi TAKASHIMA
Vice President
Japan International Cooperation Agency

Dear Sir:

We are pleased to submit herewith the Final Report for "The Preparatory Survey (Stage 2) for the Nationwide Fish Ports Project (Package III)".

The survey team is composed of Oriental Consultants Co., Ltd. (OC) in joint venture with Overseas Agro-Fisheries Consultants Co., Ltd. (OAFIC). The site surveys for candidate fish ports were conducted thrice from November 2009 to June 2010.

The survey encompasses the needs assessment including the feasibility of developing the Nationwide Fish Ports Project (Package III) which comprise of 6 Regional Fish Ports and 15 Municipal Fish Ports. The survey and study were pursued in close cooperation and coordination with concerned officials of the Department of Agriculture (DA) and Philippine Fisheries Development Authorities (PFDA) and based on the study result, the Project was found to be economically viable with an EIRR indicator of 27.8%.

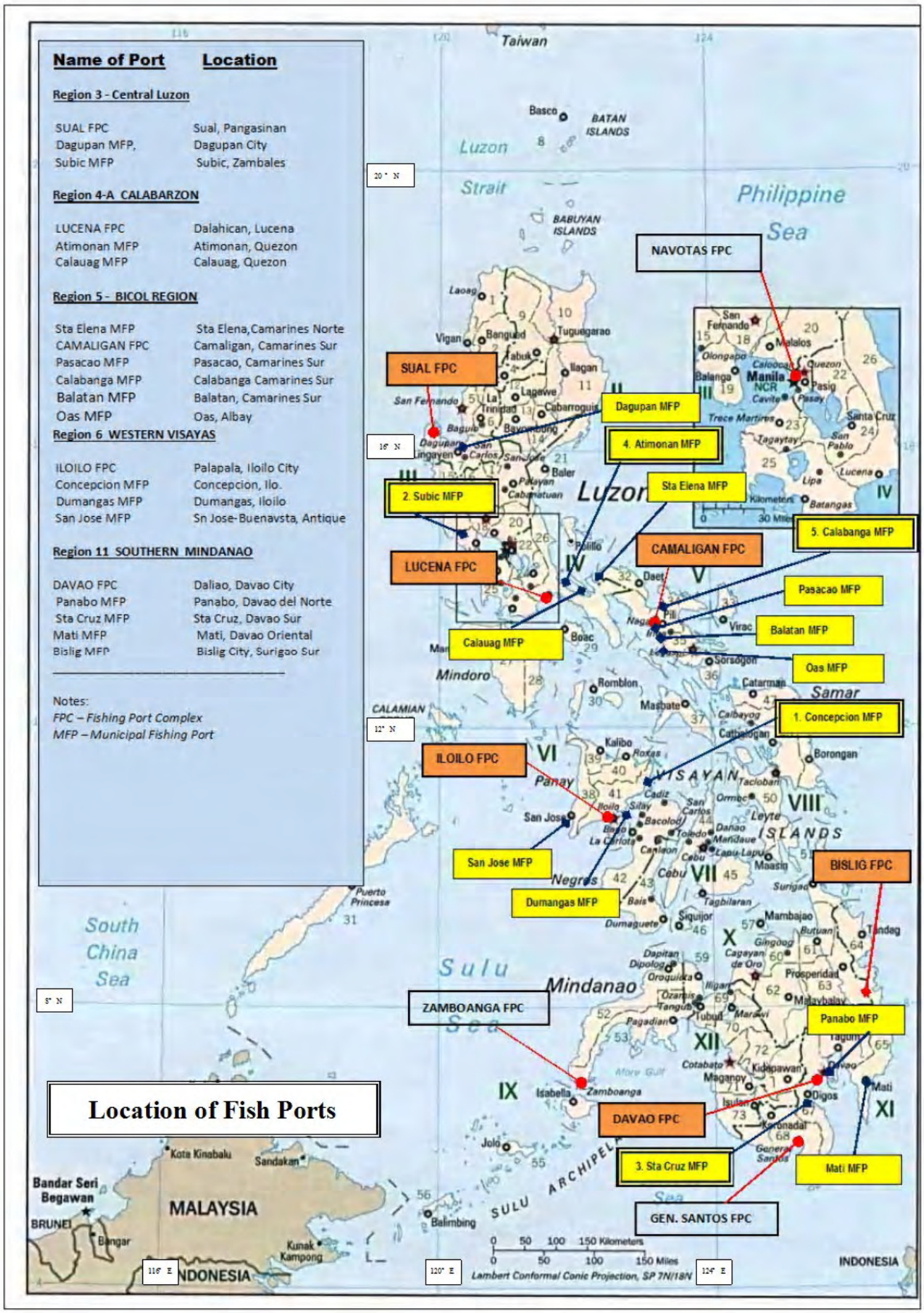
We hope that this Report satisfies the requirements of the Project and we look forward to its early implementation for the enhancement of the Philippine fishing industry and services to all concerned stakeholders.

Through this letter, we would like to express our heartfelt appreciation to PFDA, DA and other authorities concerned for the cooperation, assistances and heartfelt hospitality extended to the study team during the implementation of the survey.

We would also like to express our gratitude to your Agency, the Ministry of Foreign Affairs, the Ministry of Agriculture, Forestry and Fisheries and the Embassy of Japan in Philippines for the valuable suggestions and assistances during the execution of the survey activities.

Yours faithfully,

Masaaki GOSHIMA
Team Leader of the JICA Survey Team
The Preparatory Survey (Stage 2)
for the Nationwide Fish Ports Project (Package III)
in the Republic of the Philippines



Legend:

: Regional Fish Port (Object of F/ S)

: Municipal Fish Port (Object of F/ S)

: Municipal Fish Port (Object of Needs Assessment Survey)

Table of Contents
Vol. 1

List of Figures
Vol. 1

List of Tables
Vol. 1

Table of Contents
Vol. 2

APPENDICES:

Abbreviations

A	**AASHTO**	American Association of State Highway and Transportation Officials
	ACEL	Association of Carriers and Equipment Lessors
	ACI	American Concrete Institute
	ADA	American Disability Act
	AFMA	Agriculture and Fisheries Modernization Act
	AQD	Aquaculture Department
	ARMM	Autonomous Region in Muslim Mindanao
	ASLR	Accelerated Sea Level Rise
	ASTM	American Society for Testing and Materials
B	**BAS**	Bureau of Agricultural Statistics
	BCWD	Bislig City Water District
	BFAR	Bureau of Fisheries and Aquatic Resources
	BFPC	Bislig Fish Port Complex
C	**CCTV**	Closed Circuit Television
	CE	Catching Effort
	CFPC	Camaligan Fish Port Complex
	CNFIDP	Comprehensive National Fisheries Industries Development Plan 2008～2027
D	**DA**	Department of Agriculture
	DAO	DENR Administrative Order
	DBM	Department of Budget Management
	DEG	Diesel Engine Generator
	DENR	Department of Environment and Natural Resources
	DFPC	Davao Fish Port Complex
	DOF	Department of Finance
	DOTC	Department of Transportation and Communications
	DPWH	Department of Public Works and Highways
	DTI	Department of Trade and Industry
E	**ECC**	Environmental Compliance Certificate
	EEZ	Exclusive Economic Zone
	EIA	Environmental Impact Assessment
	EIRR	Economic Internal Rate of Return
	EIS	Environmental Impact Statement
	EMB	Environmental Management Bureau
	EMoP	Environmental Monitoring Plan
	EMP	Environmental Management Plan
	E/ N	Exchange of Notes
	ENPV	Economic Net Present Value
	EO	Executive Order
	EOCC	Economic Opportunity Cost of Capital
	EPRMP	Environmental Performance Report and Management Plan

	ERB	Energy Regulatory Board
F	**FAO**	Food and Agriculture Organization
	FIRR	Financial Internal Rate of Return
	Fishery Code 1998	Republic Act 8550, The Philippines Fishery Code of 1998
	FNPV	Financial Net Present Value
	FPC	Fish Port Complex
	F/ S	Feasibility Study
G	**GOCC**	Government Owned & Controlled Cooperation
	GOP	Government of the Philippines
	GSFPC	General Santos Fish Port Complex
	GMP	Good Management Practice
H	**HACCP**	Hazard Analysis Critical Control Points
	HPLC	High Performance Liquid Chromatograph
I	**ICC**	Investment Coordinating Committee
	IEEC	Initial Environmental Examination Check List
	IEER	Initial Environmental Examination Report
	IFPC	Iloilo Fish Port Complex
	I/P	Implementation Program
	IQF	Individual Quick Freezer
J	**JICA**	Japan International Cooperation Agency
K	**KOICA**	Korean International Cooperation Agency
L	**L/A**	Loan Agreement
	LGU	Local Government Unit
	LFPC	Lucena Fish Port Complex
	LUWA	Local Utilities and Water Administration
M	**MFC**	Marine Fish Capture
	MIMAROPA Region	Region IV-B (Mindoro, Marinduque, Romblon, Palawan)
	MIWD	Metro Iloilo Water District
	MNR	Ministry of Natural Resources
	MRF	Material Recycle Facility
	MSY	Maximum Sustainable Yield
	MT	Metric Ton
	MTPDP	Medium Term Philippine Development Plan 2004-2010
N	**NCR**	National Capital Region
	NAFC	National Agriculture and Fishery Council
	NEDA	National Economic and Development Authority
	NFA	National Food Authority
	NFAC	National Food and Agriculture Council
	NFPC	Navotas Fish Port Complex
	NFRDI	National Fisheries Research and Development Institute
	NG	National Government
O	**OJT**	On the Job Training

	O & M	Operation and Maintenance
P	**PCO**	Pollution Control Officer
	PD	Presidential Decree
	PECO	Panay Electric Company
	PFDA	Philippine Fisheries Development Authority
	PFMA	Philippine Fish Marketing Authority
	PICOP	Paper Industries Corporation of The Philippine
	PMO	Project Management Office
	PPA	Philippine Port Authority
	PPP	Public Private Partnership
Q	**QMWD**	Quezon Metropolitan Water District
R	**R.A. 9184**	Republic Act 9184
	RDC	Regional Development Council
	RoRo	Roll-on Roll-off
S	**San Jose**	San Jose de Buenavista (Antique Province)
	SEAFDEC	Southeast Asian Fisheries Development Center
	SCF	Standard Conversion Factor
	SEA	Strategic Environmental Assessment
	SFPC	Sual Fish Port Complex
	S.I.	Sensitivity Indicator
	SMR	Self Monitoring Report
	SOCOTECO	South Cotabato Electric Company
	SSOP	Sanitation Standards Operating Procedures
	SUS	Stainless Used Steel
	S.V.	Switching Value
	SWR	Shadow Wage Rate
T	**T/ A**	Technical Assistance
	TAC	Total Allowable Catch
U	**UBC**	Uniform Building Code
	USFDA	United States Food and Drug Administration
W	**WACC**	Weighted Average Cost of Capital
	WCFPC	West-Central Pacific Fisheries Committee
	WTF	Water Treatment Facility
	WWTP	Waste Water Treatment Plant
Z	**ZFPC**	Zamboanga Fish Port Complex

Executive Summary

1. Executive Summary

1.1 General

The present situation and concern of the fishery sector and fish ports in the Philippines are described hereunder:

(1) In 2008, the total volume of marine captured fish has reached an aggregate total volume of 2.4 million tons per annum, of which commercial fishery accounted for 1.2 million tons while municipal fishery accounted for 1.2 million tons, thereby exceeding the estimated MSY (Maximum Sustainable Yield) of marine fish resources in the EEZ (Exclusive Economic Zone) estimated at 1.9 million tons.

(2) In view of this development, since 1998, the fisheries sector in the Philippines exerted all efforts on fishery resource management such as designation of coastal fishing grounds up to 15 km from the shore line for municipal fisheries, enforcement of fishery resource management by municipality level, restriction on the number of purse-seine fishing vessels, protection and planting of mangrove trees, designation of marine moratorium and setting up of conservation areas and seasons. Through these efforts coupled with the reduction in illegal fishery, fishery resource is expected to be gradually maintained.

(3) The Government of the Philippines (GOP) in its 2004 to 2010 midterm development program has prioritized the stable supply of food and has tapped marine fishery as one of the primary means in achieving its objectives for economic growth by creating job opportunities for the poor through the enhancement of productivity and diversification of marine fishery products.

(4) GOP has made continuous effort to prevent the devastation of marine fishery resources from over-fishing to achieve sustainable fishery harvest through the enactment of the AFMA (Agriculture and Fishery Modernization Act) in 1997 and the Fishery Code in 1998.

(5) In 2008, the Comprehensive National Fisheries Development Industries Plan (CNFIDP) covering a 20-period years from 2008 to 2027 was established with BFAR (Bureau of Fisheries and Aquatic Resources) as the lead agency.

(6) The ultimate objective of the CNFIDP is to maintain and sustain fish production volume through ① appropriate fishery resource management, ② intensified fishery resource use, ③ full utilization of aquaculture and commercial fisheries and ④reduction of post harvest losses with the provision of appropriate post harvest facilities and techniques to reduce spoilage and ⑤ adding value of processed fish to enhance the global competitiveness of Philippine fishery products for export. This Project will directly be involved with Item ④ to achieve the objectives of items ② and ⑤. Specifically, item ④ will be pursued by provision of appropriate fish landing/handling facilities and proper operation. On the other hand、Item ⑤ -enhancing competitiveness for export will be achieved through quality management of fishery products, reduction of production/distribution cost and relevant marketing activities. Item ②-intensified fishery resource use will be achieved through technical development and diversification of usage of fishery resources by value adding of fish products through appropriate fish processing techniques. This is envisioned to generate fishery related industries thereby enhancing the standard of the fish ports. The fish ports are also expected to enhance ① fishery resource management with the observation and improvement of daily activities for fish landing/ marketing/ distribution volume of fish products by species.

(7) However, with the elapsed of the mutual fish agreement treaty with Indonesia, fishing is now

confined only within traditional fishing grounds aggravating the depletion of fishery resources and resulting to a 25% decrease in fish catch volume compounded by the 30% spoilage of fish hauls due to inadequate postharvest handling facilities. For this reason there is a need to expand the fishing activities of fisherfolks/fish operators to distant but barely developed fishing grounds within the EEZ of the country and, to provide existing regional fish ports with international standard fish processing facilities to compensate for the loss in fish catch volume, reduce the incidences of spoilage, value adding of processed fish products and increase the competitive advantage to overseas markets.

(8) The improvements of fish port facilities must be provided with technical assistance for improving fish port management that would result to improved fish port operations and service delivery efficiency which, in turn, are expected to serve port clients and end users efficiently. Consequently, this will have a positive impact on strengthening the relationship between port management and its clients thereby enhancing interaction and dialogue for resolving problems/issues to further improve port operations and services. This will further have additional positive impact on the port management for sustainable operations of the fish ports.

(9) Technical assistance should also be provided to some fish ports, especially the regional fish ports, to strengthen their capacity in value adding of frozen and processed fish and in marketing the various port facilities and services. This assistance will provide port management the required skills for developing marketing plans and strategies for encouraging/inducing new clients to invest as well as retain those that are already operating in their respective fish port complex. Therefore, the improvement of each port management's capacity to develop appropriate knowhow in fish processing techniques, marketing plans and strategies will ensure the sustainability of the operation and maintenance of each of the fish port.

(10) For this undertaking, the Philippine Fishery Development Authority (PFDA) is the government agency tasked to develop and enhance fishing industry and distribution of fish products through 8 established regional fish ports nationwide.

(11) Most of the regional fish ports however, were developed in the mid 1980s and early 1990s, so that most of the port infrastructures including the berthing and fish landing facilities, fish market halls, ice making plant and associated refrigeration machineries including freezers and store rooms and relevant utilities, are either dilapidated or out of date and therefore require immediate rehabilitation, and/or improvement or renewal.

The Surveys was conducted based on the following premise:

(1) As notified by CNFIDP, the volume of capture of marine fish in Philippine waters is simply more than what the resources can sustain. In this perspective, the fish landing supply level for each Fish Port should not be focus merely on increase in fish landings just to satisfy productions from marine resources but also from other sources, including the aquaculture industry, quality preservation of fish catch, value adding of frozen and processed fish products by the provision of appropriate fish processing techniques, and provision of ship repair facilities among others. These components should be resolved accordingly to achieve a financially sound fish port operation consistent with proper maintenance and management.

(2) As one means to achieve the foregoing objectives, one option is the adoption of HACCP accredited all in one type of facilities for fish processing. This will entail production arrangement from the receiving gate of raw fish materials, passing through a line system of processing facilities including ice making machinery, freezer, cold storage room, up to the releasing gate for processed frozen fish products of international standard. For quality assurance, the system should be accompanied with pilot laboratory facilities as part of the scope

of works of FPPIII, to enhance research and sanitation of Philippine Fishery Products to strengthen not only the global competitiveness of export products but also to reduce the incidence of possible diseases generated by inadequate fish handling preservations.

(3) The proposed improvement and development for Davao and Bislig Regional Fish Ports, however, should not include facilities that would cater to the increase in tuna catch fishing for export, pursuant to the international agreement reach by member nations of the WCFPC (Commission for the Conservation and Management of Highly Migratory fish Stocks in the Western and Central Pacific Ocean) in a conference for the sustainable utilization of tuna resources.

(4) With the development of Bislig Regional Port, it is envisioned that numerous fishing boat operators will be shifting from General Santos to Bislig as the base of operation, because of the proximity to the fishing grounds to the Eastern Seaboard fishing grounds of the Philippine Sea to compensate for the loss in fish catch due to the expiration of the fish agreement validity with Indonesia. In assessing the demand forecast, careful attention was paid on the probable number of fishing boats to relocate from Gen. Santos to Bislig.

(5) The operation of Iloilo Fishing Port (IFPC) has been adversely affected by the high cost of electricity at Php 10 to 14. /KWh which is more than double with that of other regional fish ports. As a consequence thereof, IFPC had to shut down the operation of the ice making plant. In order to avert the deplorable situation, tapping of other sources of power supply should be resorted to particularly the adoption of solar energy for generating power to reduce the unit cost of electricity for the sustainable operations of Iloilo FPC. Should other source of cheaper power is not available; operation of the refrigeration facilities would be impractical and unrealistic. Therefore, a comprehensive study on the possible use of solar energy was included in the scope of works of the survey and the findings are presented in the F/S Report for consideration.

(6) Wastewater from most of the Regional Fish Ports is currently being discharged into the sea without treatment which is detrimental to the environment and sanitation in the port. A waste water treatment plant is therefore essential to reduce the degree of BOD content pollution to a tolerable limit pursuant to EMB requirements and pertinent provision of the new March 2010 JICA Environmental and Social Consideration Guidelines.

(7) The breakwater for Iloilo FPC was originally conceived to protect the port basin and berthing areas from predominant wave actions during the occurrence of the south-west monsoon season. The monsoon waves from the east to north-east and the southeast directions although comparatively shorter in duration is also adversely affecting wave calmness in the port and intrusion of silt to the port premises brought by tidal current. For this reason, the provision of the eastern breakwater is highly desirable and this is also in response to the strong request from boat operators who indicated their intentions to frequently use Iloilo FPC provided that wave calmness in the port is improved. The installation of breakwater thereat will also protect the slipway and standby areas of commercial boats and other vessels to use the ship repair facility located at the easternmost side of the complex. It is noted in this connection that with the protection of the slipway from wave actions, more vessel operators are expected to be attracted to use the repair facility which is considered as one major source of income for Iloilo FPC to sustain its operation.

(8) The breakwater in Lucena Fish Port (LFPC) was severely damaged by Typhoon Frank in 2008 and immediate repair is needed not only to avoid further damage but also to sustain the ongoing vigorous fish landing and trading activities of the port.

(9) The existing market halls in Iloilo FPC, Lucena FPC among others including some municipal

fish ports are fully being used but the space appears to be insufficient particularly during peak operations. The structures however have already deteriorated and needs to be replaced. Additionally, appropriate waste water treatment system and drainage system for the collection of waste water are also needed as part of the development. The dilapidated market hall buildings will have to be reconstructed with reinforced concrete to reduce on maintenance cost and for lifetime durability.

Taking the foregoing current situations and issues of concern into considerations, the Project components and prioritization are discussed in PART 1 and relevant systems, scale of facilities are proposed in PART 2: Feasibility Study. To enhance and ensure sustainability of operations of the regional fish ports particularly for Iloilo, Camaligan, Lucena and Sual, fish processing facilities of international standard will be provided for value adding in processing of surplus fish and low value fish species. These commodities destined for export and domestic use will command higher prices thereby generating more revenues for the fish ports ensuring sustainable operations. These conditions together with other prerequisites were fully assessed by "with and without the Project scenarios" and the results clearly shows that "with the Project scenario" as discussed in detail in Chapter 19, the proposed Project is both economically and financially viable.

In order to achieve successful implementation and sustainable operation and maintenance of the proposed Regional Fish Ports, the development of the institutional capabilities of the implementing agency by capacity building of the staffs is vital. This aspect of the Project among others are considered as highly essential as discussed in detail in Chap. 18.3 Technical Assistance.

The scope of the Project includes the rehabilitation and/or improvement of 5 existing regional fish ports and the development of a new regional port in Bislig and 15 existing municipal fish ports to support the operations of the regional fish ports.

The Six (6) Regional Fish Ports and Five (5) Municipal Fish Ports chosen for feasibility study (F/S) comprise the following:

Reginal Fish Ports: 1) Iloilo, 2) Sual, 3) Lucena, 4) Camaligan, 5) Davao, and 6) Bislig
Municipal Fish Ports: 1) Concepcion, 2) Subic, 3) Atimonan, 4) Calabanga, and 5) Sta.Cruz

The Ten (10) Municipal Fish Ports for needs assessment survey are listed hereunder.

For Iloilo:	1) Dumangas, 2) San Jose de Buenabista,
For Sual:	3) Dagupan,
For Lucena:	4) Calauag, 5) Sta. Elena,
For Camaligan:	6) Pasacao, 7) Balatan, 8) Oas
For Davao:	9) Panabo, 10) Mati,

1.2 Current Situation and Future Outlook of Fishery Production in the Philippines

The total fishery production in the Philippines has been gradually increasing over the last 6 years from 2002 – 2007, with the rapid growth in aquaculture production by about 47% of the total, while commercial fishery production appears to be stagnating due to fishing ground limitation after the establishment of the 15-mile exclusive zone for municipal fishery. Commercial fishery was further adversely affected by the abrupt rise in fuel cost in 2008. Although catch from municipal marine fishery has been steadily increasing due to the measures taken for coastal resource management coupled with the lower effect of fuel cost for municipal fishing, the fishery resources appears to have already reached the maximum sustainable yield (MSY), similar to commercial fishery.

Considering the foregoing, it is anticipated that fish production from marine fishery may no longer increase. Although certain potential resources are still available in foreign waters, future increase in catch is expected to pose difficulties due to the stiff competition from other foreign fishing vessels in acquiring fishing rights. There is also a tendency of the West-Central Pacific Fisheries Committee (WCFPC) and other international fisheries organizations to fortify the resource conservation measures further outside the West-Central Pacific Ocean for tuna fishing in particular. In light of the forgoing, future increase in fishery production in the Philippines is expected only from the aquaculture industry particularly for mariculture and unused marine fishery resources within the 200-mile EEZ of the Archiepelago.

1.3 Demand and Supply for Fishery Products in the Philippines

Per capita fish consumption in the Philippines has been increasing since 2000 with a constant growth of fish supply. However, the food habit of the Philippine people has been gradually shifting from fishery products to livestock products (Proportion of fish intake to total animal protein has been reducing from 52.8% in 1987 to 42.1% in 2003) in accordance with the expansion of purchase capability. In this aspect, it is anticipated that the demand for fish may not increase in pace of an increase of population. Consumer's needs to fish would also change from simple fresh fish to more value-added products. Total domestic fish demand would remain at 3.3 - 3.4 million MT in 2015 - 2025, while per capita fish consumption would gradually decrease from 32.8 kg in 2015 to 28.6 kg in 2025.

In 2007, the Philippines exported fishery products of 173,076 MT (US$569.8 million). The export volume of fishery products from the Philippines has been stagnating at the range of 170,000 – 200,000 MT per annum since 2000. The export of tuna seems to be difficult to increase in the future, while skipjack would have space to use as an alternative material of tuna. Frozen prawn seems to be possible to increase with resumption of culture by participating into a cutthroat competition with other major exporters. On the other hand some commodities such as sardine, crab meat and milkfish shows the positive trend for export during the last 3 years. Milkfish demand for Overseas Filipino Workers would steadily increase to 3,490 MT (6,000 MT in raw material) in 2025.

Recently, significant changes in international trade policy, quality and safety criteria have put difficulty on the fish processing industry to improve the products that are being manufactured. Many countries, including Philippines, have adopted the Hazard Analysis Critical Control Point (HACCP) system for food safety management. The Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture (DA) is regulatory agency of fisheries products for HACCP in the Philippines. GMP also covers the basic requirements for the production of safe product and thus provides the generic pre-requisites on which a HACCP system is built.

Export of fishery and aquaculture products to the EU and US are also controlled by importing countries' legislations such as Commission Decision 95/190/EC, Codex. In 2004, BFAR was audited and requested by EC (DG SANCO) FVO to adjust the HACCP monitoring and accreditation system to meet the compliance with EU legislation and to establish good hygienic practice, upgrading inspection system and traceability.

Many of the private investors had been rejected to export the processed products caused from high initial cost to rehabilitate their factories to convene HACCP preferable processing facilities. It is urgent requirement for fishery industry to carry out their product for HACCP program. Demand of laboratory analysis from industry is increasing but cause of limited capacity analysis is concentrated to Manila and General Santos area for the tuna product. It is certain that laboratory work is needed in the local regions in the Philippine to meet industrial demand.

1.4 Fish Port Development Plan in the Philippines

(1) Regional Fish Ports: GOP built and operates 8 Regional Fish Ports.

(2) GOP intends to develop the Eastern Seaboard fishing grounds along the Philippine Sea (Pacific Ocean) with Bislig as the base port of operations to compensate for the loss in fishing ground resources in Indonesian waters.

(3) PFDA has developed 58 Municipal level fish ports which was either turned over to the LGUs (Local Government Unit) for operations or jointly operated. 18 ice plants and cold storages were also built and turned over to the LGU or leased out to the private sector.

(4) Feeder ports were developed by DOTC for multi-purpose use. Among the feeder ports that were developed, some were selected for use as municipal fish port such as Pasacao in Camarines Sur.

1.5 Fish Port Related Projects Financed by Other Financial Agencies

(1) General Santos Fish Ports: US$ 27.6 million loan from the Chinese Government for the construction of additional Port facilities including wharves, cold storage and relevant utilities. Construction was completed in 2007.

(2) Navotas Fish Port Rehabilitation: Loan from the Chinese Government to finance the rehabilitation of existing landing quay, breakwater, dredging of port basin and reclamation, port yard filling, construction of market halls, and construction of new marginal wharf, breakwater, cold storage and freezer facilities. According to the implementing agency, the China loan is still under process.

(3) KOICA: Korean Government Grant Aid of US$ 2 million for the development of fish processing facilities in Dagupan City (Pangasinan) for which construction was on-going as of this reporting period.

1.6 Prevailing Conditions and Demand Forecast of Proposed Fish Ports

1.6.1 Regional Fish Ports

Regional Fish Ports has been playing a key-role by providing facilities and services not only as a fish landing center but also as a fish distribution and marketing center, fish processing center and/or a fish transshipment hub depending on the demands needed by the fishing industry for each region. The functions of the Regional Fish Ports can be summarized as follows:

(1) Iloilo Fish Port Complex (IFPC)

IFPC serves as the regional fish port in Region VI (West Visayas), catering to all types of municipal and commercial fishing boats. Due to the change in operation pattern of fishing boats and the cessation of the booming prawn culture industry, IFPC has been utilized not only as a fish port but also as a fish/meat marketing base, making use of its advantage as a regional center for trade and commerce. More emphasis would be given to processing and marketing of fish and meat products in the future, by fully utilizing the advantage of milkfish and shrimp culture in the region.

(2) Sual Fish Port Complex (SFPC)

SFPC plays the role as the only transshipment port in northern Luzon, not only for fish caught in Lingayen Gulf but also for general commodities to Dagupan City - the center of commerce and marketing in Pangasinan province. Due to proximity to Metro Manila linked by good road, utilization of SFPC as a regional fish port is less advantageous for stakeholders. However, considering the increasing demand for fish in the northern Luzon and the increasing milkfish production in Sual, the port could be activated not only as a transshipment port but also as a fish processing and distribution center.

(3) Lucena Fish Port Complex (LFPC)

LFPC has been playing an important role as a regional fish port serving both commercial and municipal fishery as well as commercial boats, thus greatly contributing to the regional economy. The absence of traditional fish landing places in Lucena City, closely bonded the fish port with local fish boat operators, fish brokers and other related stakeholders.

(4) Camaligan Fish Port Complex (CFPC)

CFPC is characterized as a fish processing complex, providing facilities and services to private fish processors since its establishment. Establishing a better network of collecting raw materials for processing and distribution of ice in collaboration with the municipal fish ports in Bicol would enhance the operation of CFPC.

(5) Davao Fish Port Complex (DFPC)

DFPC is a unique fishing port in the Philippines allowing foreign fishing boats to transship their catch for export. DFPC has also been playing an important role in providing facilities and services to fish processors for export, using non sashimi grade tuna from fresh tuna packers from General Santos and the eastern seaboard as raw materials for processing. Similarly certain local ring net fish boats are also unloading their fish catch in DFPC for local consumption although in small quantity.

(6) Bislig Fish Port Complex (BFPC)

Bislig in Surigao del Sur is the proposed site for the development of a new regional fish port to cater to purse-seining commercial fishing in Philippine waters along the eastern seaboard. The completion of the fish port would gradually entice fishing boat operators from General Santos to relocate in Bislig. The port would serve as an ice/fuel supply base and fish transshipment port to Davao, General Santos and Butuan.

The table hereunder shows the current status and future prospect of fishing boat entries and fish unloading for each of the fish port described above. The future prospect can be achieved provided that the following pre-conditions are fulfilled.

IFPC: Invite commercial fishing boats currently mooring at Iloilo River to relocate to IFPC, and encourage wholesalers in public markets and fish processors in Iloilo City to expand production capacity
SFPC: Invite all the fish cage operators in Sual Cove to use SFPC (11 operators with 400 cages)
LFPC: Keep the 2009 level of fish unloading of purse seiners from Navotas
CFPC: Encourage fish processors in expanding the production capacity
DFPC: Keep the current level
BFPC: Invite purse-seiners & hand-liners from General Santos

Table 1.6.1 Current Status and Future Prospect of Fishing Boats Entries at Each Regional Fish Port

Fish Port	No. of fish boat entries per day (average at peak month)								
	Current (average 2005 -09)				Future (2025)				
	Municipal	Commercial	Foreign	Non-fishing	Municipal	Commercial	Foreign	Non-fishing	Milkfish carrier
IFPC	0.61	4.85	0.03	0.27	0.61	6.20	-	0.87	-
SFPC	-	4.37	-	0.36	-	4.37	-	0.36	49.01
LFPC	11.60	10.44	-	3.81	11.60	13.60	-	0.33	-
CFPC	-	0.20		-	-	-	-	-	-
DFPC	4.43	2.72	3.05	0.21	4.43	2.72	3.05	0.21	-
BFPC	53.44	2.20	-	-	(no entry)	15.77	-	-	-

Source: PFDA and Survey by JICA Team

Table 1.6.2 Current Status and Future Prospect of Fish Unloading at Each Regional Fish Port

Fish Port	Fish Unloading (MT/year)		Source of Fish (2009)		Source of Fish (2025)		Remarks (Species contributing to increase in volume)
	Ave. 2005-09	Future 2025	Over land	Fishing Boats	Over land	Fishing Boats	
IFPC	23,912	28,854	89%	11%	91%	9%	Milkfish, raw materials
SFPC	552	23,832	0%	100%	2%	98%	Milkfish, raw materials
LFPC	23,738	25,398	40%	60%	44%	56%	Tilapia, milkfish
CFPC	563	2,003	100%	0%	100%	0%	Raw materials
DFPC	5,251	6,011	8%	92%	20%	80%	Raw materials
BFPC	2,443	20,345	66%	34%	0%	100%	Skipjack (95%) & tuna (5%)

Fish Port	Fish Flow (2009)			Fish Flow (2025)		
	Market Hall	Transshipment	Processing	Market Hall	Transshipment	Processing
IFPC	23,403	509	-	26,152	509	2,033
SFPC	-	552	-	-	22,632	1,200
LFPC	19,136	4,603	-	20,675	4,603	120
CFPC	-	-	563	-	-	2,282
DFPC	415	2,171	1,161	1,339	2,171	2,441
BFPC	2,443	-	-	3,326	17,019	-

Source: PFDA and Survey by JICA Team

1.6.2 Municipal Fish Ports

The table hereunder summarizes the present status and future outlook of fishing boats and fish unloading for each of the proposed municipal fish port described above.

Table 1.6.3 Present Status and Future Prospect of Fishing Boats at Each Municipal Fish Port

Fish Port	No. of fishing boats				No. of boats entry per day				Remarks
	2009		2025		2009		2025		
	Com.	Mun.	Com.	Mun.	Com	Mun.	Com.	Mun.	
Concepcion	54	165	54	165	26.7	130.8	26.7	130.8	No change
Dumangas	1	14	1	14	0.5	2.1	0.5	2.1	No change
San Jose	39	193	39	193	13.0	69.7	13.0	69.7	No change
Dagupan	52	-	52	-	15.2	10.9	15.2	10.9	No change
Subic	10	152	10	152	5.1	73.0	5.1	73.0	No change
Atimonan	26	9	26	9	8.5	9.1	8.5	9.1	No change
Calauag	2	8	2	8	-	21.0	-	21.0	No change
Sta. Elena	19	-	39	-	6.8	18.8	14.0	18.8	Danish seiners from Mercedes
Calabanga	21	139	21	139	47.1	72.5	47.1	72.5	No change
Pasacao	13	9	13	9	7.2	0.9	7.2	0.9	No change
Balatan	33	144	33	144	19.3	45.4	19.3	45.4	No change
Oas	14	7	14	7	9.0	20.1	9.0	20.1	No change
Sta. Cruz	42	40	42	43	2.9	12.0	2.9	12.9	Increase in milkfish carrier
Panabo	-	48	-	59	-	15.3	-	18.8	Increase in milkfish carrier
Mati	18	21	40	21	5.2	10.6	6.1	10.6	Hand-liners from G. Santos

Source: PFDA and Survey by JICA Team

Table 1.6.4 Fish Unloading and Distribution at Each Municipal Fish Port

Fish Port	Fish Unloading (MT)		Source of Fish (2025)		Destination (2025)			Species contributing to increase in fish unloading
	Present 2009	Future 2025	Overland	Fishing Boats	Local	Within Province	Other Province	
Concepcion	2,438	2,457	8%	92%	5%	95%	-	Milkfish, etc.
Dumangas	334	370	-	100%	70%	30%	-	Milkfish, shrimp
San Jose	2,703	2,703	-	100%	33%	27%	40%	-
Dagupan	12,630	15,498	91%	9%	27%	13%	60%	Milkfish
Subic	10,937	11,915	57%	43%	20%	30%	50%	Milkfish, tilapia
Atimonan	3,247	3,253	44%	56%	8%	16%	76%	Milkfish
Calauag	4,600	4,954	87%	13%	16%	69%	15%	Tilapia, milkfish
Sta. Elena	1,969	4,308	-	100%	3%	-	97%	Small pelagics & shrimp
Calabanga	5,660	5,773	4%	96%	10%	8%	82%	Shrimp
Pasacao	1,659	1,659	71%	29%	65%	13%	22%	-
Balatan	2,815	3,001	6%	94%	2%	28%	70%	Shrimp
Oas	610	610	-	100%	1%	96%	3%	-
Sta. Cruz	3,004	3,257	-	100%	31%	15%	54%	Milkfish
Panabo	2,272	3,255	-	100%	31%	-	69%	Milkfish
Mati	600	1,708	-	100%	7%	34%	59%	Tuna

Source: PFDA and Survey by JICA Team

Fish boats for the municipal fish ports described above are basically expected not to increase except Sta. Elena and Mati (with shifting of fishing boats from Mercedes and General Santos respectively) and Sta. Cruz and Panabo (with the increase in numbers of fish cages).

Fish unloading volume from each municipal fish port is expected to increase in the future, mainly by aquaculture products such as milkfish, tilapia and shrimps from fish ponds around the site. In the case of Sta. Elena and Mati, fish unloading from fishing boats have the potential to increase with the shifting of operation base from other fish ports.

1.7 Overall Concept, Scope of Facilities to be Provided and Order of Priorities

Considering the CNFIDP as a top level National Plan, and based on the result of the Surveys conducted including the result of the stakeholders' workshops for facilities' need and result of the surveys for fish flow distribution pattern, the following course of action will be adopted for the implementation of the proposed improvement and/or development of the entire project.

① The facilities of the fishing ports that will contribute to value adding of fish products through processing by improving facilities and port services for quality assurance to enhance the revenues of PFDA
② The facilities needed for urgent rehabilitation
③ The facilities needed for improvement of sanitation
④ The facilities to be provided to generate job opportunities and enhance fish port demand
⑤ The facilities to activate the objectives and use of the fish ports
⑥ Rehabilitation of facilities for long use
⑦ No facilities will be provided for increase in production of tuna
⑧ Facilities to improve the environment
⑨ Verifying the management system for sustainable use of the facilities
⑩ Potential for supporting coastal fishery resource management

Evaluation for the respective candidate fish port including the requirements for the needed facilities were made based on rating system for both Regional and Municipal Fish Ports as shown hereafter.

Table 1.7.1 Criteria for Regional and Municipal Fish Ports

For Regional Fish Ports		For Municipal Fish Ports	
1	Demand for anti deterioration measures	1	Contribution to Regional Port earnings
2	Relevance to The Municipal Ports	1.a	Fish supply to the Regional Port
3	Inducing/Attracting of private processing operators	1.b	Ice supply from the Regional Port
4	Land space for expansion	2	Demand for commercial fish boat
5	Charges/Fees to port users	3	Demand for improvement and expansion
6	Potential rise in fish handling	4	Operation/control of maintenance structure
7	Need for urgent rehabilitations	5	Potential for aquaculture industry
8	Improvement to port safety	6	Prospects of fishing in far flung EEZ water
9	Environmental & social consideration	7	Condition of the access road (Accessibility)
10	Coastal fishery resource management potentials	8	Environmental & social consideration
		9	Coastal fishery resource management potential

Based on the Survey results, and continuing dialogue with PFDA and DA, the scope of the facilities to be provided for each fish port were determined and summarized as shown in Section 1.8.1. As mentioned above, the prioritization for each fish port and facilities to be provided were determined by the rating system. The result of the prioritization among fish ports are summarized hereunder.

Table 1.7.2 Summary of Prioritization for Development of Candidate Fish Ports

Regional Fish Ports	Priority
Iloilo	2
Sual	6
Lucena	3
Camaligan	5
Davao	4
Bislig	1

Municipal Fish Ports	Priority
San Jose de Buenavista	10
Concepcion	1
Dumangas	15
Dagupan	14
Subic	5
Atimonan	3
Calauag	9
Sta. Elena	7
Calabanga	4
Pasacao	11
Balatan	6
Oas	12
Sta. Cruz	2
Panabo	8
Mati	13

: selected candidate port for F/S

1.8 Current Conditions and Preliminary Design of Fish Ports Facilities

1.8.1 General

Based on the survey and investigations status of existing fish ports facilities and Section 12 Demand and Scale of Fish Port Facilities, preliminary design for the rehabilitation and improvement of existing facilities and construction of new fish processing facilities for the sustainable operations, were made. The preliminary design was conducted taking into account the most economical, suitable and request of stakeholders without, to the extent practicable obstruction to the ongoing fish port operations and activities, construction period and adverse impact to the environment during construction and operation. The following are the major items considered:

a) For major facilities, comparative studies were made for the selection of the best option

b) The design was pursued considering the suggestion of stakeholders
c) All natural condition such as topo/ hydro survey, soil investigation, tide observation, wave condition, littoral drift, etc were considered in the design
d) Selection of the best location of the fish ports including land acquisition
e) The design took into account the most appropriate location of the port, particularly for Bislig FPC
f) Use of locally available material to the extent possible
g) Use of salvaged materials for the rehabilitation, improvement and new construction of port facilities
h) Economy in construction, operation and maintenance costs
i) Compliance with DENR and JICA requirements with respect to environmental concerns
j) Evaluation of post construction of the facilities

The preliminary design was pursued based on the foregoing concept for t both the regional and municipal fish ports. The table below shows the schedule of rehabilitation and improvement works of existing facilities and construction of new facilities for the regional and municipal fish ports including the scale of each facility. The general plan, typical section of the facilities and details of each fish port are attached in the Appendix 2 and 3.

Table 1.8.1 Current Conditions and Project Components of the Regional Fish Ports

	Civil and Marine Works						Architecture Work						Refrigeration and Utilities			
	Break water	Dredge/ Reclamation	Pier/ Land'g Facilities	Slipway	Road, Yard, Parking	Revetment	Market hall	Ref. Bldg.	Admin. BLdg	Fabrication Shop	Others	Fish Processing Facility (HACCP)	Ref. Equip.	Ice Making	Ref. Rehab.	Utilities
ILOILO	Rock mound type L=600m	Dredge V= 150,000m3	Slope landing to stair landing 5 m only	Repair one slipway	Rehab around new market area	All east revetment rehab L=200m	Demolish and reconstruction 3,900 m2	Roof rehab 3,500m2, center area 2,500m2 re-construction		Demolish and re-construction 800m2	Solar power generation panel area 8,000m2	4 units, 500m2/ Unit, Labo	Contact Freezer: 1t/4 hr, Air Blast: 3-0.5t/6hr	2 units, 25t/U	Ice storage, Cold storage -20°, 17.5 rooms	Water V=277m3, Ele, waste water (repair) V=180m3, solid, sewage V=30m3
SUAL			Pier repair (concrete slab) and pier expansion (30m), partial widening	Extension of slipway (300GT)	Overlay of pavement for all road			Roof rehab 2,400m2		Demolish and re-construction 800m2	Food storage 300m2 for milk fish, Carpentry Foundry Demolish	2units, 500m2/ Unit	Brine freezer: 2t/8 hr, Air blast: 0.5t/6hr	Expansion 12t	Ice storage, Cold storage -20°, 6 rooms	1 Deep well, water V=96 m3, ele, waste water V=65m3, solid, sewage V=10m3
LUCENA	Rehab. 120m (Additional armor stones)		Pier expansion (25m)		Rehab around new market area		Reconstruction 3,800 m2	Roof rehab 2,300m2	A=780m2 (2nd floor of market hall)		Retail Market 447 m2		Air blast: 0.5t/6 hr		Ice storage, Cold storage -5°, 5 rooms	1 Deep well, Add reservoir, water V= 116m3, ele, waste water V=65m3, solid, sewage V=20m3
CAMA LIGAN		New Land Fill V=18,000m3				Extension L=95m		Roof rehab 1,500m2				4 units, 500m2/Unit, Labo	Air blast: 0.5t/6 hr	Expansion 15t	Ice storage, Cold storage -20°, 3 rooms	Water V=119 m3, Waste water V=65m3, solid, sewage V=15m3
DAVAO			Quay wall (60m)		Modification for fish Processing area only	Remove 60m	Additional market hall 342 m2					2units, 500m2/Unit, Labo			Ice storage	1 Deep well, water V=94m3, waste water V=40m3, solid, sewage V=10m3
BISLIG	Tetra block type L=334m	Dredging V= 54,000m3	New pier 124m x 15m and Stair landing 60m	New one slipway (250GT)	New road and access road pavement	New Revetment 182m	New market hall 462 m2	New ice making plant Bldg 1,100m2	New A=396m2	New 800 m2				2 units, 50t/U	Ice storage	Access road, water V= 98 m3, ele, waste water V=10m3, solid, sewage V= 6 m3

: Rehabilitation of the existing facilities
: New facilities to be constructed
: Rehabilitation and New facilities

Table 1.8.2 Current Conditions and Project Components of the Municipal Fish Ports

	Causeway	Dredge Reclamation	Revetment	Landing Facilities	Ice storage	Market hall	Utilities	Water Supply Power Supply	Other
CONCEPCION	Extension 120m Rock mound type			Stair Landing L=90m		A= 2,266 m2	Waste Warer V=5m3, sewage V=4m3	Shallow Well V= 7m3	
DUMANGAS					A=1.8x1.8m	New A=72 m2	Waste Warer V= 1 m3, sewage V= 3m3	New Connection water V=2m3	
SAN JOSE	Extension 120m Rock mound type	Reclamation A=1,350m2	Revetment L= 60m	Stair Landing L=60m	A= 2 – 3.6x1.8m	Additional A= 392 m2	Waste Warer V= 8 m3, sewage V=2m3	Extension from existing water V= 8 m3	
DAGUPAN		Reclamation A=8,700 m2	Revetment for reclamation L=250m	Stair Landing L=90 m		New A= 2,266 m2	Waste Warer V= 37 m3, sewage V= 19 m3	New Connection water V= 41m3	
SUBIC						Reconstruction A= 1,032 m2, New Retail Market A= 240 m2	Waste Warer V= 17 m3, sewage V=5m3	New Connection water 18m3	Pavement
ATIMONAN			Revetment L= 20m			Reconstruction A= 882m2	Waste Warer V= 8 m3, sewage V= 3 m3	New Connection water 12m3	Pavement
CALAUAG		Reclamation A= 3,600 m2	Revetment L= 130m			New A= 742m2	Waste Warer V= 13 m3, sewage V= 2 m3	New Connection water 13m3	Extension of Drainage, pavement
STA. ELENA	Extension L= 45 m	Dredging V = 6,000 m3	Rehab L= 105 m	Stair Landing L= 45 m	A= 2 – 3.6x2.7m	New A= 342m2	Waste Warer V= 6 m3, sewage V= 1m3	New Connection water 7m3	Access Road and yard pavement
CALABANGA		Reclamation A=2,100m2	Revetment L= 88 m	Stair Landing L=60m	A= 2 – 3.6x3.6m	New A= 567m2	Waste Warer V= 12 m3, sewage V= 4 m3	New Connection water 12 m3	Pavement
PASACAO						New A=207m2	Waste Warer V=5m3, sewage V=1m3	New Connection water 4 m3	
BALATAN	Breakwater L= 193 m mound type	Filling A= 3,700 m2, Dredging V= 30,000 m3	Revetment L= 112 m	Vertical Quay L= 105 m	A=3.6x2.7m	New A= 342m2	Waste Warer V= 6 m3, sewage V= 2 m3	New Connection water V= 7 m3	Access Road and yard pavement
OAS					A=2.7x1.8m	New A= 72 m2	Waste Warer V= 2 m3, sewage V= 1m3	New Connection water V= 2 m3	
PANABO					A=3.6x2.7m	New A= 342m2	Waste Warer V= 6 m3, sewage V= 1m3	New Connection water V= 6 m3	
STA. CRUZ	Rehabilitation of Causeway L= 254 m	Reclamation A= 1,200 m2 ,Dredging V= 3,000 m3	Revetment for reclamation L= 100 m	Stair Landing L=20m	A=3.6x2.7m	New A= 322m2	Waste Warer V= 6 m3, sewage V= 2 m3	New Connection water V= 6 m3	Access Road pavement
MATI			Revetment L= 80 m	Stair Landing L=30m	A=3.6x2.7m	New A= 252m2	Waste Warer V= 4 m3, sewage V= 2 m3	New Connection water V= 5 m3	Access Road pavement

: Rehabilitation of the existing facilities
: New facilities to be constructed
: Rehabilitation and New facilities

1.8.2 HACCP Compliant Facilities

HACCP compliant facilities with inspection laboratory for quality improvement of fishery products are proposed. The project will be targeting for small and medium size fish processing companies that lack the needed funding to install HACCP compliant facilities. The establishment of one type of standard model for HACCP compliant facility with wide ranging compatibilities for a variety of different users was conceived. Inspection laboratory with the chemical and microbiological laboratories were planned to be builds as part of the fish port to improve the quality of export for processed product to oversea. The HACCP compliant facilities proposed for this project were therefore envisioned as one standard type for the regions. This HACCP processing facilities are planned in to four regional ports (IFPC, SFPC, CFPC and DFPC), consist with flake ice machine, blast freezer, cold storage and packing machines. Inspection laboratory are proposed in three regional fish ports (IFPC, CFPC and DFPC) to focus on the inspection of *physicochemical* and *microbiological* analysis in accordance with HACCP Guidelines for fisheries processing products.

