REPUBLIC OF THE PHILIPPINES

THE REVIEW
&
COMPLEMENTARY STUDY REPORT
ON
THE FEASIBILITY STUDY, PACKAGE-I
OF
FISHING PORT IN THE PHILIPPINES

JUNE 1978

JAPAN INTERNATIONAL COOPERATION AGENCY

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Preface

The Government of the Republic of the Philippines made a plan for the improvement of five fishing port by 2000 A.D. as the target year. The Government wishes to obtain financial support to the plan under Japan's seventh yen credit scheme with the highest priority. For this purpose, the Government prepared a feasibility study report on the plan and requested Japan's financial cooperation.

The Government of Japan and other related institutions looked into the feasibility study report and found that the said report needed complementary study on its economic analysis and others and advised the Philippine Government of our readiness to carry out the review and complementary study of the report. In December 1972, the Philippine Government requested Japan's Cooperation in this matter.

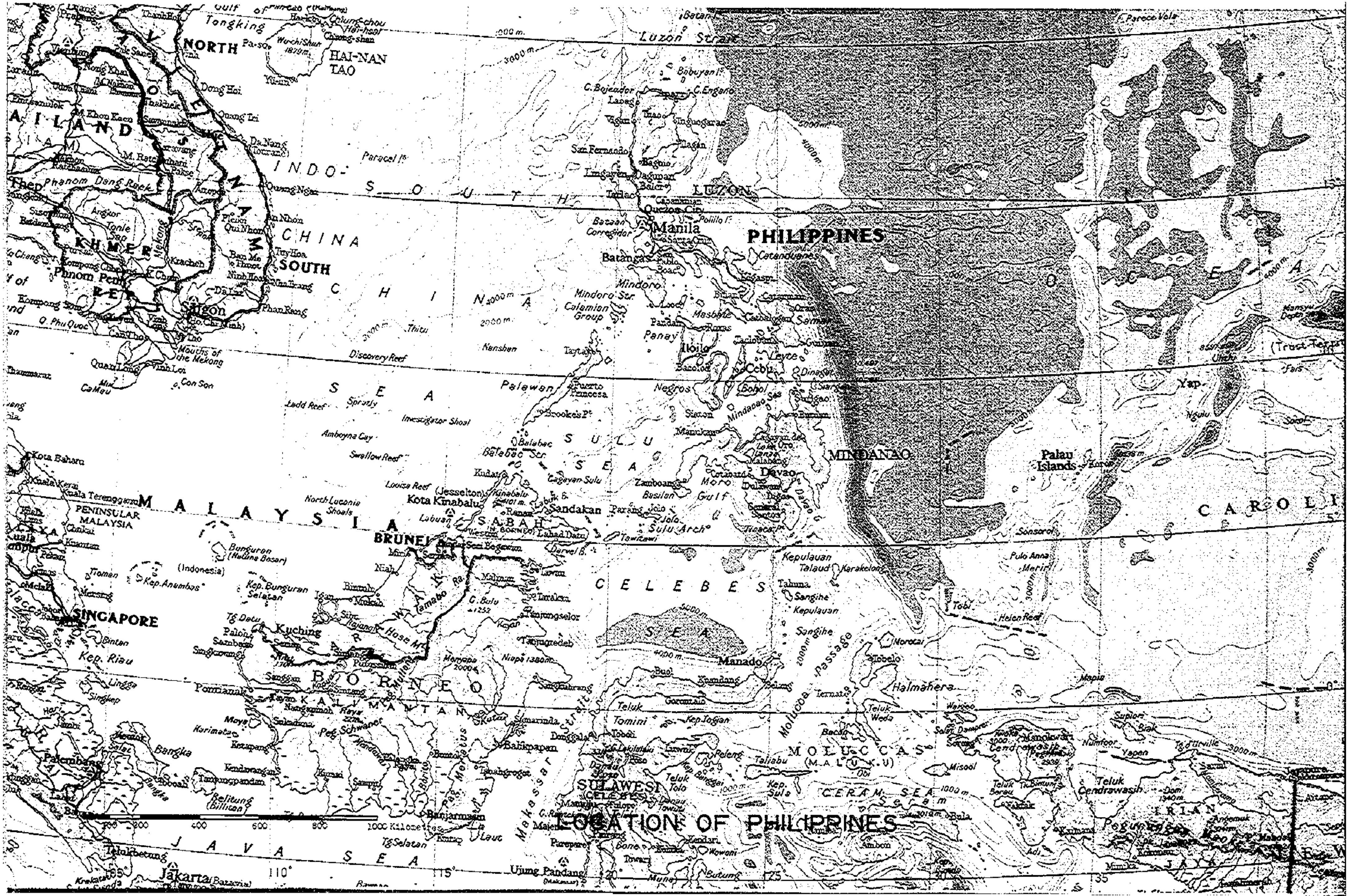
Based on these circumstances, the Japan International Cooperation Agency dispatched to the Philippines a six-man team under the leadership of Mr. Shinji Hayashi, former president of the National fishing Port Association, from February 20 to March 21, 1978 to make a review and complementary study of the feasibility study report prepared by the Philippine Government.

The present report represents a summary of the findings of the said survey. We have prepared it in the hope that it will facilitate Japan's cooperation in the project and contribute to the development of fishing industry in the Philippines.

I wish to express my deep appreciation to the Government and the people concerned of the Philippines for their cooperation extended to the study team.

June 1978

Shinsaku Hogen
President
Japan International
Cooperation Agency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PHILIPPINES
LUZON
Manila
Quezon City
MINDANAO
Davao
Cebu
Iloilo
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Panay
Negros
Samar
Leyte
Palawan
Luzon Strait
SOUTH CHINA SEA
SULU SEA
CELEBES SEA
JAVA SEA
MALAYSIA
BRUNEI
SINGAPORE
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Manado
Makassar Strait
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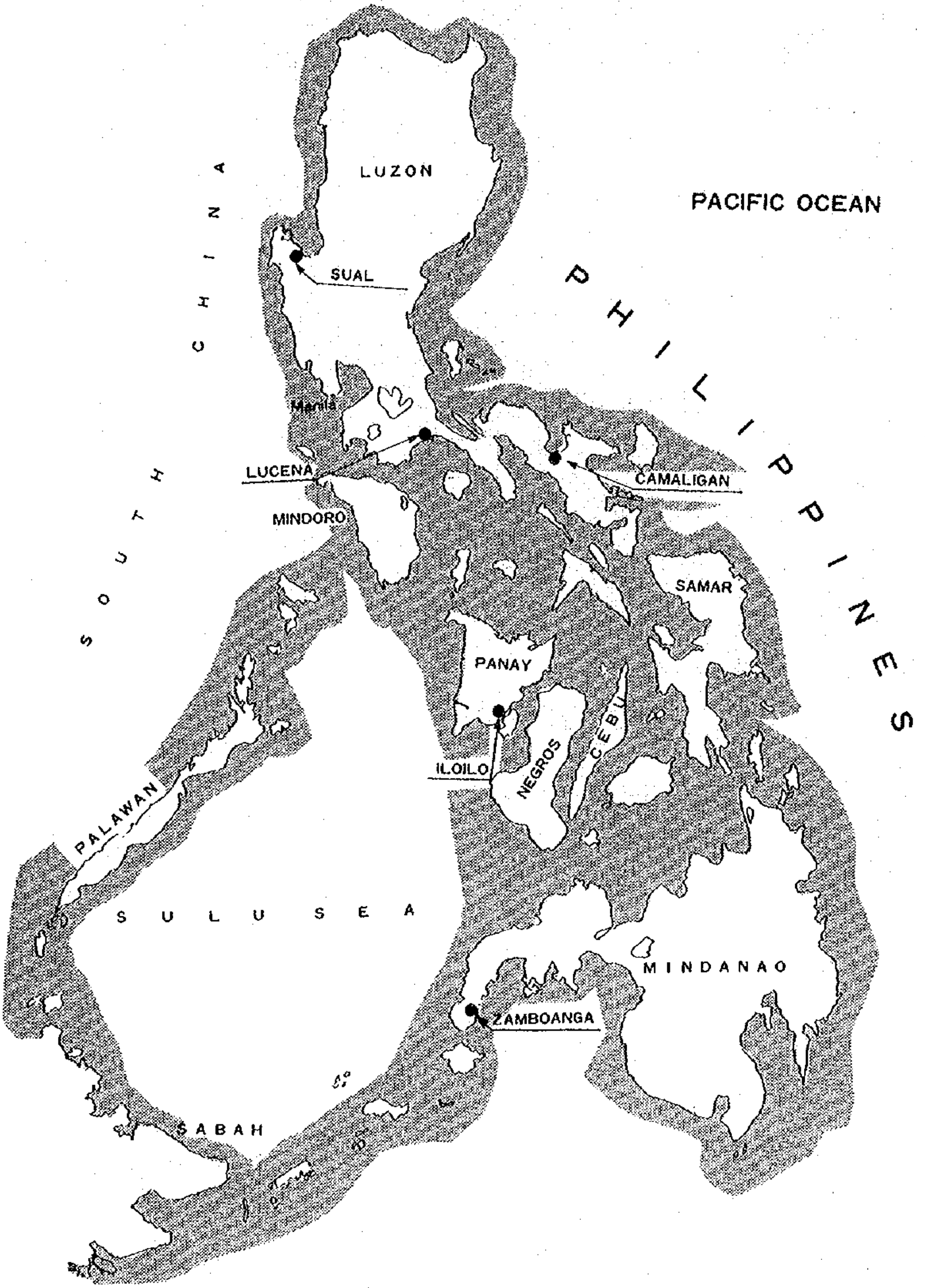
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SUMMARY

Part-1 Outline of Philippine Fisheries and Governmental Measures Taken

1-1 Outline of Philippine Fisheries

The Philippines' sea fisheries are such that they evolve primarily around the locally developed fishing of scads, anchovy and other fish off the Pacific, in the Sulu and Cerebes Seas and in each Philippine bay, and the demersal fishing are also brisk. Each fishing operation, however, is dependent upon the Philippines' own capital, and many of the fishing operations are done on a small scale, so that practically every catch is diverted for domestic consumption.

As the Philippines is blessed with lowlands, brackish waters, lakes, and rivers, fish culture in the inland waters is also brisk, playing a role in the supply of fish meat proteins. However, the existing fishing ports and distribution facilities are extremely poor as against an enormous potential demand of fish, and it is evident and urgently necessary that these facilities should be replenished.

The Government of the Philippines sees the necessity and is administratively carrying out measures in an earnest manner.

1-2 Measures Taken by Philippine Government for Promotion of Fisheries

(1) The governmental measures for the promotion of fisheries in the Philippines, the development and improvement of fish marketing, landing, distribution and fish handling facilities and the development and modernization of markets, central and provincial, will be carried out.

(2) Technologies for an increase in production will be upgraded while an attempt is made to conserve resources.

1-3 Plans for Development of Fishing Ports

As one of the measures for the promotion of fisheries, the development of fishing ports throughout the Philippines will be carried out. The development is designed to work for a concentration of the landing sites which are scattered at present and to raise the profit. Under the first development program named Package-I, the Government of the Republic of the Philippines intends to develop

1-4 Sites Planned for Development of five fishing ports.

With due consideration given to regional development, one fishing port project site is selected in the Mindanao region (Zamboanga), one in the Visaya region (Iloilo), two in the Southern Luzon Region (Camaligan and Lucena) and one in the North Luzon Region (Sual).

(1) Zamboanga fishing port

Zamboanga is the fishing port blessed with rich resources in the Sulu Sea and the Cerebes Sea. An estimated 10,000 tons of fish are landed by 34 fishing boats in 1975.

Because practically no fishing port has been developed and there is a shortage of ice, the freshness of caught fish drops and their prices are underbid, with the consequence that fishermen are earnestly hope to save the situation in which their management is difficult.

(2) Iloilo fishing port

Situated in the vicinity of the Iloilo Fishing port are the Guimaras Strait, Sulu Sea, Visayan Sea and Masbate Bay, which are blessed worth fishing grounds for trawling, purse seining and bagnet fishing. In 1975, 25,000 tons of fish were landed by 41 trawlers, 18 purse seiners and 40 bagnetters.

Of the caught fish, 90% is consumed by the major consumption city of Iloilo. At present, fishing boats are making partial use of its commercial port, but there are many inconveniences and the commercial port cannot be put to use by all fishing boats. Therefore, it is an urgent task to develop a fishing port.

(3) Camaligan fishing port

The local fisheries which developed with the abundance of fisheries resources in San Miguel Bay and adjacent Lamon Bay are making progress in

Camaligan at the estuary of the Bicol River which runs into San Miguel Bay. In 1975, an estimated 10,000 tons of fish were landed by four purse seiners and 22 trawlers.

Plans are afoot for the land transportation of some landed fish to Metropolitan Manila upon the completion of a fishing port.

(4) Lucena fishing port

The bagnet fishing of anchovy, slipmouth and small squid is brisk in the Tayabas bay. Trawl fishing also carried out in the peripheral waters. In 1975, about 15,000 tons of fish were landed by 30 bagnetters and three trawlers. However, difficulty is confronted in fish landing work as the beach on which the market is situated is shallow to a great distance. The damage due to drop in quality as well as the losses of fish are so great at present that higher priority should be given to the development of this fishing port than any other projected fishing port.

Upon the development of the projected fishing port is completed, the land transportation of fish caught to Metropolitan Manila will be carried out in an effective manner.

(5) Sual fishing port

Sual is the good natural port situated in Lingayen Bay of Northern Luzon Island. Having this bay as its fishing ground, Sual is expected to make progress as fishing base of Northern Luzon, albeit small in scale. In 1975, about 4,500 tons of fish were landed by 24 trawlers and 117 bancas. This is one of the areas in the Philippines where the inland fisheries are brisk. Some of the catches in this fishing port are expected to be land, trnasported to Metropolitan Manila. High hopes may also be pinned on the economic development of Sual.

Part-2 Zamboanga Fishing Port Development Project

2-1 Basic Line of Development and Improvement

The Zamboanga fishing port will be developed as the core fishing base for the promotion of fisheries in the southwestern area of Luzon Island.

2-2 Establishment of Targets

(1) The target years are as follows:

Basic fishing port facilities	2000 AD
Functional fishing port facilities	1990

(2) The planned handling amount of catches and the planned fishing boats force in the respective target years will be shown as follows:

	1990	2000 AD
Planned handling amount of catches	32,400 tons	62,900 tons
Planned number of fishing boats	100 boats	194 boats

2-3 Selection of Project Site

The Government of the Republic of the Philippines has selected Zamboanga as the fishing port project site. As a result of the survey carried out by the Japanese study team, Sangaly at Malasugat Bay was considered as the appropriate site for the development of a fishing port.

2-4 Plans of Basic Port Facilities and Scales

The following basic facilities will be planned.

(1) Mooring facilities (-3 m landing quay, -2 m stair landing facility and -3 m preparations quay)

(2) Revetment (Rock bulkhead) (usable also for the mooring of bagnetters)

(3) Basin (-3 m in water depth, anchorage)

According to the plans, the scales of the basic facilities are as follows:

(1)	Landing quay for use by bagnetter	380 m in length
(2)	Stair landing facility for use by small fishing boats	200 m
(3)	Rock bulkhead	720 m
(4)	Basin	Water depth of -3 m

2-5 Plans of Functional Facilities and Scales

The following functional facilities will be planned.

(1) Fish market,(2) ice plant and cold storage, (3) water supply facilities, (4) fuel supply facilities, (5) roads, (6) parking area, (7) administration office, (8) fence and guardhouse, (9) power distribution and illumination facilities, (10) drainage system, (11) public toilet, and (12) land for fishing port facilities.

The required sizes of main functional facilities (scales and capacities) are as follows;

(1) Fish market

One steel-frame building (roofed with alminum sheet) with a floor space of 20 m $\times$ 140 m (2,800 m^2).

(2) Ice plant and cold storage

Ice plant capacity:	140 tons/day
Ice storage capacity:	140 tons at -5°C
Cold storage capacity:	50 tons at -25°C

(3) Water supply facilities

Daily water supply:	174.8 tons/day
Maximum water supply per hour:	11.1 tons/hour

Incidentally, water will be conducted by a pipe line (pipe 27.0 cm in diameter) from a reservoir situated 2.5 km away and supplied by through a pressure type water tank.

(4) Fuel supply facilities

Fuel supply capacity:	16.4 kℓ/day

Fuel tank capacity: One tank of 40 kℓ

(5) Other functional facilities

1) Roads:

Width of approach road	15 m
Width of roads on the complex	10 m

Paved with asphalt (with gutters and drainages)

2) Parking area: Paved with asphalt (with gutters)

3) Administration office:

A two-storied reinforced concrete building with a floor space of 800 m^2

4) Fence and guardhouse:

Fence ...... 400 m in length

Guardhouse ... One building with a floor space of 50 m^2

5) Power distribution and illumination facilities:

Electric power shall be distributed from a substation situated 10 km away from project site. Illumination lights.

6) Public toilet:

One building with a floor space of 100 m^2

7) Land for fishing port facilities:

About 11.2 hectares

2-6 Structural Design of Principal Facilities

(1) Design Conditions

1) Design seismic intensity Kh = 1

2) Soil conditions

-5.8 m - -12.0 m	Silty sand (N=25)
-12.0 m - -20.0 m	Sandy clay (N=20)
Deeper than -20.0 m	Clayey coral (N=35)

3) Objective fishing boats

Bagnetter: 23.2 m in length, 22.0 m in breadth, 1.7 m in draft and 14.0 gross tonnages.

4) Design tide level

H.H.W.L.	+ 0.850 m
H.W.L.	+ 0.780 m
L.W.L.	+ 0.030 m

5) Design wave height $H_{max} = 0.5$ m

6) Other design conditions

Crown height:

Quay, and landing place	DL + 2.5 m
Revetment (rock bulkhead)	DL + 3.0 m
Reclaimed land	DL + 2.5 m

Design Depth: - 3.0

Surcharge load

Quay	1.0 ton/m^2
Land place, and bulkhead	0.5 ton/m^2

Property of bearing ground:

Sandy silt: C = 3 tons/m^2

$\phi = 35°$

(2) Selection of structure of main facilities

Attention will be focused on the following points in the selection of structures for the main port facilities.

1) Simple in structure, good workability and stabilized over a short period.

2) The rock bulkhead for reclaimed lands will be put to as much use for foundation of quays and landing facilities as possible to minimize the development cost.

3) The structures will be so designed as to assure the use of machinery available in the Philippines.

4) The structures will be so designed as to assure the use of locally accessible materials.

5) The quay will be of a sheet pile type. With due consideration paid to construction, reliability, durability and other factors, steel sheet piles will be put to use.

(3) Comparative design

The results of a comparative design of quays are shown below. The steel sheet pile structure is more economical than reinforced concrete piles.

Cost of -3 m steel sheet pile type quay	US$4,307/m
Cost of -3 m reinforced concrete sheet pile type quay	US$4,761/m

2-7 Construction Program

(1) As the construction period is set at two years, consideration will be given so that each type of work may be completed as shortly as possible. Consideration will also be given so that not only the basic facilities but also the functional facilities may be put to use as early as possible with a view to fully satisfy the facility demand.

(2) It is relatively easy to hire unskilled workers in the local area, but their employment is somewhat problematical during the busy fishing season. But it is difficult to secure skilled workers in port and harbor construction works. They will have to be employed from other areas.
will have to be employed from other areas.

(3) Of the construction materials, steel sheet piles and other steel materials will have to be imported, but cobbles and concrete materials will be locally procurable with ease.

(4) Practically every type of construction machineries, such as pump dredgers and pontoons are procurable in the Philippines, but only crawler cranes will have to be imported.

(5) Prior to the start of the construction, there will be need for the development of a temporary road for construction, a temporary waterway, a temporary jetty, a temporary construction office as well as service water, electric and

telephone facilities.

(6) The construction period will be set at two years (24 months).

(7) Estimate of the construction cost (Zamboanga fishing port).

(unit in x 1000 US$)

Kind of Work	Local Currency	Foreign Currency	Total
Preparatory Works	159	0	159
Mobiliyation	131	180	311
Port Work	931	2,556	3,487
Functional Fucilities	4,219	1,746	5,965
Sub Total	5,440	4,482	9,922
Tax & Duties	680	0	680
Contingency	918	672	1,590
Total	7,038	5,154	12,192

Note: The consultant's service fee is excluded.

2-8 Economic Analysis

2-8-1 Demand and Supply of Fish

At the Zamboanga fishing port project site, cheep kinds of fish are landed by bagnetters (their average wholesale price in 1978 is 2.5 Peso per kilogram). In the future, this fishing port will make a role as an important landing place which will satisfy the demand of local inhabitants — primarily, those in Zamboanga del Sur Province. Of the total amount of marine fish, about 70% are brought by the municipal fishing, and this fishing port is expected to play the role of a small-scale commercial fishing port for the poor fishermen in the future. The demand-supply balance of fish in Zamboanga del Sur Province after the completion of the fishing port is indicated in the following table.

Project	Year	Demand-Supply Balance (S−D)	Self-Sufficiency (%)
With project	1990	▲21,300 tons	55
	2000 AD	▲33,300	49
Without project	1990	▲25,200	47
	2000 AD	▲43,200	34

2-8-2 Economic Analysis

(1) Concepts

The analysis will be made along the following lines.

1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

2) For the costs, the construction, personnel, maintenance and facility renewal costs will be taken up.

3) For the benefits, analysis will be made of the direct benefits or, more specifically, (1) increase in the output of fish catches and (2) improvement in the freshness of fishes due to increased supply of ice and technological improvements.

4) Project life - 20 years after start of operation of the fishing port.

5) Reference year - Prices in 1978.

6) Discount rate - 15%.

7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

(2) Evaluation

The result of economic evaluation on construction of the Zamboanga fishing port is as follows.

With the net present value at ₱46,000,000 (¥1,370,000,000 upon conversion at 1₱ = ¥30), cost benefit ratio at 1.51 and internal rate of returns at 20%, the project is considered to be appropriate from the national economic point of view.

The other benefits which the fishing port improvement brings about are listed in the following.

1) Improvement in self-sufficiency of fishery products.
2) Modernization of fisheries upon accumulation of a variety of functions.
3) Encouraging investments.
4) Stabilization of fish prices.
5) Creation of employment opportunities.
6) Acquisition of new techniques.
7) Increasing income of fishermen.
8) Strengthening the fishermen's association.

2-9 Financial Analysis

(1) Concepts

Construction of the Zamboanga fishing port is carried out as one of the fishing port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

(2) Financial evaluation

As the result of the financial analysis, it was found that it would be difficult financially for PFMA to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enormous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion, would be reduced.

Part-3 Iloilo Fishing Port Development Project

3-1 Basic Line of Development and Improvement

The Iloilo fishing port will be developed as the core fishing base for the promotion of fisheries in the Western Visaya Region.

3-2 Establishment of Targets

(1) The target years are as follows:

Basic fishing port facilities	2000 AD
Functional fishing port facilities	1990

(2) The planned handling amount of catches and the planned fishing boats force in the respective target years will be shown as follows:

	1990	2000 AD
Planned handling amount of catches	73,600 tons	104,600 tons
Planned number of fishing boats		
1 Purse Seiners		
Large	9 boats	12 boats
Medium	29 boats	42 boats
2 Trawlers	89 boats	127 boats
3 Bagnetters	87 boats	124 baots

3-3 Selection of Project Site

The southern beach of Iloilo City which faces the Iloilo Strait and which has been selected by the Government of the Republic of the Philippines as the Iloilo fishing port project site may be considered appropriate for the construction of a fishing port as a result of the survey conducted by the Japanese study team.

3-4 Plans of Basic Port Facilities and Scales

The following basic port facilities will be planned.

(1) Mooring facilities (-5m landing quay, -2m landing facility, -2m stair land-

ing facility, -5 m preparation quay and -5 m piled pier for rest).

(2) Breakwaters (east and west)

(3) Shipyard

(4) Revetment (bulkhead for reclaimed land)

(5) Basin (set at -4m for the time being)

According to the plans, the scales of the basic facilities are as follows:

(1) -5m landing quay (depth of -4m for temporary use) for purse seiners and trawlers — 200m in length

(2) -5m preparations quay (depth of -4m for temporary use) by purse seiners and trawlers — 100m in length

(3) -5m mooring pier for purse seiners and trawlers (depth of -4m for temporary use) — 200m in length and 9m in width.

(4) The landing facility for bagnetters — 230m in length

(5) -5m preparation quay (depth of -4m for temporary use) for bagnetters — 90m

(6) -2m stair landing facility for small fishing boats — 150m in length

(7) West breakwater, 1,040m in length (of which 240m will be used for the bulkhead), south breakwater, 800m in length, Total: 1,840m

(8) Shipyard (slope) — 220m in length

(9) East bulkhead (serving both as seewall and bulkhead for reclaimed land) — 310m

(10) Basin — about 6,500 m^2 in area

The basin will be used at a depth of -4m for the time being, and the depth will be increased to -5m in the future.

3-5 Plans of Functional Facilities and Scales

The following functional facilities will be planned.

(1) Fish market, (2) shed, (3) ice plant and cold storage, (4) water supply facilities, (5) fuel supply facilities, (6) roads, (7) parking area, (8) administration office, (9) fence and guard house, (10) power distribution and illumina-

tion facilities, (11) drainage system, (12) public toilet, (13) fishing boat and engine repair shop, (14) land for fishing port facilities, and (15) aid-to-navigation.

The scales of main functional facilities are as follows:

(1) Fish market

One steel-frame building (roofed with alminum sheets) with a floor space of 40m × 125m (5,000 m^2)

(2) Ice plant and cold storage

Ice plant capacity:	350 tons/day
Ice storage capacity:	350 tons/day at -5°C
Cold storage capacity:	50 tons/day at -25°C

(3) Water supply facilities

Daily water supply:	384.1 tons/day
Maximum water supply per hour:	28.3 tons/hour

Water is supplied from the city service water system, and a unit of pressure tank connected to the service water system is installed for supply of water through piping to the required places.

(4) Fuel supply facilities

Fuel supply capacity :	225 kℓ/day
Fuel tank capacity:	200 kℓ × 2 tanks
	100 kℓ × 1 tank
Total storing capacity	500 kℓ

(5) Other functional facilities

1) Sheds: two buildings with each floor space of 1,200 m^2.

2) Roads:

Width of approach road	15 m
Width of roads on the complex	10 m

Paved with asphalt (with gutters and drainages)

3) Parking area: Paved with asphalt (with gutters)

4) Administration office:

One two-storied reinforced concrete building with a floor space of 1,600m^2.

5) Fence and guard house:

Fence, 1,680m in length

Guardhouse, One building with a floor space of 50 m^2.

6) Power distribution and illumination facilities:

Electric power shall be supplied from the city's main power transmission lines. Illumination lights.

7) Public toilets:

$100m^2$ in floor space x 2 buildings

8) Fishing boat and engine repair shop:

Shipway of an extension of 72m

9) Aid-to-navigation:

Two light beacons installed at breakwater tips

10) Land for fishing port facilities:

41.5 hectares of area

3-6 Structural Design of Principal Facilities

(1) Design Conditions

1) Design seismic intensity Kh = 0.1

2) Soil conditions

-2.0 - -5.0m	silty clay	$C = 0.5\ t/m^2$
-5.0 - -10.0m	silty loam	$C = 2\ t/m^2$
-10.0 - -15.0m	sand	N = 20
Deeper than -15.0m	sand	N = 35

3) Objective fishing boats

Trawlers: 17.4m in length, 3.9m in breadth, 2.9m in draft and 120 gross tonnages

Purse seiners (large): 24.3m in length, 6.2m in breadth, 2.8m in draft and 175 gross tonnages

Purse seiners (medium): 13.2m in length, 4.0m in breadth, 2.4m in draft and 80 gross tonnages

Bagnetters: 10.7m in length, 20.0m in breadth, 1.5m in draft and 24 gross tonnages

4) Design tide level:

H.H.W.L.	+1.530m
H.W.L.	+1.340
L.W.L.	+0.750

5) Design wave height

$H_{max} = 2.0m$

$H_{1/3} = 1.5m$

6) Other design conditions:

Crown height :	
Quay and landing place	DL + 2.5m
Revetment	DL + 3.0m
Reclaimed land	DL + 2.5m
Design depth:	-5m
(-4.0m for temporary use)	
Surcharge load:	
Quay	1.0 ton/m^2
Landing place and bulkhead	0.5 ton/m^2
Property of bearing ground:	
Silty clay	C = 0.5 ton/m^2
Silty loam	C = 2 tons/m^2

(2) Selection of structures for main facilities

In the selection of structures for principal basic facilities, the following points are to be noted.

1) Simple in structure, ready to construct and stabilized over a short period.

2) The retaining walls for reclaimed land will be put to as much as for foundation of quays and bulkheads as possible to minimize the development cost.

3) The structures will be so designed as to assure the use of construction machinery available in the Philippines.

4) The structures will be so designed as to assure the use of locally available materials.

5) The quay will be of a sheet pile type. With due consideration given to construction, reliability, durability and other factors, steel sheet pile will be put to use.

(3) Comparative design

In designing the quays, a comparative study was made on the designs of quays of a steel sheet pile type and those of a reinforced concrete sheet pile type. As the soil conditions of the fishing port project site are poor and the planned water depth is as great as -5m, it has been found that a reasonable design may be materialized only with the use of steel sheet piles.

3-7 Construction Program

(1) As the construction period is set at three years, consideration will be given so that each type of work may be completed as shortly as possible. Considerration will also be given so that not only the basic facilities but also the functional facilities may be put to use as early as possible with a view to fully satisfying the facility demand.

(2) It is relatively easy to hire unskilled workers in the local area, but it is very difficult to hire skilled workers — particularly, those experienced in port and harbor construction work. They will have to be employed from other areas.

(3) Of the construction materials, steel sheet piles and other steel materials will have to be imported, but cobbles, rubblestones and concrete materials are readily procurable in the local area and its vicinity.

(4) Practically every type of construction machinery, such as pump dredgers and pontoons are procurable in the Philippines, but crawler cranes, vibrohammers, electric generators and other special machinery and equipment will

have to be imported.

(5) Prior to the start of the construction, there will be need for the development of a temporary road for construction, a temporary waterway, a temporary pier, a temporary construction office as well as service water, electric and telephone facilities.

(6) The construction period will be set at three years (36 months).

(7) Estimate of the construction cost (Iloilo fishing port)

(Unit in X 1,000 US$)

Kind of Work	Local Currency	Foreign Currency	Total
Preparatory Works	157	0	157
Mobilization	196	333	529
Port Work	6,722	10,837	17,559
Functional Facilities	6,745	3,550	10,295
Sub Total	13,820	14,720	28,540
Tax & Duties	1,744	0	1,744
Contingency	2,334	2,208	4,542
Total	17,898	16,928	34,826

Note: The consultants service fee is excluded

3-8 Economic Analysis

3-8-1 Demand and Supply of Fish

At the Iloilo fishing port project site, a wide variety of fish are landed by various types of fishing boats. After the completion of this fishing port, management organization of this port will be required to work out appropriate measures for the treatment of various species of fish and of various types of fishing boats. The fish production is very large, and in the future this fishing port will keep one of the biggest fishing port in this region.

The share of marine fisheries in the total output of fish in Iloilo Province will be 80% in 1990 (when the fishing port is completed). It means that Iloilo Province is the area which is heavily dependent on the marine fisheries. The demand-supply balance of fish in Iloilo Province after the completion of the fishing port is shown below:

Project	Year	Demand-Supply Balance (S--D)	Self-Sufficiency (%)
With Project	1990	▲11,100 tons	85
	2000 AD	▲31,800	71
Without Project	1990	▲29,300	61
	2000 AD	▲62,100	43

3-8-2 Economic Analysis

(1) Concepts

The analysis will be made along the following lines.

1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

2) For the costs, the construction, personnel, maintenance and facility renewal costs will be taken up.

3) For the benefits, analysis will be made of the direct benefits or, more specifically, (1) increase in the output of fish catches and (2) improvement in the freshness of fishes due to increased supply of ice and technological improvements.

4) Project life - 20 years after start of operation of the fishing port.

5) Reference year - Prices in 1978.

6) Discount rate - 15%.

7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

(2) Evaluation

The result of economic evaluation on construction of the Iloilo fising port is as follows.

With the net present value at ₱213,000,000 (¥6,380,000,000 upon conversion at 1₱ = ¥30), cost benefit ratio at 1.90 and internal rate of returns at 25%, the project is considered to be appropriate from the national economic point of view.

The other benefits which the fishing port improvement brings about are listed in the following.

1) Improvement in self-sufficiency of fishery products.
2) Modernization of fisheries upon accumulation of a variety of functions.
3) Encouraging investments.
4) Stabilization of fish prices.
5) Creation of employment opportunities.
6) Acquisition of new techniques.
7) Increasing income of fishermen.
8) Strengthening the fishermen's association.
9) Reducing congestion in the commercial port.

3-9 Financial Analysis

(1) Concepts

Construction of the Iloilo fishing port is carried out as one of the fishing g port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

(2) Financial evaluation

As the result of the financial analysis, it was found that it would be difficult financially for PFMA to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enormous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion, would be reduced.

Part-4 Camaligan Fishing Port Development Project

4-1 Basic Line of Development and Improvement

The basic policy for the development of the Camaligan fishing port is to develop it in such a manner as give full play to its functions as the core fishing port for the development of the fisheries in the so southeastern part of Luzon Island, and that it may fully cope with the great development prospected of the fishery thereafter.

Reclamation of the land for fishing port facilities will be made economically in use of the dredged soil of the basin.

4-2 Project Target Year

(1) The target years are as follows:

Basic fishing port facilities 2000 AD

Functional fishing port facilities 1990

(2) The planned handling amount of catches and the planned fishing boats force in the respective target years will be shown as follows:

	1990	2000 AD
Planned handling amount of catches	40,600 tons	58,300 tons
Planned number of fishing boats		
Trawlers	69 boats	123 boats
Purse Seiners	17 boats	24 boats

4-3 Selection of Project Site

The site proposed by the Government of the Philippines for the Camaligan fishing port may be considered appropriate as a result of the Japanese Study Team's field investigation and other studies. However, this evaluation is based on the assumption that the third short cut of the Bicol River which is now under construction will be completed according to schedule and that the Camaligan fishing port site will sustain practically no adverse impact from a possible flood of the Bicol river. In the event that the completion of the third short cut is delayed to a greater extent than the construction of the Camaligan fishing port, there will be need to re-examine the selection of the fishing port site.

4-4 Plans of Basic Port Facilities and Scales

The following basic facilities will be planned.

(1) Mooring facilities (-4m landing quay and -4m preparation quay)

(2) Basin

(3) Slipway (repair of fishing boats)

According to the plans, the scales of main basic facilities are as follows:

(1) -4m landing quay for use by trawlers and purse seiners -- 250m in length

(2) -4m preparation quay for use by trawlers and purse seiners -- 120m

(3) Basin (-4m) -- 28,000m

(4) Slipway -- 100m

4-5 Plans of Functional Facilities and Scales

The following functional facilities will be planned.

(1) Fish market, (2) shed, (3) ice plant and cold storage, (5) fuel supply facilities, (6) roads, (7) parking area, (8) administration office, (9) fence and guardhouse, (10) power distribution and illumination facilities, (11) drainage system, (12) public toilet, (13) fishing boat and engine repair shop, and (14) land for fishing port facilities.

The required sizes of main functional facilities are as follows:

(1) Fish market

One steel-frame building roofed with alminum sheets with a floor space of 20m x 100m (2,000m^2)

(2) Ice plant and cold storage

Ice plant capacity:	174 tons/day
Ice storage capacity:	175 tons at -5° C

Cold storage capacity: 50 tons at -25° C

(3) Water supply facilities

Daily water supply: 178.8 tons

Maximum water supply per hour: 13.8 tons/hour

Water will be supplied from the city's service water system and distributed by way of a pressure tank.

(4) Fuel supply facilities

Fuel supply capacity : 111 kℓ/day

Fuel tank capacity: 200 kℓ (1 tank)

100 kℓ (2 tanks)

Total: 300 kℓ

(5) Other functional facilities

1) Shed:

One building with a floor space of 600 m^2

2) Roads:

Width of approach road 15m

Width of roads on the complex 10m

Paved with asphalt (with gutters and drainages)

3) Parking area:

Paved with asphalt (with gutters)

4) Administration office:

One two-storied reinforced concrete building with a floor space of $800m^2$

5) Fence and guard house:

Fence ..... about 1,365m in length

Guardhouse ..... One building with a floor space of $50m^2$

6) Power distribution and illumination facilities :

7) Public toilet :

One building with a floor space of $100m^2$

8) Fishing boat and engine repair shop :

9) Land for fishing port facilities :

15.06 hectares of area.

4-6 Structural Design of Principal Facilities

(1) Design conditions

1) Design seismic intensity: Kh = 0.1

2) Soil conditions:

-4.00 - -7.00m .... silt		C = 0.5 t/m^2
-7.00 - -15.00m .... silty clay		C = 1.5 t/m^2
-15.00 - -20.00m ... sandy silt		C = 3 t/m^2
Deeper than -20.00m ... sand		N = 30

3) Objective fishing boats

Trawlers : 23.5m in length, 4.5m in breadth, 2.3m in draft and 55 gross tonnages

Purse seiners : 24.3m in length, 4.2m in breadth, 2.9m in draft and 60 gross tonnages

4) Design water level

H.W.L.	+ 1,270m
H.W.L. at flood condition	+ 2,270m

5) Other design conditions

Crown height:

Quays, rock bulkheads	DL + 2.5m
Reclaimed land	DL + 2.5m

Design water depth: -4.0 m

Surcharge load:	Quay	1.0 ton/m^2
	Rock bulkhead	0.5 ton/m^2

Property of bearing ground:

Silt	C = 0.5 ton/m^2
Silty clay	C = 1.5 tons/m^2
Sandy silt	C = 3.0 tons/m^2

(2) Selection of structures for main facilities

In the selection of structures for principal basic facilities, the following points are to be noted:

1) In order to complete the construction over a short period, the structures will be so designed that they may be simple in construction, ready to build, become stable over short periods and mutually usable.

2) The structures will be so designed that the machinery available in the Philippines are usable and an attempt will be made to avoid using special construction machinery.

3) The structures will be so designed as to assure the usability of materials available in the Philippines.

4) The foundation of the fishing port construction site is weak and there is the danger of the foundation be scoured by stream of the Bicol River, the steel pipe piles which are ready to build and reliable in action will be used for the quays and the quays will be made a steel pipe piles with flange joints structure.

(3) Comparative design

In selecting a structure for the quays, a reinforced concrete sheet pile type (include P. C. pile type), a steel sheet pile type and a steel pipe type were compared. In view of the fact that the soil conditions of the fishing port project site are extremely poor and the Bicol River which is situated in front of the face line of the wharf is as deep as more than 10m right at the edge of the quay wall, it has been concluded that a structure of the steel pipe pile type is most appropriate. Other types are not recommendable.

4-7 Construction Program

(1) As the construction period is set at two years, consideration will be given so that each type of work may be completed as shortly as possible. Consideration will also be given so that not only the basic facilities but also the functional facilities may be put to use as early as possible with a view to fully satisfying the facility demand in each target year.

(2) It is relatively easy to hire unskiiled workers in Nage City and its vicinty,

but it is very difficult to hire skilled workers - particularly, those experienced in port and harbour construction work. They will have to be emplyed from other areas.

(3) Cobbles for filling, backfilling and basic work and concrete materials (cement, sand, gravel, molds, etc.) are locally procurable with ease. There is no question about their quality and quantity.

(4) Practically every type of construction machinery, such as pump dredgers, pile driving barges and pontoons, will be procured in the Philippines, and only crawler cranes will be imported.

(5) Prior to the start of the construction, there will be need for the development of a temporary road for construction, a temporary waterway, a temporary pier, a temporary construction office as well as service water, electric and telephone facilities.

(6) The construction period will be set at two years (24 months).

(7) Estimate of the construction cost

(Unit in X 1,000 US$)

Kind of Work	Local Currency	Foreign Currency	Total
Preparatory Works	239	0	239
Mobilization	112	155	267
Port Work	1,332	7,817	9,149
Functional Facilities	4,233	1,829	6,062
Sub Total	5,916	9,801	15,717
Tax & Duties	2,787	0	2,787
Contingency	1,306	1,470	2,776
Total	10,009	11,271	21,280

Note: The consultants service fee is excluded

4-8 Economic Analysis

4-8-1 Demand and Supply of Fish

At the Camaligan fishing port project site, expensive fishings are produced by trawlers and purse seiners (6 pesos per kilogram in 1978 whole sale prices).

If the conditions for transport to, and distribution in, Metropolitan Manila are improved and the economic distance is reduced, the Camaligan fishing port will play the role as a base for large-scale commercial fishing. Camaling Sur Province does not heavily depend on the inland fishing (which is expected to share only a few percent of the fish output in 1990), so that the stabilization of the marine fisheries will have a significant meaning for raises in the self-sufficiency ratio of proteins and in income increase. The balance of demand and supply of fish after the completion of the Camaligan fishing port is estimated below:

Project	Year	Demand-Supply Balance (S–D)	Self-Sufficiency (%)
With Project	1990	▲ 4,400 tons	92
	2000 AD	▲ 12,600	84
Without Project	1990	▲ 19,700	64
	2000 AD	▲ 41,100	47

4-8-2 Economic Analysis

(1) Concepts

The analysis will be made along the following lines.

1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

2) For the costs, the construction, personnel, maintenance and facility renewal costs will be taken up.

3) For the benefits, analysis will be made of the direct benefits or, more specifically, (1) increase in the output of fish catches and (2) improvement in the freshness of fishes due to increased supply of ice and technological improvements.

4) Project life - 20 years after start of operation of the fishing port.

5) Reference year - Prices in 1978.

6) Discount rate - 15%.

7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

(2) Evaluation

The result of economic evaluation on construction of the Camaligan fishing port is as follows.

With the net present value at ₱122,000,000 (¥3,650,000,000 upon conversion at 1₱ = ¥30), cost benefit ratio at 1.79 and internal rate of returns at 24%, the project is considered to be appropriate from the national economic point of view.

The other benefits which the fishing port improvement brings about are listed in the following.

1) Improvement in self-sufficiency of fishery products.
2) Modernization of fisheries upon accumulation of a variety of functions.
3) Encouraging investments.
4) Stabilization of fish prices.
5) Creation of employment opportunities.
6) Acquisition of new techniques.
7) Increasing income of fishermen.
8) Strengthening the fishermen's association.

4-9 Financial Analysis

(1) Concepts

Construction of the Camaligan fishing port is carried out as one of the fishing port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

(2) Financial evaluation

As the result of the financial analysis, it was found that it would be difficult financially for PFMA to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enormous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion, would be reduced.

Part-5 Lucena Fishing Port Development Project

5-1 Basic Line of Development and Improvement

The basic line for the development of the Lucena fishing port is to develop it in such a manner as to give full play to its functions as the core fishing port for the development of the fisheries in the southwestern part of Luzon Island. It will be also characterized as a base for the supply of fish to Metropolitan Manila.

In the development of this fishing port, consideration will be given so that the project is compatible with the urban development program of Lucena City.

5-2 Establishment of Targets

(1) The target year are as follows:

Basic fishing port facilities	2000 AD
Functional fishing port facilities	1990

(2) The planned handling amount of catches and the planned fishing boats force in the respective target years will be shown as follows:

	1990	2000 AD
Planned handling amount of catches	58,000 tons	143,200 tons
Planned number of fishing boats		
(1) Trawlers	30 boats	112 boats
(2) Bagnetters	73 boats	277 boats

5-3 Selection of Project Site

The site proposed by the Government of the Republic of the Philippines for the Lucena fishing port may be considered appropriate as a result of the Japanese Study Team's investigation and other studies.

5-4 Plans of Basic Port Facilities and Scales

The following basic port facilities will be planned.

(1) -4m landing quay for trawlers ------------ 75m in length.

(2) Slope landing quay for bagnetters --------- 580m in length.

(3) Stair landing facility for small fishing boats - 100m in length.

(4) -4m preparation quay for trawlers -------- 100m in length.

(5) -4m preparation quay for bagnetters ------ 50m in length.

(6) Breakwaters

East breakwater : 870m in length.

West breakwater : 1,250m in length.

5-5 Plans of Functional Facilities and Scales

The following functional facilities will be planned.

(1) Fish market, (2) shed, (3) ice plant and cold storage, (4) water supply facilities, (5) fuel supply facilities, (6) roads, (7) parking area, (8) administration office, (9) fence and guard house, (10) power distribution and illumination facilities, (11) drainage system, (12) public toilets, (13) fishing boat and engine repair shop, (14) land for fishing port facilities, and (15) aid-to-navigation.

The required size of main facilities are as follows:

(1) Fish market

One steel-frame building roofed with alminum sheets with a floor space of 40 x 125m (5,000m^2).

(2) Ice plant and cold storage

Ice plant capacity: 265 tons/day

Ice storage capacity: 265 tons at -5° C

Cold storage capacity: 50 tons at -25° C

(3) Water supply facilities

Daily water supply 329.8 tons/day

Maximum water supply per hour 21.7 tons/hour

Water will be supplied from the city's service water system for distribution by way of a pressure water tank.

(4) Fuel supply facilities

Fuel supply capacity 60 kℓ/day

Fuel tank capacity: 200 kℓ (one tank)

(5) Other functional facilities

1) Shed:

One building with a floor space of $1,400m^2$

2) Roads:

Width of approach road 15m

Width of roads on the complex 10m

Paved with asphalt (with gutters and drainages)

3) Parking area

Paved with asphalt (with gutters)

4) Administration office

One two-storied reinforced concrete building with a floor space of $1,600m^2$

5) Fence and guard house

Fence: 1,450m in length

Guardhouse: one building with a floor space of $50m^2$

6) Power distribution and illumination facilities

7) Public toilets

Two buildings, each with a floor space of $100m^2$.

8) Fishing boat and engine repair shop.

9) Land for fishing port facilities about 21.5 hectares

10) Aid-to-navigation

One mark lamp each at the tips of the east and west breakwaters.

5-6 Structures and Designs of Main Facilities

(1) Design conditions

1) Design seismic intensity Kh = 0.1

2) Soil conditions

-2.0m - -10.0m .... sand with gravel

Deeper than -10.0 m ... soft rocks

3) Objective fishing boats

Trawlers : 20.6m in length, 3.9m in breadth, 1.9m in draft and 30 gross tonnages

Bagnetters : 24.8m in length, 19.6m in breadth, 1.9m in draft and 20 gross tonnages

4) Design tide level

H.H.W.L.	+ 1.530m
H.W.L.	+ 1.430m
L.W.L.	+ 0.210m

5) Design wave height

$H_{max} = 2.0m$

$H_{1/3} = 1.5m$

6) Other design conditions

Crown height :

Quay and landing place	DL + 2.5m
Rock bulkhead, breakwater	DL + 3.0m
Reclaimed land	DL + 2.5m

7) Design water depth -4.0m

8) Surcharge load

Quay	1.0 ton/m^2
Landing place and bulkhead	0.5 ton/m^2

9) Property of bearing ground

Sand mixed with gravel N = 30

(Soft rocks are observed under this layer.)

(2) Selection of Structures for Main Facilities

In selecting structures for the main facilities, attention will be focused on the following points :

1) In order to complete the construction over a short period, the structures will be so designed that they may be simple in construction, ready to build, become stable over short periods and mutually usable.

2) The retaining walls for reclaimed land will be required for the

development of a fishing port site in a land reclamation system. This system will be economized in cost by using it as the foundation of quays and other main facilities.

3) The structures will be so designed as to assure the use of construction machinery available in the Philippines.

4) The structures will be so designed to assure the usability of locally available materials.

5) The quays will be constructed with steel sheet piles structure. As for the breakwater, the portion up to a water depth of -4.5m will be made the slooping type with rubble mound and the deeper portion will be made a composite type with blocks.

(3) Comparative Design

As the result of a comparative study with a -4m quay, the following conclusion was drawn. Therefore, steel sheet piles easy to build, good in performance and high in reliability will be put to use.

-4m quay of steel sheet pile type,	US$4,332/m
-4m quay of concrete pile type,	US$4,695/m

5-7 Construction Program

(1) As the construction period is set at three years, consideration will be given so that each type of work may be completed as shortly as possible. Consideration will also be given so that not only the basic facilities but also the functional facilities may be put to use as early as possible.

(2) It is relatively easy to hire unskilled workers in Lucena City and its vicinty, but it is very difficult to hire skilled workers - particularly, those experienced in port and harbour construction work. They will have to be employed from other areas.

(3) Cobbles for filling, backfilling and basic work and concrete materials (cement, sand, gravel, molds, etc.) are locally procurable with ease. There is

no question about their quality and quantity. Steel sheet piles and other steel materials will have to be imported.

(4) Practically every type of construction machinery, such as pump dredgers, pile driving barges and pontoons, will be procured in the Philippines, and the construction machinery that have to be imported will be limited to such special machinery as crawler cranes, vibrohammers and electric generators.

(5) Prior to the start of the construction, there will be need for the development of a temporary road for construction, a temporary waterway, a temporary pier, a temporary construction office as well as service water, electric and telephone facilities.

(6) The construction period will be set at three years. (36 months)

(7) Estimate of construction cost

(Unit in X 1,000 US$)

Kind of Work	Local Currency	Foreign currency	Total
Preparatory Works	157	0	157
Mobiliyation	123	302	425
Port Work	8,816	9,125	17,941
Functional Facilities	6,071	2,999	9,070
Sub Total	15,167	12,426	27,593
Tax & Duties	1,907	0	1,907
Contingency	2,561	1,864	4,425
Total	19,635	14,290	33,925

Note: The consultants service fee is excluded.

5-8 Economic Analysis

5-8-1 Demand and Supply of Fish

In Quezon Province where the Lucena fishing port project site is situated, the share of commercial fishing is high in its marine fisheries as it is situated close (several hours) to Manila (the share of commercial fishing in the output of the marine fisheries in 1990 is estimated at over 95%). Therefore, its dependence on the inland fishing is insignificant. Lucena is the second larger fishing port in Luzon Island after Nabotas. In other words, Lucena is positioned as the second largest supply base for Manila. The difficulties encountered by fishing boats in their approach to the shore (at present, they have to come to anchor at a point far away from the landing site) will be overcome by the construction of the fishing port, and a rise in the supply of fresh fish will guarantee an increase in the income of fishermen. The supply-demand balance of fish in Quezon Province after the completion of the Lucena fishing port is indicated below.

Project	Year	Demand-Supply Balance (S–D)	Self-Sufficiency (%)
With project	1990	▲ 26,800 tons	59
	2000 AD	▲ 3,100	97
Without project	1990	▲ 50,800	22
	2000 AD	▲ 77,700	16

5-8-2 Economic Analysis

(1) Concepts

The analysis will be made along the following lines.

1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

2) For the costs, the construction, personnel, maintenance and facility renewal costs will be taken up.

3) For the benefits, analysis will be made of the direct benefits or, more specifically, (1) increase in the output of fish catches and (2) improvement in the freshness of fishes due to increased supply of ice and technological improvements.

4) Project life - 20 years after start of operation of the fishing port.

5) Reference year - Prices in 1978.

6) Discount rate - 15%.

7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

(2) Evaluation

The result of economic evaluation on construction of the Lucena fishing port is as follows.

With the net present value at ₱162,000,000 (¥4,870,000,000 upon conversion at 1₱ = ¥30), cost benefit ratio at 1.70 and internal rate of returns at 21%, the project is considered to be appropriate from the national economic point of view.

The other benefits which the fishing port improvement brings about are listed in the following.

1) Improvement in self-sufficiency of fishery products.
2) Modernization of fisheries upon accumulation of a variety of functions.
3) Encouraging investments.
4) Stabilization of fish prices.
5) Creation of employment opportunities.
6) Acquisition of new techniques.
7) Increasing income of fishermen.
8) Strengthening the fishermen's association.
9) Reducing congestion in the commercial port.

5-9 Financial Analysis

(1) Concepts

Construction of the Lucena fishing port is carried out as one of the fishing port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here, with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

(2) Financial Evaluation

As the result of the financial analysis, it was found that it would be difficult financially for PFMA to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enormous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion, would be reduced.

Part-6 Sual Fishing Port Development Project

6-1 Basic Line of Development and Improvement

The basic line for the development of the Sual fishing port is to develop it in such a manner as to give full play to its functions as the core fishing port for the development of the Linagyen area on Luzon Island.

6-2 Establishment of Targets

(1) The target years are as follows:

Basic fishing port facilities	2000 AD
Functional fishing port facilities	1990

(2) The planned handling amount of catches and the planned fishing boats force in the respective target years will be shown as follows :

	1990	2000 AD
Planned handling amount of catches	13,200 tons	25,000 tons
Planned number of fishing boats		
(1) Trawlers	28 boats	60 boats
(2) Purse Seiners	1,400 boats	2,200 boats

6-3 Selection of Project Sites

The site proposed by the Government of the Republic of the Philippines for the Sual fishing port may be considered appropriate as a result of the Japanese Study Team's investigation and other studies.

6-4 Plans of Basic Port Facilities and Scales

The following basic port facilities will be planned.

(1) Mooring facilities (-3m landing quay, stair landing facility and -3m preparation quay)

(2) Rock bulkhead (usable also for the mooring of small fishing boats)

(3) Slipway (repair of fishing boats)

(4) Basin

According to the plans, the scales of main basic facilities are as follows:

(1) -3.0m landing quay for trawlers –– 36m in length.

(2) -3.0m preparation quay for trawlers — 19m in length

(3) -2.0m stair landing facilities for small fishing boats — 200m in length

(4) Rock bulkhead (also to be used as a mooring quay for small fishing boats) — 137m in length

(5) Slipway (slope) — 65m in length

(6) Basin

6-5 Plans of Functional Facilities and Scales

The following functional facilities will be planned.

(1) Fish market, (2) ice plant and cold storage, (3) water supply facilities, (4) fuel supply facilities, (5) roads, (6) parking area, (7) administration office, (8) fence and guardhouse, (9) power distribution and illumination facilities, (10) drainage facilities, (11) public toilets, and (12) land for fishing port facilities.

The required size of main functional facilities are as follows:

(1) Fish market

One steel-frame building roofed with aluminum sheets with a floor space of 20m x 60m (1,200m^2)

(2) Ice plant and cold storage

Ice plant capacity:	45 tons/day
Ice storage capacity:	45 tons at -5°C
Cold storage capacity:	50 tons at -25°C

(3) Water supply

Daily water supply:	73.3 tons/day
Maximum water supply per hour:	7.4 tons/hour

Water will be supplied from the city's service water system for distribution by way of a pressure water tank.

(4) Fuel supply

Fuel supply capacity per day: 88 kℓ/day

Fuel tank capacity: 100 kℓ (one tank)

(5) Scales of other functional facilities

1) Roads

Width of approach road 15m

Width of roads on the complex 10m

Paved with asphalt (with gutters and drainages)

2) Parking area

Paved with asphalt (with gutters)

3) Administration office

One two-storied reinforced concrete building with a floor space of 800 m^2

4) Fence and guardhouse

Fence: 440m in length

Guardhouse : one building with a floor space of $50m^2$

5) Power distribution and illumination facilities

6) Public toilet

One building with a floor space of $100m^2$

7) Land for fishing port facilities 5.4 ha

6-6 Structures and Designs of Principle Facilities

(1) Design Conditions

1) Design seismic intensity Kh = 0.1

2) Soil conditions

-4.0m - -12.0m	Silty clay	N = 2 ~ 5 ($C = 1.5\ t/m^2$)
-12.0m - -16.0m	Loose sand	N = 15

Deeper than -16.0m	Sand	N = 35

3) Objective fishing boats

Trawlers : 15.0 in length, 2.5m in breadth, 1.8m in draft and 15 gross tonnages

Small fishing boats : 7.0m in length, 4.0m in breadth, 0.6m in draft and 2.5 gross tonnages.