1.9 Environment and Social Consideration

As required by the Philippine Department of Environment and Natural Resources (DENR), Environment Management Bureau (EMB) an Environment Compliance Certificate (ECC) has to be obtained prior to any rehabilitation, upgrading of supporting marine infrastructures. (DAO 2003-30) The preliminary assessment of the Philippines Government Regional DENR-EMB Officials following the Revised Procedural Guidelines of DAO 2003-30 follows the " Strategic Environment Assessment (SEA) " on the level of policy, planning and program, concurring with the JICA Guidelines for Environment and Social Considerations (April 2010**).** Considering both the Philippine DENR-EMB and JICA Guidelines, the study was done by Region. Protocols were established by the DA-PFDA/ JICA Study Team with the officials of DENR-EMB in the identified Regions, Provinces, Municipalities and Barangays.

The Environment Impact Assessment (EIA) process for the identified fish ports involved the predicting and evaluating the likely impacts of the project (including cumulative impacts) on the environment during construction, commissioning, operation and abandonment. It also includes designing appropriate preventive, mitigating and enhancement measures addressing these consequences to protect the environment and the community's welfare. (DENR-EMB DAO 2003-30) As required, this was done by Regional DENR-EMB Offices were the identified ports were located.
The Environment and Social Consideration Team with the Project Team port planner presented and discussed with the DENR-EMB Regional Officials the proposed project components and layout. Based on the presentation and discussion with reference to the DAO-2003-30, the DENR-EMB Officials recommended what type of Environment Impact Assessment was to be done in concurrence with the revised JICA Environment and Social Consideration requirements. Thus herewith are the highlights of the study.

Environment Performance Report and Management Plan (EPRMP)

The documentation of the actual cumulative environmental impacts and effectiveness of current measures for single projects that already operating but without an ECC. All of the stakeholders of the project sites have been informed and consulted about the scope of project activities.

Table 1.9.1 List of Fish Ports Corresponding to EPRMP

Regional Fish Port	Social impacts	Physical Impacts	Recommendations
1. Sual	Improved livelihood &living	Pollution of seawater;	WWTP for processing wastewater
2. Iloilo	Improved livelihood &living	Pollution of seawater; silt mobilization/ transport	WWTP for processing wastewater Use of silt curtain during dredging
3. Davao	Improved livelihood &living	Pollution of seawater; Increase water turbidity;	WWTP for processing wastewater Use of silt curtain
4. Lucena	Improved livelihood &living	Water Pollution due wastes	WWTP for processing wastewater
5. Camaligan	Improved livelihood &living	Solid waste generation	WWTP for processing wastewater; SWM
Municipal Fish Port			
6. Concepcion	Improved livelihood &living	Pollution of seawater	WWTP for processing wastewater
7. Atimonan	Improved livelihood &living	Pollution of seawater	WWTP for processing wastewater

Notes: WWTP: Waste Water Treatment Plant, SWM: Solid Waste Management

Initial Environment Examination Report (IEER)

The study of the significant impacts of a project on the environment. It includes an Environmental Management Plan. All of the sites have been consulted but do not have permits and approvals as they are new sites.

Table 1.9.2 List of Fish Ports Corresponding to IEER

Regional Fish Port	Social Environment	Physical Environment	Recommendation
8. Bislig	Improved livelihood &living	Seawater pollution due to silt	Use of silt curtain during dredging;
Municipal Fish Port			
9. Subic	Improved livelihood &living	Pollution of seawater;	WWTP for processing wastewater
10. Sta. Cruz	Improved livelihood &living	Siltation due to reclamation	Use of silt curtain during dredging
11. Calabanga	Improved livelihood &living	Siltation due to reclamation	Use of silt curtain during dredging
12. Panabo	Improved livelihood &living	Pollution of seawater	WWTP for processing wastewater
13. Balatan	Improved livelihood &living	Pollution of seawater	WWTP for processing wastewater

Initial Environment Examination Checklist (IEEC)

Simplified checklist version of an IEE report to be filled up by a proponent to identify and assess a projects impact and mitigation to address such impacts sites. All of the sites have been consulted but do not have permits and approvals as they are new.

Table 1.9.3 List of Fish Ports Corresponding to IEEC

Municipal Fish Ports	Social Environment	Physical Environment	Recommendation
14. Mati	Improved livelihood &living	Pollution of seawater;	WWTP for processing wastewater
15. Dagupan	Improved livelihood &living	Siltation from reclamation;	Use of silt curtain during dredging;
16. San Jose de Buenavisa	Improved livelihood &living	Siltation from reclamation	Use of silt curtain during dredging
17. Dumangas	Improved livelihood &living	garbage and sewage increase	solid waste segregation and WWTP operation;
18. Calauag	Improved livelihood &living	Siltation due to reclamation	Use of silt curtain during dredging;
19. Sta. Elena	Improved livelihood &living	Sediments transport;	an erosion and sediment control plan
20. Pasacao	Improved livelihood &living	Pollution of surface water;	Management and monitoring of dredge operation
21. Oas	Improved livelihood &living	Soils and sediments transport	erosion and sediment control plan;

In conclusion, the PFDA EIA study generally revealed that the Fish Port Project has very minimal negative impacts on the Natural Environment, instead a positive Socio-economic impact will occur, enhancing the fishing industry. This will consequently improve the living conditions of the fisher folks. However, due diligence should be practiced by the Philippine Fish Port Authority in coordination with the Local Governments for the sustainability of these infrastructures in accordance with the laws and regulations of the Government interagency that have stakes in its operation.

1.10 Implementation Schedule

Considering the scattered sites, design preparation, size, construction cost for each fish port, mobilization and preparatory/temporary work cost of contractors and associated conditions, the rehabilitation and improvement of the 6 existing regional fish and selected 5 existing municipal fish ports was split into 3 packages. The procurement of equipment, machineries and devices for all the regional ports will be pursued in one package. Table 1.10.1 below shows the packaging arrangement of the construction of the Project.

Table 1.10.1 Contract Packaging

Packages	Contract Period		Regional Port	Municipal Port
	Period	Award Complete		
Package 1 (ILOILO)	36 Months	1st Quarter, 2014 4th, Quarter, 2016	ILOILO	CONCEPCION
Package 2 (SUAL, LUCENA and CAMALIGAN)	33 Months	1st Quarter, 2014 4th, Quarter, 2016	SUAL , LUCENA and CAMALIGAN	ATIMONAN, SUBIC CALABANGA
Package 3 (DAVAO & BISLIG)	30 Months	2nd Quarter, 2014 4th, Quarter, 2016	DAVAO BISLIG	STA. CRUZ
Package 4 (Equipment Supply) *1	36 Months	1st Quarter, 2014 4th, Quarter, 2016	ALL 6 REGIONAL PORTS	

Note *1: Procurement of equipment and devices will be split into 3 categories:. 1) Ice making Plant and Cold Storage, Refrigeration Facilities, 2) Solar Power Generation System, 3) Laboratory Equipment/Devices among others.

Procurement of equipment will cover the whole construction period to ensure that the equipments, machineries, and devices comply with the specifications.

1.11 Project Cost

Table 1.11.1 shows the estimated direct cost for each package.

Table 1.11.1 Summary of Base Cost

Unit: 1,000 PHP

Package	Regional Fish Port	Municipal Fish Port	(1) Cost of Construction for Each Site	(2) Total of Base Cost for Each Package	(3) Cost of Equipment for Each Site	(4) Total of Bare Cost for Each Site
1	ILOILO		557,874	600,387	803,916	1,361,791
		CONCEPCION	42,512		0	42,512
2	SUAL		274,999	805,926	186,219	461,218
		SUBIC	36,724		0	36,724
	LUCENA		268,099		47,438	315,537
		ATIMONAN	25,852		0	25,852
	CAMALIGAN		147,688		219,252	366,940
		CALABANGA	52,565		0	52,565
3	DAVAO		75,815	770,520	88,741	164,556
	BISLIG		639,283		316,915	956,198
		STA. CRUZ	55,423		0	55,423
TOTAL			2,176,832	2,176,832	1,662,482	3,839,314

Note1: Base Cost = Bare Cost + VAT 12%

Price escalation, physical contingency and associated costs are added to the direct cost shown in Table 1.11.1 above. The total project cost is estimated at PHP 5.374 billion broken down to PHP 4.568 billion or 85% of the total project cost to be funded under ODA Loan breakdown of which is shown in Table 1.11.2 hereunder.

Table 1.11.2 Summary of Project Cost (Regional and Municipal Fish Ports)

UNIT: 1,000 PHP

Package	(A) Total of Base Cost (including VAT)	(B) Price Escalation (Local) 7.1% per year	(C) Price Escalation (Foreign) 1.8% per year	(D) Cost Considered Price Escalation (D) = (A)+(B)+(C)	(E) Contingency 8% (E) = (D) x Conti.(%)	(F) Total Cost (F) = (D) + (E)
1, Initial Cost						
1 Package 1 (ILOILO)	600,387	36,434	46,970	683,790	54,703	738,493
2 Package 2 (SUAL, LUCENA and CAMALIGAN)	805,926	47,512	61,517	914,955	73,196	988,151
3 Package 3 (DAVAO and BISLIG)	770,520	47,799	61,501	879,820	70,386	950,206
4 Package 4 (EQUIPMENT SUPPLY)	1,662,482	68,383	139,770	1,870,635	149,651	2,020,286
Sub-Total 1	3,839,314	200,128	309,758	4,349,200	347,936	4,697,136
2, Consulting Cost						
1 Detail Design	198,310	0	0	198,310	0	198,310
2 Construction Management	396,570	0	0	396,570	0	396,570
Sub-Total 2	594,880	0	0	594,880	0	594,880
3, Sub-Total 3 (=Sub-Total 1 + 2)	4,434,194	200,128	309,758	4,944,080	347,936	5,292,016
4, Others						
1 PFDA Administration Cost (PMO)	24,499	0	0	0	0	24,499
2 Fish Port Management (T/ A)	37,050	0	0	0	0	37,050
3 Land Accruement Expense (BISLIG)	20,000	0	0	0	0	20,000
Sub-Total 4	81,549	0	0	0	0	81,549
5, Total						
Total Cost (=Sub-Total 3 +4)	4,515,743	200,128	309,758	4,944,080	347,936	**5,373,565**

*Note 1: Total Local Cost will be 838 (million PHP) includes Loan Commitment Charge.

*Note 2: Loan Commitment Charge
= Total Cost x 0.85 x 0.1% x 7 years = 31,972 (1,000 PHP)

*Note 3: 1US$=JPY90.520=PHP46. 312

*Note 4: Abbreviation
PMO: Project Management Office
T/ A: Technical Assistance

Currency Portion	(1,000 PHP)	JPY Equivalent (1,000 JPY)
Japanese Yen Loan (85% of Total Cost)	**4,567,530**	**8,927,553**
Local Portion (15% of Total Cost)	**806,035**	-
Total	**5,373,565**	-

The project cost in the case of regional fish ports only is shown in the Appendix 21, Volume 2.

1.12 Operation & Management

In implementing the proposed Project formulated in this study, it is understood that an adequate form of organisation structure shall be created in the PFDA, both in the implementing and operation/maintenance phases. In order to achieve the maximum benefit of the project implementation, any necessary institutional arrangement among DA/PFDA and other concerned agencies, including LGUs, private stakeholders, etc. will be sought for. Based on the understanding and recognition of the present status of the internal/external environments of PFDA, the Study Team have developed and tailored a blue print of the implementation structures over the both implementing and operation/maintenance phases of the Project. It is to be noted that the suggested structures and plans cover a variety of aspects in the Project implementation and are understood not readily implementable in full details. Hence, the suggested plans will be further elaborated in the course of the consultancy services and any other technical assistance programmers by JICA as appropriate.

Based on the past project implementations by Japanese ODA loan proceeds in the Philippines, an anticipated disbursement procedure for this Project has been presented, which is in accordance with the so-called "Transfer Procedure" adopted by JICA. Further, throughout discussions with DA/PFDA, the overall loan mechanism, specifically of its repayment structure, has been confirmed, where the repayment will be budgeted from the National Accounts of GOP.

In the implementation phase of the Project, a dedicated office organisation shall be created in PFDA for the project management, called the Project Management Office (PMO) in usual practice in the Philippines. The Study Team has drawn-up the organisation structure of the PMO and taken-off the budget requirement to be secured by DA/PFDA as a part of the administration cost for the Project, which is not eligible for the loan proceeds. On the other hand, required consulting services for the Project implementation will avail of eligibility for 100% coverage of the financing from the loan proceeds. The respective Terms of Reference and resultant cost estimate of the consultancy have been also developed by the Study Team.

In the operation and maintenance (O&M) phase of the Project, preferable options for efficient fish port activities have been proposed. Among the issues identified in chapter 7 of this report, rationalization of the PFDA organisation is examined in consideration of possible Public-Private Partnership (PPP) scenarios. In this assessment, components/facilities to be provided by the Project implementation have been analyzed for their adequacy to the involvement of the private sector(s) in terms of i) technical skill requirements for the O&M, ii) whether use of the facilities is either common or specific in its nature, iii) level of income/revenue generation, etc.

In order to improve the financial status of each fish port, possible increase in tariffs, charges and other income sources has been discussed in particular emphasis on tax imposition, levy by PFDA on the municipalities, etc. Other measures considered are, i) solar power generation to reduce expenses in Iloilo FPC, ii) promotion to invite more fish port users, iii) information and data standardization, iv) value added HACCP compliant processing.

To realize the foregoing strategies, the Study Team has developed possible Technical Assistance (TA) programmes to be provided by JICA either on grant or loan basis.

1.13 Technical Assistance

Technical assistance (T/A) aims for an improvement of the operation and management capacity in the regional fish port operated by PFDA. The super goal of the Project is "sound operation and management of fish ports" which would be able to be achieved through not only by rehabilitation and improvement of facilities but also by improvement and upgrading of quality of port services. In particular, the services related to such income generating facilities as fish postharvest and marketing would have to be focused on so as to increase the revenue of fish ports.

In the T/A following four components are proposed by the JICA Survey Team to achieve sustainable utilization and management of fish port in Philippines with newly introduced facilities by the Project. However, final decision on T/A will be made in discussion between JICA and PFDA later.

Table 1.13.1 Required Technical Assistance under the Project

Proposed Component			Activities	Proposed Scheme	Period
A.	Fish Port Management		A-1. Port operation and maintenance system A-2. Assistance in promotion of fish port utilization	Soft-Component of Loan	2016–18 (24 P/M)
B.	Development of Fish Processing Technology (Proof Test)		B-1. Market analysis B-2. Development of new processed products B-3. Extension & demonstration of processing technology	JICA Individual Expert	2011–13 (20 P/M)
C.	Quality Improve-ment of Fishery Products	Fresh Fish	C-1. Improvement of fish handling & trading activities C-2. Market price information system C-3. Quality inspection & assurance system C-4. Public promotion & demonstration	JICA TCP Experts (Fish marketing, HACCP / QC, and Public awareness)	2015–17 (20 P/M x 3 experts)
		Processed Fish	D-1. Review and identification of fish processed procedure D-2. Assistance in HACCP system monitoring D-3. Implementation of HACCP plan for fish processing facilities		
D.	Capacity Building of PFDA Staffs		E-1. General fish port management E-2. Fresh fish quality inspection E-3. Market price information network E-4. Leasing business knowhow	JICA Training Program	2014–17 (16 P/M)

1.14 Summary of Project Evaluation

(1) Indicators for Project Outputs

Based on the result of the feasibility study, the Project is conceived to achieve the following outputs at the time of operational stage (See the Part 2, Chapter 19.2.1).

Table 1.14.1 Indicators for Project Outputs

Outputs	Target fish ports	Target project facilities
1) Dissolution of waiting time for mooring of fishing boats	SFPC, LFPC, DFPC, BFPC, Concepcion, Calabanga, and Sta. Cruz	Multi-purpose jetty/pier, landing wharf and stair landing wharf
2) Increase of fish unloading volume	SFPC and BFPC	Multi-purpose pier, Stair landing wharf
3) Increase of boat entries to fish ports	IFPC, SFPC, LFPC and BFPC	Multi-purpose pier, Stair landing wharf
4) Increase of volume of ice produced and distributed to municipal fish ports	IFPC, SFPC, CFPC and BFPC	Block ice plant and insulated van trucks
5) Increase of export value of fish processed products	IFPC, SFPC, CFPC and DFPC	HACCP fish processing facility
6) Increase of leasing rate of fish port facilities	All fish ports	Market hall, refrigeration facilities, HACCP fish processing facility, slipway
7) Increase in fish price	All fish ports except SFPC and CFPC	Market hall

(2) Non-quantifiable Benefits Attributed to the Project

The Project is envisioned to implement various interrelated, complementing, and supporting interventions which, in turn, are expected to contribute to the attainment of the Project's outcome, i.e., *improved operational efficiency of fish ports with subsequent improvement of their earning capacity*. The analysis estimated some of the quantifiable direct benefits (e.g., increased fish landings, improved fish quality, increased revenues, etc.) that may be attributed to the Project which, in turn, served as basis for its justification. There are, however, non-quantifiable benefits that support and strengthen the Project's justification. These included the following: (i) creation of a large number of job opportunities which is estimated at about 40,000 person-years during the period of Project implementation/construction as well as a total of about 6,700 person-years during each year of operation over the 30-year period; (ii) contribution to reduction of poverty incidence in each area of fish port operation; (iii) enhanced capacity of some regional fish ports (i.e., Bislig FPC, Iloilo FPC, and Lucena FPC) to serve as a place of refuge for fishing vessels during inclement weather; (iv) increased operational efficiency of fish ports resulting from improvements in fish port facilities and technical assistance for improving fish port management; (v) strengthened capacity of individual fish port in marketing its port facilities and services; (vi) strengthened and improved cooperation in the planning of municipal fish port operations through close planning interaction between the municipal fish ports and their respective LGU, thus ensuring the long-term viability and sustainability of the fish port facilities; (vii) improved awareness of people on the need to enforce fisheries laws and regulations to preserve fisheries resources; and (viii) improved marketability and acceptance of fish processed products in the international market, through the establishment of HACCP facilities, and consequently generate considerable foreign-exchange earnings.

(3) Financial and Economic Evaluation

1) Financial Evaluation

The Project is intended to rehabilitate and improve selected regional and municipal fish ports in order to: (i) improve their earning capacity; (ii) improve sanitary conditions with subsequent

improvement of the quality of products transacted within the ports' facilities as well as improve their operational efficiency; (iii) augment the port facilities so that these are able to correspondingly accommodate increasing demand for fish port services; (iv) improve fish port environment; and (v) contribute to job opportunities in the area where each fish port operates.
To ensure the sustained financial viability of the fish ports, some necessary changes have to be made with respect to current charges and fees which are outdated or unreasonably low to accumulate revenues and sufficiently cover operation and maintenance cost. One, in particular, is the need to increase market and buyer/seller fees based on 1% of the value of the volume of fish landed at the fish ports. New charge rates are also proposed for the use and lease of various fish port facilities that are to be installed under the Project such as: (i) contact freezers; (ii) blast freezers; (iii) brine tank freezer; (iv) cold storage facilities for fish; (v) cold storage facilities for meat and chicken; (vi) chill storage; (vii) smoking chamber; (viii) vacuum packing machine; and (ix) HACCP fish processing facilities.

The financial analysis was mainly based on incremental revenues and expenses that are expected to result from the improvement/rehabilitation and construction of various port facilities which, in turn, will enhance their operational performance and therefore their revenue-generating capacity. Thus, the financial analysis evaluated the future performance of each port by comparing "with project" and "without project" scenarios to arrive at the incremental revenues and expenses. For this purpose, a financial statement of incremental revenues and expenses was developed for each port analyzed from which incremental income (net of operations expenses, interest expense, and depreciation) was derived to assess the income-earning capacity of each port attributed to port improvement/rehabilitation. This financial statement of incremental revenues and expenses was projected over a period of 30 years which, in turn, served as the basis for creating the projected cash flow statements for each port analyzed.

The projected cash flow statements then served as basis for calculating the port-specific financial internal rate of return (FIRR). The financial viability of each fish port was then compared with a weighted average cost of capital (WACC) of 2.2%. As a measure of a particular fish port's financial viability, its calculated FIRR value must be at least or greater than 2.2%. The results of the financial analysis indicate that all of the regional and municipal fish ports are financially viable as their respective FIRR exhibited a value greater than 2.2%, the weighted average cost of capital (WACC) (see table below).

Table 1.14.2 Summary of FIRR Calculations for Fish Ports

Fish Port	FIRR	Benefit: Cost Ratio
A. Regional Fish Ports		
1. Bislig	3.8%	2.67
2. Camaligan	3.9%	2.34
3. Davao	3.3%	2.65
4. Iloilo	4.0%	2.28
5. Lucena	4.3%	2.86
6. Sual	4.1%	2.68
B. Municipal Fish Ports		
1. Calabanga	4.2%	2.72
2. Sta. Cruz	3.7%	2.52
3. Concepción	4.0%	2.64
4. Atizonan	5.4%	2.59
5. Subic	5.2%	2.72
Balatan (Refference)	Negative	

The financial viability of the whole Project was likewise assessed. The calculated FIRR for the whole Project was estimated at about 4.1% and a benefit-cost ratio of 2.21.

The FIRR values were observed to be sensitive to changes in costs and revenues. In most of the sensitivity scenarios, the recalculated FIRR values remained greater than the WACC. This is especially true for scenarios where costs or revenues were independently changed to determine the recalculated FIRR. However, under scenarios where both costs/revenues were increased/decreased simultaneously, most of the regional fish ports (i.e., Bislig, Camaligan, Davao, and Sual) and some of the municipal fish ports (i.e., Calabanga, Sta. Cruz, and Concepcion) exhibited recalculated FIRRs values lower than 2.2%, but were positive and greater than 1%.

In a scenario that the LGUs are unable to raise the counterpart fund requirements, the financial viability of the Project, based only on the financial performance of the regional fish ports, was likewise carried out. Under this scenario, the calculated FIRR for the whole Project was estimated at about 4.1% and a benefit-cost ratio of 2.16. This implies that there is no significant impact on the overall Project financial viability if the municipal fish ports are excluded from the Project. The sensitivity analysis also showed that there was no significant impact on the FIRR when changes in costs and revenues are made. In most of the sensitivity scenarios, the recalculated FIRR values remained greater than the WACC.

2) Economic Evaluation

Incremental economic benefits and costs were likewise derived by comparing the benefits and costs under "with project" situation with those estimated under "without project" situation. For this purpose, all benefits and costs which were in financial values were converted to economic values by applying the world price numeraire. In this approach, economic price of tradable goods were set equal to their financial price. Financial non-traded goods/resources were converted to economic terms by a standard conversion factor (SCF) of 0.90 while labor costs were adjusted by a shadow wage rate (SWR) of 0.60.

For each specific fish port, economic benefits were identified to have significant impact on the economy, whether on a regional scale or on the national level. These benefits were then quantified, converted to their economic values, and then included in the calculation of the EIRR for each fish port. The quantified economic benefits were mainly envisaged to be derived from: (i) improved fish quality; (ii) value-adding facilities such as HACCP and local fish processing facilities; (iii) improved human health and productivity resulting from the establishment of wastewater treatment facilities; (iv) savings in fuel cost due to the transfer of fishing vessels from the General Santos Fish Port Complex to Bislig Fish Port Complex; (v) savings in the cost of repair due to the construction/repair of breakwater facilities at the Iloilo and Lucena Fish Port Complexes; and (vi) increased efficiency in fish unloading.

The economic viability of each fish port was assessed by estimating its economic internal rate of return (EIRR) and benefit-cost ratio over an expected life of 30 years. Moreover, the results of the economic analysis in Table 1.14.3 was carried out based on the assumption that the Technical Assistance is conducted simultaneously with the implementation of the project which, in turn, is expected to result in a 10% improvement in fish quality, particularly in Davao, Iloilo, and Lucena fish ports. The results of the economic analysis indicate that all of the regional and municipal fish ports are economically viable as their respective EIRR exhibited a value greater than 15%, the economic opportunity cost of capital (EOCC) assumed in the analysis. The results of the economic evaluation of each regional and municipal fish port are presented below:

Table 1.14.3 Summary of EIRR Calculations for Fish Ports

Fish Port	EIRR	Benefit: Cost Ratio
A. Regional Fish Ports		
1. Bislig	23.3%	1.53
2. Camaligan	31.1%	2.23
3. Davao	77.0%	2.75
4. Iloilo	26.7%	1.91
5. Lucena	44.0%	3.66
6. Sual	18.2%	1.18
B. Municipal Fish Ports		
1. Calabanga	18.0%	1.41
2. Sta. Cruz	36.9%	2.64
3. Concepción	23.4%	2.05
4. Atimonan	23.8%	1.69
5. Subic	26.3%	3.03
Balatan (Refference)	24.8%	1.73

The calculated EIRR for the whole Project was estimated at about 27.8% and a benefit-cost ratio of 1.94.

Although the EIRR values (for each regional and municipal fish port as well as for the whole Project) were observed to be sensitive to changes in economic costs and benefits, the recalculated EIRR values resulting from these changes were observed to be significantly higher than the acceptable value of 15% at scenarios of 10% increase in costs and 10% decrease in benefits and various combinations of increases/decreases in cost/benefits. A stricter sensitivity analysis of the EIRR values of each of the regional and municipal fish ports, and for the whole Project, was carried out by applying a 20% increase/decrease in costs/benefits and various /combinations of these and assuming a 10% improvement in fish quality due to the implementation of the Technical Assistance. The results show that the recalculated EIRR values under each risk scenario for individual regional and municipal fish ports, and for the whole Project, are quite robust and stable as they, in general, exhibited values greater or equal to 15%, the economic cost of capital applied as cut-off rate.

Two other scenarios were likewise carried out for testing the robustness of the calculated EIRR values of the regional fish ports: (i) sensitivity analysis applying a 10% change in benefits and costs and various combinations of these and assuming a 5% improvement in fish quality; and (ii) sensitivity analysis applying a 20% change in benefits and costs and assuming only a 5% improvement in fish quality. The results on both of these sensitivity analysis indicate that the regional fish ports generally remain economically viable, i.e., greater or equal to 15%, in all change scenarios which imply the stability and robustness of the calculated EIRR for each scenario.

In case the LGUs, where the intended investments on municipal fish ports are envisioned to be implemented, are not able to raise the counterpart fund requirements the economic viability of the Project (based only on the economic performance of the regional fish ports) was likewise carried out. Based on this assessment, the calculated EIRR for the whole Project was estimated at about 28.2% and a benefit-cost ratio of 1.95. The results of the sensitivity analysis for this scenario indicated that the regional fish ports will still be economically viable in situations where: (i) benefits are decreased, (ii) costs are increased, and (iii) a combination of these under situations of 10% and 20% change in each of the change variables.

1.15 Share of LGUs for Construction of Municipal Fish Ports

In this report, the required financial source for the project of LGU (Local Government Unit) fish ports is supposed to be the same as that of the regional fish ports, where 85% of the total project cost is by Yen Loan proceeds and the remaining 15% shall be GOP National budget fund.

The sharing of cost between the LGUs and the national government based on DOF (Department of Finance) requirements, however, will depend on the income level of the concerned LGUs as tabulated hereunder.

Table 1.15.1 NG-LGU Cost Sharing Policy

LGU Income Class	Municipalities and Province		
	Loan (by LGU)	Grant (by NG)	Equity (by LGU)
1st & 2nd	0	0	100
3rd & 4th	70	20	10
5th & 6th	40	50	10

Source: DOF Cluster 1-Subprojects including fish ports
NG: National Government

As indicated from the above table, projects implementation of projects under ODA grants will be executed by the National Government.

Considering the above policy, the cost of sharing by the respective LGUs for the construction of the Project would be as shown in the Table below.

Table 1.15.2 Share of the LGUs and Corresponding WACC for Relevant Municipal Fish Ports

	LGU Income Class	Loan (LGU fund)	Grant (by national government budget=JICA Loan)	Equity (LGU)	WACC (%)	FIRR (%) (Base Case)
Loan Interest (%)		7.00	1.40	7.00		
Municipal Fish Port		Cost Share (Ratio)				
Subic	1	1	0	0	7.00	> 5.20
Atimonan	1	1	0	0	7.00	> 5.40
Calabanga	1	1	0	0	7.00	> 4.20
Concepcion	3	0.7	0.2	0.1	5.88	> 4.00
Sta. Cruz	1	1	0	0	7.00	> 3.70
Regional Fish Port (for reference)		0	0.85	0.15	2.24	< 4.10 *)

1. WACC: Weighted Average Cost of Capital, 2. FIRR: Financial Internal Rate of Return
3. LGU income class is subject to further confirmation since it changing by the year.
*): including Municipal Fish Ports

As shown in the above Table, the FIRRs of all the five municipal fish ports are less than the WACC indicators should it be based on the income level of the LGUs. As such the development of the municipal fish ports are not financially viable even by loan proceeds to the respective LGUs through MDFO (Municipal Development Fund Authority), the government unit in charge of budget/fund management of LGUs in the Philippines, or by any other commercial financing institutions. Considering, however, the implementation of other municipal fish ports in the past by AFMA, and those projects developed by DOTC such as the "Feeder Ports Project" through the JBIC/OECF and other multi-national financing agencies, the implementation of the subject municipal fish ports could be pursued by virtue of a special arrangement, as for instance the DA/PFDA will initially be shouldering the ODA Loan for the immediate requirements of the LGUs and thereafter amortization of the loan from the LGUs will follow based on reasonable terms and conditions.

PART 1

Investigation on the Current Conditions and Prioritization of Candidate Fish Ports

2. Current Situation and Future Outlook of Fishery Production in the Philippines

2.1 Current Situation

Total fishery production in the Philippines has been gradually increasing during 2002 – 2007, with rapid growth of aquaculture production which consists of about 47% of total, while commercial fishery production is stagnant due to limitation of fishing grounds after setting up of exclusive municipal water (15 miles off coastline). Commercial fishery was further affected by a jump in fuel price in 2008. Although catch from municipal marine fishery which has been steadily increasing owing to the measures taken for coastal resource management and also because of lower influence of fuel price, current catch level has already reached to the maximum sustainable yield (MSY), as well as commercial fishery.

Table 2.1.1 Fishery Production in the Philippines

(Unit: 1,000 MT)

	2002	2003	2004	2005	2006	2007	Proportion
Municipal fishery (marine)	858	922	939	988	1,074	1,136	24.1%
(inland)	131	133	142	144	161	168	3.6%
Commercial fishery	1,042	1,110	1,128	1,134	1,081	1,192	25.3%
Aquaculture(except seaweed)	443	465	512	557	623	710	15.1%
(seaweed)	895	989	1,205	1,339	1,469	1,505	32.0%
Total	3,369	3,619	3,926	4,162	4,399	4,711	100%
Total (except seaweed)	2,474	2,630	2,721	2,823	2,930	3,206	68%

Source: BAS

2.2 Future Outlook

Considering the present catch level exceeding the maximum sustainable yield within the Philippine water, it is prospected that fish production from capture fishery may not be further increased. Although there are some potential resources in foreign waters such as Papua New Guinea and Indonesia as well as international waters, it would be difficult to expect future increase of catch due to competition among foreign fishing vessels in obtaining fishing rights and a tendency for strengthening of resource conservation measures by the West-Central Pacific Fisheries Committee (WCFPC) and the other international fisheries committees even outside of the West-Central Pacific Ocean (tuna in particular). In this context, future increase of fishery production in the Philippines could be expected only from aquaculture (mariculture in particular) and unused resources within the 200-mile exclusive economic zone (EEZ). The following table shows the projection for fishery production in the country taking into account the estimation made in the Comprehensive National Fisheries Development Plan (CNFIDP).

Table 2.2.1 Projection of Fishery Production

(Unit: 1,000 MT)

		2007	2015	2020	2025
Municipal fishery (marine)		1,036	1,080	1,080	1,080
(inland)		168	150	150	150
Commercial fishery		1,192	1,130	1,130	1,130
Fishery outside EEZ/*1		100	100	100	100
Aquaculture	Shrimp	41.9	57.9	63.7	68.8
	Milkfish	341.2	394.3	417.9	438.8
	Tilapia	241.2	278.7	295.4	310.2
	Carp	20.0	23.1	24.5	25.7
	Marine Fish	0.6	1.2	1.5	1.8
	Molluscs	40.6	77.1	96.4	115.7
	Seaweed	1,505.1	1,659.2	1,791.9	1,935.3
	Others	24.2	26.7	28.0	29.4
Total		4,710.8	4,978.2	5,179.3	5,385.7

Source: CNFIDP (*1: Including the future increase of catch within EEZ, Estimate by JICA Team)

3. Demand and Supply of Fishery Products in the Philippines

3.1 Domestic Market

Per capita fish consumption in the Philippines has been increasing since 2000 with a constant growth of fish supply. However, the food habit of the Philippine people has been gradually shifting from fishery products to livestock products (Proportion of fish intake to total animal protein has been reducing from 52.8% in 1987 to 42.1% in 2003) in accordance with the expansion of purchase capability. In this aspect, it is anticipated that the demand for fish may not increase in pace of an increase of population. Consumer's needs to fish would also change from simple fresh fish to more value-added products. The table below shows that total domestic fish demand in 2015, 2020 and 2025 would remain at 3.3 - 3.4 million MT, while per capita fish consumption would gradually decrease year by year.

Table 3.1.1 Per Capita Fish Consumption and Future Demand for Fish

(Unit: 1,000 MT)

	Present Situation					Future Supply & Demand		
Year	2003	2004	2005	2006	2007	2015	2020	2025
Fish production	2,630	2,721	2,823	2,939	3,206	3,319	3,387	3,450
Export	189	196	181	190	173	167	260	310
Import	152	170	232	210	200	200	200	200
Supply for domestic market	2,593	2,695	2,874	2,958	3,233	3,352	3,327	3,311
Population (1,000 persons)	81,878	83,559	85,261	86,973	88,545	102,281	109,644	115,808
Per capita fish consumption (kg/yr)	31.7	32.3	33.7	34.0	36.5	32.8	30.3	28.6

Source: NSCB, BAS, BFAR

Note: Demand projection was made based on forecast of population, per capita GRDP, average fish retail price (Income elasticity to fish: 0.781, Price elasticity to fish: -0.631, Source: USDA Economic Research Service, Oct. 2003)

3.2 Overseas Market

In 2007, the Philippines exported fishery products of 173,076 MT (US$569.8 million). Top-ten export items of fishery products are as shown on the table below:

Table 3.2.1 Export of Fishery Products from the Philippines (2007)

(Unit: 1,000 MT)

	Quantity (MT)	Major Commodities	Major Destination
Tuna & Skipjack	75,148	Canned (48,284) Fresh/chilled/frozen (26,864)	USA, Germany Thailand, USA, Spain
Seaweeds	26,603	Carrageenan (14,149) Dried seaweeds (10,486)	USA, Denmark, France France, USA, China
Shrimp/Prawn	10,760	Fresh/chilled/frozen (10,063)	Japan, Korea, USA
Crabs/Crab meat	3,990	Canned (2,180), Live/Frozen (1,809)	
Octopus	6,909	Frozen (6,728)	
Sardines	9,170	Canned (8,961)	
Grouper	5,358	Live (5,358)	
Cuttlefish/Squid	3,237	Fresh/chilled/frozen (2,987)	
Lobster	1,804	Fresh/chilled (1,803)	
Milkfish	2,518	Frozen (1,545), Canned (839)	

Source: BFAR

The export volume of fishery products from the Philippines has been stagnating at the range of 170,000 – 200,000 MT per annum since 2000. The export of tuna (frozen/canned) seems to be difficult to increase by using a domestic catch in the future, because of the resource conservation

measures taken by the WCFPC (30% reduction of yellow fin tuna within 3 years from catch level of 2007), while skipjack would be increased to use as an alternative material of Tuna for export. Shrimp/prawn (frozen) seems to be possible to increase with resumption of shrimp/prawn culture (*Penaeus vannamei* in particular) by participating into a cutthroat competition with other major exporters (Thailand, Viet Num and Indonesia). On the other hand some commodities such as sardine (canned), crab meat (canned) and milkfish products (frozen/canned) shows the positive trend for export during the last 3 years. The table below shows the forecast of milkfish demand (mostly for Overseas Filipino Workers (OFW)) in the overseas market and the estimated export volume of other major commodities.

Table 3.2.2 Estimated Demand for Export of Milkfish Products

	Actual		Future Demand			Destination of OFW (2006)
	2007	2008	2015	2020	2025	
No. of OFW	1,750	1,149	1,852	2,139	2,426	Middle-East 45.8%, Europe 9.5%, America 9.2%, H.K. 7.0%, Taiwan 6.1%, Japan 6.0%
Export of finished products (MT)	2,518	1,654	2,664	3,077	3,490	
Estimated volume in raw material (MT)	4,317	2,836	4,568	5,276	5,984	

Source: NSO (Demand projection was made by JICA Team)

Table 3.2.3 Forecasted Export Quantities of Major Commodities

(Unit: MT)

Commodities	Actual			Forecast		
	2005	2006	2007	2015	2020	2025
Tuna & skipjack (fresh/frozen/canned)	54,709	71,645	75,148	77,305	81,199	83,228
Shrimp/Prawn (frozen/prepared)	18,101	19,680	10,760	22,837	23,310	25,438
Octopus (frozen/dried/salted)	8,665	8,557	6,794	8,504	8,457	8,409
Squid (frozen/dried/salted/prepared)	4,194	2,354	3,238	3,825	4,068	4,339
Sardine (fresh/frozen/canned)	5,124	6,953	9,170	22,991	31,877	40,870
Crab (fresh/frozen/meat)	4,429	4,590	4,830	7,541	9,240	10,938
Milkfish (fresh/frozen/dried/canned)	N/D	N/D	2,518	2,664	3,077	3,490
Seaweed (Carrageenan)	9,663	10,732	14,149	18,178	21,687	25,643

Source: BFAR (Estimate was made by JICA Team based on recent trend)

3.3 Fishery Products Quality and Hygienic Control System

The fishery and aquaculture production of the Philippines is one of the primary sources of income of Filipinos significantly contributing to the national economy. However, global trend indicates a declining catch in marine fishery due to high operational cost and depleting resources in many areas. To cope with the situation, one option is to avert losses of fish harvest through quality control handling, and reduction in post harvest loss or the processing of fish catch for added value to maintain quality and profitability. Fishery products particularly for aquaculture and mariculture are expected to further develop in the future to meet domestic and overseas market demand. Developing new markets opportunities export products however is essential. But recent significant changes in international trade policy, quality and safety criteria have posed difficulty on the fish processing industry to improve product quality.

Many countries, including the Philippines, have adopted the Hazard Analysis Critical Control Point (HACCP) system for food safety management and the Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture (DA) is the regulatory agency (RA) of fisheries products for HACCP in the Philippines. RA monitors and regulates importation and exportation of fish and aquatic resources in the Philippines accordance with Republic Act No.8550. It provides mechanisms to define preventive methods to control hazards that may be unique to a particular

product or process. GMP also covers the basic requirements for the production of safe product and thus provides the generic pre-requisites on which the HACCP system was established.

Export of fishery and aquaculture products to the EU and US are also controlled by importing countries' legislations such as the Commission Decision 95/190/EC, Codex. In 2004, BFAR was audited by EC (DG SANCO) FVO mission for the inventory of HACCP monitoring system in the Philippines for which certain deficiencies were discovered in the HACCP accreditation system. As a result, FVO requested the adjustment of the system in compliance with pertinent EU legislations for the establishment of proper hygienic practice, upgrading inspection system and traceability.

HACCP is now widely adopted by regulatory agencies as an essential tool to identify and control of possible hazards/diseases associated with the preparation, storage and distribution of fish products. Products of many of processing industries were rejected for export due to the lack or absence of HCCP compliant faculties. While numerous fish processors are aware of these occurrences, the high cost of putting up the needed laboratory HACCP complying facilities is beyond their financial means. In light of the foregoing, the establishment of pilot processing facility to cater to the needs of small to medium scale industries is urgently needed for product accreditation under the HCCP Program.

Based on the HACCP monitoring program, the FVO mission was also requesting further improvements in laboratory activities, including biological, chemical and water examination and analysis. Currently, the demand for laboratory examination and analysis from industries is increasing but due to widespread shortage of facilities test and examination have to be conducted either in Manila or General Santos. Definitely, laboratory facilities are needed in local regions to service the needs of production centers to comply with the requirements and challenges of international markets.

4. Fish Port Development Plan of the Philippines

For the last few decades, the construction of Regional Fish Ports under Fishing Ports Project Packages (FPP) I and II were implemented initially by DPWH (Department of Public works and Highways) and continued by DOTC (Department of Transport and Communications). Management operation and maintenance were turned-over to PFDA. Although several other Regional Fishing and satellite Ports were included in the scope of works of FPPII in early the 1990s including Cebu, Tacloban (Leyte), Cagayan de Oro, Surigao (Surigao del Norte), Cadis (Negros Occidental), Bayawan (Negros Oriental), development was not pursued. To date 8 Regional Fish Ports are being administered and manage by PFDA.

With the recent expiry of the fish agreement treaty by and between the Indonesian Government and GOP a group of candidate fishery bases facing the Philippine Sea along the Eastern Sea-board are being eyed as major fishing ground by GOP. with potential port sites in Casiguran (Aurora Province), Real/Infanta (Quezon Province), Legaspi (Albay Province), Tacloban (Leyte Province), and Bislig (Surigao del Sur). Considering the urgent of the fishing fleets now operating in General Santos as base of operation of fishing boats, PFDA requested the inclusion of Bislig within the scope of works of Fishing Ports Package III (FPP III).

Although PFDA is mandated by its charter as an autonomous government corporation as self liquidating, they have undertaken development of municipal level fish ports financed by AFMA (Agriculture Fishery Modernization Act, 1997). To date, 57 some municipal level fish ports were built by PFDA and turned over to LGU for operation under the Local Fisheries Code. One in Infanta Municipality is jointly operated with the Municipality and PFDA. In addition to the municipal fish ports, 18 ice plants and cold storages were built by PFDA and either leased to the private sector or turned over to LGU for operation.

Apart from developing fish ports, DOTC has also developed 61 feeder ports for multi-purpose use to cater for general cargo, passengers and fish harvest under Feeder Ports Package 1 and Package 2 Projects. Among the feeder ports, Atimonan in Quezon, Pasacao in Camarines Sur, and Dumangas in Iloilo, are included in the scope of Study of Fishing Ports Package III for possible improvement. Although the proposed location of the candidate sites in Atimonan and Dumangas, are in the same Municipality, they are separately located.

5. Fish Port Related Projects Financed by Other Donors

5.1 Chinese Loan Projects

(1) General Santos Fish Port Complex (GSFPC)

GSFPC was built in 1995 as one among the Nationwide Fishing Port Project Package II under the Japanese Yen Loan assistance. The succeeding expansion as listed hereunder, was however implemented through Chinese Loan assistance and completed in July 2007.

1) Wharf 1: Water depth -9m, Length 320m, Steel sheet pile frontal wall with concrete anchor wall structure for 5,000 GT fish carrier boat.
2) Wharf 2: Similar structure with Wharf 1, with length of 227m for Purse-seine fish boats.
3) Cold Storage: 1.500 tons capacity.
4) Water Supply System.
5) Waste Water Treatment System
6) Electric Power Supply System, including the provision of DEG (Diesel Engine driven Generator) standby generating set.

The F/S (Feasibility Study), D/D (Detail Design), construction, and S/V (Supervision) for the foregoing development were undertaken by CAMC (China National Constructional and Agricultural Machinery Import and Export Corporation) of which 95% of the total project cost of US$27.6 million was provided under Chinese Loan.

(2) Navotas Fish Port Complex (NFPC)

NFPC which is located in Metro Manila, the primary consuming center of the nation has the largest port facilities, fish handling volume, income and profit among all the regional fish ports. The original facilities of NFPC was constructed under ADB assistance and completed in 1976. The port facilities such as fish landing quay, fish landing wharf, and fish markets are、however, flooded during the occurrence of high tide. This occurrence is reported to be due to proliferation of deep wells in the area caused by over pumping of underground water. In order to avert this incidence, GOP requested the Chinese Government for technical assistance. In response to the request, Chinese Government deployed CAMC (China National Constructional and Agricultural Machinery Import and Export Corporation) to conduct F/S and a report entitled “Feasibility Study for the proposed upgrading and rehabilitation project at the Navotas fish Port complex” was submitted to DA in June 2007. Based on the report, the decline in fish landing volume at NFPC was due to the sinking port yard, high fuel oil cost and shifting of the landing from Navotas to General Santos Fish Port due to proximity of fishing ground. Based the demand forecast of the study, fish landing volume in NFPC will continue to increase with the increase in population in Metro Manila estimated at 2.25% per annum or about 185 thousand tons and 207 thousand tons by 2015 and 2020 respectively.

The component of the project consist of following:

1) Rehabilitation of the Landing Quays (564m)
2) Construction of 4 units of new fish market halls
3) Dredging of the port basin
4) Raising up of the elevations of the port yard including the vehicle holding areas and road networks.
5) Provision of wastewater treatment system
6) Filling up of the area about 4.2 hectares between Pier Nos. 4 and 5 and the construction of marginal wharf thereat.

7) Rehabilitation including the raising up of the top elevation of the West Breakwater including the installation of 3 sets of navigational light beacons.
8) Provision of refrigeration facilities including cold storage of 3,000 ton capacity, contact freezers, and air-blast freezer.

Breakdown of the estimated project cost is listed hereunder.

1)	F/S	US$ 0.4 million
2)	Design/construction supervision	US$ 6.0 million
3)	Construction/Procurement of equipment	US$ 37.7 million
4)	Tax/insurance	US$ 0.9 million
5)	Contingency	US$ 3.8 million
6)	Total Project cost	US$ 48.8 million

Ninety five (95%) of the estimated project cost will be covered under the loan while 5% will be GOP counterpart fund. Loan amortization is 20 years with 5 years grace period. Mode of re-payment is twice yearly with interest rate of 3 % per annum.

The time table for completion is 9 months for design/environmental study and 33 months for construction. According to the implementing agency the Chinese loan is still under the process.

5.2 Korean Government Grant Aids through KOICA (Korean International Cooperation Agency)

(1) KOICA Project in Dagupan City

To date fish processing facilities comprising of fish processing spaces and waste water treatment plant at project cost of US$ 2 million were under construction in Bgy. Bonuan, Dagupan City by KOICA Grant Aid. Scheduled completion was in February 2010.

(2) Agricultural Master Plan (M/P) Study of KOICA

KOICA has prepared a rough sketch of the proposed fish landing facility for Mati Municipality in Davao Oriental as part of its Agricultural M/P Study. The sketch showed a brief layout plan of the pier facility located in the defunct DATICO (Davao, Timber Corporation) factory site in Mati. However, based on information from the Municipal Government of Mati, funding of the proposed project by KOICA is still uncertain.

6. Current Conditions and Issues of the Project Fish Ports

6.1 Iloilo Fish Port Complex (IFPC) and Related Municipal Fish Ports

6.1.1 Fishery Production

(1) Overall Situation

Of the total fish production of 352,631 MT (exclusive of seaweeds) in Region VI in Western Visayas in 2007, Iloilo province provided 43.7% or 154,185 MT of the harvest while Antique contributed 5.2% or 18,289 MT of the total volume. Due to over fishing in the Visayan Sea considered as one of the most productive fishing grounds nationwide and the most important fishing ground of Iloilo province based fishermen, recent marine fishery catch has been stagnating and further exploitation is posing extreme difficulties. While San Jose the capital of Antique Province is strategically located as an offshore fishing base for Cuyo Pass, Palawan Sea and as far as the South China Sea, marine fish production appears to be lower than the other inland seas, due to the absence of fishery infrastructure and limited market in Panay Island. As such fish caught by medium to large- commercial fish boats are directly transported to Manila by carrier vessels.

Iloilo is the second largest producing province for milkfish after Pangasinan. Milkfish production in Iloilo has increased from 20,484 MT to 23,882 MT from 2003 to 2007. Assuming that milkfish is not marketed outside of the province considering the high local cost, fish consumption in Iloilo is estimated at 10.5 kg per capita in 2007. Farm operators are currently controlling the volume of production to maintain the high cost of milkfish. For this reason, increasing production to meet future export demand is considered possible.

(2) Demand and Supply of Fish

Local fish demand in Iloilo province is estimated at 75,000 MT, against the estimated production of 161,000 MT in 2025. The 86,000 MT surplus is therefore assumed t to be destined for export. The table hereunder summarizes the volume of fish supply and demand.

Table 6.1.1 Estimated Local Demand and Supply of Fish

(Unit: 1,000 MT)

Region / Province	Local Demand for Fish				Fish Production				Breakdown of Production (2025)			Surplus (2025)
	2007	2015	2020	2025	2007	2015	2020	2025	MF	CF	AQ	
Region VI	250	263	255	249	318	326	332	337	149	116 (3)	72 (16)	+88
- Iloilo	62	80	77	75	154	157	159	161	76	52	33 (7)	+86
(Iloilo City)	15	15	14	14								
- Antique	19	20	20	19	19	20	21	22	11	10 (3)	1	+3

Abbreviation: MF: Municipal Fishery, CF: Commercial Fishery, AQ: Aquaculture (except seaweed) Source: BAS (2007)
Remarks: ( ) shows the estimated increment from 2007.

(3) IFPC

IFPC is the existing regional fish port in the western hemisphere of Region VI which is provided with berthing facilities to accommodate all types of fishing boats, from commercial to municipal. However, due to the change in operation pattern of fishing boats and the ceasing of the booming prawn culture, IFPC is being utilized to date not only as a fish port but also as a fish/meat marketing base, taking advantage of its strategic location as a regional center for commerce and trade. Further discussions will be made at latter part of this report on the processing and marketing of fish and meat products through the merits of the milkfish and shrimp culture in the region.

1) Fishing Boats

Due to high fuel cost, most of the Iloilo based commercial fishing boats operate in the northeastern part of Panay Island particularly in Estancia, Carles and Roxas because of proximity to the Visayan Sea. The purse seiners ranging from 50 - 150 GT operated by fishing companies including Jumbo Fishing Corp. and Jagnee Fishing Corp., among other fish operators are based in Iloilo City and/or San Joaquin and these operators occasionally use IFPC only for fish landing and for maintenance of their vessels.

There are 31 municipal banca, 48 small-scale commercial fishing boats ranging from 3 – 20 GT or about 9.1 GT in average, 23 medium-scale commercial fishing boats ranging from 20 – 50 GT or about 35.0 GT in average, 36 Large-scale commercial fishing / cargo boats ranging from 50 – 250 GT or about 128.2 GT in average, and 15 cargo vessels 250 GT and up or 743.6 GT in average, and or a maximum of 1,914 GT) were dropping anchor in IFPC from Jan. 1 – Dec. 15, 2009. As shown in the table hereunder, most of the boats are either seasonal or occasional users of IFPC depending on the price of fish demand in Iloilo City and the necessity for maintenance of their vessels. Only 8 commercial fishing boats comprising of 4 units of 50 – 250 GT operated by Jumbo Fishing Corp. and 4 units of 20 – 50 GT operated by others were regular users of IFPC in 2009. On the other hand, the number of commercial fishing boats entries to IFPC, which had been declining since 2005, was recovered in 2009, with the increase of fish unloading volume. One of the reasons is that some commercial fishing boats of Cebu have sifted their fish unloading base to IFPC since November 2009.

Table 6.1.2 Fishing Boats Entry to IFPC

Type of boats	Municipal Banca			Commercial F.B.			Non-Fishing Boats		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
No. of boats entry (daily average)	0.32	0.28	0.30	3.38	2.29	2.60	0.05	0.08	0.25
(at peak month)	0.60	0.50	0.77	5.63	3.23	3.97	0.20	0.20	0.87
Ave. berthing days / boat /month	2.7 (*1)			3-50GT: 7.1, 50GT up: 6.6 (*1)					
(at peak month)	6.7 (*1)			3-50GT: 13.0, 50GT up: 18.3 (*1)					

Remarks :*1: Data in 2009 (IFPC)
Source: PFDA

The number and frequency of fishing boats that will use IFPC in the future is expected to more or less remain at same level considering that only a limited number of fishing boats regularly use IFPC, due to the unfixed unloading places depending on volume of catch and cost of fish in each market, and the irregular arrivals of cargo vessels. Nevertheless, certain commercial boats are intending to use IFPC more frequently or on regular basis provided that wave calmness in the mooring areas is improved with the installation of a breakwater at the eastern side of the port. Considering that the fishing port is a public oriented facility that should be able to shelter fishing boats even in times of severe wave conditions, the improvement of wave calmness in the mooring areas is imperative regardless of the number of fishing boats to be accommodated.

2) Fish Catch and Unloading

About 88% of fish destined for IFPC are brought by land transport and the remaining 12% are carried by fishing boats as shown in the table below. The monthly unloading volume of fish catch varies from 0.78 – 1.22 times on the average in 2009. The peak season is from Mar. – May. The top ten species of fish unloading consists of milkfish at 22.0%, round scad at15.2%, eastern little tuna at 6.8%, Indian oil sardine at 4.7%, big-eye scad at 4.5%, Indian mackerel at 4.2%, threadfin bream at 3.9%, moonfish at 3.6%, slip-mouth at 3.1%), and yellow fin tuna at 2.7%.

Table 6.1.3 Fish Unloading at IFPC

(Unit: MT)

	2005	2006	2007	2008	2009	Average	(Breakdown Ave. 2005-09)		
							OL	LQ	TR
Annual volume	27,465	19,918	26,410	22,836	22,933	23,912	21,259	2,144	509
Daily average	76.29	55.33	73.36	63.43	63.70	66.42	59.05	5.96	1.41
Peak month average (Apr.)	90.51	85.45	88.18	80.95	83.60	85.74	76.22	8.07	1.44

Abbreviation: OL: Overland, LQ: Landing Quay, TR: Transshipment
Source: PFDA

(4) Municipal Fish Ports (Concepcion, Dumangas and San Jose De Buenavista)

The development of the proposed 3 municipal fish ports namely: Concepcion (Iloilo), Dumangas (Iloilo) and San Jose (Antique) was conceived to support the operation of IFPC. Each of the three ports has distinctive features. Concepcion is provided with a wide municipal fishing ground dotted with small islands facing the Visayan Sea. Dumangas is provided with vast fish ponds for the aquaculture industry. San Jose is an offshore fishing base to cater for the fishing grounds in Cuyo Pass and South China Sea). The current status of fishery production for each port is described as follows:

1) Concepcion

Concepcion is one of the 3 fish ports in Iloilo Province being managed and operated by the LGU for municipal and small-scale commercial fishery. There are also other 35 traditional fish landing areas in this municipality and for this reason, improving the network between the Concepcion Municipal Fish Port and the traditional landing area is essential for the smooth and efficient ice and fish distribution. The municipal fishing grounds of Concepcion are rich with high-value fish species and are being processed for export. These include shrimp, crab, and shellfish. Particular emphasis is given to anchovy a juvenile ("shirasu") that is available only in the waters between the mainland and the small offshore islands. Majority of the fishing activities in Concepcion are conducted by municipal-scale boats of 4 – 5 hours/ fishing trip Fifty five (55) commercial fishing boats comprising of beach-seine, trawl, ring-net and Danish seine are also operating outside the municipal fishing grounds at 2 – 3 days/fishing trip. The current annual fish catch is about 2,438 MT.

2) Dumangas

Aquaculture industry in Dumangas is more prevalent than marine fishery. Almost all the fishing boats are municipal banca with a total production of about 200 MT per annum. Aquaculture on the one hand accounted to 9,070 MT of milkfish production from a total fish pond area of 4,535 ha. The aquaculture industry in Dumangas is greatly contributing to the local and regional economy. Some 8 traditional fish landing areas are distributed in the municipality. Of the 8, 4 are main landing sites of which 2 are used for milkfish unloading. Based however on information, a large portion of milkfish production is directly transported by trucks from the farm gates to markets and consuming centers in Iloilo City and elsewhere.

3) San Jose

San Jose is strategically located in Panay Island to cater the fishing grounds in Cuyo Pass, Palawan and South China Sea. It is could be commuted by car from Iloilo City in 2 hours because of the relatively good road condition. Some 7 commercial and 12 municipal fish landing sites are available in the region, of which the major landing areas are Malaiba, Maybato (North & South) and San Angel. The major fishing gears in used are ring-net for an overnight fishing expedition and long-line (for a 1-week fishing trip voyage of commercial vessels and hand-line for a 1 – 2 nights fishing journey for municipal fishery.

The estimated unloading of fish catch for the above-mentioned 3 landing sites is estimated at 2,703MT.

The estimated number of fishing boats and fish unloading volumes for the 3 municipal fish port sites are shown in the Table below:

Table 6.1.4 Fishing Boats at the Relevant Municipal Fish Ports

Municipality	Barangay / Landing site	No. of fishing boats		Ave. No. of boats entry/ day	
		Commercial	Municipal	Commercial	Municipal
Concepcion		11(BS), 8(RN), 2(DS), 22(BT), 5(GN), 6(CB)	165	9.6(BS), 0.6(RN), 0.5(DS), 8.1(BT)	50.5(GN/HL), 44.3(CB), 43.9(SS)
Dumangas	Sapao	-	14	-	5.1(GN/HL), 0.6(LL), 2.5(SS),
	Dacutan W.	1(GN)	14	-	1.4(GN/HL), 0.9(LL), 0.3(FC)
	Bacay	-	58	1.2(BN)	10.2(GN/HL), 0.2(LL), 1.7(CB), 1.7(SS), 14.7(CP)
	Nanding Lopez	1(GN)	61	-	2.5(BN), 7.0(GN/HL), 1.0(LL), 22.3(SS)
	Malaiba	-	14	3.2(RN)	2.4(GN/HL), 3.0(CB), 2.5(SS)
San Jose	Maybato	13(LL)	129	1.1(LL)	9.9(GN/HL), 1.9(CB), 9.4(SS)
	San Angel	10(LL), 16(RN)	50	8.7(RN)	15.9(GN/HL), 8.7(CB), 16.0(SS),

Source: Fish Landing & Marketing Survey conducted by JICA team (Dec. 2009)
Abbreviation: BS: Beach seine, RN: Ring net, DS: Danish seine, BN: Bag net, TW: Trawl, GN/HL: Gillnet/Handline, CB: Carrier Boat, SS: Small-scale, CP: Crab pot, FC: Fish corral, LL: Long line

Table 6.1.5 Fish Unloading at the Relevant Municipal Fish Ports (Unit: MT)

Municipality	Barangay / Landing site	Peak season	Fish unloading volume (Dec. 2009)	Estimated annual volume	Major Species
Concepcion	Fish Port	Mar.-Sep.	164.7	2,438	Squid, herring, anchovy
	Sapao		1.1	16	Assorted
Dumangas	Dacutan	Aug.–Oct.	4.0	60	Acetes, anchovy
	Bocay		7.5	111	Milkfish, Blue crab, Acetes
	Nanding L.		10.6	157	Milkfish, oyster, crab, shrimp, sardine
San Jose	San Angel	Jan.– Mar.	115.5	2,703	Eastern little tuna, skipjack,
	Maybato				Red-tail scad, Big-eye scad

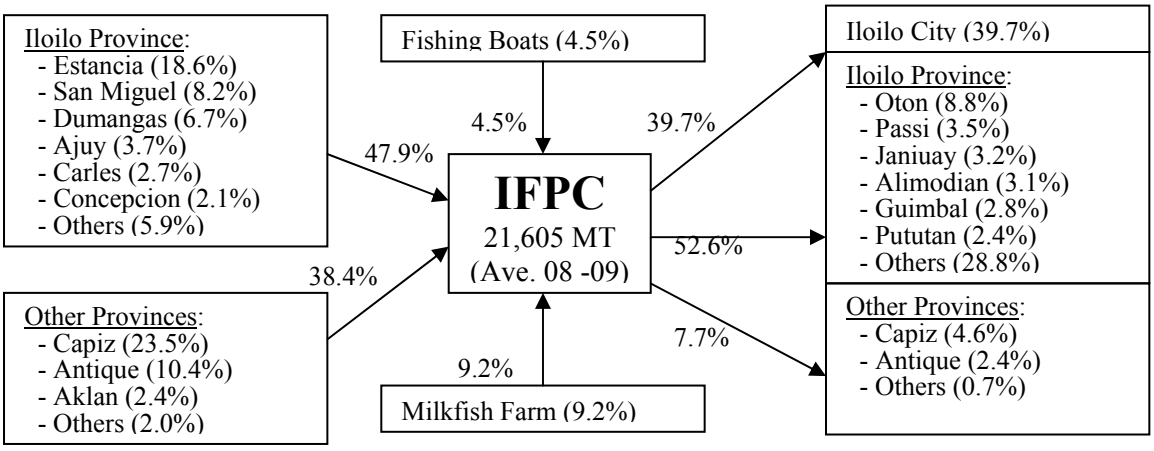
Source: Fish Landing & Marketing Survey conducted by JICA Team (Dec. 2009)
Note: Annual catch was estimated based on the following factors:
1) Concepcion & Dumangas: Monthly fluctuation at Estancia (Volume in Dec. x 14.8)
2) San Jose: Monthly fluctuation of shipping volume from San Jose to IFPC (Volume in Dec. x 23.4)

6.1.2 Fish Distribution Flow and Marketing System

(1) IFPC

1) Fish Flow

More than 55% of fish brought to IFPC comes from the various municipalities of Iloilo province including milkfish produce, while the remaining 40% originates from other provinces of Panay Island as shown in the illustration below. The major destinations of fish from IFPC include Iloilo City and other municipalities of Iloilo province. The chart hereunder shows the sources and destinations of fish products unloaded at IFPC.



Source: IFPC (source of fish) and Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009) (destination of fish)

Fig. 6.1.1 Fish Flow based on IFPC

2) Fish Marketing Channel

There are 20 fish brokers doing business at the market hall of IFPC consisting of 3 – 30 individuals per broker or an average of 17.3 personnel. Fish dealing volume varies from 420 – 13,790 kg/day or about 4,210 kg, average. Due to the 1,400 m2 limited area, icing / packing of fish are being undertaken outside the market hall causing to some extent fish spoilage and chaotic congestion in the vehicle holding areas. All fish unloaded at IFPC except those for transshipment are auctioned at the market hall.) Ninety-seven (97%) of fish supply from IFPC to various destinations is conducted by viajeros, 2% by suppliers and 1% by wholesalers and retailers. The table hereunder summarizes the type and number of vehicles used for fish transport.

Table 6.1.6 Type and Number of Vehicles Used for Distribution of Fish

(Unit: No. of vehicles/day)

	Pedicab	Tricycle	Jeepney	Multi-cab	4-wheel	6-wheel	8-wheel	10-wheel	12-wheel
Delivery	0.6	0.3	0.1	0.1	5.1	18.2	0.3	2.3	0.1
Shipment	0.3	84.4	1.0	0.9	27.7	13.3	-	0.1	-

Source: Fish Landing & Marketing Survey conducted by Survey by JICA Team (Dec. 2009)

3) Ice Supply

Due to shortage of ice, post harvest fish preservation is reported to be deficient causing fish catch spoilage in remote fishing villages particularly during peak fishing season from Mar. – May. Based on information, should this incident occur, there is no other recourse but for sustenance fishermen to occasionally discard certain volume of their catch for small pelagic fish species including sardines and eastern little tuna upon unloading. On the other hand, supply of ice to large-scale commercial fishing boats, more than 25 GT, appears to be sufficient at the current condition.

Table 6.1.7 Demand and Supply of Ice

Province	Estimated Ice Requirement	Ice Supply	Balance
Iloilo	For fishing boats: 97,200 MT For aquaculture: 12,800 MT For marketing: 38,500 MT Total 148,500 MT (495MT/day)	Private (11 ice plants by 6 ice producers): Max. 520MT/day (for fishery use: 415 MT/day)	Shortage of 80 MT/day in average (particularly limited during peak season in the remote area: Mar.-Sep.)
Antique (San Jose)	For fishing boats: 13,300 MT For aquaculture: 100 MT For marketing: 4,600 MT Total 18,00 MT (60MT/day)	Private (1 producer): Max. 40 MT/day	Shortage of 20 MT/day in average (significant ice shortage during peak season: Dec. - May)

Assumption: Icing ratio 150% of catch for commercial fishing boats, 25% for municipal fishing boats, 50% for shipping of aquaculture products, 25% for marketing of fresh fish, and 200% of raw material volume for processing ((based on BAS Fisheries Data 2007).

The demand for ice is conceived not to increase in the future. What appears to be required is the immediate enhancement of the mode of ice distribution to cater to the needs of fishing villages in rural areas. This could be undertaken through the establishment of appropriate ice distribution network including the construction of ice storage compartments in municipal ports for ice preservation for the use of sustenance fishermen in their post-harvest preservation operations to reduce spoilage or down grading of fish catch quality which consequently would reduce its value and cost. It is noted in this connection that no amount of the so called modern freezing or refrigeration technique could improve the loss in quality of fish catch due to poor post harvest handling operation cause by the absence or insufficiency of ice. For this reason, it is highly desirable that IFPC should establish regular services for ice distribution to the rural areas. In anticipation of this scheme, the construction of a 25 MT/day ice plant for IFPC to cover 25% of the present shortage was conceived. The capacity of the ice plant was determined so as not to compete with the operations of privately owned ice plants.

4) Fish Processing

IFPC is currently not provided with HACCP accredited facilities offish processing plants. Relative thereto, the table below shows the lists of the 4 fish processors that intend to relocate to IFPC if modern fish processing facilities are installed thereat. The processing plant will consist of 4 lines of 1 ton per day capacity facilities of the all-in-one type. This will consist of 1.5 ton/day capacity ice plant, 1 ton/day capacity blast freezer 20-toncapacity cold store room and 250 sqm of processing space. The proposed fish processing facilities is expected to produce about 960 MT of processed products from 1,440 MT of raw materials during peak operations.

Table 6.1.8 Existing Fish Processors in Iloilo Province

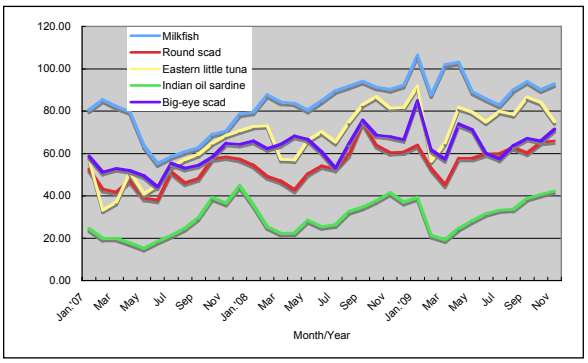
Name of Processor	Location	Species	Remarks
OFW Dumangas North Chapter	Dumangas	Milkfish	Producing the boneless and Siomai from milkfish (for local market).
Estancia Foods Products	Estancia	Squid, Prawn, Grouper, Scallop	-
UNIFISH INC.	San Donisio	Squid, Prawn, Halfbeak, Whiting, Shirasu (juvenile of anchovy)	Having processing plants at Manila, Sorsogon, Negros and Iloilo (Supplier of materials for sushi)
PIXIE'S (Outlady of Hope Inc.)	Manila	Milkfish, Round scad, Indian mackerel, etc.	Rented cold storage (50m^2) of IFPC, Davao, Cebu and Cagayan de Oro.

Source: Hearing by Survey by JICA Team

In addition, there are additional demands for cold storage rooms (20 tons x each 8 rooms for fish and meat products) by the existing fish and meat processors in Iloilo.

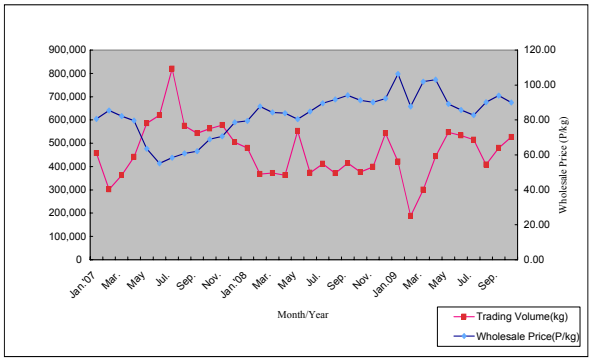
5) Fish Price

The wholesale price of fish products in IFPC varies roughly twice annually, during the peak season from Mar. – Aug. and during the lean months from Sep. - Feb. Fish cost in 2007 in general was lower due to over-supply at 26,410 MT. There was no remarkable increase in fish cost despite the high cost of fuel in 2008 as can be gleaned in the Chart below. One primary means of raising the average cost of fish catch during peak harvest season to alleviate the plight of the fishing industry is to control fish supply by producing value-added fish products under the Project.



Source: IFPC

Fig. 6.1.2 Fluctuation of Average Wholesale Prices of the Dominant Species at IPFC



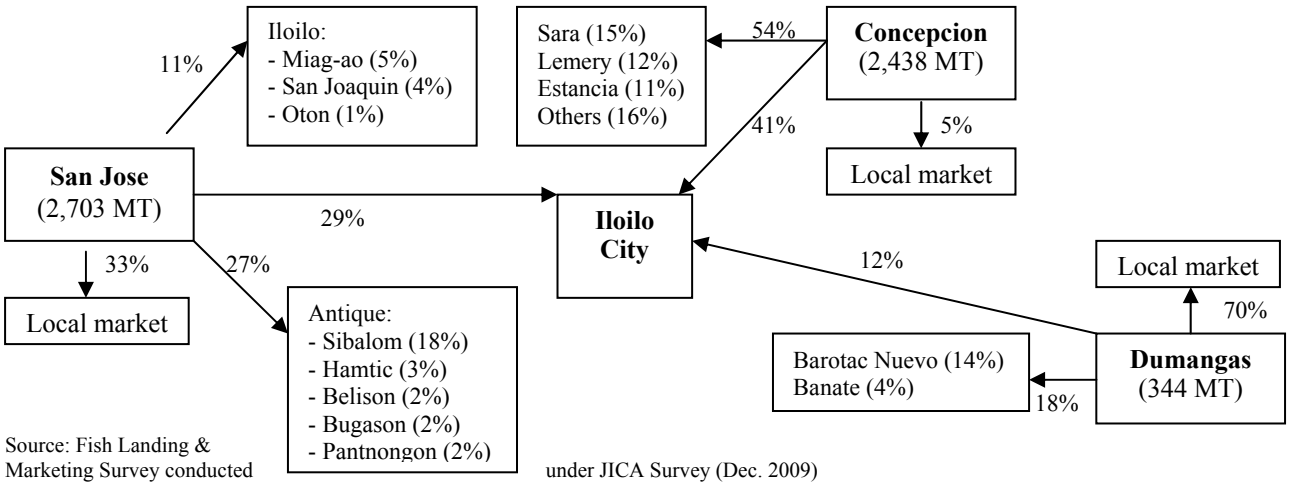
Source: IFPC

Fig. 6.1.3 Relationship between Trading Volume and Wholesale Price of Milkfish at IFPC

(2) Municipal Fish Ports (Concepcion, Dumangas, and San Jose)

1) Fish Distribution Flow

The flow chart below shows the current fish distribution pattern of municipal fish port products. Relative thereto, about 30 – 40% of fish unloaded at San Jose and Concepcion are destined for Iloilo City and the wholesale market of IFPC. For Dumangas, some 1,500 MT of milkfish are exported annually of which only about 100 MT passes though IFPC from the fish landing sites.



Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Fig. 6.1.4 Fish Flow from the Project Municipal Fish Ports

2) Fish Marketing Channel

All fish unloaded in Concepcion are consigned to fish brokers and sold to fish buyers through auction, while fish brokers procured from contracted boat operators are sold to fish buyers in San Jose. Majority of the fish catch are sold to retailers, with Concepcion accounting 60% and San Jose at 68%.

Table 6.1.9 Present Activities of Fish Brokers

Municipality	No. of fish brokers	Fish Collecting Point	Fish Selling Point	Fish dealing volume (kg/day)	Total No. of workers (average / broker)
Concepcion	15	Fish Port	Iloilo / Manila	100 - 800	33 (2.2)
Dumangas	8	Dumangas Wet Market	Dumangas Wet Market	80 - 180	16 (2.0)
San Jose	6	San Angel: 4 Maybato: 2	San Jose / Iloilo / Sibalom	100 - 900	25 (4.2)

Source: Fish Landing &marketing Survey conducted under JICA Survey (Dec. 2009)
Note: Fish brokers in Dumangas operate based in Dumangas public market for both wholesale and retail.

Fish products transacted in fish port are delivered through various types of business enterprises and vehicles as shown in the table below.

Table 6.1.10 Proportion of Fish Volume Shipped Out by Types of Actors

Municipality	Operator	Broker	Wholesaler	Trader	Retailer	Viajeros	Others
Concepcion	-	-	-	40%	60%	-	-
Dumangas	17%	-	-	17%	36%	13%	17%
San Jose	-	-	2%	5%	68%	25%	-

Source: Fish Landing &marketing Survey conducted under JICA Survey (Dec. 2009)

Table 6.1.11 Type and Number of Vehicles Used for Fish Distribution

Municipality	Delivery (No. of units/day)				Shipment (No. of units/day)			
	2-wheel	3-wheel	4-wheel	6-wheel	2-wheel	3-wheel	4-wheel	6-wheel
Concepcion	23.4	2.8	8.0	5.8	46.5	2.8	12.0	8.0
Dumangas	0.2	7.4	-	-	0.2	7.7	0.1	-
San Jose	7.9	29.3	2.0	0.5	7.6	30.7	2.6	0.6

Source: Fish Landing &marketing Survey conducted under JICA Survey (Dec. 2009)

6.1.3 HACCP System

IFPC is currently not provided with HACCP compliant processing facilities due to the prohibitive cost of electricity from PECO. Consequently, most investors prefer to establish their plant or factories outside of Iloilo city because of cheaper power cost. There are two institutions with potentials to support the HACCP monitoring system in Iloilo province. One is BFAR and the other is SEAFDEC/AQD (Aquaculture Department, Southeast Asian Fisheries Development Center). PFDA and BFAR are making arrangements to improve the management of sanitation for IFPC to cope with HACCP requirements. However, due to insufficiency of funds and manpower, the primary activities is limited only to propagation of SSOP, not laboratory analysis activities. Currently, for Region IV, almost all the isolated aquaculture samples for the examination of microbiological and chemical substances are sent to Manila for analysis. Recently, however, BFAR in Region IV have started to construct a new one floor laboratory office building near the old port for quality assurance and traceability of products. The laboratory which will be provided with microbiological and chemical analytical instruments is scheduled for operation by early 2010. SEAFDEC/AQD (AQD) which has bio-technological laboratory facilities is located 40km south of IFPC, but they do not intend to provide services for the improvement of food quality. Moreover, the mode of control is not fully developed, and their activities are more focused to fundamental research and technical improvement relating to aquaculture. To enhance export of fish products, HACCP complying facilities and system for the region is needed. Aquaculture product in Iloilo is expected to increase in the near future requiring industries to adopt the HACCP accreditation system. The BFAR for Iloilo region however is striving very hard to develop their capacity by improving their laboratory activities. The provision of laboratory facilities comprising of instruments and devices for proximate analysis of microbiological and chemical contents and water analysis in accordance with PNS/ISO/IEC 17025 is highly recommended for IFPC for the production of processed fish quality products to enhance export. The laboratory facilities will comprise of microbiological, chemical and water instruments/devices.

6.1.4 Present Status of Utilization of the Existing Fish Port Facilities

(1) IFPC

1) Refrigeration Facilities

In 2000, IFPC abandoned the operation of the ice making plant due to mechanical breakdowns. Another reason for the termination is due to the slump in shrimp/prawn culture. . In 2007, PFDA installed an air-cooled type of condensing unit partition type of large-cold store rooms with insulation panels for the storing of agri-products. The blast freezer room was also renovated for storing of beverages. The cold storages were divided by nets into small spaces. The table hereunder shows the utilization status of refrigeration facilities at IFPC.

Table 6.1.12 Refrigeration Facilities in IFPC

Refrigeration Facilities	Number (Unit)	Description	Technical possibility for Rehabilitation (reason)	
ICE making plant	1	: Non operational (100%)	C	(Aged Deterioration)
ICE storage	1	: Non operational (100%) Including temporary stock room	C	(Aged Deterioration)
Cold storage	2	: Non operational (100%) Except one renovated storage	B	(Aged Deterioration)
Contact freezer	8	: Non operational (100%)	C	(Aged Deterioration)

Remarks: A: Rehabilitation is not required except ordinary maintenance.
B: Replacement of some machinery parts will be required within 10 years.
C: Total replacement is needed.

2) Market Hall Facilities

The market hall is well utilized as place of unloading and trading of fishery products from midnight to dawn. Aquaculture products are either brought by trucks or directly unloaded from fish boats along the sloped fish landing facility for trading at the market hall or for transfer to other points of destination. Marketing activities are so rampant with activities such as packing of fish products, fish icing and auctioning thereby causing disorderliness and chaotic congestion compounded by the crowded constricted space of the market hall. Because of the constriction, product packing, icing, and reloading activities are being conducted in the vehicle holding areas outside but adjacent to the market hall. The southern side of the market hall is unpaved, causing dirt to be brought inside the market compound. The situation is further aggravated by the unlimited access of the public with all sorts of transportation system including tricycles and jeepneys. During auction and trading activities, fish traders and suppliers are squeezed to a small space inside the market area. The market hall is severely dilapidated and the flooring, roofing and structural components need immediate rehabilitation in compliance with sanitation requirements as provided under cleanliness environmental regulations. Some utilities are only partially functioning with some faucets for the water supply system is no longer functioning and the drainage system is not provided with cover. The vehicle holding areas which is located at the back of the market hall is not provided with lighting facilities for night time marketing activities. Trucks, tricycles and jeepneys are jammed at the vehicle holding areas waiting for shipment, but are disorderly parked causing jamming and chaos. Expansion and renewal of the market hall facility are essential to promote orderliness and sanitation.

3) Landing Wharf

The multipurpose pier is well utilized by fishing vessels, patrol boats, and commercial ships. However, due to the numerous types of boats and vessels the mooring areas is overcrowded particularly during peak unloading operations of fish catch. Enhancement of management and operation are required to organize the use of the facility. It is noted in this connection that the pier is a dedicated facility purposely planned for fishing boats and unless restrictions

are made for its usage, chaotic congestions could not be avoided.

6.1.5 Physical Condition of the Fish Port Facilities

(1) IFPC

1) Breakwater

The breakwater is basically in good condition except for minor damages caused by minute settlement of the armor stones at the tip of the facility. There is a need to construct the east breakwater to enhance calmness in the port basin and mooring from wave actions coming from the southeast during the monsoon season.

Similar to the west breakwater, the composite type will be adopted with rock mound for the shallower portions and caisson on rock mound base for the deeper section to reduce on cost. Precise positioning and length of the breakwater will be determined based on the result of wave analysis. The inner side of the breakwater will be use as mooring areas of small boats and vessels waiting to be dry docked through the slipway for repairs and maintenance. The installation of breakwater thereat will also protect the port from silt intrusions.

2) Commercial Boat Landing

The quay wall for commercial fish boats is basically in good condition except that most of the rubber fenders are severely damaged due to long use and depreciation. The concrete slope fish landing is slightly partially damaged.

In accordance with the strong request of stakeholders, the fish slope landing facility will be converted to fish stair landing type of facility to reduce the incidences of slippage during unloading of fish catch caused by the slippery surface of the fish slope landing facility.

3) Basin

The port basin and commercial boat mooring areas became shallower due to silt intrusion/deposits. Sand/silt accumulation is also found at the corner of the breakwater and fish slope landing facility.

Removing the silts at the port basin area and along the quay wall is necessary for the safe entrance and mooring of commercial fish boats particularly at low tides. Dredging the frontage of the fish landing facility is also required to facilitate unloading operations of small boats especially during low tides.

4) Revetment

The East side revetment is totally damaged while the west side is slightly damaged causing the scouring of the reclaimed area thereat.

In order to prevent further damage from occurring, immediate repair is essential to arrest further damage of the revetment from occurring and for the protection of the reclaimed fills from scouring, particularly for the slipway facility.

5) Slipway

One of the 2 slipway facilities is no longer operational due to the damage of the rail and the longitudinal and crosswise underwater concrete beams supporting the rails by the typhoon that occurred in 2007. The workshop machineries as well as the sidings and roofing of the workshop building are severely deteriorated.

The construction of the east side breakwater will shelter the slipway from northeast wave actions thereby inducing numerous ship operators to use the ship repair facilities. For this

reason, immediate repair of the damaged slipway including the winch and ship positioning dolphin is essential to cope with the expected influx of users. Due consideration will be given for the planning and construction of the underwater beam to facilitate future maintenance works.

6) Market Hall and Refrigeration Building

The framing, roofing, columns of the market hall are severely deteriorated, most especially the flooring which is totally damaged is causing insanitation to fish catch handling operations. The drainage system around the market hall is no longer functioning. The roofing of the refrigeration building is also totally damaged and the steel columns are severely corroded.

Fig. 6.1.5 Market Hall (IFPC)

The market hall should be reconstructed and expanded to decongest the crowded trading activities with the flooring to be elevated to facilitate fish unloading/loading to/from delivery trucks and to enhance cleanliness and sanitations. The new market hall including the roofing will be constructed of reinforced concrete to avoid costly maintenance against corrosion. Construction of the market hall will be in such a way that marketing activities will not be hampered. The renovation of the refrigeration facilities will be confined to the storage only so as not to disrupt the ongoing operations.

7) Fish Processing Facilities

In order to enhance global competitiveness and sanitations new HACCP compliant fish processing facilities will be constructed at the vacant lot behind the market hall.

8) Utilities

While services of PANECO for power supply is quite good, the rate per kwh at Php 10 to 14 is exceptionally high and is more than double that of the other regional fish ports and, this is one of the primary contributory causes of the operational losses of IFPC. Water supply from Metro ILOILO Water District is also good but IFPC is not providing services for sewage treatment due to the high cost of the facility and the high cost of operation. Garbage collection of trash from IFPC is made by ILOILO City Government.

In order to make the operation of IFPC viable other sources of electrical supply should be considered particularly solar energy to reduce on power cost for sustainable operation of the refrigeration facilities. The installation of Waste Water Treatment (WWT) for IFPC should be pursued incompliance with DENR/EMB regulations and pertinent applicable JICA Guidelines. The fish processing system to be provided will be one means of improving fish quality product for added value to command higher cost particularly for export. This is also an alternate means of generating more income for IFPC while reducing spoilage of fish harvest thereby promoting the sustainable use of marine fishery resources. The repair of the standby generating sets of IFPC to be used in the event of power failure is also highly recommended.

- **Source of Power Supply**

  Based on the financial statement of IFPC, personnel services incurred the highest expenses followed by the cost of electrical consumption. The power rates at Php 10 to

14 for IFPC are more than twice of the other regional ports. For this reason, tapping of other sources is essential for a sustainable operation of the refrigeration facilities including the ice plant. Among the various sources of electricity, non polluting power generation is highly desirable because it produces cheap power although the cost of initial investment would have to be further studied in light of its practicality. Listed hereunder are the 4 alternate sources of power supply under consideration: 1) Photovoltaic power, 2) Wind power, 3) Tidal power, and 4) Eco-generating power.

Lance in France is the pioneer in using tidal difference for generating power although others are still in the experimental stage. Eco-generated power is still being refined and at the pilot stage level. As such, comparison of what type of power generation will be adopted will be selected from among the following: 1) Photovoltaic, 2) Wind power and Existing commercial power.

Recently, the use of photovoltaic for power generation has been used worldwide. Power capacity ranges from 1,000 to 10,000kw and varies from place to place. On the one hand, wind generated power system has been on the increasing trend but the adverse effect on human health is widely. This is reported to be due to the low frequency waves of windmill cutting the surrounding air.

Table 6.1.13 Photovoltaic Power and Windmill

Power source	Photovoltaic	Wind		Commercial
		Large	Small	
Power capacity	1,000 to 10,000kw 0.1 to0.15kw/m2	Windmill Height: 80 to 100m	Windmill height: 20 to 30m	Any capacity Available
Particulars	Large space is required for the panels	Special crane is required pole erection	Crane is required for pole Erection	Any capacity Available
Prime investment	Middle	Large	Middle	Small
Maintenance cost	Small	Small	small	Small
Environmental load	Recovery of Batteries	Harmful to Humans	Harmful to Humans	CO_2 exhausting

9) Refrigeration Facilities

The refrigeration facilities were constructed 25 years ago as a centralized system with ammonia as the mode of refrigerant. However, the facilities had not been operated since the beginning of 2000 due to the decline in shrimp culture.

Table 6.1.14 Physical Condition of Refrigeration Facilities in IFPC

Refrigeration Facilities	Particulars
Centralized refrigeration system	Ammonia Refrigerant
Common utilities	: Receiver (1) , Air-forced evaporated condensers(5)
	: Cooling towers(3)and pump,
High pressure side	: Compressor units (9)
Low pressure side	:
Ice making system	Liquid trap (2), Brine tank (2), etc.
Ice storage	Evaporator (2), Liquid traps (2), etc.
Contact freezer	Contact freezers t (8), Surge drum(8), etc.

- Common equipment: No longer re-useable, except for the receiver
- High-pressure side equipment: One reciprocating compressor could be re-used if completely overhauled. The eight sets of screw compressors cannot be used because the maker refused to overhaul the machineries
- Low-pressure side equipment: Evaporator can be used after restoration. Other equipments cannot be used including the piping and insulation materials

- Freezer: Better to replace with new machine including the surge drum, etc
- Storage and doors: Insulation panels can be used after the repair of damaged spots, doors should be replaced with new ones. Floor mortar should be completely reconstructed

(2) Related Municipal Fish Ports

1) Concepcion

a) Causeway

About 10m long of causeway was constructed but thereafter construction was suspended. Materials for armor stones and concrete pavement are still in good condition. There is a need to extend the causeway up to up to a sufficient water depth to enable fish boats to dock alongside for the unloading of fish catch.

Fig. 6.1.6 Stair Landing and Causeway (Concepcion)

The causeway will be very long because of the shoaling seabed. A rock mound type of causeway should be adopted due to the shallow water depth. The top of the causeway should be provided with concrete pavement for vehicle access. Precise position/alignment, crown height, stone size and etc., of the causeway will be determined based on the results of wave studies.

b) Stair Landing

The Stair landing facility is structurally in good condition and silt did not accumulate in front of the facility. Mooring depth is not sufficient at low tide. The stair landing facility which is located in the open sea is subjected to rough wave actions. It is reported that during monsoon season, the front of the market hall is affected by wave splashes.

In order to maintain sufficient water depth and calmness in the mooring areas a new stair landing facility should be constructed at the tip behind the extended causeway with a T or L shaped configuration to protect the mooring areas from wave actions particularly during the monsoon season.

c) Revetment

The east and west revetment with concrete slope is basically in good condition.

Rehabilitation of the revetments is therefore not necessary.

d) Market Hall and Ice Storage

The structure of the Market hall is constructed of composite materials with the flooring and columns made of reinforced concrete, while the roof frames are constructed with wooden truss provided with galvanized corrugated steel sheets roofing. The roof however is dotted with small holes. A privately operated ice storage compartment is located at the back of the market hall.

In order to reduce on maintenance cost the market hall should be reconstructed totally with reinforced concrete including the roofing and flooring. Construction will be such that it should not obstruct the marketing activities. The market hall should be provided with additional ice storage facility and ice crushing machine.

e) Utilities

Electrical supply to the port facilities including the market hall, vehicle holding areas among others are in good condition. The existing water supply system is provided with an elevated water tank but the whole structure is severely deteriorated and no longer functioning. Water is supplied to vendors except for the market hall which is supplied by the private sector. Wastewater mixed with solid trash is discharged to the sea due to the absence of wastewater treatment (WWT) facility and appropriate solid waste disposal. Garbage generated by the operation of the port is being collected by the municipal government for disposal.

The development of deep well(s) should be considered due to the insufficiency of supply from LUWA.

The WWT facility should be constructed in compliance with DENR/EMB regulations.

2) Dumangas (Dacutan)

a) Stair Landing

The existing stair landing facility constructed with riprap coralline stones, concrete curb and concrete bitts are still in good condition.

3) San Jose De Buenavista

a) Causeway

The newly constructed market hall is located on shore. Causeway was not constructed due to financial constraint. Construction of the causeway up to a sufficient water depth is essential to allow the unloading of fish catch directly from fish boats.
Causeway will be very long due to the shoaling seabed, based on initial survey. The causeway should be the rock mound type with concrete pavement on top to allow access of vehicles into the mooring areas. Precise positioning, crown height, stone size, etc of the causeway will be determined based on the result of wave studies.

b) Stair Landing

The stair landing facility which is located in front of the reclamation is structurally in good condition. But water depth is insufficient for fish boats to dock at low tides.

In order to maintain sufficient water depth and calmness in the mooring areas a new stair landing facility should be constructed at the tip behind the extended causeway with a T or L shaped configuration to protect the mooring areas from wave actions particularly during the monsoon seasons.

c) Market Hall and Ice Storage

The structure of the market hall which is still in good condition is made of reinforced concrete column/ beams with wooden truss and corrugated GI sheet roofing.

The market hall should be provided with fish handling shed and fish brokers' office space to be reconstructed with reinforced concrete. Additional ice storage facility with ice crushing machines should also be provided.

d) Utilities

While power and water supply are available, it has yet to be tapped because the market hall is still not operational. The port is not provided with WWT facility.

The new facilities as mentioned above need to be with power and water supply system. For sanitation and hygiene, a WWT facility should be provided in compliance with DENR/EMB requirements

6.1.6 Status of Operation and Maintenance

(1) IFPC

Due to financial constraints, PFDA conducted as part of the yearly activities minor repair works for buildings, utilities and other associated miscellaneous works. Major maintenance for civil and marine works was not conducted due to financial constraints. It is noted in this connection that based on information, the budget of IFPC for maintenance in 2009 was Php 300,000 which is not enough to maintain major repairs needed for marine/civil work facilities.

1) Refrigeration Facilities

The maintenance team for the refrigeration facilities consists of six staffs including the chief engineer of the technical division of IFPC. The ammonia refrigeration system however, totally broke down. The Freon refrigeration system on the other hand is by automatic operation and therefore do not require constant monitoring. Should the ammonia system for the ice making plant be restored in the future, there is a need to enhance the technical skill capacity of the maintenance staffs otherwise operation and maintenance will be conducted by the private operator if the facility is leased out by PFDA.

2) Market Hall Facilities

Market hall is being operated by PFDA. PFDA is also providing the security in the complex. The ongoing trading activities at the market hall however, are being pursued without reference to SSOP guidelines.