4) Design tide level

H.H.W.L.	+ 0.710m
H.W.L.	+ 0.710m
L.W.L.	± 0.0m

5) Design wave height

$H_{max} = 0.5m$

6) Other design conditions

Crown height :

Quay, stair landing facility	DL + 2.5m
Rock bulkhead	DL + 3.0m
Reclaimed land	DL + 2.5m

Design water depth : -3.0m

Surcharge load :

Quay	1.0 ton/m^2
Landing facility, rock bulkhead	0.5 ton/m^2

Property of bearing ground :

Silty clay	N = 2 ~ 5 (C = 1.5 t/m^2)
Loose sand	N = 15

(2) Selection of Structures for Main Facilities

In selecting structures for the principal basic facilities, the following points are to be noted :

1) In order to complete the construction over a short period, the structures will be so designed that they may be simple in construction, ready to build, become stable over short periods and mutually usable.

2) The retaining walls for reclaimed land will be required for the development of a fishing port site in a land reclamation system. This system will be economized in cost by using it as the foundation of quays and other main facilities.

3) The structures will be so designed as to assure the use of construction machinery available in the Philippines.

4) The structures will be so designed as to assure the usability of locally available materials.

5) The quay will be constructed with sheet pile type structure and steel sheet piles will be put to use.

(3) Comparative Design

As the result of a comparative study with a -3m quay, the following conclusion was drawn. Therefore, steel sheet piles easy to build, good in performance and high in reliability will be put to use.

-3m steel sheet pile quay	US$4,333/m
-3m reinforced concrete sheet pile quay	US$4,947/m

6-7 Construction Program

(1) As the construction period is set at two years, consideration will be given so that each type of work may be completed as shortly as possible. Consideration will also be given so that not only the basic facilities but also the functional facilities may be put to use as early as possible.

(2) It is relatively easy to hire unskilled workers in Dagpan City and its vicinity, but it is very difficult to hire skilled workers - particularly, those experienced in port and harbour construction work. They will have to be employed from other areas.

(3) Cobbles for filling, backfilling and basic work and concrete materials (cement, sand, gravel, molds, etc.) are locally procurable with ease.

Steel sheet piles and other steel materials will have to be imported.

(4) Practically every type of construction machinery, such as pump dredgers, pile driving barges and pontoons, will be procured in the Philippines, and the construction machinery that have to be imported will be limited to crawler cranes.

(5) Prior to the start of the construction, there will be need for the development of a temporary road for construction, a temporary waterway, a temporary pier, a temporary construction office as well as service water, electric and telephone facilities.

(6) The construction period will be set at two years (24 months).

(7) Estimate of construction cost

(Unit in x 1,000 US$)

Kind of Work	Local Currency	Foreign Currency	Total
Preparatory Works	156	0	156
Mobilization	45	91	136
Port Work	690	1,106	1,796
Functional Facilities	2,008	942	2,950
Sub Total	2,899	2,139	5,038
Tax & Duties	463	0	463
Contingency	504	321	825
Total	3,866	2,460	6,326

6-8 Economic Analysis

6-8-1 Demand and Supply of Fish

The area which expects the supply of fish produced in the Sual fishing port is Pangasinan Province. The present self-sufficiency rate of fish in this province is extremely low, and the prices of fish are expensive (6 Peso per kilogram in 1978 wholesale prices), and most of the production is done by municipal fishing. In view of fishing, this area is underdeveloped. In this sense, the proposed fishing port will play a significant role in stepping up commercial fishing. Most of the province's fish production is presently dependent upon the inland fishing, and the development of a marine fishing is an urgent task for the supply of new sources of proteins. In the light of the low self-sufficience ratio of fish in this province, however, preference will probably have to be given to the efforts to make up for the shortage. The balance of fish demand and supply after the completion of the fishing port is indicated below:

Project	Year	Demand-Supply Balance (S–D)	Self-Sufficiency (%)
With Project	1990	▲ 31,400 tons	60
	2000 AD	▲ 54,800	52
Without Project	1990	▲ 39,600	50
	2000 AD	▲ 74,800	34

6-8-2 Economic Analysis

(1) Concepts

The analysis will be made along the following lines.

1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

2) For the costs, the construction, personnel, maintenance and facility renewal costs will be taken up.

3) For the benefits, analysis will be made of the direct benefits or, more specifically, increase in the output of fish catches and improvement in the freshness of fish due to increased supply of ice and technological improvements.

4) Project life - 20 years after start of operation of the fishing port.

5) Reference year - Prices in 1978.

6) Discount rate - 15%.

7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

(2) Evaluation

The result of economic evaluation on construction of the Sual fishing port is as follows.

With the net present value at ₱30,000,000 (¥890,000,000 upon conversion at 1₱ = ¥30), cost benefit ratio at 1.63 and internal rate of returns at 21%, the project is considered to be appropriate from the national economic point of view.

The other benefits which the fishing port improvement brings about are listed in the following.

(1) Improvement in self-sufficiency of fishery products.

(2) Modernization of fisheries upon accumulation of a variety of functions.

(3) Encouraging investments.

(4) Stabilization of fish prices.

(5) Creation of employment opportunities.

(6) Acquisition of new techniques.

(7) Increasing income of fishermen.

(8) Strengthning the fishermen's association.

6-9 Financial Analysis

(1) Concepts

Construction of the Sual fishing port is carried out as one of the fishing port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here, with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

(2) Financial Evaluation

As the result of the financial analysis, it was found that it would be difficult financially for PFMA to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enormous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion, would be reduced.

Part-7 Consultant Services

(1) Principle subject of consultant services

Following principle subjects are contained in the consultant service of this fishing port development project.

1) Preliminary survey for detail designing
2) Field investigation for detail designing
3) Detail designing and cost estimation
4) Supervision and inspection
5) Training
6) Guidance

(2) Schedule

1) Soil investigation .... first year
   (from end of 1978 to beginning of 1979)
2) Topographical survey .... first year
   (from end of 1978 to beginning of 1979)
3) Designing and cost estimation .... first year
   (1979)
4) Training .... 2nd year (1980)
5) Guidance .... after third year
   (3 years after 1980)

(3) Cost of consultant services estimated

(Unit in x 1,000 US$)

Subject	Sub-Item	Consulting Service Cost		
		Local	Foreign	Amout
Engineering Service (Part-1)		(323)	(4,542)	(4,865)
	Sub Soil Investigation	232	581	813
	Topographical Survey	62	158	220
	Designing & Cost Estimation	29	3,803	3,832
	(1) for Basic Facilities	22	2,299	2,321
	(2) for Functional Facilities	7	1,504	1,511
Engineering Service (Part-2)	Supervision & Inspection	(864)	(5,291)	(6,155)
	(1) for Basic Facilities	604	4,545	5,149
	(2) for Functional Facilities	260	746	1,006
Training		(8)	(44)	(52)
	Technical Training	4	22	26
	Operational Training	4	22	26
Guidance		(115)	(631)	(746)
	Guidance	115	631	746
Total		1,310	10,508	11,818

Part-8 Administration and Management of Fishing Ports

8-1 Administration of Fishing Ports

The basic principles for the administration of the fishing ports are as follows:

(1) The facilities will be maintained in a perfect conditions at all times.

(2) The facilities will be put to effective use at all times so that full play may be given to their functions.

For the above principles, the following measures are required:

(1) Utilization by fishing boats:

Assurance for safe porty entry and departure.

Assurance for smooth unloading.

Assurance for smooth and rapid supply to, and repair work on, fishing boats

(2) Handling of catches :

Smooth collection and sorting of hauled fish in bulk.

Fair transaction.

Formation of reasonable prices.

The fishing port takes on a significantly public character, so that there is need for a powerful administrative agency to carry out its management.

All fishing ports in the Philippines are placed under the uniform management of the Philippine Fish Marketing Authority (PFMA) in accordance with the provisions of the Presidental Decree No. 977. A PFMA office is established at each fishing port for its management.

2-2 Management of Fishing Ports

(1) Methods of management of fishing port facilities as viewed by fishing port administrators

The methods for the management of a fishing port come in the following types:

Method 1 : Management and administration are carried out by the governmental body.

Method 2 : Management is carried out but administration is entrusted to a private business or some other organization.

Method 3 : An area is offered for facilities, by the government, but their construction, administration and management are all carried out by a private business or some other organization.

(2) Classification of fishing port facilities and methods of management

The fishing port facilities are roughly classified into two types — the basic facilities which include the quays and other basic components of a fishing port, and the functional facilities which include a fish market and other structures indispensable for the handling of hauled fish.

The efficiency of a fishing port will be impared if all its facilities are run in a stereotyped manner. Care must be exercised about this point.

In general, the basic facilities should be put under the control and management of one and the same entity. As for the functional facilities, whose which take a significantly public character, such as roads, parking area, channel marks, land for fishing port facilities, yard, fishing gear yard and administration office should also naturally be placed under the control and management of one and the same entity.

Part-9 Future Problems and Recommendation

(1) As the development of a fishing port makes progress, it will become necessary to develop and solidify a system of control and management for the fishing port. It will also become necessary to assure the availability of workers for a smooth control and management of the completed fishing port.

(2) With respect to the control and management of the fishing port, there is need to train port authority officials in a positive manner. For a qualitative improvement of the workers, it is advisable to conduct a fact-finding survey on the realities of advanced countries and for some of the workers to undergo training there.

(3) As a means to bring up fishing port specialists, it is necessary to give knowledge to technicians experienced in port and harbour construction about planning for fishing ports and fishing, so that they may equip themselves with sophisticated knowledge about fishing.

(4) In working out designs for a fishing port project, there is need to pay attention to the following matters:

1) No soil survey whatever has ever been carried out at each planned fishing port project sites. The sub-soil investigation, such as boring, must be carried out before plans are worked out for execution of the construction project.

2) Particularly at the Camaligan and Lucena fishing ports, it should be implemented detail sub-soil investigation in an elaborate manner.

3) In formlating elaborate plans for the fishing port facilities, it is desirable that full heed be given to the views and desires of ship captains and other users. This consideration is required particularly for the scale and location of auxiliary pier facilities, such as arrangement of mooring bitts and fenders.

CONCLUSION AND RECOMMENDATION

In conjunction with the Philippine Fishing Port Development Program Package-(I), formulated by the Government of the Republic of the Philippines, the following conclusion and recommendation was drawn as the result of the review and complementary study for the feasibility study report, prepared by the Government of the Republic of the Philippines, by through field inspection and investigation and technical data analysis.

(1) The five fishing ports (Zamboanga, Iloilo, Calaligan, Lucena and Sual) included in the Philippine Fishing Port Development Package (I) are considered appropriate and reasonable.

(2) The project site of each fishing port, the basic program for its development and the improvement program are considered appropriate both in terms of scale and substance.

(3) The thoughts about, and the reasons for, the necessity and urgency of the five fishing ports' development are considered appropriate in substance.

(4) This project, fishing port development Package-(I), shall be considered to be appropriate from the national economic point of view.

(5) The cost required for the development of the five fishing ports is estimated below :

(1 US$ = 220 ¥)
(1 US$ = 7.22₱)

District	Local Portion (US$)	Foreign Portion (US$)	Total Amount (US$)
1. Zamboanga Port	7,037,484	5,153,671	12,191,155
2. Iloilo Port	17,898,457	16,927,305	34,825,762
3. Camaligan Port	10,009,056	11,271,066	21,280,122
4. Lucena Port	19,634,846	14,290,069	33,924,915
5. Sual Port	3,866,167	2,459,660	6,325,827
Sub-Total	58,446,010	50,101,771	108,547,781
6. Consultant Services	1,310,000	10,508,000	11,818,000
Grand Total	59,756,010	60,609,771	120,365,781

Introduction

Introduction

1. Background

In order to work for the development of fishing ports throughout the Philippines as one of the measures to step up its fisheries, the Government of the Republic of the Philippines decided to formulate a Fishing Port Development Program (Package I) for five fishing ports as the first step.

The Government of the Republic of the Philippines completed a feasibility study on the Fishing Port Development Program (Package I) and requested to the Government of Japan through the Japanese Embassy in Manila in December 1977 to send a survey team for a review and complementary study in respect to the Fishing Port Development Program (Package I).

In accordance with this request, the Government of Japan entrusted the Japan International Cooperation Agency with such business as would be related to a survey on the Fishing Port Development Program (Package I). The Japan International Co-operation Agency, in turn, organized a review and complementary study team and sent it to the Philippines in February to March (30 days) 1978.

2. Objective

The purpose of this survey team was to carry out an overall review of the Fishing Port Development Program (Package I) prepared by the Government of the Republic of the Philippines. In order to accomplish this study objective, the study team carried out complementary study not only in Manila but also in five ports, where fishing ports were to be developed.

3. Organization of the Study Team

The survey team consisted of six members in addition to the team leader, Shinji Hayashi, and they were given the following assignments:

(Title)	(Name)	(Present Job)	(Assignment)
Leader	Shinji Hayashi	Former President, National Fishing Ports Association	
Member	Masafumi Sugie	Construction Division, Fishing Ports Department, Fisheries Agency	Management & Coordination

(Title)	(Name)	(Present Job)	(Assignment)
Member	Kazuhiro Koshiro	Overseas Coastal Area Development Institute of Japan (OCDI)	Planning & Civil Engineering in general
Member	Sadatoshi Iibuchi	Former Japan International Cooperation Agency	Distribution & Processing
Member	Kametaro Washizu	Universal Marine Consultant Co., Ltd. (UNIMAC)	Fisheries in general
Member	Tateo Kusano	System Science Consultant Co., Ltd. (SSC)	Economy in general
Member	Takashi Yamanaka	Japan International Cooperation Agency	Business coordination

4. Schedule and Works of the Study Team

The study team left Tokyo on February 20, 1978, and arrived at Manila on the same day. For 30 days before their return to Tokyo on March 21, they were engaged in carrying out study in Manila and five ports where fishing ports were scheduled to be developed. Their implemented schedule and work are given below:

Date	Study Schedule and Works	Lodged in
2/20 Mon.	Leaves Tokyo at 10:35 and arrives at Manila at 15:07	Manila
2/21 Tue	Interview to Asian Development Bank, Courtesy call to Japanese Embassy and JICA Manila Office	Manila
2/22 Wed	Courtesy call and interview to the NEDA and DNR of the Government of the Philippines, field inspection for the Navotas fishing port complex. Data collection.	Manila
2/23 Thu	Visits the BFAR and DPWTC of the Government of the Philippines. Discusses the schedule and others with counterparts of the Government of the Philippines.	Manila
2/24 Fri	General meeting with officials of the related department & bureau of the Government of the Philippines. Courtesy call to Japanese Ambassador.	Manila

Date	Study Schedule and Works	Lodged in
2/25 Sat	Leaves Manila at 08:30 and arrives at Lingayen at 12:00. Courtesy call and interview to the Governor of the Province of Pangasinan.	Lingayen
2/26 Sun	Courtesy calls to the Mayor of Sual and field inspection at the project site of Sual Fishing Port.	Lingayen
2/27 Mon	Interview and data collection to Bureau of Fisheries (BFAR) and Bureau of Public Works (BPW). Courtesy call to the Mayor of Lingayen. Surveys fishing villages in Lingayen.	Lingayen
2/28 Tue	Leaves Lingayen at 09:00 and arrives at Lucena at 17:45.	Lucena
3/01 Wed	Courtesy call to the Mayor of Lucena and interview to the Urban Development Department of the Lucena City office, field inspection and data collection at the project site of Lucena Fishing Port, interview fishing boat skippers and others. Courtesy call to the Governor of the Province of Quezon. Data collection to BFAR and BPW.	Lucena
3/02 Thu	Surveys the landing of caught fish at the project site of fishing port and discussion meeting holds with the counterparts. Divided into three groups, the team carries out a field inspection and data collection.	Lucena
3/03 Fri	Field inspection to the Cotta Port. Divided into two groups, the team carries out a complementary study and data collection.	Lucena
3/04 Sat	Leaves Lucena at 07:15 and arrives at Iriga. Courtesy call to the Governor and the mayor of Camaligan and the related bureaus of the Government in Naga City. Interview and data collection.	Iriga
3/05 Sun	Field inspection at Camaligan, Bicol river and Sun Miguel Bay by ship and plane and holds a discussion meeting with the counterparts.	Iriga
3/06 Mon	Divided into two groups, the team carries out a study and collects data. Leaves Naga at 13:15 and arrives at Legaspi at 15:30. Data processing and analyses.	Legaspi
3/07 Tue	Interview and study the Legaspi Public market and other facilities. Leaves Legaspi at 18:10 and arrives at Iloilo at 19:30.	Iloilo

Date	Study Schedule and Works	Lodged in
3/08 Wed	Field inspection to the project site of Iloilo Fishing Port. Courtesy call to the Provincial Governor and the Mayor of Iloilo and interview to the Urban Development Department of the City Office. Divided into three groups, the team carries out complementary study and data collection. Holds a discussion meeting with the counterparts.	Iloilo
3/09 Thu	Leaves Iloilo at 10:50 and arrives at Cebu at 11:50. Data processing and analyses.	Cebu
3/10 Fri	Leaves Cebu and arrives at Zamboanga at 11:50. Courtesy call and interview to the Provincial Governor, BFAR, District Military Commander and Mayor of Zamboanga. Data collection.	Zamboanga
3/11 Sat	Courtesy call to the Army Commanding General, Field inspection to the project site of Zamboanga Fishing Port (aboard a government plane). Holds a discussion meeting with officials of the related bureau of the City Office and collects data. Holds a discussion meeting with the counterparts.	Zamboanga
3/12 Sun	Data processing and analyses.	Zamboanga
3/13 Mon	Leaves Zamboanga at 08:30 and arrives at Manila at 10:30. Data processing and analyses.	Manila
3/14 Tue	Holds a discussion meeting with the counterparts and prepares the draft of the progress report.	Manila
3/15 Wed	Carries on the preparation of the report draft.	Manila
3/16 Thu	Carries on the preparation of the report draft. Holds a discussion meeting with the counterparts on the report draft. Prepares the report.	Manila
3/17 Fri	Submits and explains the report to the related department and bureaus of the Government.	Manila
3/18 Sat	Data processing and analyses.	Manila
3/19 Sun	Data processing and analyses.	Manila
3/20 Mon	Leaves farewell of the Government's DPWTC and NEDA. Also leaves farewell of the JICA Manila Office. Submits and explains the report to the Japanese Embassy and bids good-bye. Leaves farewell of the OECF Manila Office.	Manila
3/21 Tue	Leaves Manila at 13:50 and arrives at Tokyo at 20:15 (with Mr. Koshiro, a member of the team, heading to Jakarta in order to take charge another JICA's study work.)	

5. Acknowledgment

In carrying out its study, the study team was given cooperation and counsel by various quarters, including the related agencies of the Government of the Republic of the Philippines, the related municipalities and the Japanese Embassy in Manila. The study team expresses its deepest appreciation specifically to the following persons for their full cooperation.

Mr. Tedoro T. Encarnacion, Asst. Secretary of DPWTC, the Government of the Republic of the Philippines

Mr. Jesus M. Sunga, Director, Infrastructure Staff of NEDA, the Government of the Republic of the Philippines

Mr. Benito Q. Bengzon, General Manager of PFMA, the Government of the Republic of the Philippines

Mr. Pete N. Prado, Director of PPDO, DPWTC, the Government of the Republic of the Philippines

Officials of PPDO, DPWTC, the Government of the Philippines Counterparts, the Government of the Republic of the Philippines

Mr. Shota Iwamoto, First Secretary of the Japanese Embassy in Manila

Mr. Koichi Goto, Manila Office, Japan International Cooperation Agency

Part I

Outline of Philippine Fisheries and Governmental Measures Taken

PART I OUTLINE OF PHILIPPINE FISHERIES AND GOVERNMENTAL MEASURES TAKEN

Chapter 1 Outline of Philippine Fisheries

1-1 Population and People's Fish Eating Tendency

The Philippines had a population of 41,830,000 in 1975. Of them, the number of persons engaged in fisheries, when the number of persons engaged in fisheries on a business basis is added to that of persons engaged in small-scale coastal fisheries and inland fisheries, is reported as exceeding 500,000.

The Fillipinos like to eat fish meat, pork and chicken as animal proteins. Practically every fish caught in the Philippines is offered for food. The annual per capita consumption of acquatic products (annual fish catch/population) in 1975 stood at about 32 kg per person, which was in no way smaller than that of the other peoples who were fond of fish meat.

The output of acquatic products has been increasing year by year, to be sure, but it cannot catch up with a rise in the consumption.

1-2 Total Fishery Production

The total fishery production in the last five years as classified by year is indicated in Table 1-1. The total fishery production in 1975 stood at about 1,340,000 tons.

Table 1-1 Total fishery production by year

Unit: ton

Year		1971	1972	1973	1974	1975
Total Production		1,023,000	1,122,000	1,205,000	1,268,000	1,337,000
Sea	Commercial Fishing	382,000	425,000	465,000	471,000	499,000
	Municipal Fishing	543,000	599,000	640,000	684,000	732,000
Inland Waters		98,000	99,000	100,000	113,000	106,000

Note: Data by FISHERIES STATISTIC OF PHILLIPIN 1975

1-3 Types of Fisheries

1-3-1 Sea Fisheries

The sea fisheries of the Philippines are classified into commercial fishing and municipal fishing, depending on the scale and characteristic of the operation.

(1) Commercial Fishing

This is the kind of fishing which is carried out by registered fishing boats, three tons and larger in gross tonnage, and in which fishing operations are permitted off all territorial waters under certain restrictions of the Fishery Agency (e.g., a ban on fishing operations in waters with depths of less than seven fathoms). The main types of commercial fishing are given below:

1) Trawl Fishing

The trawl fishing conducted in the Philippines is of the otter-board type. The trawlers are classified into the 50-100 ton class and the class of less than 50 ton.

The fishes caught by this type of fishing include slipmouth, nemipterid, mackerels, shrimps, croaker, lizardfish, cavalla, grouper and others. The catch in 1975 was registered at 239,000 tons. The number of days per fishing trip is 5-7 days on the average. The ship type, fishing gear and fishing method well matched to the local conditions are put to use.

2) Purse seine Fishing

Purse seine fishing is carried out by fishing boats of the 60-145 ton class. Fishing operations of this type are conducted in the night time with fish lamps. The fishes caught by this type of fishing include round scads (about 70%), sardines, frigate mackerels, tunas, bigeye scad, mackerels, and others. The fishing period extends all the year and the major fishing season sets in the March-September period. The catch in 1975 stood at 168,200 tons. The number of days per fishing trip for large purse seiner is 10-14 on the average.

3) Bagnet Fishing

Bagnet fishing is the fishing method in which "PAYAU", or a "steeped raft" developed in the Philippines is put to use. In this fishing, nets and fish lamps are equipped to large Banca (5-20 ton) according to the same concept as that of the bagnet fishing method. The fishes caught by this fishing include sardines, anchovies, round scads, small squid, slipmouth and others. The catch in 1975 stood at 45,000 tons. One feature of the bagnet fishing method is that an outrigger as long as a fishing boats is put to use. In normal circumstances, fishing boats move out in the evening for fishing operations and put back to port the following morning. Fishing boats also move from one fishing ground to another to chase schools of fish.

(2) Municipal Fishing

This type of fishing is carried out by small fishing boats, three ton and smaller. They are engaged primarily in line-fishing, gillnet fishing, and otter trawling (Lingayen Gulf). The fishing ground consists of waters within three kilometers from the seacoast, and in this type of fishing, fishing boats go out and return on the same day.

1-3-2 Inland Waters Fisheries

The inland waters fisheries come in two types -- fishing in rivers and estuaries with fish racks, push nets and culturing in fish ponds. The production in 1975 was registered at 106,400 tons. Milkfish is a representative fish, and shrimps and oysters are also hauled in great quantities.

1-4 Present Situation of Landing Places

1-4-1 Landing Places

More than 2,000 landing places are scattered along the seacoats of each province of the Philippines. Partly because the domestic demand is relatively larger in gravity than the exportation in respect to the consumption of catches, the landing places which have large shares in the fish landing are concentrated in major consumption areas and their vicinities.

Photo 1-1 Trawler (Camaligan fishing port)

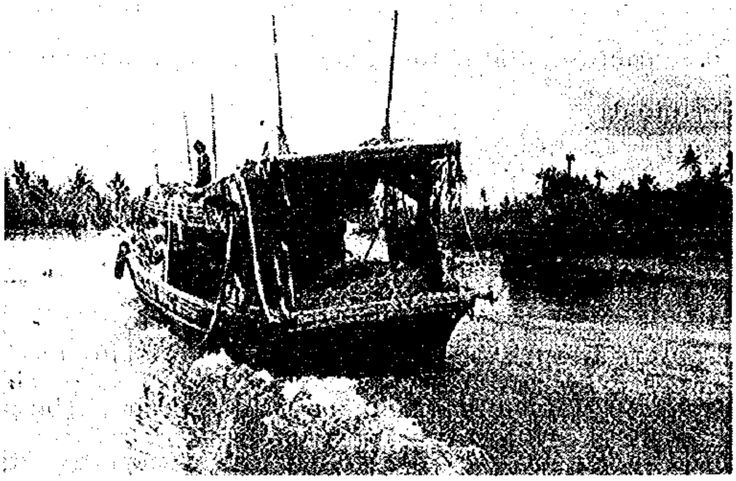


Photo 1-2 Trawler (Camaligan fishing port)

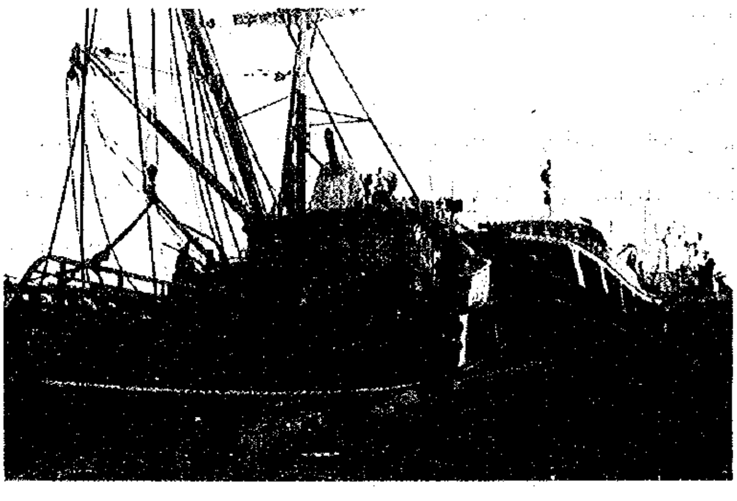


Photo 1-3 Purse Seiner

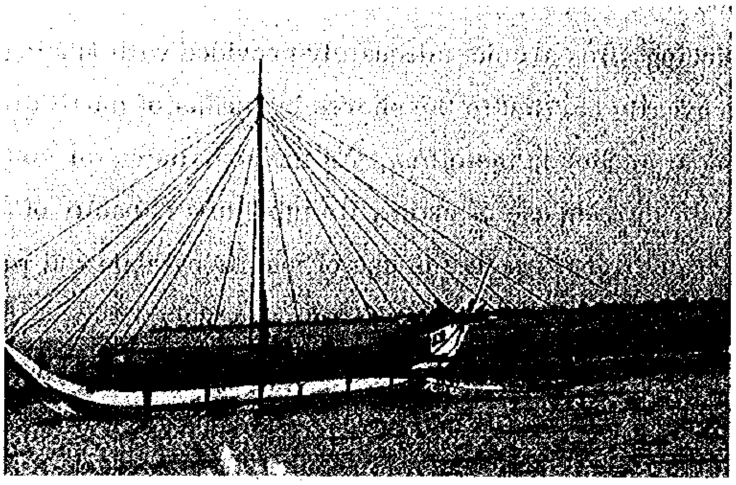


Photo 1-4 Bagnetter (Zamboanga fishing port)

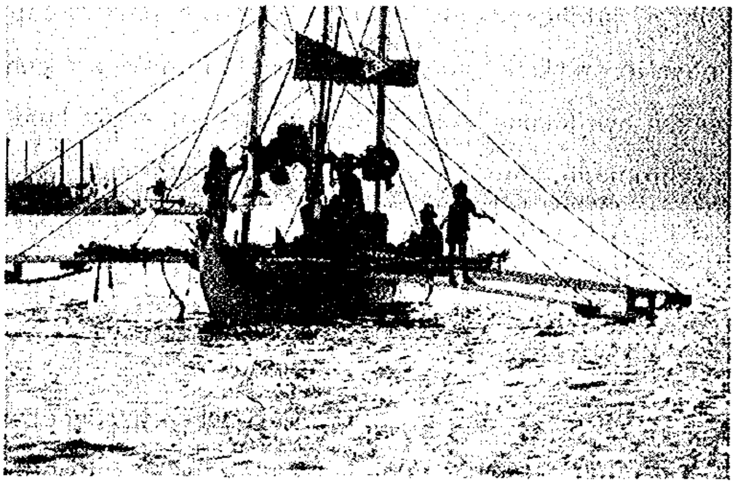


Photo 1-5 Bagnetter (Lucena fishing port)

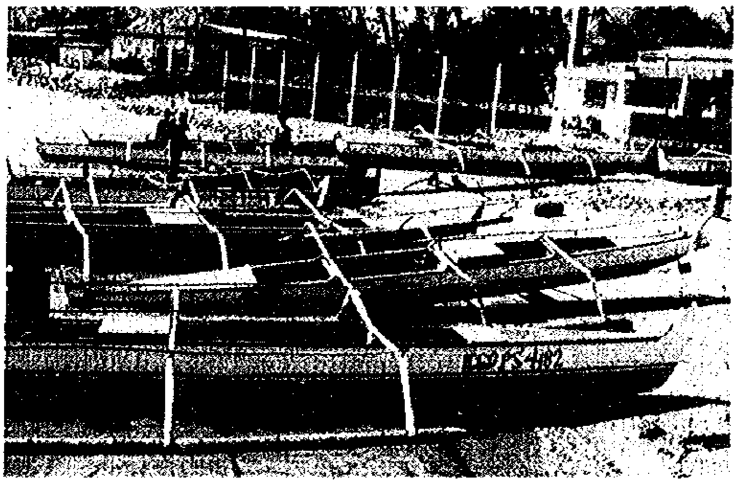


Photo 1-6 Banca (Sual fishing port)

1-4-2 Landing Method

Many of the landing sites are not adequately provided with landing facilities so that the catches are usually carried to the shores by means of small crafts from the fishing boats staying at anchor in the offing. As the containers for conveyance of the catches, the trawlers are in use of mainly tin tubs (of a capacity of about 35 kg), while the purse seiners and bagnetters are in use of mainly bamboo and rattan containers (about 35 to 50 kg). In either case, the containers are placed one on top of another in carriage, resulting in damage to the fish bodies. It is desirable to use plastic containers with supports in the future.

1-4-3 Wholesale Markets and Transport of Catches

Wholesale markets are established in the landing places and consumption areas where relatively large catches are dealt with. The transport of catches from production areas to wholesale markets and from wholesale markets to consumption areas is done in most cases by "Jeepny" and other vehicles for short land trip. As the Philippines are an archipelago, ship transport (fishing boats and fish carrier) is also done in many cases. Aircraft is used for the transport of some of high-grade products.

1-4-4 Distribution System

No organized distribution system is available between producers and consumers, but catches are normally channeled according to the following route:

Production center → wholesale market → retail market

Producer → { Consignor / Broker / Buyer } → Retailer

1-4-5 Supplying of Fishing Boats

Large quantities of ice, water, oil and others are supplied to trawlers and purse seiners, which sail out for fishing operations over relatively long periods, each fishing trip stretching for 5-14 days. Bagnetters are supplied with small quantities of oil, water and others, but not with ice, as they usually go out and return on the same day.

Photo 1-7 Landing of catches (Lucena fishing port)

Photo 1-8 Transport of catches (Lucena fishing port)

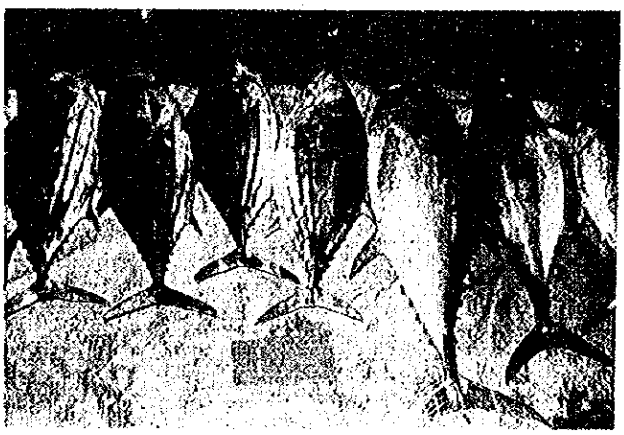


Photo 1-9 Fish at the fish market (Lucena fishing port)

Photo 1-10 Fish at the fish market
(Lucena fishing port)

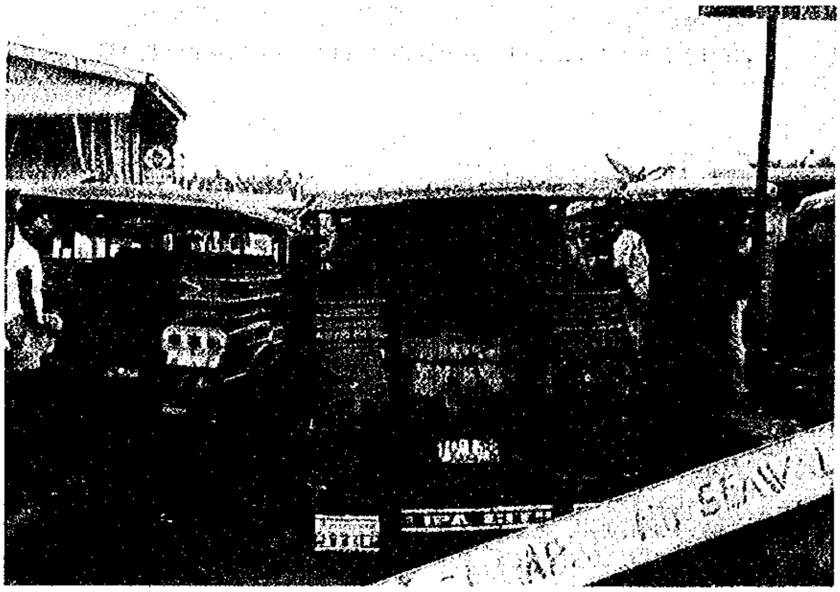


Photo 1-11 Fish carriers (Jeepny) from fish market of Lucena.

Chapter 2 Measures Taken by Government of the Philippines for Promotion of Fisheries

2-1 Measures for Promotion of Fisheries

The Government of the Philippines are contemplating the following measures for the promotion of fisheries:

1. Redevelopment of markets, landing facilities, distribution facilities, cargo handling facilities, etc.
2. Upgrading of productivity.
3. Development of the processing and upgrading of added values with modernization.
4. Development and modernization of local markets.
5. Prohibition of illegal fishing methods and over-fishing and conservation of resources.
6. Stabilization and maintenance of foreign markets and expansion of exports with development of markets.
7. Promotion of fisheries and redevelopment of the environment as well as harmony with maintenance.
8. Development and upgrading of fishing technology required for development of aquatic resources.

2-2 Demand of Aquatic Products

The Government of the Philippines estimates that the national demand of aquatic products will increase at an annual rate of 5.5%, as indicated in Table 1-2, while taking note of a rise in the population (3.9% a year) and also increases in the demand of others.

Table 1-2 National demand of aquatic products

Unit: ton

Year	1975	1980	1987	2000
National demand of aquatic products	1,376,900	1691,400	2,262,400	3,652,600

Note: The demand of aquatic products is computed in the following manner:

$$D_n = C_0(1 + y \cdot e)\ n \times P_n$$

where D_n is the effective demand in year n, Co the base demand for fish, y the real per capita income growth rate, e the income elasticity of demand for fish, n the year and P_n the population in year n.

2-3 Plans for Development of Fishing Ports

As one of the measures cited in 2-1 for the promotion of fisheries, the Government of the Philippines is determined to redevelop fishing ports throughout the country: it has decided to develop five fishing ports as its first project with a view to working for a concentration of the fish landing centers which are scattered at present and also for a stabilization of the fish prices and an increase of the catches, while attempting to develop fishing port facilities (water supply facilities, cargo handling facilities, markets, ice making and cold store, etc.).

2-3-1 Sites Planned for Development of Fishing Ports

While giving consideration to a balance with regional development, the selection of the areas which will form the basis for the selection of project sites for the development of fishing ports is so arranged that one area has been designed in Mindanao Region, one in Bisaya Region, two in South Luzon Region and one in North Luzon Region. With respect to projects for the development of fishing ports, the following project points where practically no fishing facility is available at present have been chosen with due consideration given to the historical, social and geographical conditions of each fishing landing site within the aforementioned areas:

Mindanao Region:

Zamboanga Fishing Port (Sangali, Zamboanga City)

Bisaya Region:

Iloilo Fishing Port (Iloilo City, Panay Island)

South Luzon Region:

Camaligan Fishing Port (Naga City, Province of Camarines Sur)

Lucena Fishing Port (Lucena City, Province of Quezon)

North Luzon Region:

Sual Fishing Port (Sual City, Province of Pangasinan)

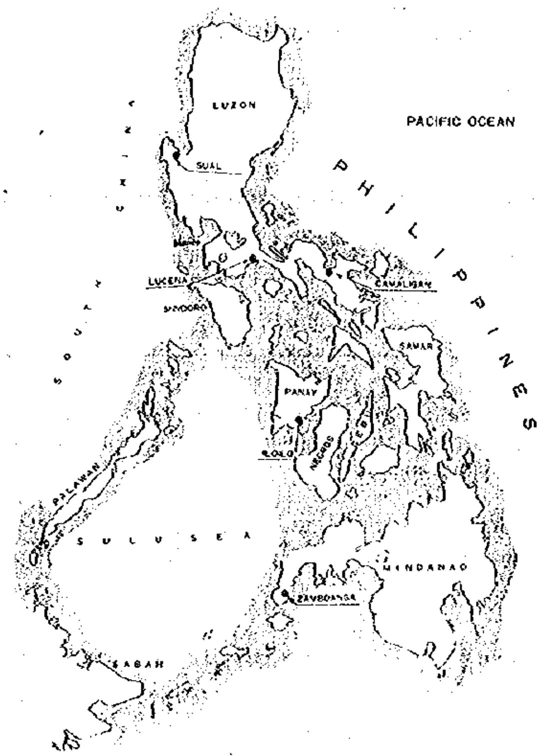


Fig. 1-1 Location of Project Site of Fishing Port, Philippines

2-3-2 Fishing Ports (Sites) under Development Plan

1. Zamboanga Fishing Port

(1) Present Situation of Fisheries

The City of Zamboanga is situated on the tip of the Zamboanga Peninsula in the western part of Mindanao Island, the fishing has been brisk from old as it has many good fishing grounds in its periphery. Locally, bagnet fishing is brisk. Zamboanga also served as the distribution center of the tunas and bonitos caught in the south.

The trend that have taken place in the number of registered fishing boats and in the fish catch in the last three years are indicated in Tables 1-3 and 1-4.

Table 1-3 Number of resistered fishing boats (Zamboanga)

Year	1973	1974	1975
Bagnetter	36 boats	44 boats	60(34) boats

Note: 1) The figure in brackets for 1975 represents the number of fishing boats landing catches in this area which has been surveyed by the Government of the Philippines.

2) About half of the number of resistered fishing vessels use other fish landing sites, as the local fishing port facilities are insufficient.

Table 1-4 Trend of yearly fish catch (Zamboanga)

Unit: tons

Year	1973	1974	1975
Fish catch	6,751	6,246	10,903

Note: The fish catch represents the territorial quantity.

(2) Present Situation of Fish Landing Site

Bagnetters are at anchor off the coast situated in the neighborhood of the Provincial Fishery Bureau in the city for fish landing and rest, but practically no fishing port facility is available at present.

The transports which purchase the tunas and bonitos caught in the southern waters are at anchor in the waters close to the anchorage of foreign trade ships for purchasing purposes.

The fishing port project site is situated in Sangali, about 30 km north-northeast of the City of Zamboanga.

Fishing has once been brisk in Sangali. However, as all bagnetters make use of the waters facing Zamboanga for distribution and other reasons, this community turns out to be a lonely fishing hamlet at present. Only fishing with small Banca is carried out. No fishing port facilities are available with the exception of an unsophisticated shipyard.

(3) Thought about Use of Fishing Port

Upon completion of the proposed fishing port, the bagnetters which presently make use of the waters facing Zamboanga will be assembled to enable them to make full use of the various facilities to be equipped to this fishing port, so that the fishing port may be put to much more use to work for the promotion of fisheries. As a link of its city planning scheme, the city authorities hope to develop the Sangali area and stabilize the welfare -- particularly, to develop a fishing port for a stabilization of the fish prices with the maintenance of freshness of landed fish.

(4) Thought about Distribution of Catches

Plans are afoot for the transshipment of landed fish to other places without degrading their freshness upon completion of the proposed fishing port.

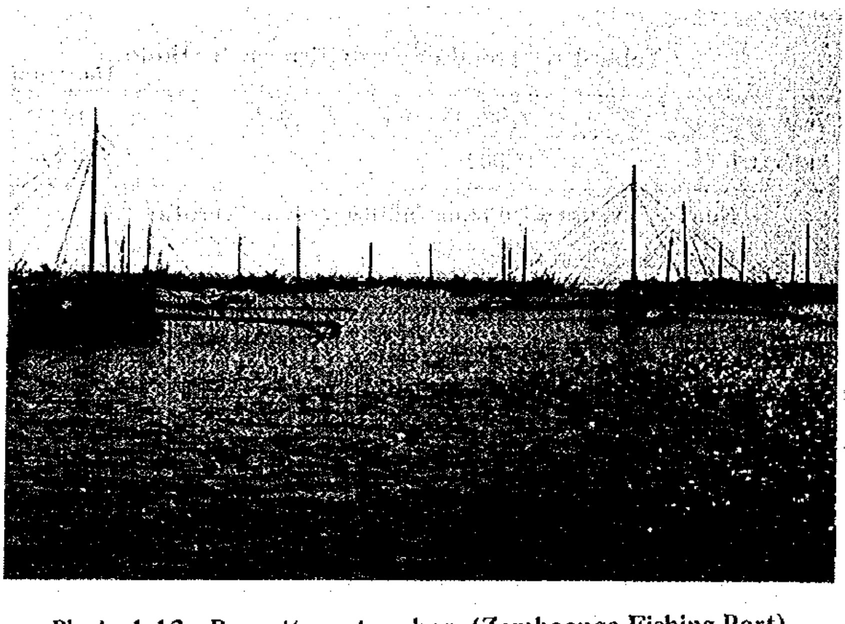


Photo 1-12 Bagnetters at anchor (Zamboanga Fishing Port)

2. Iloilo Fishing Port

(1) Present Situation of Fisheries

1) Sea Fisheries

Situated west to this area are the Guimaras Strait and the Sulu Sea, where there exist broad fishing grounds for trawling, purse seine fishing and bagnet fishing. The city of Iloilo is brisk, as it turns out to be a major consumption center and the fishing boats registered in other areas also land their catches.

The trend in the number of registered fishing boats and in the fish catch in the last three years are given in Tables 1-5 and 1-6.

Table 1-5 Number of registered fishing boats (Iloilo)

Year	1973	1974	1975
Purse Seiner	7 boats	8 boats	10(18) boats
Trawler	13	16	19(41)
Bagnetter	18	18	23(40)

Note: The figure in brackets for 1975 represents the number of fishing boats landing their catches in this area which has been surveyed by the Government of the Philippines.

Table 1-6 Trend of yearly fish catch (Iloilo)

Unit: tons

Year	1973	1974	1975
Fish catch	18,002	21,226	25,226

Note: The fish catch represents the territorial quantity.

2) Inland Waters Fisheries

Inland waters fisheries, such as fishery in fish ponds, are also carried out.

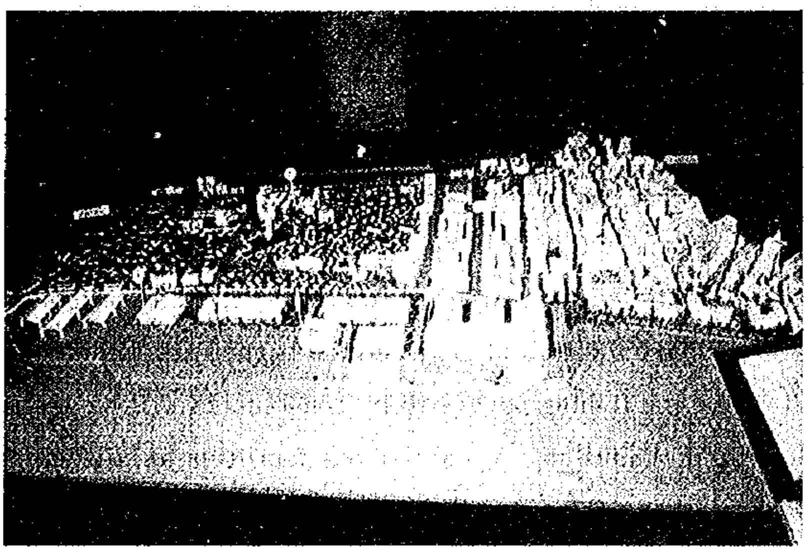


Photo 1-13 Model of Projected Iloilo Fishing Port
(Produced by Iloilo City)

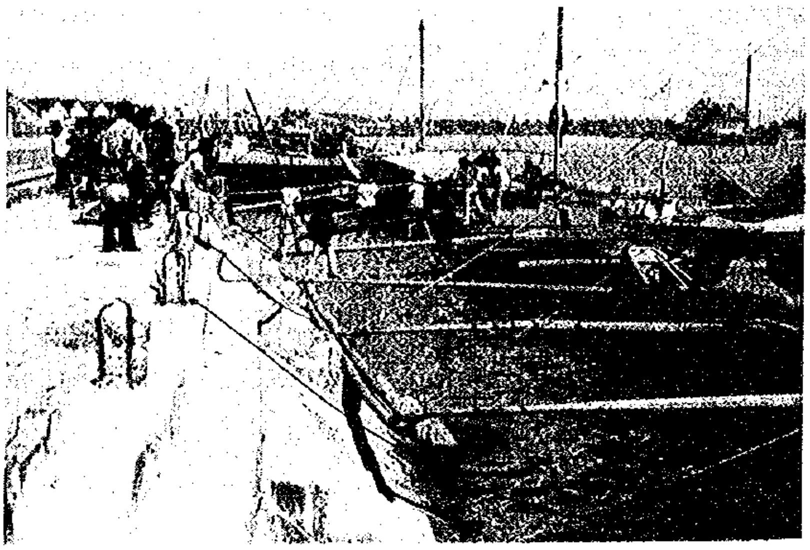


Photo 1-14 Bagnetters at anchor in Iloilo merchantile port

(2) Present Situation of Fish Landing Site

Trawlers and purse seiners, along with other general ships, make use of the banks of the Iloilo River which runs through the city. Bangnetters use the beach situated in the south of the city.

The fishing port project site is the beach which is utilized by bagnetters at present. No fishing port facilities are available at present.

(3) Thought about Use of Fishing Port

Upon completion of the projected fishing port, the trawlers and purse seiners which share the Iloilo River and the bagnetters which make use of the beach where the fishing port is to be constructed will be assembled to enable them to make full use of the various facilities to be equipped to the fishing port, so that fishing port may be put to much more use and the freshness and prices of caught fish may be raised to increase the fish landing. As a link of its already formulated city planning project (the city's beach section is to be divided into a fishing port area, a resort area and a foreign trade port area), the city authorities strongly hope to develop a fishing port.

(4) Thought about Distribution of Catches

Plans are afoot for the consumption in the city of about 90% of landed fish upon completion of the projected fishing port, some of the fishes (shrimps, etc.) are being shipped to Metropolitan Manila by ship and aircraft.

3. Camaligan Fishing Port

(1) Present Situation of Fisheries

The fisheries of this area which began with trawling in the San Miguel Bay, into which the nutriments of the Bicol River were brought, have developed to the point where fishing is extended to cover the adjacent Lamon Bay and where not only trawling but also purse seine fishing for round scads and other fishes are carried out.

The trend in the number of registered fishing boats and in the fish catch in the last three years are shown in Tables 1-7 and 1-8.

Table 1-7 Number of registered fishing boats (Camaligan)

Year	1973	1974	1975
Purse Seiner	1 boats	1 boats	3(4) boats
Trawler	39	50	44(22)

Notes: 1) The figure in brackets for 1975 represents the number of fishing boats landing their catches in this area as surveyed by the Government of the Philippines.

2) Half of the number of registered fishing boats use other landing quays due to the unavailability of adequate fishing port facilities.

Table 1-8 Trend of yearly fish catch (Camaligan)

Unit: tons

Year	1973	1974	1975
Fish catch	8,059	6,548	10,390

Note: The fish catch represents the territorial quantity.

(2) Present Situation of Landing Quay

At present, trawlers and purse seiners use the banks of the Bicol River in the city center, which runs through Naga City into the San Miguel Bay, and several points in a section of about three kilometers downstream along the river.

The fishing port project site is fartherest downstream, about 23 km from the river mouth.

The upstreams of the rivers adjacent to Naga City have been used by fishing boats from old for the following reasons:

1) The seacoast along the estuary of the Bicol River is a sand dune inconvenient for use by fishing boats.

2) Along the downstream of the Bicol River, roads have not yet been developed, nor are there large hamlets, so that difficulty will be encountered in deeling with catches, even if they are landed. It is also difficult to supply commodities to outgoing fishing boats.

3) Each fishing trip of trawlers and other similar fishinb boats extends over a long period. Even if they go up a river about 25 km at the end of their fishing trip, the loss of time will presumably be insignificant.

(3) Thought about Use of Fishing Port

Upon completion of the projected fishing port, the fishing boats which presently make disorderly use of various places in the river will be assembled at one place in the light of a necessity of riparian control, and the various facilities to be equipped to the fishing port will be put to full use to increase its utilization. Beside, the freshness and prices of landed fish will be raised and the fish landing will be increased to meet a rising demand and work for a stable development of fisheries.

Anticipating an increase in the fish landing, the city authorities look forward to an orderly utilization of the river from a standpoint of riparian control and strongly hope to develop a fishing port.

(4) Thought about Distribution of Catches

Plans are afoot for the diversion of landed catches to Naga City, the hinterland consumption center, and its neighboring communities upon completion of the projected fishing port, some of them being transported to Metropolitan Manila by truck.

4. Lucena Fishing Port

(1) Present Situation of Fisheries

1) Sea Fisheries

The bagnet fishing of anchovies, slipmouth and small squid in the Tayabas Bay is brisk. Trawlers sail out as far as the Sibuyan Sea. Depending on the market prices, the landing is carried out in Manila and Batanga in many cases.

The trend that have taken place in the number of registered fishinb boats and in the fish catch in the last three years are shown in Tables 1-9 and 1-10.

Table 1-9 Number of registered fishing boats (Lucena)

Year	1973	1974	1975
Bagnetter	56 boats	39 boats	60(30) boats
Trawler	33	25	43(3)

Notes: 1) The figure in brackets for 1975 represents the number of fishing boats landing catches in this area as surveyed by the Government of the Philippines.

2) Many of the registered fishing boats go to other landing quays due to the unavailability of adequate fishing port facilities (particularly, landing facilities).

Table 1-10 Trend of yearly fish catch (Lucena)

Unit: tons

Year	1973	1974	1975
Fish catch	4,541	12,773	14,624

Note: The fish catch represents the territorial quantity.

2) Inland Waters Fisheries

Inland waters fisheries, such as in fish ponds, are relatively brisk.

(2) Present Situation of Landing Quay

The project site for the fishing port is the shoaling beach of Dalahican, a fishing community in the city, which is used by bagnetters and trawlers as their landing quay at present. Casting anchor far out in the offing, bagnetters land their catches and take a rest. After landing their catches, trawlers are tied up in the inlet of the Cotta section of the city. No fishing port facilities other than a wholesale market building (wooden) are available.

(3) Thought about Use of Fishing Port

Although there lie such big consumption centers such as Lucena and Manila, the fish landing and other facilities are inadequate and inconvenient, so that the idea is to promote fisheries by assembling the trawlers and bagnetters which are dispersed in other landing quays at present and by stepping up the utilization of this fishing port. As a link of its already formulated city planning project, the city authorities strongly hope to develop a fishing port.

(4) Thought about Distribution of Catches

Plans are afoot for the land transport of landed catches to Lucena and its vicinity as well as Metropolitan Manila, a major consumption center, upon completion of the projected fishing port.

5. Sual Fishing Port

(1) Present Situation of Fisheries

1) Sea Fisheries

In the Lingayen waters, trawling by small trawlers with their bases in Dagupan City and fishing by Banca along the coasts of the bays in this Province are carried out.

The trend that have taken place in the number of registered fishing boats and in the fish catch are shown in Tables 1-11 and 1-12.

Table 1-11 Number of registered fishing boats (Sual)

Year	1973	1974	1975
Trawler	20 boats	18 boats	24 boats
Banca	71	89	117

Notes: 1) The number of trawlers represents that of fishing boats operating with their bases in the Lingayen Bay in Pangasinan Province.

2) The number of Banca represents that which is registered in the Sual section of Sual Town.

3) There existed about 1,460 Banca from Dagupan City to Alminos Town as of 1975. In the two towns adjacent to Sual Town, there are 757 Banca.

Table 1-12 Trend of yearly fish catch (Sual)

Unit : tons

Year	1973	1974	1975
Fish catch	3,300	4,300	4,400

Note: The fish catch represents the landed catches (excluding those for self-consumption) of the trawlers and Banca shown in Table 1-11. The Bancas are from the section stretching from Dagupan City to Aliminos City.

2) Inland Waters Fisheries

Inland waters fisheries, such as in fish ponds, are brisk in Pangasinan Province, and the catch is great.

(2) Present Situation of Landing Quay

Sual, which is selected for the construction of a fishing port, used to be prosperous as a good natural port for trading with China in the old days. At present, this port is the base for the operation of two trawlers and a large number of Banca. No fishing port facilities other than a pier, 176 m in length and 6 m in width, are available.

The small trawlers which are registered in Pangasinan Province and operating in the Lingayen waters are using Dagupan City as their base. Bancas are engaged in fishing operation with the beach as their base.

(3) Thought about Use of Fishing Port

Upon completion of the projected fishing port, the small trawlers which are registered in Pangasinan Province and operate in the Lingayen waters will be assembled. At the same time, the use of this fishing port by the Bancas in the city and its adjacent communities will be considered, should there be such request. By making full use of the various facilities of this fishing port, its utilization will be increased, the freshness of fish maintained, their prices raised and their landing increased. The city authorities strongly hope to develop a fishing port for the development of this area and the promotion of sea fisheries.

(4) Thought about Distribution of Catches

Upon completion of the projected fishing port, landed catches will be diverted to the town in the hinterland, Lingayen City, Dagupan City, Bagio City and other consumption centers, some of them being land-transported to Metropolitan Manila.