(2) Municipal Fish Ports

Table 6.1.15 Status of Operation and Maintenance of Municipal Ports

Port	Facilities	Remarks
Concepcion	Market Hall	Roof was repaired a few years ago.
Dumangas	Stair Landing	No maintenance was made for the stair landing facility.
San Jose	All facilities	No maintenance because the newly constructed facilities is still not in use.

6.1.7 Problems and Needs of Stakeholders

The major problems and needs elaborated in the Stakeholders Workshops for each site are summarized as follows:

Table 6.1.16 IFPC

Category	Problems	Needs
Facilities	1. High operational cost of the fish ports due to ramshackle condition of the facilities	1. Replacement/ repairing/improvement of existing facilities
	2. Harbor and berthing areas not available during southwest monsoon	2. Repair and lengthening of existing breakwaters and dredging of harbor basin and mooring areas
	3. Crowded market hall due to limited space	3. Expansion of fish unloading area
Services	4. High cost of electricity thus adversely affecting port operations	4. Use of solar energy for power generation.
Others	5. Depleting marine fish catch	5. Promotion of aquaculture industry for sustainable fish supply.

Table 6.1.17 Concepcion

Category	Problems	Needs
Facilities	1. Crowded mooring areas and shallow berthing depths	1. Expansion of causeway & berthing areas and dredging of the channel entrance.
	2. Hazard of entry to the port particularly during monsoon season and at night time	2. Construction of breakwater and installation of beacon light for navigation.
	3. No one is tasked for port management and security	3. Province of a port office and appropriate staffs including security.
	4. Spoilage of raw materials during peak season due to insufficiency/absence of ice.	4. Insufficiency of Ice distribution service, fish preservation facilities, and water supply system
	5. Water pollution	5. Absence of waste treatment facility
	6. Limited number of buyers due to filthy markets.	6. Upgrading of market hall
Services	7. Unstable fish price	7. Market network and information

Table 6.1.18 Dumangas

Category	Problems	Needs
Facilities	1. No centralized fish landing area	1. Establishment of a fish port
Services	2. Unstable fish price	2. Market and information network
	3. Expensive ice	3. Ice distribution network
	4. Unsatisfactory enforcement of fisheries regulations	4. Policy formulation

Table 6.1.19 San Jose De Buenavista

Category	Problems	Needs
Facilities	1. Cartel is promoted due to the absence of centralized fish landing area 2. Difficulty in entry to existing fish port due to shallow depth particularly at low tide	1. Establishment of centralized landing facilities to unify/consolidate trading activities
		2. Extension of causeway to deep waters
	3. Fish spoilage due to insufficiency of ice and market	3. Ice distribution network
Services	1. Oversupply of fish during peak season	1. Control of fish catch and sale volumes
	2. Unsatisfactory enforcement of municipal law (solid waste, sewage, security)	2. Conduction of massive IEC activities

6.2 Sual Fish Port Complex (SFPC) and Related Municipal Fish Ports

6.2.1 Fishery Production

(1) Overall Situation

Pangasinan is the top ranking milkfish producing province nationwide with 84,772 MT of aquaculture produce in 2007. Pangasinan accounted about 25% of the total fish production country wide and 95% of the production region-wise. The province contributed about two-third of the total fish production of Region I at 117,761 MT exclusive of seaweeds.. At the current rate, milkfish production in Pangasinan would be able to cope with the pace of increasing domestic and export demands.

Both municipal and commercial fisheries are minor sub-sectors of the fishing industry due to limited fishing ground in Lingayen Gulf, more so that the fishery resources in the Gulf is reported to be heavily depleted due to trawl fishing. Consequently, marine fishery appears to be stagnant and not much increase is expected for the future from marine fishery, except for purse-seiners and long-liners fishing based in Bolinao operating offshore along the northern waters of Luzon Sea for skipjack fishing which still appears to have the potential of increasing production.

(2) Demand and Supply of Fish

Dagupan is the fish marketing center in the province. Fish comes from all over the coastal areas of Lingayen Gulf and 60 to 70% of the fish products transacted in the wholesale market of Dagupan are being distributed to Regions I and II.

Region I is expected to continue as the major source of fish supply to Region II, Region III and NCR, for filling the deficiency in fish supply through enhancement of the aquaculture industry as shown in the Table below:

Table 6.2.1 Estimated Local Demand and Supply of Fish (Unit: 1,000 MT)

Region / Province	Local Demand for Fish				Fish Production				Breakdown of Fish Production (2025)			Surplus (2025)
	2007	2015	2020	2025	2007	2015	2020	2025	MF	CF	AQ	
Region I	166	177	171	166	147	166	178	190	38	9 (2)	143(41)	+24
- Pangasinan	97	104	101	98	115	133	144	155	15	7 (2)	133(38)	+57
(Dagupan City)	5	5	5	5								
Region II	111	116	111	108	56	59	62	65	27	23 (4)	17 (5)	-41
Region III	355	367	368	370	259	296	320	344	42	12 (2)	290(83)	-26
- Zambales	18	26	26	25	19	21	22	23	9	6 (2)	8 (2)	-2
NCR	422	413	411	410	91	98	103	108	6	98(16)	4 (1)	-302

Abbreviation: MF: Municipal Fishery, CF: Commercial Fishery, AQ: Aquaculture (except seaweed) Source: BAS (2007)
Remarks: ( ) shows the estimated increment from 2007. NCR includes Navotas Fishing Port.

(3) SFPC

SFPC is currently catering not only as a fish port for fish caught in Lingayen Gulf but also as transshipment hub for general cargos bound to Dagupan City, a major center of trade and commerce in the Ilocos Region. But the proximity to Metro Manila linked by good access roads is less advantageous for SFPC. Considering however the increasing milkfish production in Sual, SFPC could be activated not only as a fish processing center but also as a transshipment hub multi-purpose port for goods and commodities destined for large cities in the north including Central Luzon considering that no major port exist in northern Luzon except for the Port of San Fernando and Port of Irene in Apari which are not sheltered and are susceptible to severe wave actions.

1) Fishing Boats

Twenty-eight (28) units of registered commercial fishing boats consisting of Danish seines are based in Dagupan while 6 units (3 Danish seines and 3 trawlers) are based in Sual. Most of the Danish seines of 21.2 GT in average are unloading their catch in SFPC during the southwest monsoon season, from Sep. – Feb. because of the difficulties in entering the shallow mouth of Pantal River in Dagupan coupled with the occurrence of severe wave actions. Even during the northeast monsoon season from Mar. – Aug., some 4 - 16 units of fish boats occasionally use SFPC depending on wave condition. Additionally, a total of 31 units of cargo/passenger vessels and barges, 401 GT in average and 1,243 GT maximum, are occasionally using the multi-purpose pier of SFPC for the unloading of fertilizers and livestock, but are not used for loading and unloading of fish feed for cage culture.

Table 6.2.2 Fishing Boats Entry to SFPC

Type of boats	Commercial Fishing Boats			Non-Fishing Boats		
	2007	2008	2009	2007	2008	2009
No. of boats entry (daily average)	2.26	1.83	1.59	0.26	0.17	0.17
(at peak month)	3.63	4.60	4.67	0.33	0.23	0.33
Ave. berthing days / boat / month	-	2.69	5.24	-	14.90	8.21
(at peak month)	-	8.08	7.73	-	19.33	13.50

Source: PFDA and SFPC (2008)

Due to the additional cost of land-transportation needed for the transport of fish to Dagupan City from SFPC, existing Dagupan based commercial fishing boats may not completely relocate to SFPC unless the shallow mouth of Pantal River will constrain commercial fish boat entrance, in the future.

2) Fish Catch and Unloading

Fish unloading volume in SFPC has been limited, ranging from 500 – 1,200 MT per annum since 1994. Bolinao is closer to the fishing grounds than Sual for purse-seine fishing, while Dagupan is suitable for fish wholesale and for this reason local ring-netters prefer to unload at Dagupan. Due to the distance of the fishing grounds from Sual, the use of SFPC for commercial fishing boats is limited as compared with other fish ports.

Table 6.2.3 Fish Unloading at SFPC (Unit: MT)

	2005	2006	2007	2008	2009	Average	Major Species
Annual volume	469	580	515	557	639	552	Round scad (40.1%), Indian
Daily average	1.30	1.61	1.43	1.55	1.78	1.52	Mackerel (23.4%), Big-eye
Average in peak month (Oct.)	3.66	4.55	3.85	4.54	6.44	4.51	scad (7.3%)

Source: PFDA

Some 324 large–scale marine fish cages, 19m in diameter x 18 meter in depth exist in Lingayen Gulf producing milkfish with total volume of 18,450 MT in 2008. However, most of the harvest was unloaded at the municipal public jetty for transshipment to Manila. Inviting these fish cage operators to SFPC is possible not only for transshipment purposes but also for milkfish processing by providing them with farm support logistics including ice, fish feed, fuel and dedicated berthing facilities primarily for carrier boats of fish cage operators).

Based on this premise, production of milkfish from cage fishing is expected to increase to 22,800 MT in 2025 in accordance with the maximum approved number of cages of about 400 in total by BFAR, pursuant to environmental considerations and marketability of the products.

(4) Municipal Fish Ports (Dagpan and Subic)

Since the proposed municipal fish ports will be developed to support the operations of SFPC, two candidate port sites with diverse features were considered. These are: a) Dagupan fish port as fish distribution center for Northern Luzon) and b) Subic – Zambales to be used as fishing bases to South China Sea). The current condition of fishery production for each port is described as follows:

1) Dagupan

Dagupan Fish Port has ever since been functioning not only as the fish landing & marketing center of Pangasinan but also as a passenger boat terminal for the existing river and canal system in the surroundings of Dagupan City. The principal fishing gears used by

commercial fishing boats are the Danish seine operating inside Lingayen Gulf. Of the total volume of fish transacted in Dagupan Fish Port some 14,270 MT/year or about 90% are brought overland.

2) Subic

Subic Fish Port is strategically located in an appropriate location as one among the offshore fishing bases for the South China Sea. The fishing gears comprise primarily of hand-line and gill net for capturing large pelagic and demersal fish species. The fleet of commercial fishing boats includes purse-seine, ring-net and Danish seine for capturing of small pelagic fish. The main fishing ground is the South China Sea. Fish aggregating devices (FAD) are used for the fishing expeditions. The annual unloading volume is estimated at 11,861 MT, for which some 5,451 MT comes from fishing boats while the remaining comes from other fish landing areas transported on land.

The estimated number of fishing boats and fish unloading volumes for the 3 municipal fish port sites are tabulated hereunder.

Table 6.2.4 Fishing Boats at the Relevant Municipal Fish Ports

	Total No. of fishing boats		Ave. No. of boats entry / day (Dec. 2009)	
	Commercial	Municipal	Commercial	Municipal
Dagupan	31(DS), 21(BT)	-	1.4(DS), 9.5(BT)	-
Subic	9(HL), 1(RN)	152	0.2(PS), 1.0(RN), 0.1(DS), 2.0(BN), 1.8(HL/LL)	22.6(HL/GN), 0.1(LL), 32.1(SS), 14.4(OT), 3.9(CB)

Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)
Abbreviation: DS: Danish seine, BT: Baby trawl, PS: Purse seine, RN: Ring net, BN: Bag-net, HL/GN: Handline/Gillnet, LL: Longline, SS: Small-scale fishing boats, OT: Others
Note: Danish seine fishing boats of Dagupan are operated based in Sual during survey period. Number of boats entry at Dagupan at a peak month is estimated 6.0 (DS) and 9.5 (BT) by adding number of boats entry at SFPC in December.

Table 6.2.5 Fish Unloading at the Relevant Municipal Fish Ports (Unit: MT)

	Peak season	Fish unloading volume (Dec. 2009)	Estimated annual volume	Major Species
Dagupan	Mar. - May	1,073	12,630	Milkfish, tilapia, squid, anchovy, scad, mackerel
Subic	Oct. – Apr.	618 (OL)	10,937	Milkfish, tilapia, squid, skipjack

Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)
Note: Annual catch was estimated based on the following factors:
1) Dagupan: Fish unloading volume in Dec. x 12 + (Unloading volume at SFPC in Dec. x 8.31)
2) Subic: 5,412 MT (Estimate based on Subic Municipal Office Data 2009) + (Overland volume in Dec. x 8.94)

6.2.2 Fish Distribution Flow and Marketing System

(1) SFPC

1) Fish Flow

All fish unloaded in SFPC are transshipped to the wholesale market in Dagupan City, except for small portion which are provided to the crews or sold to local buyers in Sual. Fish destined to SFPC are not delivered by land transport but by sea transport.

2) Fish Marketing Channel

Fish brokers/dealers are not available in SFPC. All fish products that are unloaded are transshipped by boats to Dagupan among other means of sea transport.

3) Ice Supply

Ice shortage may at times occur in Pangasinan, particularly in Sual where large-scale fish cage operation are largely dependent on importation of ice from elsewhere as can be seen on

the table below:

Table 6.2.6 Demand and Supply of Ice

Province	Estimated Ice Requirement	Ice Supply	Balance
Pangasinan	For fishing boats: 11,500 MT For aquaculture: 47,600 MT For marketing: 28,800 MT Total 87,900 MT (293 MT/day)	SFPC: 15 MT/day (operated by private company) Private: 260 MT/day (Calaciao: 120 MT, Dagupan: 5 MT, Bolinao: 135 MT)	Shortage of 18 MT/day

Assumption: Icing ratio 150% of catch for commercial fishing boats, 25% for municipal fishing boats, 50% for shipping of aquaculture products, 25% for marketing of fresh fish, and 200% of raw material volume for processing ((based on BAS Fisheries Data 2007).

Considering the future increase in milkfish production and the attraction of fish cage operators for the possible use of SFPC, it is essential to expand the existing ice plant of SFPC so as to ensure stable supply of ice for Sual area. Based on estimation, the required volume of ice for milkfish cage production in Sual would at least be 28 MT/day (Milkfish 35 MT/cage/crop x 1.5 crops/year x 324 cages x 50% / 300 days). Thus, an additional 15 MT/day of ice plant would be necessary.

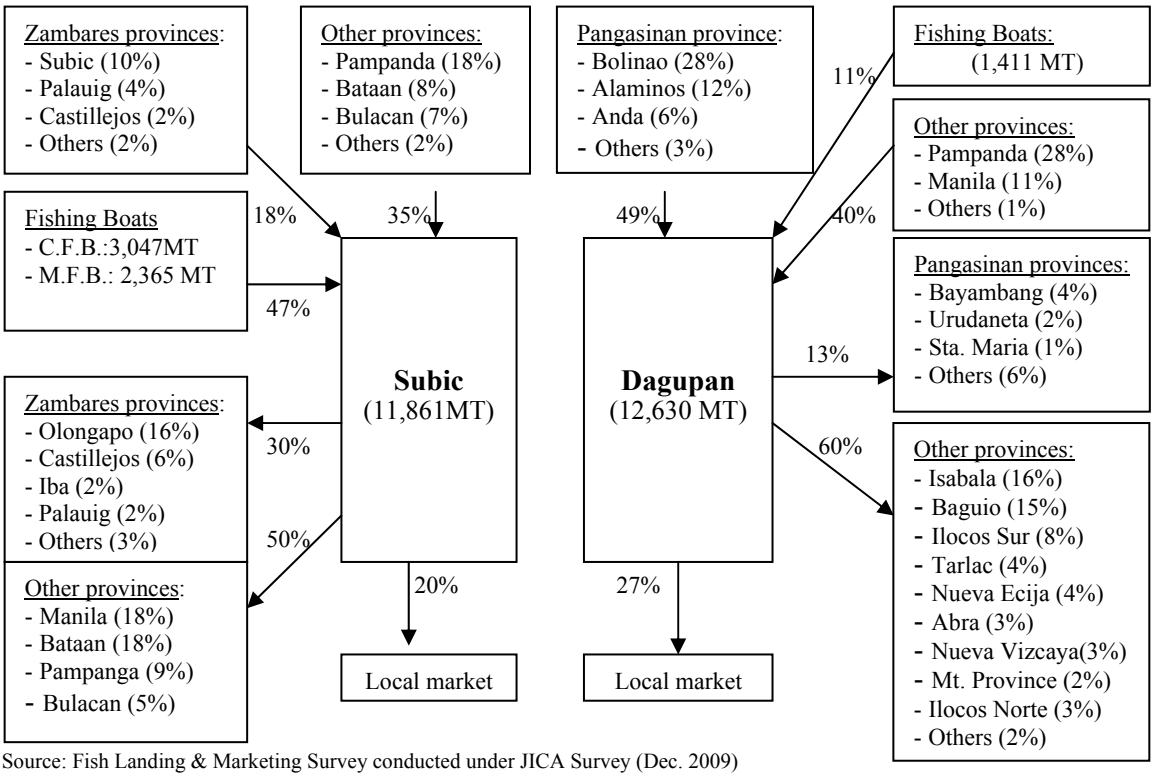
4) Fish Processing

Although there is no fish processor at present, several corporations including the lessee of the refrigeration facilities (Bolinao Agro-Resources Inc.) and some of the milkfish producers appears to be interested in milkfish processing. For undertaking this tasks, at least 2-lines of milkfish processing plant is considered necessary as one option of attracting fish cage operators and other associated investors to relocate to SFPC. One of the 2-lines facility should be of the all-in-one type model to be provided with ice plant of 1.5 ton/day capacity, 1 ton/day capacity blast freezer, 20-ton capacity cold store room and 250 m2 processing room. These fish processing facilities are estimated to produce approx. 480 MT of processed products from720 MT of raw materials at peak operation.

(2) Municipal Fish Ports (Dagupan and Subic)

1) Fish Distribution Flow

For the time being, the relation among SFPC and the proposed municipal ports in Dagupan and Sualin terms of fish distribution would be nominal as shown in the Flow Chart below. Majority of the fish to be unloaded will be consigned outside the municipality estimated at 73% for Dagupan and 80% for Subic, respectively. In this context, both ports have potential capacity to provide the raw materials needed for the proposed processing plant for SFPC in the future.



Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Fig. 6.2.1 Fish Flow from the Project Municipal Fish Ports

2) Fish Marketing Channel

All fish products to be unloaded in Dagupan Wholesale Market and Bulungan Fish Port in Subic will be consigned to fish brokers for transactions with fish buyers through auction and negotiation.

Table 6.2.7 Present Activities of Fish Brokers

Municipality	No. of fish brokers	Fish Collecting Point	Fish Selling Point	Fish dealing volume (kg/day)	Total No. of workers (average / broker)
Dagupan	Large 75 Small	Dagupan / Sual	Dagupan Wholesale Market	Large: 1,000 – 8,000 Small: 60 - 600	300 (4.0)
Subic	18	Subic	Bulungan Fish Port	520 – 2,400	43 (2.4)

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

The fish products transacted at the fish ports will be distributed and transported by various types of enterprise and vehicles as shown in the table below.

Table 6.2.8 Proportion of Fish Volume Shipped Out by Types of Actors

Municipality	Operator	Broker	Wholesaler	Trader	Retailer	Viajeros	House to House
Dagupan	-	1%	93%	-	4%	-	2%
Subic	-	-	12%	-	45%	43%	-

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Table 6.2.9 Type and Number of Vehicles Used for Fish Distribution

Municipality	Delivery (No. of units/day)					Shipment (No. of units/day)			
	2-wheel	3-wheel	4-wheel	6-wheel	10-wheel	2-wheel	3-wheel	4-wheel	6-wheel
Dagupan	0.1	2.5	2.0	11.2	2.0	-	60.1	0.4	
Subic	-	2.0	2.8	8.9	0.1(18-wheel)	3.4	28.2	19.2	7.2

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

6.2.3 HACCP System

Aquaculture products is an important industry in Region 1, but production is still confronted with numerous difficulties due to deficiency of needed expertise to produce value-added products, lack of experts for the effective transfer of know-how, and multi-layered marketing system. SFPC is currently not provided with HACCP compliant processing and laboratory facilities. Recently, SFPC had leased out the refrigeration facilities and ice plant to a private operator. Attraction of the aquaculture industry to SPFC is essential for the promotion and establishment of food safety system. As informed by a certain investor, SFPC is mandated to eventually become the supply/distribution basket for aquaculture product in the region. In connection with HACCP facilities, there is only one institution in the region with a potential to support the HACCP monitoring system in Sual. This is BFAR's National Integrated Fisheries Technical development Center (NIFTD), located in Bonuan, Pangasinan. NIFTD's main activities are the technical development of the aquaculture industry including hatchery, pathology and limnology, but are not involved with processing or marketing. Some of the laboratory equipments of NIFTD can be utilized for test needed for microbiological analysis, although AAS or GC/MS chemical analysis could not be undertaken. Currently, almost all of the isolated cage aquaculture samples to determine the chemical substances are sent to Manila BFAR central laboratory office or in certain cases, to exporting destination for test and analysis. The enhancement of fishery product for export is anchored on HACCP compliant fish processing system. Anticipating that cage-culture products will increase in the near future in Region I, improving the accessibility of SFPC by providing HACCP compliant monitoring system is essential. The BFAR regional division or NIFTD has the potential to support the proposed HACCP monitoring system of SPFC, but further development of their capacity is required by enhancing their laboratory activities. Relative thereto, it is for the best interest of SFPC to possess a laboratory for use inside the complex pursuant to PNS/ISO/IEC 17025 standard for product quality assurance assessment prior to shipment for domestic and overseas markets. Laboratory facility for physiochemical analysis, chemical examination and water analysis are required.

*Abbreviation: GC/ MS: Gas Chromatography/ Mass Spectrometer, PNS/ ISO/ IEC: Philippine National Standard/ International Organization for Standardization/ International Electro technical Commission

6.2.4 Present Status of Utilization of the Existing Fish Port Facilities

(1) SFPC

1) Refrigeration Facilities

SPFC had leased the refrigeration facilities to "*Bolinao Agro Incorporated",* 2 years ago but operation appears to be limited only for the ice making plant and the temporary ice stock room. Other facilities such as the freezers and cold storage are still slated for repair. The following table is the lists of refrigeration facilities in SFPC.

Table 6.2.10 Refrigeration Facilities in SFPC

Refrigeration Facilities	Number (Unit)	Description	Technical possibility for Rehabilitation (reason)
ICE making plant	1	: Operational (100%) Not full production	B (Depreciated-Antiquated)
ICE storage	1	: Operational (50%) For temporary stocking only	A (Depreciated-antiquated)
Cold storage	2	: Not operational (100%)	A (Antiquated)
Contact freezer	2	: Not operational (100%)	C (Antiquated)

Remarks: A: Rehabilitation is not required except ordinary maintenance.
B: Replacement of some machinery parts will be required within 10 years.
C: Total replacement is needed.

2) Fish Landing Facilities

The pier which was designed for fish boats is being utilized as a multi-purpose berthing facility for patrol boat and cargo ships. The pier is fully occupied during peak operations from November to February. During this time, the pier is fully occupied fully occupied so that berthing time is limited to a possible minimum. Also, numerous fishing boats have to wait to be accommodated. For this reason, the pier must be enlarged to cater to aquaculture carrier vessels expected to increase with the proposed improvement of SPFC and increase in aquaculture productions.

6.2.5 Physical Condition of the Fish Port Facilities

(1) SFPC

1) Multi Purpose Pier

Visual surveys conducted shows that the pier is heavily dilapidated. Concrete cover of re-bars has chip off exposing them to severe corrosions. Deep cracks were also found in many parts of the beams. No damage is found on the concrete piles.

Due to the extent of damage, it is considered best to totally demolish the superstructure for reconstruction. All the damaged rubber fenders should also be replaced.

Fig. 6.2.2 Stair Landing (SFPC)

2) Stair Landing

Minor damage was found on the fish stair landing facility particularly the concrete slabs.

All damages should be repaired for the safe operation of unloading of fish harvest

3) Basin

The light beacon navigation aid is still in good condition.

4) Revetment

The concrete slab and rock mound revetment located at the north east corner of the port is partially damaged.

Immediate repair of the damage should be undertaken to avoid further escalation of damages.

5) Slipway

The civil work facilities of the slipway including the rails and concrete foundation are not damage but the winch, cradles and workshop machineries are severely deteriorated and corroded.

Slipway will be extended. Also, power supply system and the machineries as stated above including the equipment and facilities needed to operate the slipway should be refurbished although the capacity of the workshop will have to be reduced.

6) Market Hall and Refrigeration Building

The market hall has no damage after it was renovated in 2009. The refrigeration building is partially damage.

Total rehabilitation of the refrigeration building is recommended.

7) Fish Processing Facilities

HACCP accredited fish processing facilities is proposed for construction at the vacant area near the administration building.

8) Utilities

All the utilities work including power supply, fresh water supply, sea water supply are no longer functioning.

Reconstruction of the utility works considering future demand. The port should be provided with waste water treatment facility pursuant to DENR/EMB requirements. Development of deep wells is needed for the water supply system of the complex.

9) Refrigeration Facilities

The refrigeration facility was constructed more than 20 years ago as a centralized system with ammonia as the mode of refrigerant. As mentioned above a private company has been operating the ice making plant including the temporary ice stock room.

Table 6.2.11 Physical Condition of Refrigeration Facilities in SFPC

Refrigeration Facilities	Description
Central refrigeration system	Ammonia Refrigerant
Common utilities	: Receiver (1), Air-forced evaporated condensers (2)
	: Cooling towers (1) and pump,
High pressure side	: Compressor unit (4)
Low pressure side	:
Ice making system	Liquid trap (1), Brine tank (1), etc.
Ice storage	Evaporator (2), Liquid traps (2), etc.
Contact freezer	Contact freezing unit (2), Surge drum (2), etc.

- Storage and doors (Prefabricated insulation panel type)
- Common equipments: No longer usable except for the receiver
- High-pressure side equipment: One reciprocating compressor has been overhauled. The other compressors should also be overhauled
- Low-pressure side equipment: Evaporator is usable after repair. Other equipment and materials are no longer usable including the piping and insulation materials
- Freezer: Replacement with new freezers including the surge drums, etc., is better
- Storage and doors: Insulation panels are usable after the repair of damaged spots

(2) Related Municipal Fish Ports

1) Dagupan

a) Market Hall

There were no significant damages in the market hall.

b) Stair Landing

There were no significant damages in the fish landing facility.

c) Utilities

The fish port should be provided with WWT facility and appropriate solid waste handling facility pursuant to DENR/EMB requirements.

2) Subic

a) Market Hall

Wooden column is damaged by termites. Concrete footing is heavily deteriorated.

Total reconstruction of the market hall including the pavement in the surrounding areas is recommended.

Fig. 6.2.3 Market Hall (Subic)

b) Basin

Depth of basin is quite shallow from silt deposits coming from the nearby river discharge. Due to the shallow depth, unloading of fish catch is done manually by fishermen from fish boats anchored off shore.

c) Landing Facilities

Landing facilities composed of Quay wall and Pier. Both facilities were deteriorated due to long use and depreciation.

d) Utilities

The fish port should be provided with WWT facility and appropriate solid waste handling facility pursuant to DENR/EMB requirements.

6.2.6 Status of Operation & Maintenance

(1) SFPC

Rehabilitation of Sual fishing port was conducted by PFDA in 2009. The list of repairs is tabulated hereunder:

a) Repair and improvement of administration office
b) Repair and improvement of market hall building
c) Extension of perimeter fence and related work
d) Repair of guardhouse
e) Fabrication & installation of signboard
f) Improvement of pump house shed

g) Rehabilitation of street lighting

- Refrigeration Facilities

  Employees of the private operator are providing the maintenance of the refrigeration facilities effectively and efficiently. Operation cost of the private operator is considered as relatively reasonable.

(2) Municipal Fish Ports

Table 6.2.12 Status of Operation and Maintenance of Municipal Ports

Port	Facilities	Remarks
Dagupan	Fish Landing	Passenger's shed was constructed in 2006.
Subic		The facilities are not maintained.

6.2.7 Problems and Needs of Stakeholders

The major problems and needs elaborated by the Stakeholders during the Workshop for each site are summarized as follows:

Table 6.2.13 SFPC

Category	Problems	Needs
Facilities	1. Boatyard needs rehabilitation	1. Rehabilitation of boat yard
	2. Inadequate berthing facilities	2. Improvement of berthing facilities
Services	3. No market activities	3. Awareness of port services by all port stakeholders
	4. High cost of electricity and fish port charges/fees (outdated refrigeration)	4. Upgrading refrigeration facilities

Table 6.2.14 Dagupan

Category	Problems	Needs
Facilities	1. Limited space for existing trading activities (congestion, conflict of interest)	1. Expansion of wholesale market
		2. Relocation of fish landing and market facilities
	2. Difficult market access	3. Provision of HACCP-compliant facilities
	3. Fish export not possible	
Services	4. Deficiency in implementation of pertinent ordinances (confusion between enforcers and users)	4. Harmonize related laws and ordinances
		5. Regulate entry of non-Dagupan / Pangasinan products
	5. Poor fish quality	
	6. Poor quality of fish products due to inappropriate post harvest handling practice	6. Provision of extensive training program and information dissemination on fish handling and quality control practices
Others	7. Difficulty of transportation	7. Construction of road from MFL to NBI

Table 6.2.15 Subic

Category	Problems	Needs
Facilities	1. Inadequate / insufficient port infrastructure	1. Upgrading of existing and construction of other needed facilities
Services	1. Pilfering at night	1. Adequate security
	2. No unity among stakeholders	2. Constant consultation through appropriate IEC
Others	1. Rampant illegal fishing activities	1. Strict implementation of fisheries law
	2. Delinquent non-payment of concession dues	2. Strict implementation policy on revenue collection through training of LGU and application of sanctions

6.3 Lucena Fish Port Complex (LFPC) and Related Municipal Fish Ports

6.3.1 Fishery Production

(1) Overall Situation

Of the total fish production in 2007, in Calabarzon Region (IV-A) produced 360,568 MT exclusive of seaweeds, with Quezon province supplying 31.2% or 114,487 MT of the harvest of which 21.3% or 24,395 MT were hauled to Lucena City. The main fishing grounds of the catch are Lamon Bay located in the north coast and Tayabas Bay in the south coast. Purse-seiners based in Lucena are operating in the offshore waters of Sibuyan, Burias and Marinduque Islands. Due to limited marine fishery resources and the low growth rate of aquaculture production, fish production in Quezon province has been stagnating along the level of 110,000 MT over the last 5 years.

(2) Demand and Supply of Fish

Quezon province is one of the major fish suppliers to Laguna, Cavite and NCR. By 2025, about 56,000 MT of fish produce in Quezon and 17,000 MT of fish products in Lucena City are estimated to be delivered to the said areas.

Table 6.3.1 Estimated Local Demand and Supply of Fish (Unit: 1,000 MT)

Region / Province	Local Demand for Fish				Fish Production				Breakdown of Fish Production (2025)			Surplus (2025)
	2007	2015	2020	2025	2007	2015	2020	2025	MF	CF	AQ	
Region IV-A	429	446	461	473	360	387	403	420	122	87	211(60)	+53
Quezon	60	70	68	66	115	118	120	122	20	77	25 (7)	+56
(Lucena City)	9	9	8	8	24	24	25	25	4	17	4 (1)	+17
Laguna	90	90	93	96	52	54	55	56	41	0	15 (4)	-40
Cavite	104	115	125	133	16	17	18	19	4	4	11 (3)	-114
Batangas	82	84	84	84	94	106	113	121	21	5	95 (27)	+37
NCR	422	413	411	410	91	98	103	108	6	98 (16)	4 (1)	-302

Abbreviation: MF: Municipal Fishery, CF: Commercial Fishery, AQ: Aquaculture (except seaweed) Source: BAS (2007)
Remarks: ( ) shows the estimated increment from 2007.

(3) LFPC

LFPC has been playing an important role as regional fish port serving both commercial and municipal fishery as well as other means of ship transports, thus greatly contributing to the regional economy. Due to the absence of (traditional) fish landing sites in Lucena City, LFPC is closely unified with the local fish operators, fish brokers and other related stakeholders.

1) Fishing Boats

There are more than 300 municipal fishing boats, 52 commercial fishing boats ranging from 5-50GT, 20 commercial fishing boats of 50GT and above and 7 general cargo/passenger vessels operating in LFPC in 2008. Most of the commercial fishing boats have constantly been using LFPC for fish harvest unloading. Due to the limited fishery resources of the present fishing grounds and based on the restriction imposed on the total number of purse-seiners, the number and frequency of boats using LFPC are considered to remain at the present level. The multi-purpose pier to accommodate fishing boats of more than 50 GT appears to have surpassed its design capacity, and for this reason certain number of commercial fishing boats is unloading at the adjacent PPA commercial port causing loss of income to LFPC estimated at about Php 3 million in 2008. However, since 2009, this problem has been solved, resulting in the increase of number of commercial fishing boats

entry to LFPC in 2009. In addition, a certain numbers of purse seiners based at Navotas started to unload fish at LFPC since 2009.

Table 6.3.2 Fishing Boats at LFPC

Type of boats	Municipal Banca			Commercial F.B.			Non-Fishing Boats		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
No. of boats entry (daily average)	7.21	13.64	5.82	6.86	6.71	9.10	0.76	0.19	0.10
(daily average at peak month)	23.58	25.07	10.93	9.47	9.77	13.60	1.27	0.50	0.33
Ave. berthing days / boat /month (2008)	**MB:** 2.8, **CFB (3 – 50GT):** Catcher 12.1, Carrier 9.0, Sonar Boat 9.7, Light Boat 7.6, Escort 11.0, Cargo Banca 6.4, **CFB (50 GT up):** Catcher 7.4, Carrier 13.6, Cargo/Passenger Boat 30.2								

Abbreviation: MB: Municipal Banca, CFB: Commercial Fishing Boat Source: PFDA and LFPC

2) Fish Catch and Unloading

The average annual fish harvest unloading in LFPC over the last 3 years is 24,744 MT, of which approx. 40% is brought overland and 60% by direct unloading from fishing boats as shown in the table below. The unloaded fish products except for transshipment are being auctioned at the market hall of the port complex. Monthly unloading varies from 0.69 – 1.47 times the average. The fishing season is from Dec. – May in general, peaking from Mar. – Apr. in particular. Major fish harvest unloaded at LFPC for marine fishery include the Indian oil sardine at 22.8%, round-scad at 13.1%and Indian mackerel at 8.2%and skipjack at 7.5%. Cultured fish products such as tilapia accounted 9.6%of the produce and milkfish at 8.4%.

Table 6.3.3 Fish Unloading at LFPC

(Unit: MT)

	2005	2006	2007	2008	2009	Average	(Breakdown average 2005-09)			
							OL	LQ	MP	TR
Annual volume	20,688	21,705	28,127	24,400	23,773	23,738	9,568	4,027	5,541	4,603
Daily average	57.47	60.29	78.13	67.78	66.04	65.94	26.58	11.19	15.39	12.79
Average in peak month	70.60	87.65	92.95	99.48	92.17	88.57	27.68	18.86	24.58	15.40

Abbreviation: OL: Overland, LQ: Landing Quay, MP: Multi-purpose Pier, TR: Transshipment Source: PFDA

(4) Municipal Fish Ports (Atimonan, Calauag and Sta. Elena)

Considering that the proposed municipal fish ports will be developed to support the operation of LFPC, 3 fish landing sites have been surveyed as possible source of fish supply to LFPC. These are: 1) Atimonan, Quezon 2) Calauag, Quezon and 3) Sta. Elena, Camarines Norte. All the sites face Lamon Bay, the fishing ground for both commercial and municipal fisheries.

1) Atimonan

Atimonan Fish Port is the only place of fish harvest unloading and no other fish landing site is available in the locality. As such, fish catch landing in the municipality appeared to be centralized. Thirty (30) commercial fishing boats comprising of ring-net and Danish seine and a number of municipal fishing boats are unloading small pelagic and demersal fish products in this Fish Port, with annual unloading volume of 3,247 MT of which more than 50% are unloaded from fishing boats.

2) Calauag

There is one LGU-operated fish port, one privately owned fish port and 25 traditional fish landing sites in Calauag. Commercial fishing boats in Calauag are fewer than Atimonan. Majority of the fish harvest unloaded comes from other areas by land transport of which

only 14% of the total volume are unloaded from fishing boats and redistributed to other consuming municipalities. Annual fish unloading volume is estimated at 4,600 MT.

3) Sta. Elena

Sta. Elena is provided with Two (2) commercial ports located in San Lorenzo and Pulong Guit-Guit and 8 traditional municipal fish landing sites. . Sta. Elena is one of the major fish suppliers to LFPC estimated at 9% of the total volume. For the time being, most of the fish catch are being unloaded at San Lorenzo located along the Luzon highway, but Pulong Guit-Guit which is not provided with infrastructure fish landing facilities appears to be more attractive in as far commercial fishery by Danish seine, baby trawl and ring-net is concerned, considering the proximity of the calm and deep fishing grounds. Currently, there are 19 commercial fishing boats in San Lorenzo, and about 35 commercial fishing boats in Sta. Elena with Mercedes as the base of operation. The annual fish unloading volume in San Lorenzo and Pulung Guit-Guit is estimated at 1,969 MT.

The estimated number of fishing boats and fish unloading volumes in the 3 municipal fish port sites are tabulated hereunder.

Table 6.3.4 Fishing Boats at the Relevant Municipal Fish Ports

Municipality	Barangay / Landing Site	Total No. of Fishing Boats		Ave. No. of Boats Entry/ day	
		Commercial	Municipal	Commercial	Municipal
Atimonan	LGU Fish Port	13(RN), 13(DS)	9(GN/HL)	5.5(RN), 3.0(DS)	1.5(GN/HL), 1.4(CB), 6.2(SS)
Calauag	LGU Fish Port	2(DS)	8(SG)	-	21.0
Sta. Elena	Pulong Guit-Guit	N/D	N/D	-	14.9(GN)
	San Lorenzo	11(DS), 6(BT), 1(TW), 1(RN)	N/D	1.7(DS), 2.9(BT), 0.2(TW), 2.0(CB)	3.9

Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)
Abbreviation: RN: Ring-net, DS: Danish seine, GN/HL: Gillnet/Handline, CB: Carrier Boat, SG: Spear Gun, BT: Baby Trawl, TW: Trawl

Table 6.3.5 Fish Unloading at the Relevant Municipal Fish Ports (Unit: MT)

	Peak season	Fish Unloading Volume (Dec. 2009)	Estimated Annual Volume	Major Species
Atimonan	July – Sep.	97.1 (OL) 124.4 (FB)	3,247	Scad, skipjack, slipmouth, monocle bream, sardine, Indian mackerel
Calauag	Jan. – Nov.	313.8	4,600	Sardine, milkfish, tilapia, Kalapato, Eastern little tuna
Sta. Elena		134.3	1,969	Round scad, monocle bream, Indian mackerel, shrimps

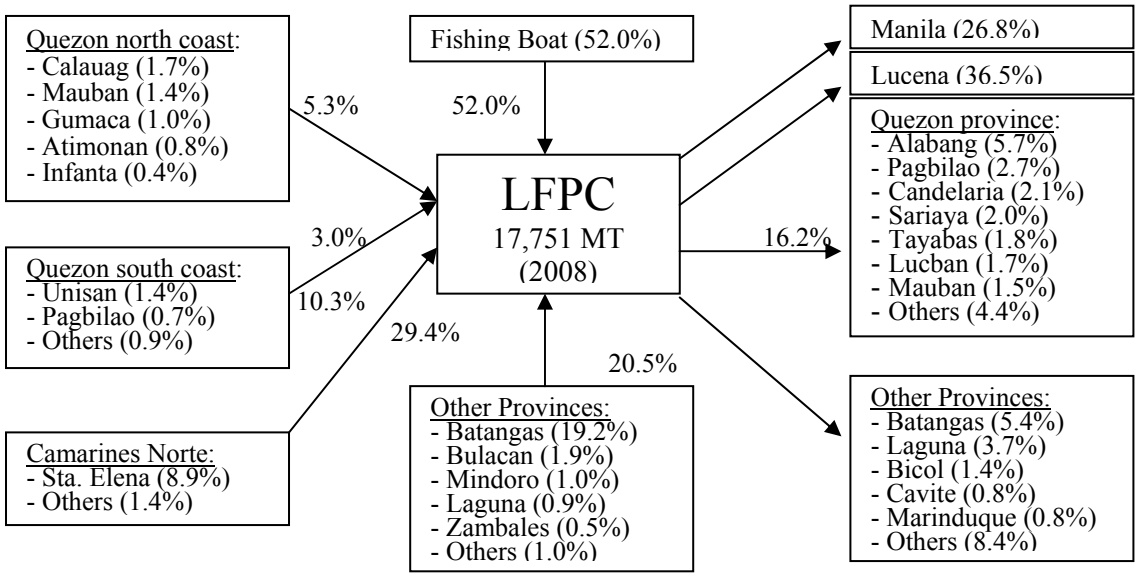
Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)
Note: Estimated annual catch = Unloading volume in Dec. x 14.66 Abbreviation: OL: Overland, FB: Fishing Boats

6.3.2 Fish Distribution Flow and Marketing System

(1) LFPC

1) Fish Distribution Flow

The flow chart hereunder shows the sources and destinations of fish products unloaded at LFPC.



Source: LFPC (source of fish) and Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009) (destination of fish)

Fig. 6.3.1 Fish Flow based on LFPC

2) Fish Marketing Channel

All fish unloaded at LFPC except r transshipment will be transacted at the Market Hall of LFPC for auction and negotiations through 25 authorized fish brokers. However, due to the 1,914 m2 limited space of the market hall, there is no other recourse but to conduct the icing / packing of fish products outside the market hall thus causing fish spoilage and congestion at the vehicle holding areas. Municipal fishery catch are generally sold to retailers outside the market hall because of the small quantity. Fish distribution from LFPC to other points of destination are undertaken by wholesalers at 52%, brokers at 20%, retailers at 13%, various viajeros at 11% and traders at 2%. The table hereunder shows the type and number of vehicles being used for distribution.

Table 6.3.6 Type and Number of Vehicles Used for Distribution of Fish

(Unit: No. of vehicles/day)

	Pedicab	Tricycle	Jeepney	Elf	4-wheel	6-wheel	8-wheel	10-wheel
Delivery	0.1	3.4	6.1	1.9	1.4	7.5	0.2	0.1
Shipment	6.8	5.4	3.3	3.9	5.3	4.5	0.7	1.6

Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)

3) Ice Supply

Ice supply in Lucena City, Atimonan and Calauag based on the result of the surveys appears to be sufficient even with the increasing aquaculture production in Quezon province, as shown in the table hereunder.

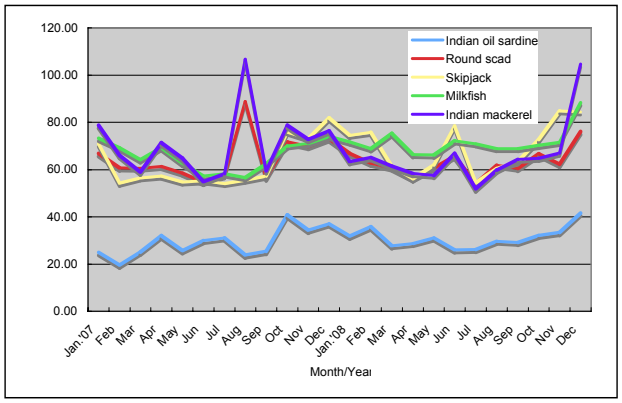
Table 6.3.7 Demand and Supply of Ice

Province	Estimated Ice Requirement	Ice Supply	Balance
Lucena City	For fishing boats: 26,700 MT For aquaculture: 1,800 MT For marketing: 6,100 MT Total 34,600 MT (115 MT/day)	LFPC: 25 MT/day Private (3 ice plants in Lucena City and 1 in San Juan - Batangas): Max. 150MT/day	Enough supply of ice even considering the supply to the outside of Lucena.
Quezon (except Lucena)	For fishing boats: 93,400 MT For aquaculture: 6,900 MT For marketing: 18,300 MT Total 116,000 MT (395MT/day)	Private (1 ice plant in Calauag, 2 in Atimonan): Max. 50 MT/day	Unknown due to no fish production data available on municipal level.

Assumption: Icing ratio 150% of catch for commercial fishing boats, 25% for municipal fishing boats, 50% for shipping of aquaculture products, 25% for marketing of fresh fish, and 200% of raw material volume for processing ((based on BAS Fisheries Data 2007).

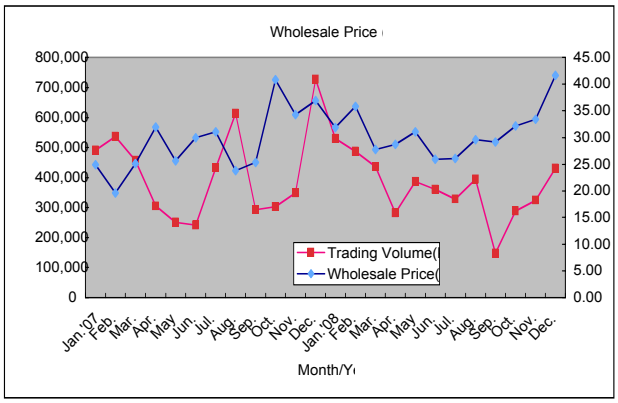
4) Fish Price

The wholesale price of fish products in LFPC has increased from Oct. – Dec. but went down from Mar. – May which is inversely proportional to the trading volume as shown in the Charts hereunder.



Source: LFPC

Fig. 6.3.2 Fluctuation of Average Wholesale Prices of the Dominant Species at LFPC



Source: LFPC

Fig. 6.3.3 Correlation between Trading Volume and Wholesale Price of Sardine at LFPC

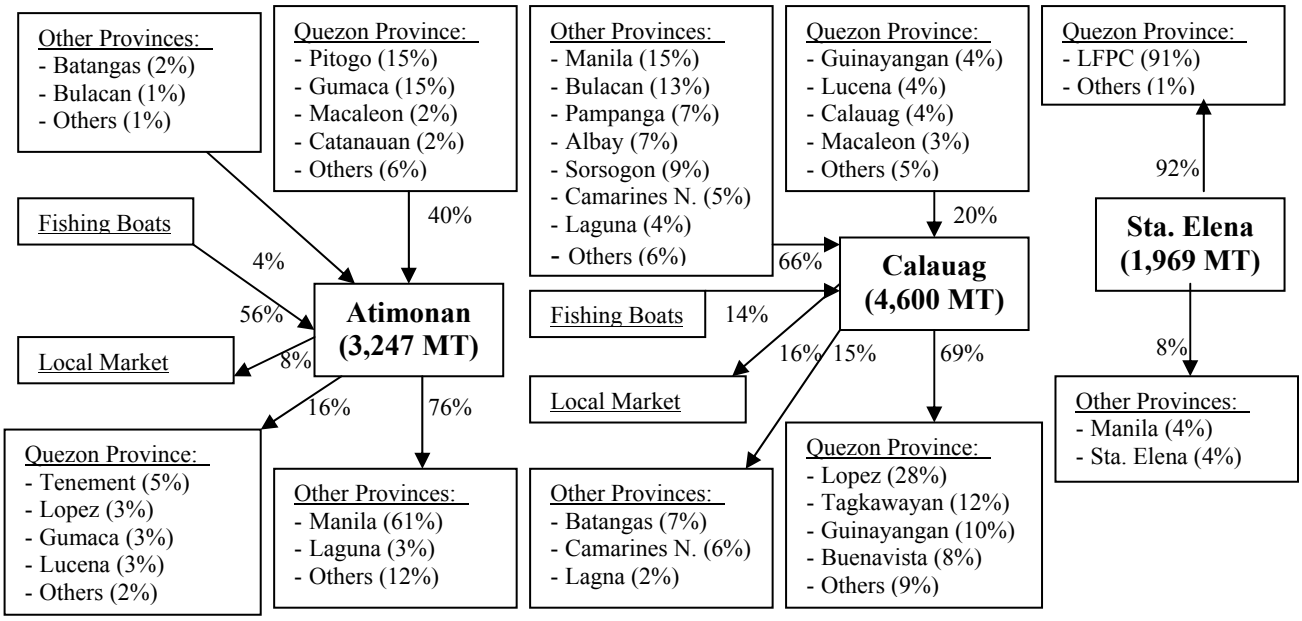
5) Fish Processing

The dominant fish species unloaded at Lucena is the Indian oil sardine at 4,398 MT or about 22.8% of the total landed volume in 2008. Daily pricing has largely fluctuated in accordance with seasonality and volume of supply. There are currently 16 fish processors for smoked fish in Lucena City, producing approx. 3,000 MT of sardines annually. To stabilize fish price in times of abundant supply of small pelagic fish such as sardines, local fishery-related enterprises should embark the control of trading volume coupled with value-added diversification of products. For this purpose, the proposed improvement of LFPC would include the provision of essential demonstration and technical support and assistances for technical processing and marketing.

- A Pilot 100 sqm scale fish processing room will be for the proposed value-added products for fish hamburger/sausage.
- 4 units of -25 degrees Cold store compartments will also be provided as part of the processing plant.

(2) Municipal Fish Ports (Atimonan, Calauag, and Sta. Elena)

1) Fish Distribution Flow



Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Fig. 6.3.4 Fish Flow from the Project Municipal Fish Ports

2) Fish Marketing Channel

Fish trading activities in Atimonan and Calauag are being conducted by fish brokers. Currently, there is no fish broker in Sta. Elena, thus, traders are unloading the fish catch directly to LFPC.

Table 6.3.8 Present Activities of Fish Brokers

Municipality	No. of fish brokers	Fish Collecting Point	Fish Selling Point	Fish dealing volume (kg/day)	Total No. of workers (average / broker)
Atimonan	13	Lamon Bay	Manila	500 – 5,000	54 (4.2)
Calauag	3	Fish Port	Fish Port	1,500 – 3,000	24 (8.0)
Sta. Elena	-	-	-	-	-

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Fish products transacted at the municipal fish ports are distributed to other points of destination by various types of enterprise and vehicles as shown in table below.

Table 6.3.9 Proportion of Fish Volume Shipped Out by Types of Actors

Municipality	Operator	Broker	Wholesaler	Trader	Retailer	Viajeros	Others
Atimonan	-	1%	23%	-	49%	27%	-
Calauag	-	-	15%	-	84%	-	-
Sta. Elena	-	-	91%	4%	4%	-	

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Table 6.3.10 Type and Number of Vehicles Used for Fish Distribution

Municipality	Delivery (No. of units/day)				Shipment (No. of units/day)			
	2-wheel	3-wheel	4-wheel	6-wheel	2-wheel	3-wheel	4-wheel	8-wheel
Atimonan	0.1	2.9	6.3	-	6.8	5.4	7.2	-
Calauag	-	9.8	6.1	-	17.9	31.3	1.7	-
Sta. Elena	-	-	-	-	1.9	0.9	-	6.4

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

6.3.3 HACCP System

To date LFPC is not provided with HACCP compliant fish processing plant. Sixteen dried fish processing industries are located near LFPC, but their products are destined only for domestic markets. BFAR regional office is monitoring the SSOP status and collecting of fish production data from the market hall and landing sites but unless the trading system of fish products is not well established, the current chaotic congestion in LFPC will continue to worsen thereby affecting the systematic mode of fish supply. Regional BFAR office is currently the taking leading role of enhancing market activities by operating laboratory facilities for the improvement of food safety in the region. The description of laboratory facilities required for the promotion and enhancement of sanitation in LFPC is listed hereunder.

- Laboratory for Microbiological study, water analysis, and Chemical analysis.
- Office space for the Laboratory staffs.

6.3.4 Present Status of Utilization of the Existing Fish Port Facilities

(1) LFPC

1) Refrigeration Facilities

The refrigeration system except the freezers has been in operation for seventeen years. The contact-freezers have not been used, and one unit including the compressor was transferred to CFPC. The cold store facilities are well utilized for the stocking of dried fish and meat products. The table hereunder shows the present refrigeration facilities in LFPC.

Table 6.3.11 Refrigeration Facilities in LFPC

Refrigeration Facilities	Number (Unit)	Description	Possibility to Rehabilitate (reason)
ICE making plant	1	: Operational (100%) Not full production	A (dilapidated)
ICE storage and Temporary stock room	1	: Operational (100%)	A (dilapidated)
Cold storage	2	: Operational (100%)	A (dilapidated)
Contact freezer	2	: Not operational (100%)	C (dilapidated)

Remarks: A: Rehabilitation is not required except ordinary maintenance.
B: Replacement of some machinery parts will be required within 10 years.
C: Total replacement is needed.

2) Market Hall Facilities

The market hall in LFPC is utilized mostly at dawn. About 60% of the fish catch is brought directly to the market hall from the vessels while 40% is brought overland. Most of the time, fish catch transactions and shipping activities are being carried out simultaneously. Aquaculture products are brought by trucks while fish harvest from small boats are landed at the fish slope landing facility for transfer to inland transport for delivery to consuming centers/markets. Marketing activities are so rampant with simultaneous activities thereby causing disorderliness and chaotic congestion compounded by the crowded constricted space of the market hall. The brokers' office which is located at the 1st floor of the market

hall is outside the system flow of marketing activities and this is one of the contributory causes of inconveniences and disorderliness. Because of the limited space, retailers are also forced to conduct business outside the market hall under the heat of the sun which is affecting the quality of the fish products. Rearrangement of the brokers' office, renovation of the market hall and improving the security system are essential aspects to improving the market activities.

3) Fish Landing Facilities

The multi-purpose pier is being utilized by a variety of users including fishing vessels/boats, patrol boats and cargo ships.

6.3.5 Physical Condition of the Fish Port Facilities

(1) LFPC

1) Breakwater

The breakwater was damaged by several typhoons. The breakwater is constructed of rock mound with crown made of concrete blocks. Several concrete blocks along the east portion are either slanted or ruptured. No severe damage was observed for the concrete blocks at the west portion of the breakwater, although certain sections of the rock mound portion are damaged.

Fig. 6.3.5 Breakwater (LFPC)

Immediate rehabilitation is needed. In order to determine the scope of rehabilitation, a detail survey will be conducted for the preparation of an inventory of quantity needed to estimate the cost of repairs. For the east portion, two options are being considered: ①Remove and reinstall the crown concrete ②Place additional rock and pour concrete to bind the top. Based on the result of the surveys for the west portion of the breakwater, the installation of additional rocks to repair the damage is needed.

2) Multi-Purpose Pier

The LFPC pier for commercial fish boats was renovated by PFDA in 2000 for Ferry Boats to be accommodated. This entailed the driving of additional concrete piles and widening the deck structure. The pier is stable and currently in good condition except for the damaged rubber fenders due to depreciation.

To date, ferry boats are no longer berthing at LFCP pier because the PPA has constructed an adjacent commercial port in 2009. Although the Ferry Boats have transferred to PPA port, the capacity of the LPFC pier is still short due to the mooring of numerous commercial fishing boats. For this reason, the stakeholders and PFDA strongly requested for an extension of the pier.

3) Banca/ Basnig Landing (Slope Landing)

Minor damages were discovered on the concrete slab of the slope fish landing facility for small boats.

4) Basin

Silt has not accumulated at the port basin and depth of water appears to have been the same after more than 20 years of operation.

5) Revetment

Minor damages were found on the stone revetment to contain the reclamation fills.

Placing of rocks to fill the hollow or caved in portions of the revetment is recommended.

6) Slipway

No visible damage was found on the slipway facility.

The facility is being operated and maintained by a private operator.

7) Market Hall and Refrigeration Building

The structural member of the Market Hall consisting of RC column and steel truss with Galvanized Iron sheet (G.I. sheet) roofing are still in good condition except for the numerous pot holes on the flooring. The trenches at both sides of the market hall are clogged and filled with stagnant water. All the G. I. sheet claddings around the refrigeration building are corroded. Some of the Steel grating covers for the trench are heavily corroded. Corrosion on the anchor plate & lower section of the columns were found.

The Market hall is too small to accommodate the ongoing trading activities and hence need to be expanded and constructed with RC concrete (including the roofing) to reduce on maintenance cost. Construction will be made without unnecessarily obstructing the marketing activities. The market hall will be provided with fish dealers' office and other amenities to facilitate an orderly operation. The flooring will be elevated and to be provided with appropriate trenches equipped with strainers for draining wastewater but retaining solid waste. Wastewater treatment facility will be provided in compliance with DEBR/EMB requirements.

8) Fish Processing Facilities

LPFC will be provided complying fish processing facilities to be located in an appropriate location to facilitate the system of operations of the complex.

9) Utilities

Service for power supply appears to be good. Potable water supply comes from the city water district. Previously, water came from deep wells but is no longer functioning.

Development of water reservoir to augment the limited water supply from the city main and/or construction of underground reservoir to impound water are needed. In compliance with DENR/EMB regulations for sanitation and hygiene, the complex should be provided with wastewater treatment facility and solid waste disposal facility.

10) Refrigeration Facilities

The refrigeration facility which was constructed more than 20 years ago is a centralized system with ammonia as the medium of refrigerant. All refrigeration facilities have been used except for the contact freezer. The private operator provided certain modification with the addition of an ante-room for the cold storage. Cooling towers were provided as part of the original development.

Table 6.3.12 Status of Refrigeration Facilities in LFPC

Refrigeration Facilities	Description
Central refrigeration system	Ammonia Refrigerant
Common utilities	: Receiver (1) , Atmospheric type evaporated condensers(1) Cooling towers(1)and pump,
High pressure side	: Compressor unit (4)
Low pressure side	:
Ice making system	Liquid trap (1), Brine tank (1), etc.
Ice storage	Evaporator (2), Liquid traps (2), etc.
Cold storage	Evaporator (2), Liquid traps (2), etc.
Freezer	Contact freezing unit (1), Surge drums (1), etc.
Mobile type freezer	All-in-one type contact freezer (1)

- Storage and doors (Prefabricated insulation panel type)
- Common equipment: No longer usable except for the receiver
- High-pressure side equipment: All compressors could be used after completely overhauling the machineries
- Low-pressure side equipment: Evaporator is usable after renovation. Other equipment and materials are no longer usable including the piping and insulation materials
- Freezers: To be replaced with new ones including the surge drum, etc
- Mobile freezer: Machinery side should be totally overhauled. The low side should be changed with new ones except the casing
- Storage and doors: Insulation panels can be used after the repairs of damaged spots. Doors should be replaced with new ones. Floor mortar should be reconstructed. Connection between the cold storage and ante-room should be modified

(2) Municipal Fish Ports

1) Atimonan

a) Stair Landing

The fish stair landing facility concrete has minor damage and the bed of sand material underneath the structure is scoured.

Repairs of damaged areas by placing of concrete are recommended.

b) Market Hall

Reconstruction of market hall made by concrete column and roof is recommended to reduce on maintenance cost.

Fig. 6.3.6 Market Hall (Atimonan)

c) Utilities

Wastewater combined with trash from the market hall is directly discharged to the coastline through an open ditch.

The fish port should be provided with WWT facility and appropriate solid waste handling facility pursuant to DENR/EMB requirements.

2) Calauag

a) Causeway

The causeway is structurally sound except for the cracks along certain portions of the slope protection.

b) Harbor Basin

The port is located in shoaling sea bed and as such the basin is very shallow. For this reason, fishing boats have to berth at high tide. During the low tide, the shore extends up to about 50 to 100m offshore from the tip of the causeway.

Although dredging of the basin was proposed by the municipality, the concept is not practical because the area to be dredged is not only wide but will be subjected to fill by silt/sand deposits in a short period of time. There is no other recourse at the moment but for the facility to remain as it is unless other appropriate location is provided by the LGU.

c) Utilities

A mixture of waste and solid waste from a part of the city proper is being directly discharged into the sea where fish landing activities are made adjacent to the drainage/sewage pipes. The sea bed along and tip of the causeway is heavily polluted.

The City should provide a waste water treatment facility such as septic tank, along the sea wall in an appropriate location where waste water is directed for treatment prior to discharge into the sea. The garbage disposed thereat should be cleaned to improve sanitation and food safety.

3) Sta. Elena

a) Causeway

Causeway was seriously damaged due to typhoon. It's not impossible for fishing Bessel to berth. Rock mole revetment of reclamation area connecting to the causeway was also damaged.

The damaged facility should be provided with bigger size rocks to make it resistant against big wave attacks particularly during monsoon season and occurrence of typhoons.

b) Access Road

The less than 10-km access road from the town proper to the fish port is unpaved and took about 1 hour to commute by car.

To enhance the use of the port facilities, the access road should be improved to facilitate the transport of fish catch.

c) Utilities

The fish port should be provided with WWT facility and appropriate solid waste handling facility pursuant to DENR/EMB requirements.

6.3.6 Status of Operation & Maintenance

(1) LFPC

Although PFDA provided additional fresh water tank, the shortage of fresh water supply still remains to be solved. The rock mound type of revetment was modified to mortar covered stone revetment.

- **Refrigeration Facilities**

  The crew for maintenance consists of about twelve staffs including the chief engineer. Operation and maintenance of the refrigeration facilities and ice plant including ice sales by the said employees are undertaken in 6 shifts. To enhance efficiency and expediency of operations, separation of tasks for maintenance activities and ice trading/sales should be looked into.

- **Market Hall Facilities**

  The market hall which is operated by PFDA has unlimited access to all trading activities from unloading of fish catch to marketing, auctioning, packing and transporting of products and this is causing disorderliness and chaotic operation of the facility. Improvement has to be made to ensure food safety and security.

(2) Municipal Fish Ports

Table 6.3.13 Status of Operation and Maintenance of Municipal Ports

Port	Facilities	Contents
Atimonan	Market Hall	The roofing is frequently damaged by Typhoons so that repair is done once every couple of years.
Calauag	Causeway	Concrete cracks along the slope of the facility are continuously being repaired by the LGU. portion by portion
Sta.Elena	Causeway	Facility heavily damaged. Not operational.

6.3.7 Problems and Needs of Stakeholders

The major problems and needs elaborated by the Stakeholders during the Workshop conducted for each site are summarized as follows:

Table 6.3.14 LFPC

Category	Problems	Needs
Facilities	1. Crowded docking areas of boats.	1. Expansion of berthing facility
	2. Ship repair yard area is narrow.	2. Expansion of ship repair yard area
	3. Storage space for smoked fish is small.	3. Expansion of storage for smoked fish
	5. Insufficient space for brokers. No disposal area for garbage. Pier facility is not provided with water supply at the pier	4. Expansion of market hall 5. Provision of solid waste control facility and appropriate water supply system
	6. No designated area for loading and unloading	6. Separation of unloading and loading
	7. Trading area in bad condition (damaged floor, leaks & rusty roof, inadequate lighting facilities, etc.)	7. Construction of new market hall 8. Installation of comfort rooms, laboratory, office for fish processing, first aid station, etc.
	8. Inadequate port facilities.	
Services	9. Incidences of thievery.	9. Strengthening of security system (CCD camera, elevated guardhouse)
	10. Foul odor coming from canals.	10. Provision of waste water treatment facility
	11. High cost of trading	11. Close consultation with PFDA

Table 6.3.15 Atimonan

Category	Problems	Needs
Facilities	1. Overcrowded during peak season 2. Unsanitary condition of the fish port 3. Dilapidated market hall (roof leakages) 4. Improper installation of communication and electrical facilities in the port 5. Low quality of fish (consequently, low cost)	1. Expansion of port facilities (docking area, market hall, separate entrance & exit gates) 2. Provision of comfort rooms, solid waste disposal area STP facility for waste water, and water supply system. 3. Construction of new market hall 4. Repair of telephone and electrical cables/wirings. 5. Control of fish catch and shipping volumes
Services	6. Thievery incidences due the absence of security persons and inadequate lighting facilities. 7. Absence of fuel supply facility.	6. Strengthening of security complemented with the installation of outdoor lighting facilities. 7. Invitation of fuel station operator.

Table 6.3.16 Calauag

Category	Problems	Needs
Facilities	1. Difficulty in berthing & docking of boats due to strong wave, shallow basin/mooring areas and absence of lighting facilities. 2. Flooding of boulevard	1. Construction of breakwater, extension of causeway and installation of beacon light 2. Raising of the seawall height
Services	3. Fishing gears at docking yard thievery.	3. Strengthening security with installation of outdoor lighting faculties.

Table 6.3.17 Sta. Elena

Category	Problems	Needs
Facilities	1. Low price of fish and decrease trend of fishing boats due to limited number of buyers 2. Inadequate supply of ice (high cost) 3. Unsanitary condition of the fish port	1. Invitation of more buyers by installation of landing/trading facilities 2. Ice supply at reasonable price 3. Installation of comfort rooms, waste disposal, and water supply system.
Services	4. Inadequate financing institutions 5. Illegal fishing (trawl, etc.)	4. Invitation of bank to set up branch at the port. 5. Promotion of aggressive law enforcement

6.4 Camaligan Fish Port Complex (CFPC) and Related Municipal Fish Ports

6.4.1 Fishery Production

(1) Overall Situation

The Bicol Region (Region V) produced a total of 198,370 MT (exclusive of seaweeds), of which municipal fishery provided 64.7% or 128,278 MT of the harvest that is one among the highest region-wide. Fish production in terms of volume, particularly for municipal fishery and aquaculture has been gradually increasing in recent years. Fishery industry in the Region is blessed with numerous bays and gulfs, as municipal fishing grounds producing a wide variety of high value demersal fish species including shrimps, crabs, octopus, squids and shellfishes, usable as processing raw materials for export.

Of the total production in the Region, Camarines Sur is the top fish producing province accounting 34.7% or 60,656 MT exclusive of seaweed, followed by the provinces of Masbate at 50,901MT and Camarines Norte at 24,127 MT.

(2) Demand and Supply of Fish

The demand/supply of fish in Region V and Camarines Sur appears to be balanced with small surplus of about 13,000 MT. Fish products from the Region come from Region VIII (Eastern Visayas) and distributed to Quezon and Manila.

Table 6.4.1 Estimated Local Demand and Supply of Fish (Unit: 1,000 MT)

Region / Province	Local Demand for Fish				Fish Production				Breakdown of Fish Production (2025)			Surplus (2025)
	2007	2015	2020	2025	2007	2015	2020	2025	MF	CF	AQ	
Region V	187	197	190	185	192	195	196	198	128	55	21 (6)	+13
Camarines Sur	62	66	63	62	67	69	70	71	31	26	14 (4)	+9
(Naga City)	6	6	5	5								
Albay	43	45	44	43	16	16	17	17	8	6	3 (1)	-26
(Legaspi City)	7	6	6	6								
Camarines Norte	19	20	19	19	28	28	28	28	22	5	1	+9

Abbreviation: MF: Municipal Fishery, CF: Commercial Fishery, AQ: Aquaculture (except seaweed) Source: BAS (2007)
Remarks: ( ) shows the estimated increment from 2007.

(3) CFPC

CFPC is characterized as a fish processing complex, providing facilities and services to private fish processors since its establishment. The potentials of CFPC could further be enhanced by improving the network for collection of raw materials for fish processing and ice distribution in collaboration with the operation of the municipal fish ports in Bicol Region.

1) Fishing Boats

The number of fishing boats using CFPC has been decreasing from 40 to 11 from 2005 and 2008, due to increase in operational cost cause by the high cost of fuel, shallow water depth at the river mouth and improvement of access roads linking Camaligan City and the respective municipal ports. It is noted in this connection that CFPC is located about 30 km upstream from the mouth of Bicol River which is relatively far from the fishing grounds. Of the previous 5 Camaligan based fishing operators, 2 had closed and 1 transferred to Pasacao along the south coast. The 2 remaining operators are in service but not on full-scale. Moreover, fish harvest are currently being unloaded at a privately owned landing place in front of Naga Public Market due to proximity of marketing and consuming centers as compared with CFPC which is farther. The table hereunder summarizes the number of fish boat entrance to CFPC.

Table 6.4.2 Commercial Fishing Boats Entry to CFPC

Type of boats	Commercial fishing boats			
	2005	2006	2007	2008
No. of boats entry	40	22	14	11
Average GRT per boat	54.7	47.8	45.0	47.7
Months having the entry o boats	Jan.-June, Aug. & Oct.-Dec.	Jan.-Feb., May, & Oct.-Dec.	Jan.-Mar., May, & Oct.-Nov.	Feb. & Mar.

Source: PFDA and LFPC

Operation of fishing boats in Camaligan would continue or cease operation depending on the cost trend of oil and fuel in the future. Regrettably, regaining of the fishing operation activities in Camaligan to the previous level appears to pose extreme difficulties.

2) Fish Catch and Unloading

Over the past 5 years from 2005 to 2009, no fish harvest was unloaded at CFPC except for the 16 MT recorded in 2005. To date, commercial fishing boats are directly unloading their catch in Naga City, approx. 5 km upstream from CFPC, because as mentioned earlier of the better accessibility to public markets. Only essential raw materials for fish processing are brought into CFPC but has been decreasing from 869 MT in 2005 to 222 MT in 2009. While

CFPC is provided with a market hall, it is not being use because of the inconvenient location which is far from marketing and consuming centers coupled with limited fish brokers. It is noted in this connection that only one fish broker is operating in Naga City and that broker is also a fishing operator, called, NFH).

(4) Municipal Fish Ports (Calabanga, Pasacao, Balatan, and Oas)

Four municipal fish port sites are identified among others in Bicol Region, as one of collection / supply bases of raw materials to CFPC, and/or ice distribution targets from CFPC, namely, 1) Calabanga, 2) Pasacao, 3) Balatan (all located in province of Camarines Sur) and 4) Oas (Albay).

1) Calabanga

Calabanga is located in San Miguel Bay which is endowed with water full of nutrients and fishery resources comprising of anchovy, sardine, Acetes shrimp, crabs and shellfish. Most of the fishing activities are municipal in scale involving baby trawl, gill-net and long-line operating inside the bay with an annual fish unloading volume is estimated at 5,660 MT comprising largely of anchovy and sardines. There are 9 traditional fish landing sites, among which Sabang is the only commercial fish landing center, scale-wise.

2) Pasacao

Pasacao which is situated along the south coast faces Ragay Gulf where an LGU-operated feeder port exists. This port is being used not only as fish port but also as passenger/cargo terminal traversing Burias Island. Additionally, one privately owned fishing base called NFH Fishing Inc. who as stated earlier transferred from Camaligan is operating purse-seiners fish boats. Six (6) other traditional fish landing centers also exist. The major fishing gears in used are commercial-scale ring-net and bag-net and municipal-scale gill-net/hand-line with annual fish unloading volume estimated at 1,659 MT, a majority of which is from commercial fishery exclusive of the catch from purse-seine fishing.

3) Balatan

Balatan is also located in Ragay Gulf showing similar fishing pattern as those in Pasacao, but fishing activities are more active with numerous fishing boats, commercial as well as municipal. Commercial fishing boats include 5 sets of purse seiners, with one set comprising of 1 catcher, 1 sonar, 2 light boats and 1 carrier and 5 ring-netters. There are 4 traditional fish landing sites, of which one is situated along the coastal area from Poblacion to Duran where commercial fishing boats (purse-seine) are being accommodated. The annual production is estimated at 2,815 MT.

4) Oas (Albay)

There are 5 traditional landing sites in Oas predominantly for municipal fishing boats, with Cagmanaba and Tapel as the most active. A small number of Oas based commercial fishing boats comprising of ring-net and Danish seine also operate in the area. Municipal fishing boats use a variety of gears capturing assorted fish species suitable as raw materials for processing. These include beach seine for anchovy, hand-line for demersal fish species, squid and tuna, gill-net for sardine, depending on the season. Additionally, since 2007 the municipality with its own funds has embarked the development of 300 artificial reefs 7km offshore at depth of 350 feet in 5 barangays. The annual fish catch to date is estimated at 610 MT inclusive of the catch in Cagmanaba and Tapel.

The table hereunder shows the estimated number of fishing boats and fishery productions in 4 municipal fish port sites.

Table 6.4.3 Fishing Boats at the Relevant Municipal Fish Ports

	Name of landing site	No. of fishing boats		Ave. No. of boats entry / day	
		Commercial	Municipal	Commercial	Municipal
Calabanga	Sabang	1(RN), 20(BT)	17(MT), 70(GN), 52 (NM)	0.6(LL), 35.1(BT), 12.0(CB)	21.2(MT), 30.0 (GN w/motor) 21.3(GN w/o motor)
Pasacao	LGU feeder port	2(RN), 2(BN), 7(CB), 2(SB)	1(GN), 5(SB), 3(NM)	0.6(RN), 0.1(BN), 5.1(CB)	0.2(GN/HL), 0.7(SS)
Balatan	Poblacion Duran	5(PS), 5(CB), 15(SB), 5(RN), 3(DGN)	117(GN/HL), 27(LL)	3.3(PS), 5.5(RN), 3.3(CB), 6.5(SB)	35.4(GN/HL), 10.0(LL)
Oas	Cagmanaba	2(RN)	5(LL), 2(SB)	1.4(RN), 1.2(BN),	1.4(GN/HL), 2.5(LL), 4.4(SS)
	Tapel	3(RN), 9(DS)	-	0.7(RN), 0.6(DS), 0.9(BN),	2.0(GN/HL), 3.4(LL), 6.4(SS)

Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)
Abbreviation: PS: Purse seiner, CB: Carrier Boat, SB: Service boat, RN: Ring-net, DS: Danish seine, GN/HL: Gillnet/Handline, SG: Spear Gun, BT: Baby Trawl, MT: Mini Trawl, TW: Trawl, LL: Longline, DGN: Drft gill net, NM: Non-motorized

Table 6.4.4 Fish Unloading at the Relevant Municipal Fish Ports (Unit: MT)

	Peak season	Fish unloading volume (Dec. 2009)	Estimated annual volume	Major Species
Calabanga		386.1	5,660	Anchovy, sardine, Acetes shrimp, crab
Pasacao		131.9	1,659	Sardine, scad, eastern little tuna, skipjack
Balatan	July – Aug.	223.8	2,815	Sardine, shrimp, Sibobog, Talimago, scad
Oas	Nov. – Feb.	48.5	610	Round scad, anchovy, squid, skipjack

Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)
Note: Calabanga: Unloading volume in Dec. x 14.66; Pasacao/Balatan/Oas: Unloading volume in Dec. x 12.58

6.4.2 Fish Distribution Flow and Marketing System

(1) CFPC

1) Fish Distribution Flow

Based on the Fish Landing and Marketing Survey conducted by JICA under the Stage 2 Preparatory Survey in December 2009, the ratio between fish and other foods items as per the records of CFPC such as hotdog, ham and chicken is 32:68 by volume for inbound and 23:77 by volume for outbound. Inbound and outbound fish from CFLC refers only to raw materials and processed products, respectively as shown in the table hereunder. Due however to the limited port area, the processing capacities of CFPC for raw materials and processed products is reaching its allowable limit.

Table 6.4.5 Raw Materials for Processing and Processed Products at CFPC

(Unit: MT)

Species	Raw materials processed (MT)		Processed products (MT)		Shipped-out volume (MT)		Destination
	2008	2009	2008	2009	2008	2009	
Cuttlefish	N/D	13.14	15.89	18.09	16.65	11.71	H.K, Taiwan, Japan
Giant Squid		52.49	170.38	41.80	167.72	38.42	Japan, H.K.,Manila
Octopus		53.90	82.28	45.46	65.53	32.10	USA, Japan
Lobster		7.09	9.90	6.26	9.67	6.26	Japan, Manila
Finfish		1.63	-	0.81	-	0.51	Manila
Crab Meat		66.73	42.59	46.40	18.87	23.19	USA
FW shrimp		20.59	17.28	9.21	17.28	2.00	Taiwan
Shellfishes		2.60	34.50	2.18	29.94	4.84	Japan, H.K.
Total		221.95	372.82	170.24	325.66	123.20	

Source: CFPC

2) Fish Marketing Channel

Raw materials for fish processing are procured through viajeros at 38%, dealers/traders at 32%, retailers at 18%, brokers at 10%and others at 2%. Processed products are dispensed through dealers/traders at 47%, viajeros at 39% and retailer's at 11%. Type and number of vehicles used for fish the delivery are tabulated hereunder.

Table 6.4.6 Type and Number of Vehicles Used for Fish Distribution

(Unit: No. of vehicles/ day)

	Pedicab	Tricycle	Jeepney	Van/Wagon/ Mini-truck	4-wheel	6-wheel	8-wheel	10-wheel
Delivery	-	1.0	0.2	1.7	1.3	1.9	0.1	0.2
Shipment	0.1	2.2	0.5	2.3	1.8	2.7	0.2	0.1

Source: Fish Landing & Marketing Survey conducted by JICA Survey (Dec. 2009)

3) Ice Supply

An absolute volume of 59 MT/day ice shortages is estimated for Camarines Sur. The cost of ice in Camaligan is relatively high as compared with other Regions. For this reason, the quality and consequently the value of about 30% of fish produce are downgraded and classified as Class-B due to poor post harvest handling operations cause by ice shortage, resulting to cheaper cost which is detrimental to the fishing industry particularly the sustenance fishermen. Although CFPC has already commenced ice distribution to few municipal fish ports, the supply network and capacity should be augmented and enhanced to eradicate fish spoilage or loss of quality and value particularly in remote fishing villages, most especially during the peak fishing season.

In view of the foregoing, an additional 15 MT/day of ice plant will be installed for CFPC in collaboration with existing privately owned ice dealers.

Table 6.4.7 Demand and Supply of Ice

Province	Estimated Ice Requirement	Ice Supply	Balance
Camarines Sur	For fishing boats: 45,600 MT For aquaculture: 4,800 MT For marketing: 16,000 MT For processing: 800 MT Total 67,200 MT (224 MT/day)	CFPC: 15 MT/day Private (4 ice plants): Max. 210MT/day (of which, for fisheries use: 150 MT/day)	Shortage of 59 MT/day in average (particularly limited to supply to the remote area during peak season)

Assumption: Icing ratio 150% of catch for commercial fishing boats, 25% for municipal fishing boats, 50% for shipping of aquaculture products, 25% for marketing of fresh fish, and 200% of raw material volume for processing ((based on BAS Fisheries Data 2007).

4) Fish Processing

The volume of fish processed products has been declining from 1,538 MT in 2004 to 170

MT in 2009 as can be seen on the table below. However, all the processors doing business in CFPC belong to the small and medium-scale category. For this reason, much as they would like to improve their facilities to meet the international standard for export, the deficiency in funds has been the limiting factor to pursue this goal.

Table 6.4.8 Quantity of Processed Products by Processors at CFPC

(Unit: MT)

Processor	2004	2005	2006	2007	2008	2009	Species processed
Fresh Catch	-	-	-	-	222.75	114.60	Giant squid, Cuttlefish, Octopus, Lobster, Shellfishes,
T & T Seafood	532.99	155.13	16.16	34.00	43.36	5.56	FW shrimp, Giant squid
Kim Marine	-	-	-	-	-	3.68	FW shrimp
CLC Seafoods	-	-	-	-	-	46.40	Crab Meat
Southgate Ace	-	-	21.99	29.49	37.88	-	
Sedgewick	374.20	281.18	196.96	115.07	-	-	
AFI International	193.00	116.00	-	-	-	-	
Sanvar	438.11	317.58	204.14	124.06	68.83	-	Moved to Tabaco from 2009
Total	1,538.3	869.89	439.25	302.62	372.82	170.24	

Source: CFPC

As raw materials are readily available, and the fact that there is abundant export markets for processed fish, the improvement/enhancement of the fish processing industry in CFPC for HACCP accreditation would propel the business activities of the Complex to the previous level. Sanvar, Fresh Catch, Kim Marine and CLC Seafoods are the 4 processors in CFPC intending to adopt the use of updated facilities should it be provided. With this in consideration, it was conceived to provide CFPC with an all-in-one type of 4 lines fish processing facilities provided each with 2 tons/day capacity ice making machine. 1 ton/day capacity blast freezer, 20 ton capacity cold storage room, and 250 m2 area of processing room. These fish processing facilities are estimated to produce approx. 960 MT of processed products from 1,440 MT in raw materials during peak operations.

5) Fish Price

While the cost of processed fish products for export is twice the cost of products for domestic markets, to date, about 25% of the processed products for export from CFPC are rebuffed because it does not meet international standard. On the one hand, the cost of raw materials for processing appears to be stable as can be gleaned from the table hereunder.

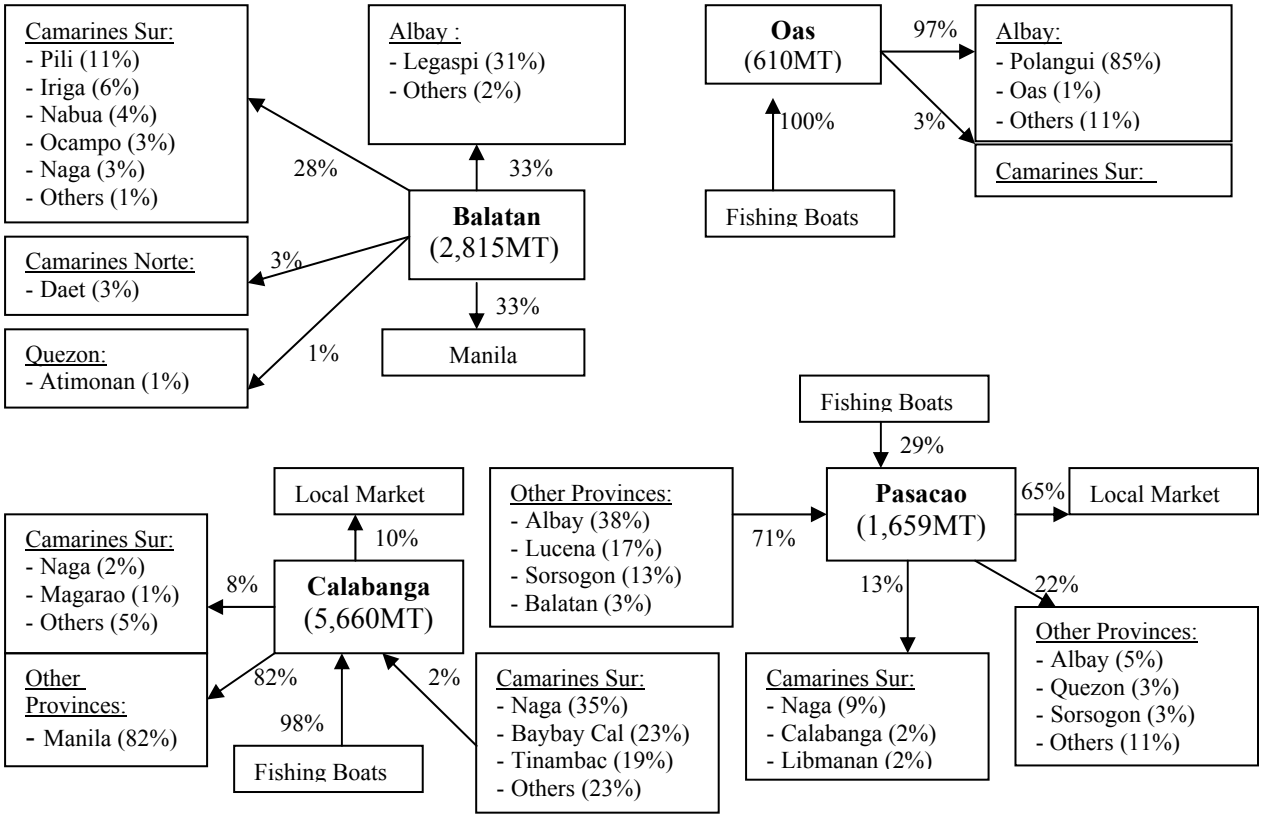
Table 6.4.9 Price of Raw Materials and Processed Products in CFPC

Products / Species	Price of Raw materials (P/kg)	Price of Processed Products
Fresh/Frozen Giant Squid	150 – 180	Class A (for export): 70 – 80%
Fresh/Frozen Octopus	80 - 100	Class B & C (for domestic): 20 – 30%
Frozen/Freshwater Shrimp	70 - 80	Price difference between Class A and B: 2 times.
Fresh/Frozen Cuttlefish	100 – 120	Price of Class A product: about 3 times of that of
Blue Crab	100 – 120 (Crab meat: 500)	raw materials

Source: Interview of fish processors in CFPC

(2) Municipal Fish Ports (Calabanga, Pasacao, Balatan, and Oas)

1) Fish Distribution Flow



Source: Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)

Fig. 6.4.1 Fish Flow from the Project Municipal Fish Ports

2) Fish Marketing Channel

Fish brokers and traders at the proposed municipal fish ports have their own work shed except Oas for which no broker exists.

Table 6.4.10 Present Activities of Fish Brokers

Municipality	No. of fish brokers	Fish Collecting Point	Fish Selling Point	Fish dealing volume (kg/day)	Total No. of workers (average / broker)
Calabanga	12	Calabanga	Manila, Sorsogon, Camaligan, Naga, Sabang	80 - 350	28 (2.3)
Pasacao	(B) 3 (T)18	Pasacao	(B) Pangasinan, Albay, Lucena, (T) Naga	(B) 1,600 – 1,800 (T) 100 - 350	12 (4.0)
Balatan	(L) 3 (M) 16 (S) 12	Pilar Pantao, Balatan	Manila Iriga, Legaspi, Nabua Nabua, Iriga	(L) 5,000-8,000 (M) 200-800 (S) 50 - 100	45 (15.0) 71 (4.4) 31 (2.6)
Oas	-	-	-	-	-

Source: Fish Landing &marketing Survey conducted under JICA Survey (Dec. 2009)
Note: B: Broker, T: Trader, L: Large-scale, M: Medium-scale, S: Small-scale

The table hereunder shows the mode of overland delivery of fish products transacted at the respective municipal fish ports by various type of enterprise.

Table 6.4.11 Proportion of Fish Volume Shipped Out by Types of Actors

Municipality	Operator	Broker	Wholesaler	Trader	Retailer	Viajeros	Processor
Calabanga	-	-	2%	-	17%	-	81%
Pasacao	-	-	-	29%	71%	-	
Balatan	-	-	-	68%	3%	29%	-
Oas	-	-	88%	6%	6%	-	

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Table 6.4.12 Type and Number of Vehicles Used for Fish Distribution

Municipality	Delivery (No. of units/day)				Shipment (No. of units/day)			
	2-wheel	3-wheel	4-wheel	10-wheel	2-wheel	3-wheel	4-wheel	6-wheel
Calabanga	1.1	1.3	-	-	14.2	14.5	-	-
Pasacao	-	0.4	1.8	0.2	19.4	3.4	1.0	0.7
Balatan					1.2	0.1	8.0	0.3
Oas	-	-	-	-	1.6	0.1	6.7	-

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

6.4.3 HACCP System

Eight processing companies were based in CFPC until the middle of 2009. But this year one leading company, "Savan Co. Ltd." relocated to Tabaco, Albay, due to the obsolete facilities in CFPC. Another two companies merged to reduce on operational cost after the economic crisis in 2008. One of the companies (T&T Co. Ltd.) was previously a certified HACCP accredited processing factory in 2004, but the accreditation expired because of the sluggish economic growth. Other companies had the experience of applying for HACCP accreditation in the past but were not pursued. The absence of HACCP facilities in CFPC coupled with the initial high cost of improving the existing facilities had caused three factories to withdraw their applications although one company is still exerting all efforts to acquire a certificate. To date, CLC seafood Ltd. is faced with shipping difficulties from sluggish laboratory work and as a consequence caused the increase in bacteria content of raw materials. CFPC had been leasing the refrigeration and ice plant facilities to private operators. However, the refrigeration storage of the complex is partly being used to store meat products. Based on HACCP system, cross contamination of different products must be avoided due to the high risk of bacterial infection such as *Salmonella*. For this reason, it is highly desirable to provide CFPC with HACCP complying processing facilities and storage for the separation of meat and fish product with a view to producing value-added goods. Fish processing facility calls for SSOP and HACCP system, to ensure the production of food quality goods and it is considered the responsibility of Competent Agencies (CA) to provide the needed equipments and expertise. The time loss for laboratory examinations will instigate physical and financial damage to both the goods and producer. For this reason, the establishment of HCPP compliant laboratory facility in CFPC for reliable, accurate and speedy examinations and analysis of goods is strongly recommended. Laboratory analysis and assessment could be undertaken in collaboration with BFAR. It is informed in this connection that BFAR5-RFFC is currently preparing a project for capacity integration by upgrading/improving of facilities to cope with production demand from the view point of food safety. A project for post-harvest facilities has been initiated with the establishment of a feed mill factory provided with laboratory facilities. However, while BFAR provided one permanent organic staff, this is not sufficient to control all the laboratory activities. The operation of the laboratory will require more experts to conduct comprehensive and accurate examinations of microbiology and proximate analysis. Establishing a laboratory in CFPC in collaboration with BFAR5 is therefore an excellent opportunity l for PFDA, BFAR and the fish industry to jointly operate the facility to ensure food quality and safety for the production of value-added goods for the benefit of the nation in general and the industry and end users in particular. The components of the facilities are listed hereunder. Laboratory facility for microbiological study, chemical study (GC), and water analysis equipments are required.

*Abbreviation: GC: Gas Chromatography

6.4.4 Present Status of Utilization of the Existing Fish Port Facilities

(1) CFPC

1) Refrigeration Facilities

The refrigeration facilities including the contact freezers were installed about 20 years ago. PFDA converted the ice storage and temporary ice stock rooms were to cold store room and leased them to private companies. Two other cold storage facilities are also in used and an ante-room was added for each storage facilities. The cold storage was filled with frozen meat product at the time of the survey. The space for processing facility was quite narrow. The table hereunder summarizes the types of refrigeration facility in CFPC.

Table 6.4.13 Refrigeration Facilities in CFPC

Refrigeration Facilities	Number (Unit)	Description	Technical possibility for Rehabilitation (reason)
ICE making plant	1	: Operational (100%) Not in full production	B (Depreciated)
ICE storage and Temporary stock room	1	: Operational (100%)	B (Depreciated)
Cold storage	2	: Operational (100%)	B (”do”)
Contact freezer	4	: Operational (25%)	C (”do”)

Remarks: A: Rehabilitation is not required except ordinary maintenance.
B: Replacement of some machinery parts will be required within 10 years.
C: Total replacement is needed.

6.4.5 Physical Condition of the Fish Port Facilities

(1) CFPC

1) Land Leveling

CFPC estate is large but a marginal portion is not yet developed.

Land area for further expansion of the complex is therefore available. Development will entail filling, leveling and construction of revetments to contain the fill.

2) Revetment

The revetment along the river is in good condition and therefore rehabilitation is not needed.

3) Pier

There is no damage on the existing pier.

4) Navigation Channel

Existing navigation channel from Bicol river mouth to CFPC retain water depth for fishing boat to operate.

5) Market Hall and Refrigeration Building

The structure of the market hall and refrigeration building is in good condition although small holes were found on the roof of the refrigeration building.

Fig. 6.4.2 Harvest of Ice (CFPC)

The roof of the refrigeration facility should be repaired or replaced depending on the degree of damage.

6) Fish Processing Facilities

CFPC should be provided with HACCP complying fish processing facilities in a vacant area behind the market hall.

7) Utilities

Power supply is in good condition. Water supply comes three deep wells which are in good condition. CFPC is not provided with wastewater treatment (WWT) plant.
CFPC should be provided with (WWT) in compliance with DENR/EMB regulations. CFPC should also be provided with HACCP complying/accredited fish processing plant facilities to promote the production of value-added goods, as one means of controlling fish spoilage and increasing the value of fish products. Reducing fish spoilage and adding value to the products are primary alternate means of conserving marine fishery resources.

8) Refrigeration Facilities

The facility was constructed as centralized refrigeration system with ammonia as refrigerant. All the refrigeration facilities have been modified. The ice storage and temporary ice stock room were converted to cold store rooms. Each cold store room was provided with an ante-room. The ice making plant although antiquated and hazardous is still operating.

Table 6.4.14 Physical Condition of Refrigeration Facilities in CFPC

Refrigeration Facilities	Description
Central refrigeration system	Ammonia Refrigerant
Common utilities	: Receiver (1), Atmospheric type evaporated condensers (1), Cooling tower (1)and Pump,
High pressure side	: Compressor unit (4)
Low pressure side	:
Ice making system	Liquid trap (1), Brine tank (1), etc.
Ice storage	Evaporator (1), Liquid traps (1), etc.
Cold storage	Evaporator (2), Liquid traps (2), etc.
Freezer	Contact freezing unit (4), Surge drum (4), etc.

- Storage and doors (Prefabricated insulation panel type)
- Common equipment: Condenser should be replaced with a type for reducing high pressure and temperature
- High-pressure side equipment: All compressors after repairs are reusable
- Low-pressure side equipment: Evaporator can be used after refreshing. Other equipment can't be used including piping materials and insulation materials
- Freezer: It is better to replace to new one including surge drum etc. or wiring line should be changed completely
- Storage and doors: all storage room and doors should be re-constructed including the anti-room

(2) Municipal Fish Ports

1) Calabanga

a) Breakwater

Half of the breakwater at the landside portion is higher in elevation as compared with the other half at the seaside. Vehicular access is therefore limited only along the land side portion of the breakwater. Small armor stones were

Fig. 6.4.3 Landing Area (Calabanga)

found scattered along the seaside portion of the breakwater. Rehabilitation of the breakwater is not needed.

b) Stair Landing

The stair landing facility is structurally sound but fish landing is not possible during low tide because of the shallow depth. Rehabilitation of the facility is not needed.

c) Fish Handling Shed and Ice Storage

The fish port should be provided with fish handling shed and ice storage facility.

d) Utilities

The fish port is not provided with power and water supply system although source of power and water is readily available.