Part II

Zambonga Fishing Port Development and Improvement Project

PART II ZAMBOANGA FISHING PORT DEVELOPMENT AND MPROVEMENT PROJECT

Chapter 1 Basic Line of Development and Improvement

The Zamboanga fishing port development and improvement project will have to be implemented along the basic line stated in the following with due consideration of the present condition of marine products and their marketing in the Philippines and Zamboanga, situation of the landing site and the government policies and plans for promotion of the fishery industries discussed in PART I.

(1) The project should not remain merely in dissolving the shortage in the present facilities but be capable of coping satisfactorily with the prospected sharp increase of port demand in the near future. Consideration should also be made for the project to be also capable of coping with the great development prospected of the fishery thereafter.

(2) The Zamboanga fishing port will be so developed and improved that it will be able to exhibit its functions as a pivotal fishing port for development of the fishery in the south-western area of Mindanao.

(3) Reclamation of the land for fishing port facilities will be made economically in use of the dredged soil of the basin.

Chapter 2 Establishment of Project Targets

2-1 Project Target Year

For the basic facilities of breakwaters, mooring facilities, bulkhead and basins and functional facilities of road and land for fishing port facilities, the target year will be set at 2000 A.D.

For the other functional facilities such as fish market, sheds, ice plant and cold storage, water supply facility, fuel supply facility, fishing port administration facilities and fishing boats and engines repair shop, the target year will be set at 1990.

2-2 Planned Handling Amount and Fishing Boat Force

The planned handling amount of the catches and the fishing boat force in the respective target years will be as shown in Table 2-1.

Table 2-1 Planned handling amounts and fishing boat force

Target year	Planned Handling Amount of Catche	Number of Bagnetters
1990	32,400 tons	100 boats
2000 A D	62,900	194

Chapter 3 Selection of Project Site

The site selected by the Government of the Republic of the Philippines for the construction of a fishing port is situated in the fishing port area envisioned in the city development plan by the Zamboanga City and is of the location shown in Fig. 2-1.

As the result of examination at the site, the Study Team considers this point to be an adequate project site from the reasons set forth in the following, and thus the projected fishing port will be located here.

(1) It is a good natural port situated in the bay.

(2) There is a sufficient area available for construction of the fishing port.

(3) A road (paved with two lanes) runs to the center of the nearby city of Zamboanga in the hinterland.

(4) Under its urban development program, the city authorities have decided to divide the seacoast facing the downtown section into a commercial port area, a naval port area and a resort area. Other parts of the seacoast inside and near the city are either a marsh thickly wooded with mangroves or a coral reef, so that no places are more suitable for the construction of a fishing port than Sangali (Malasugat Bay).

(5) Fishing has been brisk in this area from the old days.

(6) For a change of the landing quay, agreement has already been reached between the city authorities and those engaged in fisheries.

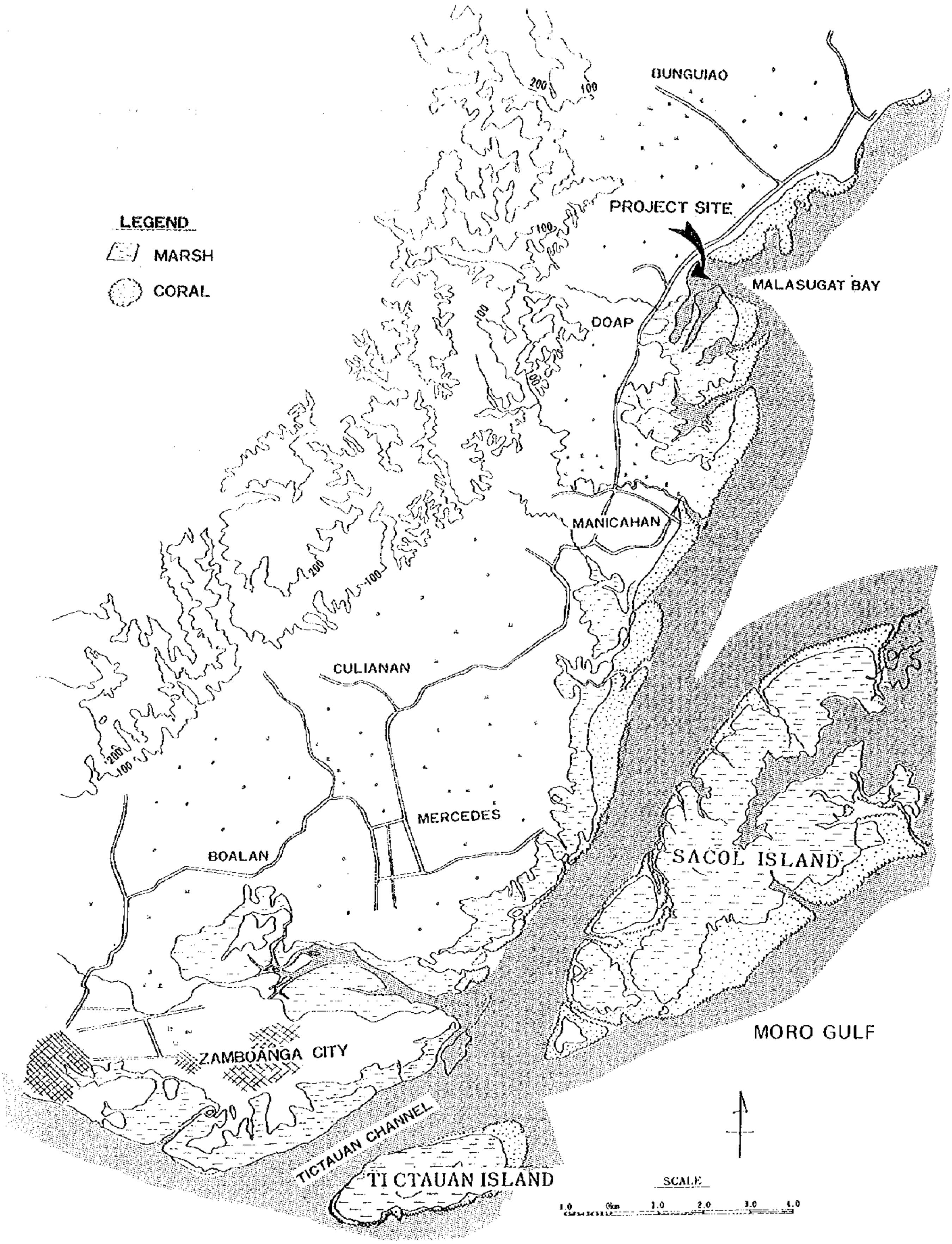


Fig. 2-1 Topographical Map of Zamboanga, Mindanao

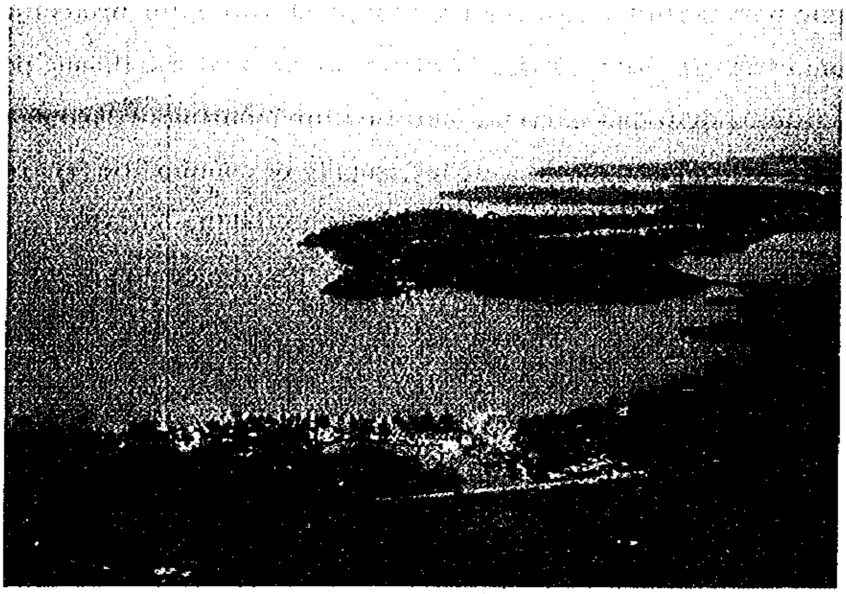


Photo 2-1 Seeing Zamboanga fishing port project site and Malasugat Bay

Photo 2-2 Seeing the hinterland condition and coastal line at the fishing port construction site.

Chapter 4 Plan of Basic Port Facilities

By the basic port facilities are referred to the facilities for protecting the fishing port from external forces having adverse effects upon the fishing port such as waves, littoral drift and current, facilities for mooring or landing the boats for the purpose of unloading the catches, supply of commodities or recess, and facilities for fulfilling the fundamental roles of the fishing port such as water surfaces allowing safe departure, return and anchorage or mooring of the fishing boats.

4-1. Project Facilities

Project facilities are as follows.

1. Mooring facilities
   (1) Landing quay (for bagnetters)
   (2) Stair landing facility (for small fishing boats)
   (3) Preparation quay (for bagnetters, but part of landing quay will be used both for preparation quay.)
2. Revetment (rock bulkhead, usable also for the mooring of bagnetters)
3. Basin
   (1) Basin for bagnetter

4-2. Plan of Mooring Facilities

4-2-1 Plan conditions for mooring facilities

Planning of the mooring facilities will be made with the following plan conditions taken into consideration.

(1) The landing quay for the bagnetters shall be of -3.0 m quay.

(2) The landing facility for small fishing boats shall be a -2.0 m stair landing facility.

(3) The bagnetters the landing of whose catches is completed will be moored along the south revetment (rock bulkhead) or being anchored in the north basin on the days when the sea is calm. They will be moored

or anchored in the north basin or in the water deep in the bay on the days when the sea is rough. The small fishing boats the landing of whose catches is completed will be moored at any place desired along the beach.

4-2-2 Required length of the mooring facility

The required length of the respective mooring facilities shall be as given below.

1. Required lengths of landing quay for trawlers and landing facility for bag-netters

The required lengths of mooring facilities are calculated as shown in Table 2-2.

Table 2-2 Required lengths of the landing quay for trawlers and the landing facility for Bagnetters.

King of Fishing Boat	Planned Number of Boats. A	Number of Sailing Days. B	Standard Number of Fishing Boats. C	Hours of use per Boat per Landing. D
Bagnetter	194 boats	1 day	155 boats	0.7 hrs.

King of Fishing Boat	Length of One Berth. E	Market Open Hours a Day. F	Quay Sufficiency Rate. G	Required Length of Quay $(\frac{C \cdot D}{F} \cdot E)\ G$
Bagnetter	26 m/berth	6 hrs.	80 %	$\doteqdot$ 380 m

Note: 1) Standard number of fishing boats:
The standard number of bagnetters using the facility a day shall be set at 80% of the planned number of bagnetters.

$194 \text{ boats} \times 0.8 \doteqdot 155 \text{ boats}$

2) Hours of use per boat per landing:
Calculation is

Hours of use per boat per landing operation

$$= \frac{\text{mean landing quantity per boat per operation}}{\text{Landing capacity}} + \text{Extra hours, or}$$

$$= \frac{3.5 \text{ tons}}{8.0 \text{ tons/hour}} + 0.25 \text{ hrs.} \doteqdot 0.7 \text{ hrs.}$$

3) Per berth length:
The bagnetters are of the type of Length, 23.2m; width, 22.0m; draft, 1.7m; and gross tonnage, 14 tons.
They are used as vertical mooring against the quay so that the length of one berth is

$22.0 \text{ m} \times 1.15 \doteqdot 26 \text{ m}$

2. Required length of the stair landing facility for small fishing boats

The facility is to be used as vertical mooring with the fishing boats, and its length of extension shall be 200 m.

4-3. Plan of Other Port Facilities

1. Revetment (Rock Bulkhead)

A 720 m rock bulkhead will be constructed and used also by bagnetters mooring.

2. Basin

The basin for bagnetter will be dredged to a depth of -3.0 m.

4-4. Layout and Utilization Plan

As this fishing port is located on a sand beach, an attempt will be made to work for an economical development of the site for the fishing port, while making use of the sand dredged from the basin. So the pier type of port terminal will be planned for the port development.

Layout of the facilities specified in Sections 4-2 through 4-3 and the plan for the fishing boats to use them are as shown in Fig. 2-2. A detailed layout plan including the land functional facilities is illustrated in Fig. 2-5.

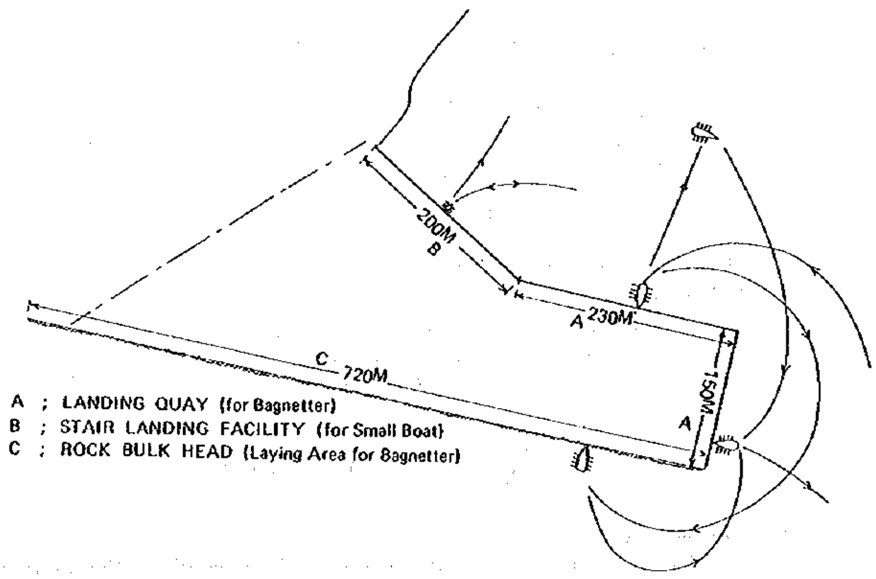


Fig. 2-2 Zamboanga Fishing Port Basic Facilities Layout and Utilization Diagram.

Chapter 5 Plan of Functional Facilities

The functional facilities are referred to the facilities complementing the basic facilities and, at the same time, serving for reasonable execution of the works and services to be performed at the fishing port and thus enhancing the usefulness of the fishing port, and where the fish market and the ice plant and cold storage are constructed in the fishing port area, they are classified as one of the fishing port facilities.

5-1 Planned Facilities

Planned facilities include (1) fish market, (2) ice plant and cold storage, (3) water supply facilities, (4) fuel supply facilities, (5) road, (6) parking area, (7) administration office, (8) fence and guardhouse, (9) power distribution and illumination facilities, (10) drainage system, (11) public toilet, (12) land for fishing port facilities.

5-2 Plan Conditions and Required Quantities of Functional Facilities

5-2-1 Plan conditions of functional facilities

Planning of the functional facilities will be made with the following plan conditions taken into consideration.

(1) As regard the water supply facility, a water tank connected with a water reservoir shall be installed, and pipes shall be laid down to necessary places for water supply.

(2) For fuel supply, fuel tank and fuel supply taps are installed, and the supply to the fuel tanks shall be made by tank lorries from the Zamboanga city.

(3) From the management requirement, there shall be constructed only one road which leads to the outside of the fishing port area.

(4) At the boundary between the land for fishing port facilities and the privately owned land, a fence shall be provided. At the boundary of the road leading to the outside, a gate and a guardhouse shall be installed.

(5) As the land for fishing port facilities, sites for the various functional facilities shall be created. In the case of this fishing port, however, no fish

industry shall be established.

5-2-2 Required sizes of functional facilities

1. Required sizes of main functional facilities (scale and capacity)

(1) Fish market

1) Standard amount of handling per day

Planned number of fishing boats is ..... 100 boats (A)

Standard number of landing fishing boats per day (B);

$(A) \times 80\% = 80$ boats/day

Standard landing quantity per day (C);

$(B) \times 3.5$ tons/boat = 280 tons/day

Processing capacity per m^2 of fish market (D);

100 kg/m^2

2) Required floor area of fish market

$(C) \div (D) = 280$ tons/day $\div$ 100 kg/m2 = 2,800 m^2

3) Scale of fish market

Steel-framed, aluminium sheets roofing building of 20m x 140x (2,800 m^2)

(2) Ice plant and cold storage

1) Ice plant

Standard landing quantity per day (C); ..... 280 tons/day

Use of ice at the fish market a day is 1/2 of the landed amount of catches.

Ice making capacity

$(C) \times 1/2 = 280$ tons/day $\times 1/2 = 140$ tons/day

2) Ice storage

Storage amount of ice is equivalent to one day's production of ice or 140 tons (at -5°C)

3) Cold storage

Freezing amount a day; 5 tons/day

Cold storage amount; 50 tons (at -25°C)

(3) Water supply facility

Table 2-3 Water supply calculation table

Classification	Water Supply per Day	Water Supply per Hour
Supply to Fishing Boats		
Bagnetter	0.36 tons/boat × 80 boats = 28.8 tons	28.8 tons ÷ 6 hrs. = 4.8 tons
Ice Plant and Cold Storage	140 tons	140 tons ÷ 24 hrs. = 5.8 tons
Other use	6 tons	6 tons ÷ 12 hrs. = 0.5 tons
Total	174.8 tons/day	11.1 tons/hrs.

A water pipeline (zincified steel pipe 27 cm in diameter) shall be laid down to a water reservoir 25 km away to conduct water. On the compounds of the fishing port, a pressure-type water tank shall be installed to supply water to necessary places.

(4) Fuel supply facility

1) Fuel supply

Number of objective fishing boats of fuel supply (B)

Bagnetters ..... 80 boats

Fuel supply per boat per time (F); 0,205 kℓ/boat

Fuel supply per day (G);

(G) = (B) × (F) = 80 boats × 0.205 kℓ/boats= 16.4 kℓ/day

2) Fuel tank capacity

The oil storage shall be set at two days' supply

16.4 kℓ/day × 2 days ÷ 33 kℓ

For storage of fuel, a 40 kℓ tank shall be installed in the compound of the fuel tank, and the fuel shall be supplied to the fuel supply taps on the quays through piping.

Note: The fuel supply amount per boat per time is calculated as given below.

Classification	Bagnetter
Fishing boat horse power (A)	180 HP
Main fuel consumption/hr/HP (B)	0.19 kg/hr/HP
Average running hours/navigation/boat (C)	6 hrs.
Main fuel supply/time/boat (A)×(B)×(C)	0.205 kℓ/boat

2. Scales of the other functional facilities

(1) Roads

The road going out of the complex of the fishing port shall be set at 15 m in width, and the roads running within the complex shall be set at 10 m. Both types of roads shall be paved by asphalt and furnished with gutters and drainages.

(2) Parking area

A parking space (asphalt paved with gutters) shall be provided in the back of the fish market.

(3) Administration office

A reinforced concrete two-storied building with a total floor area of 800 m^2 shall be constructed.

(4) Fence and guardhouse

A fence 400 m in length, a gate and a guardhouse with a floor area of 50 m^2 shall be constructed.

(5) Power distribution and illumination facilities

The existing substation situated about 10 km away from the fishing port and the fishing port project site shall be connected by power distribution lines. A transformer should be installed on the complex to supply electricity to necessary places. Illumination light should be installed where they are required.

(6) Public toilets

A public toilet with a floor area of 100 m^2 shall be constructed.

(7) Land for fishing port facilities

About 11.2 hectares of land shall be developed for the aforementioned functional facilities and also for fishing processing area and net and gear area.

5-3 Layout Plan

Layout or arrangement of the facilities specified in Section 5-2 is as shown in Figs. 2-3 and 2-4. A detailed layout plan including the basic facilities is illustrated in Fig. 2-5.

ZAMBOANGA FISHING PORT

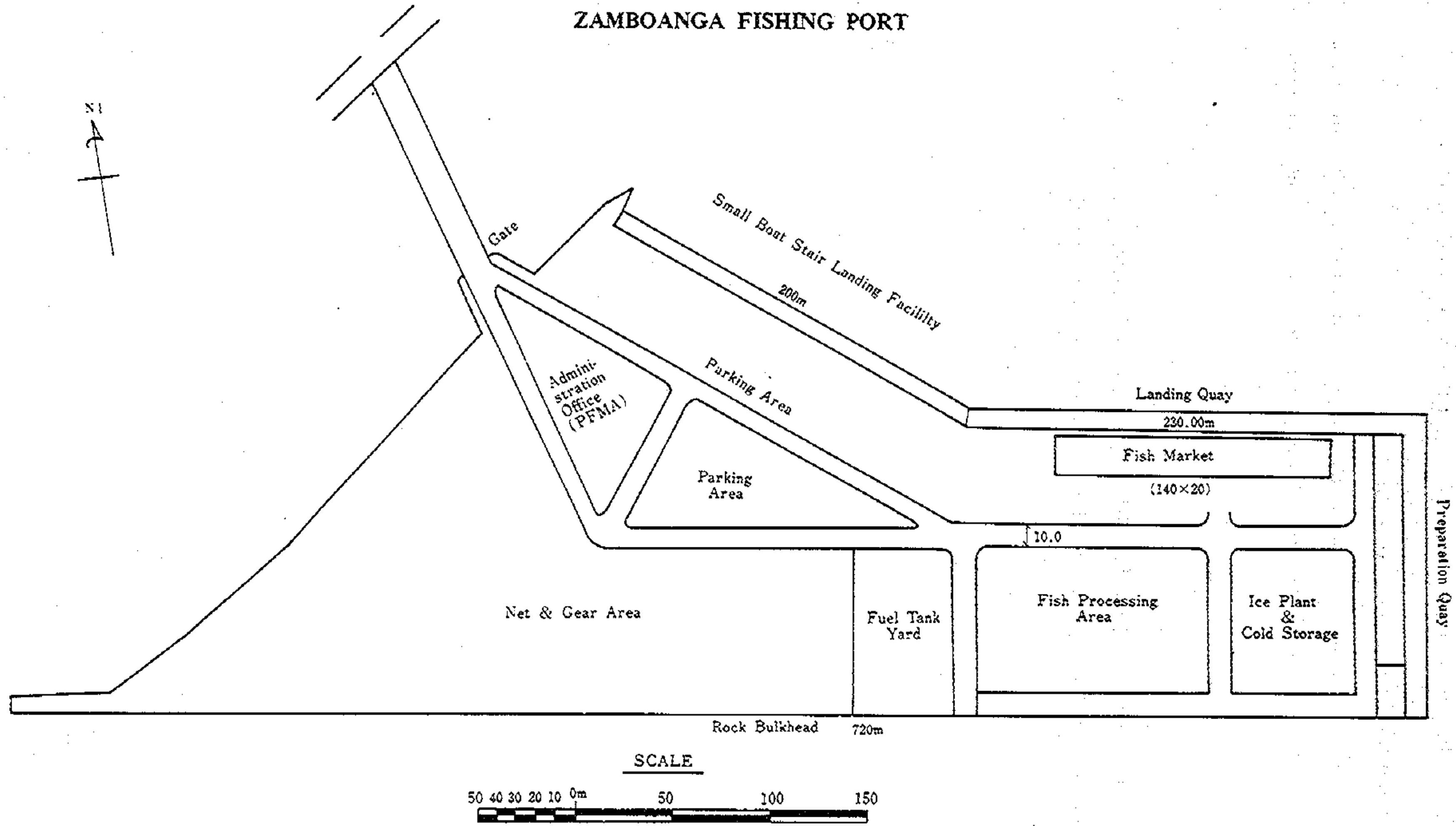


Fig. 2-3 Arrangement of Functional Facilities, Zamboanga Fishing Port

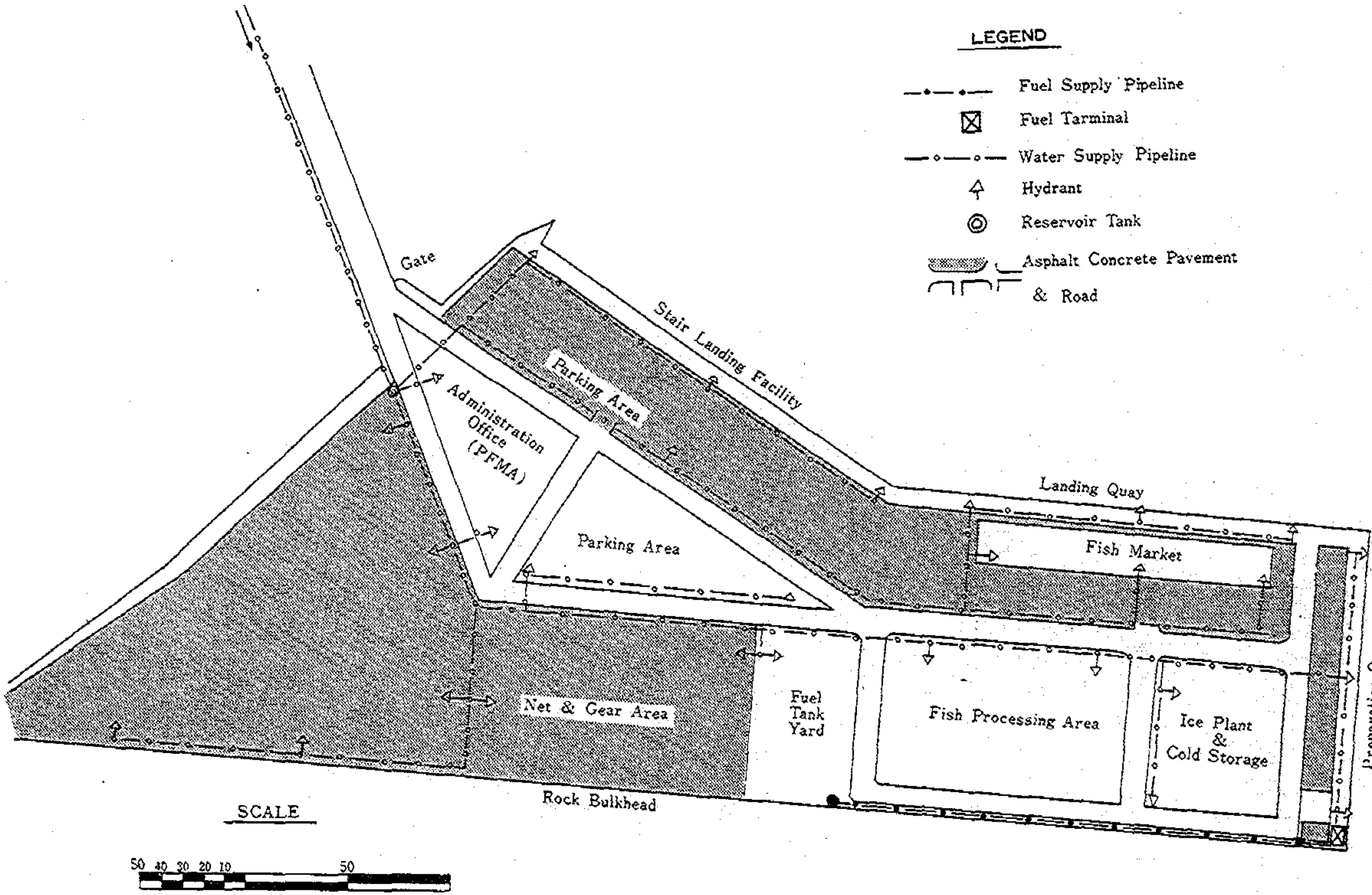


Fig. 2-4 Water & Fuel Supply System, Zamboanga Fishing Port

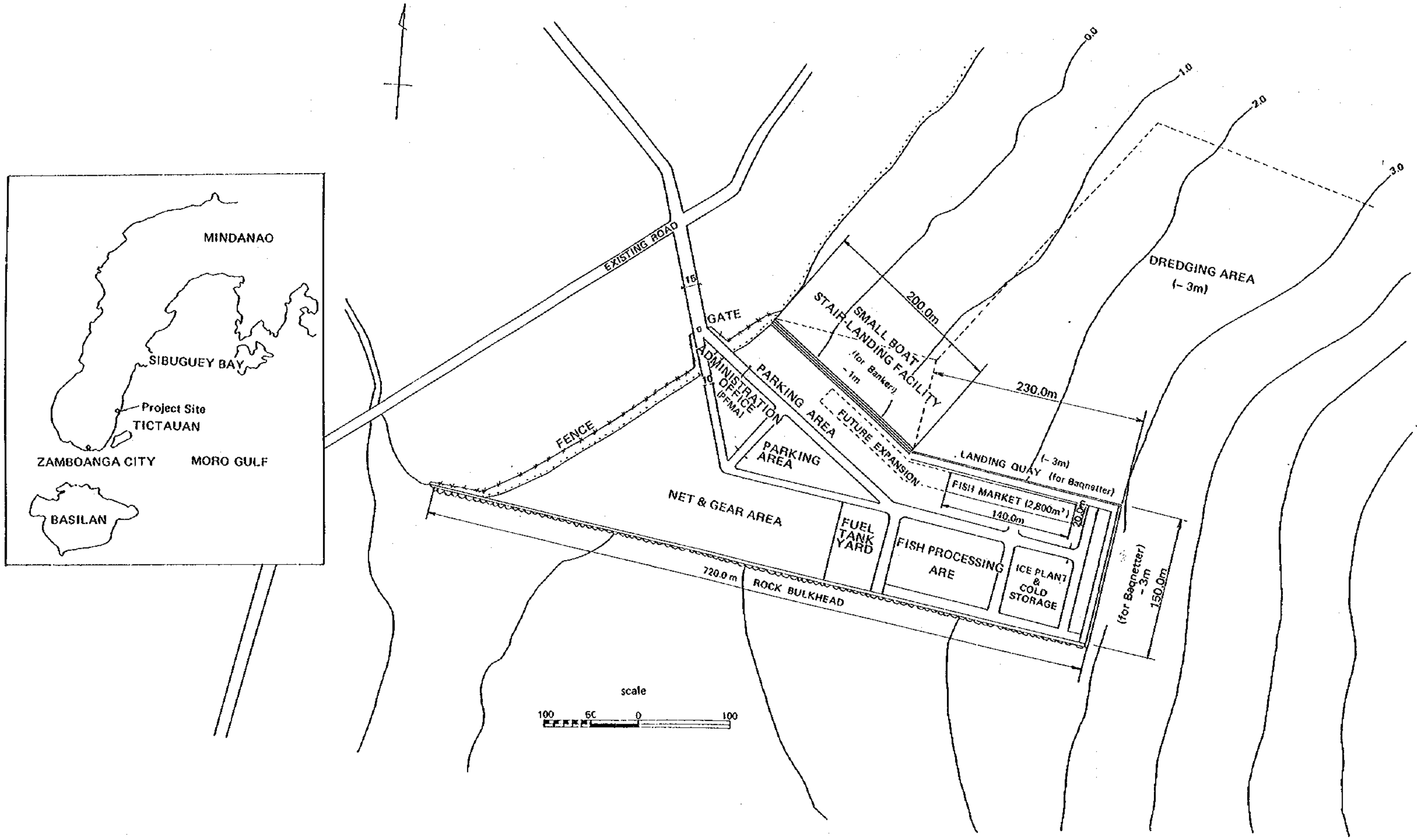


Fig. 2-5 Master Plan of Zamboanga Fishing Port

Chapter 6 Structural Design of Principal Facilities

6-1 Design Conditions

Design conditions used for design of quays and other principal facilities are summarized in the following.

(1) Design seismic intensity (Kh)

$$Kh = z.k.c.$$

where
z: Regional seismic intensity (or z = 1.2) according to the "Seismic Data in the Philippines" shown in Fig. 5-6;
k: Structural importance coefficient (or k = 1.0); and
c: Seismic coefficient (or c = 0.1).

Then, $Kh = 1.2 \times 1.0 \times 0.1 = 0.12$ or nearly 0.1.

(2) Soil conditions

No soil survey was conducted at the site of construction so that with the recent soil survey data at near the construction point taken as a reference, the soil condition was estimated as shown in the subsoil condition columnar diagram of Fig. 2-7.

(3) Objective fishing boat

The objective fishing boats consist of bagnetter. The specification of this boat type are given below:

Length:	23.2 m	Breadth :	22.0 m
Draft:	1.7 m	Gross tonnage :	14.0 tons

(4) Tide condition

In the absence of the records of observation at the site, the design tide levels are determined as shown below from the "Tide and Current Table, Philippines" (published by the Bureau of Coast & Geodetic Survey) and the charts.

H.H.W.L.	+0.850 m
H.W.L.	+0.780 m
	(0.631 + 0.15 = 0.781)
L.W.L.	+0.030 m (0.034)

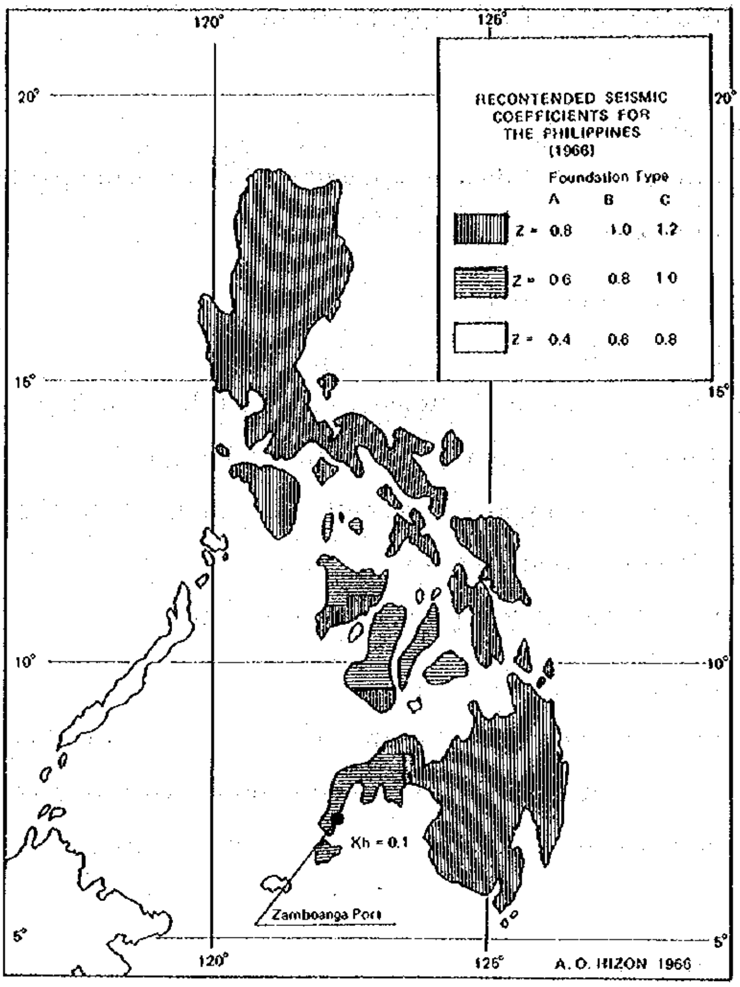


Fig. 2-6 Seimic Condition of the Philippines

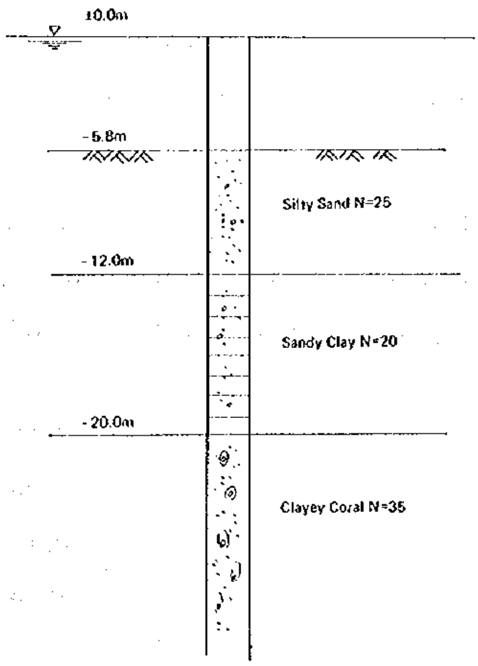


Fig. 2-7 Estimated Sub Soil Condition of Zamboanga Port

The tide level information described on the charts is:

H.W. (spring tide)	3.1 ft (0.945 m)
H.W. (neap tide)	1.7 ft (0.518 m)
L.W. (spring tide)	0.1 ft (0.030 m)
L.W. (neap tide)	0.6 ft (0.183 m)
High tide level at spring equinox (average)	4.9 ft (1.341 m)
Low tide level at spring equinox (average)	-1.3 ft (-0.40 m)

(5) Design wave height

In the absence of the records of observation of waves at the fishing port construction site, the design wave heights are estimated from the records of strong winds and condition of no wave on the basis of the shape of Malasgat Bay, position of the port entrance and its direction, the design wave height is estimated at Hmax ≒ 0.5 m just in case of the worst eventuality. And this wave height will be used for designing of main port facilities.

(6) Other design conditions

The other conditions considered for design are as follows.

1) Crown heights;

Quay and landing place	DL +2.5 m
Revetment and breakwater	DL +3.0 m
Reclaimed land	DL +2.5 m

2) Design water depth;

Maximum draft of objective fishing boat (A)	1.7 m
Allowance (for a reef presumed to be present on part of the bottom) (B)	1.3 m
Design water depth (A) + (B)	-3.0 m

3) Surcharge load;

Quay	1.0 ton/m^2
Landing place and bulkhead	0.5 ton/m^2

4) Internal frictional angle of backing cobble $\phi = 30^{\circ}$

5) Property of bearing ground

Sandy Silt $C = 3$ tons/m^2

$\phi = 35^{\circ}$

6-2 Selection of Structures of Main Facilities

6-2-1 Points noted in selection

In selection of the structures of the principal basic facilities, the following points are to be noted.

(1) Since it is required to complete the work in a short period and start the use as soon as practicable, such a structure should be chosen which is simple, of good workability and stabilized in a short time.

(2) The land for fishing port facilities shall be created entirely by reclamation with spoil so that it is required to construct sub-bulkheads in the water. These rock bulkhead will be used for fundation of quay wall and revetments to make economically.

(3) The structure shall be so chosen as to permit as much use of the construction machines presently available in the Philippines as practicable while use of special machines is avoided.

(4) The structure shall be so chosen as to permit as much use as practicable of the materials available at the site.

(5) The quays shall be of sheet pile structure, and from the workability, reliability and durability, steel sheet piles are to be used.

6-2-2 Structural elements of principal basic structures

Structural elements of the principal basic structures are as given below.

(1) -3m Quay steel sheet pile structure (See Fig. 2-8)

Body	Steel sheet piles (U-III type) ; ℓ = 11.0 m;
	Embedment, -9.0 m.
Tie rod	Tie rod (III ϕ30m/m).

Apron　　　　　Effective width, 10.0 m; Concrete pavement, with 20cm thick.

(2)　-1m Stair landing facility - Concrete structure (See Fig. 2-9)

Body　　　　　Concrete stair work

Foot protection　　　Precast concrete blocks

(3)　Revetment (Rock bulkhead) (See Figs. 2.10 and 2.11)

A concrete coping will be constructed on the basis of the rubble mound which will be used as a temporary bulkhead for reclamation work. Behind the coping, a berme will be constructed. Incidentally, mooring posts will also be constructed for the small fishing boats.

(4)　Others

The standard cross section of the concrete sheet pile quay used in the comparative design is shown in Fig. 2-12 for reference purposes.

The unit construction costs which are calculated at comparative designing are listed as follows;

-3m Steel sheet pile structure type of quay .....　　　　4,307 US$/m

-3m Reinforced concrete sheet pile structure type of quay ...

4,761 US$/m

This unit costs are calculated at the completion of quay.

The -3m quay of Zamboanga port is designed by using steel sheet pile structure for the reasons of its economy, workability, reliability, and durability against reinforced concrete sheet pile structure.

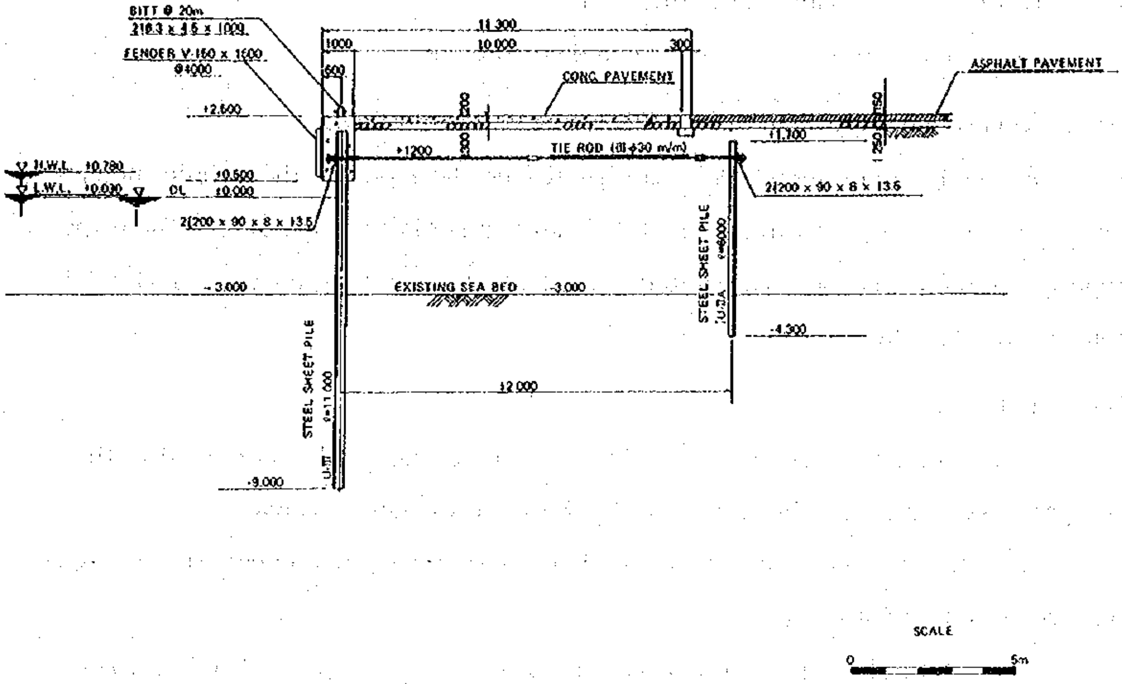


Fig. 2-8 Cross Section of Landing Quay – Zamboanga Port

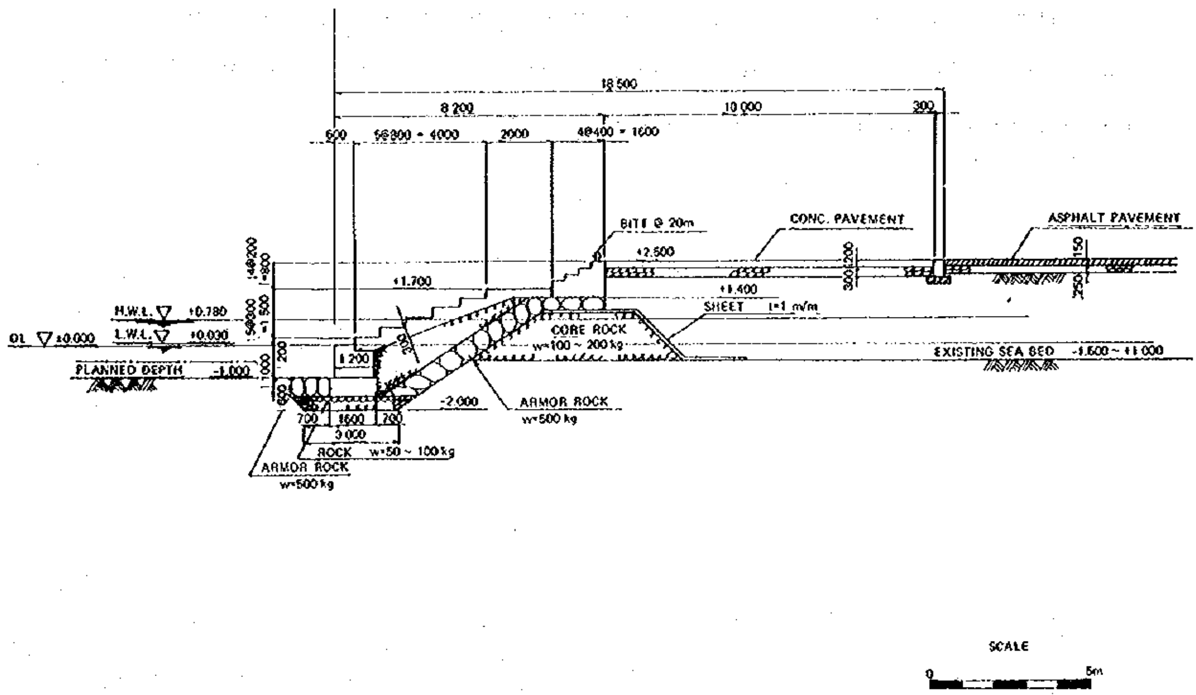


Fig. 2-9 Cross Section of Stair Landing – Zamboanga Port

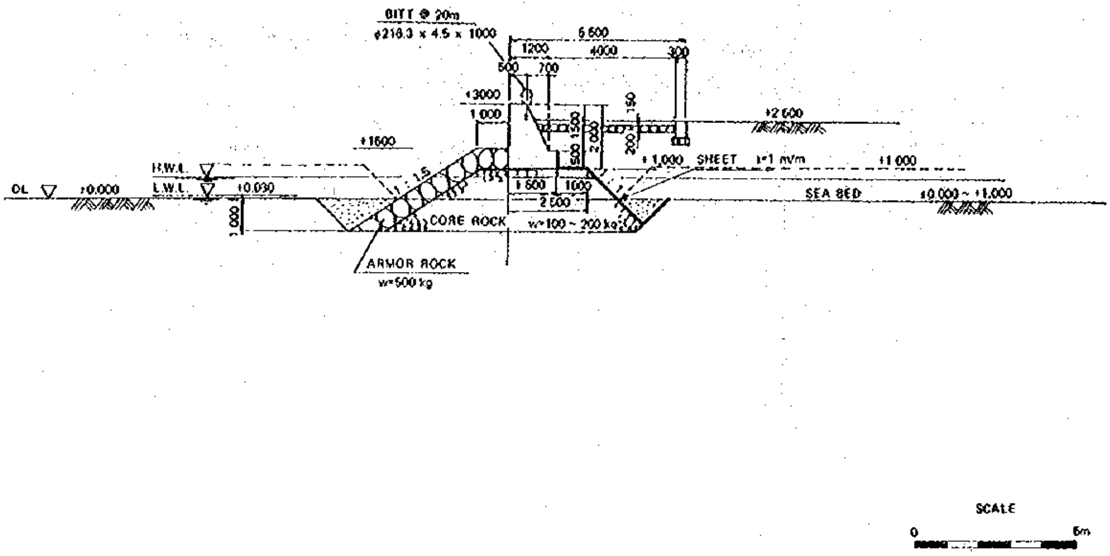


Fig. 2-10 Cross Section of Rock Bulkhead (1) – Zamboanga Port

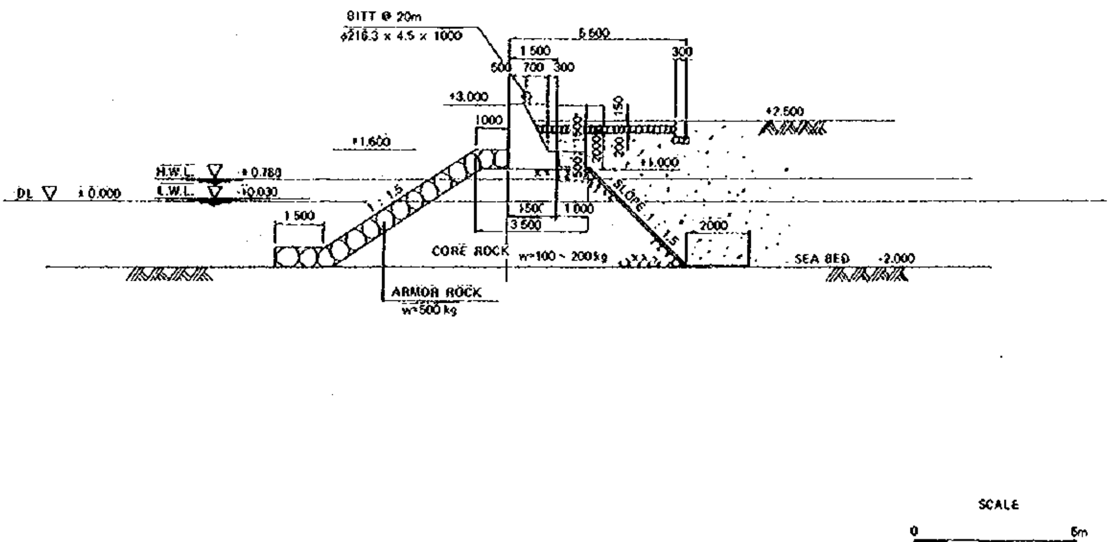


Fig. 2-11 Cross Section of Rock Bulkhead (2) – Zamboanga Port

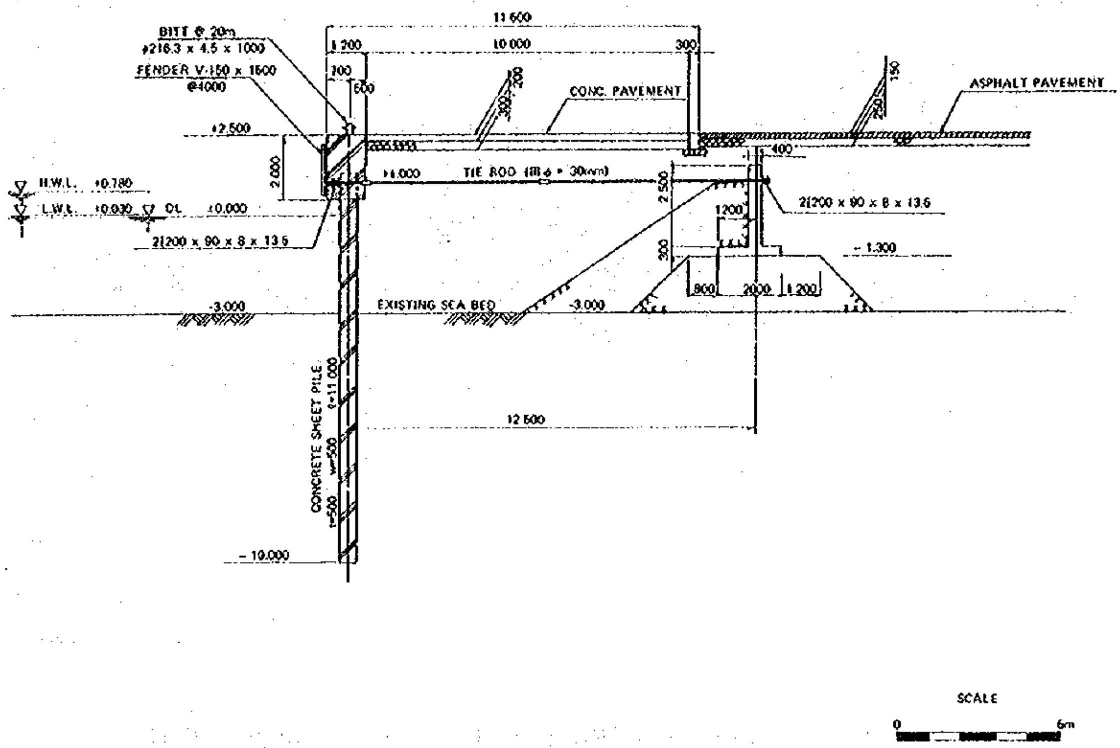


Fig. 2-12 Cross Section of Landing Quay – Zamboanga Port (using for comparative designing)

Chapter 7 Construction Program

7-1 Work Program

The construction plan should be made with consideration given to the work schedule so that the work period being two years, the respective works are started as soon as practicable and that from the urgency of use of the facilities and the viewpoint of effective utilization of them, not only the basic facilities but the functional facilities can be placed in use soon.

Further, in implementing the construction program, consideration should be made so that the demand for facilities at the respective target years would be met satisfactorily.

Moreover, at the construction site, the catch landing and other works are actively carried out presently. Thus, it is required to give consideration to these activities so that they are as scarcely hampered as possible.

7-1-2 Securing workers for construction and procurement of materials and machines

(1) Securing the construction workers

Unskilled workers who are to be engaged in the construction work may be relatively easily secured not only in Zamboanga but also in the periphery of the construction site. In the periphery of the construction site, however, much cannot be expected of the securing of unskilled workers in the busy fishing season, when most of them are engaged in fisheries.

It is also possible to secure skilled workers in general types of construction work, such as concrete workers. However, it is difficult to secure skilled workers in port and harbor construction work, and there arises need for the employment of skilled workers from other areas.

(2) Procurement of construction materials

The procurement of main construction materials will be made as follows:

1) Core, backfill and foundation cobble

Various cobble and grabbel are available in abundance on the hill situated about 1.5 km inland from the construction site as natural rubble stones and their use is possible. The stones of the beach area are mixed with coral and bad in quality, so that they cannot be put to use.

2) Sand and gravel for concrete

Neighboring dune sand may be put to use. The supply of gravel will be feasible by crushing stones.

3) Backfill soil and replacement sand

The backfill soil is securable with ease in that a large amount of spoil produced upon dredging of the basin is used.

4) Cement

Indigenous cement is used since its supply is stable and it has no problem in quality as well as quantity.

5) Steel materials

Steel sheet piles, tie rods, iron bars and other steel materials will be imported, because there is need for a stable supply and a uniform quality.

6) Forms and supports

Wooden forms, supports and other temporary materials are all procurable domestically. Steel forms and steel supports are partly procurable domestically, but there is a problem in the supply capacity. Thus, their use will be limited to the important structures, and their supply will be dependent on the import.

7) Other special materials

Cables, electrical wires, electrical equipment, plants and machines will be dependent on the import.

(3) Procurement of construction machines

The following construction machines are obtainable in Manila City and its peripheral area so that they will be procured domestically:

1) Pump dredger,
2) Pontoons and pontoons for crawler,
3) Dump trucks,
4) Batcher plant, and
5) Crushing plant.

The following machines will be imported:

1) Crawler crane,

7-1-3 Facilities required for construction

(1) Temporary road for construction

There is need to construct a temporary road for construction suited to the face line of the access road.

(2) Temporary channel for construction

The seashore at the site of construction being shoaling, it is considered to be advantageous to construct, prior to other works, a temporary channel for introduction of dredgers and working vessels for quay wall construction.

(3) Temporary construction office, etc.

Simultaneously with the start of the construction, it will be necessary to construct an office for the officials in charge of the construction, a warehouse, a materials yard, a machinery yard and others. As the construction site is located far from the center of Zamboanga City, there is need to prepare workers' billets.

(4) Water, electric power, telephone and other facilities

There is need to prepare at least the water, electric and telephone facilities before the start of the construction work. Water may be supplied from the mountain situated behind the construction site, whereas the Government is encouraged to take appropriate measures in regard to electric power and telephone service.

7-2 Project Schedule

The project schedule is illustrated in Table 2-4.

7-3 Estimation of Construction Cost

7-3-1 Concept for cost estimation

Estimation of the construction cost is made according to the following concept.

Table 2-4 Project schedule – Zamboanga fishing port

Completion Time 24 month

Item	Q'ty		Number of Months (6, 12, 18, 24, 30)
Mobilization	LS	1	
Port Work Landing Quay	m	380	
Stair Landing Facility	m	200	
Rock Bulkhead	m	720	
Dredging & Reclamation	m^3	380,000	
Functional Facilities			
Building Work	LS	1	
Road & Pavement	LS	1	
Miscellaneouse Work	LS	1	

(1) Estimation of the construction cost is made on the 1978 prices.