Tapping of water and power for the port is needed. Also the fish port should be provided with WWT facility and appropriate solid waste handling facility pursuant to DENR/EMB requirements.

2) Pasacao

a) Pier and Stair Landing Facilities

The existing pier and fish stair landing facility are structurally in good condition.

b) Market Hall

The port should be provided with a new fish handling shed, fish dealers' office, storage room and ice storage facility.

c) Utilities

The fish port should be provided with WWT facility and appropriate solid waste handling facility pursuant to DENR/EMB requirements.

3) Balatan

a) Breakwater

The port should be provided with breakwater to protect the basin and mooring areas from wave actions.

b) Causeway and Stair Landing Facilities

The existing causeway and stair landing facility are structurally in good condition and requires no repairs except for the construction of landing facilities provided with backup space for commercial fish boats.

c) Land Adjustment for Market Hall, Administration Building and Ice Storage

Land adjustment to accommodate the construction of market hall, administration building and ice storage is needed. Water and power supply will be connected to existing facilities. Fuel supply station will also be provided.

d) Utilities

The fish port should be provided with WWT facility and appropriate solid waste handling facility pursuant to DENR/EMB requirements.

4) Oas

a) Market Hall and Ice Storage

The proposed Oas fish port should be provided with a market hall, ice storage facility, power and water supply system and waste water treatment facility.

6.4.6 Status of Operation and Maintenance

(1) CFPC

In 2008 PFDA conducted repair works with a budget of Php 150 thousand for yearly maintenance of building facilities, utilities and minor equipment. Maintenance for civil and marine work facilities was not pursued due to insufficiency of funds.

- **Refrigeration Facilities**

PFDA is currently operating and maintaining the refrigeration facilities including the ice plant. The staffs assigned for this work is separated into operation and maintenance and ice harvesting and sales. Considering efficiency and expediency of operations, it may be advisable looking into separating the staff for ice sales and harvest and operation and maintenance of the refrigeration facilities including the ice plant.

(2) Municipal Fish Ports

Table 6.4.15 Status of Operation and Maintenance of Municipal Ports

Port	Facilities	Contents
Calabanga	Breakwater	No maintenance activities. Half of breakwater at the sea side is heavily damaged.
Pasacao	All facilities	No maintenance activity because the port was completed only in 2004.
Balatan	Causeway and revetment	Causeway has no damage but all the revetments are damaged. No maintenance activity due to budgetary reasons.
Oas	No facility	-

6.4.7 Problems and Needs of Stakeholders

The major problems and needs elaborated in the stakeholders workshop at each site are summarized as follows:

Table 6.4.16 CFPC

Category	Problems	Needs
Facilities	1. Low quality products and high electricity cost due to antiquated contact freezers.	1. New blast/contact freezer (IQF)
	2. High packaging cost and speedy melting of frozen fish in cold store room.	2. New cold storage for processed products
	3. Inadequate space for expansion of processing facilities.	3. Expansion of fish processing areas
	4. Unsanitary / foul odor caused by waste water disposal.	4. Solid waste treatment system
	5. Contamination of processed products due to low quality ice.	5. Improvement in water quality including replacement of ice cans for the existing ice plant
	6. Leaking roof of the refrigeration building.	6. Rehabilitation of existing refrigeration building
Services	7. High expense for ice	7. Review of selling price of ice by PFDA
	8. Difficulty in compliance with sanitary requirement	8. HACCP-applicable fish processing facility
	9. Double efforts for operators to get ice	9. Appropriate ice distribution system
Others	10. Harassment and extortion in traveling products to the port at night	10. Strengthening of security by LGU
	11. Shallow river mouth	11. Dredging of river mouth by LGU
	12. Lack of boat repair facilities	12. Invitation of private sector

Table 6.4.17 Calabanga

Category	Problems	Needs
Facilities	1. Low quality fish (spoilage).	1. Appropriate fish trading area
	2. Double handling of fish catches unloading due to shallow water depth.	2. Berthing/landing facility
	3. Difficulty in berthing & unloading of fish catches due to wave actions.	3. Breakwater
	4. Low quality of processed fish	4. Fish drying machine and processing area
Services	5. High cost of trading fish (high cost of price)	5. Appropriate ice distribution system
	6. Difficulty in buying fuel for boats	6. Invitation of fuel operator
	7. High cost of capital (high interest rate)	7. Provision of appropriate credit institution

Table 6.4.18 Pasacao

Category	Problems	Needs
Facilities	1. Spoilage of unsold fish and deterioration of fish quality under sunshine	1. Appropriate storage for fresh fish and covered fish handling area
	2. Front portion of causeway damaged	2. Repair of causeway
Services	1. Congestion caused by many unlicensed vendors and unauthorized persons	1. Appropriate port management and control system
	2. High cost of ice	2. Appropriate ice distribution system

Table 6.4.19 Balatan

Category	Problems	Needs
Facilities	1. Unsanitary condition of fish landing area	1. Installation of comfort rooms and proper waste management system
	2. Difficulty in berthing and boats damage due to strong wave and shallow water	2. Appropriate berthing and landing facility
Services	3. Lack of LGU personnel assigned in the port	3. Assignment and training of LGU staff, installation of a port office
	4. Inconvenience for all port users because of overcrowding	4. Allocation of areas for each type of users and control
	5. Low quality fish	5. Appropriate storage for fresh fish and covered fish handling area
	6. Shortage and high cost of ice	6. Appropriate ice distribution system
	7. Problems on thievery	7. Allocation of security guard(s) in the port
Others	8. Municipal ordinance not enforced	8. Capacity building of LGU personnel
	9. Lack of dry dock facility for boat repair	9. Invitation of private sector
	10. High price of fishery supplies	10. ditto

Table 6.4.20 Oas

Category	Problems	Needs
Facilities	1. No safe boat docking area during storms	1. Breakwater and landing facility
	2. Low quality of dried fish	2. Countermeasure during rainy seasons
Services	1. Expensive diesel fuel (no buying source)	1. Establishment of co-purchase system
	2. No source of fishing materials	2. Ditto
	3. Low quality of fish caused by shortage and high cost of ice	3. Establishment of ice purchase system (coop-based)
Others	1. Difficulty in shipping out of fish	1. Improvement of road
	2. Lack of capital for fishing gears	2. Provision of credit (coop-based)

6.5 Davao Fish Port Complex (DFPC) and Related Municipal Fish Ports

6.5.1 Fishery Production

(1) Overall Situation

In 2007, except for seaweed, Davao in Region XI produced 67,190 MT of fish products consisting of commercial fishery at13,040 MT, municipal fishery at 31,565 MT) and aquaculture at 10,896 MT. Total fish production in the Region has been increasing from 2004 to 2007 with the development of the aquaculture industry. Milkfish cage culture in particular has been growing

in recent years in Sta. Cruz. It is also noted in this connection that some 1,075 hectare and 220 hectare of Mariculture Parks exist in Panabo and Samal Island respectively.

The main fishing grounds comprised of: i) Davao Gulf for ring-netters, ii) Within the EEZ water along the Pacific Ocean for purse seiners and iii) outside the limit of EEZ water for foreign tuna long-liners. Due to fish resource depletion in Davao Gulf, the Eastern Seaboard is currently being exploited for commercial fishery.

(2) Demand and Supply of Fish

Fish demand in 2025 for Region XI is estimated at 149,000 MT, with Davao City as a consuming center accounting about 53,000 MT. Fish production in the region however is forecasted at 73,000 MT considering the incremental growth of aquaculture. With this in consideration, following the same pattern, fish shortage would have to be covered with supply from General Santos in Region XII, Bislig (Surigao del Sur) and Mati (Davao Oriental) where certain fishing boats from General Santos are expected to gradually shift their fishing base of operations due to the expiry of the fish agreement treaty with the Indonesian Government. As a consequence thereof GSFPC is estimated to lose some 20,000 MT of fish production. With the increase in fish catch of both local and foreign fishing operators for skipjack and sardines from outside the EEZ estimated at roughly about 50,000 MT by 2025, the net increment production at GSFPC is estimated at 30,000 MT by 2025.

Table 6.5.1 Estimated Local Demand and Supply of Fish (Unit: 1,000 MT)

Region / Province	Local Demand for Fish				Fish Production (2025)				Breakdown of Fish Production (2025)			Surplus (2025)
	2007	2015	2020	2025	2007	2015	2020	2025	MF	CF	AQ	
Region XI	152	153	151	149	67	70	71	73	34	17	22 (6)	-76
Davao City	50	52	53	53	9	9	9	9	2	6	1	-44
Davao del Sur	30	32	31	30	31	33	34	36	15	6	16 (5)	+6
Davao del Norte	31	34	33	33	4	4	5	5	2	0	3 (1)	-28
Composta Valley	23	24	23	23	5	5	5	5	4	0	1	-18
(Tagum City)	8	8	7	7								
Davao Oriental	18	18	17	17	16	17	17	18	11	5 (1)	2 (1)	+1
Region XII	140	148	148	149	287	305	316	327	47	245(30)	35(10)	+178
General Santos C.	19	22	23	24								

Abbreviation: MF: Municipal Fishery, CF: Commercial Fishery, AQ: Aquaculture (except seaweed) Source: BAS (2007)
Remarks: ( ) shows the estimated increment from 2007.

(3) DFPC

The operation of DFPC is quite unique as far as Philippine fishing ports is concerned, by allowing foreign fishing operators to transship their harvest for export. DFPC has also been playing an important role in providing facilities and services to fish processors for export, use of raw materials from fresh tuna packers (tuna fish rejected for export), dealers from General Santos and other municipal ports such as Bislig and Mati. Some of the local fishing boats (ring-net) are also unloading their harvest in DFPC although in small quantity for local consumption purposes only.

1) Fishing Boats

Foreign tuna long-liners fishing boats ranging from 20–100 GT has decreased since mid-2009 because many Taiwanese boats shifted their base of operations to Indonesia. On the other hand, Japanese boats based at DFPC have increased from 7 to 10 units. Also, local commercial fishing boats 24 GT in average, comprising of ring-netters and carriers has dramatically increased from 9 to 14 units from 2008 – 2009. The average berthing days per

month (no. of fishing trips) has likewise increased from 3.56 days in 2008 to 7.00 days in 2009 as shown in the table hereunder.

Table 6.5.2 Fishing Boats Entry to DFPC

Type of boats	Municipal F. B.			Commercial F. B.			Foreign Fishing Boats		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
No. of boats entry (daily average)	4.55	2.68	2.33	1.11	1.10	3.00	2.12	1.40	1.41
(at peak month)	3.70	4.90	3.45	2.30	1.77	3.87	2.87	1.73	1.71
Ave. berthing days / boat / month	-	-	-	-	3.56	7.00	-	5.99	5.98
(at peak month)	-	-	-	-	6.63	9.70	-	7.30	7.31

Note: Data of 2009 shows the average of Jan. – Oct. (10 months). Source: PFDA and SFPC (2008)

Local commercial fishing boats however is foreseen not to increase considering that fishery resources in the Davao Gulf, the main fishing ground for ring-netters and bag-netters has heavily depleted. Foreign tuna long-liners are foreseen to be maintained at the current level although the operational scale and pattern may be altered in accordance with the change in trend of WCFPC's measures for tuna resource management.

2) Fish Catch and Unloading

The annual fish unloading volume over the last 4 years has been stagnating from 4,000 – 5,5,00 MT of tuna of which 400 – 600 MT mostly pelagic fish species are caught by local fishing boats, and about 400 – 500 MT of tuna and other various fish species are brought overland.

Taking into account the trend of fishing boats, fish unloading volume is expected not to increase in the future, except raw materials for processing brought overland.

Table 6.5.3 Fish Unloading at DFPC

(Unit: MT)

	Type of boat	2005	2006	2007	2008	2009	Average 2005-09	Breakdown	
								TR/OL	NE/LQ
Annual volume	Foreign	4,177	5,089	5,929	3,916	2,936	4,410	2,171	2,239
	Local	1,021	722	819	888	758	841	426	415
Daily average	Foreign	11.60	14.14	16.47	10.88	8.16	12.25	6.03	6.22
	Local	2.83	2.00	2.27	2.47	2.12	2.33	1.18	1.15
Average in peak month	Foreign	21.10	22.42	25.60	23.46	11.44	20.80	9.73	11.07
	Local	5.84	5.95	7.97	5.80	4.71	6.06	3.49	2.57

Abbreviation: TR: Transshipment (foreign), NE: Non-Exportable (foreign), OL: Overland (local, for processing), LQ: Landing Quay (local).
Source: PFDA

(4) Municipal Fish Ports (Sta. Cruz, Panabo and Mati)

For potential municipal fish ports related to the operation of DFPC, the following 3 sites were identified as sources of supply for raw materials in fish processing. The sites surveyed are: 1) Sta. Cruz, 2) Panabo and 3) Mati.

1) Sta. Cruz

The major fish landing sites in Sta. Cruz that has been investigated include Colonon, Poblacion Zone-III (Apo Beach), Poblacion, Purok Dusap, Tuban, Tagabuli and Bato, of which Tagabuli is a fish cage milkfish unloading site. There are 42 ring-net and bag-net commercial boats and 10 hand-line and gill-net municipal fishing boats operating in Davao Gulf. Sta. Cruz has the largest commercial fishing boats among the coastal barangays of the Gulf with annual fish unloading volume estimated at 285 MT exclusive of milkfish.

2) Panabo

Panabo is one among the sites nationwide for the development of Mariculture Parks. The park has a total area of 1,075 ha with 349 cages developed by the joint efforts of the government and the private sector. No commercial fishery is operating in Panabo. Fish landing centers for Panabo are located in: 1) The Mariculture Park site in Cagangohan, 2) San Pedro, 3) San Vicente and 4) J.P. Laurel also in Cagangohan. Of the 4 sites, unloading of milkfish at the Mariculture Park Site appears to be highest. The annual fish production at Cagangohan is estimated at 2,272 MT but is expandable with the installation of more cages. It is informed in this connection that BFAR has approved the increase of up to 400 cages in total) to cope with the increasing demand of export and domestic markets.

3) Mati

The 5 major traditional fish landing sites in Mati are located in 1) Poblacion, 2) Badas (Tagawisan), 3) Dahican, 4) Maito (DATICOR) and 5) Magsaysay. Main gears used for fishing include the tuna hand-line and ring-net for commercial fishery and the long-line for municipal fishery. The fishing ground for tuna hand-line is within the EEZ water near the borderline with Indonesia. Fishing expeditions takes about 1 – 2 weeks/trip. Municipal fishing is conducted in Mayo Bay by ring-net and long-line at 4-8 hours/trip or so called overnight fishing trip. The annual fish unloading volume is estimated at 422 MT. Mati is conceived to be developed as an offshore fishing base for the eastern seaboard fishing ground.

The table hereunder shows the estimated number of fishing boats and fish unloading volumes for the 3 municipal fish ports.

Table 6.5.4 Fishing Boats at the Relevant Municipal Fish Ports

Municipality	Barangay / Landing Site	No. of Fishing Boats		Ave. No. of Boats Entry/ day	
		Com.	Mun.	Com.	Mun.
	Tuban	8(BN)	10	0.6(BN)	0.5 (SS)
Sta. Cruz	Apo Beach III	34(RN)	-	1.8(RN), 0.5(BN)	1.9 (SS)
	Bitaug	-	138	-	6.5 (SS)
	Tagabuli	-	ND	-	9.6 (CB)
Panabo	Cagangohan	-	48	-	0.6 (GN/HL), 8.0(CB), 6.7(SS)
Mati	Magamboi	-	9	0.7(RN)	4.2
	Magsaysay	-	8	1.1(RN), 0.2(CB)	0.4
	Mayo&Liverty	2(HL), 4(RN)	2	0.9(RN), 0.1(HL),	1.0(LL), 0.9(SS)
	Dahican	-	2	0.7(RN)	2.6
	Badas	5(RN), 7(HL)	-	0.8(HL), 0.7(CB)	0.7(LL), 0.8(SS)

Source: Fish Landing & Marketing Survey conducted by JICA Survey (Dec. 2009)
Abbreviation: BN: Bag-net, RN: Ring-net, PS: Purse seine, HL: Handline, LL: Longline, CB: Collect Boat, SS: Small-scale

Table 6.5.5 Fish Unloading at the Relevant Municipal Fish Ports (Unit: MT)

	Peak season	Fish unloading volume (Dec. 2009)	Estimated annual volume	Major Species
Sta. Cruz	Oct. – Mar.	12.6	285	Tuna, mackerel
Panabo	Apr. – Sep.	189.3	2,272	Milkfish
Mati	Apr. – Nov.	25.0	600	Scad, tuna

Source: Fish Landing & Marketing Survey conducted by JICA Survey (Dec. 2009)
Note: Sta. Cruz: Fish unloading volume in Dec. x 22.65; Panabo: Fish unloading volume in Dec. x 12;
Mati: Fish unloading volume in Dec. x 24
Remarks: In case of Sta. Cruz, the above Fig. does not include the unloading volume of milkfish at Bry. Tagabuli (estimated annual production 2,719 MT from 546 units of fish cages, total surface area: 49,442m2)

All the sites have the potential of increasing production of milkfish by mariculture, and possible expansion of marketing outlets, should the proposed fish port be developed to support the mariculture industry in the area.

Table 6.5.6 Estimated Milkfish Production by Fish Cage (Unit: MT)

Fish Port Site	Current Situation		Future (Year 2025)		Remarks
	No. of cages	Production	No. of cages	Production	
Sta. Cruz	546	2,719	600	2,972	Located in Tagabuli Bay
Panabo	349	2,272	500	3,255	Mariculture Park (1,075 ha)
Mati	2	(demo-scale)	ND	ND	Mariculture Park

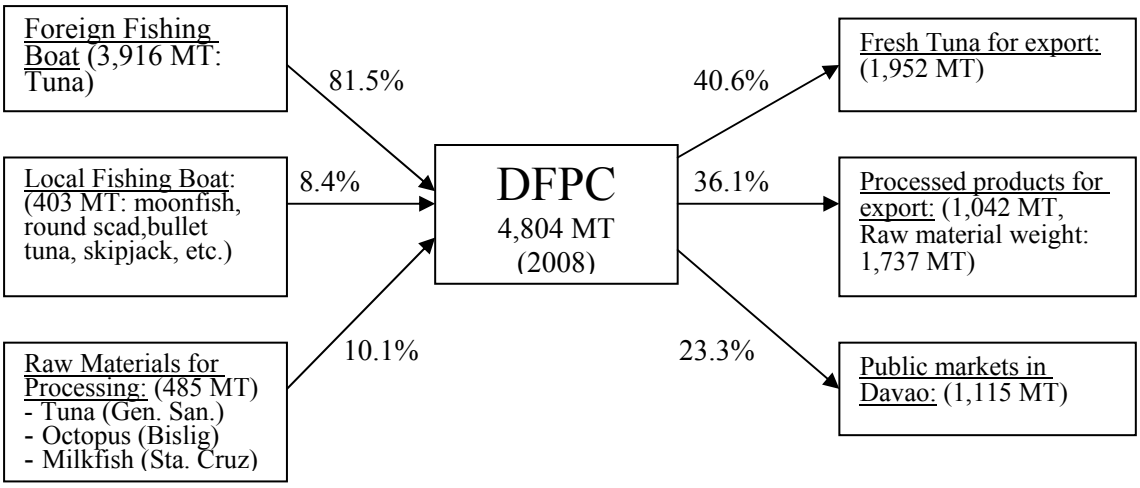
Note: Production is estimated by JICA Survey Team Source: BFAR

6.5.2 Fish Distribution Flow and Marketing System

(1) DFPC

1) Fish Distribution Flow

Sources of inbound fish products to DFPC composed of: 1) fish caught by foreign fishing boats (tuna long-liners), 2) fish caught by local fishing boats, and 3) raw materials mostly tuna from GSFPC for processing of fish are transported overland. Outbound fish products from DFPC consist of: 1) fresh tuna for export, 2) processed fish products and 3) fresh fish products for the local market.



Source: DFPC

Fig. 6.5.1 Fish Flow based on DFPC

2) Fish Marketing Channel

Fish unloaded at DFPC destined for delivery to various locations are conducted by traders/dealers at 70%, buyers at 22%, brokers at 7% and wholesalers at 1%. Supply of raw materials for fish processing on the one hand are undertaken by fish dealers transported overland. The table below shows the type and number of vehicles used for delivery.

Table 6.5.7 Type and Number of Vehicles Used for Fish Distribution

(Unit: No. of vehicles/day)

	Tricycle	4-wheel	6-wheel	10-wheel
Delivery	0.1	0.3	1.8	0.1
Shipment	1.8	1.4	1.4	-

Source: Fish Landing & Marketing Survey conducted by JICA Survey (Dec. 2009)

3) Ice Supply

As can be seen on the table hereunder, ice production in Davao at present appears to be sufficient for fish harvest post handling preservations. Should additional ice be needed along with the development of the aquaculture industry, the capacity of the existing ice plants could is deemed sufficient to cope with the increasing requirements, except ice required in the future for the processing of fish for HACCP accreditations.

Table 6.5.8 Demand and Supply of Ice

Province	Estimated Ice Requirement	Ice Supply	Balance
Davao City	For fishing boats: 1,300 MT For aquaculture: 400 MT For processing: 1,800 MT For marketing: 2,200 MT Total 5,700 MT (19 MT/day)	DFCP: 30 MT/day (of which fisheries use: 15 MT/day)	Shortage of 4 MT/day (Fulfilled by private ice plants)
Davao del Norte, Davao del Sur, Compostela Valley	For fishing boats: 14,900 MT For aquaculture: 7,200 MT For marketing: 10,400 MT Total 32,500 MT (108 MT/day)	Private (3 ice plants in Davao City and 1 in Digos): Max. 290MT/day (of which fisheries use: 230 MT/day)	Enough supply of ice at present, even if considering the outside demand.
Davao Oriental	For fishing boats: 10,800 MT For aquaculture: 500 MT For marketing: 4,100 MT Total 15,400 MT (51 MT/day)	LGU (Mati): 2 MT/day Private (Mati): 20 MT/day Private (Governor Generoso): 50 MT/day	Enough supply of ice at present (More ice demand if more fishing boats from General Santos).

Assumption: Icing ratio 150% of catch for commercial fishing boats, 25% for municipal fishing boats, 50% for shipping of aquaculture products, 25% for marketing of fresh fish, and 200% of raw material volume for processing ((based on BAS Fisheries Data 2007). No ice is used for foreign tuna long liners as they are equipped with chiller unit.

4) Fish Processing

In 2008, there were 8 fish processors in DFPC, of which 5 were operational producing 1,042 MT of processed products, mainly tunas shown in the table hereunder. Among the processors, Ming Trading and another establishment are potential users of the proposed HACCP accredited new processing plants to be developed as part of the scope of works for the improvement of DFPC. Potential sources of raw materials are from milkfish produced from fish cages, and other assorted marine products comprising mainly of octopus, shrimps, squids, shellfish from Bislig and Mati. The processed fish products are targeted for export considering that it commands high cost, and because local markets in Davao Region has already been saturated with milkfish products and that the supply of tuna as raw materials is anticipated not to increase in the future.

The fish processing plant to be provided for DFPC will comprise of 2 lines of 1 ton per day capacity facilities. One line of the 2 lines will be an all-in-one type system comprising of 1.5 ton/day capacity ice plant 1 ton/day capacity blast freezer, 20-ton capacity cold store room, and 250 sqm of processing room. The fish processing facilities are expected to produce approx. 960 MT of processed products from1, 440 MT of raw materials during peak operation.

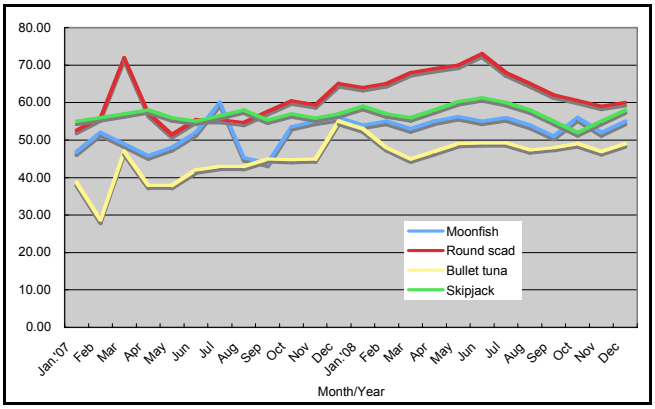
Table 6.5.9 Quantity of Processed Products by Processors at DFPC (Unit: MT)

Name of Processor	2005	2006	2007	2008	Species processed
Far East Seafood	-	-	-	725.1	Tuna
Ming Trading	-	-	-	247.5	Octopus, Squid, Milkfish, etc.
Kenbin Trading	-	-	-	29.2	Tuna
Ace Tuna	-	-	-	17.2	Tuna
BM Princess Nada	-	-	-	22.4	Tuna
Total	887.1	610.9	898.1	1,041.6	

Source: DFPC

5) Fish Price

Due to the absence of wholesale activities in Mindanao, fish price is lower than those of Luzon and Visayas but fish production of local fishing boats is quite limited. As can be on the graph, significant price fluctuation by seasons appears not to have occurred.

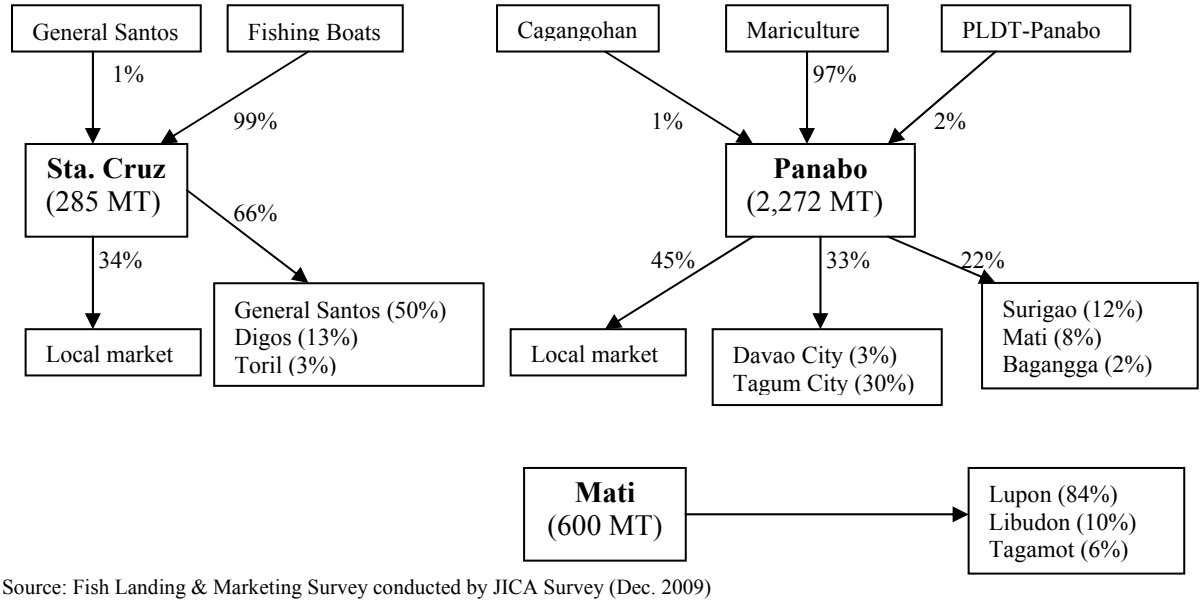


Source: DFPC

Fig. 6.5.2 Fluctuation of Wholesale Price at DFPC

(2) Municipal Fish Ports (Sta. Cruz, Panabo, and Mati)

1) Fish Distribution Flow



Source: Fish Landing & Marketing Survey conducted by JICA Survey (Dec. 2009)

Fig. 6.5.3 Fish Flow from the Project Municipal Fish Ports

2) Fish Marketing Channel

The table hereunder summarizes the activities of the fish brokers and dealers/ traders at each municipal fish port in Davao.

Table 6.5.10 Present Activities of Fish Brokers

Municipality	No. of Fish Brokers	Fish Collecting Point	Fish Selling Point	Fish Dealing volume (kg/day)	Total No. of Workers (average / broker)
Sta. Cruz	(B) 3	Sta. Cruz	Digos, Sta. Cruz	50 – 1,000	62 (2.6)
	(D/T) 2			10 – 80	14 (2.0)
Panabo	(B) 2	Panabo	Panabo, Davao,	-	-
	(D/T) 32		Tagum		
Mati	(B) 4	Dahican,	Mati Public Market	200 – 600	20 (4.0)
	(D/T) 3	Tagaw isan	Tagaw isan	50 – 150	6 (2.0)

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)
Note: B: Broker, D/T: Dealer/Trader

The table hereunder shows the mode of overland delivery of fish products transacted at the respective municipal fish ports by various type of enterprise.

Table 6.5.11 Proportion of Fish Volume Shipped Out by Types of Actors

Municipality	Operator	Broker	Wholesaler	Trader	Retailer	Viajeros
Sta. Cruz	-	91%	-	1%	-	7%
Panabo	1%	7%	92%	-	-	-
Mati	-	19%	-	14%	46%	20%

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

Table 6.5.12 Type and Number of Vehicles Used for Fish Distribution

Municipality	Delivery (No. of units/day)				Shipment (No. of units/day)			
	2-wheel	3-wheel	4-wheel	6-wheel	2-wheel	3-wheel	4-wheel	6-wheel
Sta. Cruz	0.4	-	-	0.3	0.4	-	-	0.3
Panabo	-	-	-	-	-	-	-	-
Mati	-	-	-	-	6.1	0.4	1.2	0.3

Source: Fish Landing & Marketing Survey conducted under JICA Survey (Dec. 2009)

6.5.3 HACCP System

There are eight fish processing operators in DFPC for tuna shipping and loading. Some of the operators applied for HACCP accreditation in the past for certified tuna processing after the renovation of the unloading and processing facilities. BFAR Davao has a branch office in DFPC to monitor tuna vessels' port entries for transshipment. BFAR laboratory is located in the center of Davao City where HACCP related activity is conducted. The laboratory is used for the analysis of microbiology, chemistry, molecular biology and proximate analysis are being analyzed. The laboratory is provided with skilled staffs to monitor HACCP related samples from aquaculture products, marine fishery, among others. However, some of the laboratory equipments are already obsolete and unless replaced precision SSOP/HACCP monitoring activities could not undertaken precisely. Laboratory facility for microbiological and chemical study (GC/MS/MS), and water analysis equipment is required.

*Abbreviation: GC/ MS/ MS: Gas Chromatography/ Tandem Mass Spectator

6.5.4 Present Status of Utilization of the Existing Fish Port Facilities

(1) DFPC

1) Refrigeration Facilities

All the refrigeration facilities except for the contact freezer were installed 15 years ago. The ice storage and temporary ice stock room were converted by PFDA into cold storage. The storage was leased to a private operator. Partition is provided between the temporary ice stock room and ice storage. Two operators have leased the cold storage. Pre-cooling system for ice raw water was installed to the system. Recently, the ice making equipment has been modified to comply with HACCP accreditation system.

Table 6.5.13 Refrigeration Facilities in DFPC

Refrigeration Facilities	Number (Unit)	Description	Technical possibility for Rehabilitation (reason)
ICE making plant	1	: Operational (100%) Not in full production	A (Depreciated)
ICE storage and Temporary stock room	1	: Operational (50%) Cooling system not used	A (Depreciated)
Cold storage	1	: Operational (100%)	A (Depreciated)
Chilling water system	1	: Operational (50%)	B (Depreciated)
Contact Freezer	2	: Non Operation (100%)	C (Depreciated)

Remarks: A: Rehabilitation is not required except ordinary maintenance.
B: Replacement of some machinery parts will be required within 10 years.
C: Total replacement is needed.

2) Market Hall Facilities

The market hall in Davao was converted for tuna unloading and transshipment. Most of the domestic fish catch are unloaded to temporary sheds (tents) along the seawall, without utilities for feed water and drainage. At peak time, the shed is fully utilized, and additional space is required for quality and quantity handling of fish catch. For this reason, the market hall for domestic consumption is urgently needed. Sanitation Standards Operating Procedures (SSOP) in this port complex is widely known and from this point of view, a new modernized market facility with sanitary facilities for handling of fresh fish is required.

6.5.5 Physical Condition of the Fish Port Facilities

(1) DFPC

1) Breakwater, Landing Quay, Revetment, Building and Utilities

All civil and marine infrastructures are in good condition.

Rehabilitation is not needed except for extension of the landing quay for ring-net fish boats, construction of market hall and additional deep well.

Fig. 6.5.4 Landing Quay (DFPC)

2) Fish Processing Facilities

HACCP compliant fish processing facilities will be constructed in the vacant area behind the administration building.

3) Utilities

Additional Waste Water Treatment (WWT) should be constructed for the fish processing facilities stated above.

4) Refrigeration Facilities

The refrigeration facility which was constructed 15 years ago is centralized with ammonia as the mode of refrigerant. All the refrigeration facilities except contact freezer were provided. Evaporator for the ice storage has not been installed. Pre-cooling system for raw water was installed by PFDA due to the increase in capacity of the ice plant. Cans for the production of ice were changed to stainless steel to comply with HACCP requirements.

Table 6.5.14 Physical Condition of Refrigeration Facilities in DFPC

Refrigeration Facilities	Description
Central refrigeration system	Ammonia Refrigerant
Common utilities	: Receiver (1), Atmospheric type evaporated condensers (1), Cooling towers (2)and Pump,
High pressure side	: Compressor unit (6)
Low pressure side	:
Ice making system	Liquid trap (1), Brine tank (1), Heat exchanger (1), chilled water receiver (1), etc.
Ice storage	Evaporator (1), Liquid traps (1), etc. No partition between ice storage and temporary room Evaporator (1), Liquid traps (1), etc.
Cold storage	Contact freezing unit (4), Surge drum (4), etc.
Freezer	

- Storage and doors (Prefabricated insulation panel type)
- Common equipment: Condenser should be changed with a larger surface to reduce high pressure, and high temperature, and not for use in cooling tower
- High-pressure side equipment: All compressors need to be overhauled
- Low-pressure side equipment: Evaporator needs to be refurbished. Other equipment and materials not usable (including piping and insulation materials)
- Freezer: Replace connecting hose, and refresh refrigeration line
- Storage and doors: Partition should be installed for the storage and modification should

be made to the doors

(2) Municipal Fish Ports

1) Sta. Cruz (Tagabuli Site)

a) Causeway

Crown height of existing causeway is very low. The size of armor stones of the causeway is too small.

There is a need to raise the elevation of the causeway. The top should be provided with access for vehicles. The facility should be provided with fish landing jetty, market hall and wastewater treatment facility. The needed utilities such as power and water should also be provided accordingly.

Fig. 6.5.5 Causeway (Sta. Cruz)

2) Panabo (Cagangohan Site)

a) Stair Landing

The site is provided with fish stair landing facility, revetment and temporary fish handling shed. All facilities are in good condition.

The proposed fish port should be provided with permanent fish handling shed, water/power supply and waste water treatment facility.

3) Mati

a) Jetty, Market Hall and Utilities

The proposed site should be provided with a fish landing Jetty market hall and necessary utilities such as power/water supply and WWT facility.

6.5.6 Status of Operation and Maintenance

(1) DFPC

No major repairs were made for civil and marine works. Minor repair were done for buildings, utilities and miscellaneous equipment as yearly maintenance. Maintenance budget for 2008 is Php 500,000.

- **Refrigeration Facilities**

  PFDA is operating and maintaining the refrigeration facilities including the ice plant with twelve staffs at 6 shifts per day. In addition to operation and maintenance, the staffs are also involved with ice harvest and sales. While the operation is well organized, there is a need to improve the skills of the staff for operation and maintenance.

(2) Municipal Fish Ports

Table 6.5.15 Status of Operation and Maintenance of Municipal Ports

Port	Facilities	Contents
Sta. Cruz	Causeway	No maintenance of causeway. Stones of slope protection are eroded.
Panabo	Fish handling shed	Nipa roof is being maintained by the fish cage operators' associations.
Mati	No facility	-

6.5.7 Problems and Needs of Stakeholders

The major problems and needs elaborated during the Stakeholders' Workshop for each site are summarized as follows:

Table 6.5.16 DFPC

Category	Problems	Needs
Facilities	1. Docking area crowded with many boats	1. Expansion of docking area
Services	2. Security deficiency.	2. Security system to be improved.
	3. Sub-standard food security practices.	3. Provision of training for GHP, GMP, SSOP and HACCP.
Others	4. Employment instability.	4. Standardization of salary scale, institute dialogues between labor and management.
	5. Depleting fish supply (low fish catch).	5. Diversification of fishing grounds and sources of supply.

Table 6.5.17 Sta. Cruz

Category	Problems	Needs
Facilities	1. No definite landing area and available space for facilities	1. Secure appropriate site for a fish port
Services	2. Illegal fishing	2. Strengthening of political will to prosecute illegal fishers
Others	3. Low fish catch (overfishing)	3. Expand mariculture, promote alternative livelihood, provide training program to fisherfolk, and plant mangrove trees
	4. Sea pollution	4. Implementation of environmental protection law

Table 6.5.18 Panabo

Category	Problems	Needs
Facilities	1. High operation cost and difficulty in harvesting (longer time) from fish cage	1. Jetty
	2. Low quality of harvested fish (milkfish) caused by shortage of ice	2. Ice plant
Services	3. Damage and illegal fishing besides cages	3. Implementation of proper security system with adequate personnel and equipment
	4. Oversupply of milkfish, no control of harvesting cycle, and unstabilized fish price	4. Improvement of market linkages
Others	5. Low fish catch (over fishing)	5. Provision of alternative livelihood

Table 6.5.19 Mati

Category	Problems	Needs
Facilities	1. Low prices offered by traders	1. Centralization of fish landing and marketing centers to invite more buyers
	2. No proper market value caused by low quality of fish	2. Enough ice supply and fish storages
Services	3. Difficulty to regulate overpopulation around fish landing sites	3. Port management and control
	4. No financial means appropriate for the sector	4. Credit and financial program
Others	5. Low or decrease of fish supply and harvest (Illegal fishing)	5. Task force coastal law enforcement

6.6 Bislig Fish Port Complex (BFPC) and Related Municipal Fish Ports

6.6.1 Fishery Production

(1) Overall Situation

Of the total fish production of 18,348 MT exclusive of seaweeds in Surigao del Sur province in 2007, Bislig City produced a mere1, 345 MT of the whole harvest. This accounted 7.3% of the total production comprising of 618 MT of commercial fishery, 439 MT of municipal fishery and 288 MT of aquaculture products. Due to the expiry of the fish agreement treaty with Indonesia, fish production of General Santos base purse-seiners and long-liners largely diminished. To compensate for the loss in catch the rich fish resources in the eastern seaboard region within the

EEZ of the Philippine Archipelago between latitude 6–10 degrees which is under exploited is being tapped as fishing grounds. In this context, the development of Bislig as a regional fish port and base of operation for commercial fishing is given serious consideration by the Philippine Government due to its proximity to the fishing grounds.

(2) Demand and Supply of Fish

Surigao del Sur where Bislig is located is envisioned to be a major net fish producing province by 2025 along with the exploitation of the eastern seaboard. Bislig is expected to become a major fish producer for Region XI as well as raw fish for the canning factories in General Santos.

Table 6.6.1 Local Demand and Supply of Fish (Unit: 1,000 MT)

	Local Demand for Fish				Fish Production				Breakdown of Fish Production (2025)			Surplus (2025)
	2007	2015	2020	2025	2007	2015	2020	2025	MF	CF	AQ	
Region XIII	84	88	85	83	89	100	106	113	76	30 (22)	7 (2)	+30
Surigao del Sur	20	20	20	19	19	28	34	40	15	22 (20)	3 (1)	+21
(Bislig)	4	4	4	4								
Agusan del Norte	22	23	22	22	13	13	14	14	10	0	4 (1)	-8
(Butuan City)	11	11	11	10								
Surigao del Norte	19	20	19	19	56	57	58	59	49	8 (2)	2 (1)	+40
Region XI	152	153	151	149	66	69	71	73	34	17	22 (6)	-76
Davao City	50	52	53	53	9	9	9	9	2	6	1	-44

Abbreviation: MF: Municipal Fishery, CF: Commercial Fishery, AQ: Aquaculture (except seaweed) Source: BAS (2007)
Remarks: ( ) shows the estimated increment from 2007.

(3) Fishing Boats

The 2 major fish unloading sites in Bislig are located in Mangagoy in the vicinity of the Public Market and Poblacion. Regrettably, due to the absence of fish landing facilities, commercial fishing boats are unable to directly unload their fish harvest onshore and double-handling had to be resorted to. The table hereunder shows the ongoing operational activities of fishing boats in Bislig.

Table 6.6.2 Operational Status of Fishing Boats in Bislig

		Commercial Fishery	Municipal Fishery
No. of fishermen /1		1,080	915
No. of fishing boats /1		34	334 (motorized) & 180 (non-motor)
	/2	44 (HL/LL)	149 (GN), 33 (BT), 55 (HL), 30 (OT)
No. of boats	Mangagoy	2.1 (HL/LL)	13.0 (HL), 1.0 (CB), 2.9 (OT)
entry per day	Poblacion	0.1 (HL/LL)	36.1 (HL), 0.1 (CB)
(Dec.)			

Source: 1/ Bislig City and 2/ Fish Landing & Marketing Survey conducted by JICA Survey Team (Dec. 2009)
Abbreviation: HL: Handline, LL: Longline, GN: Gillnet, BT: Baby trawl, OT: Others

Five (5) tuna hand-line commercial fishing boats, 3 from General Santos and 2 from Davao are operating in Surigao del Sur with Bislig as the base of operation. As mentioned earlier, due to the expiry of fish agreement treaty with Indonesia, numerous purse seine hand-line commercial fishing boats are expected to relocate to Bislig from General Santos to Bislig.

(4) Fish Catch and Unloading

The table hereunder shows the estimated volume of fish unloading volumes in Bislig.

Table 6.6.3 Present Situation of Fish Catch and Unloading at Bislig

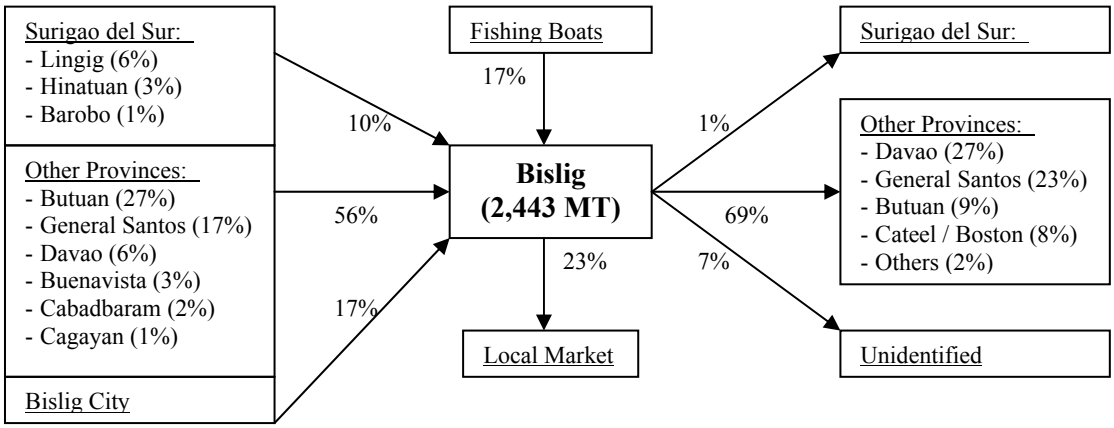
Peak Season	Apr. – Sep.	
Annual Production (2007)/1	Commercial: 618 MT, Municipal: 439 MT	
Landing Site	Mangagoy Market Site	Poblacion
Fish Unloading Volume (Dec. 2009) /2	70.3 MT	31.5 MT
Estimated Annual Unloading Volume	1,687 MT	756 MT
Major Species	(Commercial) Skipjack, tuna (Municipal) Tuna, anchovy, slipmouth, rabbitfish, snapper, grouper, parrot fish	

Source: 1/ Bislig City (2007) and 2/ Fish Landing & Marketing Survey by JICA Survey Team (Dec. 2009)
Note: Fish unloading volume (Dec.) x 24

6.6.2 Fish Distribution Flow and Marketing System

(1) Fish Distribution Flow

The Table hereunder shows Current fish products distribution flow in Bislig.



Source: Fish Landing & Marketing Survey conducted by JICA Survey (Dec. 2009)

Fig. 6.6.1 Fish Flow at Bislig

Assuming that General Santos based purse-seiners shifted to Bislig, most of the unloaded fish would be transshipped to General Santos by insulated trucks although some may be supplied to DFPC for processing and local consumption.

(2) Fish Marketing Channel

Two (2) large-scale fish brokers are available in Bislig, one located in Magsaysay Market and the other in Poblacion. Each broker is transacting some 2,000 – 2,500 kg/day of fish produce. Each broker is supported by 10 staffs. Also, there are 5 medium-scale brokers transacting fish products of about 250-500 kg/ day and 4 small-scale fish brokers transacting some 60-150 of fish product daily.

Almost all fish unloaded at Mangagoy Public Market site are distributed through wholesalers (50%) and traders/dealers (46%). Type and number of vehicles used for fish distribution are as shown on Table below.

Table 6.6.4 Type and Number of Vehicles Used for Fish Distribution

(Unit: No. of vehicles/day)

	Motor cycle	Fish Car	Tricycle	Jeepney	Bus	Backload	Elf / Multicab	6-wheel
Delivery	2.5	2.3	1.3	9.1	0.4	0.2	0.2	0.1
Shipment	2.8	2.2	3.9	4.1	3.8	0.6	0.5	1.1

Source: Fish Landing & Marketing Survey conducted by JICA Survey Team(Dec. 2009)

(3) Ice Supply

Two (2) privately owned ice plants are operating in Bislig, with a total capacity of 15 MT/day. Ice requirement is estimated at 3,014 MT/year of which 2,034 MT are for the use of fishing boats, 600 MT are for the shipping of aquaculture products and the remaining 672 MT are used in the marketing of fresh fish. This will redound to a daily supply of 10 MT/day of ice. To date, the present ice supply capacity in Bislig seems to be sufficient even during peak fishing season.

However, should the 80 sets of General Santos base purse-seiners be transferring to Bislig, some 30,000 MT/year or 100 MT/day of ice is estimated to be needed in addition to the produce of the existing ice plants. With the foregoing in consideration and for the advance information to those intending to set up an ice plant in the future, a 50MT/day capacity ice plant for the initial stage is deemed appropriate.

6.6.3 Physical Condition of the Bislig Fish Port Facilities

PPA constructed Caramcam Pier which is close to Mangagoy Municipal Market in 2007. The port consists of a pier on RC pile foundation, revetment, reclaimed area, pavement, ramp, street lighting facilities and small office building, to cater RoRo vessels. Regrettably, however, the port was barely used, so that the facilities are still in good condition.

Fig. 6.6.2 Caramcam Pier (Bislig)

PFDA requested PPA to use the port as base for fishing operation for which a Resolution of Bislig City Council was forwarded to PPA on Nov.23 2009.

The following are the observation results about Caramcam pier as fishing port.

Caramcam Pier was designed to accommodate RoRo vessels not fishing boats with outrigger. Fish landing facilities such as stair landing for fishing boat is needed as part of the port facilities. It is also needed new offshore breakwater to accommodate the fishing boats operation.

The reclamation area is too small as backup area for the installation of ice making plant, administration building, slipway and related facilities. Additional reclamation area therefore is needed.

Additional utilities including fresh water supply, electricity and sewage system are needed for the proposed fishing port.

6.6.4 Status of Operation & Maintenance

Facilities for Caramcam pier were constructed on 2007 and no maintenance had been carried out ever since because as mentioned earlier the facility as intended was barely used and the facility is relatively new.

6.6.5 Problems and Needs of Stakeholders

The major problems and needs elaborated in the stakeholders workshop at Bislig are summarized as follows:

Table 6.6.5 Problems and Needs of Stakeholders

Category	Problems	Needs
Facilities	1. Inadequate supply of water and power system. 2. Narrow access road to the proposed site. 3. Difficulty in fish unloading (big waves). 4. No dry dock facility. 5. Lack of fishing equipment and materials. 6. Deficient communication facilities.	1. Improvement of power system and installation of water facilities. 2. Widening of access road to port site. 3. Construction of a breakwater. 4. Construction of dry dock area. 5. Identification and invitation of investors. 6. Installation of efficient and reliable communication facilities.
Services	7. Lack of coordination among the stakeholders. 8. Lack of support and constructive intervention by the LGU. 9. Inadequate human resources from the locality.	7. Establishment and strengthening of stakeholders organizations. 8. Strong and collaborative LGU stakeholder's partnership. 9. Provision of trainings to support the skills requirement of port operation.
Others	10. Delay in the completion of the Maharlika Highway leading to Bislig. 11. Presence of squatters.	10. Completion of the Maharlika Highway. 11. Proper transfer of squatters to relocation areas.

7. Current Conditions of Fish Ports Management

7.1 General

a) At present, the PFDA manages only the eight (8) regional fishing ports although in the past, certain municipal fish ports were also run by its Operation Management Department under the Municipal Fishing Port Development Project. With the implementation of the Local Government Code (LGC), the control over all the municipal ports, including those used to be managed by PFDA, has been devolved to the Local Government Units (LGUs). Consequently, PFDA is involved only with the management and operation of the regional fish ports while the municipal ports are administered and managed by the respective LGUs.

b) The corporate powers of PFDA are exercised by the Board of Directors comprising the Secretary of the DA as Chairman, Administrator of the NFA (National Food Authority) as Vice-Chairman, Secretaries of the DPWH, Department of Trade and Industry (DTI) and Department of Environment and Natural Resources (DENR) as members and two representatives from the fisheries private sector. The General Manager supported by the Assistant General Manager manages everyday affairs of the PFDA.

c) For the management, operation and maintenance of municipal ports, the mayor of the town, through the municipal administrator and the municipal secretary, runs all public economic enterprises, including the fishing port.

d) As in many coastal municipalities, the normal practice is for municipal government to organize a management team headed by a supervisor who actually runs the fish port. This person manages staff members that are tasked to undertake different activities, including the checking and inspection of unloading of fish hauls, issuance of bills and receipts, collection of fees, gathering and compiling of fishery statistics and other important functions.

e) According to the municipalities, the management and operation staff is of organic personnel in the LGUs except for janitorial services which are locally contracted to individuals. Wages and benefits of organic staff are therefore paid for by municipal funds except for the payment of janitorial services which are paid for by the revenues of the municipal ports. For more than two decades, the Authority has made headways in attaining its objectives and fulfilling its mandate. Through three core programs, namely: the Regional Fish Ports Program; the Municipal Fish Ports Program; and the Ice Plants and Cold Storages Program, PFDA has continuously responded to the need of the fishery sector for post-harvest facilities and services.

7.2 Management & Maintenance Organization of PFDA

7.2.1 General

a) PFDA is one of the twenty one (21) attached agencies of DA, including those relevant to fishery sector such as the National Agriculture and Fishery Council (NAFC), National Fisheries Research and Development Institute (NFRDI), Southeast Asian Fisheries Development Center (SEAFDEC). Summary of the government entities in relation to the Philippine fishery sector is shown in Table 7.2.1.

b) Creation of PFDA was way back in 1976, when the Philippine government promulgate PD 977 to create the Philippine Fish Marketing Authority (PFMA) under the Secretary of the late Ministry of Natural Resources (MNR), considering importance of the post-harvest problems. In 1981, PFMA was transferred to the National Food Authority (NFA) with an emphasis of basic food requirements in the country. Upon issuance of EO 772 in 1982 to amend the PD 977, the Authority was renamed PFDA and again reverted to MNR in order to implement the Integrated Fishery Development Plan. Thereafter, upon establishment of the Ministry of

Agriculture and Food (MAF) by virtue of EO 967 in 1984, PFDA was attached to then MAF, which is now DA.

Summary of the Philippine Government Entity in Fishery Sector is shown in the following table.

Table 7.2.1 Summary of the Philippine Government Entity in Fishery Sector

Bureaus & Agencies	Responsibility, Functions, Mandates, etc.	Established Year	Remarks
Bureau of Post-Harvest Research and Extension (BPRE)	- Having engaged in both postharvest research and extension activities, - Taking a lead in providing more postharvest interventions to empower the agriculture and fishery sectors in line with AFMA initiatives.	1992	National Postharvest Institute for Research and Extension (NAPHIRE), 1978, as the predecessor.
Bureau of Fisheries and Aquatic Resources (BFAR)	Responsible for the development, improvement, management and conservation of the country's fisheries and aquatic resources.	1998	BFAR under the late Ministry of National Resources, 1974.
Bureau of Agricultural and Fisheries Product Standards (BAFPS)	Responsible for setting and implementing standards for fresh primary and secondary processed agricultural and fishery products,	1997	Created in accordance with AFMA.
National Agricultural and Fishery Council (NAFC)	- Act as an advisory body to DA through policy recommendations (EO 116), - Develop a nation wide network of agricultural and fishery councils that will serve as a forum for consultative discussions within the agricultural and fishery sectors (EO 116), - Assist DA in the monitoring and coordination of the agriculture and fisheries modernisation process (AO 6, DA), - Serve as the integrative and consultative structure for inter-agency and inter-sectorial collaboration in agri- and fishery- modernisation (AO 6, DA)	1987	National Food and Agriculture Council (NFAC), 1982, as the predecessor.
National Fishery and Aquatic Resources Management Council (NFARMC)	- Assist in the formulation of the national policies for the protection, sustainable development and management of fishery and aquatic resources for the approval of the DA Secretary, - Responsible for policy agenda studies, reviews and consultation reports. It also covers legal, advisory and technical service on aquaculture, fishing technology, post harvest, fisheries resources studies, policy formulation and planning service.	1998	Created in accordance with AFMA.
National Fishery Research and Development Institute (NFRDI)	As the primary research arm of BFAR, - establish a national infrastructure unit complete with technologically-advanced features and modern scientific equipment, which shall facilitate, monitor, and implement various research needs and activities of the fisheries sector; - provide a venue for intensive training and development of human resources in the field of fisheries, a repository of all fisheries researches and scientific information, for the maximum utilization of available technology; - hasten the realization of the economic potential of the fisheries sector by maximizing developmental research efforts in accordance with the other requirements of the national fisheries conservation and development programs, also possibly through collaborative effort with international institutions; and - formally establish, strengthen and expand the network of fisheries-researching communities through effective communication linkages nationwide.	1998	Created in accordance with AFMA.
Southeast Asian Fishery Development Centre/Aquaculture Department (SEAFDEC/AQD)	AQD as a part of the ASEAN autonomous inter-governmental body to develop fisheries potential of the South Asian region, - conducts research, develop technologies, disseminate information, and train people in the farming of fishes, crustaceans, molluscs, and seaweeds for food, livelihood, equity, and sustainable development, - is funded by the Philippines for its physical facilities, and funding for the operations and the salaries of the researchers, scientists, and service personnel, - is mandated to i) promote and undertake research on aquaculture relevant and appropriate to the region, ii) encourage human resource development in aquaculture through training and extension, and iii) disseminate and exchange information in aquaculture,	1973	SEAFDEC was established in 1967, by the member countries comprising Japan, Malaysia, the Philippines, Singapore, Thailand, Brunei Darussalam, and the Socialist Republic of Vietnam. It has the following four departments, each carrying out training and research programmes within specified activities: - AQD in the Philippines for farming aquatic organisms, - Training Department (TD) in Thailand for fishing technologies, - Marine Fishery Resources Development and Management Department (MFRDMD) in Malaysia for the wise use of oceanic resources.

Among others above, outline of the DA, PFDA and BFAR organizations such as its establishment, regulatory basis, responsibility and functions, financial basis, etc,., are summarized in the following table.

Table 7.2.2 Organization of DA, PFDA and BFAR

	DA	PFDA	BFAR
Legal Basis	EO 116, 1987 RA 8435 (AFMA), 1997	PD 977, 1976 EO 722, 1982 EO 116, 1998 RA 8435 (AFMA), 1997 RA 8550 (Philippine Fishery Code of 1998)	RA 177, 1947 EO 116, 1987 RA 8550 (Philippine Fishery Code of 1998)
Mission/Visions	- The lead agency to boost farmers' income and reduce poverty incidence in the rural sector through the Medium Term Philippine Development Plan (MTPDP). - Prosperous rural communities, built on profitable farms that provide surplus for agro-industry and food security. - The target areas include i) idle or marginal agricultural lands, ii) offshore and inland bodies of water for aquaculture, iii) new and existing agricultural areas for intercropping with high value crops and raising of livestock, poultry and [illegible] - Productivity enhancement, more efficient logistics and improved retailing linkages by i) production support to enhance farm and fishery productivity, ii) logistics support to raise distribution efficiency, iii) governance and institutional support to provide a policy and regulatory environment conductive to efficient production and distribution of agribusiness commodities.	PFDA is a government owned and controlled corporation (GOCC) attached to DA for promoting the development of the fishing industry through provision of post-harvest infrastructure facilities and essential services. - Establish, operate and maintain strategic and globally competitive fishery post-harvest infrastructures and facilities, as well as provide market information and related services.	As an attached agency of DA, BFAR is responsible for the development, improvement, management and conservation of the Philippine's fisheries and aquatic resources. - Conserve, protect and sustain the management of the country's fishery and aquatic resources, - Alleviate poverty and provide supplementary livelihood among municipal fisher folk, - Improve aquaculture productivity within ecological limit - Utilise optimally the offshore and deep sea resources, - Upgrade post-harvest technology. It is also to task on the following: - Provide economical, efficient and effective fisheries services to fishponds operators, fishermen and other members of the community, - Implement fishery laws and policies, plans and programs, - Inspect fishery demonstration farms, nurseries, fishery projects and fishery stations.
Function/Resposibility in Fish Port Projects	DA is defined as the Department who actually undertake main responsibility for executing the AFMA implementation.	PFDA is one of the attached agencies to be coordinated by DA in implementing AFMA and Philippine Fishery Code of 1998. PFDA is specifically responsible for the establishment/rehabilitation and/or operation of fisheries infrastructure facilities such as regional fish ports, landing areas, ice plants and cold storages and municipal processing plants, etc.	BFAR is also one of the attached agencies of DA, to be closely coordinated with in pursuing the Philippine Fishery Code of 1998. BFAR serve as the lead implementing agency of the fishery programs nationwide and oversee program implementation, ensure proper coordination among program implementors, prepare overall work plan and budget, and monitor projects and activities in coordination with LGUs and others.
Financial Backgrounds	As DA is one of the Government Departments of the Philippines, the operation and management has been financially appropriated by the national budget. The substantial portion of the DA income is sourced from the government subsidy.	PFDA is a GOCC, which operations are of income/revenue generating. As long as the present operations of the existing facilities, the financial status of PFDA is self-sustainable with a minimum level of the government subsidy.	As a nature of its operations, BFAR is not an income/revenue generating organisation. The BFAR financial status substantially depends on the subsidy from the national government thru DA and others.

Note: Organization structure and financial statement for DA and BFAR are found in the Appendix 14 and 15.
Abbreviations: EO: Executive Order, RA: Republic Act, PD: Presidential Decree

c) In fishery project and programme implementations, delineation of the roles, functions and authorities among the agencies including those above listed are generally as follows:

- PFDA: It shall be responsible for the establishment/ rehabilitation and/or operation of fisheries infrastructure facilities such as regional fish ports, landing areas, ice plants and cold storages and municipal processing plants, etc.
- BFAR: It will serve as the lead implementing agency of the MakaMASA-Fisheries Program nationwide and that the Bureau Director will act as the Program Director. The Bureau shall oversee program implementation, ensure proper coordination among program implementers, prepare overall work plan and budget and monitor projects and activities, in coordination with the Local Government Units and other concerned agencies.
- Local Government Units (LGUs): LGUs shall act as the lead planning and implementing unit of fisheries projects and activities at the provincial and municipal levels. They shall provide extension services to targeted clienteles, gather fisheries data for policy formulation and provide linkage with fisherfolk's cooperatives/organizations, nongovernment organizations and the private sector.
- Bureau of Agricultural Statistics (BAS): BAS shall provide statistical services to the private sector, academic community, government organizations, international entities and the general public .to enhance their productivity and socio-economic well-being.

- Bureau of Agricultural Research (BAR): BAR shall be responsible in the coordination and monitoring of research activities of the agencies involved in fisheries, assist in the formulation of research plans and programs and conduct in-house research reviews/national research symposia/trainings.
- SEAFDEC/AQD: This regional body will be responsible for the promotion, implementation and coordination of aquaculture fisheries research relevant and appropriate in the fisheries sector development in the region, provide technical assistance, develop human resources and disseminate and exchange information on aquaculture.
- National Agricultural and Fishery Council (NAFC): shall provide consultative forum or venue for continuing discussions on issues pertaining to the development and management of the fisheries sector as well as implement locally-funded and foreign-assisted programs and projects designed to make fisheries industry profitable and sustainable.
- Agricultural Credit and Policy Council (ACPC): ACPC shall be responsible in the conduct of activities to foster the efficiency and effectiveness of the rural financial market, development of financial credit programs and promotion of institution-building for fishfarmers/fisherfolks.
- Quedan and Rural Credit Guarantee Corporation (QUEDANCOR): This agency shall be responsible for improving the bankability of and access by fisherfolks and cooperatives to formal credit institutions as well as support dynamic capital formation and savings mobilization among rural populace.
- Department of Environment and Natural Resources (DENR): This agency shall be responsible in exploration, assessment, classification and inventory of the country's natural resources and promote proper and mutual consultation with the private sector development, utilization and conservation.
- Department of Trade and Industry (DTI)/Board of Investments (BOI): These agencies shall be responsible to develop fisheries as a globally competitive industry and to attract local and foreign investment.
- Department of Science and Technology (DOST)/Philippine Council for Aquatic and Marine Research and Development (PCAMRD): The DOST, through PCAMRD shall provide an environment to promote research and development for fisheries using a multidisciplinary, inter-agency, and systems approach, as well as facilitates the allocation of funds earmarked for fisheries and aquatic resources R & D.
- Department of National Defense (DND)/Philippine Coast Guard (PCG): These law enforcement agencies are responsible for the enforcement of fisheries laws and regulations, supervision of the maritime transportation industry, shall ensure compliance of vessels to safety standards and apprehension of illegal fishers, smugglers and poachers.
- Private/State Universities and Colleges (SUCs): Selected SUCs shall support the fisheries development and management through the conduct of fisheries research covering information gathering, technology verification, adaptation and dissemination.
- National Fisheries and Aquatic Resources Management Councils (NFARMC)/Municipal/City Integrated Fisheries and Aquatic Resources Management Councils (M/C/IFARMCs): These councils shall assist in the formulation of policies for the protection, sustainable development and management of fishery and aquatic resources and assist in the preparation of fisheries industry development plans.
- Non-Government Organizations (NGOs): These organizations shall serve as the major catalysts of social development in the country's rural areas seeking to create alternative approaches to increase people's participation in overall development through innovative mechanisms for interaction between government and non-government agencies.
- The Department of Transportation and Communications (DOTC) and Philippine Ports Authority (PPA): DOTC, PPA and PFDA shall coordinate with DA for the purpose of determining priority fishports, seaports and airports and facilitating the installation of bulk-handling and storage facilities, and other post-harvest facilities needed in order to enhance the marketing of agriculture and fisheries products, provided that fishports, seaports and airports are also equipped with quarantine, sanitary and phytosanitary centers.

DOTC shall have the mandate to cancel arrastre and cargo handling franchises among operators whom it deems inefficient and/or ineffective owing, but not limited to, a history of under-capitalization, lack of equipment and lack of professional expertise. DOTC shall recommend to the Philippine Ports Authority and consult with ship-owners and ship-operators in assessing the cargo-handling capabilities of cargo operators prior to extending new franchises or awards.

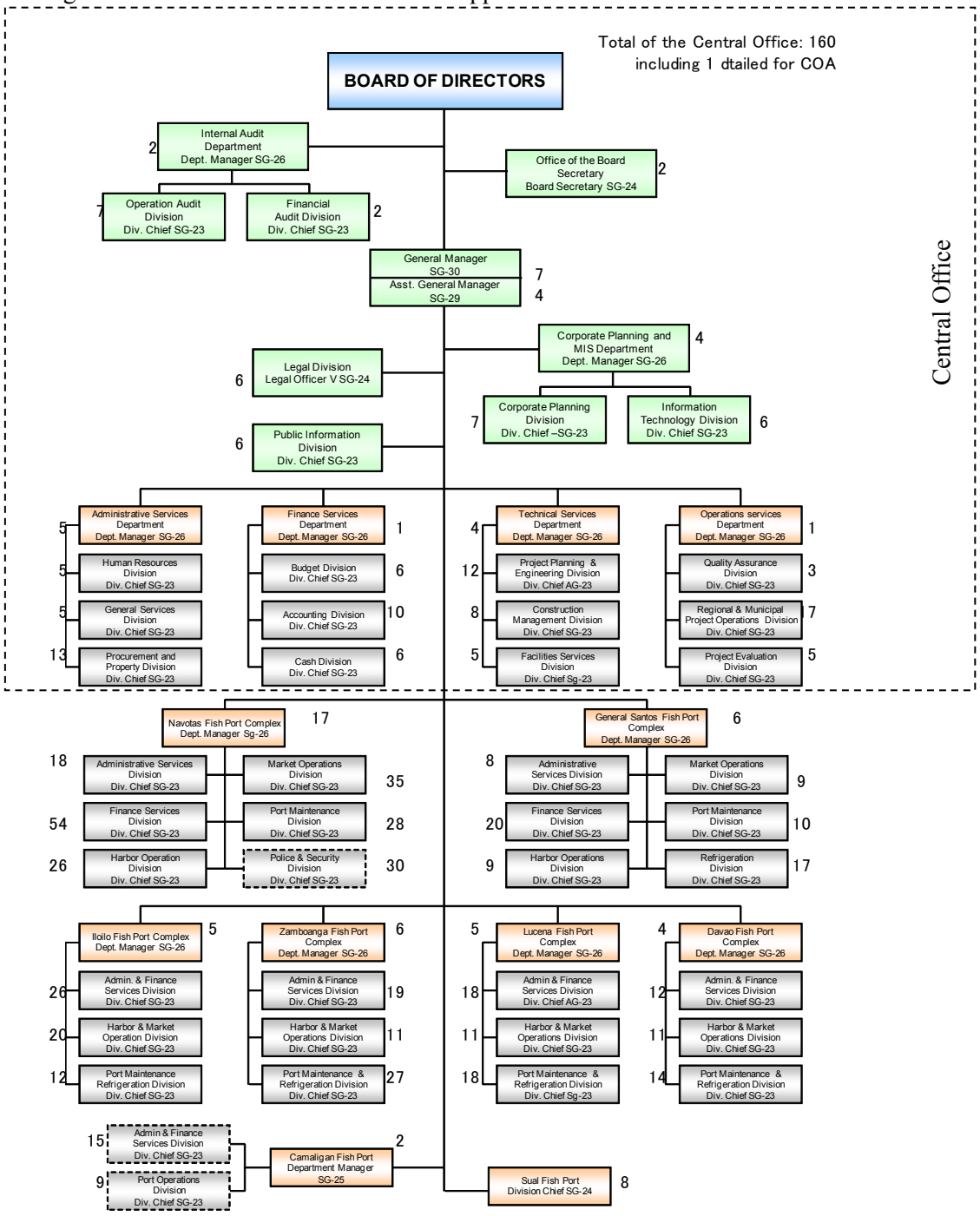
The institutional outline of PFDA is summarized in Table 7.2.2.

Table 7.2.3 Mission, Vision, Objectives and Major Services of PFDA

MISSION
We (PFDA), in PFDA, shall strive to: - Establish, operate and maintain strategic and globally competitive fishery post-harvest infrastructures and facilities, as well as provide market information and related services. - Conduct our operations prudently, providing viability and financial growth to assure continuous improvement of port facilities and delivery of services. - Satisfy our stakeholders' business needs with timely and quality services. - Work as a team with skill and dedication, in an environment that ensures growth opportunities.
VISION
The PFDA is dynamic and viable government corporation that provides services and contributes to the country's food security by supporting and environmentally sustainable and competitive fishing industry through technologically advanced post-harvest facilities and infrastructures.
CORPORATE OBJECTIVES
The PFDA endeavours to achieve these objectives: - Promote the development of the fisheries industry and improve efficiency in the handling and distribution of fish and fishery/aquatic products through the establishment and operation of fish ports, fish markets, and other post-harvest facilities, - Provide essential fisheries-related post-harvest services that would improve the quality of fish products that could compete in the global market.
MANDATE
The PFDA, a government owned and controlled corporation attached to DA, was created to promote the development of the fishing industry through provision of post-harvest infrastructure facilities and essential services that improve efficiency in the handling and distribution of fish and fishery products and enhance their
MAJOR SERVICES
Being a developmental government institution, the PFDA performs the supportive role of providing the fishing industry with a nationally integrated fisheries infrastructure by strong institutional linkages. Particularly, the - Management, operations, and development of regional commercial fish port complexes located in strategic areas in the Philippines, - Establishment of ice plants and cold storages, municipal fish ports, warehouses, factory buildings and other structures necessary for the development of the fishing industry, - Conduct of training on Hazard Analysis Critical Control Points and Good Manufacturing Practices and on the operation and management of municipal fish port, - Monitoring, compilation, and dissemination of fishery statistics and information necessary in the conduct of business activities and policy formulation.

7.2.2 PFDA

a) Fig. 7.1 shows the organizational Structure of the overall PFDA Central Office including the Regional Fish Ports. Based on management scale, PFDA Central Office has 160 staff members, 41 for Davao FPC, 63 for Iloilo FPC, 52 for Lucena FPC, 26 for Camaligan FPC and 8 for Sual FPC for a total of 700 including other contractual employees. Personnel wages and benefits account for a high portion of the PFDA expenditures, but efforts are being exerted to downsize its size through national government initiatives for rationalization and standardization. In January 2009, PFDA staff had decreased by 26 from 726 to 700. Details of the organization for each FPC are shown in Appendix 14.



Note: Figures beside the each column show the number of staff.

Fig. 7.2.1 Organization of PFDA

b) Despite the effort for the above re-structuring of the PDFA organization, handling and movement of fresh fish however is continuing and operation of the fish ports, trading and other activities including operation of the refrigeration facilities have to be conducted and maintained at 3 shifts per day all year round. Therefore, while the instantaneous slimming down of staff is highly desirable, the same could not immediately be pursued as conceived. Moreover, in addition to PFDA's tasked for the regional fish ports, the Authority has also been supporting municipalities by deploying employees for capacity building of LGU staff for management, operation and maintenance of municipal port facilities.

7.3 Management & Maintenance Organization of Municipal Fish Port

a) In municipalities/LGUs, there are a variety of organization depending on the traditional municipal government structures. An example of the organization, in case of San Jose De Buenavista, Antique, is shown in Fig. 7.3.1 below, including a proposed fish port operation unit.

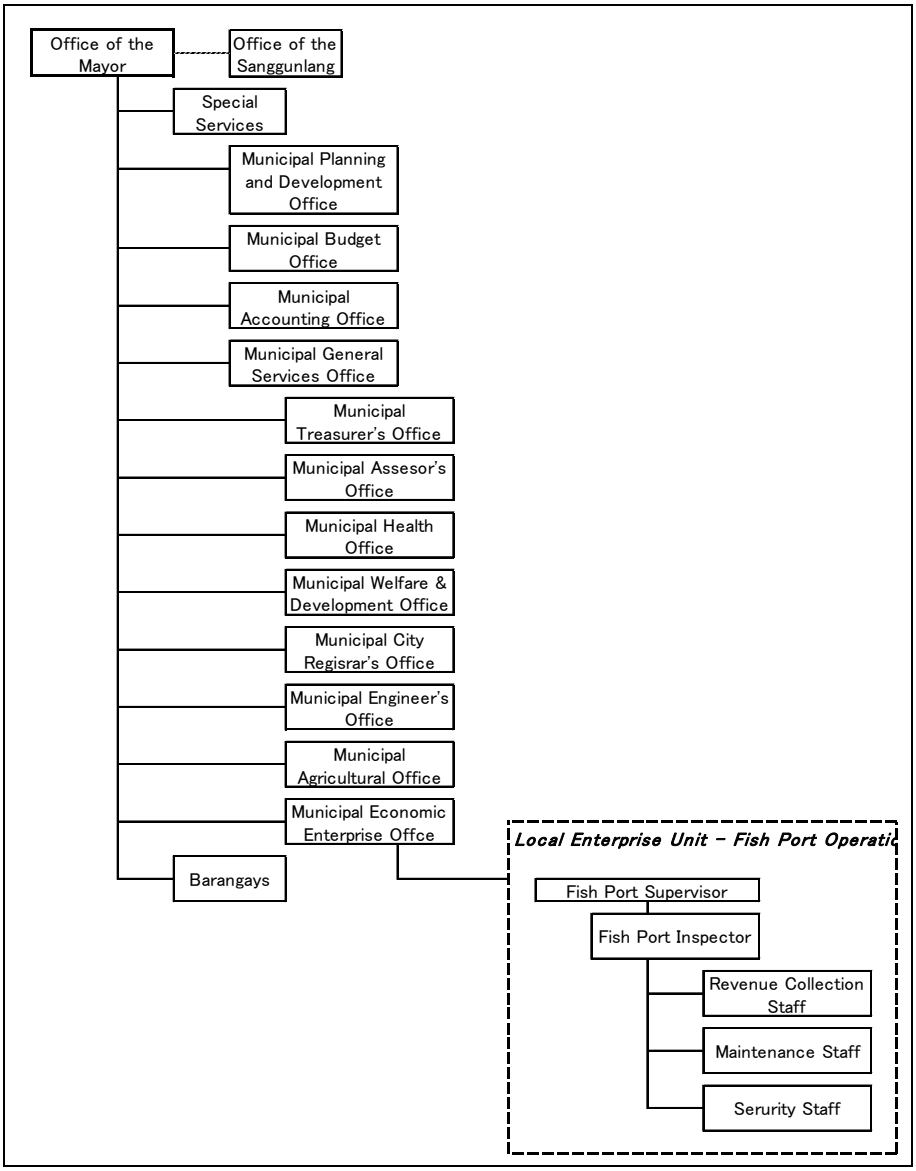


Fig. 7.3.1 Organization of Municipal/LGU, including a Possible Fish Port Unit

b) ig. 7.3.2 hereunder shows a typical organizational structure of the LGU's fish port for the management, operation and maintenance. The organization structure also appears to significantly varies in each municipality/LGUS.

c) Based on information from the PFDA, the LGUs have adopted the organizational structure of PFDA when PFDA was still managing and operating the municipal fish ports.

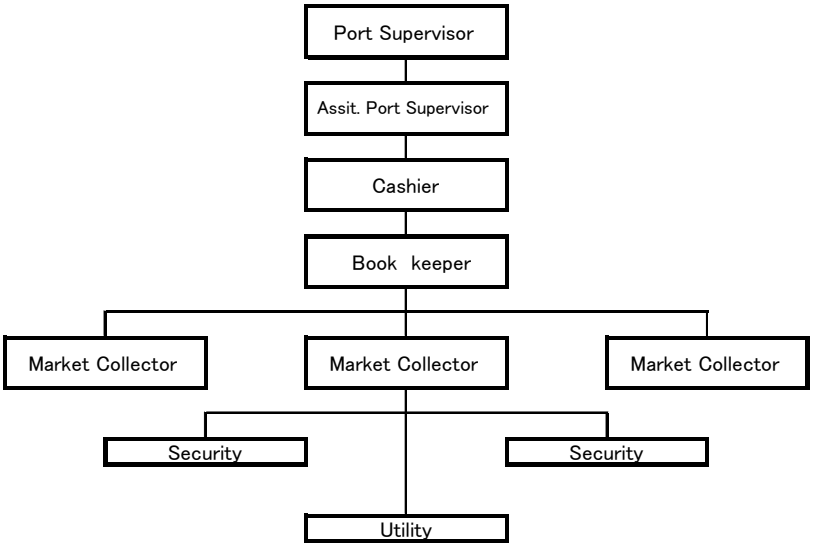


Fig. 7.3.2 Municipal Fish Ports Organizational Chart for Management, Operation & Maintenance

7.4 Management Status of the Regional Fish Ports

a) The Port Management Office of the Regional Fish Ports of PFDA is headed by a Port Manager and the tasked are allocated to 3 sections. The Management and Maintenance Section is in charge for operation and maintenance of the refrigeration facilities including the ice plant, the Accounting Section for management, operation and maintenance of port services and the Marketing Section for trading and promotion.

b) The financial statement for income and expenses for 2008 and 2009 for the 5 selected Regional FPC is shown in Table 7.4.1 and Table 7.4.2 hereunder. It can be seen that Iloilo FPC, Sual FPC, Lucena FPC and Camaligan FPC have deficit revenues but the overall revenues generated by the 8 Regional Fish Ports under PFDA administration particularly for Navotas FPC and General Santos FPC have sufficient revenues as shown in Table 7.4.4 below, to subsidize the operation of losing regional fish ports.

c) In the case of Iloilo FPC, the operation of the refrigeration facilities and ice plant is severely affected by the high cost of commercial electricity and unless other source of power is tapped, sufficient revenues could not be generated for sustainability of operations.

d) The deficit for Camaligan FPC is due to the decrease in volume of processed fish which was flourishing until 2004. This is primarily due to the stoppage of unloading of fish hauls by fish boats/carriers due to the abrupt rise in fuel cost aggravated by the heavy accumulation of silts at the mouth of Camaligan River.

Table 7.4.1 Statement of Income & Expenditures
(for the Year Ended December 31, 2008, In 1,000,000 Philippine Peso)

		IFPC	SFPC	LFPC	CFPC	DFPC
(a) Income	Entrance/Berthing Fee	11.41	0.18	0.59	0.00	4.38
	Ice Conveyance Fee	0.25	0.07	1.14	0.00	
	Entrance/Parking Fee	0.66	0.13	1.03	0.00	
	Port Usage Fee	0.07	0.55	0.00	0.00	
	Landing/Market Hall Fee	2.93	0.03	3.41	0.00	2.00
	Land Rental	1.63	0.05	2.08	0.80	4.80
	Cold Store Fee	7.07	0.00	1.96	1.63	
	Refrigeration Use Fee	0.80	0.00	0.00	0.58	0.08
	Slipway	1.50	0.12	2.68	0.00	0.00
	Building/Equipment Rental	4.00	0.60	2.86	0.63	6.50
	Sales of Ice	0.00	0.00	9.84	5.50	6.40
	Total	**30.32**	**1.73**	**25.59**	**9.14**	**24.16**
(b) Expenses	Personnel Services	19.13	2.44	14.89	7.88	11.91
	Fuel /Lubrication	0.00	0.00	2.19	0.00	0.00
	Electricity	15.72	0.15	7.42	4.32	6.54
	Water					
	Security	4.23	0.90	3.92	0.56	5.53
	Total	**39.08**	**3.49**	**28.42**	**12.76**	**23.98**
Balance (a-b)		**-8.76**	**-1.76**	**-2.83**	**-3.62**	**0.18**

Abbreviations: IFPC-Iloilo Fish Port Complex, SFPC-Sual Fish Port Complex, LFPC- Lucena Fish Port Complex, CFPC-Camaligan Fish Port Complex, DFPC- Davao Fish Port Complex

Table 7.4.2 Consolidated Statement for Income & Expenses of Regional Fish Ports (for Year Ended December 31, 2009 - In Philippine Pesos)

			DRFP	IRFP	LRFP	CRFP	SRFP
INCOME	Permits and Licences		4,307,743.57	1,617,856.32	3,361,714.30	744.6	1,021,319.35
	Service Income		4,819,288.63	12,325,222.13	2,980,113.36	840,689.08	1,456,599.99
	Business Income		22,832,986.83	20,016,377.42	23,839,191.45	10,444,231.89	2,253,234.96
	Other Income		556,322.34	7,164.30	12,587.50	0	790
	GROSS INCOME		**32,516,341.37**	**33,966,620.17**	**30,193,606.61**	**11,285,665.57**	**4,731,944.30**
EXPENSES	**Personal Services**		**11,883,784.24**	**20,122,876.80**	**14,567,502.19**	**7,521,359.32**	**2,468,687.13**
	Maintenance and Other Operating Expenses	Traveling Expenses	123,849.06	21,825.07	158,807.30	64,146.56	18,216.00
		Training Expenses	4,500.00	0	8,824.00	12,400.00	0
		Supplies and Materials Expense	1,570,198.28	1,345,024.36	2,014,993.30	777,441.09	131,398.61
		Utility Expenses	6,540,732.46	13,896,650.77	7,761,093.83	3,855,980.37	239,506.97
		Communication Expenses	256,818.30	124,788.16	155,666.84	103,504.04	68,234.14
		Advertising Expenses	1,080.00	1,300.00	400	6,828.13	0
		Printing and Binding Expenses	1,600.64	0	113,375.22	6,058.26	0
		Representation Expenses	185,381.38	60,000.00	60,000.00	76,633.60	9,395.97
		Transportation and Delivery Expenses	9,713.83	17,763.21	0	945,676.46	0
		Subscription Expenses	16,209.14	12,428.00	4,945.00	5,380.00	0
		Professional Services	5,766,185.29	4,146,331.14	5,044,470.70	515,326.97	968,425.47
		Repairs and Maintenance	797,055.64	127,341.62	494,682.00	321,009.91	41,592.07
		Donations	0	0	0	1,300.00	0
		Taxes, Duties and Licenses	234,688.58	233,995.54	221,751.84	202,126.91	87,154.25
		Fidelity Bond Premiums	9,165.00	9,570.00	7,728.75	8,488.00	1,653.75
		Insurance Expenses	258,211.19	11,974.56	259,531.62	126,231.01	0
		Bad Debts Expenses	0	0	908,825.88	9,680.00	0
		Depreciation	2,113,245.83	3,936,654.13	1,352,722.72	557,893.08	368,776.36
		Other Maintenance and Operating Expenses	237,053.35	69,221.91	174,899.36	57,172.14	20,049.39
		Total MOOE	**18,125,687.97**	**24,069,793.37**	**18,742,718.36**	**7,653,276.53**	**1,954,402.98**
	Financial Expenses		**0**	**131.5**	**1,750.00**	**8,280.00**	**1,637.00**
	TOTAL EXPENSES		30,009,472.21	44,192,801.67	33,311,970.55	15,182,915.85	4,424,727.11
PROFIT FROM OPERATIONS			**2,506,869.16**	**-10,226,181.50**	**-3,118,363.94**	**-3,897,250.28**	**307,217.19**
Other Income and Expenses	Income from Grants and Donations		1,397,236.52	737,769.34	0	0	0
	Interest Income		299,531.63	123,649.60	84,091.48	16,889.65	8,548.48
	Gain(Loss) on Sale/Disposal of Assets		56,202.69	327,322.50	0	0	0
	Gain(Loss) on Foreign Exchange(FOREX)		-280,752.92	0	0	0	0
NET PROFIT			**3,979,087.08**	**-9,037,440.06**	**-3,034,272.46**	**-3,880,360.63**	**315,765.67**

e) Similarly, port activities in Davao FPC and Lucena FPC have also been declining principally due to the rising cost of fuel. For Davao FPC the condition was further compounded by the termination of the fish treaty agreement with the Indonesian Government which prompted Davao FPC based fishermen to fish in Davao Gulf within the EEZ of the country. Moreover, Davao FPC based Taiwanese fishermen shifted to Indonesia because of the expiry of the fishing agreement with Indonesia.

f) Sual at present is in the state of waiting for full reactivation.

g) With the installation of appropriate facilities and technical assistance for capacity building of PFDA staff (as fully discussed in other Chapters of this Report), the deplorable situation is improvable for sustainability of operations particularly those regional fish ports which are experiencing difficulties in sustaining profitable operations.

Table 7.4.3 Usage & Management Status of the Five Regional Fish Ports

Fish Port	Status of Usage					Profit (In thousand pesos)					
	FLF/MH	RF	IP	PF	SWF	Year					Profitability
						2004	2005	2006	2007	2008	
IFPC	◎	x	x	△	○	-7,800	-10,160	-13,470	-10,620	-10,110	x
SFPC	△	△	○	△	x	970	990	570	-390	-92	△
LFPC	◎	◎	◎	△	◎	2,310	2,950	-3,900	2,720	-2,590	○
CFPC	x	◎	◎	◎	None	30	-2,130	-2,560	-3,150	-3,250	△
DFPC	◎	◎	◎	◎	None	3,640	7,250	10,750	8,020	5,980	◎

Where, FLF/MH: Fish Landing Facility/Market Hall, RF: Refrigeration Facilities, IP: Ice Plant, PF: Processing Facilities, SWF: Slipway Facility, R&E: Revenue & Expenditures

Notations, ◎: Superb ○: Good, △: Fair, ×: Poor (issue(s) to be solved)

Table 7.4.4 Financial Statement of PFDA in 2008 (in Philippine Currency)

Particulars		(Pesos)
INCOME	Operating Revenue	524,976,000
	Non-Operating Revenue	-296,000
	Sub-Total	524,680,000
EXPENSES	Personnel Services	220,312,000
	O&M Expenses	275,266,000
	Others	23,333,000
	Sub-Total	518,911,000
PROFIT (Balance)		5,769,000
National Government Subsidy*		25,000,000
Total Funds on Hand		30,769,000

Source: Income and Expenditure Statement of Selected Government Corporations

Note: *National Government subsidy in support to the modernization of the fisheries sector to meet global challenges

h) The difference in electrical cost between Davao FPC and Iloilo FPC is apparent particularly when compared with the cost of labor which occupies the largest share of the expenditures. The deficit for Iloilo FPC especially for the operation of the ice plant and refrigeration facilities would significantly be reduced and revenues are expected to rise if the power rate decreases from Php 11/kwh to say Php 8/kwh level even if it is higher than Davao FPC power rate. The reduction in power rate is also expected to induce more processors who relocated outside Iloilo City to avail of cheaper power cost, but intending to move to Iloilo FPC on condition that power rates are lowered. The technical and economic studies of the Report has discussed in detail about the merits of adopting solar energy for power generation to complement the high commercial power cost to reduce on power rate to make the operation of facilities at Iloilo FPC sustainable.

8. Relevant Laws and Procedures to be Taken for Social and Environmental Considerations

The Philippine Fish Ports Authority identified existing ports for improvement and rehabilitation located in the Regional areas of Northern Luzon (Sual Regional Fish port) and Central Luzon (Municipality of Subic); in Southern Luzon (Lucena Regional Fish Port located at Dalahican, including the Municipal Fish Ports of Atimonan, Calauag and Sta. Elena in Camarines Norte); Camaligan Regional Fish Port in the Bicol Region (including the Municipal Fish Ports of Oas, Balatan, Calabanga and Pasacao); Western Visayas (Iloilo Regional Fish Port including the Municipal Fish Ports of Dumangas, Concepcion and San Jose de Buenavista in Antique); and Mindanao (the Regional Fish Port of Davao including the proposed Bislig Fish Port, the Municipal Fish Ports of Panabo, Sta. Cruz and Mati) a total of twenty one (21) sites.

As required by the Philippine Department of Environment and Natural Resources (DENR), Environment Management Bureau (EMB) an Environment Compliance Certificate (ECC) has to be obtained prior to any rehabilitation, upgrading of supporting marine infrastructures. Following the Basic Policy and Operating Principles of the Philippine Environment Impact Statement System developing projects must be "Consistent with the principles of sustainable development, it is the policy of the DENR to implement a systems-oriented and integrated approach to the Environmental Impact Statement (EIS) system to ensure a rational balance between socio-economic development and environmental protection for the benefit of present and future generations. In like manner, JICA's basic principles states that " While project proponents etc. bear the ultimate responsibility for the environmental and social considerations of projects, JICA supports and examines appropriate environmental and social considerations undertaken by project proponents etc. to avoid or minimize development projects' impacts on the environment and local communities, and to prevent the occurrence of unacceptable adverse impacts. JICA thus promotes sustainable development in developing countries". We find that both the Philippine DENR-EMB, and JICA Environment and Social Consideration requirements adhere to the same principles of environment and social considerations for proposed projects. Emphasizing such projects must be technologically sound, environmentally and culturally sustainable, and socially acceptable.

The preliminary assessment of the Philippines Government Regional DENR-EMB Officials following the Revised Procedural Guidelines of DAO 2003-30 follows the " Strategic Environment Assessment (SEA)" on the level of policy, planning and program, concurring with the JICA Guidelines for Environment and Social Consideration (April 2010). Based on the Regional consultation with the Environment Management Bureau (EMB), the proposed Fish Ports for rehabilitation and improvement are thus classified as category B projects, non-critical projects in environmentally critical areas. Considering both the Philippine DENR-EMB and JICA Guidelines, the study was done by Region. To facilitate the implementation of the study, protocols were established by the DA-PFDA / JICA Study Team with the officials of DENR-EMB in the identified Regions, Provinces, Municipalities and Barangays

The 1st phase of the study focused on the twenty one (21) sites. Preliminary project designs from the project engineers of the twenty-one (21) ports proposed structures were studied to identify the possible impacts it might have on the environmental and social dimensions of each port. These were done through site assessments and sampling as well as interviews with LGU officials and stakeholders for information about their existing environmental and social conditions.

The Methodology for the 2nd phase followed the DENR-EMB Procedural Manual DAO 2003-30 prescribed outline for the preparation of Environmental Performance Report and Management Plan (see outline EPRMP Appendix 11.1.1) in the five (5) Regional Fish Ports located in Sual, Pangasinan; Lucena,Quezon; Camaligan, Camarines Sur; Iloilo City, Iloilo; and Davao City, Davao Oriental , and two (2) Municipal Fish Port in Concepcion, Iloilo and Atimonan, Quezon.

The Initial Environmental Examination Report (see IEER outline Appendix 11.1.2) was recommended for one (1) regional fish port and five (5) Municipal Fish Ports in Subic, Zambales; Calabanga, Camarines Sur; Balatan Camarines Sur ; Panabo,Davao del Norte; and, Sta. Cruz, Davao del Sur. Eight (8) Initial Environmental Examination Check list (IEEC see outline Appendix11.1.3) was recommended for Municipal Fish Ports of Dagupan, Pangasinan; Calauag, Quezon; Sta.Elena, Camarines Sur; Pasacao, Camarines Sur; Oas, Albay; San Jose de Buenavista, Antique; Dumangas, Iloilo and Mati, Davao Oriental.

In response to the impact of climate change caused by projects. The impacts projected by the projects on the environment have also been included as Carbon Emissions. To be considered are the Carbon Emissions from the fishing ports in terms of Carbon Emission Factor (CEF). The magnitude of GHG emissions for the main ports are not of critical significance considering that combined overall GHG generation of 6 main ports is less than 250 Metric Tons annually. Compare this to the power generating plants that generate hundreds of thousands GHG emissions yearly. Nonetheless, any measure or effort to reduce this quantity of GHG emissions by reducing electrical energy consumption in each fish port projects are important contributions to overall effort to mitigate effects of global warming. Likewise, a study also looks into identified ports in the country that are at high vulnerability and risk to environmental disasters. The DENR-Manila Observatory jointly completed study on vulnerability of the Philippines to various climate and geophysical disasters prepared a mapping of various areas of the country that show risks and vulnerabilities of provinces and regions relative to each other. The table is very useful in planning infrastructure and projecting agricultural production since it gives clear indications what a potential site will be vulnerable to disasters like tsunami, typhoons, earthquake, and volcanic eruptions. Thus, if a port site is highly vulnerable to typhoons, appropriate measures can be incorporated in the engineering design to mitigate impacts of the disaster or another site could be considered instead.

The vulnerability of coastal areas/regions to accelrated sea level rise (due to global warming) was prepared by the National Mapping and Resource Authority together with the Office of Civil Defense/National Disaster Coordinating Council of the Philippines. This latter shows what level of sea water rise would be disastrous to the identified coastal town or city. For instance, Dagupan is vulnerable to disaster (i.e., inundation/submergence) if mean sea elevation rises by 3-5 meters above current levels in Lingayen Gulf.

Results of the study shall then be reviewed by the Regional DENR-EMB Offices to validate the studies, and if found consistent with the requirements and acceptable shall thus be granted an Environment Compliance Certificate (ECC).

9. Issues and Roles of Respective Fish Ports

Taking the aforesaid current conditions and the information gathered after a series of discussions with the agencies concerned, the issues and roles of respective the Fish Ports are summarized hereunder.