(2) Unit prices of the construction materials and those of laboures used in the estimation are determined with the Standard Material Unit Prices and Standard Labour Wages (1977) of the Government of the Republic of the Philippines taken as the base and the material unit prices and labour wages obtainable upon survey at the fishing port project site taken as a reference.

(3) For the imported materials, the unit prices are obtained at the prices of CIF plus domestic transportation cost in 1978.

(4) Exchange rate of the local currency to the foreign currency is:

US$ 1.0 = 7.22 ₱ = ¥ 220.

(5) With no soil survey conducted at the construction site, a soil investigation will have to be conducted newly, and depending on the result of such soil investigation, the design conditions may change, involving a possibility of the design being modified more or less for the main structures. Thus, a contingency is estimated at a rate of 15% as physical contingency.

7-3-2 Estimation of construction cost

The construction cost required for development and improvement of the Zamboanga fishing port is set forth in Table 2-5.

Table 2-5 Construction cost of Zamboanga fishing port

	Unit	Quanty	Unit Price (US$)			Total (US$)		
			Local	Foreign	Amount	Local	Foreign	Amount
(Preparatory Work)						(158,630)	0	(158,630)
Site Clearance	m^2	81,000	0.23	0	0.23	18,630	0	18,630
Temporary Jetty	L.S	1				140,000	0	140,000
(Mobilization)	L.S	1				(131,000)	(180,000)	(311,000)
(Port Work)						(931,180)	(2,555,720)	(3,486,900)
Landing & Preparation Quay	m	380	431	3,876	4,307	163,780	1,472,880	1,636,660
Stair Landing Facility	m	200	1,133	890	2,023	226,600	178,000	404,600
Rock Bulkhead	m	720	540	407	947	388,800	293,040	681,840
Dredging & Reclamation	m^3	380,000	0.40	1.61	2.01	152,000	611,800	763,800
(Functional Facilities)						(4,218,990)	(1,745,733)	(5,964,723)
Fish Market	m^2	2,800	117.43	92.58	210.01	328,804	259,224	588,028
Administration Office	m^2	800	652.36	0	652.36	521,888	0	521,888
Public Toilet	m^2	100	652.36	0	652.36	65,236	0	65,236
Roads & Pavements	m^2	78,518	29.09	0	29.09	2,284,089	0	2,284,089
Electrical	L.S	1				156,600	486,100	642,700
Drainage	m	3,710	49.51	0	49.51	183,682	0	183,682
Water System	L.S	1				287,200	91,600	378,800
Fuel System	L.S	1				24,900	117,900	142,800
Fence & Gate	L.S	1				17,500	0	17,500
Ice Plant & Cold Storage	L.S	1				349,091	790,909	1,140,000
Sub Total						5,439,800	4,481,453	9,921,253
Tax & Duties	L.S	1				679,747	0	679,747
Contingency	%	15				917,932	672,218	1,590,150
Total						7,037,484	5,153,671	12,191,155

Chapter 8 Economic Analysis

8-1 Economic Background of Zamboanga Fishing Port

The site for the construction of the Zamboanga Fishing Port is situated 28 km northeast of Zamboanga City, the central city of Zamboanga del Sur Province. This port will be used only by bagnetters, and many of the fish species caught by these ships are relatively cheap in price. The fishermen directly tied in with this fishing port are concentrated in the communities adjacent to the construction site, and their communities are well arranged as fishing villages. Thus, the Zamboanga Fishing Port may be described as the one which will protect and bring up the local petty fisheries and satisfy, even if not to the full extent, the local demand.

In this analysis to be made from the viewpoint of the national economy, serious note will be taken of the aforementioned characteristics and an attempt will be made to analyze the form in which the intention of the Government of the Philippines to replenish the domestic fish demand may be realized by the development of a fishing port and the degree to which the effects of the development may be brought about from the economic point of view.

In general terms, the benefits of a fishing port consist of the following factors:

(1) Reduction of the time required for the fishing boats to come in and go out of the port through relief from congestion in the port;

(2) Increasing catches with increasing expedition of the fishing boats;

(3) Improvement in the freshness of fishes through increasing supply of ice and technical inovation;

(4) Realization of powered and larger fishing boats upon completion of a modern and larger scale fishing port (modernization of the fishery by functional accumulation);

(5) Increasing income of fishermen due to elevation of the average fish prices;

(6) Improvement in the rate of self-sufficiency of proteins;

(7) Stabilization of the fish prices from stable supply of fishes;

(8) Creation of employment opportunities and urbanization effect; and

(9) Acquisition of new techniques, and acceleration of the fishermen association.

The analysis will be made mainly with respect to the benefits (2) and (3) which permit quantifying among the benefits listed above.

8-2 Demand and Supply of Fish in Zamboanga del Sur Province

8-2-1 Market territory, and recent outputs and demands for fishes

The biggest market of the Zamboanga fishing port is Zamboanga city. And, here, the discussion will be made with the market territory of the Zamboanga fishing port restricted to the Zamboanga del Sur Province.

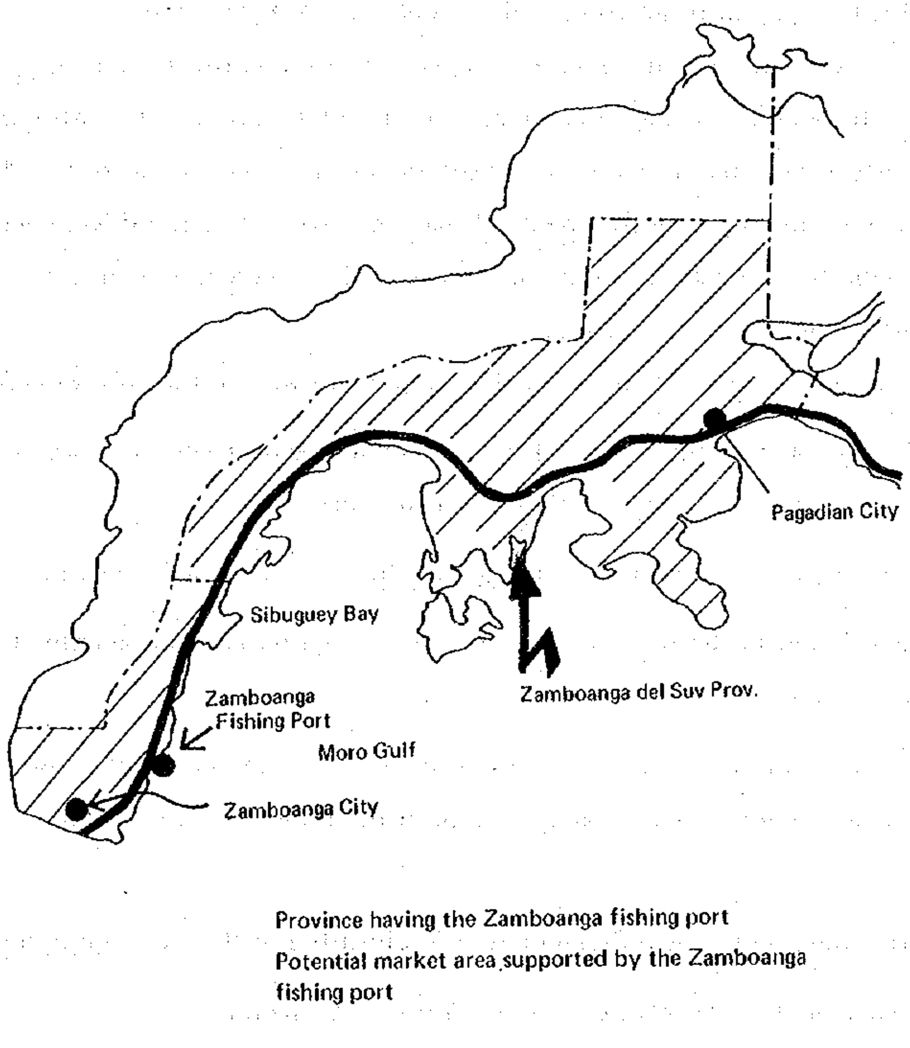


Fig. 2-13 Objective market territory of Zamboanga fishing port

The output and demand of fishes in Zamboanga del Sur Province in 1977 are shown in Table 2-6.

Exports will be diverted to Japan, the United States, and Hong Kong. In the Philippines, the fishes produced in the prov. will be diverted not only within the prov. but also to Metropolitan Manila, Cebu Island and the cities of Davao, Cotabato and Pagadian. Of the output of marine fisheries, about 56% come from municipal fishing and the remaining 44% from commercial fishing.

Table 2-6 Details of fish supply and demand (1977).

tons

Supply and Demand / Kinds	Annual output	Demand in the province	Net Domestic & foreign exports
Marine Fisheries	158,400		
Inland Fisheries	9,800		
Total	(100.0) 168,200	(17.2) 29,000	(82.8) 139,200

Note: 1) The demand in the province was estimated, with the 1977 population of 1,025,000 used, according to the following formula

$$D'_n = C_0 (1 + y \cdot e)^n \cdot P_n$$

where D'_n : Effective demand in the n-th year with 1975 taken as a base year;

C_0 : Basic consumption in the reference year (27.0 kg);

y : Real per capita income growth rate (6%);

e : Income elasticity of demand for fish (0.4); and

P_n : Population of the n-th yaar (with 1975 as the base year).

2) Data: 1 "Five Year Western Mindanao Development Plan 1978–82" NEDA

2 Other information from the Zamboanga del Sun Regional Gov.

8-2-2 Analytical conditions

The analytical conditions are considered as follows.

(1) The output of the municipal marine fisheries will continue to maintain the present level.

(2) The inland fisheries will have no increase in the output but continue to maintain the present level.

(3) The rates of the net export and domestic shipment which have shares in the total output will be retained as they are, and a rise in the demand outside the Province will be proportionate to a rise in the output.

8-2-3 Analysis of the change in the balance of demand and supply

Under the foregoing present situation and analytical conditions, analysis of the balance of demand and supply in the future (for the two cases, with and without the fishing port) is made according to the following procedures.

(1) Forecast of population

Populations in the future are forecasted, upon the pattern of change of the population in 1960 - 1975, as shown in Table 2-7 and Fig. 2-14.

Table 2-7 Traditional change and forecasted values of population in Zamboanga del Sur Prov.

Unit: 1000 persons

area \ Year	1960	1970	1975	1981	1990	2000
Zamboanga City	131	200	262	360	525	720
Other area	455	690	735	740	705	620
Total	586	890	997	1,100	1,230	1,340

Data: "Socio Economic Profile, Zamboanga City" 1975, City of Zamboanga
"Philippine Statistical Year Book" 1977, NEDA

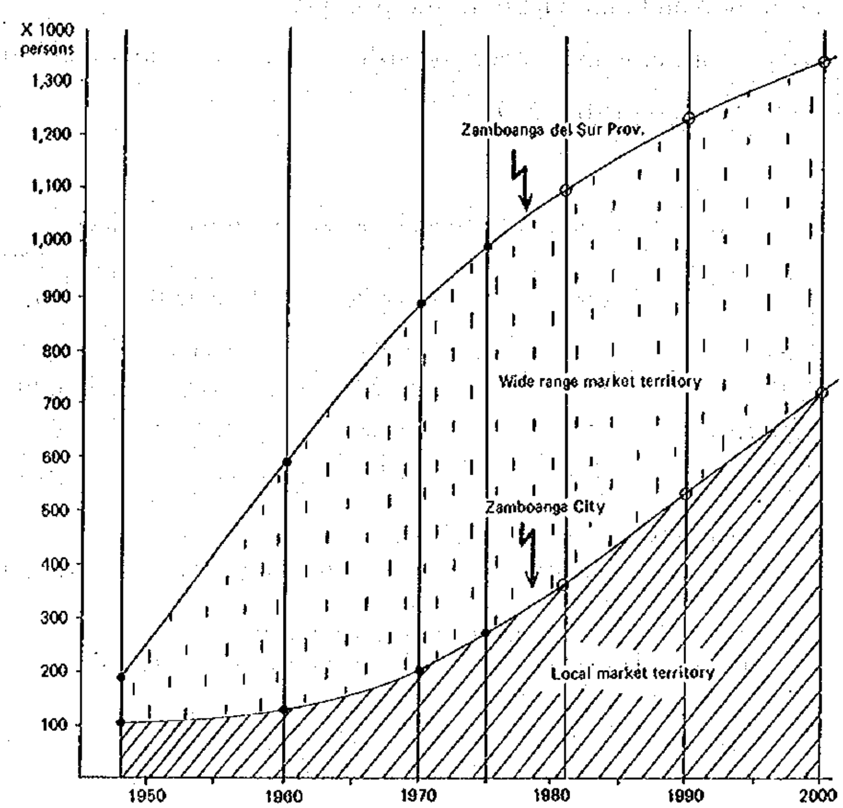


Fig. 2-14 Population change and forecast

(2) Forecast of demand for fishes in the province

Demand forecasts of the objective market territory (Zamboanga del Sur Province) are, if the forecast is made for the local market territory (Zamboanga City) and for the wide range market territory (whole area of Zamboanga del Sur Province except Zamboanga City), as shown in Table 2- 8.

Table 2-8 Demand forecast of fisheries in Zamboanga del Sur Prov.

tons

Year \ Market territory	Local market territory	Wide range market territory	Objective market territory
1975	7,074	19,845	26,919
1981	11,207	23,037	34,244
1990	20,228	27,163	47,391
2000	35,167	30,283	65,450

Note: The demand forecasting method is the same to that for Table 2-6

(3) Balance of demand and supply in the province

The balance of demand and supply with a fishing port and that without a fishing port are shown in Table 2-9.

Table 2-9 Balance of demand and supply in the province.

tons

Project	Year	Supply(S)	Demand(D)	S/D
With Port	1990	26,100	47,400	0.55
	2000	32,200	65,600	0.49
Without Port	1990	22,200	47,400	0.47
	2000	22,300	65,500	0.34

Note 1. Supply (S): $S = (Y_0 + Y_1) - E$

Y_0: Output (commercial fisheries) at fishing port (with or without fishing port).

Y_1: Output of municipal and inland fisheries.

E : Flow out of the province (net domestic and foreign exports) – In the case of this port, E = 0.

2. Demand (D): Provincial demand specified in paragraph (2).

The findings of this analysis indicates that the self sufficiency rate stands at less than 60% even if a fishing port is available. However, as a fairly large portion of the output which is to be set aside for domestic shipment and export will presumably be produced by large fishing vessels other than bagnetters (fishing boats in Zamboanga fishing port), the self-sufficiency rate will reach 70-90% (when a fishing port is available in 1990).

8-3 Economic Evaluation

8-3-1 Concept of analysis

The analysis will be made along the following lines.

(1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

(2) For the costs, the construction, personnel, maintenance and facility renewal costs will be taken up.

(3) For the benefits, analysis will be made of the direct benetis, more specifically, (1) increase in the output of fish catches and (2) improvement in the freshness of fishes due to increased supply of ice and technological improvements.

(4) Project life - 20 years after start of operation of the fishing port (1981).

(5) Prices - Prices in 1978.

(6) Discount rate - 15%.

(7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

8-3-2 Costs

(1) Construction cost

In the construction cost, consultant fee is included. Details of the construction cost by year and by foreign and domestic currencies are shown in Table 2-10. The consultant fee is divided into that for construction and that for management and is allocated to the respective years. For the contingency, 15% of the total construction cost is used. From the character of the cost benefit analysis, the interest during the construction period is not included.

Table 2-10 Details of the construction cost of Zamboanga fishing port.

Unit: US$1,000 (₱1,000)

Year	Foreign currency			Local currency			Total		
	Construction works	Consultants fee	Total	Construction works	Consultants fee	Total	Construction works	Consultants fee	Total
1979	3,017	771	3,788 (27,350)	3,398	87	3,485 (25,161)	6,415	858	7,273 (52,511)
1980	2,137	371	2,508 (18,108)	3,639	70	3,709 (26,778)	5,776	441	6,217 (44,886)
Total	5,154	1,142	6,296 (45,458)	7,037	157	7,194 (51,939)	12,191	1,299	13,490 (97,397)

(2) Operating and Maintenance Costs

As the annual maintenance expense, 1.5% of the construction cost is counted for the years subsequent to the start of operation. For the personnel expense, a monthly wage of ₱15,800 is estimated for 14 officials (including a 10% allowance).

(3) Replacement Costs

The basic facilities are of longer lifespan than 20 years, and for the functional facilities only, the replacement cost during the project life is counted with lifespan taken as 15 years (the salvage value of project cost, of course, taken into account).

8-3-3 Benefits

(1) Direct benefits

1) Increase in the output of fish catches

With development and improvement of the fishing port, mooring is eased and landing and operational capacities are elevated greatly, while constant supply of the materials such as water, ice and fuel which are required for fishing is enabled, resulting in enlargement of the economic as well as physical capacity of the fishing port (which is presently a mere landing place as it is under the natural condition) for the fishing boats. With such enlarging the capacity, the following changes are occurred (when compared with the case of "without project").

① Reopening of the operation of the fishing boats which have stopped the operation.

② Increase in the expedition times of the boat which is operated at present.

③ Entry of the registered fishing boats in this port which were unloading at the other ports.

④ Entry of the fishing boats registered in the other ports.

⑤ Increase of the incoming fishing boats owing to construction of new fishing boats.

For the foregoing changes, the economic evaluation is made as set forth in the following.

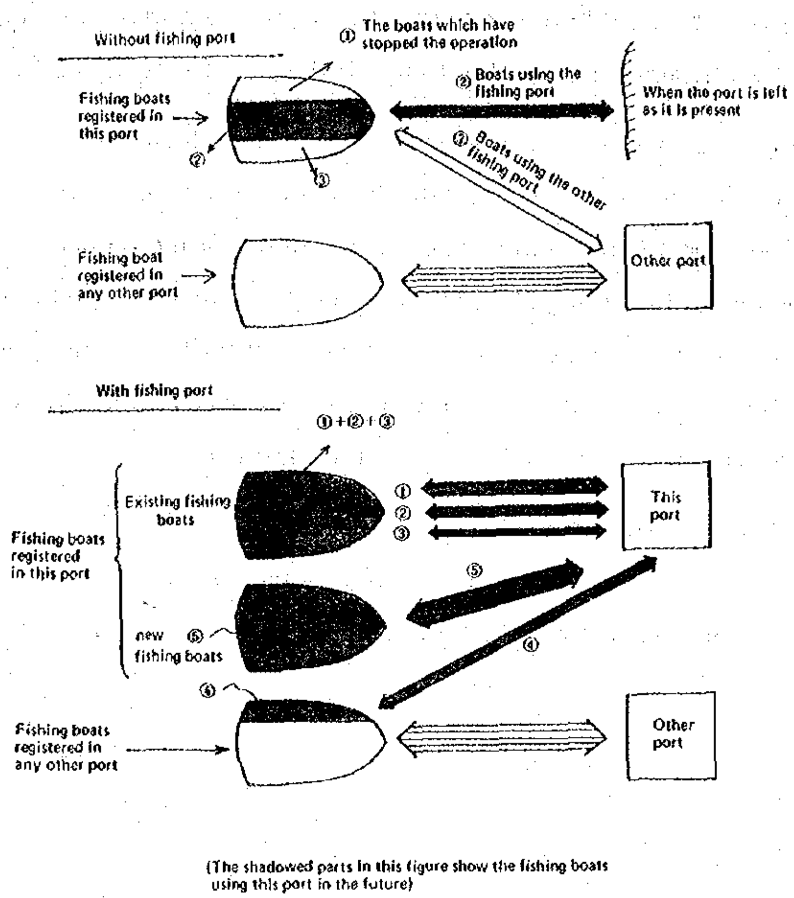


Fig. 2-15 Change in the form of use of the fishing port.

Against the background of these changes, an analysis will be made from the viewpoint of the national economy as follows:

In the light of the nature of the fishing port, it will greatly change the frequency of operations by fishing boats or the number of their port entries to reduce the hours for approaching, landing and departure for fishing. ② is excluded from the analysis. Of the increased fishing boats, ③ and ④ are small in number in view of the fact that they are the bagnetters which sail out and return on the same day and do not bring about major changes from the viewpoint of the national economy, so that they are excluded from the analysis. Consequently, the analysis covers ① and ⑤. With respect to ⑤ , the net benefit may be computed by deducting the construction and operation costs of newly built ships from the gross income by landed catches. Reference will be made later about the conditions for an estimation and the results of the estimation.

2) Improvement in the degree of freshness of fish catches

Upon construction of the fishing port, the freshness of the catches is improved greatly due to increase in the supply of ice on one hand and to improvements in the handling and carrying techniques. Consequently, the mean price of the fishes unloaded at the port will rise, and generating much benefit adding the increase in the fish production. (Assumptions and procedures of estimation are described later.)

3) Method of estimation

Estimation of the net benefits from 1) and 2) above will be made according to the procedure illustrated in the flow chart of Fig. 2-16.

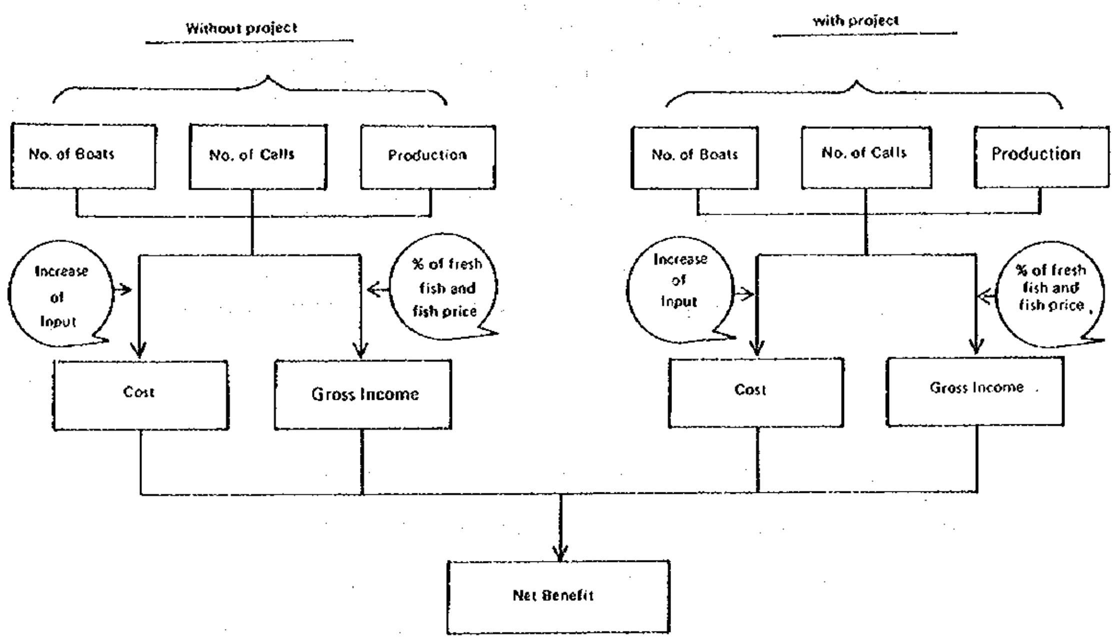


Fig. 2-16 Estimation Procedure of Net Benefit.

Estimation of the net benefit is made according to the formula

$$B \text{ (Net benefit)} = GI - C$$
$$GI = B_1 + B_2$$
$$C = C_1 + C_2 + C_3 + C_4$$

where GI: Increment in Gross Income,

B_1: Increment in Gross Income due to increase in the annual output of catches,

B_2: Increase in Gross Income due to improvement in the degree of freshness of the fish catches,

C: Increment in the cost,

C_1: Increment in the depreciation cost of the fishing boat,

C_2: Increment in the maintenance cost of fishing boat,

C_3: Increment in the running cost of fishing boat, and

C_4: Increment in the cost of ice

Formulas for estimation of B_1 and B_2 constituting items of the gross income are:

① B_1 is increment in gross income due to increase in the output of fish catches

$$B_1 = (Q^1 - Q^0) \left\{ \gamma^0 P_f + (1 - \gamma^0) P_s \right\}$$

and

② B_2 is increment in gross income due to improvement in the degree of freshness of the fish catches

$$B_2 = Q^1 \cdot (\gamma^1 - \gamma^0)\ (P_f - P_s)$$

where

Q^1: Output when there is a fishing port,

Q^0: Output when there is no fishing port,

γ^1: Degree of freshness when there is a fishing port,

γ^0: Degree of freshness when there is no fishing port,

P_f: Price of fresh fish, and

P_s: Price of spoiled fish.

Basic conditions for estimation are as given below.

① Number of fishing boats, fishing boat calls and output of fish catches.

Table 2-11 and Fig. 2-17 show the values with all of the fishing boats coming into this port taken as objectives, and these values are subjected to the following procedure for estimation of the net effect of the fishing port project to the national economy. That is, assuming that there is no increase in the number of days per expedition of fishing operation and that the fishing boats using the port are all of the registered boats in this port, there is obtained, by subtracting the fishing boats using the other ports from the foregoing forecasted value, the increment in the incoming fishing boats due to the fishing boats suspended reopening the operation and the fishing boats newly built. This value is taken as a basis of calculation in this analysis.

Table 2-11 Number of fishing boats, boat calls and output (Bagnetters).

Project	1981			1990			2000		
	No. of boats	Calls	Produc-tion (t)	No. of boats	Calls	Produc-tion (t)	No. of boats	Calls	Produc-tion (t)
With project	43	3,914	13,700	100	9,200	32,400	194	17,848	62,900
Without project	39	3,571	12,500	40	3,714	13,000	42	3,857	13,500

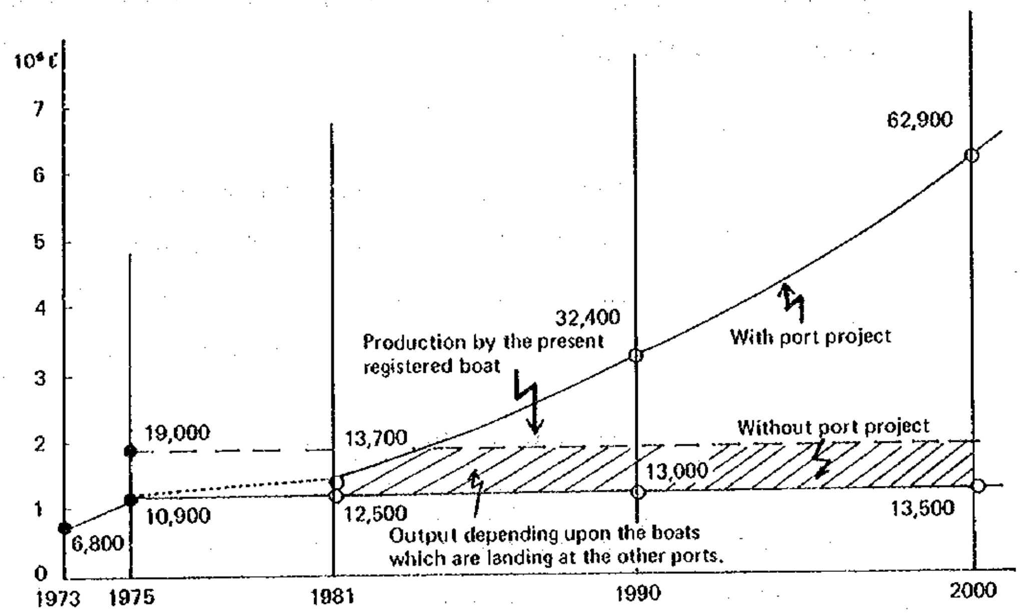


Fig. 2-17 Forecasted fish production with and without fishing port.

(2) Fish Prices

a) Market Prices (1978)

The findings of a local survey are given below:

1st class: 3.5 ₱/kg

2nd class: 2.5 ₱/kg

3rd class: 1.5 ₱/kg

b) Prices for the estimation

Price of fresh fish: 2.5 ₱/kg

Price of spoiled fish: 1.0 ₱/kg

③ Degree of freshness

The present ice making capacity of Zamboanga City is 80 tons a day. If the plant is operated for 300 days a year, the capacity will reach 24,000 tons a year. If it is assumed that the ice set aside for the catches of bagnetters is 15% (30% if the ice used by big fishing vessels are included), the consumption of ice at the site of the fishing port is 3,600 tons a year.

The present fish production is 10,900 tons by bagnetters. 0.5 ton of ice per ton of fish is needed for the retaining of their freshness after landing. Therefore, the present shortage of ice is 34%.

The rate of spoiled fish is set at 40% in the case a fishing port is unavailable. If the fishing port is developed, there will be a rise in the supply of fresh fish due to an increase in the supply of ice, the damage to the bodies of fish will be reduced due to an improvement of the on-land handling technology, and the ratio of spoiled fish will be reduced to 20%.

④ Fishing boat construction cost and annual maintenance cost

The fishing boat construction cost and the annual maintenance cost are indicated in Table 2-12.

Table 2-12 Fishing boat construction cost and annual maintenance cost.

₱

Type of boat	Gross Ton	Construction cost	Annual maintenance cost		
			Repair	Fishing net, etc.	Total
Bagnetters	13.3 t	44,333	2,217	13,333	15,550

Note 1: The fishing boat construction cost is assumed to be ₱ 3,333 per gross ton. (Calculated as 1₱ = 30¥)

2: The repair expense is assumed to be 5% of the construction cost.

3: Fishing nets, etc.

Purse Seiners	₱ 66,667/year
Trawlers	₱ 66,667/year
Bagnetters	₱ 13,333/year
small boats	Negligible

4: The fishing boats are assumed to be usable for 8 years.

(5) Fishing boat running cost

This comprises the wage and salaries, fuel cost, water service fee, crew meal expense, etc., and the basic figures for estimation are as shown below.

Table 2-13 Fishing boat running cost per expedition.

₱

Type of boat	Days per expedition	No. of crew	Average expedition times per year	Crew meal per expedition	Wages per expedition	Water consumption		Operating hours per day (h/day)	Horse power (H. P.)	Fuel consumption	
						ℓ	₱			ℓ	₱
Bagnetters	1	18	92	54	270	360	1	6	183	209	418

Note 1: Fuel – 0·19 ℓ/hp. hour.

2: Fuel unit price – 2₱/ℓ.

3: Water – (1) Trawler, 30 ℓ/day.
(2) Purse Seiner, 30 ℓ/day.
(3) Bagnetter, 20 ℓ/day.

4: Water unit price – domestic water, 0.5₱/m^3; and industrial and commercial water, 1.0₱/m^3.
Here, the latter is employed (0.001₱/ℓ).

5: Wage and salaries –15₱/man day (average of the unskilled and the skilled labour.

6: Meal expense – 3₱/man day.

(6) Ice cost

Use of ice by the bagnetters is 0.5 ton per ton of fishes.

For the unit price, the market price of 120 ₱/t is used.

4) Estimation

(1) Net benefit due to increase in the output of fish catches

₱99,073,000

(2) Net benefit due to improvement in the freshness of fish catches

₱36,484,000

(3) Total net benefit

₱135,557,000

(2) Other benefits

The other benefits which the fishing port improvement brings about are listed in the following.

1) Improvement in self-sufficiency of fishery products.
2) Modernization of fisheries upon accumulation of various functions.
3) Encouraging investments.
4) Stabilization of fish prices.
5) Creation of employment opportunities.
6) Acquisition of new techniques.
7) Increase of fishermen's income.
8) Formation of a new local centre for the regional development.
9) Strengthening the fishermen's association.

8-3-4 Evaluation

The result of economic evaluation on construction of the Zamboanga fishing port is as follows.

With the net present value at ₱45,821,000 (¥1,374,630,000 upon exchange rate at 1₱ = 30¥), cost benefit ratio at 1.51 and internal rate of returns at 20.2%, the project is considered to be appropriate from the national economic point of view.

Chapter 9 Financial Analysis

9-1 Financial Analysis

Construction of the Zamboanga fishing port is carried out as one of the fishing port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

9-2 Main Factors of Financial Analysis

9-2-1 Usage of the fishing port

The number of fishing boats using the port, frequency of entry and fish landing amount, which constitute the basic data for financial analysis, are set forth in Table 2-14.

Table 2-14 Annual number of fishing boats using this port, frequency of entry and fish landing amount.

Item	Year	Bagnetters
No. of boats	1981	43
	1990	100
	2000	194
No. of Calls	1981	3,914
	1990	9,200
	2000	17,848
Fish production (tons)	1981	13,700
	1990	32,400
	2000	62,900

9-2-2 Method of estimation of the revenue of fishing port

(1) Sources of revenue

Here, the revenue of the fishing port is limited to the fees for use of the facilities related to handling of fish catches and supply of materials to the fishing boats and the profit from sales of ice when the ice plant and cold storage facilities are operated directly by PFMA.

(2) Method of estimation of the revenue

Basic data for estimation of the revenue and the items of revenue are represented in Fig. 2-18. The method of estimation of the revenue is illustrated in Fig. 2-19.

Basic data 1
1. No. of boats
2. No. of Calls
3. Fish Productions

Basic data 2	
1	Gross tonage
2	Days per expedition
3	Running hours per day
4	Horse power of boats
5	Fuel consumption
6	No. of crew
7	Expedition per year
8	Ice consumption
9	Mooring time at the port

↓

Revenue	
1	Harbour due
2	Berthing fee
3	Quayside conveyance fee
4	Fuel conveyance fee
5	Levy on fresh water sold to fishing boats
6	Levy on fish brought to the market by land transportation vehicles
7	Fee for use of the market hall
8	Charge for overstay at the unloading area
9	Annual registration fee
10	Ice sales

Fig. 2-18 Basic data for estimation of the revenue and items of estimation

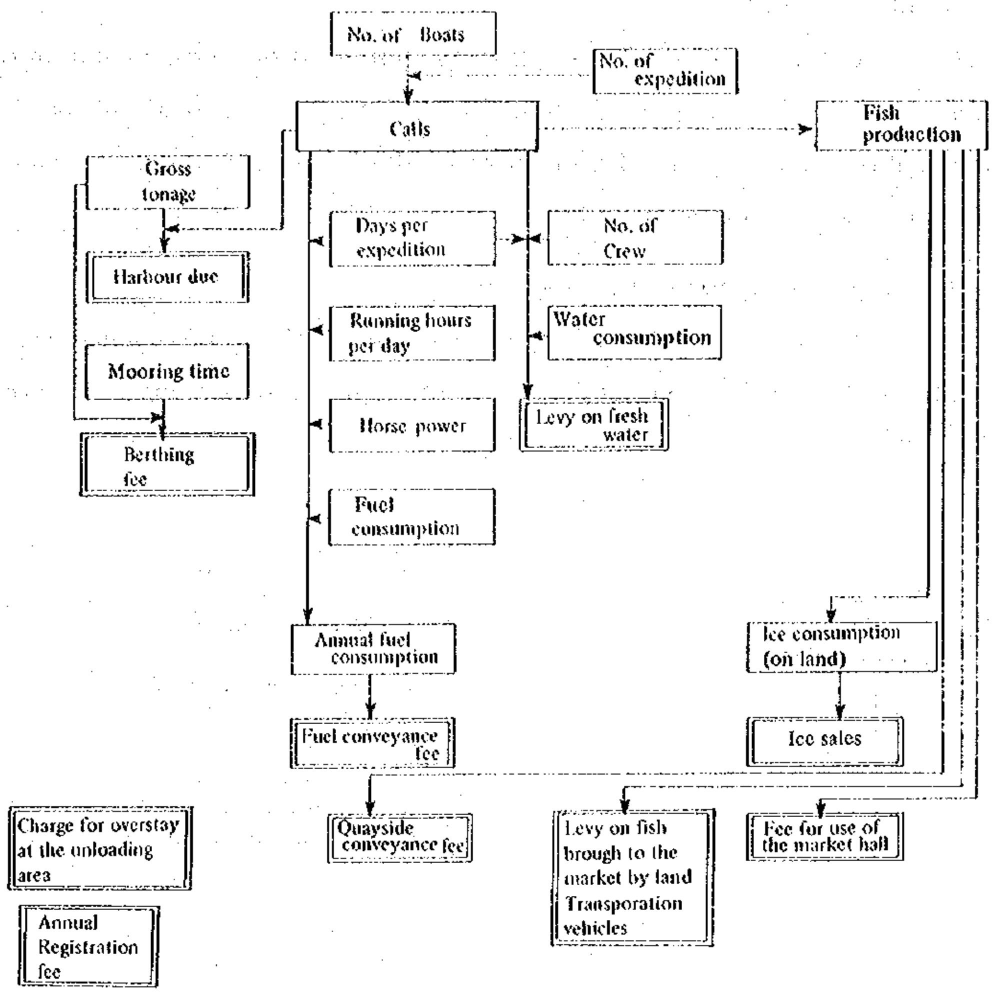


Fig. 2-19 Method of estimation of the revenue.

9-2-3 Method of Cost estimation

The items of cost are wage and salaries, maintenance expense, depreciation and interests on loans.

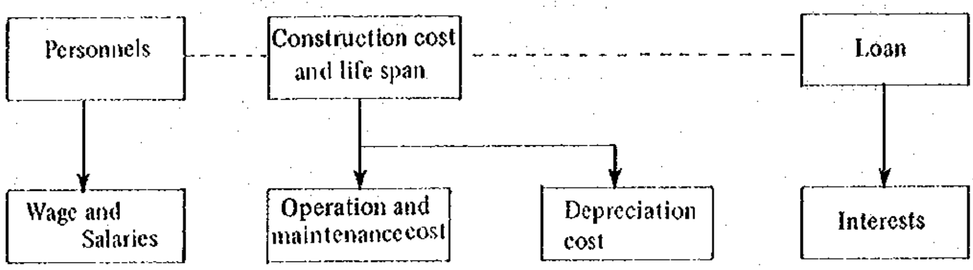


Fig. 2-20 Method of cost estimation.

9-3. Revenue of Fishing Port

9-3-1 Harbor due

This is a fee collected from the fishing boats entering the port according to the gross tonnage of the respective boats, and the unit of the fee is 0.6 (₱/gross tonnage per entry).

The calculation formula is

$$0.6 \times (\text{Gross tonnage}) \times (\text{Number of entries})$$

The gross tonnage of the fishing boats is as shown in Table 2-15.

Table 2-15 Gross tonnage of the fishing boats.

Item \ Type of Boats	Bagnetter
Gross tonage	13.3 tons

The revenue is shown in Table 2-16.

Table 2-16 Revenue from harbour due.

Year	Harbour due	Boat calls
1981	31,234 ₱	3,914 calls
1985	49,981	6,263
1990	73,416	9,200
1995	107,922	13,524
2000 AD	142,427	17,848

9-3-2 Berthing fee

This is a fee for use of the berth to be collected from the fishing boats utilizing the fishing port according to the gross tonnage, and the unit of the fee is shown in Table 2-17.

Table 2-17 Unit of berthing fee.

Gross tonage (GT)	GT<10	10≦GT<100	100≦GT<200	200≦GT
Unit fee (₱/entry)	10	12	14	16

The calculation formula is

(Unit fee) × (Number of entries).

The revenue is scheduled in Table 2-18.

Table 2-18 Revenue from berthing fees.

Year	fee	Boat calls
1981	46,968 ₱	3,914 calls
1985	75,160	6,263
1990	110,400	9,200
1998	162,288	13,524
2000 AD	214,176	17,848

9-3-3 Quayside conveyance fee

Where the fishes are conveyed on the quay, this is a fee for use of the facility, and the unit of the fee is 1.25₱ per tub.

The tub has a capacity of 40 kg so that the calculation formula is

$$1.25 \times \left(\frac{1000}{40}\right) \times (\text{Landing amount.})$$

The revenue is then presented in Table 2-19.

Table 2-19 Revenue from quayside conveyance fees.

Year	fee	fish production
1981	428,125 ₱	13,700 tons
1985	687,847	22,011
1990	1,012,500	32,400
1995	1,489,063	47,650
2000	1,965,625	62,900

9-3-4 Fuel conveyance fee

This is the fee for conveyance of the fuel supplied to the fishing boats and is a fee for use of the fuel supply facility. The annual amount of consumption of the fuel is given by

(Number of entries) × (Days per expedition) × (Running hours a day) × (Horse power) × (Main fuel consumption,)

and the unit fee is 4 (₱/kℓ). The calculation formula is

$$4 \times \left(\frac{1}{1000}\right) \times (\text{Annual water consumption}).$$

The original units required for calculation are of the values shown in Table 2-20.

Table 2-20 Original units concerning fuel consumption.

Item \ Type of boats	Bagnetter
days per expedition (Days)	1
Running hours per day (hr.)	6
Horse power (H.P.)	183
Fuel consumption (ℓ/H.P. Hr.)	0.19

The revenue is shown in Table 2-21.

Table 2-21 Revenue from fuel conveyance fees.

Year	fee	Fuel consumption	Boat calls
1981	3,266 ₱	817 kℓ	3,914 calls
1985	5,227	1,307	6,263
1990	7,677	1,919	9,200
1995	11,286	2,821	13,524
2000	14,894	3,723	17,848

9-3-5 Levy on fresh water sold to fishing boats

This is collected for the water supply to the fishing boats and is a fee for use of the facility.

The annual amount of consumption of water is given by:

(Number of entries)×(Original unit of water consumption)×(Number of crew) ×(Days of expedition)

and the unit of the fee is 0.5 ₱/ton. Then, the calculation formula is

$$0.5 \times (\frac{1}{1000}) \times (\text{Annual water consumption.})$$

The original units required for calculation are of the values shown in Table 2-22.

Table 2-22 Original uints concerning water consumption.

Item \ Type of boats	Bagnetter
Water consumption (ℓ/person day)	20
No. of Crew	18
days per expedition (days)	1

Table 2-23 Revenue from levies on fresh water sold to fishing boats.

Year	Levies	Annual water consumption	Boat calls
1981	705 ₱	1,409 tons	3,914 calls
1985	1,127	2,255	6,263
1990	1,656	3,312	9,200
1995	2,434	4,869	13,524
2000	3,213	6,425	17,848

9-3-6 Levy on fish brought to the market by land transportation vehicles

This is a fee for transportation of fishes from fishing boats to the market, and the unit of the fee is 0.50 (₱/tub). The calculation formula is

$$0.50 \times \left(\frac{1000}{40}\right) \times \text{(Landed amount of fish catches).}$$

The revenue is shown in Table 2-24.

Table 2-24 Revenue from levies on fish brought to the market by land transportation vehicles.

Year	Levies	fish production
1981	171,240 ₱	13,700 tons
1985	275,139	22,011
1990	405,000	32,400
1995	595,625	47,650
2000	786,250	62,900

9-3-7 Fee for use of the ma rket hall

This is a fee for use of the market hall, and the unit of the fee is 0.15 (₱/tub). The calculation formula is

$$0.15 \times \left(\frac{1000}{40}\right) \times \text{(Landed amount of fish catches.)}$$

The revenue is shown in Table 2-25.

Table 2-25 Revenue from fee for use of the market hall.

Year	fee	fish production
1981	51,375 ₱	13,700 tons
1985	82,542	22,011
1990	121,500	32,400
1995	178,688	47,650
2000	235,875	62,900

9-3-8 Charge for overstay at the unloading area

This is a charge for staying over the standard time at the unloading area, but it is difficult to estimate such charge so that it is not counted here.

9-3-9 Annual registration fees

This represents the fees for registration of the brokers, wholesalers and shipowners but is not included here.

9-3-10 Ice sales

This represents the profit from sales of ice for maintaining the freshness of fishes. The wholesale price of ice is taken as 120₱/t, and its 20% or 24 (₱/t) is assumed to be the profit. The original units of the ice consumption are shown in Table 2-26. The calculation formula is

$$24 \times (1 \times \text{Landed amount of catches (trawlers)} + 1/2 \times \text{Total amount of landed catches}).$$

The revenue is given as shown in Table 2-27.

Table 2-26 Ice consumption original units.

kg/fish kg

Item \ Type of boats	Bagnetter
Ice consumption (on ship)	0
Ice consumption (on land)	0.5

Table 2-27 Ice sales

Year	Net income	Ice consumption (on land)
1981	164,400 ₱	6,850 tons
1985	264,133	11,006
1990	388,800	16,200
1995	571,800	23,825
2000	754,800	31,450

9-4 Expenditures of Fishing Port

9-4-1 Personnel expense

The officials of the organization of administration of the fishing port are estimated at 14 persons. The monthly personnel expense is assumed to be ₱15,800. Then, with an allowance of 10% added, the annual personnel expense is estimated at ₱208,560.

9-4-2 Maintenance expense

As the annual maintenance expense of the fishing port facilities, 1.5% of the construction cost is taken, and an amount of ₱1,320,302/year is estimated.

9-4-3 Depreciation

The basic facilities are of longer lifespan so that they are excluded from the objects of depreciation, with the maintenance expense counted for them.

The functional facilities have the 15 years lifespan, with the salvage value set to 0. With the straight line method, the annual amount of depreciation is ₱2,871,020.

9-4-4 Interest on loan

The loan as the management entity is ₱45,457,000. The interest was then calculated at a rate of 3.5 percent per year. The principal repayment is done equally every year in 15 years after 1986 so that the interest payable after 1986 will decrease gradually.

9-5 Financial Evaluation

Income statement of the Zamboanga fishing port and the cash flow are set forth in Tables 2-28 and 2-29.

As the result of the foregoing financial analysis, it was found that it would be difficult financially for PFMA to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enormous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion, would be reduced.

However, as seen from the result of the economic evaluation in Chapter 8, the development and improvement of the fishing port will bring about many economic effects and are thus worthy of investment.

Table 2-28 Income statement of Zamboanga fishing port

(₱)

Item		1979	1980	1981	1982	1983	1984	1985	1986
1. Revenues	Harbour Due	—	—	31,234	35,921	40,608	45,294	49,981	54,668
	Berthing Fee	—	—	46,968	54,016	61,064	68,112	75,160	82,208
	Quayside Conveyance Fee	—	—	428,125	493,056	557,986	622,917	687,847	752,778
	Fuel Conveyance Fee	—	—	3,266	3,756	4,246	4,737	5,227	5,717
	Levy on Fresh Water sold to Fishing Boats	—	—	705	810	916	1,022	1,127	1,233
	Levy on Fish brought to the Market	—	—	171,250	197,222	223,194	249,167	275,139	301,111
	Fee for Use of Market Hall	—	—	51,375	59,167	66,958	74,750	82,542	90,333
	Ice Sales	—	—	164,400	189,333	214,267	239,200	264,133	289,067
	Total	—	—	897,322	1,033,281	1,169,239	1,035,198	1,441,157	1,577,115
2. Expenses	Salaries and Wages	—	—	208,560					
	Repair and Maintenance	—	—	1,320,302	4,399,882	〃	〃	〃	〃
	Depreciation	—	—	2,871,020					
	Interest	478,621	1,274,127	1,591,012	1,591,012	1,591,012	1,591,012	1,591,012	1,691,012
	Total	478,621	1,274,127	5,990,894	6,990,894	5,990,894	5,990,894	5,990,894	5,990,894
3. Income before Depreciation and interest		0	0	△ 631,540	△ 496,581	△ 359,623	△ 223,664	△ 87,705	△ 48,253
4. Net Income		△ 478,621	△ 1,274,127	△ 5,093,662	△ 4,957,613	△ 4,821,655	△ 4,686,696	△ 4,549,737	△ 4,413,779
5. Accumulated Income		△ 478,621	△ 1,752,748	△ 6,846,410	△11,804,023	△16,625,678	△21,311,374	△25,861,111	△30,274,890

Item		1987	1988	1989	1990	1991	1992	1993	1994
1. Revenues	Harbour Due	59,355	64,042	68,729	73,416	80,317	87,218	94,119	101,020
	Berthing Fee	89,256	96,304	103,352	110,400	120,778	131,155	141,533	151,910
	Quayside Conveyance Fee	817,708	832,639	947,569	1,012,500	1,107,813	1,203,125	1,298,438,	1,393,750
	Fuel Conveyance Fee	6,207	6,697	7,187	7,677	8,399	9,121	9,642	10,564
	Levy on Fresh Water sold to Fishing Boats	1,339	1,445	1,550	1,656	1,812	1,967	2,123	2,279
	Levy on Fish brought to the Market	327,083	353,056	379,028	405,000	443,125	481,250	519,375	557,500
	Fee for Use of Market Hall	98,125	105,917	113,708	121,500	132,938	144,375	155,813	167,250
	Ice Sales	314,000	338,933	363,867	388,800	425,400	462,000	498,600	535,200
	Total	1,713,074	1,849,032	1,984,991	2,120,949	2,320,580	2,520,211	2,719,842	2,919,473
2. Expenses	Salaries and Wages	208,560							
	Repair and Maintenance	1,320,302	4,399,882	〃	〃	〃	〃	〃	〃
	Depreciation	2,871,020							
	Interest	1,484,944	1,378,877	1,272,809	1,166,742	1,060,674	954,607	848,539	742,472
	Total	5,884,826	5,778,759	5,672,691	5,566,624	5,460,556	5,354,489	5,248,421	5,142,354
3. Income before Depreciation and interest		184,212	320,170	456,129	592,087	791,718	991,349	1,190,980	1,390,611
4. Net Income		△ 4,171,752	△ 3,929,727	△ 3,687,700	△ 3,445,675	△ 3,139,976	△ 2,834,278	△ 2,528,579	△ 2,222,881
5. Accumulated Income		△34,446,642	△38,376,369	△42,064,069	△45,509,744	△48,649,720	△51,483,998	△54,012,577	△56,235,458

Item		1995	1996	1997	1998	1999	2000		
1. Revenues	Harbour Due	107,922	114,823	121,724	128,625	135,526	142,427		
	Berthing Fee	162,288	172,666	183,043	193,421	203,798	214,176		
	Quayside Conveyance Fee	1,489,063	1,584,375	1,679,688	1,775,000	1,870,313	1,965,625		
	Fuel Conveyance Fee	11,286	12,007	12,729	13,450	14,172	14,894		
	Levy on Fresh Water sold to Fishing Boats	2,434	2,590	2,746	2,901	3,057	3,213		
	Levy on Fish brought to the Market	595,625	633,750	671,875	710,000	748,125	786,250		
	Fee for Use of Market Hall	178,688	190,125	201,563	213,000	224,438	235,875		
	Ice Sales	571,800	608,400	645,000	681,600	718,200	754,800		
	Total	3,119,104	3,318,735	3,518,366	3,717,997	3,917,628	4,117,259		
2. Expenses	Salaries and Wages	208,560							
	Repair and Maintenance	1,320,302	4,399,882	〃	〃	〃	〃		
	Depreciation	2,871,020							
	Interest	636,404	530,337	424,269	318,202	212,134	106,067		
	Total	5,036,286	4,930,219	4,824,151	4,718,084	4,612,016	4,505,949		
3. Income before Depreciation and interest		1,590,242	1,789,873	1,989,504	2,189,135	2,388,766	2,588,397		
4. Net income		△ 1,917,182	△ 1,611,484	△ 1,305,785	△ 1,000,087	△ 694,388	△ 388,690		
5. Accumulated Income		△58,152,640	△59,764,124	△61,069,909	△62,069,996	△62,764,384	△63,153,074		

Table 2-29 Cash-flow schedule of Zamboanga fishing port

(P)

Item	Year	1979	1980	1981	1982	1983	1984	1985	1986
1. Source of Funds	Equity	25,160,877	26,778,489	–	–	–	–	–	–
	Loan	27,349,764	18,107,709	–	–	–	–	–	–
	Gov. Project Allotment	478,621	1,274,127	2,222,642	2,086,593	1,950,635	1,814,676	1,678,717	4,573,259
	Depreciation	–	–	2,871,020	2,871,020	2,871,020	2,871,020	2,871,020	2,871,020
	Net income	△ 478,621	△ 1,274,127	△ 5,093,662	△ 4,957,613	△ 4,821,655	△ 4,685,696	△ 4,549,737	△ 4,413,779
	Total	52,510,641	44,886,198	0	0	0	0	0	3,030,500
2. Uses of Funds	Construction	52,510,641	44,886,198	–	–	–	–	–	–
	Loan Amortization	–	–	–	–	–	–	–	–
	Reinvestment	–	–	–	–	–	–	–	–
	Total	52,510,641	44,886,198	0	0	0	0	0	3,030,500

Item	Year	1987	1988	1989	1990	1991	1992	1993	1994
1. Source of Funds	Equity	–	–	–	–	–	–	–	–
	Loan	–	–	–	–	–	–	–	–
	Gov. Project Allotment	4,331,232	4,089,207	3,847,180	3,605,155	3,299,456	2,994,758	2,688,059	2,382,361
	Depreciation	2,871,020	2,871,020	2,871,020	2,871,020	2,871,020	2,871,020	2,871,020	2,871,020
	Net income	△ 4,171,752	△ 3,929,727	△ 3,687,700	△ 3,445,675	△ 3,139,976	△ 2,834,278	△ 2,528,579	△ 2,222,881
	Total	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500
2. Uses of Funds	Construction	–	–	–	–	–	–	–	–
	Loan Amortization	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500
	Reinvestment	–	–	–	–	–	–	–	–
	Total	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500

Item	Year	1995	1996	1997	1998	1999	2000		
1. Source of Funds	Equity	–	–	–	–	–	–		
	Loan	–	–	–	–	–	–		
	Gov. Project Allotment	1,876,662	1,770,964	1,465,265	1,159,567	853,868	548,170		
	Depreciation	2,871,020	2,871,000	2,871,020	2,871,020	2,871,020	2,871,020		
	Net income	△ 1,917,182	△ 1,611,484	△ 1,305,785	△ 1,000,087	△ 694,388	△ 388,690		
	Total	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500		
2. Uses of Funds	Construction	–	–	–	–	–	–		
	Loan Amortization	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500		
	Reinvestment	–	43,065,300	–	–	–	–		
	Total	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500	3,030,500		

Part III

Iloilo Fishing Port Development and Improvement Project

PART III ILOILO FISHING PORT DEVELOPMENT AND IMPROVEMENT PROJECT

Chapter 1 Basic Line of Development and Improvement

The Lucena fishing port development and improvement project will have to be implemented along the basic line stated in the following with due consideration of the present condition of marine products and their marketing in the Philippines and Iloilo, situation of the landing site and the government policies and plans for promotion of the fishery industries discussed in PART I.

(1) The project should not remain merely in dissolving the shortage in the present facilities but be capable of coping satisfactorily with the prospected sharp increase of port demand in the near future. Consideration should also be made for the project to be also capable of coping with the great development prospected of the fishery thereafter.

(2) The Iloilo fishing port will be so developed and improved that it will be able to exhibit its functions as a pivotal fishing port for development of the fishery in the western Bisaya region.

(3) Consideration should be made for compliance, as much as practicable with the city development plan of Iloilo.

(4) Reclamation of the land for fishing port facilities will be made economically in use of the dredged soil of the basin.

Chapter 2 Establishment of Project Targets

2-1 Project Target Year

For the basic facilities of breakwaters, mooring facilities, bulkhead and basins and functional facilities of road and land for fishing port facilities, the target year will be set at 2000 A.D.

For the other functional facilities such as fish market, sheds, ice plant and cold storage, water supply facility, fuel supply facility, fishing port administration facilities and fishing boats and engines repair shops, the target year will be set at 1990.

2-2 Planned Handling Amount and Fishing Boat Force

The planned handling amount of the catches and the fishing boat force in the respective target years will be as shown in Table 3-1.