9.1 Iloilo Fish Port Complex (IFPC) and Related Municipal Fish Ports

To date, half of the fish produced in Panay Island are consumed locally and the remaining half is marketed mostly to Metro Manila. Iloilo City is considered as the center of fish distribution for local markets, while most of the fish for other destinations comes from the northern part of Panay (Roxas City, Carles and Estancia in particular). Among other major fish ports, IFPC is expected to continue serving as the regional fish trading and distribution center in Panay Island, providing municipal fish ports with ice to reduce post-harvest spoilage in production areas, ensuring the conservation of the quality of fish products for transaction at IFPC on freshness, origin and mode of handling operations, and distribution of fish to Iloilo City and to other inland towns. Moreover, IFPC is expected to play a leading role in providing HACCP-compliant fish processing facilities, resuming its position as the center of fish trading activities since the end of the prawn culture industry boom in the 1980 – 90's.

Table 9.1.1 Roles and Issues (IFPC and Related Municipal Ports)

Fish Port	Roles	Issues/ countermeasures
IFPC	Regional fish trading and distribution center	1) High electric power rate: As options to find ways and means of reducing the high cost of electricity in IFPC, the use of other alternative sources such as a) Solar power generation system, and/or b) replacing the current provider of electricity with other power company. This would ensure the sustainable operation of the refrigeration facilities, ice making plant and ship repair facilities to enhance the competitive advantage of IFPC in serving the fishing industry. 2) Enhancing wave calmness in the port basin: The calmness in the port basin and berthing areas are adversely affected by wave actions particularly during the occurrence of the northeast monsoon season. Provision of the east breakwater would significantly improve calmness, availability and safety of the port at any given weather condition. This would also prevent silt intrusion into the port meriting for savings in costly maintenance dredging operations to maintain the required water depth of the port. These improvements would unquestionably attract more fish boat operators to relocate to IFPC and make the complex as their fishing based of operations. Currently the port is silted thus requiring costly dredging works to remove silt accumulations from the port basin and mooring areas. 3) In order to attract more users to use IFPC, there is a need to provide a wider marketing hall facility with amenities such as fish stair landing facility, appropriate drainage system and waste water treatment facility to enhance sanitations to ensure food safety pursuant to GMP-SSOP requirements. The structure of the market hall including the roofing will be constructed of reinforced concrete to reduce on maintenance cost against corrosion considering that the facility is located adjacent to the sea.

Fish Port	Roles	Issues/ countermeasures
		4) In order to promote sources of income generating added value fish products particularly for export, the provision of IFPC with HACCP compliant fish processing facilities is highly desirable. The facility will cater to both marine fishery and cultured fish products especially the milkfish. There is a need to strengthen the ice distribution network for municipal fish ports to reduce the prevalent incidences of post harvest spoilage particularly in remote fishing villages. In order to pursue this objective, IFPC should be provided with an ice plant considering the needs of municipal ports, traditional fish landing areas and other remote fishing communities. 5) There are numerous clamors from fish boat operators for the rehabilitation of the ship repair/yard facilities including the slipways at ILFPC for their immediate use provided that the slipway area is sheltered from wave actions by the provision of the east breakwater.
Concepcion	Commercial and municipal fishing base (for supply of demersals and small pelagics)	1) In order to secure safety and facilitate berthing operations and unloading of fish catch activities, expansion of existing causeways in municipal ports is considered essential. There is also a need to improve and expand the market halls and providing them with utilities and amenities to enhance sanitations to attract more consumers to use the facility. 2) In order to support fishermen particularly the sustenance, appropriate ice supply network and means of collection of fish catch from municipal fish ports and remote fishing villages/communities should be established so as to reduce the incidences of post-harvest spoilage.
Dumangas	Aquaculture products unloading base (for supply of milkfish)	1) Supply of sufficient ice to fish ponds 2) Ensuring smooth fish harvest and transportation of the products.
San Jose	Offshore Fishing landing facilities (for supply of large pelagics)	1) Concentration of fish unloading to existing fish port 2) Provision of fish brokers' requirements for appropriate working space provided with amenities and logistics including water and ice to induce them to use the fish port. 3) Supply of sufficient ice to reduce the incidences of post-harvest loss.

9.2 Sual Fish Port Complex (SFPC) and Related Municipal Fish Ports

SFPC and the 2 proposed municipal fish ports are all facing the South China Sea, as the common fishing grounds. Firstly, milkfish produce in nearby cages will be the primary product to revitalize the operation of SFPC for which majority of the produce will be for transshipment to Metro Manila and the remaining for processing at SPFC. Secondly, the improvement of Subic municipal fish port, would further support the development of SFPC as a fish processing center for skipjack which is one of primary catch of purse-seiners operating in the South China Sea, with the support of private investors. Raw materials destined for SPFC is expected to come from 3 major fish landing bases in Subic municipal fish port, Masinloc (privately owned fish landing facilities) and Bolinao Municipal fish port. Dagupan is expected to continue serving as a regional fish trading and distribution center, collecting fish harvest from various fish ports along the Lingayen Gulf and marketing them to northern Luzon where fish supply deficit exist.

Due to the inadequacy of commercial berthing facilities and ship repair yard/in Pangasinan, La Union, and Zambales provinces, the demand of these services appears to be high.

Table 9.2.1 Roles and Issues (SFPC and Related Municipal Ports)

Fish Port	Roles	Issues/ countermeasures
SFPC	Fish transshipment and processing, and ship repair center of the region	1) Strong collaboration among the private sector, LGU and SPFC is essential to inviting fish cage operators to use SPFC for transshipment and processing of milkfish. 2) Provision of berthing space for milk fish carrier boats, storing facility for fish harvest and logistic support for fish feed, fuel and cage net in SPFC. 3) Strengthening of ice supply to fish cages. 4) Expansion of the Pier to accommodate various requirements of fishing boats and agri-fishery supply cargo vessels. 5) Rehabilitation of the existing ship repair facility and expansion of the ship repair yard to accommodate the dry docking of several boats simultaneously. 6) Invitation of private enterprise for fish processing of skipjack in SFPC facilities.
Dagupan	Fish collection and distribution center	1) Relocation of the existing fish port to other appropriate spot to mitigate congestion so as to facilitate and ensure smooth delivery and distribution of fish products. The proposed relocation however would be subject to land availability. 2) Upgrading the sanitation of the wholesale market activities.
Subic	Multi-type fish landing and supply base	1) Expansion of the market hall and make available spaces for fish brokers' activities. Upgrading of sanitation to induce retailers and consumers alike to use the facility. 2) Improvement of the berthing facility to allow direct unloading of fish catch, subject to land availability.

9.3 Lucena Fish Port Complex (LFPC) and Related Municipal Fish Ports

The CALABARZON region including LFPC and 3 other proposed municipal fish ports are the current main fish supplier of fish harvest to Metro Manila and the neighboring provinces. LFPC plays a significant role the only regional fish landing base in southern Luzon and as the regional fish marketing center of fish gathered from various eastward municipal fish ports. Similar to IFPC, LFPC would have to be rehabilitated, upgraded and modernized as center for supplying quality-assured fresh fish to local consumers. Similarly, LFPC fish produce would have to be diversified particularly for low-value small pelagics (sardines, etc.) that are the major species being unloaded at LFPC. Processing will benefit for an add value and cost of the products.

Table 9.3.1 Roles and Issues (LFPC and Related Municipal Ports)

Fish Port	Roles	Issues/countermeasures
LFPC	Fish landing and distribution center	1) Urgent rehabilitation of the typhoon damaged breakwater 2) Expansion of the pier to mitigate congestion and queuing of fishing boats for unloading of fish catch. 3) Renewal and expansion of the market hall to be provided with essential amenities to improve sanitations. The structure will be constructed of reinforced concrete to avoid costly maintenance cost. The improvement of the market hall is expected to induce sellers and buyers alike to use the facility and enhance the trading activities to promote quality-assured fresh products pursuant to GMP-SSOP regulations. 4) Diversification of fish processing methods other than dried/smoked fish products. 5) Stabilization of fish price for small pelagic in particular to increase the income of fishermen. 6) Improvement of water supply system to ensure adequacy.
Atimonan	Fish supply base	1) Expansion and re-construction of the market hall to accommodate the existing fish brokers and to attract more fish buyers and retailers. 2) Upgrading of hygienic conditions in the existing fish port.

Fish Port	Roles	Issues/countermeasures
Calauag	Fish transit/trading base	1) Expansion and re-construction of a market hall to accommodate existing fish brokers and to attract more sellers and buyers alike. 2) Upgrading of sanitation for the existing municipal fish port.
Sta. Elena	Offshore fishing base in Lamon Bay	1) Development of the existing fish port taking advantage of the favorable geographical features (deep-water depth and proximity to fishing grounds). The development is foreseen as catalyst for fishermen in the locality who have relocated to other landing sites to return to Sta. Elena as base of operation. 2) Setting up of appropriate ice supply network so as to reduce the incidences of post-harvest loss 3) Paving the access road (about 9 km from the national highway) by other concerned agency.

9.4 Camaligan Fish Port Complex (CFPC) and Related Municipal Fish Ports

The Bicol Region is a rich source of a variety of raw materials essential for fish processing. CFPC has been playing a leading role as the fish-processing center in the Bicol Region with the active participations of private enterprises. In order to revitalize the role of CFPC as center of fishing industry, it is essential to rehabilitate, upgrade and modernize the existing facilities of the complex to meet international food standards. CFPC is expected to continue as a leading fish processing center, by supplying sufficient ice to municipal fish producing areas without ice plants, providing the complex with HACCP-compliant processing facilities and support for small and medium-scale fish processors to enable them to increase their export-of quality fishery products. CFPC based commercial fishing boats have temporarily suspended operations due to high fuel cost but their resumption is being awaited.

Table 9.4.1 Roles and Issues (CFPC and Related Municipal Ports)

Fish Port	Roles	Issues/countermeasures
CFPC	Regional fish processing center	1) Expansion of the terminal facilities to be provided with HACCP compliant processing facilities for the promotion of export-oriented marine fish products. 2) Strengthening the means of ice distribution to municipal fish ports.
Calabanga	Fish processing and supply base (supply of raw materials)	1) Supply of sufficient ice to reduce incidences of post-harvest loss 2) Improvement in quality of locally processed dried/salted fish products. 3) Diversification of products to be processed
Pasacao	Offshore fishing base (supply of small pelagics)	1) Sufficient supply of ice to reduce incidences of post-harvest loss 2) Provision of covered fish handling facility so as to process fish under hygienic conditions.
Balatan	Offshore fishing base (supply of small pelagics)	1) Sufficient supply of ice to reduce incidences of post-harvest loss. 2) Concentration of fish landing and trading areas under hygienic condition by providing appropriate landing and handling facilities to enhance quality of productions.
Oas	Municipal fishing base (supply of raw materials)	1) Sufficient supply of ice to reduce incidences of post-harvest loss. 2) Setting up of an appropriate system for the supply of fishing necessities including fishing materials and fuel. 3) Centralization of fish landing and trading areas for sound trading and under hygienic condition

9.5 Davao Fish Port Complex (DFPC) and Related Municipal Fish Ports

Davao Region is a net fish deficit area with General Santos as the source of fish supply. DFPC has been playing a unique role in the Philippines, allowing foreign fishing vessels to transship their fresh tuna catch for direct export, while GSFPC is a production center supplying tuna raw

materials for canning. Although DFPC has also been a fish processing center, most of the raw materials are from other regions with General Santos as the main supplier. There is however a need for DFPC to diversify the production of processed fish, not just tuna but also others. While DFPC is expected to continue as base for fresh tuna transshipment, it is also expected to become a fish processing center in the region.

Table 9.5.1 Roles and Issues (DFPC and Related Municipal Ports)

Fish Port	Roles	Issues/countermeasures
DFPC	Fresh tuna transshipment and processing center	1) Refrain from tuna fishing and exporting in accordance with the suggested measures of WCFPC 2) Promotion of processed fish for export in conformity with HACCP standards. 3) Provision of landing wharf for local fishing boats by improving the existing berthing facility to reduce fish landing time so as to mitigate congestion in the mooring basin
Sta. Cruz	Aquaculture products unloading base (supply of milkfish)	1) Improvement of the existing causeway to ensure smooth mooring of work boats 2) Sufficient supply of ice to fish cage operators during harvest. Provision of facilities for storing of fish farm supplies including fish feed, fuel and nets.
Panabo	Aquaculture products unloading base (supply of milkfish)	1) Construction of a causeway to ensure the implementation of programmed harvesting activities. 2) Sufficient supply of ice to fish cage operators during harvesting season. 3) Provision of facilities for storing of fish farm supplies including fish feed, fuel and nets.
Mati	Offshore fishing base (supply of large pelagics)	Centralization of fish landing sites to attract more fish buyers

9.6 Bislig Fish Port Complex (BFPC) and Related Municipal Fish Ports

Bislig is the proposed site for a new regional fish port along the Eastern Seaboard, mainly for purse-seiners who are expected to shift to Bislig from General Santos once the development of the proposed regional fish port is completed. BFPC would be a transshipment port for skipjack catch to Davao and General Santos as raw materials for processing and for the local consumption in Davao.

Table 9.6.1 Roles and Issues (BFPC and Related Municipal Ports)

Fish Port	Roles	Issues/planning
BFPC	Offshore fishing and fish transshipment base (supply of large pelagics)	1) Construction of a fish landing complex for commercial fishing boats operating in Philippine Sea water along the Eastern Seaboard. 2) Provision of breakwater to shelter the port basin and mooring areas from wave actions thereby enhancing port calmness for safety of berthing/mooring operations. 3) Sufficient supply of ice, fuel and water to commercial fishing boats 4) Provision of fishing net mending facility, fishermen's health and welfare facilities, etc. [Preconditions:] 1) Completion of pavement linking the access road and national highway 2) Acquisition of the existing PPA port by PFDA 3) Availability of land for future expansion of BFPC.

9.7 Common Items Required for All Candidate Fish Ports

Table 9.7.1 Common Items Required for All Candidate Fish Ports

Fish Port	Roles	Issues/countermeasures
All Fish Ports	Re-vitalization of depreciated /deteriorated facilities to regain previous functions and to cope with demand and production output	Repair, rehabilitate, renew, or replace as appropriate deteriorated/ depreciated/ damaged civil/ marine structures, building facilities, machineries, utilities and other associated facilities and work.
	Provision of facilities to enhance environmental conditions against possible adverse impact	1) Provision of facility for waste water treatment. 2) Confirmation of solid waste disposal system. Use of environmental friendly power generation system for the operation of regional fish ports. Capacity of stand-by diesel engine driven for IFPC to be determined based estimated power demand.
	Confirmation of fish port management system	Capacity building of staffs to enhance their skills for sustainable and uninterrupted operation of the facilities.

Note: The foregoing forecast, proposed development and countermeasures are initial findings, subject to further studies/confirmation during the 2nd Stage of the Feasibility Study.

10. Overall Concept, Scope of Facilities and Prioritization of Components to be Provided for the Project

10.1 Overall Concept of the Project

Considering that CNFIDP is a top level fishery plan, and based on the result of the clarification of issues of concern to be addressed as mentioned in previous Sections, the course of action to be adopted for the entire proposed rehabilitation and improvement of regional and municipal fish ports was determined through successive deliberation with concerned GOP officials. In light of the foregoing, prioritization of components for each of the proposed development is based on the following premise:

① Considering the facilities and mode of management that will contribute to the improvement of the port service through fish and products value adding and thus the improvement of the earnings of fishing ports being administered by PFDA.
② Priority will be given to facilities for urgent rehabilitation and facilities that would require immediate renewal.
③ Priority will be given to the rehabilitation of facilities that would contribute to the improvement of sanitation, quality of marine products and operation efficiency.
④ Priority will be given to facilities that would lead to the increase in job opportunities and augmentation of the facilities to correspond to the increase in fish port demand.
⑤ Facilities for municipal fish ports needed to support and complement the operation of Regional Fish Ports so as to be mutually supplementing and the synergy effect of the objective fish port for fishery activity circulation.
⑥ Rehabilitation of equipment and facilities needed to be improved, replaced or repaired for long use.
⑦ Component of facilities that would not lead to increase in production of tuna.
⑧ Priority will be given to facilities that would contribute to the improvement of the environment of the current fish port activities and its surroundings.
⑨ Verifying the management system for sustainable use. Confirmation of the organizational structure to manage the respective will be continued.
⑩ Priority will be given to fish ports with high potential for supporting coastal fishery resource management

10.2 Prioritization for the Proposed Development of Each Candidate Regional and Municipal Fish Ports and Component of the Facilities Intended to be Provided for Each Port

The scope of facilities intended to be provided by port was determined based on the result of the surveys conducted and the series of deliberations/dialogues with all agencies concerned including the result of the workshops with stakeholders. Compilation of the results of the findings for prioritization and the scope of works to be provided for each candidate port are summarized in the tables hereunder.

Table 10.2.1 Scope of Facilities to be Provided for Each Regional Fish Ports

Regional Fish Port	Port Facilities										Functional Facilities								Utilities						
	Pier/Quay	Stair Landing	Fender Systgem	Breakwater	Revetment	Perimeter Fence	Harbor Dredging	Navigation Aid	Access Road	Land Fill	Market Hall	Refrigeration bldg.	Refrigeration machineries	Ice Making	Administrarion Bldg.	Fish Processing (HACCP	Ship Repair shop	Slipway	Fuel oil supply	Electric Power Supply	Water Supply	Deepwell	Waste Water Treatment	Solid Waste Treatmentr	Solar Power supply
Iloilo		○	○	○	○		○	○			○	○	○	○		○	○	○		○	○		○	○	○
Sual	○		○									○	○	○		○	○	○		○	○	○	○	○	
Lucena	○		○	○							○	○	○		○	○*				○	○	○	○	○	
Camaligan					○	○				○		○	○	○		○				○	○		○	○	
Davao	○		○								○		○			○				○	○	○	○	○	
Bislig	○	○	○	○	○	○	○	○	○		○	○		○	○		○	○	○	○	○	○	○	○	

Note *: Fish Processing of Lucena is for dry/ smoke fish only (not HACCP)

Table 10.2.2 Scope of the Facilities of Municipal Fish Ports

Regional Fish Port	Municipal Fish Port	Port Facities				Functional Facilities		Utilities	
		Causeway	Dredging/Rclaimed Land	Stair Landing	Breakwater	Market Hall/Landing Shed	Ice Storage/ Ice retail Shop	Water, Fuel, Electricity Supply	Waaste water Treatment
Iloilo	San Jose de Buenavista	○	○	○		○	○	○	○
	Concepcion	○		○		○		○	○
	Dumangas			○		○	○	○	○
Sual	Dagupan		○	○		○		○	○
	Subic					○		○	○
Lucena	Atimonan					○		○	○
	Calauag		○			○	○	○	○
	Sta. Elena	○	○	○		○	○	○	○
Camaligan	Calabanga		○	○		○	○	○	○
	Pasacao					○		○	○
	Balatan	○	○	○	○	○	○	○	○
	Oas					○	○	○	○
Davao	Sta. Cruz	○	○			○	○	○	○
	Panabo					○		○	○
	Mati		○	○		○	○	○	○

The table hereunder summarizes the evaluation criteria used in determining the scope of works intended to be provided for each of the candidate regional and municipal fish ports. As shown in the tables below, the rating system was adopted to facilitate the system of prioritization of projects for possible development, improvement, upgrading, renewal, repairs, rehabilitation or any combination of the foregoing depending on the assessment of the prevailing conditions at site, consultations with Government Agencies concerned and results of the workshops conducted with stakeholders.

Table 10.2.3 Prioritization Criteria for Regional and Municipal Fish Ports

For Regional Fish Ports		For Municipal Fish Ports	
		1	Contribution to Regional Port earnings
1	Demand for anti-Deterioration measures	**1.a**	Fish delivery to Regional Port
2	Relevance to Municipal Ports	**1.b**	Ice supply from Regional Port
3	Inducing/Attracting private processing company	**2**	Demand for commercial fish boat
4	Land space for expansion	**3**	Demand for improvement and expansion
5	Charges/Fees to port users	**4**	Operation/control of maintenance structure
6	Potential rise in fish handling	**5**	Potential in aquaculture
7	Need for urgent rehabilitations	**6**	Prospects of fishing in distant EEZ water
8	Improvement of port safety	**7**	Condition of access road
9	Environmental & Social Consideration	**8**	Environmental & Social Consideration
10	Coastal fishery resource management potentials	**9**	Coastal fishery resource management potentials

The results of assessment for the order of prioritization for the development of each fish port and component of facilities for the Project are shown in Tables 10.2.4 to 10.2.7. The following Table 10.2.4 shows the result of prioritization by Port that among Regional Fish Ports Bislig is 1st priority followed by Iloilo as 2nd and others. As for the Municipal Fish Ports top five (5) prioritized ports including 1st: Concepcion, 2nd: Sta. Cruz, 3rd: Atimonan, 4th: Calabanga, and 5th: Subic are selected as candidate site for succeeding Feasibility Study (F/S), while other remaining ten (10) Municipal Fish Ports are for Needs Assessment Survey.

Table 10.2.4 Summary Prioritization for Development of Candidate Regional and Municipal Ports

Regional Fish Ports	Priority
Iloilo	**2**
Sual	**6**
Lucena	**3**
Camaligan	**5**
Davao	**4**
Bislig	**1**

Municipal Fish Ports	Priority
San Jose de Buenavista	**10**
Concepcion	**1**
Dumangas	**15**
Dagupan	**14**
Subic	**5**
Atimonan	**3**
Calauag	**9**
Sta. Elena	**7**
Calabanga	**4**
Pasacao	**11**
Balatan	**6**
Oas	**12**
Sta. Cruz	**2**
Panabo	**8**
Mati	**13**

: selected candidate port for F/S

The detail prioritization of the 6 Regional candidate ports and 15 Municipal candidate ports were determined separately, based on the criteria shown in Table 10.2.3 above. Each criterion was allocated with ten (10) points as indicated in yellow, for a total of 100 points. The result of the prioritization assessment for each port is shown at the top row of the table for each port site. The total assessed ratings for each port is indicated at the right end side of each row. The priority ranking is designated by numbers as shown on the right side end column of the table for each port, and those chosen for the feasibility studies are indicated in blue. The same procedure was adopted in

determining the order of prioritization for facilities to be provided for each fish port, and the results are indicated in orange. In addition to the evaluation criteria, the contribution of "Coastal fisheries Resources Management" was determined separately as shown in Table 10.2.6, while the total ratings are shown in Tables 10.2.5 and 10.2.6.

Table 10.2.5 Rating System Adopted to Determine Prioritization of Development for Candidate Regional Fish Ports including the Relevant Facilities Intended to be Provided

Regional Fish Port	Category of Facilities	Proposed Facilities to be improved or added	Demand for Anti-deterioration Measures	Relevance to Municipal Ports	Inducing/Attracting Private Processing Company	Land Space for Expansion	Charges/Fees to Port User	Potential Rise in Fish Handling	Need for Urgent Rehabilitations	Improvement of Port Safety	Environment & Social consideration	Coastal Resource Management	Sub total	Adjustment 2)	Total Point	Priority (Facilities)	Priority (Fish Port)
Point allocation 1)			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**100**				
Iloilo Regional Fish Port			**10**	**6**	**10**	**10**	**10**	**10**	**6**	**10**	**8.7**	**9**	**90**	**1.00**	**89.7**		
Iloilo FPC Facilities	Port	Stair Landing	6	6	3	10	10	6	10	6	8	-	65	1.11	72.2	13	
		Fender System	10	6	3	10	10	3	6	6	8	-	62	1.11	68.9	16	
		Revetment	10	6	6	10	6	6	10	6	9	-	69	1.11	76.7	10	
		Breakwater (Additional)	-	6	6	10	10	10	-	10	7	-	59	1.43	84.3	4	
		Harbor Dredging	10	6	6	10	10	10	6	10	7	-	75	1.11	83.3	7	
		Navigation Aids	-	6	3	10	6	6	-	10	9	-	50	1.43	71.4	14	
	Functional	Market Hall	10	10	6	10	10	10	10	-	10	-	76	1.25	95.0	1	
		Fish Processing (HACCP)	-	6	10	10	10	6	-	-	8	-	50	1.67	83.3	7	2
		Ref. Building repair	10	6	6	10	10	10	6	-	9	-	67	1.25	83.8	6	
		Ice Making	6	10	6	10	10	6	-	-	9	-	57	1.43	81.4	9	
		Ref. Machineries	10	6	10	10	10	6	6	-	9	-	67	1.25	83.8	5	
		Slipway	10	6	3	10	10	3	10	-	8	-	60	1.25	75.0	11	
		Ship Repair Shop Equip/Bldg.	10	6	3	10	10	3	6	-	9	-	57	1.25	71.3	15	
	Utility	Waste water treatment	-	6	10	10	10	6	-	-	10	-	52	1.67	86.7	3	
		Solar Panel Power	-	6	10	10	10	10	-	-	10	-	56	1.67	93.3	2	
		Utilities	6	6	6	10	10	6	6	-	9	-	59	1.25	73.8	12	
Sual Regional Fish Port			**6**	**6**	**10**	**6**	**10**	**6**	**6**	**-**	**8.2**	**7**	**65**	**1.11**	**72.4**		
Sual FPC Facilities	Port	Milk Fish Jetty	10	6	10	6	10	10	10	-	8	-	70	1.25	87.5	3	
		Pier extension	-	6	10	10	10	6	-	-	8	-	50	1.67	83.3	5	
	Functional	Fish Processing (HACCP)	-	6	10	6	10	10	-	-	8	-	50	1.67	83.3	5	
		Ice Making	-	10	6	10	10	10	-	-	9	-	55	1.67	91.7	1	
		Ref. Machineries/condenser	10	6	10	10	10	10	6	-	8	-	70	1.25	87.5	3	6
		Ref. Building repair	6	6	10	10	10	10	6	-	7	-	65	1.25	81.3	9	
		Slipway extension	-	6	10	6	10	10	-	-	8	-	50	1.67	83.3	5	
		Ship Repair Shop Equip/Bldg.	10	6	10	6	10	6	6	-	7	-	61	1.25	76.3	11	
	Utility	Waste water treatment	-	6	10	10	10	10	6	-	10	-	62	1.43	88.6	2	
		Deep Well	6	6	10	10	10	6	6	-	8	-	62	1.25	77.5	10	
		Utility	-	6	10	6	10	10	6	-	9	-	57	1.43	81.4	8	
Lucena Regional Fish Port			**10**	**6**	**6**	**10**	**10**	**10**	**10**	**6**	**8.4**	**8**	**84**	**1.00**	**84.4**		
Lucena FPC Facilities	Port	Repair Breakwater	10	6	6	10	10	10	10	10	8	-	80	1.11	88.9	1	
		Extension Pier	10	6	3	10	10	10	-	10	7	-	66	1.25	82.5	9	
		Repair Fender	10	6	3	10	10	10	6	10	8	-	73	1.11	81.1	12	
	Functional	Market Hall	10	10	6	10	10	10	6	-	9	-	71	1.25	88.8	2	
		Retail Market	-	6	6	10	10	10	-	-	9	-	51	1.67	85.0	6	
		Fish Processing	-	6	10	10	10	6	-	-	8	-	50	1.67	83.3	8	3
		Ref. Machineries	10	6	10	10	10	6	6	-	8	-	66	1.25	82.5	9	
		Ref. Building repair	10	6	10	10	10	6	6	-	8	-	66	1.25	82.5	9	
		Administration Building	10	6	10	10	10	6	6	-	9	-	67	1.25	83.8	7	
	Utility	Waste water treatment	-	6	10	10	10	10	6	-	10	-	62	1.43	88.6	3	
		Deep Well	10	6	10	10	10	10	6	-	8	-	70	1.25	87.5	4	
		Utilities	-	6	10	10	10	10	6	-	9	-	61	1.43	87.1	5	

Note: 1) Point Allocation 10:(High=10, Mid=6, Low=3), As for Environmental & Social Consideration impact (Small=10, Mid=6, Big=3)
2) Adjustment is made in order to equalize the total point with neglecting the non-applicable columns shown by (-)

Table 10.2.5 Rating System Adopted to Determine Prioritization of Development for Candidate Regional Fish Ports including the relevant Facilities intended to be provided (cont'd)

Regional Fish Port	Category of Facilities	Proposed Facilities to be improved or added	Demand for Anti-deterioration Measures	Relevance to Municipal Ports	Inducing/Attracting Private Processing Company	Land Space for Expansion	Charges/Fees to Port User	Potential Rise in Fish Handling	Need for Urgent Rehabilitations	Improvement of Port Safety	Environment & Social consideration	Coastal Resource Management	Sub total	Adjustment	Total Point	Priority (Facilities)	Priority (Fish Port)
Point allocation			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**100**				
Camaligan Regional Fish Port			**6**	**10**	**10**	**6**	**10**	**6**	**6**	**-**	**8.2**	**-**	**62**	**1.25**	**77.8**		**5**
Camaligan FPC Facilities	Port	Port area expansion by land fi	-	10	10	6	10	6	3	-	7	-	52	1.43	74.3	**6**	
		Slope protection	-	3	10	6	10	6	3	-	6	-	44	1.43	62.9	**9**	
		Perimeter Fence	-	3	10	6	10	6	3	-	7	-	45	1.43	64.3	**8**	
	Functional	Ref. Machineries	10	10	10	6	10	6	6	-	9	-	67	1.25	83.8	**3**	
		Ref. Building repair	10	10	10	6	10	6	6	-	9	-	67	1.25	83.8	**3**	
		Ice Making (Additional)	-	10	10	6	10	6	-	-	9	-	51	1.67	85.0	**1**	
		Fish Processing (HACCP)	-	10	10	6	10	6	-	-	9	-	51	1.67	85.0	**1**	
	Utility	Waste water treatment	-	6	10	6	10	6	6	-	10	-	54	1.43	77.1	**5**	
		Utilities	-	6	10	6	10	6	3	-	8	-	49	1.43	70.0	**7**	
Davao Regional Fish Port			**6**	**10**	**6**	**10**	**10**	**10**	**3**	**10**	**8.6**	**7**	**81**	**1.00**	**80.6**		**4**
Davao FPC Facilities	Port	Quay for Ring-net Boats	-	10	6	10	10	10	3	10	8	-	67	1.25	83.8	**1**	
		Fender System	6	6	6	10	10	6	3	10	8	-	65	1.11	72.2	**7**	
	functional	Market Hall	-	10	6	10	10	10	3	-	9	-	58	1.43	82.9	**3**	
		Ref. Machineries	10	10	6	10	10	6	6	-	9	-	67	1.25	83.8	**1**	
		Fish Processing (HACCP)	-	10	10	10	10	6	3	-	8	-	57	1.43	81.4	**5**	
	Utility	Waste water treatment	-	6	10	10	10	6	6	-	10	-	58	1.43	82.9	**3**	
		Deep well	-	6	10	10	10	6	6	-	8	-	56	1.43	80.0	**6**	
		Utilities	-	6	10	10	10	6	3	-	9	-	54	1.43	77.1	**8**	
Bislig Regional Fish Port			**-**	**-**	**6**	**10**	**10**	**10**	**10**	**10**	**8.3**	**8**	**72**	**1.25**	90.4		**1**
Bislig FPC Facilities	Port	Berthing Facility	-	-	6	10	10	10	-	10	7	-	53	1.67	88.3	**2**	
		Breakwater	-	-	10	10	10	6	-	10	8	-	54	1.67	90.0	**1**	
		Access Road (Port Area)	-	-	6	10	10	10	-	-	8	-	44	2.00	88.0	**4**	
		Harbor Dredging	-	-	10	10	10	6	-	10	7	-	53	1.67	88.3	**2**	
		Navigation Aids	-	-	6	10	10	6	-	10	9	-	51	1.67	85.0	**8**	
		Port Yard	-	-	6	6	10	10	-	-	9	-	41	2.00	82.0	**10**	
	Functional	Admin Bldg.	-	-	6	10	10	6	-	-	9	-	41	2.00	82.0	**10**	
		Ice Making	-	-	6	10	10	10	-	-	8	-	44	2.00	88.0	**4**	
		Market Hall			6	10	10	6	-	-	8	-	40	2.00	80.0	**13**	
		Slipway, Work shop	-	-	6	10	10	10	-	-	8	-	44	2.00	88.0	**4**	
	Utility	Waste Water Treatment	-	-	6	10	10	6	-	-	10	-	42	2.00	84.0	**9**	
		Deep well			6	10	10	10	-	-	8	-	44	2.00	88.0	**4**	
		Fuel Oil Supply System	-	-	6	10	10	6	-	-	8	-	40	2.00	80.0	**13**	
		Utilities	-	-	6	10	10	6	-	-	9	-	41	2.00	82.0	**10**	

Notes: Implementation schedule of Bislig-Trento National road pavement work is subject to confirmation.

Table 10.2.6 Priority of Municipal Fish Ports and Relevant Facilities by Port

Regional Fish Port	Mun. Fish Port	Category of Facilities	Proposed Facilities to be improved or added	Contribution to Regional Port: Fish delivery to Regional Port	Contribution to Regional Port: Ice Supply from Regional Port	Demand for Commercial Fish Boat Facilities	Demand for Improvement and Expansion	Operation/Control of Maintenance Structure	Potential in Aquaculture	Frequency to EEZ Waters	Condition of Access Road	Environment & Social consideration	Coastal Resource Management	Sub total	Adjustment	Total Point	Priority (Facilities)	Priority (Fish Port)
	Point allocation			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**100**				
Iloilo	**San Jose de Buenavista Municipal Fish Port**			**5**	**5**	**6**	**9**	**6**	**3**	**10**	**6**	**7**	**7**	**64**	**1.00**	**64**		
	San Jose	Port	Fish Landing Jetty	6	6	6	10	-	3	10	6	7	-	54	1.25	**67.5**	**3**	**10**
			Land fill	6	6	6	8	-	3	10	6	5	-	50	1.25	**62.5**	**6**	
		Functional	Ice Storage	9	9	6	10	-	3	10	6	7	-	60	1.25	**75.0**	**1**	
			Fish Handling shed	9	9	6	8	-	3	10	6	7	-	58	1.25	**72.5**	**2**	
		Utility	Utilities	6	6	6	8	-	3	10	6	8	-	53	1.25	**66.3**	**4**	
			Waste water treatment	6	6	6	10	-	3	6	6	10	-	53	1.25	**66.3**	**4**	
	Concepcion Municipal Fish Port			**10**	**10**	**6**	**6**	**6**	**10**	**3**	**10**	**8**	**8**	**77**	**1.00**	**77**		
	Concep-cion	Port	Expansion of Jetty	10	10	6	6	-	10	3	10	8	-	63	1.25	**78.8**	**1**	**1**
		Functional	Market Hall	10	10	3	6	-	10	3	10	8	-	60	1.25	**75.0**	**2**	
		Utility	Utilities	6	6	3	6	-	6	3	10	8	-	48	1.25	**60.0**	**4**	
			Wasete water treatment	6	6	6	6	-	6	3	10	10	-	53	1.25	**66.3**	**3**	
	Dumangas Municipal Fish Port			**6**	**6**	**3**	**4**	**6**	**10**	**3**	**10**	**8**	**2**	**58**	**1.00**	**58.0**		
	Dumangas	Port	Stair Landing	6	3	3	3	-	10	3	10	8	-	46	1.25	**57.5**	**5**	**15**
		Functional	Ice Storage	5	9	3	6	-	10	3	10	7	-	53	1.25	**66.3**	**2**	
			Fish Handling Shed	6	6	3	3	-	10	3	10	7	-	48	1.25	**60.0**	**4**	
		Utility	Utilities	6	6	3	6	-	10	3	10	8	-	52	1.25	**65.0**	**3**	
			Wasete water treatment	6	6	3	6	-	10	3	10	10	-	54	1.25	**67.5**	**1**	
	Point allocation			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**100**				
Sual	**Dagupan Municipal Fish Port**			**3**	**3**	**3**	**8**	**6**	**10**	**3**	**10**	**7.5**	**5**	**59**	**1.00**	**58.5**		
	Dagupan	Port	Stair Landing	3	3	3	10	-	10	3	10	8	-	50	1.25	**62.5**	**2**	**14**
			Reclaim land	3	3	3	6	-	10	3	10	7	-	45	1.25	**56.3**	**4**	
		Functional	Wholesale Market Hall	6	6	3	6	-	10	3	10	8	-	52	1.25	**65.0**	**1**	
		Utility	Utilities	3	3	3	6	-	10	3	10	7	-	45	1.25	**56.3**	**4**	
			Waste water treatment	3	3	3	6	-	10	3	10	10	-	48	1.25	**60.0**	**3**	
	Subic Municipal Fish Port			**6**	**3**	**6**	**10**	**6**	**6**	**10**	**10**	**9**	**7**	**73**	**1.00**	**73.0**		
	Subic	functional	Market Hall	6	3	6	10	-	6	10	10	8	-	59	1.25	**73.8**	**1**	**5**
		Utility	Utilities	6	3	3	6	-	6	6	10	8	-	48	1.25	**60.0**	**3**	
			Wasete water treatment	6	3	6	10	-	6	6	10	10	-	57	1.25	**71.3**	**2**	
	Point allocation			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**100**				
Lucena	**Atimonan Municipal Fish Port**			**10**	**10**	**3**	**10**	**6**	**6**	**3**	**10**	**9.5**	**7**	**75**	**1.00**	**74.5**		
	Atimo-nan	Functional	Market Hall	10	10	3	10	-	6	3	10	9	-	61	1.25	**76.3**	**1**	**3**
		Utility	Utilities	6	6	3	6	-	6	3	10	8	-	48	1.25	**60.0**	**3**	
			Waste water treatment	6	6	3	10	-	6	3	10	10	-	54	1.25	**67.5**	**2**	
	Calauag Municipal Fish Port			**9**	**6**	**3**	**6**	**6**	**10**	**3**	**10**	**7**	**7**	**67**	**1.00**	**67.0**		
	Calauag	Functional	Land Fill	6	6	3	6	-	10	3	10	6	-	50	1.25	**62.5**	**3**	**9**
			Fish Handling Shed	9	6	3	9	-	10	3	10	8	-	58	1.25	**72.5**	**1**	
		Utility	Water, Electric Supply	6	6	3	6	-	6	3	10	8	-	48	1.25	**60.0**	**4**	
			Waste water treatment	6	6	3	6	-	10	3	10	10	-	54	1.25	**67.5**	**2**	
	Sta. Elena Municipal Fish Port			**9**	**6**	**6**	**10**	**6**	**9**	**6**	**3**	**7**	**7**	**69**	**1.00**	**69.0**		
	Sta. Elena	Port	Land Fill, Dredging	9	6	6	10	-	9	3	3	7		53	1.25	**66.3**	**3**	**7**
			Fish landing	9	6	6	10	-	9	6	3	7		56	1.25	**70.0**	**1**	
		Functional	Market Hall	9	6	6	10	-	9	3	3	8		54	1.25	**67.5**	**2**	
			Ice Storage	9	6	6	6	-	9	3	3	7		49	1.25	**61.3**	**4**	
		Utility	Utilities	6	6	3	6	-	6	3	3	8		41	1.25	**51.3**	**6**	
			Waste water treatment	6	6	3	6	-	9	3	3	10		46	1.25	**57.5**	**5**	

Note :Construction schedule of Access road to Sta. Elena Fish Landing site is subject to confirmation.

Table 10.2.6 Priority of Municipal Fish Ports and relevant Facilities by Port (cont'd)

Regional Fish Port	Mun. Fish Port	Category of Facilities	Proposed Facilities to be improved or added	Contribution to Regional Port Earnings: Fish delivery to Regional Port	Contribution to Regional Port Earnings: Ice Supply from Regional Port	Demand for Commercial Fish Boat Facilities	Demand for Improvement and Expansion	Operation/Control of Maintenance Structure	Potential in Aquaculture	Frequency to EEZ Waters	Condition of Access Road	Environment & Social consideration	Coastal Resource Management	Sub total	Adjustment	Total Point	Priority (Facilities)	Priority (Fish Port)
Point allocation				**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**100**				
Camaligan	**Calabanga Municipal Fish Port**			**10**	**10**	**4**	**10**	**6**	**6**	**3**	**10**	**8**	**7**	**74**	**1.00**	**74.0**		
	Calabanga	Functional	Land fill	6	6	6	10	-	6	3	10	7	-	54	1.25	**67.5**	3	**4**
			Fish Handling Shed	10	10	6	10	-	6	3	10	8	-	63	1.25	**78.8**	1	
			Ice Storage	10	10	3	6	-	6	3	10	7	-	55	1.25	**68.8**	2	
		Utility	Utilities	6	6	3	6	-	3	3	10	8	-	45	1.25	**56.3**	5	
			Waste water treatment	10	6	6	6	-	3	3	10	10	-	54	1.25	**67.5**	3	
	Pasacao Municipal Fish Port			**6**	**10**	**6**	**6**	**6**	**3**	**3**	**10**	**8**	**5**	**63**	**1.00**	**63.0**		
	Pasa-cao	Functional	Market Hall	6	10	6	6	-	3	3	10	8	-	52	1.25	**65.0**	1	**11**
		Utility	Utilities	3	6	6	6	-	3	3	10	8	-	45	1.25	**56.3**	3	
			Waste water treatment	6	6	3	6	-	3	3	10	10	-	47	1.25	**58.8**	2	
	Balatan Municipal Fish Port			**6**	**6**	**10**	**10**	**6**	**3**	**6**	**10**	**7**	**6**	**70**	**1.00**	**70.0**		
	Balatan	Port	Fish Landing	6	6	10	10	-	3	6	10	8	-	59	1.25	**73.8**	1	**6**
			Breakwater	6	6	10	6	-	3	6	10	8	-	55	1.25	**68.8**	4	
			Land fill/ Dredging	6	6	10	10	-	3	3	10	7	-	55	1.25	**68.8**	4	
		Functional	Fish Handling Shed	6	6	10	10	-	3	3	10	8	-	56	1.25	**70.0**	3	
			Ice Storage	6	6	10	6	-	3	3	10	7	-	51	1.25	**63.8**	6	
		Utility	Utilities	3	6	3	6	-	3	3	10	8	-	42	1.25	**52.5**	7	
			Waste water treatment	6	6	10	10	-	3	3	10	10	-	58	1.25	**72.5**	2	
	Oas Municipal Fish Port			**10**	**10**	**3**	**6**	**6**	**3**	**3**	**6**	**9**	**7**	**63**	**1.00**	**62.5**		
	Oas	Functional	Market Hall	10	10	3	10	-	3	3	6	8	-	53	1.25	**66.3**	1	**12**
			Ice Storage	10	10	3	6	-	3	3	6	7	-	48	1.25	**60.0**	2	
		Utility	Utilities	6	6	3	6	-	3	3	6	8	-	41	1.25	**51.3**	4	
			Waste water treatment	6	6	3	6	-	3	3	6	10	-	43	1.25	**53.8**	3	
Point allocation				**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**100**				
Davao	**Sta. Cruz Municipal Fish Port**			**10**	**10**	**4**	**7**	**6**	**10**	**3**	**10**	**8**	**7**	**75**	**1.00**	**75.0**		
	Sta. Cruz	Port	Land fill/Dredging	10	6	4	7	-	10	3	10	7	-	57	1.25	**71.3**	4	**2**
			Fish Landing Jetty	10	10	4	7	-	10	3	10	8	-	62	1.25	**77.5**	2	
		Functional	Market Hall	10	10	4	10	-	10	3	10	8	-	65	1.25	**81.3**	1	
			Ice Storage	10	10	4	6	-	10	3	10	7	-	60	1.25	**75.0**	3	
		Utility	Utilities	6	6	3	6	-	10	3	10	8	-	52	1.25	**65.0**	6	
			Waste water treatment	6	6	4	6	-	10	3	10	10	-	55	1.25	**68.8**	5	
	Panabo Municipal Fish Port			**8**	**10**	**3**	**3**	**6**	**10**	**3**	**10**	**8**	**7**	**68**	**1.00**	**68.0**		
	Panabo	Functional	Fish Handling Shed	10	10	3	3	-	10	3	10	8	-	57	1.25	**71.3**	1	**8**
		Utility	Utilities	6	6	3	3	-	10	3	10	8	-	49	1.25	**61.3**	3	
			Waste water treatment	6	6	3	6	-	10	3	10	10	-	54	1.25	**67.5**	2	
	Mati Municipal Fish Port			**4**	**3**	**6**	**6**	**6**	**3**	**10**	**10**	**7**	**6**	**61**	**1.00**	**61.0**		
	Mati	Port	Land fill	4	3	3	6	-	3	10	10	7	-	46	1.25	**57.5**	5	**13**
			Stair Landing	4	3	6	6	-	3	10	10	7	-	49	1.25	**61.3**	3	
		Functional	Market Hall	4	5	6	6	-	3	10	10	8	-	52	1.25	**65.0**	1	
			Ice Storage	4	5	6	6	-	3	10	10	7	-	51	1.25	**63.8**	2	
		Utility	Utilities	4	3	3	3	-	3	10	10	8	-	44	1.25	**55.0**	6	
			Waste water treatment	4	3	3	6	-	3	10	10	10	-	49	1.25	**61.3**	3	

Table 10.2.7 Rating on the Aspects of Coastal Fishery Resource Management (CRM) for Each Candidate Regional and Municipal Fish Port

	Fish Port	Possibility to centralise fish landing	Location of MPA/Fish Sanctuary /Mangrove	Control of illegal fishing boats	Accessibility to open sea	Total Rating
Regional Fish Port	Iloilo	3	2	3	1	**9**
	Sual	2	3	1	1	**7**
	Lucena	3	2	3	0	**8**
	Camaligan	0	0	0	0	**0**
	Davao	3	1	3	0	**7**
	Bislig	2	3	2	1	**8**
Municipal Fish Port	San Jose	2	2	2	1	**7**
	Concepcion	3	3	2	0	**8**
	Dumangas	0	1	1	0	**2**
	Dagupan	2	2	1	0	**5**
	Subic	3	1	2	1	**7**
	Atimonan	3	2	2	0	**7**
	Calauag	3	3	1	0	**7**
	Sta. Elena	2	3	1	1	**7**
	Calabanga	2	3	2	0	**7**
	Pasacao	1	3	1	0	**5**
	Balatan	3	2	1	0	**6**
	Oas	2	3	2	0	**7**
	Sta.Cruz	2	3	2	0	**7**
	Panabo	2	3	2	0	**7**
	Mati	1	2	2	1	**6**
Point allocation		3	3	3	1	**10**

Note:Figures of total rating are reflected in Tables 10.5 and 10.6 for the determination of Prioritization of candidate fish ports.