001 **Table 3-1 Planned handling amounts and fishing boat force**

Target Year	Planned handling Amount of Catches	Number of Purse Seiners		Number of Trawlers	Number of Bagnetters
		Large	Medium		
1990	73,600 tons	9 boats	29 boats	89 boats	87 boats
2000 A D	104,600	12	42	127	124

Chapter 3 Selection of Project Site

The site selected by the Government of the Republic of the Philippines for the construction of a fishing port coincides with the fishing port site envisioned in the already formulated urban development program of Iloilo City as indicated in Fig. 3-1.

As the result of examination at the site, the Study Team considers this point to be an adequate project site from the reasons set forth in the following, and thus the projected fishing port will be located here.

(1) At present, this site is used for the landing of catches from bagnetters.

(2) There is a sufficient area available for construction of the fishing port.

(3) It is a seashore close to the central section of Iloilo City.

(4) Electricity and water are obtainable with ease.

(5) There exists a nearby road (asphalt paved with two lanes) behind the site.

(6) As it is located near a commercial port, the site is convenient to bring in materials for the construction of a fishing port.

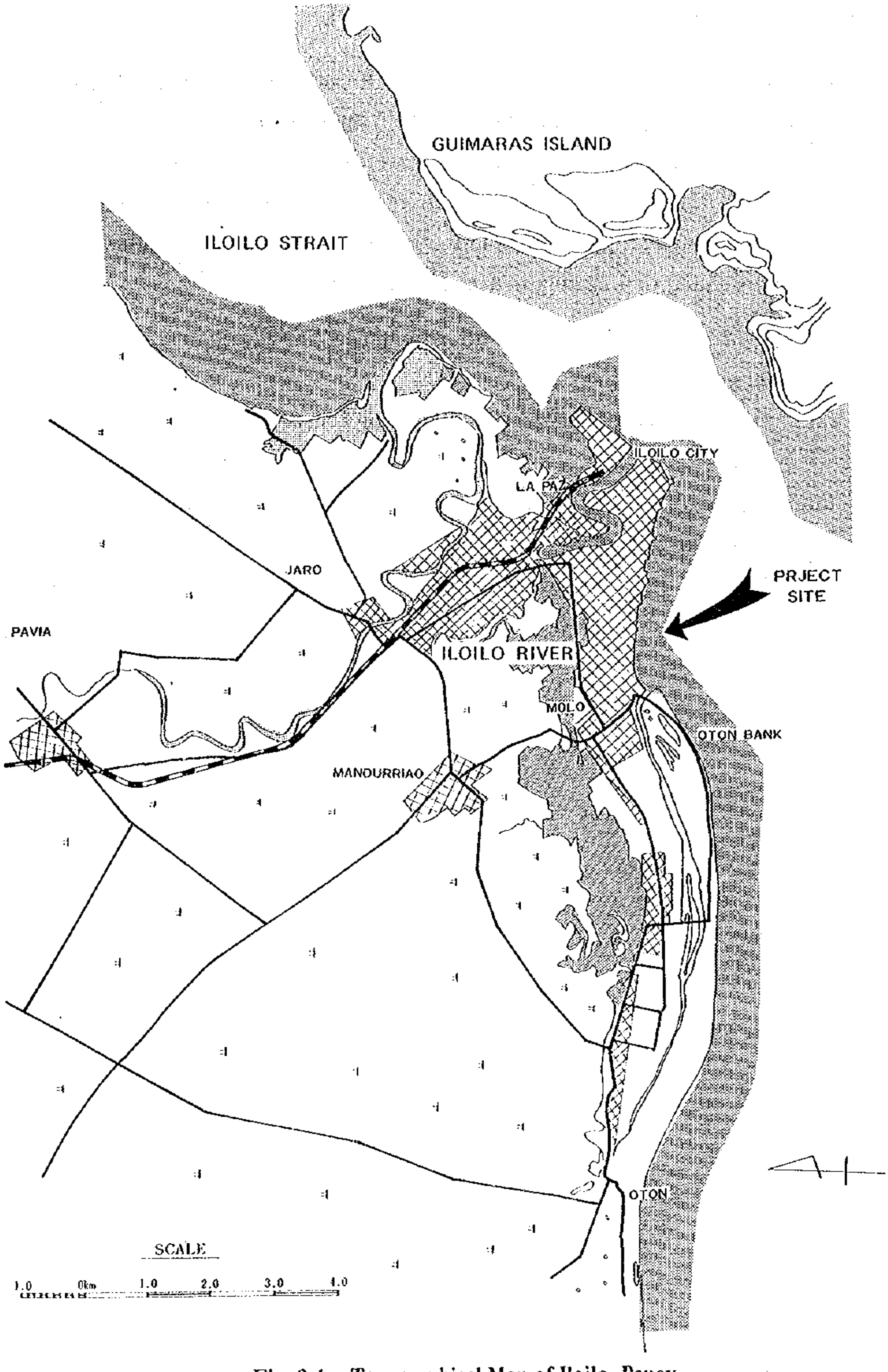


Fig. 3-1 Topographical Map of Iloilo, Panay

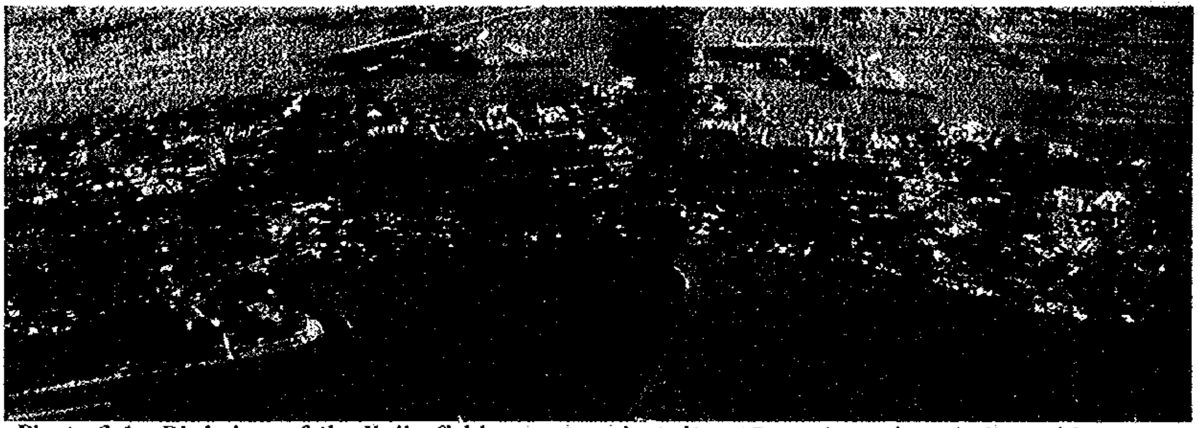


Photo 3-1 Bird view of the Iloilo fishing port project site. (Curved sea shore indicated in center of picture)


Photo 3-2 Seeing the condition of back ground of Iloilo fishing port project site.

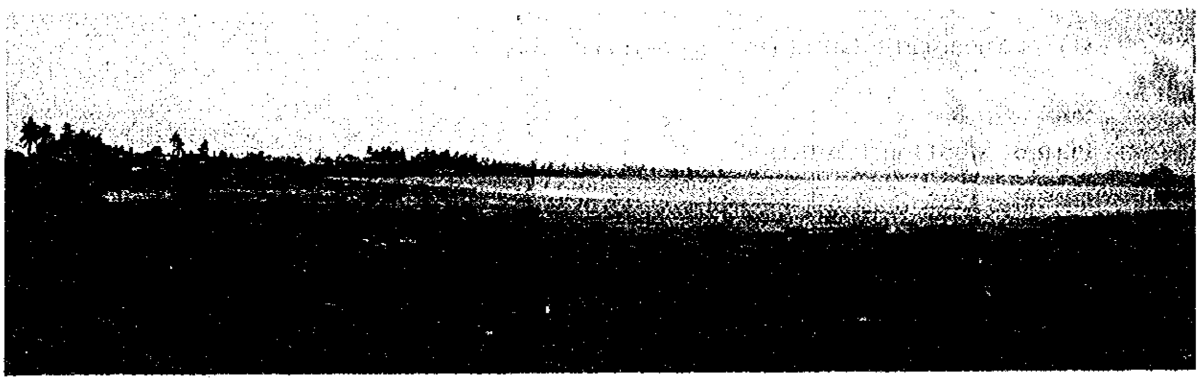


Photo 3-3 The photo shows the conditions of the beach at ebb tide in the Iloilo fishing port project site.

Chapter 4 Plan of Basic Port Facilities

By the basic port facilities are referred to the facilities for protecting the fishing port from external forces having adverse effects upon the fishing port such as waves, littoral drift and current, facilities for mooring or landing the boats for the purpose of unloading the catches, supply of commodities or recess, and facilities for fulfilling the fundamental roles of the fishing port such as water surfaces allowing safe departure, return and anchorage or mooring of the fishing boats.

4-1 Project Facilities

Project facilities are as follows.

1. Mooring Facilities
   - (1) Landing quay (for purse seiners and trawlers)
   - (2) Landing site (for bagnetters)
   - (3) Stair landing facility (for small fishing boat)
   - (4) Preparation quay (purse seiners and trawlers)
   - (5) Preparation quay (for bagnetters)
   - (6) Mooring pier (purse seiners and trawlers)
2. Breakwater
   - (1) East breakwater
   - (2) West breakwater
3. Bagnetter landing
4. Revetment (Rock bulkhead)
5. Basins
   - (1) Anchorage basin (for bagnetters)

4-2 Plan of Mooring Facilities

4-2-1 Plan conditions for mooring facilities

Planning of the mooring facilities will be made with the following plan conditions taken into consideration.

(1) The landing and preparation quays for the purse seiners and trawlers shall be of -5.0 m quay. (The temporarily used depth shall be -4.0 m).

(2) The laying and mooring facility for purse seiners and trawlers shall be -5.0 m mooring pier. (The temporarily used depth shall be -4.0 m)

(3) The landing facilities for bagnetters shall be a slipway type facility. The quay for fishing preparations of bagnetters shall be -5.0 m in depth (the temporarily used depth will be -4.0 m).

(4) The landing facility for small fishing boats shall be a -2.0 m stair landing facility.

(5) Purse seiners and trawlers will mutually use the same facilities.

(6) The purse seiners and trawlers which have completed the landing of their catches or their fishing preparation will be moored along the mooring pier. The bagnetters which have completed the landing of their catches or their fishing preparation will anchor in the inner basin (including the adjacent water in case the number of fishing boats in port is great). Small fishing boats having the landing finished will use any adequate shore within or outside of the port.

(7) The use of the fishing port by fishing boats when they do not go out fishing due to a stormy weather and other reasons will be made as follows:

The purse seiners and trawlers which are in port will be moored in a vertical row along all the mooring quays available in the port. The bagnetters will anchor in the inner basin. As for this fishing port, the port berth is so small in area that the fishing boats which cannot be accommodated will seek refuge in other safe waters.

4-2-2 Required lengths of mooring facilities

The required lengths of the mooring facilities are as follows:

1. Required lengths of landing facilities for purse seiners, trawlers and bagnetters.

The computation of the required lengths is done as indicated in Table 3-2.

Table 3-2 Required lengths of landing facilities for purse seiners, trawlers and bagnetters

Kind of Fishing Boat	Planned Number of Boats. A	Number of Sailing Days. B	Standard Number of Fishing Boats. C	Hours of Use per Boats per Landing. D
Purse Seiner	boat	days	boats	hours
Large	14	12	1	5.0
Medium	42	7	6	2.1
Trawler	127	6	21	1.8
Bagnetter	124	1	100	0.7

Kind of Fishing Boat	Length of One Berth. E	Market Open Hours a Day. F	Quay Sufficiency Rate. G	Required Length of Quay.
Purse Seiner	m	hours	%	$(\frac{C \cdot D}{F} \cdot E)G$
Large	28	6	100	= 30 m
Medium	15	6	100	= 30
Trawler	20	6	100	= 140
Bagnetter	23	6	100	= 230

Note 1) Standard number of fishing boats

The standard number of purse seiners and trawlers using the facility a day shall be;

Purse seiner: (Large) 12 boats ÷ 12 days = 1 boat

(Medium) 42 boats ÷ 7 days = 6 boats

Trawlers: 127 boats ÷ 6 days = 21 boats

2) Hours of use per boat per landing

Calculation is

Hours of use per boat per landing operation

$$= \frac{\text{Mean landing quantity per boat per operation}}{\text{Landing capacity}} + \text{Extrd hours, or}$$

Purse seiner:

$$(\text{Large}) = \frac{20 \text{ tons}}{5 \text{ tons/hour}} + 1.0 \text{ hour} = 5 \text{ hours}$$

$$(\text{Medium}) = \frac{8 \text{ tons}}{5 \text{ tons/hour}} + 0.5 \text{ hour} = 2.1 \text{ hours}$$

$$\text{Trawler:} = \frac{6.5 \text{ tons}}{5 \text{ tons/hour}} + 0.5 \text{ hour} = 1.8 \text{ hours}$$

$$\text{Bagnetter:} = \frac{3.5 \text{ tons}}{8 \text{ tons/hour}} + 0.25 \text{ hour} = 0.7 \text{ hour}$$

3) Per berth length:

The type of purse seiners and trawlers are as follows;

Purse seiners:

(Large) Length, 24.3 m; width, 6.2 m; draft, 2.8 m; and gross tonnage, 175 tons.

(Medium) Length, 13.2 m; width, 4.0 m; draft 2.4 m; and gross tonnage 80 tons.

Trawlers:

Length, 17.4 m; width, 3.9 m; draft, 2.9 m; and gross tonnage 120 tons.

They are used alongside the quay so that the length of one berth is

Purse seiners:

(Large) $24.3 \text{ m} \times 1.15 \doteqdot 28 \text{ m}$

(Medium) $13.2 \text{ m} \times 1.15 \doteqdot 15 \text{ m}$

Trawlers: $17.4 \text{ m} \times 1.15 \doteqdot 20 \text{ m}$

The bagnetters are of the type of

Length, 10.7 m; width, 20.0 m; draft, 1.5 m; and gross tonnage, 24 tons.

They are used the facility in vertical mooring so that the length of one berth is

$20.0 \text{ m} \times 1.15 = 23.0 \text{ m}$

4) Quay sufficiency rate:

Days of use of the trawlers number about 300 a year so that the quay sufficiency rate is taken as 100%. Annual days (frequencies) of use of the bagnetters are only 95 days (95 times) so that in consideration of economy, the quay sufficiency rate is taken as 80%.

2. Required length of the stair landing facility for small fishing boats.

The facility is to be used with the fishing boats laid alongside, and its length of extension shall be 150 m.

3. Required lengths of the preparation quays for trawlers and purse seiners.

The preparation quay for trawlers and purse seiners is to be used with the boats lying alongside and shall be of about 5 berths, 100 m.

4. Required length of the preparation quay for bagnetters.

The preparation quay for bagnetters is to be used with the boats lying vertically and shall be of about 4 berths, 100 m.

5. Required length of mooring pier for laying the purse seiners and trawlers.

In normal circumstances, the pier will be used with the boats lying alongside, but it will be used with the boats moored in a vertical line when all of them do not go out fishing due to a stormy weather or other reasons.

4-3 Plan of Breakwaters

4-3-1 Plan conditions for breakwater

The plans for the breakwater will be formulated with due consideration given to the following plan conditions:

(1) The NE direction is predominant in Iloilo and its vicinity and dollowed by the SW direction.

(2) The land form of the fishing port project site is such that the sea side is situated in the SW direction as indicated in Fig. 3-1. The wave on which attention ought to be focused is the diffracted which is caused

by the wind blowing from the southwest to the northeast and also the wave caused by the winds blowing in the southwest direction. The condition of design wave, which is estimated by wind data, at the project site of breakwater is 1.5 m in significant wave height and the wave direction is SW-SSW.

(3) The entrance of port will be situated in the west of the port with due consideration paid to the port departure and entry of fishing boats. The shape of the entrance of port will be determined while giving consideration to the minimization of the wave coming into the port and the prevention of the port from siltation caused by littral drift. The width of the entrance of port will be set at 120 m.

(4) The south breakwater will be constructed on the sand bar (-4 m in water depth). As the center line of the west breakwater will also serve as the training jetty of the Batiano River, the face center line of jetty will be determined with due consideration given to the outflow of the river water.

4-3-2 Length of breakwater

There will be installed a south breakwater, 800 m, and a west breakwater, 800 m.

4-4 Plan of Shipyard

The ship yard, which is of a sloping type, will permit the landing of fishing boats per certain periods for minor repair work. The length will be 220 m.

4-5 Plan of Revetment Rock Bulkhead

West rock bulkhead of 240 m in length and east rock bulkhead of 310 m in length will be installed.

4-6 Plan of Basins

The basin for the bagnetters will have a required water area secured in the back of the south and west breakwater. Particularly, the bagnetters have a occupancy area of about 500 m^2 per vessel, caused by their outriggers and will thus require a mooring area of about 2,500 m^2 per boats at normal time or about 6,500 m^2 at strong wind.

4-7 Layout and Utilization Plan

Layout of the facilities specified in Sections 4-2 through 4-6 and the plan for the fishing boats to use them are as shown in Fig. 3-2. A detailed layout plan including the land functional facilities is illustrated in Fig. 3-5.

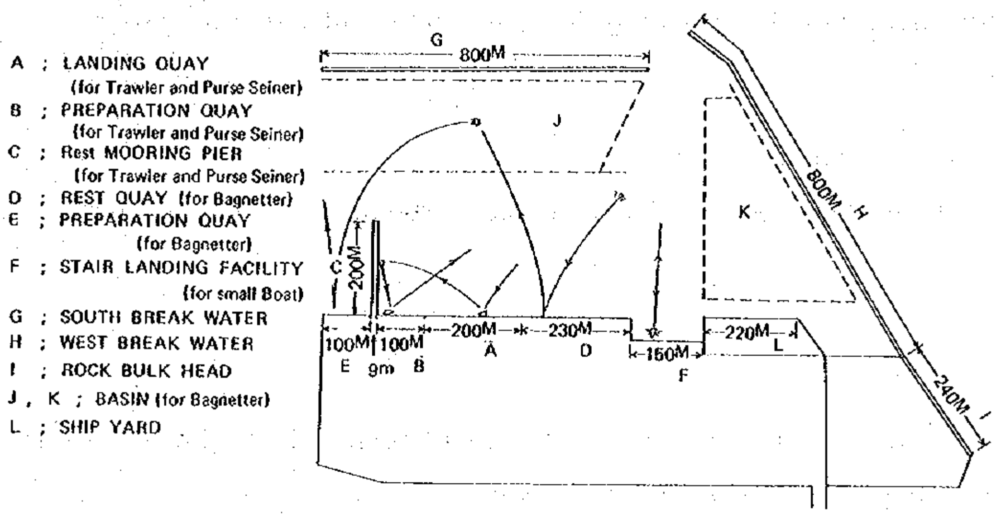


Fig. 3-2 Iloilo Fishing Port Basic Facilities Layout and Utilization Diagram.

Chapter 5 Plan of Functional Facilities

The functional facilities are referred to the facilities complementing the basic facilities and, at the same time, serving for reasonable execution of the works and services to be performed at the fishing port and thus enhancing the usefulness of the fishing port, and where the fish market and the ice plant and cold storage are constructed in the fishing port area, they are classified as one of the fishing port facilities.

5-1 Planned Facilities

Planned facilities include (1) fish market, (2) sheds, (3) ice plant and cold storage, (4) water supply facilities, (5) fuel supply facilities, (6) road, (7) parking area, (8) administration office, (9) fence and guardhouse, (10) power distribution and illumination facilities, (11) drainage system, (12) public toilet, (13) fishing boat and engine repair shop, (14) land for fishing port facilities and (15) aids-to-navigation.

5-2 Plan Conditions and Required Quantities of Functional Facilities

5-2-1 Plan conditions of functional facilities

Planning of the functional facilities will be made with the following plan conditions taken into consideration.

(1) The ice plant and cold storage shall be installed at a location as close to the fish market and also to the fishing preparation quay for trawlers as practicable.

(2) For water supply, a water tank shall be installed which is connected to the service water system of the city and from which pipes are extended to the required places for supply of water.

(3) For fuel supply, fuel tanks and fuel supply taps shall be installed, and the supply to the fuel tanks is made by tank lorries from the Iloilo City.

(4) From the management requirement, there shall be constructed only one

road which leads to the outside of the fishing port area.

(5) At the boundary between the land for fishing port facilities and the privately owned land, a fence shall be provided. At the boundary of the road leading to the outside, a gate and a guardhouse shall be installed.

(7) As fishing boat and engine repair facilities for major repair of fishing boats, slipway and dock equipment shall be created.

(8) As the land for fishing port facilities, sites for the various functional facilities shall be provided.

(9) Navigational aids shall be installed at the extreme ends of the south and west breakwaters.

5-2-2 Required sizes of functional facilities

1. Required sizes of main functional facilities (scale and capacity)

(1) Fish market

1) Standard amount of handling per day

Planned number of fishing boats is;

Purse seiners:

Large;	9 boats	(A)
Medium;	29 boats	
Trawlers:	89 boats	
Bagnetters:	87 boats	

Standard number of landing fishing boats per day is;

Purse seiners:

Large;	9 ÷ 12 ≑ 1 boat	(B)
Medium;	29 ÷ 7 ≑ 4 boats	
Trawlers:	89 ÷ 6 ≑ 15 boats	
Bagnetters;	87 × 80% ≑ 70 boats	

2) Standard landing quantity per day

Purse seiners:

Large; 1 boat × 20 tons ≑ 20 tons

Medium; 4 boats × 8 tons ≑ 32 tons

Trawlers: 15 boats × 6.5 tons ≑ 98 tons (C)
Bagnetters: 70 boats × 3.5 tons ≑ 250 tons

3) Processing capacity per m^2 of fish market

Catches from trawlers 50 kg/m^2 (D)
Catches from bagnetters and purse seiners 100 kg/m^2

4) Required floor area of fish market

Catches from trawlers

(C) ÷ (D) = 98 tons ÷ 50 kg/m^2 ≑ 2,000 m^2

Catches from bagnetters and purse seiners

(C) ÷ (D) = 302 tons ÷ 100 kg/m^2 ≑ 3,000 m^2

Total 5,000 m^2

5) Scale of fish market

Steel-framed, aluminium sheets roofing building of 40.0 m × 125.0 m (5,000 m^2)

(2) Ice plant and cold storage

1) Ice plant

Supply of ice to fishing boats is of the same amount, for the trawlers and purse seiners, to the amount of catches landed per day. Use of ice at the fish market a day is 1/2 of the landed amount of catches.

Ice making capacity

152 tons × 1 + (152 + 250) 1/2 ≑ 350 tons/days

2) Ice storage

Storage amount of ice is equivalent to one day's production of ice or 350 tons (at -5°C)

3) Cold storage

Freezing amount a day 5 tons/day (E)

Cold storage amount

(E) × 10 days stock = 5 tons/day × 10 days = 50 tons (at -25°C)

(3) Water supply facility

Table 3-3 Water supply calculation table

Classification	Water supply per day	Water supply per hour
Supply to fishing boats		
Purse Seiners (Large)	7.92 tons/boat × 1 boat = 7.92 ^{t}	$90.1^t \div 6^{hrs} = 15.0^{tons}$
Purse Seiners (Medium)	4.20 tons/boat × 4 boats = 16.80 ^{t}	
Trawlers	3.24 tons/boat ×15 boats = 48.60 ^{t}	
Bagnetters	0.24 tons/boat ×70 boats = 16.80 ^{t}	
Ice Plant & Cold Storage	270 ^{t}	$270^t \div 24^{hrs} = 11.3^{tons}$
Other Use	24 ^{t}	$24^t \div 12^{hrs} = 2.0^{tons}$
Total	384.1 tons/day	28.3 tons/hrs

Water is supplied from the city service water system, and a unit of pressure tank connected to the service water system shall be installed for supply of water through piping to the required places.

(4) Fuel supply facility

1) Fuel supply

Table 3-4 Fuel supply per day

Number of Objective Fishing Boats of Fuel Supply (B)		Fuel Supply per Boat per Time (F)	Fuel Supply per Day (B) x (F)
Purse Seiners (Large)	1 boat	14.410 Kℓ/boat	15 Kℓ/day
Purse Seiners (Medium)	4 boats	7.384	30
Trawlers	15 boats	11.136	167
Bagnetters	70 boats	0.182	13
Total			225

2) Fuel tank capacity

Stock of two day's requirement of fuel

225 kl/day x 2 days = 450 kl

For storage of fuel, two tanks with capacity of 200 kl each and a 100 kl tank is installed in the compound of the fuel tank and the fuel shall be supplied to the fuel supply taps on the quays through piping.

Note: The fuel supply amount per boat per time is calculated as given below.

Table 3-5 Fuel supply amount per boat per time.

Classification	Purse Seiner		Trawler	Bagnetter
	Large	Medium		
Fishing boat horse power	395 HP	347	407	160
Main fuel consumption/hr/HP	0.19 Kg/hr/HP	0.19	0.19	0.19
Average running hours/navigation/boat	12 x 16 = 192 hrs	7 x 16 = 112	6 x 24 = 144	6
Main fuel supply/time/boat	14.410 Kℓ/boat	7.384 Kℓ/boat	11.136 Kℓ/boat	0.182 Kℓ/boat

2. Scales of the other functional facilities

(1) Shed (Catch transport vessel stock building)

There shall be installed two buildings with a floor area of 1,200 m^2 each.

(2) Roads

The road running out of the fishing port area shall be 15 m in width, and the roads within the compounds of the fishing port shall be 10 m in width. All these roads shall be paved by asphalt and provided with drainages and gutters.

(3) Parking area

A parking space (asphalt paved) shall be provided in the back of the fish market, and sheds.

(4) Administration office

A two-storied reinforced concrete building with a total floor of 1,600 m^2 shall be constructed.

(5) Fence and guardhouse

There shall be installed an extension of 1,680 m of fence, a gate and a guardhouse of a floor area of 50 m^2.

(6) Power distribution and illumination facilities

With the electric power supplied from the city, the power distribution lines within the fishing port area shall be installed. Illumination lights should be installed where they are required.

(7) Public toilets

Two public toilets, each with a floor space of 100 m^2, shall be constructed.

(8) Fishing boat and engine repair shop

A slipway of an extension of 72 m, fishing boat loading equipment (rails, power winches, etc.) and land for repairing work shall be provided.

(9) Land for fishing port facilities

There shall be created about 21.5 hectares of land as the site for the foregoing functional facilities and the lot for fish processing, fish industry and net and gear area.

(10) Aids-to-navigation

A red light beacon shall be installed at the extreme end of the south breakwater, and a white light beacon at the extreme end of the west breakwater.

5-3 Layout Plan

Layout or arrangement of the facilities specified in Section 5-2 is as shown in Figs. 3-3 and 3-4. A detailed layout plan including the basic facilities is illustrated in Fig. 3-5.

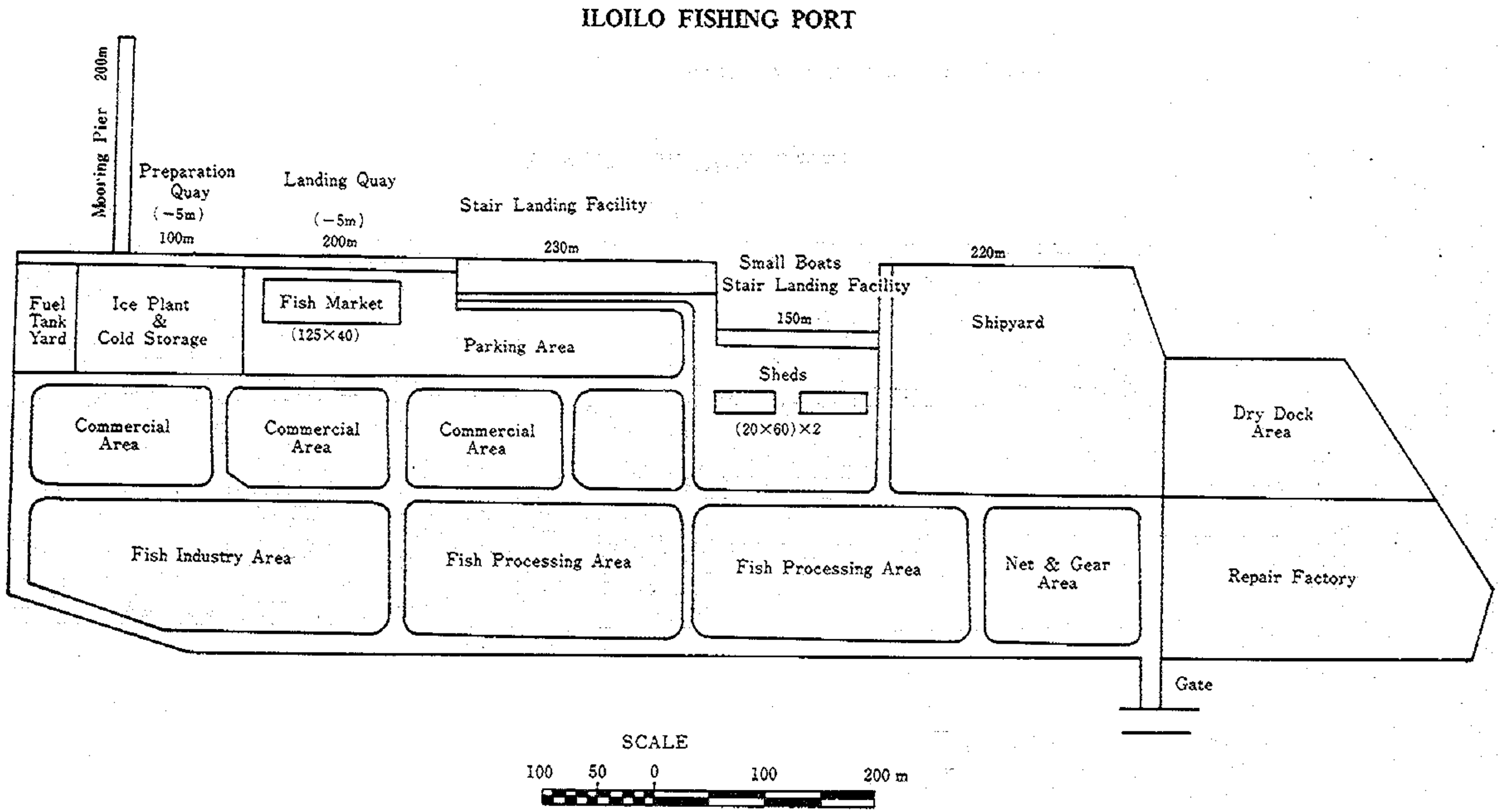


Fig. 3-3 Arrangement of Functional Facilities, Iloilo Fishing Port

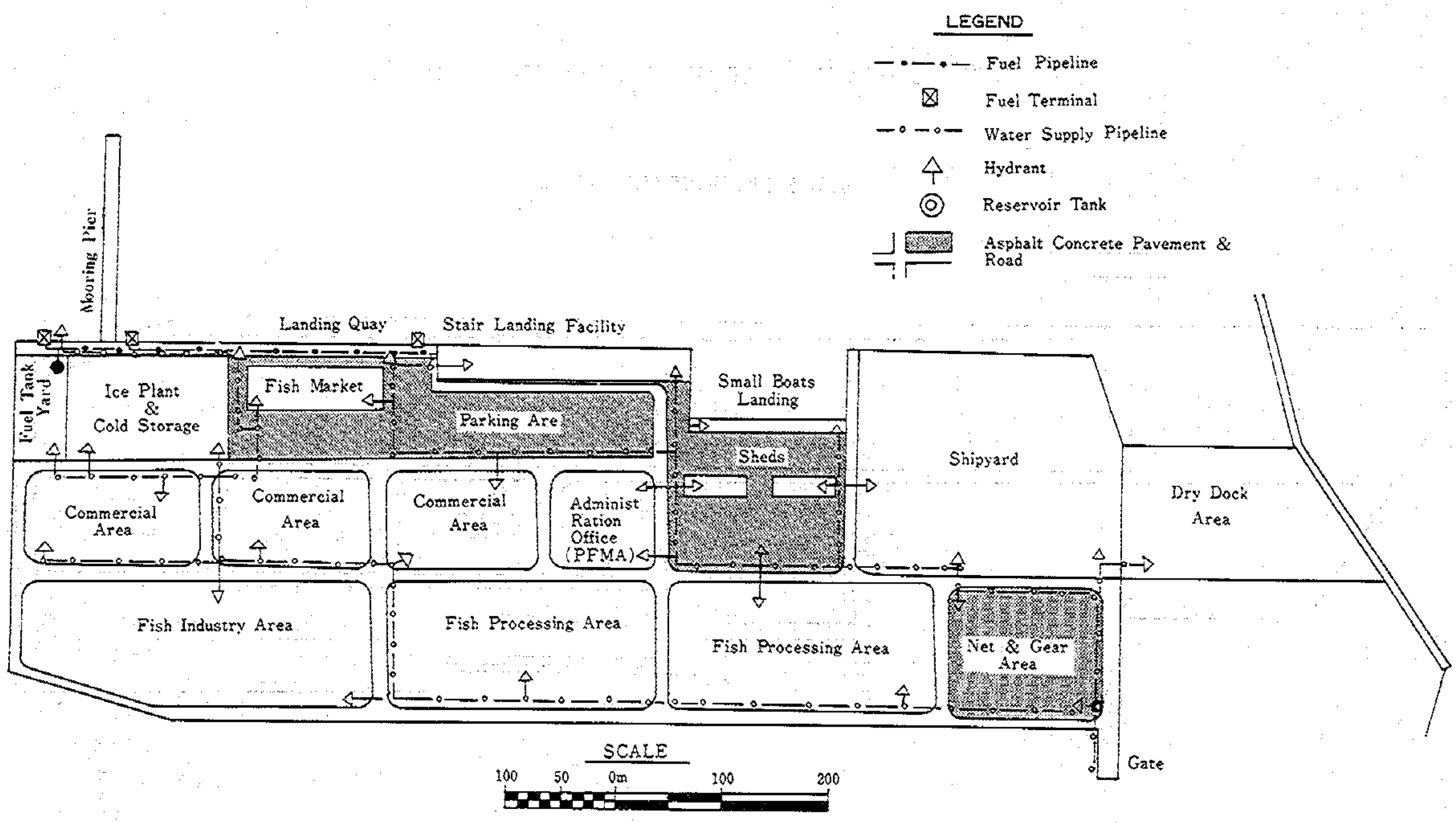


Fig. 3-4 Water & Fuel Supply System, Iloilo Fishing Port

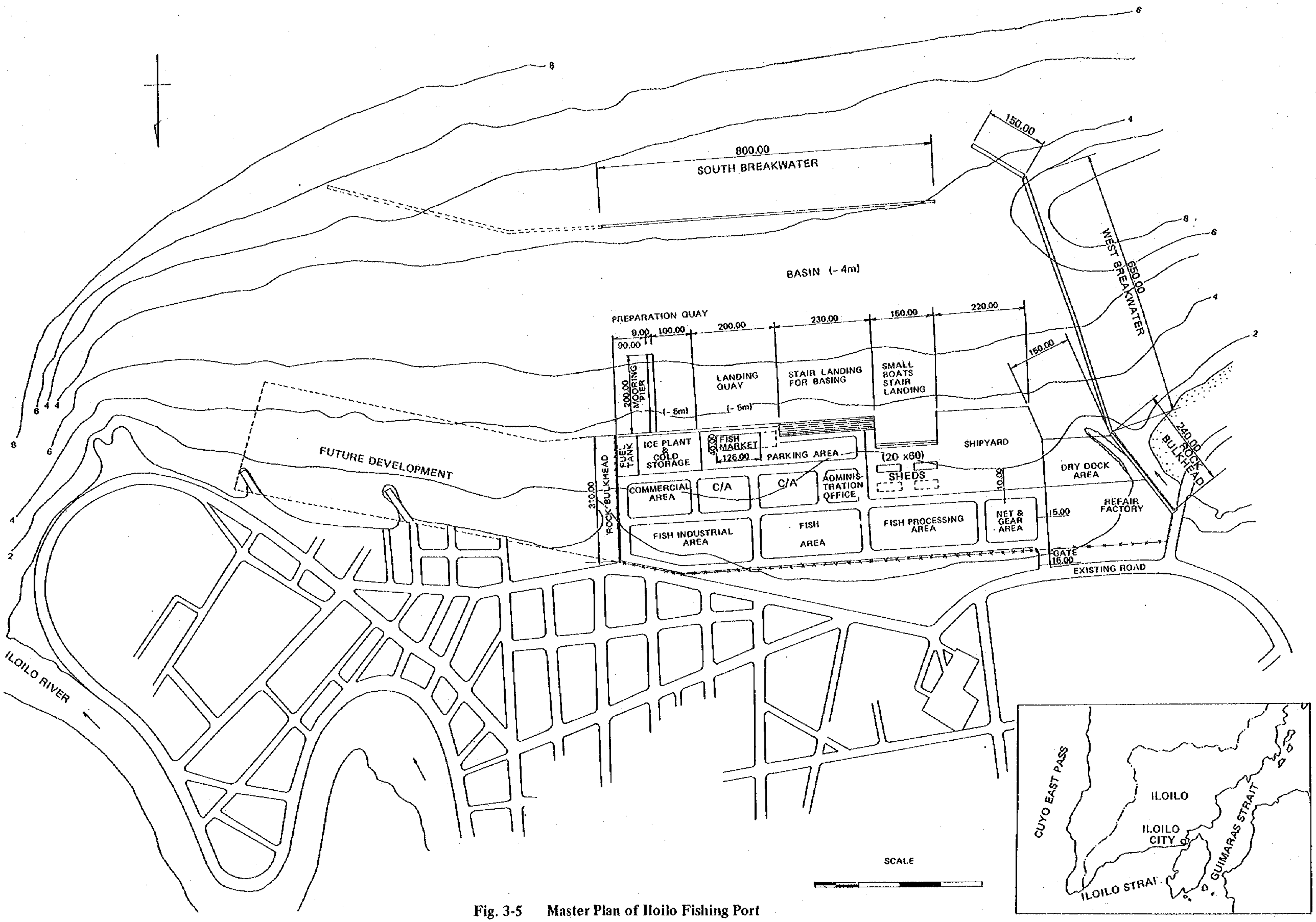


Fig. 3-5 Master Plan of Iloilo Fishing Port

Chapter 6 Structural Design of Principal Facilities

6-1 Design Conditions

Design conditions used for design of quays and other principal facilities are summarized in the following.

(1) Design seismic intensity (Kh)

$$Kh = z.k.c$$

where z : Regional seismic intensity (or z = 1.2) according to the "Seismic Data in the Philippines" shown in Fig. 3-6;

k : Structural importance coefficient (or k = 1.0); and

c : Seismic coefficient (or c = 0.1).

Then,

$$Kh = 1.2 \times 1.0 \times 0.1 = 0.12 \text{ or nearly } 0.1.$$

(2) Soil conditions

No soil survey was conducted at the site of construction so that with the recent soil survey data at the point near the construction point taken as a reference, the soil condition was estimated as shown in the subsoil condition columnar diagram of Fig. 3-7.

(3) Objective fishing boat

The objective fishing boat include trawlers, purse seiners (large and medium) and bagnetters, and the specifications of their ship type are indicated in Table 3-6.

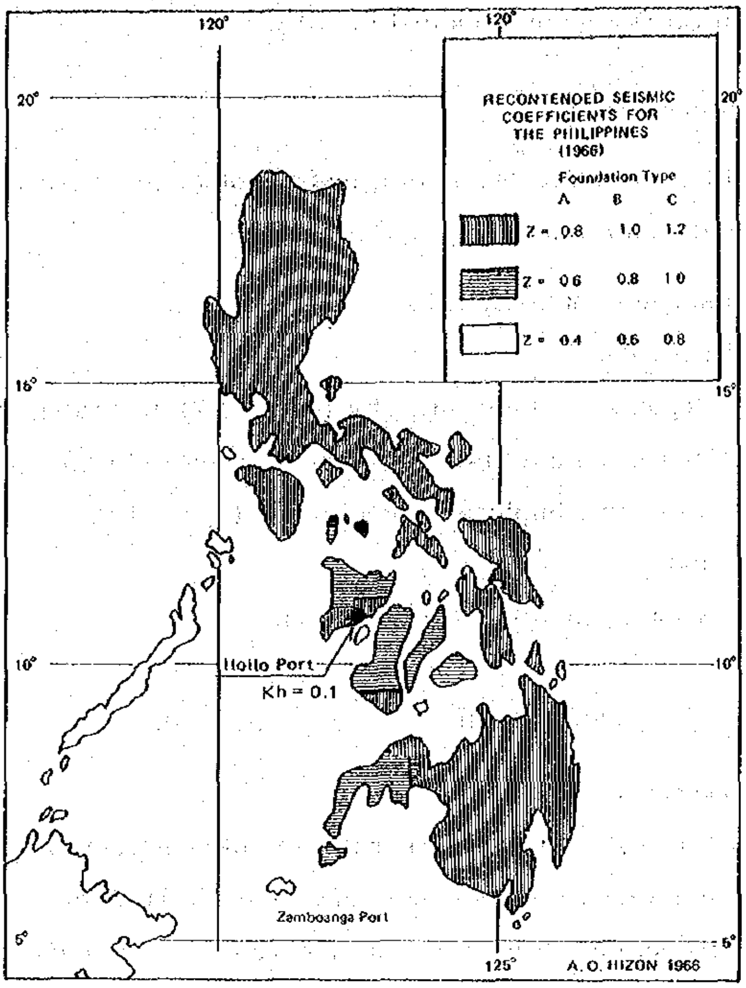


Fig. 3-6 Seimic Condition of the Philippines

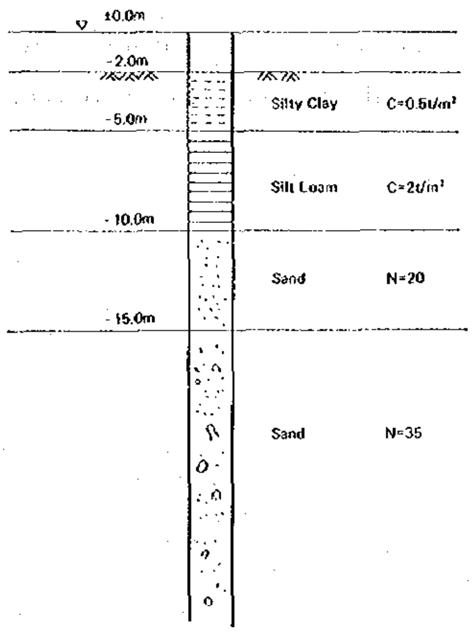


Fig. 3-7 Estimated Sub Soil Condition of Iloilo Port

Table 3-6 Type parameters of objective fishing boats.

Kind of Fishing Boat	Length Overall	Extreme Breadth	Draft	Gross Tonnage
Trawler	17.4 m	3.9 m	2.9 m	120 tons
Purse Seiner				
Large:	24.3	6.2	2.8	175
Medium:	13.2	4.0	2.4	80
Bagnetter	10.7	20.0	1.5	24

(4) Tide condition

In the absence of the records of observation at the site, the design tide levels are determined as shown below from the "Tide and Current Table, Philippines" (published by the Bureau of Coast & Geodetic Survey) and the charts.

H.H.W.L. +1.530 m

H.W.L. +1.340 m

(1.250 + 0.09 = 1.340)

L.W.L. +0.750 m

(0.722 + 0.03 = 0.752)

Incidentally, the information given in the chart about the tide levels is as follows:

H・W (spring tide)	5.0 ft (1.52 m)
H・W (neap tide)	2.8 ft (0.85 m)
L・W (spring tide)	0.2 ft (0.06 m)
L・W (neap tide)	1.9 ft (0.58 m)
High tide level at spring equinox (average)	6.7 ft (2.04 m)
Low tide level at spring equinox (average)	-1.3 ft (-0.40 m)

(5) Design wave height

In the absence of the records of observation of waves at the fishing port construction site, the design wave heights are estimated from the records of strong winds and wave invading conditions in the past as given below:

H_{max} = 2.0 m; and

$H_{1/3}$ = 1.5 m.

(6) Other design conditions

The other conditions considered for design are as follows.

1) Crown heights;

Quay and landing place	DL +2.5 m.
Revetment and breakwater	DL +3.0 m.
Reclaimed land	DL +2.5 m.

2) Design water depth;

Maximum draft of objective fishing boat (A) 2.9 m

Allowance (B) 1.1 m for the time being
2.1 m in the future (at -5 m of depth)

Design depth (A + B)

Design water depth of structures	-5.0 m
Temporarily dredged depth of berth, etc.	-4.0 m

3) Surcharge load;

Quay	1.0 ton/m^2
Landing place and bulkhead	0.5 ton/m^2

4) Internal frictional angle of backing cobble ϕ = 30°

5) Property of bearing ground

Silty clay	C = 0.5 ton/m^2
Silty loam	C = 2 tons/m^2

6-2 Selection of Structures of Main Facilities

6-2-1 Point noted in selection

In the selection of structures for principal basic facilities, the following points are to be noted.

(1) As there is need to complete the construction over a short period to start the use of the fishing port at the earliest possible date, the structure must be simple, ready to construct and become stable over a short period.

(2) The land for fishing port facilities shall be created entirely by reclamation with spoil so that it is required to construct sub-bulkheads in the water.

(3) The structure shall be so chosen as to permit as much use of the construction machines presently available in the Philippines as practicable while use of special machines is avoided.

(4) The structure shall be so chosen as to permit as much use as practicable of the materials available at the site.

(5) The quays shall be of sheet pile structure, and from the workability, reliability and durability, steel sheet piles are to be used.

6-2-2 Structural elements of principal basic structures

Structural elements of the principal basic structures are as given below.

(1) -5 m Quay – steel sheet pile structure (See Fig. 3-8)

Body – Steel sheet piles (U-IVA), ℓ = 14.0 m

Embedment -12.0 m

Tie rod – tie rod (ϕ 35 m/m)

Apron – Effective width: 10.0 m

Paved with concrete, 20 cm in thickness

Anchors – Steel sheet piles (U-IIIA), ℓ = 10.0 m

(2) -2 m stair landing facility; Concrete structure (see Fig. 3-9)

Body – Concrete stair work.

Foot protection – Precast concrete blocks (piled in 2 layers)

(3) -4 m stair landing facilities (see Fig. 3-10)

Body – Concrete stair work

Foot protection – Precast concrete blocks (piled in 3 layers)

(4) Shipyard (Basnig landing)

Concrete structure (see Fig. 3-11)

Body – Concrete blocks beneath the depth ±0.0 m.

In-situ concrete above the depth ±0.0 m.

(5) Piled pier (see Fig. 3-12)

Main body – Steel pipe piles, ø 609.6 m/m, t = 12 m/m, ℓ = 15.5 m

Pier width 9.0 m, length 200 m

Floor plates: reinforced concrete.

(6) Bulkhead

Body – Rubble mound foundation (used for bulkhead of reclamation work)

Concrete coping (with mooring bitts).

Apron pavement of a width of 5.5 m provided in the back of the wall.

(7) Breakwater 1 (water depth of up to -4.5 m) (see Fig. 3-14)

Rubble mound breakwater (Slooping type)

Crown height	+3.0 m
Crown width	3.0 m

Rubble mound:

Armour rock	2,000 kg/piece; two layer.
Backfill rock	500 kg/piece; one layer.
Core rock	100 - 200 kg/piece.

(8) Breakwater 2 (water depth of more than -4.5 m) (see Fig. 3-15)

Block composite breakwater (Composite type)

Crown height	+ 3 m (front)
Crown width	6 m

Body – Concrete blocks, 3 layers

Coping, in-situ concrete.

Rubble mound:

Armor rock	500 kg/piece
Filling rock	100-200 kg/piece

(9) Breakwater-3 (Extreme end part) (See Fig. 3-16)

Block composite breakwater (Composite type)

Crown height $+3.0$ m.

Crown width 3.0 m.

Body - Concrete block, three layers.

Coping, in-situ concrete, serving also as the foundation for the beacon.

Rubble mound:

Armor rock 2,000 kg/piece

Filling rock 100-200 kg/piece

(10) Dry dock (See Fig. 5-17)

Body - Precast concrete blocks beneath the depth ± 0.0 m.

In-situ concrete above the depth ± 0.0 m.

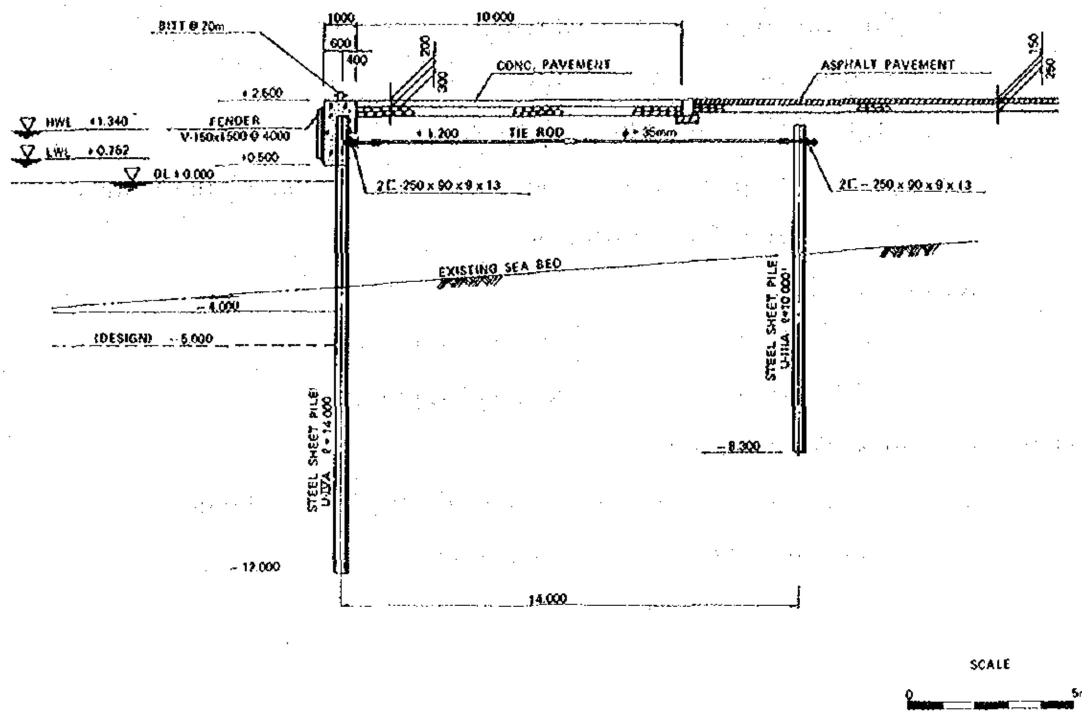


Fig. 3-8 Cross Section of Landing Quay – Iloilo Port

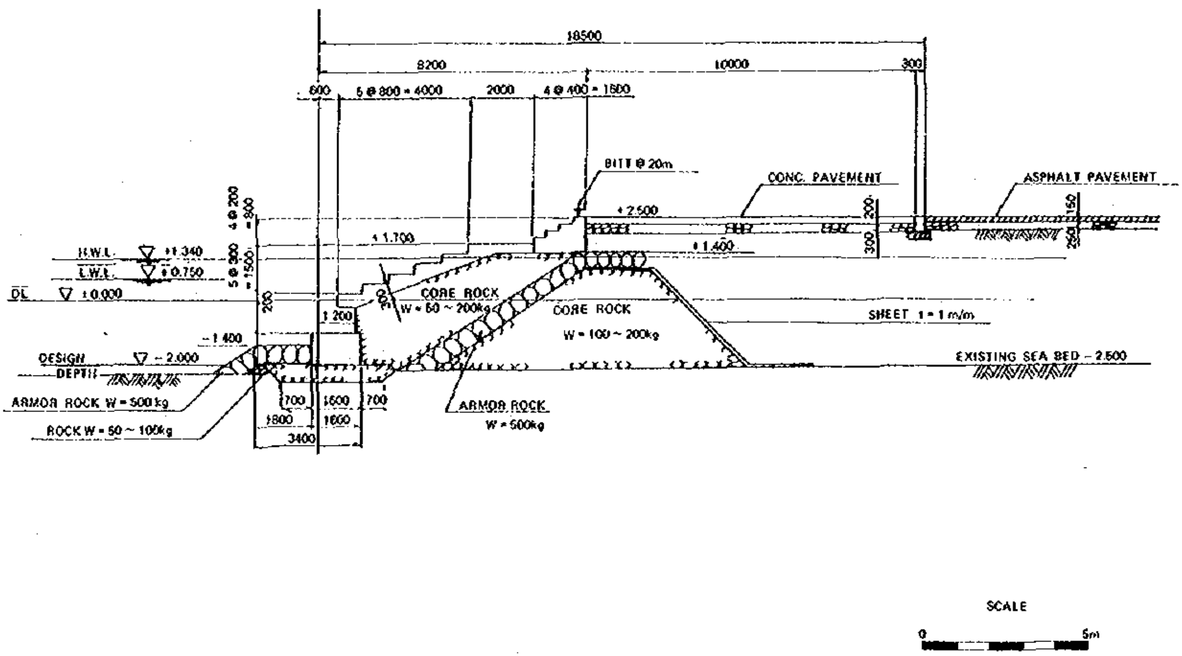


Fig. 3-9 Cross Section of Stair Landing – Iloilo Port

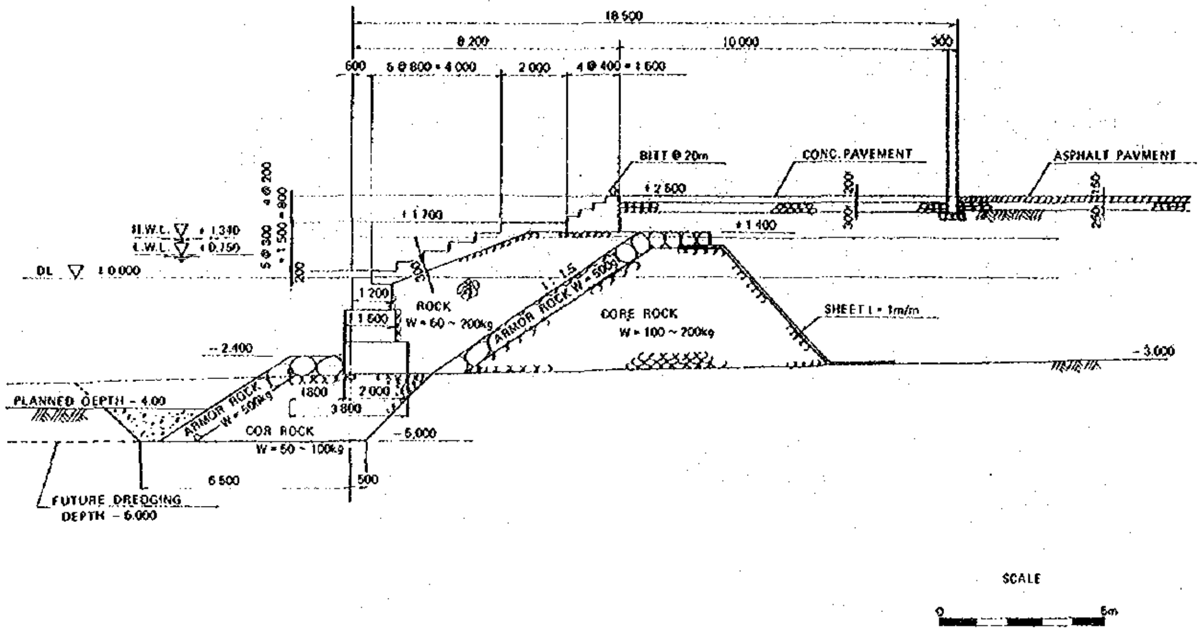


Fig. 3-10 Cross Section of Stair Landing – Iloilo Port

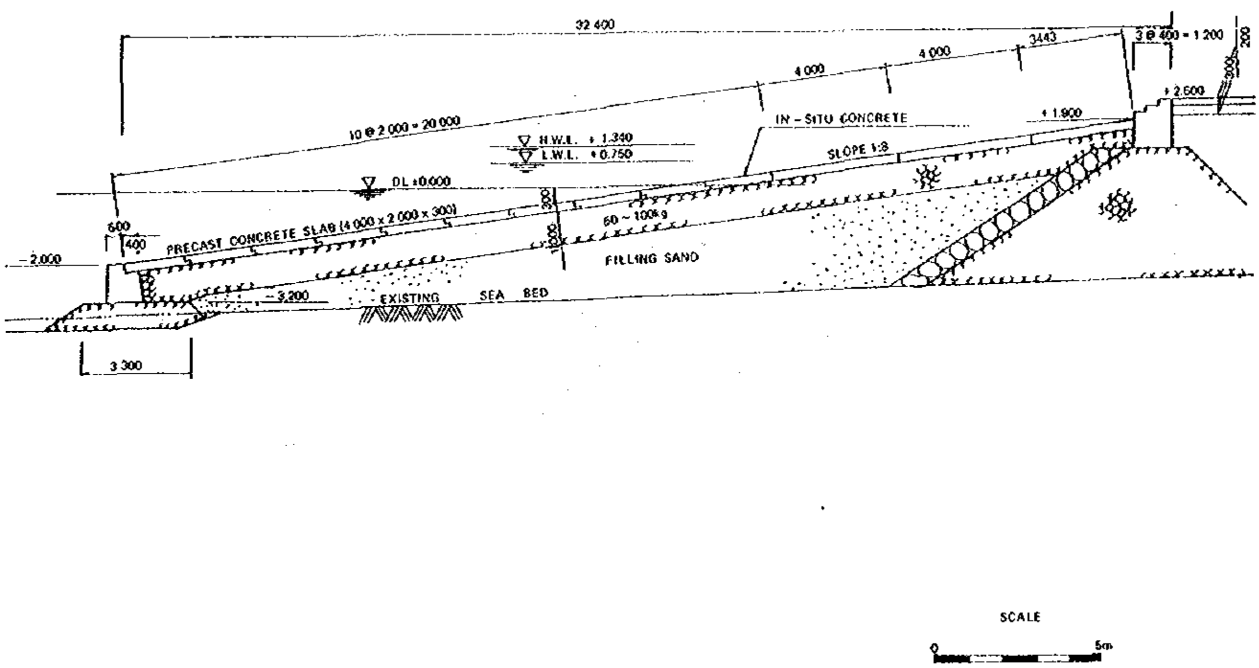


Fig. 3-11 Cross Section of Basnig Landing – Iloilo Port

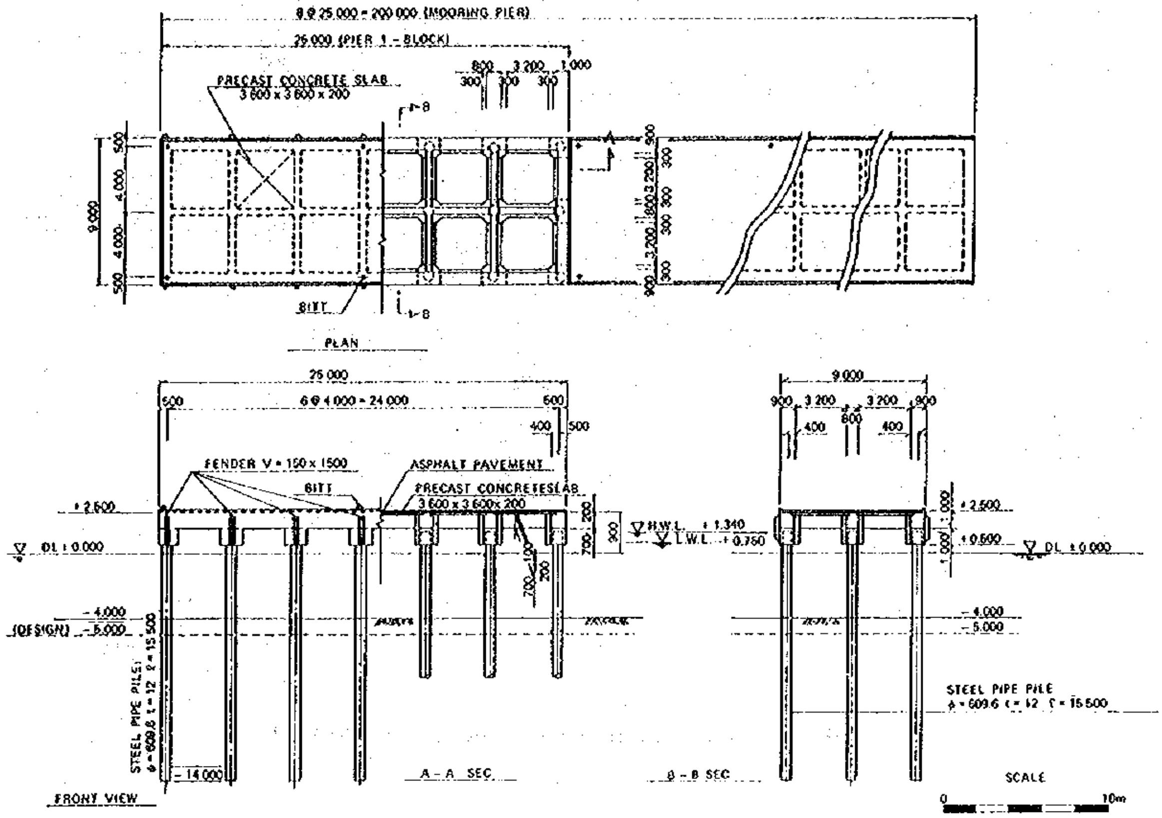


Fig. 3-12 Cross Section of Mooring Pier – Iloilo Port

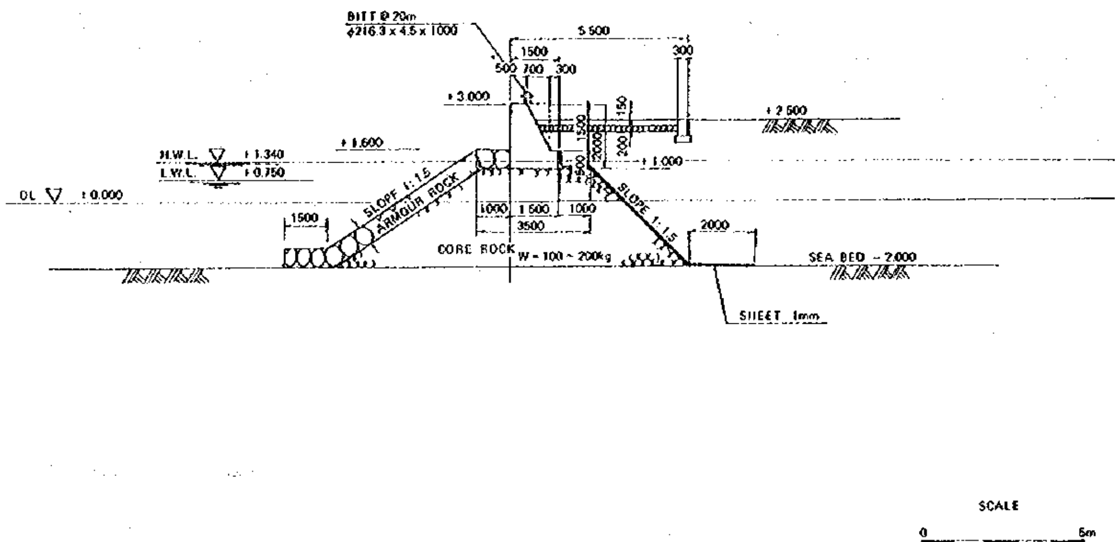


Fig. 3-13 Cross Section of Rock Bulkhead – Iloilo Port

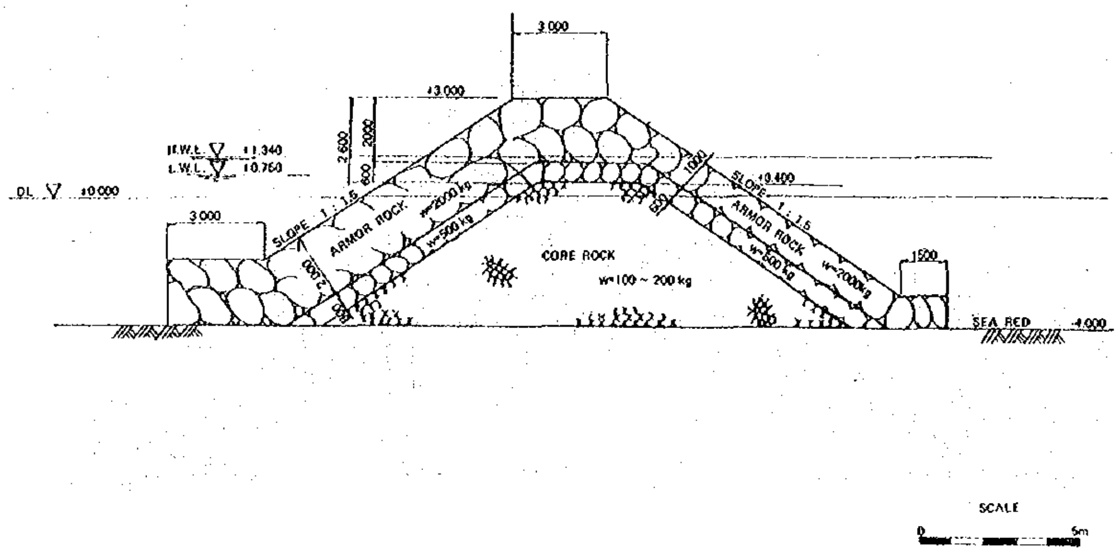


Fig. 3-14 Cross Section of Breakwater (1) – Iloilo Port

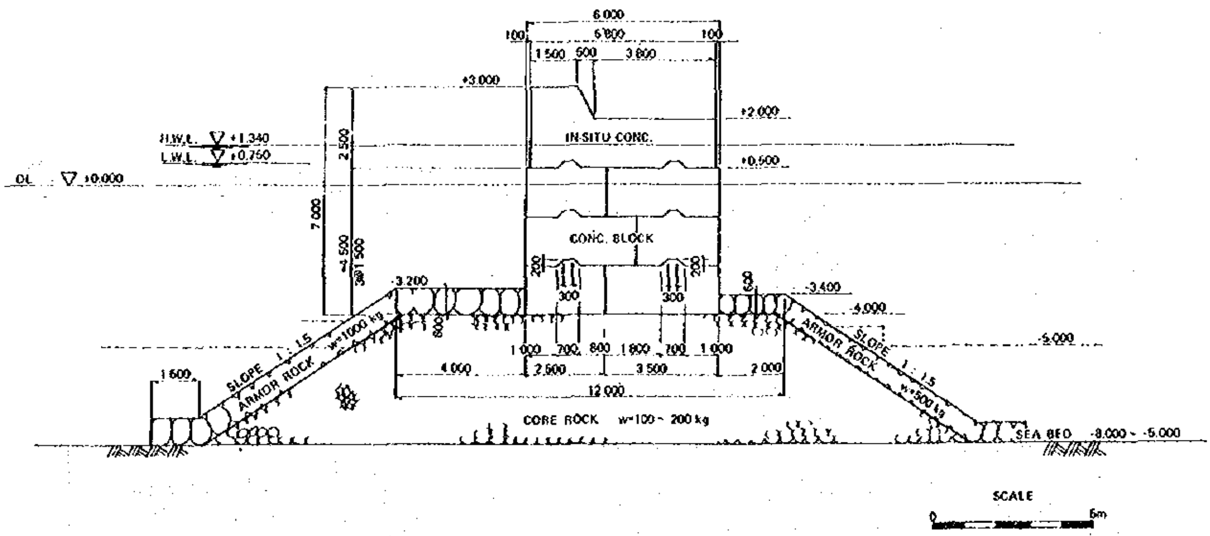


Fig. 3-15 Cross Section of Breakwater (2) – Iloilo Port

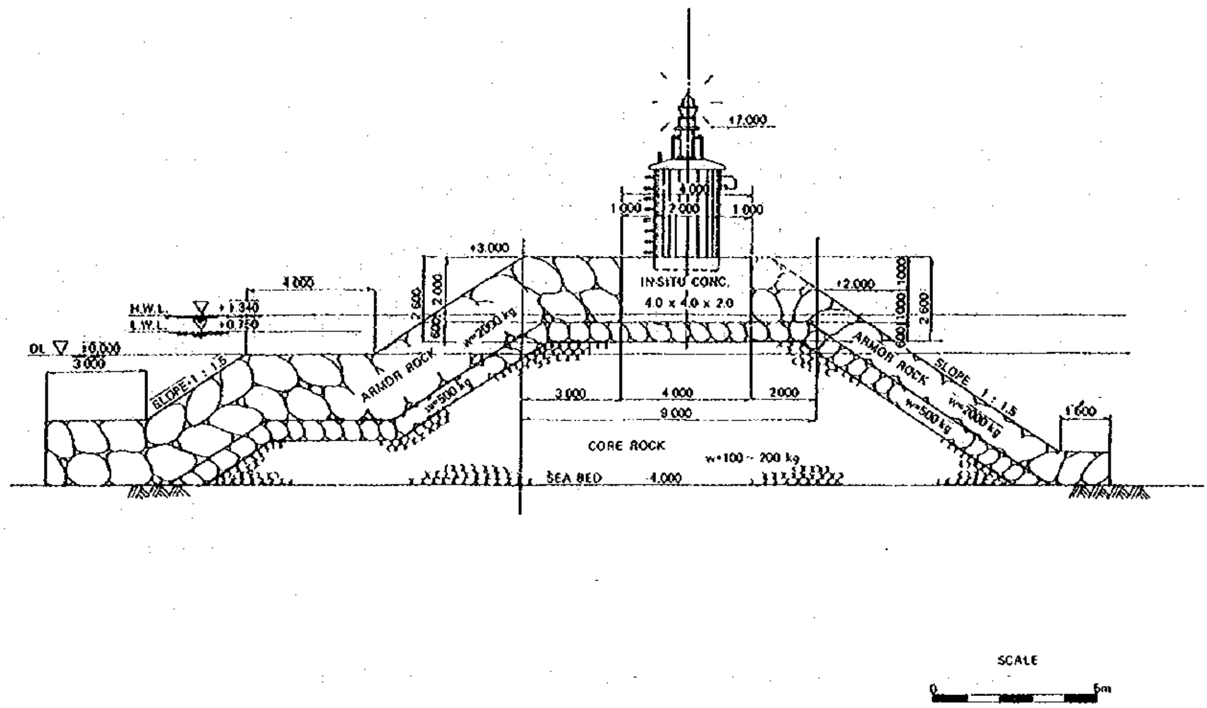


Fig. 3-16 Cross Section of Breakwater (3) – Iloilo Port

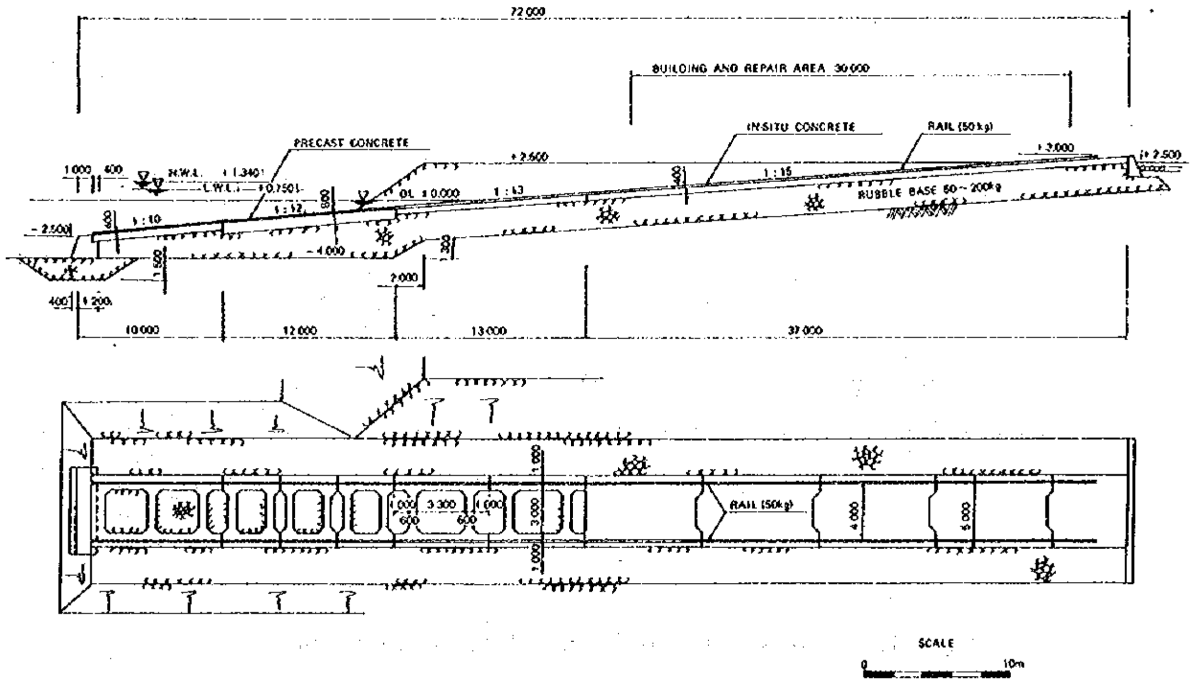


Fig. 3-17 Cross Section of Dry Dock – Iloilo Port

Chapter 7 Construction Program

7-1 Work Program

7-1-1 Principles

The construction program should be made with consideration given to the work schedule so that the work period being three years, the respective works are started as soon as practicable and that from the urgency of use of the facilities and the viewpoint of effective utilization of them, not only the basic facilities but the functional facilities can be placed in use soon.

Further, in implementing the construction program, consideration should be made so that the demand for facilities at the respective target years would be met satisfactorily.

Moreover, at the construction site, the catch landing and other works are actively carried out presently. Thus, it is required to give consideration to these activities so that they are as scarcely hampered as possible.

7-1-2 Securing workers for construction and procurement of materials and machines

(1) Securing the construction workers

The construction site is only 4 km apart from the central section of Iloilo City so that it will be easy to secure unskilled workers. Also, it will not be difficult to secure the concrete workers and other skilled workers in the general works.

However, it will be difficult to secure the skilled workers in the port construction works, and they will have to be introduced from the other areas.

(2) Procurement of construction materials

For procurement of the important materials among the construction materials in general are;

1) The places in the vicinity of Iloilo City from which various rubble stones may be supplied include the hill situated about 15 km northwest of

the city and Guimaras Island across the Iloilo Strait. It is advisable to use Guimaras Island to secure large quantities of rubble stone uniform in quality.

2) Sand and gravel for concrete works

Sand and gravel are as procurable as rubble stone. Incidentally, it is advisable to use pit sand and crushed stones.

3) Backfill and displacement sand

The large quantities of deredged sand which is to be obtained from the dredging of the basin will be put to use.

4) Cement

Indigenous cement is used since its supply is stable and it has no problem in quality as well as quantity.

5) Steel materials

Steel materials such as steel sheet pile, tie rod and reinforcing bar are required to be of stable supply and uniform quality so that their supply will be dependent on imports.

6) Forms and supports

Wooden forms, supports and other temporary materials are all procurable domestically. Steel forms and steel supports are partly procurable domestically, but there is a problem in the supply capacity. Thus, their use will be limited to the important structures, and their supply will be dependent on the import.

7) Other special materials

Cables, electrical wires, electrical equipment, plants and machines will be dependent on the import.

(3) Procurement of construction machines

The following construction machines are obtainable in Manila City and its peripheral area so that they will be procured domestically:

(1) Pump dredger,

(2) Pile driving barge,

(3) Pontoons and pontoons for crawler,

The following machines will be imported from the outside of the country.

(1) Crawler crane,

(2) Vibro-hammers, and

(3) Generator and other special machines.

7-1-3 Facilities required for construction

(1) Temporary road for construction

As the construction site is situated close to the city, there is need to construct a temporary road for exclusive use in the construction to bring in construction materials and construction machinery.

It is advisable to construct the temporary road along the face line of a future road. For this construction, some of the dwellings will have to be moved, so that the city authorities or the Government will have to compensate for their removal.

(2) Temporary channel for construction

The beach on which the construction site is situated is shallow to a great distance. For the approach and entry of dredgers, earth and stone carriers and other working vessels, there is need to construct a temporary channel for the construction.

(3) Forwarding and landing facilities of stone materials for construction

The transport of rubblestones, cobbles, gravel and sand will be done by ships and barges so that it will be necessary to construct forwarding facilities at the site for the supply of construction materials and landing facilities in the vicinity of the site for the construction of the fishing port.

With respect to the temporary stone material forwarding facilities, it is necessary to make them simple with a much end on system. The site for the construction of the fishing port is shallow to a great distance, so that the cobbles and other stone materials transported by barge and other ships will be landed by using the port facilities of Iloilo Port and revetments of the Iloilo River. And these material will be transported by dump truck from there to the construction site. In this case, there is need to pay heed so that the functions of Iloilo Port may not be hampered and also to work for coordination with city traffic.

(4) Temporary office, etc.

Simultaneously with the start of the construction work, it is necessary to construct an office for the officials in charge of the construction, a storehouse, a construction material yard, a construction machinery yard, etc. Now that the construction site is a flat sand beach, which is flooded at high tide, the aforementioned facilities will have to be constructed on an embankment of more than +1.5 m in height.

(5) Water, electricity, and telephone facilities

These systems will have to be completed by the city authorities or the Government from the city to the construction site before the construction work starts.

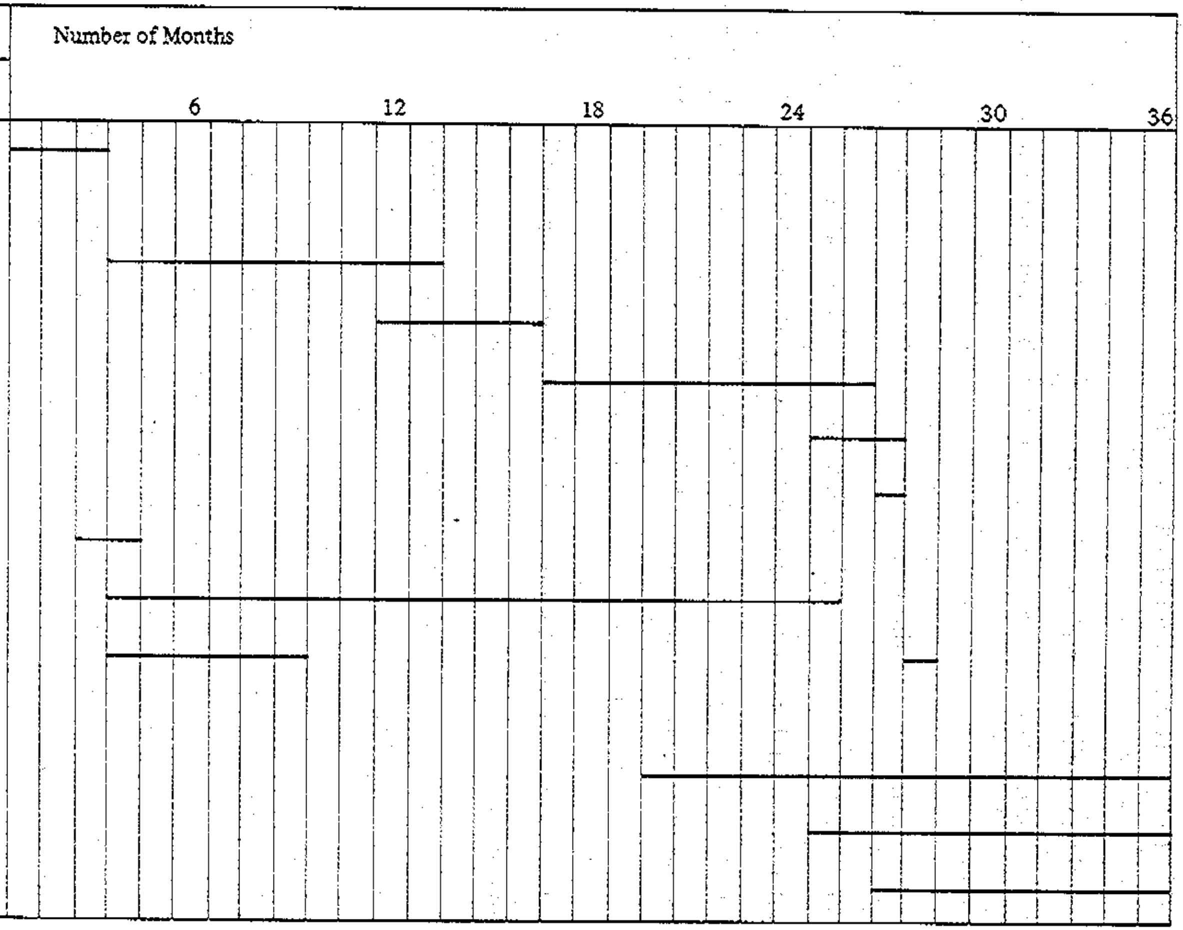
7-2 Project Schedule

The project schedule is indicated in Table 3-7.

Table 3-7 Project schedule – Iloilo fishing port

Completion Time 36 month

Item	Q'ty		Number of Months
Mobilization	LS	1	
Port Work			
Landing Quay	m	390	
Mooring Pier	m	200	
Stair Landing Facility	m	380	
Basing Landing	m	200	
Dry Dock	Set	1	
Sub Bulkhead	m	80	
Breakwater	m	2,150	
Dredging & Reclamation	m^3	1,420,000	
Functional Facilities			
Building Work	LS	1	
Road & Pavement	LS	1	
Miscellaneous Work	LS	1	



7-3 Estimation of Construction Cost

7-3-1 Concept for cost estimation

Estimation of the construction cost is made according to the following concept.

(1) Estimation of the construction cost is made on the 1978 prices.

(2) Unit prices of the construction materials and those of laboures used in the estimation are determined with the Standard Material Unit Prices and Standard Labour Wages (1977) of the Government of the Republic of the Philippines taken as the base and the material unit prices and labour wages obtainable upon survey at the fishing port project site taken as a reference.

(3) For the imported materials, the unit prices are obtained at the price of CIF plus domestic transportation costs in 1978 .

(4) Exchange rate of the local currency to the foreign currency is:

US$ 1.0 = 7.22 ₱

= ¥220.

(5) With no soil survey conducted at the construction site, a soil investigation will have to be conducted newly, and depending on the result of such soil investigation, the design conditions may change, involving a possibility of the design being modified more or less for the main structures. Thus, a contingency is estimated at a rate of 15% as physical contingency.

7-3-2 Estimation of construction cost

The construction cost required for development and improvement of the Iloilo fishing port is set forth in Table 3-8.

Table 3-8 Construction cost of Iloilo fishing port

	Unit	Quanty	Unit Price (US$)			Total (US$)		
			Local	Foreign	Amount	Local	Foreign	Amount
(Preparatory Work)						(157,250)		(157,250)
Site Clearance	m^2	75,000	0.23	0	0.23	17,250	0	17,250
Temporary Jetty	L.S	1				140,000	0	140,000
(Mobilization)	L.S	1				(196,000)	(333,000)	(529,000)
(Port Work)						(6,721,643)	(10,836,725)	(17,558,368)
Landing & Preparation Quay	m	390 *1)	631	5,679	6,310	246,090	2,214,810	2,460,900
Mooring Pier	m	200	1,084	4,078	5,162	216,800	815,600	1,032,400
Stair Landing Facility (A)	m	230	2,059	1,618	3,677	473,570	372,140	845,710
Stair Landing Facility (B)	m	150	1,545	1,166	2,711	231,750	174,900	406,650
Basning Landing	m	220	2,840	3,076	5,916	624,800	676,720	1,301,520
Dry Dock	NOS	1	43,773	71,455	115,228	43,773	71,455	115,228
Sub-Bulkhead	m	80	327	3,305	3,632	26,160	264,400	290,560
Breakwater	m	2,150 *2)	1,890	1,426	3,316	4,063,500	3,065,900	7,129,400
Dredging & Reclamation	m^3	1,420,000	0.56	2.24	2.80	795,200	3,180,800	3,976,000
(Functional Facilities)						(6,745,474	(3,549,671)	(10,295,145)
Fish Market	m^2	5,000	112.32	88.56	200.88	561,600	442,800	1,004,400
Transit Shed	m^2	2,400	112.32	88.56	200.88	269,568	212,544	482,112
Administration Office	m^2	1,600	624.00	0	624.00	998,400	0	998,400
Public Toilet	"	200	624.00	0	624.00	124,800	0	124,800
Roads & Pavement	"	107,100	27.82	0	27.82	2,979,522	0	2,979,522
Electrical	L.S	1				149,800	413,300	563,100
Drainage	m	8,460	47.36	0	47.36	400,666	0	400,666
Water System	L.S	1				338,300	112,900	451,200
Fuel System	L.S	1				136,400	645,400	781,800
Fence & Gate	L.S	1				54,600	0	54,600
Ice Plant & Cold Storage	L.S	1				731,818	1,722,727	2,454,545
Sub Total						13,820,367	14,719,396	28,539,763
Tax & Duties	L.S	1				1,743,509	0	1,743,509
Contingency	%	15				2,334,581	2,207,909	4,542,490
Total						17,898,457	16,927,305	34,825,762

Note: *1) = Total length of 390 m includes the preparation quay length of 100 m for Trawlers and Purse Seiners, and 90 m for Bagnetter.

*2) = Total length of 2,150 m includes the rock bulkhead length of 240 m which is connected west breakwater, and 310 m located east side of port terminal.

Chapter 8 Economic Analysis

8-1 Economic Background of Iloilo Fishing Port

The Iloilo fishing port has Iloilo city, the central city of Iloilo Province, as its hinterland. In this area, the fish processing industries and other related industries including shipbuilding are brisk. The site for the construction of the fishing port is situated adjacent to the center of the city, so that it is convenient to supply fish to the city and secure workers for work in the fishing port. On the other hand, the roads are crowded due to the excessive congestion of the city, and it is surmisable that the transport of fish and the supply of commodities for fishing operations would be hampered. For this reason, the city authorities have embarked upon the construction of a bypass and a short cut.

The fishing boats using the fishing port are those in various types of fishing boat, such as purse seiners, trawlers and bagnetters, and the varieties of fishes landed at this fishing port are multifarious.

In this analysis to be made from the viewpoint of the national economy, serious note will be taken of the aforementioned characteristics and an attempt will be made to analyze the form in which the intention of the Government of the Philippines to replenish the domestic fish demand may be realized by the development of a fishing port and the degree to which the effects of the development may be brought about from the economic point of view.

In general terms, the benefits of a fishing port consist of the following factors:

(1) Reduction of the time required for the fishing boats to come in and go out of the port through relief from congestion in the port;

(2) Increasing catches with increasing expedition of the fishing boats;

(3) Improvement in the freshness of fishes through increasing supply of ice and technological inovation;

(4) Realization of powered and larger fishing boats upon completion of a modern and larger scale fishing port (modernization of the fishery by functional accumulation);

(5) Increasing income of fishermen due to elevation of the average fish prices;

(6) Improvement in the rate of self-sufficiency of proteins;

(7) Stabilization of the fish prices from stable supply of fishes;

(8) Creation of employment opportunities and urbanization effect; and

(9) Acquisition of new techniques, and acceleration of the fishermen association.

The analysis will be made mainly with respect to the benefits (2) and (3) which permit quantifying among the benefits listed above.

8-2 Demand and Supply of Fish in Iloilo Province

8-2-1 Market territory and recent outputs of and demands for fishes

The biggest markets of the Iloilo fishing port are the Lucena City and Manila City. But, here, the discussion will be made with the market territory of the Iloilo fishing port restricted to the Iloilo Province.

The output and demand of fish in Iloilo Province in 1977 are indicated in Table 3-9. The exports are diverted to Japan, the United States, Hong Kong and other countries. In the Philippines, large quantities are forwarded to Metropolitan Manila.

Of the output of the marine fisheries, municipal fishing accounts for about 60% (59,600 tons), and commercial fishing 40% (42,100 tons).

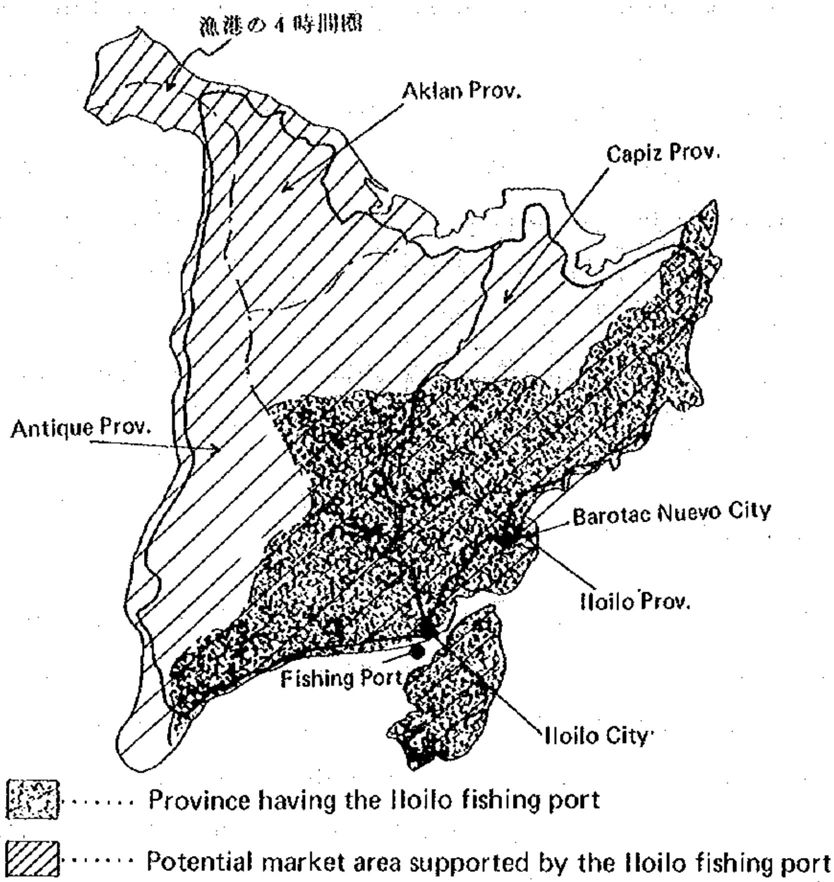


Fig. 3-18 Objective market territory of Iloilo fishing port.

Table 3-9 Details of fish supply and demand (1977).

tons

	Annual output	Demand in the province	Net Domestic & foreign exports
Marine fisheries	101,700		
Inland fisheries	27,500		
Total	(100,0) 129,200	(40.0) 51,700	(60.0) 77,500

Note: 1) The demand in the province was obtained, with the 1977 population of 1,150,000 used, according to the formula

$$D_n = C_o (1 + y \cdot e)^n \cdot P_n$$

where D_n : Effective demand in the n-th year with 1975 taken as a base year;

C_0 : Basic consumption in the reference year (32.6 kg);

y : Real per capita income growth rate (6%);

e : Income elasticity of demand for fish (0.4); and

P_n : Population of the n-th year (with 1975 as the base year).

2) Data: "Provincial Fisheries Data 1977," Iloilo Prov. Govt., 1978.

8-2-2 Analytical conditions

The analytical conditions are considered as follows.

(1) The output of the municipal marine fisheries will continue to maintain the present condition.

(2) The inland fisheries will have no increase in the output but continue to maintain the present condition.

(3) The rates of the net export and domestic shipment which have shares in the total output will be retained as they are, and a rise in the demand outside the Province will be proportionate to a rise in the output.

8-2-3 Analysis of the change in the balance of demand and supply

Under the foregoing present situation and analytical conditions, analysis of the balance of demand and supply in the future (cases with and without the fishing port) is made according to the following procedures.

(1) Forecast of population

Populations in the future are forecasted, upon the pattern of change of the population in 1960-1975, as shown in Table 3-10 and Fig. 3-19.

Table 3-10 Change and forecasted values of population in Iloilo Prov.

Unit: 1,000

Area \ Year	1960	1970	1975	1981	1990	2000
Iloilo city	152	210	227	240	250	250
Other area	814	958	1,079	1,180	1,370	1,590
Total	966	1,168	1,306	1,420	1,620	1,840

Data: "Comprehensive Urban Development plan, 1977 – 2000", City of Iloilo.
"Philippine Statistical Year Book", 1977, NEDA.

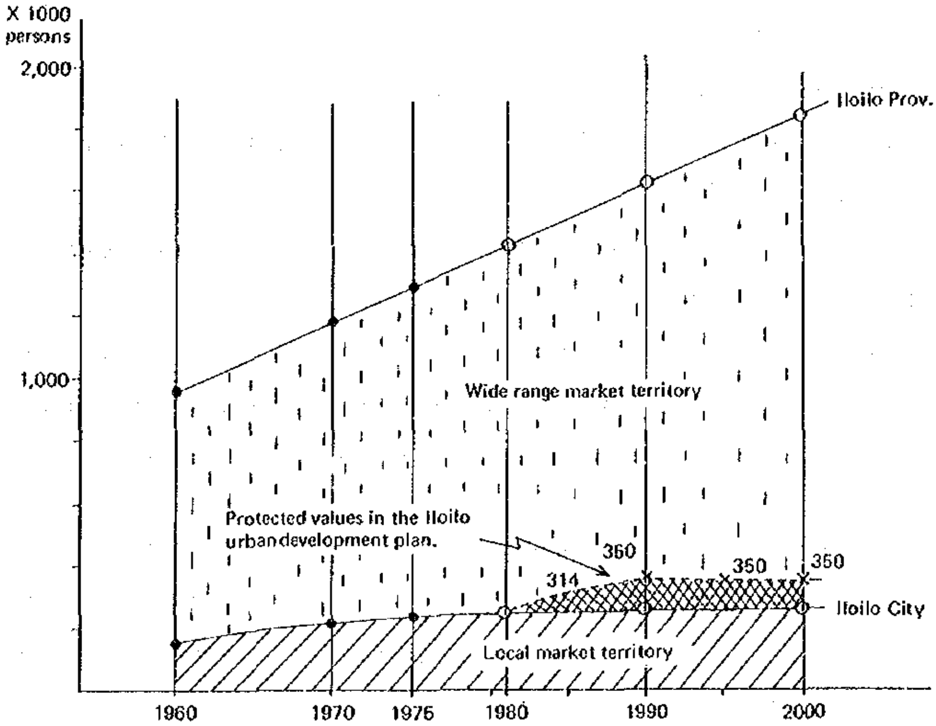


Fig. 3-19 Population change and forecast.

(2) Forecast of demand for fishes in the province

Demand forecasts of the objective market territory (Iloilo Province) are, if the forecast is made for the local market territory (Iloilo City) and for the wide range market territory (whole area of Iloilo Province except Iloilo City), as shown in Table 3-11.

Table 3-11 Demand forecast of fishes in Iloilo Prov.

tons

Year \ Market territory	Local market territory	Wide range market territory	Objective market territory
1979	7,400	35,176	42,576
1981	9,021	44,354	53,375
1990	11,630	63,733	75,363
2000	14,743	93,768	108,511

Note: The demand forecasting method is the same to that for Table 3-9.

(3) Balance of demand and supply in the province

The balance of demand and supply with a fishing port and that without a fishing port are shown in Table 3-12.

Table 3-12 Balance of demand and supply in the province.

tons

Project	Year	Supply (S)	Demand (D)	S/D
With port	1990	64,300	75,400	0.85
	2000	76,700	108,500	0.71
Without port	1990	46,100	75,400	0.61
	2000	46,400	108,500	0.43

Note 1) Supply (S): $S = (Y_0 + Y_1) - E$

Y_0 : Output (commercial fishery) at fishing port (with or without fishing port).

Y_1 : Outputs of municipal and inland fisheries.

E : Flow out of the province (net domestic and foreign exports)

2) Demand (D): Provincial demand specified in paragraph (2).

When a fishing port is developed in Iloilo, 100% of the province's commercial fishing will be evolved in the fishing port. Consequently, the self-sufficience rate (S/D) in Table 3-12 may be considered to be the true self-sufficience rate of the Province. When a fishing port is not available in 1990, the self-sufficience rate will be 61%, but the construction of the fishing port will make it possible to raise the rate to 85%. In 2000, the self-sufficience rate will be 43% in case a fishing port is not available, whereas it will stand at 71% in case a fishing port is available. This signifies the fact that there will be acute lack of fish in case there is no fishing port and the demand of fish in the Province will be fairly large.

8-3 Economic Evaluation

8-3-1 Concept of analysis

The analysis will be made along the following lines.

(1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

(2) For the costs, the construction, personnel, maintenance and facility renewal costs will be taken up.

(3) For the benefits, analysis will be made of the direct benefits or, more specifically, (1) increase in the output of fish catches and (2) improvement in the freshness of fishes due to increased supply of ice and technological improvements.

(4) Project life - 20 years after start of operation of the fishing port (1982).

(5) Prices - Prices in 1978.

(6) Discount rate - 15%.

(7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

8-3-2 Costs

(1) Construction cost

In the construction cost consultant fee is included. Details of the construction cost by year and by foreign and domestic currencies are shown in Table 3-13. The consultant fee is divided into that for construction and that for management and is allocated to the respective years. For the contingency, 15% of the total construction cost is used. From the character of the cost benefit analysis, the interest during the construction period is not included.

Table 3-13 Details of the construction cost of Iloilo fishing port

US$ 1,000
(₱1,000)

	Foreign currency			Local currency			Total		
	Construction works	Consultants Fee	Total	Construction works	Consultants Fee	Total	Construction works	Consultants Fee	Total
1979	7,557	2,061	9,618 (69,422)	4,055	191	4,246 (30,659)	11,612	2,252	13,864 (100,101)
1980	5,204	601	5,805 (41,911)	6,527	96	6,623 (47,818)	11,731	697	12,428 (89,729)
1981	4,166	736	4,902 (35,391)	7,317	121	7,438 (53,699)	11,483	856	12,339 (89,090)
Total	16,927	3,398	20,325 (146,744)	17,899	408	18,307 (132,176)	34,826	3,805	38,631 (278,920)

(2) Operating and maintenance costs

As the annual maintenance expense, 1.5% of the construction cost is counted for the years subsequent to the start of operation. For the personnel expense, a monthly wage of ₱31,600 is estimated for 28 officials (including a 10% allowances).

(3) Replacement costs

The basic facilities are of longer lifespan than 20 years, and for the functional facilities only, the replacement cost during the project life is counted with lifespan taken as 15 years (the salvage value of project cost of course, taken into account).

8-3-3 Benefits

(1) Direct benefits

1) Increase in the output of fish catches

With development and improvement of the fishing port, mooring is eased and landing and processing capacities are elevated greatly, while constant supply of the materials such as water, ice and fuel which are required for fishing is enabled, resulting in enlargement of the economic as well as physical capacity of the fishing port (which is presently a mere landing place as it is under the natural condition) for the fishing boats. With such enlarging the capacity, the following changes are occurred (when compared with the case of "without the project").

① Reopening of the operation of the fishing boats which have stopped the operation.

② Increase in the expedition times of the boat which is operated at present.

③ Entry of larger fishing boats to use Iloilo commercial port.

④ Entry of the registered fishing boats in this port which were unloading at the other ports.

⑤ Entry of the fishing boats registered in the other ports.

⑥ Increase of the incoming fishing boats owing to construction of new fishing boats.

For the foregoing changes, the economic evaluation is made as set forth in the following.

At present, bagnetters are using the natural coastline for the landing of their catches, whereas trawlers, purse seiners are making use of Iloilo commercial port. The development of the fishing port will make it possible to reduce the hours required for various operations of these fishing boats. As it is not surmisable that there will be a rise in the frequency of operations, ② is excluded from the analysis. The landing of catches in the Iloilo fishing port, as indicated in Fig. 3-22, far exceeds that of registered fishing vessels at present. There seem to be few cases for ① and ④. With respect to the landing of the fishing boats registered with other fishing ports (③ , ⑤), there will presumably emerge no major changes from the standpoint of the national economy, so that the attention of this analysis is focused on ⑥ . At present, a fairly large number of fishing boats come in from other ports, and the availability or unavailability of a fishing port in 1981-2000 depends on the construction of new fishing boats.

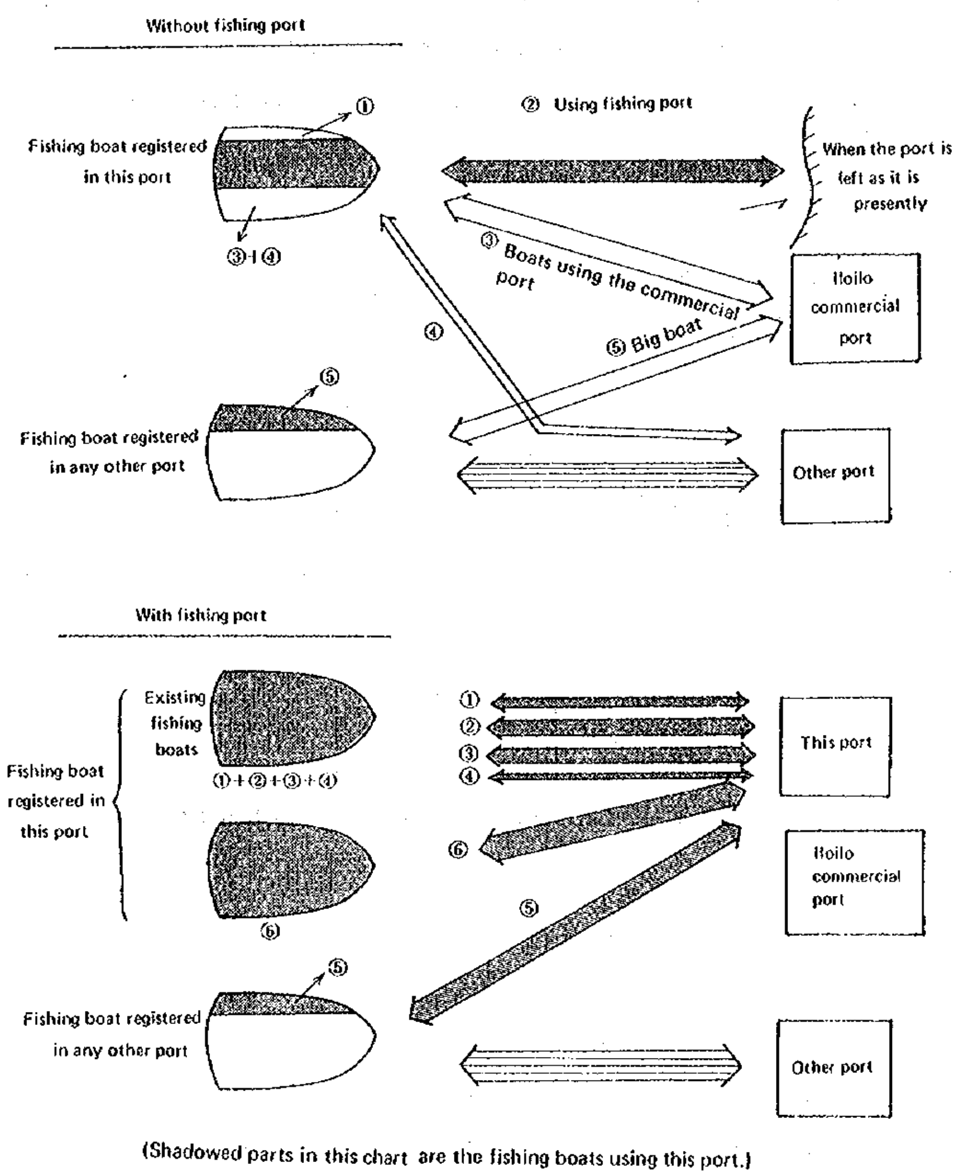


Fig. 3-20 Change in the form of use of the fishing port.

2) Improvement in the degree of freshness of fish catches

Upon construction of the fishing port, the freshness of the catches is improved greatly due to increase in the supply of ice on one hand and to improvements in the handling and carrying techniques. Consequently, the mean price of the fishes unloaded at the port will rise, and generating much benefit adding the increase in the fish production (Assumptions and procedures of estimation are described later).

3) Method of estimation

Estimation of the net benefits from 1) and 2) above will be made according to the procedure illustrated in the flow chart of Fig. 3-21.

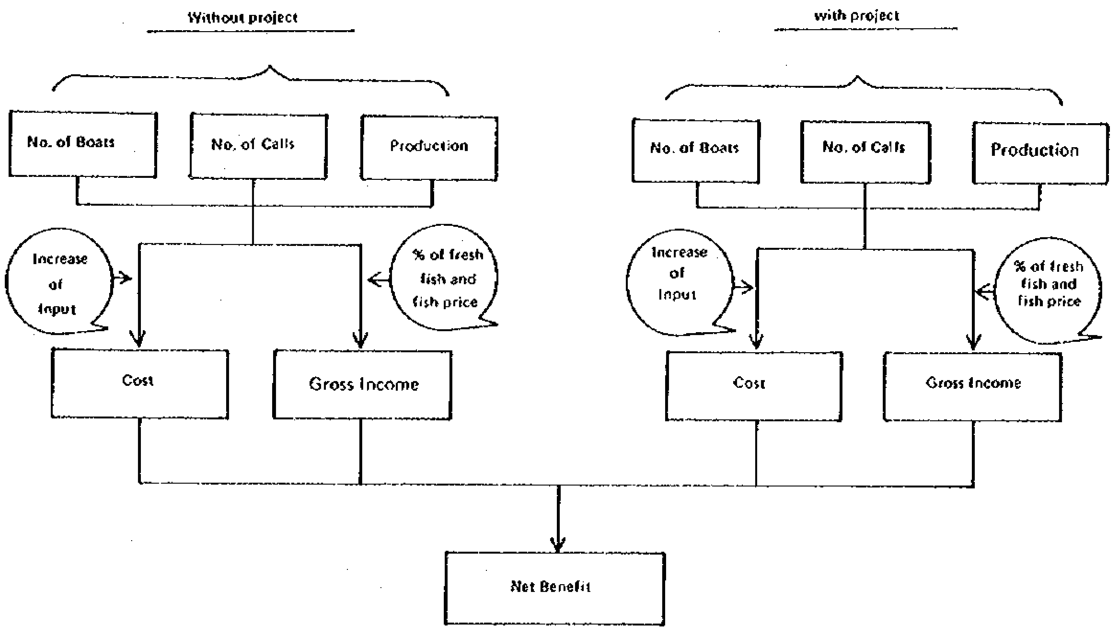


Fig. 3-21 Estimation procedure of net benefit.

Estimation of the net benefit is made according to the formula

Net benefit $B = GI - C$

$$GI = B_1 + B_2$$

$$C = C_1 + C_2 + C_3 + C_4$$

where GI : Increment in Gross Income,

B_1 : Increment in Gross Income due to increase in the annual output of catches,

B_2 : Increase in Gross Income due to improvement in the degree of freshness of the fish catches,

C : Increment in the cost,

C_1 : Increment in the depreciation cost of the fishing boat,

C_2 : Increment in the maintenance cost of fishing boat,

C_3 : Increment in the running cost of fishing boat,

and

C_4 : Increment in the cost of ice

Formulas for estimation of B_1 and B_2 constituting items of the gross income are:

① B_1 is increment in gross income due to increase in the output of fish catches

$$B_1 = (Q^1 - Q^0) \left\{ r^0 \cdot Pr + (1 - r^0) Ps \right\}$$

and

② B_2 is increment in gross income due to improvement in the degree of freshness of the fish catches

$$B_2 = Q^1 \cdot (r^1 - r^0)(Pr - Ps)$$

where Q^1 : Output when there is a fishing port,

Q^0 : Output when there is no fishing port,

r^1 : Degree of freshness when there is a fishing port,

r^0 : Degree of freshness when there is no fishing port,

Pr : Price of fresh fish, and

Ps : Price of spoiled fish.

Basic conditions for estimation are as given below.

① Number of fishing boats, fishing boat calls and output of fish catches.

Table 3-14 and Fig. 3-22 show the values with all of the fishing boats coming into this port taken as objectives, and these values are subjected to the following procedure for estimation of the net effect of the fishing port project to the national economy. That is, assuming that there is no increase in the number of days per expedition of fishing operation and that the fishing boats using the port are all of the registered boats in this port,

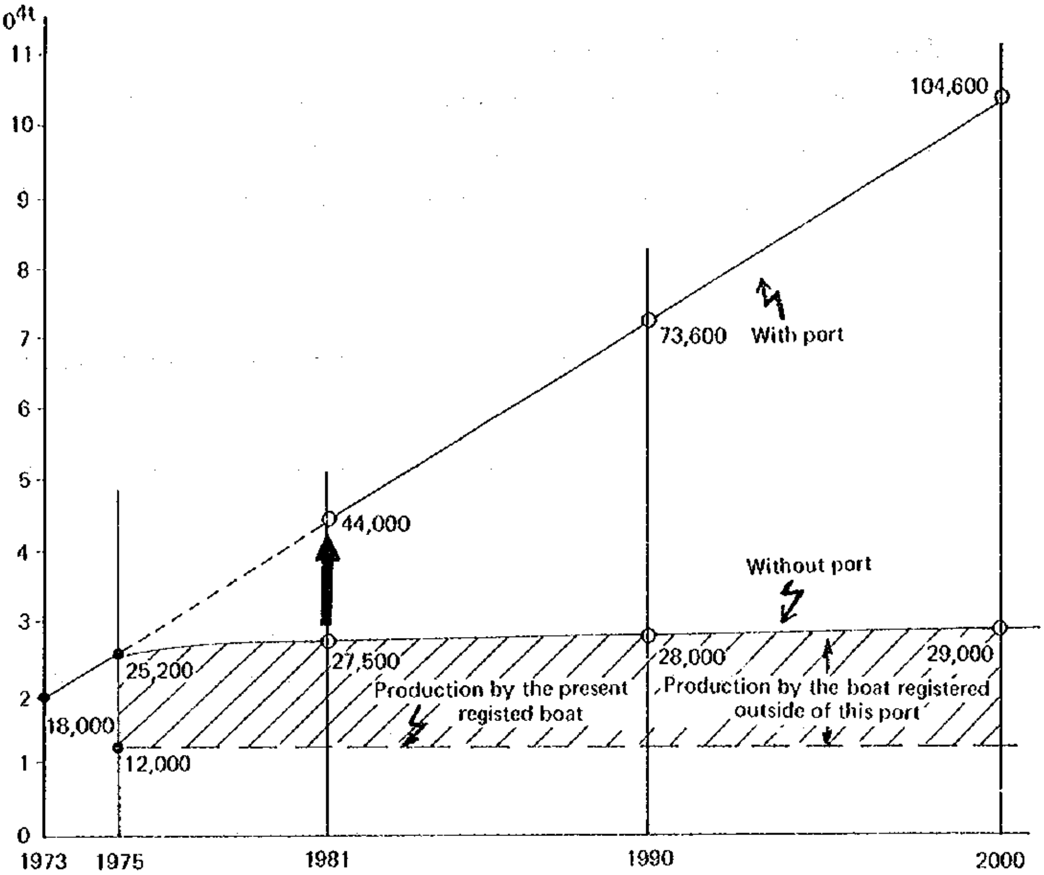


Fig. 3-22 Forecasted fish production with and without fishing port.

Table 3-14 Number of fishing boats, boat calls and output.

Project	Type of boats		1981 No. of boats	1981 Calls	1981 Production	1990 No. of boats	1990 Calls	1990 Production	2000 No. of boats	2000 Calls	2000 Production
With project	Purse Seiners	Big	5	110	2,200 t	9	189	3,900 t	12	252	5,100 t
		Small	18	825	6,600	29	1,305	10,700	42	1,890	15,400
		Total	23	935	8,800	38	1,494	14,600	54	2,142	20,500
	Trawlers		54	2,708	17,600	89	4,450	29,500	127	6,350	42,000
	Bagnetters		53	5,029	17,600	87	8,265	29,500	124	11,780	42,100
	Total		130	8,672	44,000	214	14,209	73,600	305	20,272	104,600
Without project	Purse Seiners	Big	3	70	1,400	4	75	1,500	4	75	1,500
		Small	11	513	4,100	11	513	4,100	11	513	4,100
		Total	14	583	5,500	15	588	5,600	15	588	5,600
	Trawlers		34	1,692	11,000	34	1,723	11,200	36	1,800	11,700
	Bagnetters		33	3,143	11,000	34	3,200	11,200	35	3,343	11,700
	Total		81	5,418	27,500	83	5,511	28,000	86	5,731	29,000

there is obtained, by subtracting the fishing boats using the other ports from the foregoing forecasted value, the increment in the incoming fishing boats due to the fishing boats aving the operation suspended reopening the operation and the fishing boats newly built. This value is taken as a basis of calculation in the following estimation.

② Fish Prices

The prices of fresh fish prevailing in 1978 average 5₱/kg (fish for Iloilo Province), and those of spoiled fish average 1 ~ 2₱/kg.

Consequently, the price is set at 5₱/kg for fresh fish and 1.5₱/kg for spoiled fish.

Table 3-15 Fish prices

₱/kg

Species	1975	1976	1977
Mackerel	4.63	5.30	6.15
Milk fish	5.81	6.84	7.80
Remipterid	5.45	6.16	7.66
Caesis	5.12	5.76	7.15
Anchovies	3.95	4.40	5.46
Round Scad	3.72	4.04	4.11
Grouper	5.98	8.13	8.88
Slopmouth	3.84	4.39	5.31
Prawn	27.80	32.20	40.90
Shrimps	14.09	15.25	16.33
Tuna	4.90	6.41	7.57

③ Degree of freshness

The present ice making capacity of Iloilo city is 278 tons per day. If the plant is operated for 300 days a year, the capacity will reach 83,400 tons a year. If it is assumed that 30% of this capacity is put to use for the retaining of the freshness of fish, it will mean that 25,000 tons a year is used at present.

The present output is 5,000 tons by bagnetters, and 20,200 tons by trawlers and purse seiners. The ice loaded in ships and also used to retain the freshness of landed fish is 0.5 ton for a ton of fish in the case of bagnetters and 1.5 tons in the case of purse seiners and trawlers. Therefore, there will be need for 32,800 tons of ice to retain the freshness of fish. As the present ice supplying capacity stands at 25,000 tons, there is a lack of 7,800 tons (24%). If it is assumed that several percent of fish is damaged during their transport process, the ratio of spoiled fish is set at 30%. This percentage applies to the case where a fishing port is not available. If a fishing port is available, the supply of ice and the improvement of fish processing technology will make it possible to keep practically every fish in a fresh condition. Here, the effects brought about the supply of ice are taken into consideration, the ratio of spoiled fish is set at 15%.

④ Fishing boat construction cost and annual maintenance cost

The fishing boat construction cost and the annual maintenance cost are indicated in Table 3-16.

Table 3-16 Fishing boat construction cost and annual maintenance cost.

₱

Type of boat		Gross Ton	Construction Cost	Annual maintenance cost		
				Repair	Fishing Nets, etc.	Total
Purse Seiners	Big	174.6	582,000	29,100	66,667	95,767
	Small	77.4	258,000	12,900	66,667	79,567
Trawlers		78.7	262,333	13,117	66,667	79,784
Begnetters		24.1	80,333	4,017	13,333	17,350

Note 1) : The fishing boat construction cost is assumed to be ₱3,333 per gross ton. (Calculated as 1 ₱ = 30¥)

2) : The repair expense is assumed to be 5% of the construction cost.

3) : Fishing nets, etc.

Purse seiners	₱66,667/year
Trawlers	₱66,667/year
Bagnetters	₱13,333/year
Small boats	Negligible

4) : The fishing boats are assumed to be usable for 8 years.

⑤ Fishing boat running cost

This comprises the wage and salaries, fuel cost, water service fee, crew meal expense, etc., and the basic figures for estimation are as shown below.

Table 3-17 Fishing boat running cost per expedition.

₱

Type of boat		Days per expedition (Days)	No. of Crew	Average expedition times per year	Crew meal per expedition	Ways per expedition	Water consumption		Operating hours per day (hr)	Horse power (H.P.)	Fuel consumption	
							ℓ	₱			ℓ	₱
Purse Seiners	Big	14	22	21	924	4,620	9,240	9	16	395	16,811	33,622
	Small	6	20	45	360	1,800	3,600	4	16	347	6,329	12,658
Trawlers		4	15	50	180	900	1,800	2	24	397	7,241	14,482
Bagnetters		1	12	95	36	180	240	1	6	159	181	362

Note 1) : Fuel - 0.19 ℓ/H.P. hours.
2) : Fuel unit price - 2 ₱/ℓ.
3) : Water - ① Trawler, 30 ℓ/day.
② Purse seiner 30 ℓ/day.
③ Bagnetter 20 ℓ/day.
4) : Water unit price - domestic water, 0.5 ₱/m^3; and industrial and commercial water, 1.0 ₱/m^3. Here, the latter is employed (0.001 ₱/ℓ).
5) : Wage and salaries - 15 ₱/man day (average of the unskilled and the skilled labourer.
6) : Meal expense - 3 ₱/man day.

⑥ Ice cost

Use of ice by the bagnetters is 0.5 ton per ton of fishes, and 1.5 tons is required for the trawlers and purse seiners.

For the unit price, the market price of 120₱/t is used.

4) Estimation

(1) Net benefit due to increase in the output of fish catches ₱304,968,000

(2) Net benefit due to improvement in the freshness of fish catches ₱132,846,000

(3) Total net benefit ₱437,814,000

(2) Other benefits

The other benefits which the fishing port improvement brings about are listed in the following.

1) Improvement in self-sufficiency of fishery products.
2) Modernization of fisheries upon accumulation of a variety of functions.
3) Encouraging investments.
4) Stabilization of fish prices.
5) Creation of employment opportunities.
6) Acquisition of new techniques.
7) Increasing income of fishermen.
8) Strengthning the fishermen's association.
9) Reducing congestion in the commercial port (Cotta).

8-3-4 Evaluation

The result of economic evaluation on construction of the Iloilo fishing port is as follows.

With the net present value at ₱212,722,000 (Y6,381,660,000 upon conversion at 1 ₱ = 30Y), cost benefit ratio at 1.90 and internal rate of returns at 24.9%, the project is considered to be appropriate from the national economic point of view.

Chapter 9 Financial Analysis

9-1 Financial Analysis

Construction of the Iloilo fishing port is carried out as one of the fishing port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

9-2 Main Factors of Financial Analysis

9-2-1 Usage of the fishing port

The number of fishing boats using the port, frequency of entry and fish landing amount, which constitute the basic data for financial analysis, are set forth in Table 3-18.

Table 3-18 Annual number of using fishing boats, frequency of entry and fish landing amount.

Item	Year	Purse Seiners		Trawler	Begnetter	Total
		Big	Small			
No. of Boats	1981	5	18	54	53	130
	1990	9	29	89	87	214
	2000	12	42	127	124	305
No. of Calls (Calls)	1981	110	825	2,708	5,029	8,672
	1990	189	1,305	4,450	8,265	14,209
	2000	252	1,890	6,350	11,780	20,272
Fish Production (tons)	1981	2,200	6,600	17,600	17,600	44,000
	1990	3,900	10,700	29,500	29,500	73,600
	2000	5,100	15,400	42,000	42,100	104,600

9-2-2 Method of estimation of the revenue of fishing port

(1) Sources of revenue

Here, the revenue of the fishing port is limited to the fees for use of the facilities related to handling of fish catches and supply of materials to the fishing boats and the profit from sales of ice when the ice plant and cold storage facilities are operated directly by PFMA.

(2) Method of estimation of the revenue

Basic data for estimation of the revenue and the items of revenue are represented in Fig. 3-23. The method of estimation of the revenue is illustrated in Fig. 3-24.

Basic data 1
1. No. of boats
2. No. of Calls
3. Fish Productions

Basic data 2	
1	Gross tonage
2	Days per expedition
3	Running hours per day
4	Horse power of boats
5	Fuel consumption
6	No. of crew
7	Days for repair per year
8	Expedition per year
9	Ice consumption
10	Capacity of Vehicles
11	Mooring time at the port

↓

Revenue	
1	Harbour due
2	Berthing fee
3	Quayside conveyance fee
4	Ice conveyance fee
5	Fuel conveyance fee
6	Levy on fresh water sold to fishing boats
7	Levy on fish brought to the market by land transportation vehicles
8	Fee for use of the market hall
9	Fishing boat repair fee
10	Parking fee
11	Charge for overstay at the unloading area
12	Annual registration fee
13	Ice sales

Fig. 3-23 Basic data for estimation of the revenue and items of estimation.

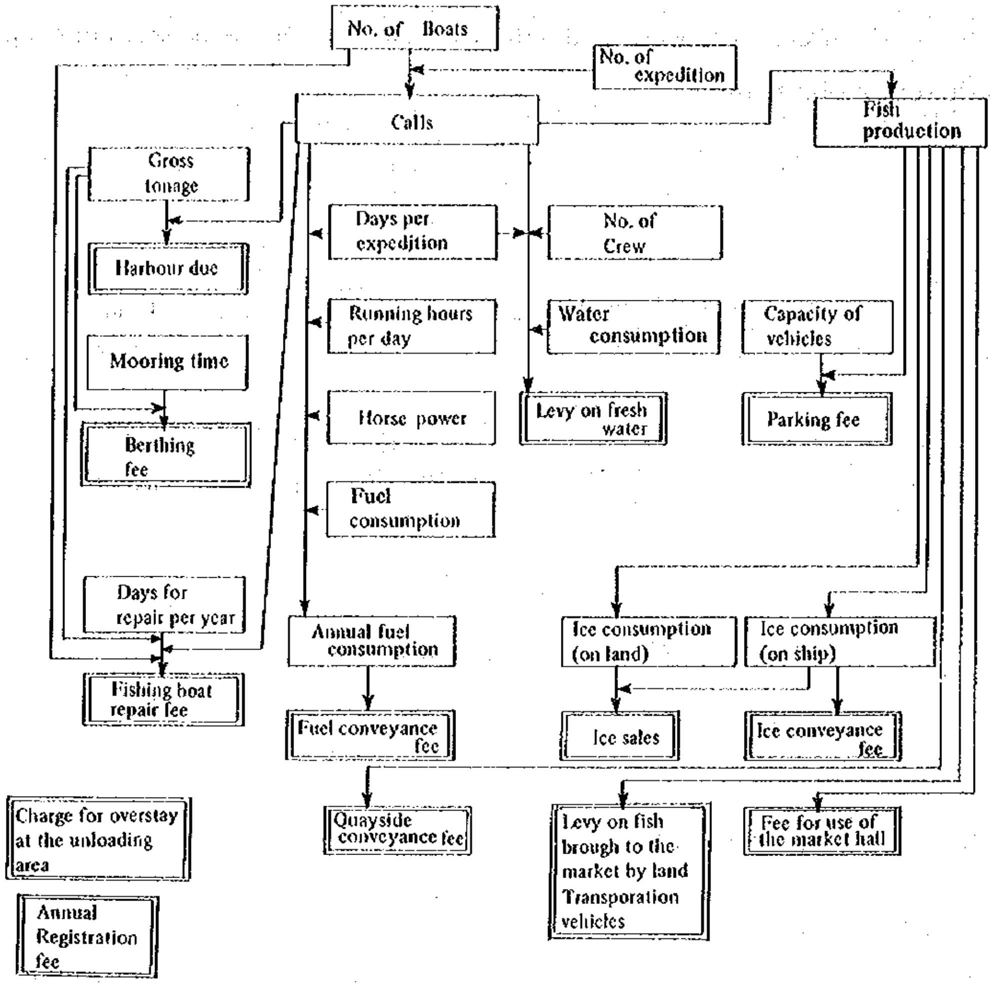


Fig. 3-24 Method of estimation of the revenue.

9-2-3 Method of cost estimation

The items of cost are wage and salaries, maintenance expense, depreciation and interests on loans.

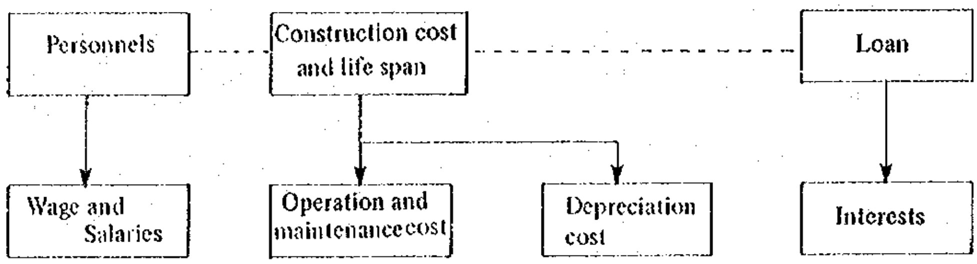


Fig. 3-25 Method of cost estimation.

9-3 Revenue of Fishing Port

9-3-1 Harbour due

This is a fee collected from the fishing boats entering the port according to the gross tonnage of the respective boats, and the unit of the fee is 0.6 (₱/gross tonnage per entry).

The calculation formula is

0.6 × (Gross tonnage) × (Number of entries).

The gross tonnage of the respective types of fishing boats is as shown in Table 3-19.

Table 3-19 Gross tonnage of using fishing boats.

Type of Boats / Item	Purse Seiner		Trawler	Begnetter
	Big	Small		
Gross tonnage	174.6	77.4	78.1	24.1

The revenue is as shown in Table 3-20.

Table 3-20 Revenue from harbour due.

Year	Harbour due	Boat calls
1981	250,428 ₱	8,972 calls
1985	321,369	11,133
1990	410,045	14,209
1995	497,201	17,241
2000	584,357	20,272

9-3-2 Berthing fee

This is a fee for use of the berth to be collected from the fishing boats utilizing the fishing port according to the gross tonnage, and the units of the fee are as shown in Table 3-21.

Table 3-21 Unit of berting fee.

Gross tonnage	GT < 10	10 ≦ GT < 100	100 ≦ GT < 200	200 < GT
Unit fee (₱/time)	10	12	14	16

The calculation formula is

(Unit fee) × (Number of entries).

The revenue is scheduled in Table 3-22.

Table 3-22 Revenue from berthing fees.

Year	Fee	Boat Calls
1981	104,284 ₱	8,972 calls
1985	133,885	11,133
1990	170,886	14,209
1995	207,327	17,241
2000	243,768	20,272

9-3-3 Quayside conveyance fee

Where the fishes are conveyed on the quay, this is a fee for use of the facility, and the unit of the fee is 1.25₱ per tub.

The tub has a capacity of 40 kg so that the calculation formula is

$$1.25 \times \left(\frac{1000}{40}\right) \times \text{(Landing amount)}.$$

The revenue is then presented in Table 3-23.

Table 3-23 Revenue from quayside conveyance fees.

Year	Fee	Fish production
1981	1,375,000₱	44,000 tons
1985	1,786,111	57,156
1990	2,300,000	73,600
1995	2,784,375	89,100
2000	3,268,750	104,600

9-3-4 Ice conveyance fee

This is a fee for conveyance of ice supplied to the fishing boats. The ice is supplied to the trawlers and purse seiners and its quantity is the same to that of the fish catches landed. The unit of the conveyance fee is 0.09398 (₱/block). The calculation formula is

$$0.09398 \times \left(\frac{1000}{50}\right) \times \left(\text{Quantity of fish landed (for trawlers)}\right).$$

provided 1 block = 50 kg.

The revenue is as shown in Table 3-24.

Table 3-24 Revenue from ice conveyance fees.

Year	Fee	Fish production (Purse Seiner, Trawler)
1981	49,624₱	26,400 tons
1985	64,411	34,267
1990	82,895	44,100
1995	100,188	53,300
2000	117,481	62,500

9-3-5 Fuel conveyance fee

This is the fee for conveyance of the fuel supplied to the fishing boats and is a fee for use of the fuel supply facility. The annual amount of consumption of the fuel is given by

(Number of entries) × (Days of expedition) × (Running hours a day) × (Horse power) × (Main fuel consumption),

and the unit fee is 4 (₱/kℓ). The calculation formula is

$$4 \times \left(\frac{1}{1000}\right) \times (\text{Annual fuel consumption}).$$

The original units required for calculation are of the values shown in Table 3-25.

Table 3-25 Original units concerning fuel consumption.

Item \ Type of boats	Purse Seiner		Trawler	Begnetter
	Big	Small		
Days per expedition (Days)	14	6	4	1
Running hours per day (hr.)	16	16	24	6
Horse Power (H.P.)	395	347	397	159
Fuel consumption (ℓ/H.P.hr)	0.19	0.19	0.19	0.19

The revenue is as shown in Table 3-26.

Table 3-26 Revenue from fuel conveyance fees.

Year	Fee	Annual Fuel consumption	Boat calls
1981	110,367 ₱	27,592 kℓ	8,972 Calls
1985	141,598	35,399	11,133
1990	180,635	45,159	14,209
1995	218,950	54,737	17,241
2000	257,265	64,316	20,272

9-3-6 Levy on fresh water sold to fishing boats

This is collected for the water supply to the fishing boats and is a fee for use of the facility.

The annual amount of consumption of water is given by

(Number of entries) × (Original unit of water consumption) × (Number of crew) × (Days of expedition).

and the unit of the fee is 0.5(₱/ton). Then, the calculation formula is

$$0.5 \times \left(\frac{1}{1000}\right) \times \text{(Annual water consumption)}.$$

The original units required for calculation are of the values shown in Table 3-27.

Table 3-27 Original units concerning water consumption.

Item \ Type of boats	Purse Seiner		Trawler	Begnetter
	Big	Small		
Water consumption (ℓ/person day)	30	30	30	20
No. of Crew	22	20	15	12
Days per expedition (days)	14	6	4	1

Table 3-28 Revenue from levies on fresh water sold to fishing boats.

Year	Levies	Annual water consumption	Boat calls
1981	5,034 ₱	10,068 tons	8,972 calls
1985	6,449	12,899	11,133
1990	8,219	16,438	14,209
1995	9,957	19,914	17,241
2000	11,695	23,390	20,272

9-3-7 Levy on fish brought to the market by land transportation vehicles

This is a fee for transportation of fishes from fishing boats to the market, and the unit of the fee is 0.50 (₱/tub). The calculation formula is

$$0.50 \times \left(\frac{1000}{40}\right) \times \text{(Landed amount of fish catches).}$$

The revenue is as shown in Table 3-29.

Table 3-29 Revenue from levies on fish brought to the market by land transportation vehicles.

Year	Levies	Fish production
1981	550,000 ₱	44,000 tons
1985	714,444	57,156
1990	920,000	73,600
1995	1,113,750	89,100
2000	1,307,500	104,600

9-3-8 Fee for use of the market hall

This is a fee for use of the market hall, and the unit of the fee is 0.15 (₱/tub). The calculation formula is

$$0.15 \times \left(\frac{1000}{40}\right) \times \text{(Landed amount of fish catches).}$$

The revenue is as shown in Table 3-30.

Table 3-30 Revenue from fee for use of the market hall.

Year	Fee	Fish production
1981	165,000 ₱	44,000 tons
1985	214,333	57,156
1990	276,000	73,600
1995	334,125	89,100
2000	392,250	104,600

9-3-9 Fishing boat repair fee

Upon repair of a fishing boat, this is a fee for use of the facility to be collected according to the gross tonnage and the number of days of repair. The units of the fee are as shown in Table 3-31.

Table 3-31 Units of the fishing boat repair fee.

Gross tonnage	GT<10	10≦GT<100	100≦GT<200	200≦GT
Unit fee (₱/day)	10	15	20	30

Accordingly, the calculation formula is

(Unit fee) × (Number of days of repair) × (Number of fishing boats).

The original units required for calculation are of the values shown in Table 3-32, and the revenue is as shown in Table 3-33.

Table 3-32 Original units related to use of the repair facility.

Type of boats / Item	Purse Seiner		Trawler	Bagnetter
	Big	Small		
Gross tonnage (tons/boat)	174.6	77.4	78.7	24.1
Days for repair per year (day)	15	15	15	12

Table 3-33 Revenue from fishing boat repair fees.

Year	Fee	No. of Boats
1981	27,240 ₱	130
1985	35,093	167
1990	44,910	214
1995	54,428	260
2000	63,945	305

9-3-10 Parking fee

This is a fee for the fish carrier trucks in use of the parking facility. The carrier trucks are of a fish loading capacity of 18 tubs/truck (or 720 kg/truck), and the parking fee is 5₱ a day or less.

The calculation formula is

$$5 \times \left(\frac{1000}{720}\right) \times \text{(Landed amount of catches)}.$$

Then, the revenue is as shown in Table 3-34.

Table 3-34 Revenue from parking fees.

Year	Fee	Fish production
	₱	tons
1981	305,556	44,000
1985	396,914	57,156
1990	511,111	73,600
1995	618,750	89,100
2000	726,389	104,600

9-3-11 Charge for overstay at the unloading area

This is a charge for staying over the standard time at the unloading area, but it is difficult to estimate such charge so that it is not counted here.

9-3-12 Annual registration fees

This represent the fees for registration of the brokers, wholesellers and shipowners but is not included here.

9-3-13 Ice sales

This represents the profit from sales of ice for maintaining the freshness of fishes. The wholesale price of ice is taken as 120₱/t, and its 20% or 24 ₱/t is assumed to be the profit. The original units of the ice consumption are shown in Table 3-35. The calculation formula is

$$24 \times 1000 \times 1 \times \text{Landed amount of catches (trawlers)} + 1/2 \times \text{(Total amount of land catches)}.$$

The revenue is given as shown in Table 3-36.

Table 3-35 Ice consumption original units.

kg/fish kg

Item \ Type of boats	Purse Seiner		Trawler	Bagnetter
	Big	Small		
Ice consumption (on ship)	1	1	1	0
Ice consumption (on land)	0.5	0.5	0.5	0.5

Table 3-36 Ice sales.

Year	Net Income	Ice consumption (on ship)	Ice consumption (on land)
1981	1,161,600 ₱	26,400 tons	22,000 tons
1985	1,508,267	34,267	28,578
1990	1,941,600	44,100	36,800
1995	2,348,400	53,300	62,500
2000	2,755,200	44,550	52,300

9-4 Expenditures of Fishing Port

9-4-1 Personnel expense

The officials of the organization of administration of the fishing port are estimated at 28 persons. The monthly personnel expense is assumed to be ₱31,600. Then, with an allowance of 10% added, the annual personnel expense is estimated at ₱417,120.

9-4-2 Maintenance expense

As the annual maintenance expense of the fishing port facilities, 1.5% of the construction cost is taken, and an amount of ₱3,771,630/year is estimated.

9-4-3 Depreciation

The basic facilities are of longer lifespan, so that they are excluded from the objects of depreciation, with the maintenance expense counted for them.

The functional facilities have the 15 years lifespan, with the salvage value set to 0. With the straight line method, the annual amount of depreciation is ₱4,955,390

9-4-4 Interest on loan

The loan as the management entity is ₱146,745,000. The interest was then calculated at a rate of 3.5 percent. The principal repayment is done equally every year in 15 years after 1987 so that the interest payable after 1987 will decrease gradually.

9-5 Financial Evaluation

Income statement of the Iloilo fishing port and the cash flow are set forth in Table 3-37 and 3-38.

As the result of the foregoing financial analysis, it was found that it would be difficult financially for PFMA to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enormous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion would be reduced.

However, as seen from the result of the economic evaluation in Chapter 8, the development and improvement of the fishing port will bring about many economic effects and are thus worthy of investment.

Table 3-37 Income statement of Iloilo fishing port

(P)

Item \ Year		1979	1980	1981	1982	1983	1984	1985	1986
1. Revenues	Harbour Due	—	—	—	250,428	268,163	265,893	303,633	321,369
	Berthing Fee	—	—	—	104,284	111,684	119,084	126,485	133,885
	Quayside Conveyance Fee	—	—	—	1,375,000	1,477,778	1,580,556	1,633,333	1,786,111
	Ice Conveyance Fee	—	—	—	49,624	53,321	57,018	60,714	64,411
	Fuel Conveyance Fee	—	—	—	110,367	118,175	125,982	133,790	141,598
	Levy on Fresh Water sold to Fishing Boats	—	—	—	5,034	5,388	5,742	6,096	6,449
	Levy on Fish brought to the Market	—	—	—	550,000	591,111	632,222	673,333	714,444
	Fee for Use of the Market Hall	—	—	—	165,000	177,333	189,667	202,000	214,333
	Fishing Boat Repair Fee	—	—	—	27,240	29,203	31,167	33,130	35,093
	Parking Fee	—	—	—	305,556	328,395	351,235	374,074	396,914
	Ice Sales	—	—	—	1,161,600	1,248,267	1,334,933	1,421,600	1,508,267
	Total	—	—	—	4,104,133	4,408,818	4,713,503	5,018,189	6,322,874
2. Expenses	Salaries and Wages	—	—	—	417,120				
	Repair and Maintenance	—	—	—	3,771,630	9,144,146	〃	〃	〃
	Depreciation	—	—	—	4,955,396				
	Interest	1,215,234	3,163,913	4,516,708	5,136,059	5,136,059	5,136,059	5,136,059	5,136,059
	Total	1,215,234	3,163,913	4,516,708	14,280,205	14,280,205	14,280,205	14,280,205	14,280,205
3. Income before Depreciation and interest		0	0	0	△ 84,617	220,068	524,753	829,439	1,134,124
4. Net Income		△ 1,215,234	△ 3,163,913	△ 4,516,708	△10,176,072	△ 9,871,387	△ 9,556,702	△ 9,262,016	△ 8,957,331
5. Accumulated Income		△ 1,215,234	△ 4,379,147	△ 8,895,855	△19,071,927	△28,943,314	△38,510,016	△47,772,032	△56,729,363

Item \ Year		1987	1988	1989	1990	1991	1992	1993	1994
1. Revenues	Harbour Due	339,104	356,839	374,574	392,310	410,045	427,476	444,907	462,338
	Berthing Fee	141,285	148,685	156,086	163,486	170,886	178,174	185,462	192,751
	Quayside Conveyance Fee	1,888,889	1,991,667	2,094,444	2,197,222	2,300,000	2,396,875	2,493,750	2,590,625
	Ice Conveyance Fee	68,108	71,805	75,501	79,198	82,895	86,353	89,812	93,271
	Fuel Conveyance Fee	149,405	157,213	165,020	172,828	180,635	188,298	195,961	203,624
	Levy on Fresh Water sold to Fishing Boats	6,803	7,157	7,511	7,865	8,219	8,567	8,914	9,262
	Levy on Fish brought to the Market	755,556	796,667	837,778	878,889	920,000	958,750	997,500	1,036,250
	Fee for Use of the Market Hall	226,667	239,000	251,333	263,667	276,000	287,625	299,250	310,875
	Fishing Boat Repair Fee	37,057	39,020	40,983	42,947	44,910	46,814	48,717	50,621
	Parking Fee	419,753	442,593	465,432	488,272	511,111	532,639	554,167	575,694
	Ice Sales	1,594,933	1,681,600	1,768,267	1,854,933	1,941,600	2,022,960	2,104,320	2,185,680
	Total	5,627,559	5,932,245	6,236,930	6,541,616	6,846,301	7,134,531	7,422,761	7,710,991
2. Expenses	Salaries and Wages	417,120							
	Repair and Maintenance	3,771,630	9,144,146	〃	〃	〃	〃	〃	〃
	Depreciation	4,955,396							
	Interest	5,136,059	4,793,654	4,451,249	4,108,844	3,766,439	3,424,034	3,081,629	2,739,224
	Total	14,280,205	13,937,800	13,595,395	13,252,990	12,910,585	12,568,180	12,225,775	11,883,370
3. Income before Depreciation and interest		1,438,809	1,743,495	2,048,180	2,352,866	2,657,551	2,945,781	3,234,011	3,522,241
4. Net Income		△ 8,652,646	△ 8,005,555	△ 7,358,465	△ 6,711,374	△ 6,064,284	△ 5,433,649	△ 4,803,014	△ 4,172,379
5. Accumulated Income		△65,382,009	△73,387,564	△80,746,029	△87,457,403	△93,521,687	△98,955,336	△103,758,350	△ 107,930,729

Item \ Year		1995	1996	1997	1998	1999	2000	2001	
1. Revenues	Harbour Due	479,770	497,201	514,632	532,063	549,494	566,926	584,357	
	Berthing Fee	200,039	207,327	214,615	221,903	229,192	236,480	243,768	
	Quayside Conveyance Fee	2,687,500	2,784,375	2,881,250	2,978,125	3,075,000	3,171,875	3,268,750	
	Ice Conveyance Fee	96,729	100,188	103,647	107,105	110,564	114,023	117,481	
	Fuel Conveyance Fee	211,287	218,950	226,613	234,276	241,939	249,602	257,265	
	Levy on Fresh Water sold to Fishing Boats	9,609	9,957	10,304	10,652	11,000	11,347	11,695	
	Levy on Fish brought to the Market	1,075,000	1,113,750	1,152,500	1,191,250	1,230,000	1,268,750	1,307,500	
	Fee for Use of the Market Hall	322,500	334,125	345,750	357,375	369,000	380,625	392,250	
	Fishing Boat Repair Fee	52,524	54,428	56,331	58,235	60,138	62,042	63,945	
	Parking Fee	597,222	618,750	640,278	661,806	683,333	704,861	726,389	
	Ice Sales	2,267,040	2,348,400	2,429,760	2,511,120	2,592,480	2,673,840	2,755,200	
	Total	7,999,220	8,287,450	8,575,680	8,863,910	9,152,140	9,440,370	9,728,600	
2. Expenses	Salaries and Wages	417,120							
	Repair and Maintenance	3,771,630	9,144,146	〃	〃	〃	〃	〃	
	Depreciation	4,955,396							
	Interest	2,396,819	2,054,414	1,712,009	1,369,604	1,027,199	684,794	342,389	
	Total	11,540,965	11,198,560	10,856,155	10,513,750	10,171,345	9,828,940	9,486,535	
3. Income before Depreciation and interest		3,810,170	4,098,700	4,386,930	4,675,160	4,963,390	5,251,620	5,539,850	
4. Net Income		△ 3,541,745	△ 2,911,110	△ 2,280,475	△ 1,649,840	△ 1,019,205	△ 388,570	242,605	
5. Accumulated Income		△111,472471	△ 114,383,581	△ 116,664,050	△ 118,313,899	△ 119,333,104	△ 119,721,674	△ 119,479,609	

Table 3-38 Cash-flow schedule of Iloilo fishing port

(₱)

Item		1979	1980	1981	1982	1983	1984	1985	1986
1. Source of Funds	Equity	30,658,625	47,817,526	53,698,931	—	—	—	—	—
	Loan	69,441,967	41,911,111	35,311,458	—	—	—	—	—
	Gov. Project Allotment	1,215,234	3,163,913	4,516,708	5,220,676	4,915,991	4,611,307	4,306,620	4,001,935
	Depreciation	—	—	—	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396
	Net income	△ 1,215,234	△ 3,163,913	△ 4,516,708	△10,176,072	△ 9,871,387	△ 9,566,702	△ 9,262,016	△ 8,957,331
	Total	100,100,592	89,728,637	89,090,389	0	0	0	0	0
2. Uses of Funds	Construction	100,100,592	89,728,637	89,090,389	—	—	—	—	—
	Loan Amortization	—	—	—	—	—	—	—	—
	Reinvestment	—	—	—	—	—	—	—	—
	Total	100,100,592	89,728,637	89,090,389	0	0	0	0	0

Item		1987	1988	1989	1990	1991	1992	1993	1994
1. Source of Funds	Equity	—	—	—	—	—	—	—	—
	Loan	—	—	—	—	—	—	—	—
	Gov. Project Allotment	13,480,250	12,833,159	12,186,069	11,538,978	10,891,888	10,261,257	9,935,382	8,999,983
	Depreciation	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396
	Net income	△ 8,652,646	△ 8,005,555	△ 7,358,465	△ 6,711,374	△ 6,064,284	△ 5,433,649	△ 4,803,014	△ 4,172,379
	Total	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	10,087,764	9,783,000
2. Uses of Funds	Construction	—	—	—	—	—	—	—	—
	Loan Amortization	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000
	Reinvestment	—	—	—	—	—	—	—	—
	Total	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000

Item		1995	1996	1997	1998	1999	2000	2001	
1. Source of Funds	Equity	—	—	—	—	—	—	—	
	Loan	—	—	—	—	—	—	—	
	Gov. Project Allotment	8,369,349	7,738 714	81,439,025	6,477,444	5,846,809	5,216,174	4,585,075	
	Depreciation	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396	4,955,396	
	Net income	△ 3,541,745	△ 2,911,110	△ 2,280,475	△ 1,649,840	△ 1,019,205	△ 388,570	242,065	
	Total	9,783,000	9,783,000	84,113,946	9,783,000	9,783,000	9,783,000	9,782,536	
2. Uses of Funds	Construction	—	—	—	—	—	—	—	
	Loan Amortization	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,783,000	9,782,536	
	Reinvestment	—	—	74,330,946	—	—	—	—	
	Total	9,783,000	9,783,000	84,113,946	9,783,000	9,783,000	9,783,000	9,782,536	

Part Ⅳ

Camaligan Fishing Port Development and Improvement Project

PART IV CAMALIGAN FISHING PORT DEVELOPMENT AND IMPROVEMENT PROJECT

Chapter 1 Basic Line of Development and Improvement

The Camaligan fishing port development and improvement project will have to be implemented along the basic line stated in the following with due consideration of the present condition of marine products and their marketing in the Philippines and Camaligan, situation of the landing site and the government policies and plans for promotion of the fishery industries discussed in PART I.

(1) The project should not remain merely in dissolving the shortage in the present facilities but be capable of coping satisfactorily with the prospected sharp increase of port demand in the near future. Consideration should also be made for the project to be also capable of coping with the great development prospected of the fishery thereafter.

(2) The Camaligan fishing port will be equipped to give full play to its capacities as the core for the development of fisheries in the southeastern part of Luzon.

(3) Reclamation of the land for fishing port facilities will be made economically in use of the dredged soil of the basin.

Chapter 2 Establishment of Project Target

2-1 Project Target Year

For the basic facilities of breakwaters, mooring facilities, bulkhead and basins and functional facilities of road and land for fishing port facilities, the target year will be set at 2000 A.D.

For the other functional facilities as fish market, sheds, ice plant and cold storage, water supply facility, fuel supply facility fishing port administration facilities, and fishing boats and engines repair shop, the target year will be set at 1990.

2-2 Planned Handling Amount and Fishing Boat Force

The planned handling amount of the catches and the fishing boat force in the respective target years will be as shown in Table 4-1.

Table 4-1. Planned handling amounts and fishing boat force

Target Year	Planned handling Amount of Catches	Number of Trawlers	Number of Purse Seiners
1990	40,600 tons	69 boats	17 boats
2000 AD	58,300	123	24

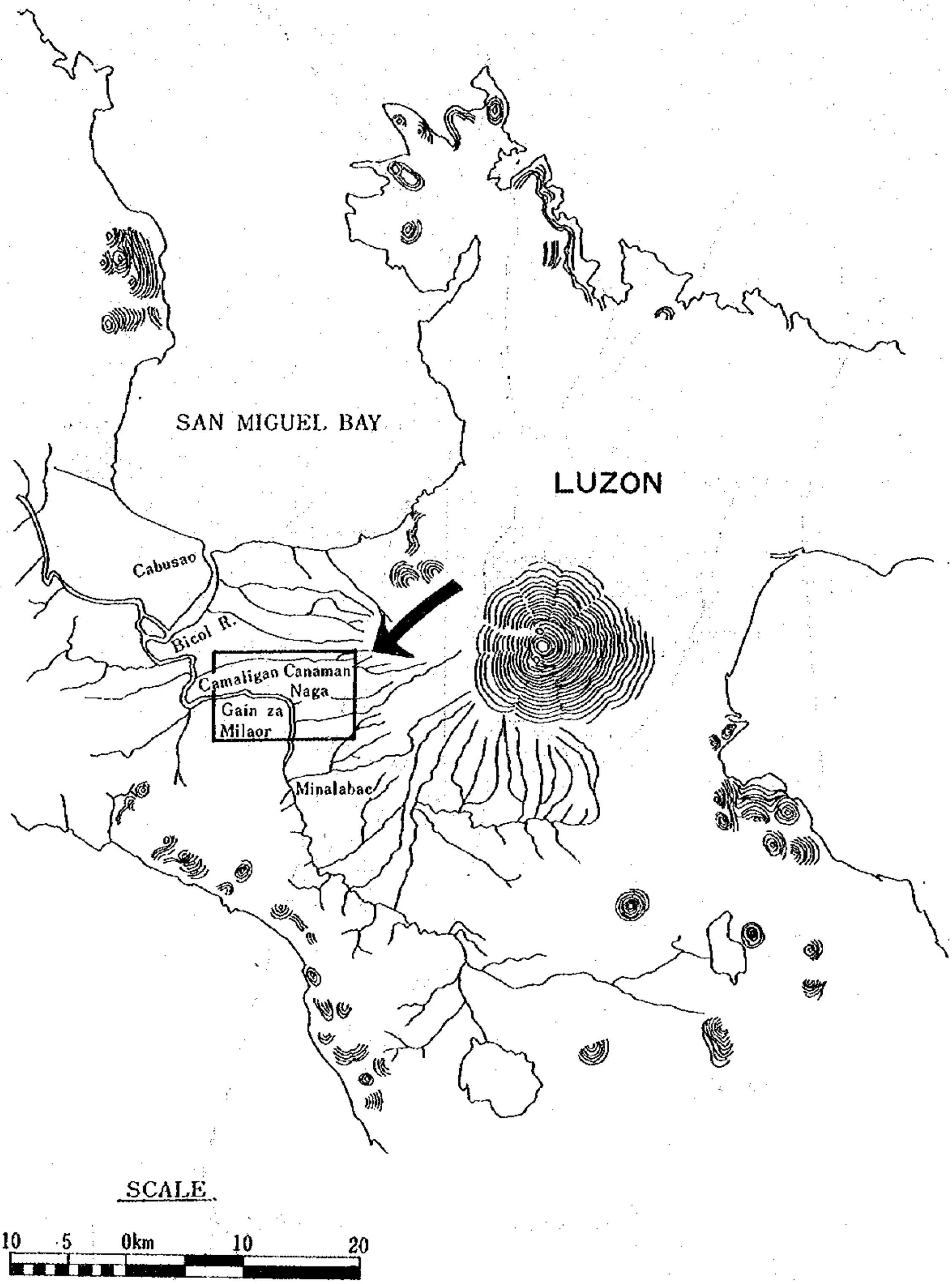


Fig. 4-1 (1) Location of Camaligan Fishing Port Project Site

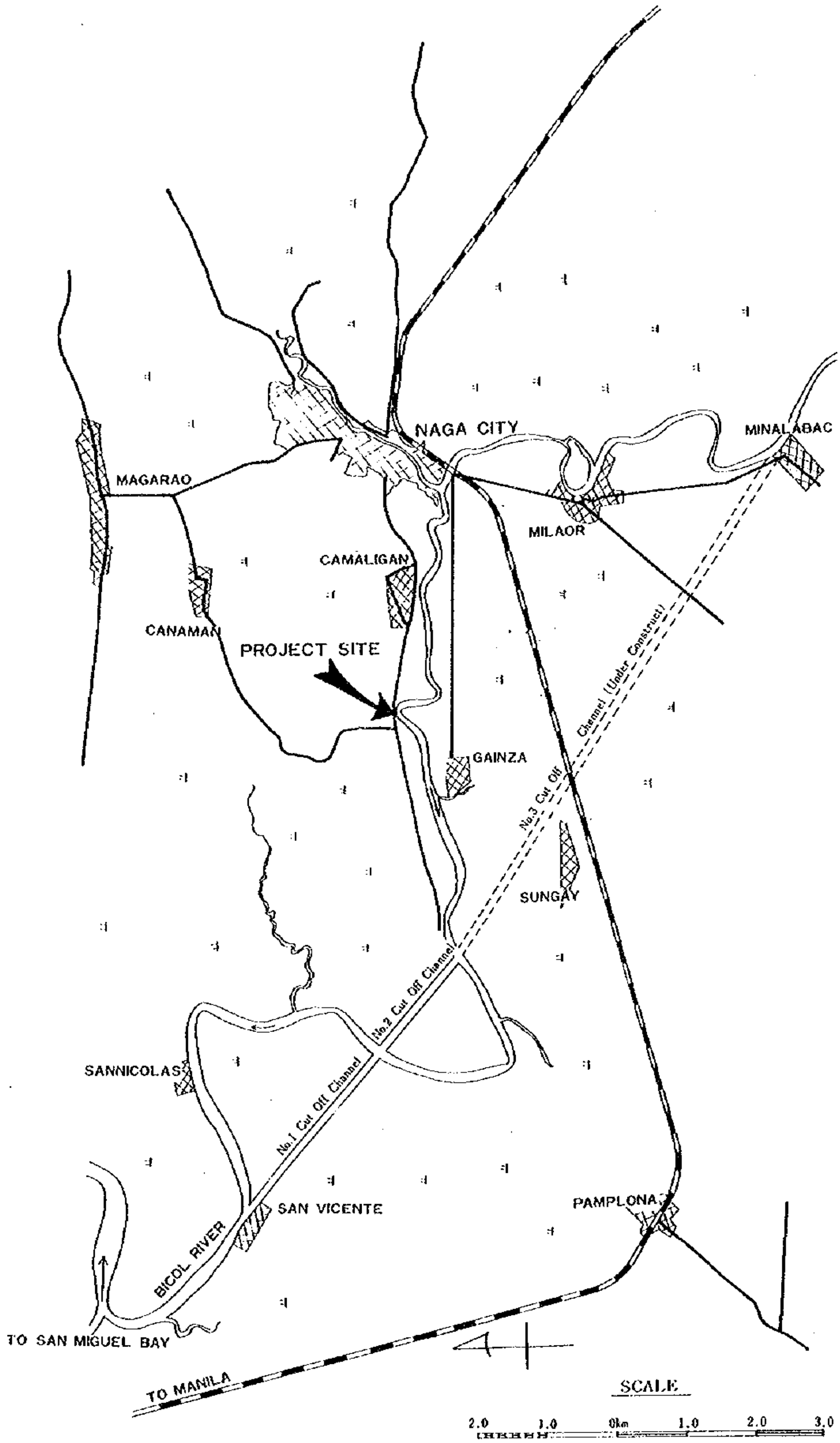


Fig. 4-1 (2) Topographical Map of Camaligan, Naga City, Luzon

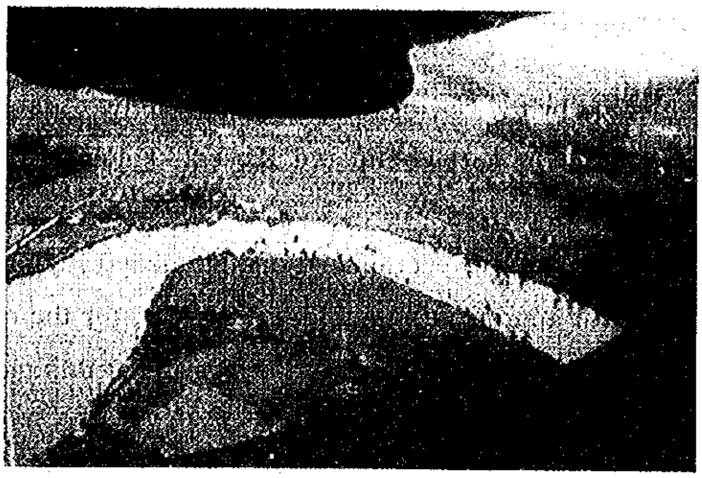


Photo 4-1 Bird view of Camaligan fishing port project site

Photo 4-2 Seeing fishing port land site and the stream of the Bicol river

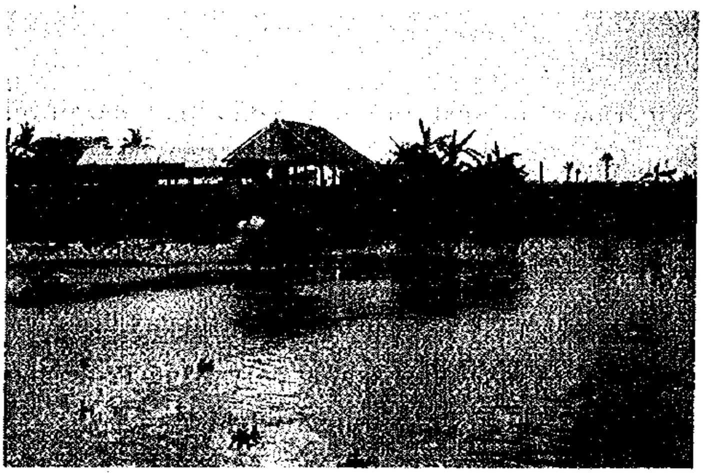


Photo 4-3 Seeing fishing port project site where is observed from the Bicol river

Chapter 3 Selection of Project Site

The site selected by the Government of the Republic of the Philippines for the construction of a fishing port is situated about 23 km upstream from the estuary of the Bicol River.

As the result of a field inspection and complementary study, the study team also considered it appropriate to select this place for the construction of the Camaligan fishing port and recommend its location at this place for the following reasons:

(1) The site may well be put to use as a basin for fishing boats by excavating and dredging part of the winding stream of Bicol River.

(2) The site is the river bank which is close (about 3 km) to the city of Naga (seat of the Provincial Government).

(3) The site assures the acquisition of adequate land for the construction of the fishing port which will be situated closest to the landing of catches from trawlers and purse seiners for this area (the hinterland of this landing area is already used for another purpose and the construction of a fishing port is difficult).

(4) The water depth functionally required for a fishing port may be assured.

(5) Electricity and fresh water are readily accessible.

(6) A nearby road is available behind the site. Incidentally, it is possible to use a bypass in going to the city of Naga.

(7) There is no impediment to the acquisition of land for the fishing port facilities.

However, this selection of project site is stand on the view of the No. 3 short cut of Bicol river, which has been constructed as one of the flood control work, will be completed before the starting period of fishing port project and there is no problem concerned with abnormal erosion or siltation at planned project site. So, if this No. 3 short cut work of Bicol river will delay drastically by some reasons, the selection of Camaligan fishing port project site should be re-examined severely along all stream of Bicol river.

Chapter 4 Plan of Basic Port Facilities

By the basic port facilities are referred to the facilities for protecting the fishing port from external forces having adverse effects upon the fising port such as waves, littoral drift and current, facilities for mooring or landing the boats for the purpose of unloading the catches, supply of commodities or recess, and facilities for fulfilling the fundamental roles of the fishing port such as water surfaces allowing safe departure, return and anchorage or mooring of the fishing boats.

4-1 Project Facilities

Project facilities are as follows.

1. Mooring facilities
   (1) Landing quay (for trawlers and purse seiners)
   (2) Preparation quay (for trawlers and purse seiners)
2. Basins
   (1) Anchorage basin (for trawlers and purse seiners)
3. Shipyard

4-2 Plan of Mooring Facilities

4-2-1 Plan conditions for mooring facilities

Planning of the mooring facilities will be made with the following plan conditions taken into consideration.

(1) The landing and preparation quays for the trawlers and purse seiners shall be of -4.0m quay.

(2) Trawlers and purse seiners will mutually use the same quay.

(3) The trawlers and purse seiners whose discharge is completed will cast anchor in the basin. Fishing preparations (refueling and water supply) will be made along the preparations quay.

4-2-2 Required length of the mooring facility

The required length of the respective mooring facilities shall be as given below.

1. Required lengths of the landing quay for trawlers and purse seiners.

The required lengths of mooring facilities are calculated as shown in Table 5-2

Table 4-2 Required lengths of the landing quay for trawlers and purse seiners.

Kind of Fishing Boat	Planned Number of Boats, A	Number of Sailing Days, B	Standard Number of Fishing Boats, C	Hours of use per Boat per Landing, D
Trawler	123 boats	6 days	21 boats	2 hrs.
Purse Seiner	24	12	2	5

Kind of Fishing Boat	Length of One Berth, E	Market Open Hours a Day, F	Quay Sufficiency Rate. G	Required Length of Quay $(\frac{C \cdot D}{F} \cdot E)G$
Trawler	27 m	6 hrs.	100 %	≒ 190 m
Purse Seiner	29	6	100	≒ 60

Note 1) Standard number of fishing boats:
The standard number of trawlers using the facility a day shall be
123 boats ÷ 6 days ≒ 21 boats/day.
The standard number of purse seiners using the facility a day shall be
24 boats × 12 days ≒ 2 boats/day.

2) Hours of use per boat per landing:
Calculation is
Hours of use per boat per landing operation

$$= \frac{\text{Mean landing quantity per boat per operation}}{\text{Landing capacity}} + \text{Extra hours, or}$$

$$\text{Trawler} = \frac{7.6 \text{ tons}}{5 \text{ tons/hr.}} + 0.5 \text{ hr.} \fallingdotseq 2 \text{ hrs., and}$$

$$\text{Purse seiner} = \frac{20.0 \text{ tons}}{5 \text{ tons/hr.}} + 1.0 \text{ hr.} = 5 \text{ hrs.}$$

3) Per berth length:
The trawlers are of the type of
Length, 23.5; width, 4.5m;
draft, 2.3m; gross tonnage, 55 tons.
The purse seiners are of the type of
Length, 24.3m; width, 4.2m;
draft, 2.9m; gross tonnage 60 tons.
They are used alongside the quay so that the length of one berth is
Trawlers 23.5m × 1.15 ≒ 27m
Purse seiners 24.3m × 1.15 ≒ 29m

4) Quay sufficiency rate:
Days of use of the trawlers and purse seiners number about 300 a year so that the quay sufficienty rate is taken as 100%.

2. Required lengths of the preparation quays for trawlers and purse seiners.
The preparation quay for trawlers is to be used with the lying alongside and shall be of about 4 berths, 120 m.

4-3 Plan of Shipyard

The shipyard is the facility of sloping structure where fishing boats will be placed on the land for certain periods for minor repair work. The length is set at 100 m.

4-4 Plan of Basin

The basin for trawlers and purse seiners will be developed by excavating and dredging 28,000 m^2 out of the opposite bank to a depth of -4 m.

4-5 Layout and Utilization Plan

Layout of the facilities specified in Sections 4-2 through 4-4 and the plan for the fishing boats to use them are as shown in Fig. 4-2. A detailed layout plan including the land functional facilities is illustrated in Fig. 4-5.

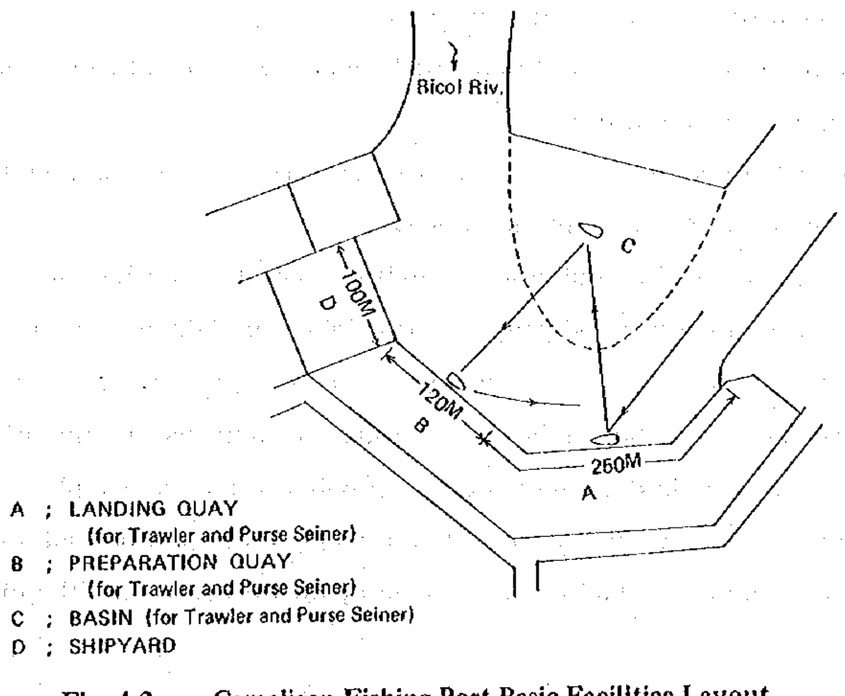


Fig. 4-2 Camaligan Fishing Port Basic Facilities Layout and Utilization Diagram.

Chapter 5 Plan of Functional Facilities

By the functional facilities are referred to the facilities complementing the basic facilities and, at the same time, serving for reasonable execution of the works and services to be performed at the fishing port and thus enhancing the usefulness of the fishing port, and where the fish market and ice plant and cold storage shall be constructed in the fishing port area, they are classified as one of the fishing port facilities.

5-1 Planned Facilities

Planned facilities include (1) fish market, (2) sheds, (3) ice plant and cold storage, (4) water supply facilities, (5) fuel supply facilities, (6) road, (7) parking area, (8) administration office, (9) fence and guardhouse, (10) power distribution and illumination facilities, (11) drainage system, (12) public toilet, (13) fishing boat and engine repair shop, and (14) land for fishing port facilities.

5-2 Plan Conditions and Required Quantities of Functional Facilities

5-2-1 Plan conditions of functional facilities

Planning of the functional facilities will be made with the following plan conditions taken into consideration.

(1) The shed (catch transport vessel stock building) shall be installed in the back of the preparation quay.

(2) The ice plant and cold storage shall be installed at a location as close to the fish market and prepararation quay for fishing boats as practicable.

(3) With respect to the water supply facilities, a pressure water tank connected with the City's service water system shall be installed, and pipes will be laid down to necessary points for water supply.

(4) For fuel supply, fuel tanks and fuel supply taps shall be installed, and the supply to the fuel tanks is made by tank lorries from the city of

Naga.

(5) The existing road behind the project site for the fishing port is inappropriate in location, so that it will have to be relocated.

(6) A fence shall be established at the border between the fishing port project site and the privately owned land. At the entrance, a gate and a guard house shall be constructed.

(7) As fishing boat and engine repair facilities for major repair of fishing boats, slipway and dock equipment shall be provided.

(8) As the land for fishing port facilities, sites for the various functional facilities shall be created.

5-2-2 Required sizes of functional facilities

1. Required sizes of main functional facilities (scale and capacity)

(1) Fish market

1) Standard amount of handling per day

Planned number of fishing boats is;

$$\left.\begin{array}{ll} \text{Trawlers} & \text{69 boats} \\ \text{Purse Seiners} & \text{17 boats} \end{array}\right\} \text{(A)}$$

Standard number of landing fishing boats per day is;

$$\left.\begin{array}{ll} \text{Trawlers} & \text{69 boats} \div 7 \fallingdotseq \text{10 boats} \\ \text{Purse Seiners} & \text{17 boats} \div 12 \fallingdotseq \text{2 boats} \end{array}\right\} \text{(B)}$$

Standard landing quantity per day is;

$$\left.\begin{array}{ll} \text{Trawlers} & \text{10 boats} \times \text{7.6 tons/boat} \fallingdotseq \text{76 tons} \\ \text{Purse Seiner} & \text{2 boats} \times \text{20 tons/boat} \fallingdotseq \text{40 tons} \end{array}\right\} \text{(C)}$$

2) Processing capacity of fish market per m^2

$$\left.\begin{array}{ll} \text{Catches from trawlers :} & 50\ kg/m^2 \\ \text{Catches from purse seiners :} & 100\ kg/m^2 \end{array}\right\} \text{(D)}$$

3) Required floor area of fish market

Catches from trawlers :

$$(C) \div (D) = 76 \text{ tons} \div 50\ kg/m^2 \fallingdotseq 1{,}600\ m^2$$

Catches from purse seiners :

$$(C) \div (D) = 40 \text{ tons} \div 100 \text{ kg/m}^2 \doteqdot 400 \text{ m}^2$$

Total: $2{,}000 \text{ m}^2$

4) Scale of fish market

Steel-framed, aluminium sheets roofing building of 20×100 m. ($2{,}000 \text{ m}^2$)

(2) Ice plant and cold storage

1) Ice plant

Supply of ice to fishing boats is of the same amount, for the trawlers, to the amount of catches landed per day. Use of ice at the fish market a day is 1/2 of the landed amount of catches.

Ice making capacity:

$$116 \text{ tons} \times 1 + (116 \text{ tons} \times 1/2) = 174 \text{ tons/day}$$

2) Ice storage

Storage amount of ice is equivalent to one day's production of ice or 175 tons (at -5°C).

3) Cold storage

Freezing amount a day : 5 tons/day (E)

Cold storage amount : (E) × 10 days stock

5 tons/days × 10 days = 50 tons at -25°C

(3) Water supply facility

Table 4-3 Water supply calculation table

Classification	Water Supply per Day	Water Supply per Hour
Supply to fishing boats:		
Trawlers	3.24 tons/boat × 10 boats = 32.4 tons	46.8 tons ÷ 6 hrs = 7.8 tons
Purse Seiners	7.20 tons/boat × 2 boats = 14.4 tons	
Ice plant & cold storage	120 tons	120 tons ÷ 24 hrs = 5.0 tons
Other use	2 tons	12 tons ÷ 12 hrs = 1.0 tons
Total	178.8 tons	13.8 tons/hrs

Water is supplied from the city service water system, and a unit of pressure tank connected to the service water system is installed for supply of water through piping to the required places.

(4) Fuel supply facility

1) Fuel supply

Number of objective fishing boats of fuel supply (B):

Trawlers	10 boats/day
Purse Seiners	2 boats/day

Fuel supply per boat per time (F) ;

Trawler	8.208 kℓ/boat
Purse Seiners	14.227 kℓ/boat

Fuel supply per day (G) :

Trawlers	(B) × (F)	= 10 boats × 8.208kℓ/boat ≑ 82
Purse Seiners	(B) × (F)	= 2 boats × 14.227kℓ/boat ≑ 29
	Total:	111kℓ/day

2) Fuel tank capacity

Stock of two days' requirement of fuel

111kℓ/day × 2 days = 222 kℓ

For storage of fuel, a 200 kℓ tank and a 100 kℓ tank shall be installed in the compound of the fuel tank and the fuel shall be supplied to the fuel supply taps on the quays through piping.

Note: The fuel supply amount per boat per time is calculated as given below.

Table 4-4 Fuel supply amount per boat per time.

Classification	Trawler	Purse Seiner
Fishing boat horse power	300 HP	390 HP
Main fuel consumption/hr/HP	0.19 kg/hr/HP	0.19 kg/hr/HP
Average running hours/navigation/boat	6 x 24 = 144 hrs	12 x 16 = 192 hrs
Main fuel supply/time/boat	8.208 kℓ/boat	14.227 kℓ/boat

2. Scales of the other functional facilities

(1) Shed (Catch transport vessel stock building)

There shall be installed a building with a floor area of 600 m^2.

(2) Roads

The replacement for the existing road shall be 15 m in width and about 1,600 m in length. The roads within the compounds of the fishing port shall be 10 m in width, each being paved. The roads shall be furnished with gutters and drainages.

(3) Parking area

A parking space (asphalt paved) shall be provided in the back of the fish market.

(4) Administration office

A reinforced concrete two storied building with a total floor area of 800 m^2 shall be constructed.

(5) Fence and guardhouse

There shall be installed an extension of 1,365 m of fence, a gate and a guardhouse of a floor area of 50 m^2.

(6) Power distribution and illumination facilities

With the electric power supplied from the city, the power distribution lines within the fishing port area shall be installed. Illumination lights should be installed where they are reuired.

(7) Public toilet

Two toilet buildings, each with a floor space of 100 m^2, shall be installed.

(8) Fishing boat and engine repair shop

A slipway of an extension of 72 m, fishing boat loading equipment (rails, power winches, etc.) and land for repairing work shall be provided.

(9) Land for fishing port facilities

There shall be created about 21.6 hectares of land as the site for the foregoing functional facilities and the lot for fish processing, fish industry and net and gear area.

5-3 Layout Plan

Layout or arrangement of the facilities specified in Section 5-2 is as shown in Fig. 4-3 and 4-4. A detailed layout plan including the basic facilities is illustrated in Fig. 4-5.

CAMALIGAN FISHING PORT

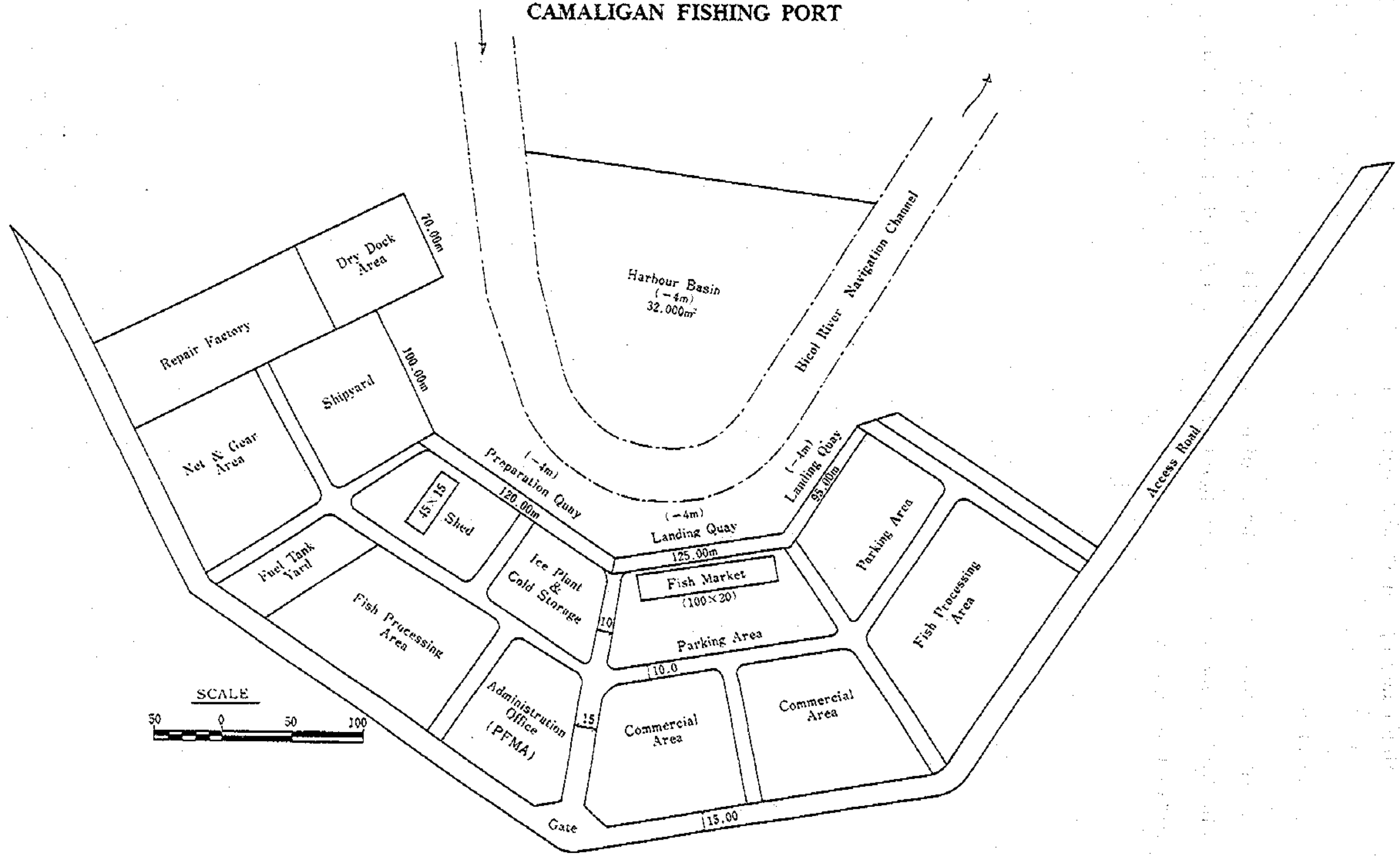


Fig. 4-3 Arrangement of Functional Facilities, Camaligan Fishing Port

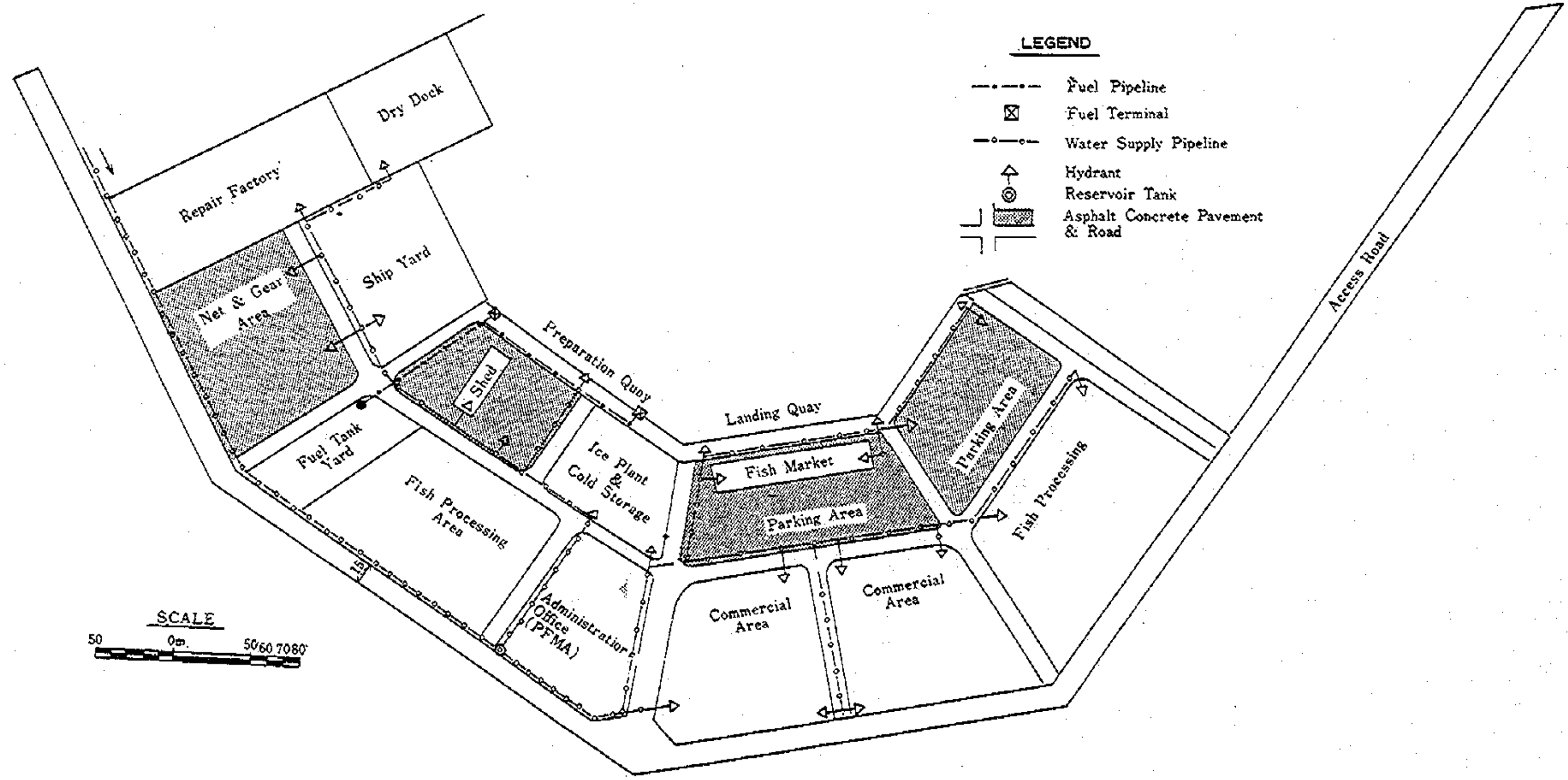


Fig. 4-4 Water & Fuel Supply System, Camaligan Fishing Port

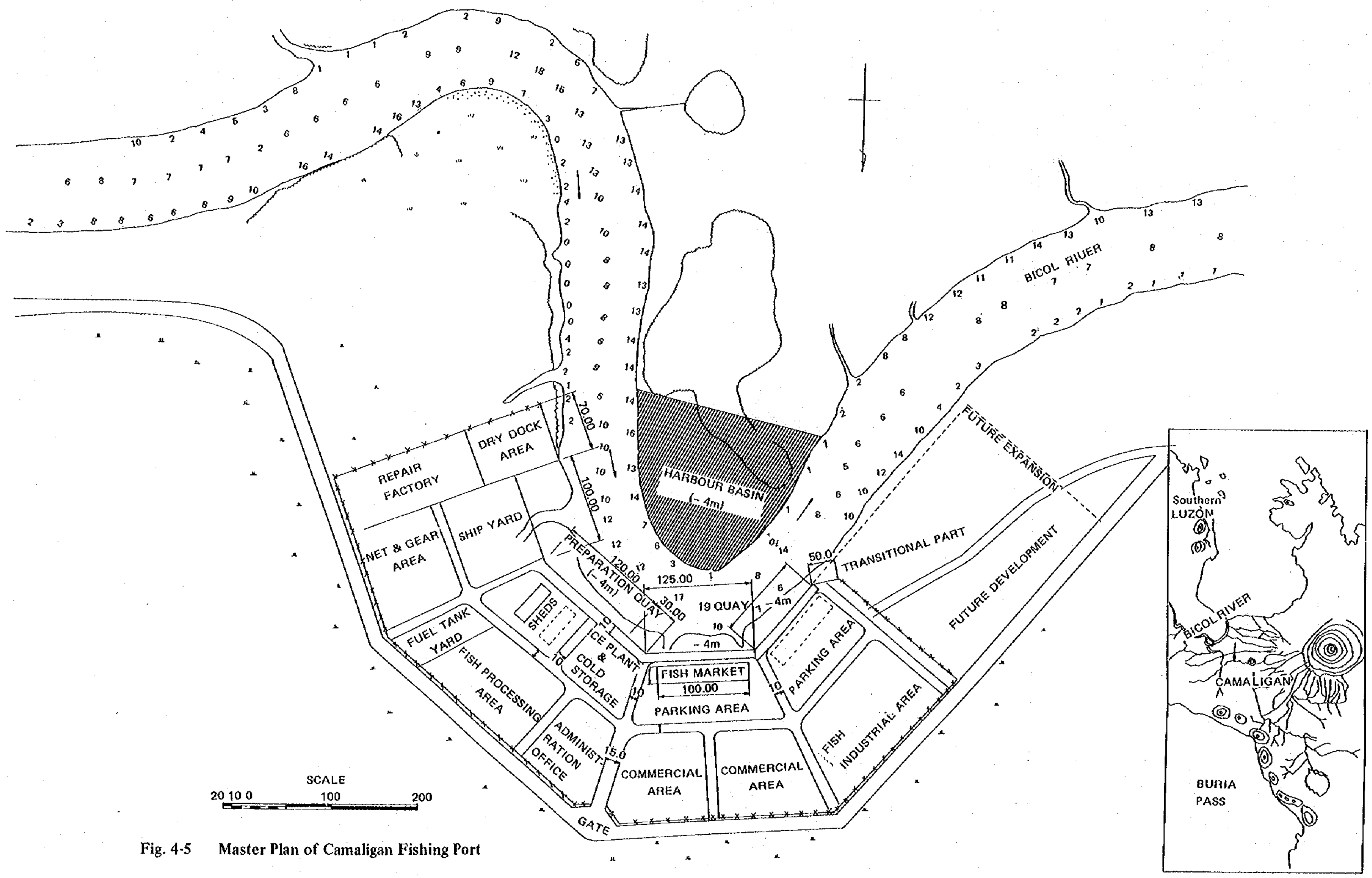


Fig. 4-5 Master Plan of Camaligan Fishing Port

Chapter 6 Structural Design of Principal Facilities

6-1 Design Conditions

Design conditions used for design of quays and other principal facilities are summarized in the following.

(1) Design seismic intensity (Kh)

$$Kh = z.k.c$$

where z: Regional seismic intensity (or z = 1.2) according to the "Seismic Data in the Philippines" shown in Fig. 5-6;

k: Structural importance coefficient (or k = 1.0); and

c: Seismic coefficient (or c = 0.1).

Then,

$$Kh = 1.2 \times 1.0 \times 0.1 = 0.12 \text{ or nearly } 0.1.$$

(2) Soil conditions

No soil survey was conducted at the site of construction so that with the soil survey data at the point (bridge building site) near the construction point taken as a reference, the soil condition was estimated as shown in the subsoil condition columnar diagram of Fig. 4-7.

(3) Objective fishing boat

The objective fishing boats are trawlers and basings, and their ship type parameters are as shown in Table 4-5.

Table 4-5 Type parameters of objective fishing boat

Kind of fishing boat	Length Overall	Extreme Breadth	Draft	Gross Tonnage
Trawler	20.6 m	3.9 m	1.9 m	30 tons
Purse Seiner	24.8	19.6	1.9	20

(4) Water level

In the absence of the records of observation at the site, the design tide levels are determined as shown below from the "Tide and Current Table, Philippines" (published by the Bureau of Coast & Geodetic Survey) and the charts.

H. W. L.	+ 1.270 m (1.266)
H. W. L. at flood condition	+ 2.270 m

However, when the flood control project of the Bicol River makes progress and a short cut is completed for the third canal, the tide level may be controlled at the time of a flood and there will be no anxiety about an extraordinarily high level caused by a flood.

(5) Flow Speed of River

No attempt will be made here to take note of an extraordinarily fast flow at the time of a flood as the flood control of the Bicol River and the third Canal's short cut are to be completed by 1978.

(6) Other design conditions

The other conditions considered for design are as follows.

1) Crown heights;

Quay and landing place	DL + 2.5 m.
Reclaimed land	DL + 2.5 m.

2) Design water depth;

Maximum draft of objective fishing boat (A)	2.9 m
Allowance (B)	1.1 m
Design water depth (A) + (B)	-4.0 m

3) Surcharge load;

Quay	1.0 ton/m^2
Landing place	0.5 ton/m^2

4) Internal frictional angle of backing cobble $\phi = 30°$

5) Property of bearing ground

Silt $C = 0.5$ tons/m^2

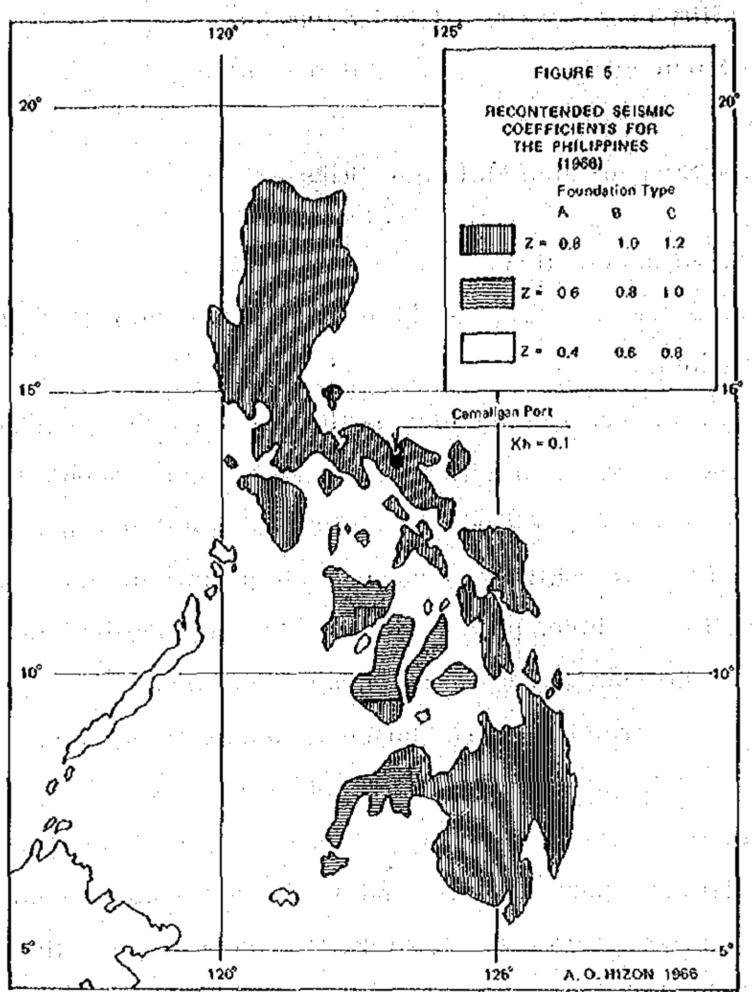


Fig. 4-6 Seimic Condition of the Philippines

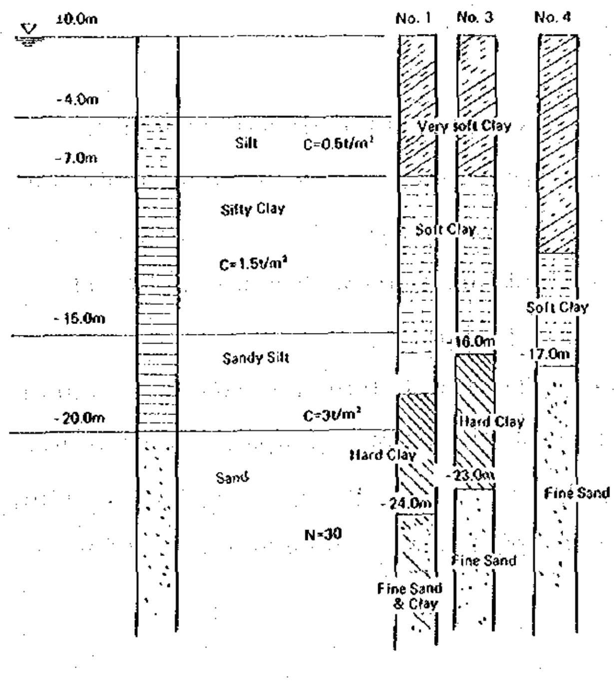


Fig. 4-7 Estimated Sub Soil Condition of Camaligan Port

Silty clay $C = 1.5\ tons/m^2$

Sandy silt $C = 3.0\ tons/m^2$

6-2 Selection of Structures of Main Facilities

6-2-1 Points noted in selection

In selection of the structures of the principal basic facilities, the following points are to be noted.

(1) Since it is required to complete the work in a short period and start the use as soon as practicable, such a structure should be chosen which is simple, of good workability and stabilized in a short time.

(2) The structure shall be so chosen as to permit as much use of the construction machines presently available in the Philippines as practicable while use of special machines is avoided.

(3) The structure shall be so chosen as to permit as much use as practicable of the materials avilable at the site.,

(4) As the soil condition of project site is very weak and poor for foundation of port structure and Bicol river is as deep as more than 10 m (and even so near the banks at project site), so that the quay wall should be sheet pile structure, and from the workability, reliability and durability, steel pipe piles with joinable flange should be used.

6-2-2 Structural elements of principal basic structures

Structural elements of the principal basic structures are as given below.

(1) -4 m Quay .... Steel pipe pile structure (See Fig. 4-8)

Body .... Steel pipe piles with joints, ϕ = 1,016 m/m, t = 12 m/m, ℓ = 27.0 m.

Tie rod .... Tie rod ϕ 60 m/m rod to rod 2.0 m

Anchor .... Steel pipe pile, coupled pile structure

No. 1 pipe pile; ϕ = 607.6 m/m, t = 9.5 m/m, ℓ = 30.0 m

No. 2 pipe pile; ϕ = 609.6 m/m, t = 9.5 m/m, ℓ = 30.0 m

(2) Ship yard .... Concrete structure (see Fig. 4-9)

Body .... Precast concrete slabs beneath the depth of $\pm$ 0.0 m

In-situ concrete above the depth of $\pm$ 0.0 m

(3) Dry dock (See Fig. 4-10)

Body .... Concrete blocks beneath the depth $\pm$0.0 m

In-situ concrete above the depth $\pm$0.0 m;

Length, 72 m; Width, 5.0 m.

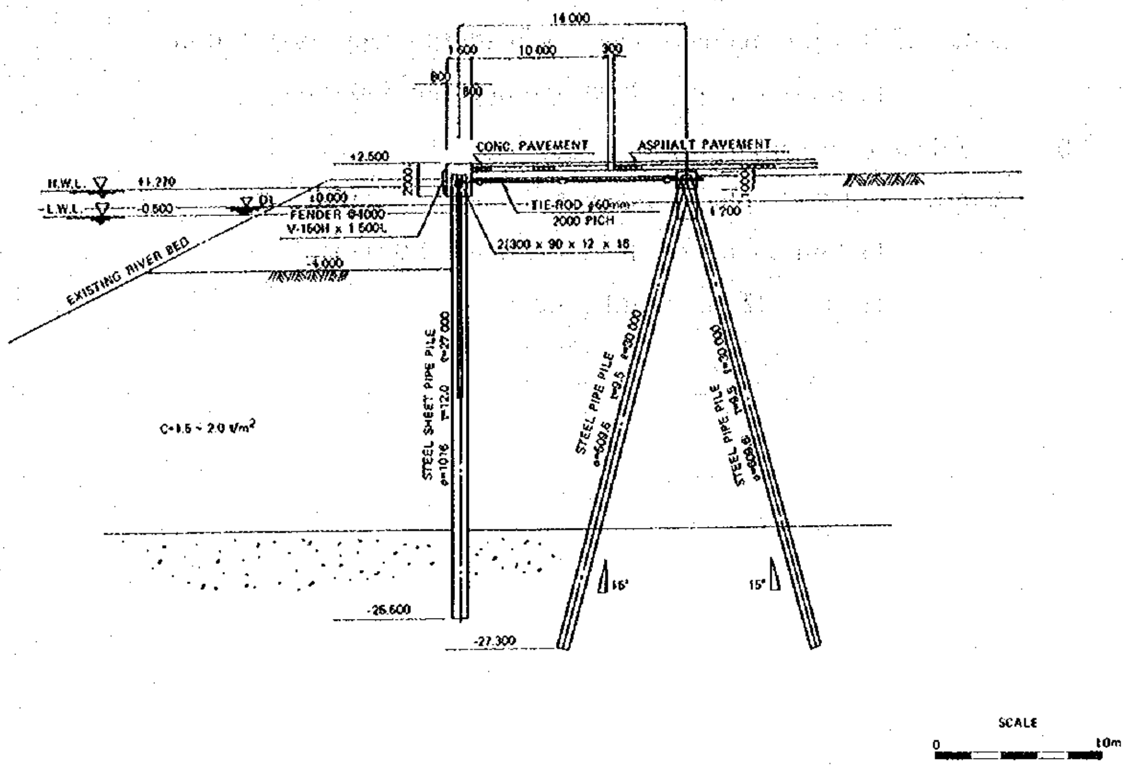


Fig. 4-8 Cross Section of Landing Quay – Camaligan Port

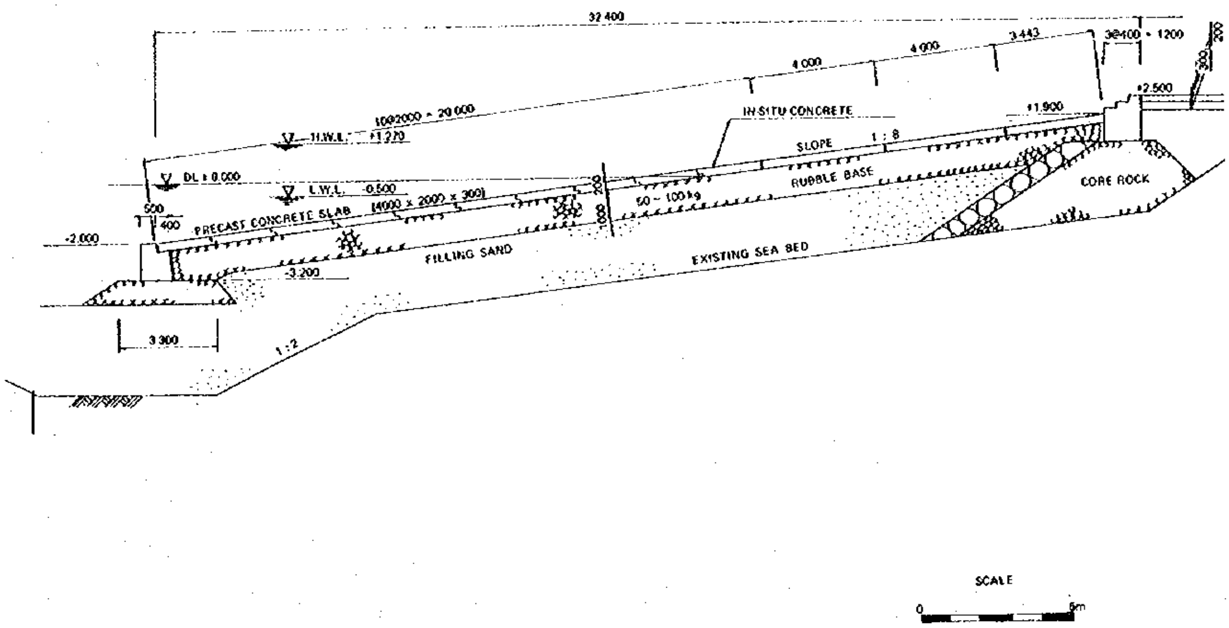


Fig. 4-9 Cross Section of Basnig Landing – Camaligan Port

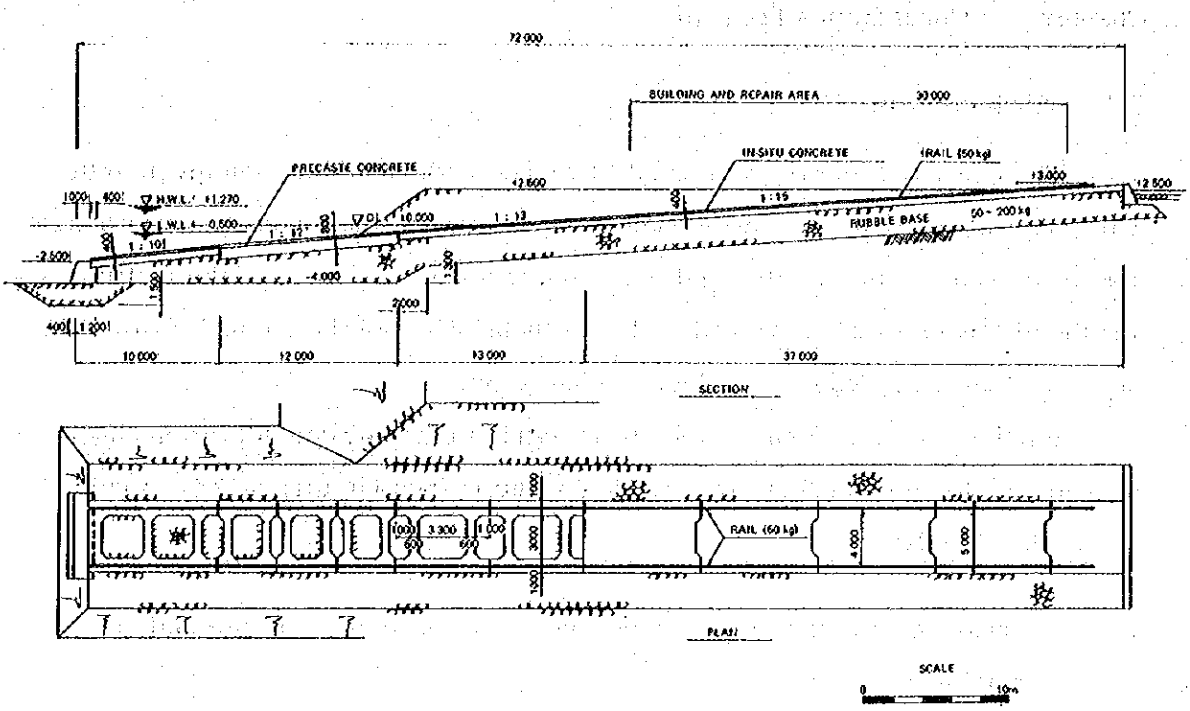


Fig. 4-10 Cross Section of Dry Dock – Camaligan Port

Chapter 7 Construction Program

7-1 Work Program

The construction program should be made with consideration given to the work schedule so that the work period being two years, the respective works are started as soon as practicable and that from the urgency of use of the facilities and the viewpoint of effective utilization of them, not only the basic facilities but the functional facilities can be placed in use soon.

Further, in implementing the construction program, consideration should be made so that the demand for facilities at the respective target years would be met satisfactorily.

7-1-2 Securing workers for construction and procurement of materials and machines

(1) Securing the construction workers

The construction site is only 3 km apart from the central section of Naga City so that it will be easy to secure unskilled workers. Also, it will not be difficult to secure the concrete workers and other skilled workers in the general works.

However, it will be difficult to secure the skilled workers in the port construction works, and they will have to be introduced from the other areas.

(2) Procurement of construction materials

For procurement of the important materials among the construction materials in general,

1) Core, backfill and foundation cobble

Quality rubble stones are available in abundance on the volcanic hill situated about 10 km from the construction site, and the use of the cobble by crushing these stones is feasible.

2) Sand and gravel for concrete

The procurement of mountain sand and gravel in the vicinity of the construction site is feasible. Gravel may also be put to use by crushing rubble stone and cobble.

3) Backfill soil and replacement sand

Earth and sand for backfilling and replacement are procurable from hills in the vicinity of the construction site. Practically every road usable for the transport of sand and gravel has two lanes, but the streets in Naga City are so congested that they are not suitable for the transport of large quantities of earth and sand. A study of the road is indispensable, and there is need to solidify and widen some of the roads.

4) Cement

Indigenous cement is used since its supply is stable and it has no problem in quality as well as quantity.

5) Steel material

Steel materials such as steel sheet pile, tie rod and reinforcing bar are required to be of stable supply and uniform quality so that their supply will be dependent on imports.

6) Forms and supports

Wooden forms, supports and other temporary materials are all procurable domestically. Steel forms and steel supports are partly procurable domestically, but there is a problem in the supply capacity. Thus, their use will be limited to the important structure, and their supply will be dependent on the import.

7) Other special materials

Cables, electrical wires, electrical equipment, plants and machines will be dependent on the import.

(3) Procurement of construction machines

The following construction machines are obtainable in Manila City and its peripheral area so that they will be procured domestically:

(1) Pump dredger,

(2) Pile driving barge,

(3) Pontoons and crawler pontoons for crawler,

(4) Dump trucks,

(5) Batcher plant, and

(6) Crushing plant,

The following machines will be imported from the outside of the country.

(1) Crawler crane.

7-1-3 Facilities required for construction

(1) Temporary road for construction

A road which is connected to the city of Naga runs 50 m behind the construction site, but its width is only one lane in most parts, so that there is need to widen the road in some parts. As there exist upland and paddy fields low in productivity around the construction site, it will be easy to construct a temporary road for the construction of the fishing port.

(2) Temporary office, etc.

With initiation of the work, it is required to construct a field office for the construction work personnel, warehouse, material yard and construction machine yard. As farms and other privately owned plots are situated at the construction site, it will be necessary for the city authorities or the Government of the Philippines to expropriate these plots.

(3) Water, electricity and telephone facilities

These will have to be completed, before start of the work, from the city to the construction site by the hand of City or Government.

7-2 Project Schedule

The project schedule is illustrated in Table 4-6.

7-3 Estimation of Construction Cost

7-3-1 Concept for cost estimation

Estimation of the construction cost is made according to the following

Table 4-6 Project schedule – Camaligan port

Completion Time 24 month

No Item	Q'ty		Number of Months (6, 12, 18, 24, 30)
Mobilization	LS	1	
Port Work			
Landing Quay	m	420	
Basnig Landing	m	100	
Dry Dock	Set	1	
Dreding & Reclamation	m^3	145,000	
Functional Facilities			
Building Work	LS	1	
Road & Pavement	LS	1	
Miscellaneous Work	LS	1	

concept.

(1) Estimation of the construction cost is made on the 1978 prices.

(2) Unit prices of the construction materials and those of labourrs used in the estimation are determined with the Standard Material Unit Prices and Standard Labour Wages (1977) of the Government of the Republic of the Philippines taken as the base and the material unit prices and labour wages obtainable upon survey at the fishing port project site taken as a reference.

(3) For the imported materials, the unit prices are obtained at the price of CIF plus domestic trausportation cost in 1978.

(4) Exchange rate of the local currency to the foreign currency is :

US$1.0 = 8.22 ₱ = ¥220.

(5) With no soil survey conducted at the construction site, a soil investigation will have to be conducted newly, and depending on the result of such soil investigation, the design conditions may change, involving a possibility of the design being modified more or less for the main structures. Thus, a contingency is estimated at a rate of 15% as physical contingency.

7-3-2 Estimation of construction cost

The construction cost required for development and improvement of the Camaligan fishing port is set forth in Table 4-7.

Table 4-7 Construction cost of Camaligan fishing port

	Unit	Quanty	Unit Price (US$)			Total (US$)		
			Local	Foreign	Amount	Local	Foreign	Amount
(Preparatory Work)						(239,100)	0	(239,100)
Site Clearance	m2	170,000	0.23	0	0.23	39,100	0	39,100
Temporary Jetty	L.S	1				200,000	0	200,000
(Mobilization)	L.S	1				(112,000)	(155,000)	(267,000)
(Port Work)						(1,332,405)	(7,817,236)	(9,149,641)
Landing & Preparation Quay	m	420*	1,838	16,545	18,383	771,960	6,948,900	7,720,860
Basning Landing	m	100	4,347	4,709	9,056	434,700	470,900	905,600
Dry Dock	NOS	1	44,545	72,636	117,181	44,545	72,636	117,181
Dredging & Reclamation	m3	145,000	0.56	2.24	2.80	81,200	324,800	406,000
(Functional Facilities)						(4,232,668)	(1,828,691)	(6,061,359)
Fish Market	m2	2,000	118.45	93.39	211.84	236,900	186,780	423,680
Transit Shed	m2	675	118.45	93.39	211.84	79,954	63,038	142,992
Administration Office	m2	800	658.03	0	658.03	526,424	0	526,424
Public Toilet	m2	100	658.03	0	658.03	65,803	0	65,803
Roads & Pavement	m2	73,298	29.37	0	29.37	2,152,762	0	2,152,762
Electrical	L.S	1				98,700	272,400	371,100
Drainage	m	6,220	49.95	0	49.95	310,689	0	310,689
Water System	L.S	1				247,100	79,300	326,400
Fuel System	L.S	1				63,400	299,900	363,300
Fence & Gate	L.S	1				47,300	0	47,300
Ice Plant & Cold Storage	L.S	1				403,636	927,273	1,330,909
Sub Total						5,916,173	9,800,927	15,717,100
Tax & Duties	L.S	1				2,787,354	0	2,787,354
Contingency	%	15				1,305,529	1,470,139	2,775,668
Total						10,009,056	11,271,066	21,280,122

Note: *) = Total length of 420 m includes 50 m of the transitional part of quay wall.
The preparation quay length is 120 m.

Chapter 8 Economic Analysis

8-1 Economic Background of Camaligan Fishing Port

The Camaligan fishing port is situated in the Bicol River near Naga, the central city of Camalines Sur Province. The riverside close to the project site is currently used by trawlers and purse seiners for the landing of their fish catches, which include many expensive fishes.

No fishing villages exist in the vicinity of the port site. This projected port is not the port which would link with any specific fishing villages, but the fishing port which aims at carrying out highly developed fisheries by bringing up large scale fishing firms and at the same time at helping to organize petty fishermen and redistributing the profit. At present, great economic losses are incurred in fish landings at several places on the Bicol River's banks due to an inefficient unloading of fish catches, an inefficient treatment of fish, a lack of market facilities and the facilities to supply ice, fuel and water.

In the economic evaluation it will be clarified with importance attached to the foregoing local characteristics, in what form the fulfilment of the demand for fishes intended by the Government of the Republic of the Philippines is achieved, and from the economic point of view, what effect will be brought about, by the fishing port development and improvement.

Benefits from a fishing port are generally summarized as set forth in the following:

(1) Reduction of the time required for the fishing boats to come in and go out of the port through relief from congestion in the port;

(2) Increasing catches with increasing expedition of the fishing boats;

(3) Improvement in the freshness of fishes through increasing supply of ice and technological inovation;

(4) Realization of powered and larger fishing boats upon completion of a modern and larger scale fishing port (modernization of the fishery by functional accumulation);

(5) Increasing income of fishermen due to elevation of the average fish

prices;

(6) Improvement in the rate of self-sufficiency of proteins;

(7) Stabilization of the fish prices from stable supply of fishes;

(8) Creation of employment opportunities and urbanization effect; and

(9) Acquisition of new techniques, and acceleration of the fishermen association.

The analysis will be made mainly with respect to the benefits (2) and (3) which permit quantifying among the benefits listed above.

8-2 Demand and Supply of Fish in Camalines Sur Province

8-2-1 Market territory and recent outputs of an demands for fishes

The major market close to the Camaligan fishing port is Naga city. The wider market area includes Camalines Sur Province, Albay Province, Sorsagon Province and Camalines Norte Province. This market area stretches long from east to west. However, as relatively highly priced fish has a big share in the catches landed at this fishing port, there are many cases in which fish will be transported to Metropolitan Manila. Assuming that the fisheries' structure of the Bicol region is almost the same in Camalines Sur Province, following estimation is made in relation to the balance of demand and supply in the province.

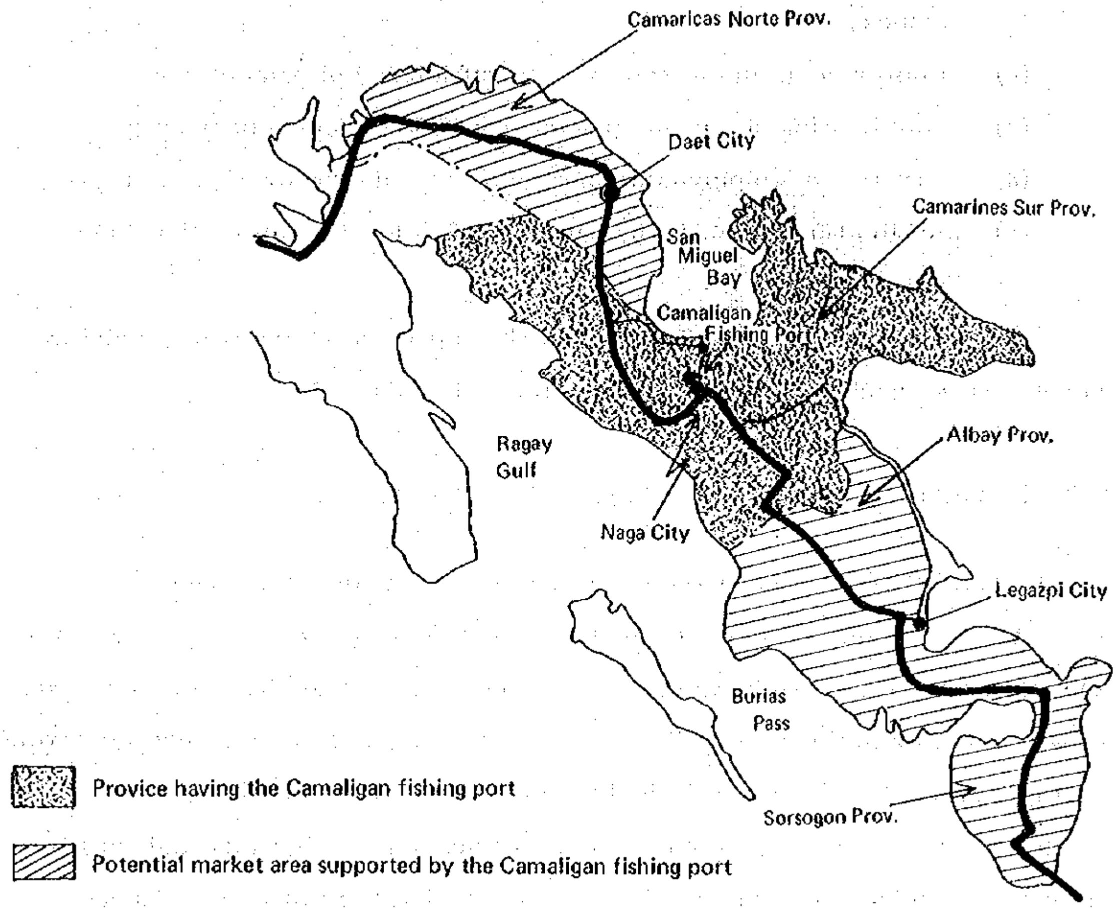


Fig. 4-11. Objective market territory of Camaligan fishing port

The composition of marine and inland fisheries in the Bicol Region is shown in Table 4-8. The production share of commercial fishing in the marine fisheries stands at 55%. Assuming that this fishing pattern is also applicable to Camalines Sur Province, the following estimation will be made.

Table 4-8 Details of fish supply in Bicol region (1975)

Kinds		Production	Percentage
Marine fisheries	Municipal fishing	tons 67,800	% 62.8
	Commercial fishing	33,400	30.9
	Total	101,200	93.7
Inland fisheries		6,800	6.3
Total		108,000	100.0

The details of the fish output and demand in Camalines Sur Province in 1975 are estimated as indicated in Table 4-9 (the formula used for this computation is shown below the table).

Table 4-9 Details of supply and demand of fish in the province (1975)

tons

Kinds \ Output and Demand		Annual output	Demand in the province	Net Domestic & foreign exports
Maine fisheries	Municipal fishing	21,100		
	Commercial fishing	10,400		
	Total	31,500		
Inland fisheries		2,100		
Total		(100.0) 33,600	(98.5) 33,100	(1.5) 500

Note: 1) The demand in the province was obtained, with the 1975 population of 1,015,000 used, according to the formula

$$D_n = Co\,(1 + y \cdot e)^n \cdot Pn$$

where D_n : Effective demand in the n-th year with 1975 taken as a base year;

C_o : Basic consumption in the reference year (32.6 kg);

y : Real per capita income growth rate (6%);

e : Income elasticity of demand for fish (0.4); and

P_n : Population of the n-th year (with 1975 as the base year).

The output and demand in Camalines Sur Province are shown in Table 4-9. This table suggests that 99% of the provincial fish output is consumed within the province. It indicates that high-grade fishes, which are landed in large quantities, is transported to Metropolitan Manila and exported to foreign countries in extremely limited quantities due the traffic conditions and the shortage of fish supply within the province.

8-2-2 Analytical conditions

The analytical conditions are considered as follows.

(1) The output of the municipal marine fisheries will continue to maintain the present level.

(2) The inland fisheries will have no increase in the output but continue to maintain the present level.

(3) The share of the exports and domestic shipments is set at about 20% (however, the share will be retained as it is in case there is no fishing port) of the total output (marine and inland fisheries), on the assumption that the share will be improved by an improvement of the traffic conditions and an increase in the ice supplying capacity.

8-2-3 Analysis of the change in the balance of demand and supply

Under the foregoing present situation and analytical conditions, analysis of the balance of demand and supply in the future (for the two cases with and without the fishing port) is made according to the following procedures.

(1) Forecast of population

Populations in the future are forecasted, upon the pattern of change of the population in 1960 - 1975, as shown in Table -10 and Fig. 4-12.

Table 4-10 Traditional change and forecasted values of population in Camarines Sur Province

Unit : 1000

area \ year	1960	1970	1975	1981	1990	2000
Naga city	--	92	92	92	92	92
Other area	—	857	923	988	1,098	1,228
Total	820	949	1,015	1,080	1,190	1,320

Note: "Socio Economic Profiles, Naga City" 1975, city of Naga
"Philippine Statistical Year Book" 1977, NEDA

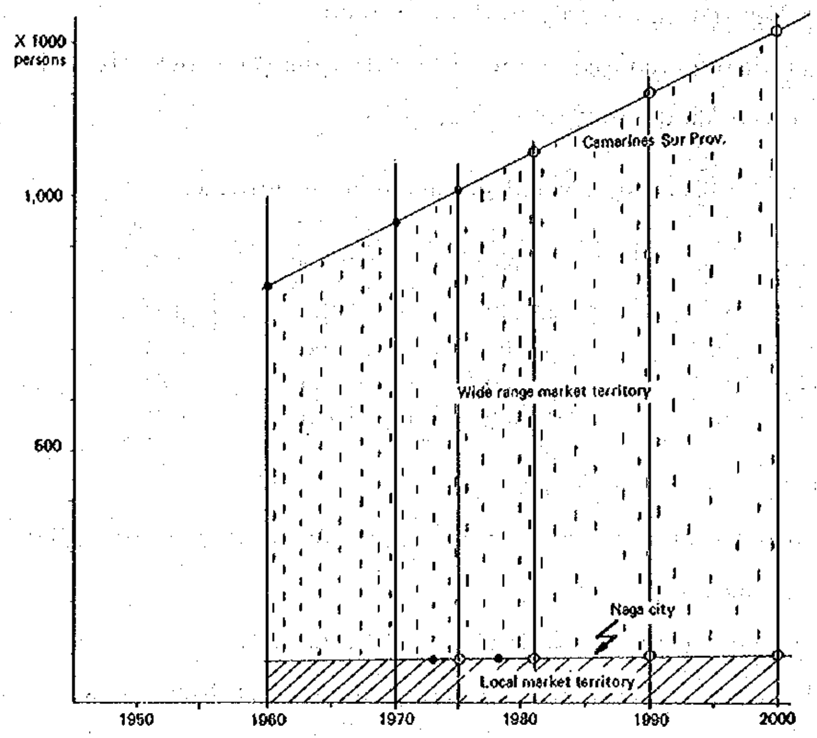


Fig. 4-12 Population change and forecast

(2) Forecast of demand for fishes in the province

Demand forecasts of the objective market territory (Camarines Sur Province) are, if the forecast is made for the local market territory (Naga City) and for the wide range market territory (whole area of the Province except Naga City), as shown in Table 4.11.

Table 4-11 Demand forecasts of fishes in Camarines Sur Prov.

tons

Market territory / Year	Local market territory	Wide range market territory	Objective market territory
1975	2,999	30,090	33,089
1981	3,458	37,137	40,595
1990	4,280	51,079	55,359
2000	5,425	72,420	77,845

Note: The demand forecasting method is the same to that for Table 4-9.

(3) Balance of demand and supply in the province

The balance of demand and supply with a fishing port and that without a fishing port are shown in Table 4.12.

Table 4-12 Balanc of demand and supply in the province.

tons

Project	Year	Supply (S)	Demand (D)	S/D
With port	1990	51,040	55,400	0.92
	2000	65,200	77,800	0.84
Without port	1990	35,700	55,400	0.64
	2000	36,700	77,800	0.47

Note 1). Supply (S) : $S = (Y_0 + Y_1) - E$

Y_0 : Output (commercial fishery) at fishing port (with or without fishing port).

Y_1 : Outputs of municipal and inland fisheries.

E : Flow out of the province (net domestic and foreign exports)

2). Demand (D) : Provincial demand specified in paragraph (2)

In this analysis it is assumed that the share of fish transported to Metro Manila and exported to foreign countries in the total provincial output stands at 20%. If this percentage becomes lower than 20%, actually it is possible to make the demand and supply balance in Camalines Sur Province. This condition suggests that the construction of the projected fishing port will make it possible for the province to attain its completed self-sufficiency.

8-3 Economic Evaluation

8-3-1 Concept of analysis

The analysis will be made along the following lines.

(1) The effect of the fishing port development will be taken as the difference between the case where the fishing port is present and that where the fishing port is not present.

(2) For the costs, the construction, personnel, maintenance and facility

renewal costs will be taken up.

(3) For the benefits, analysis will be made of the direct benefits more specifically, 1) increase in the output of fish catches and 2) improvement in the freshness of fishes due to increased supply of ice and technological improvements.

(4) Project life - 20 years after start of operation of the fishing port (1981).

(5) Prices - Prices in 1978.

(6) Discount rate - 15%.

(7) Evaluation - Net present value, cost benefit ratio and internal rate of returns will be estimated.

8-3-2 Costs

(1) Construction cost

In the construction cost, consultant fee is included. Details of the construction cost by year and by foreign and domestic currencies are shown in Table 4-13. The consultant fee is divided into that for construction and that for management and is allocated to the respective years. For the contingency, 15% of the total construction cost is used. From the character of the cost benefit analysis, the interest during the construction period is not included.

Table 4-13 Details of the construction cost of Camaligan fishing port.

Unit: US$1,000 (₱1,000)

Year	Foreign Currency			Local Currency			Total		
	Construction Works	Consultants Fee	Total	Construction Works	Consultants Fee	Total	Construction Works	Consultants Fee	Total
1979	6,717	1,354	8,071 (58,273)	4,561	156	4,717 (34,058)	11,278	1,510	12,788 (92,331)
1980	4,554	618	5,173 (37,347)	5,448	103	5,551 (40,079)	10,002	722	10,724 (77,425)
Total	11,271	1,972	13,244 (95,620)	10,009	259	10,268 (74,137)	21,280	2,232	23,512 (169,756)

(2) Operating and maintenance costs

As the annual maintenance expense, 1.5% of the construction cost is counted for the years subsequent to the start of operation. For the personnel expense, a monthly wage of ₱23,700 is estimated for 21 officials (including a 10% allowance).

(3) Replacement costs

The basic facilities are of longer lifespan than 20 years, and for the functional facilities only, the replacement cost during the project life is counted with lifespan taken as 15 years (the salvage value of project cost of course, taken into account).

8-3-3 Benefits

(1) Direct benefits

1) Increase in the output of fish catches

With development and improvement of the fishing port, mooring is eased and landing and operational capacities are elevated greatly, while constant supply of the materials such as water, ice and fuel which are required for fishing is enabled, resulting in enlargement of the economic as well as physical capacity of the fishing port (which is presently a mere landing place as it is under the natural condition) for the fishing boats. With such enlarging the capacity, the following changes are occurred (when compared with the case of "without the project").

① Reopening of the operation of the fishing boats which have stopped the operation.

② Increase in the expedition times of the boat which is operated at present.

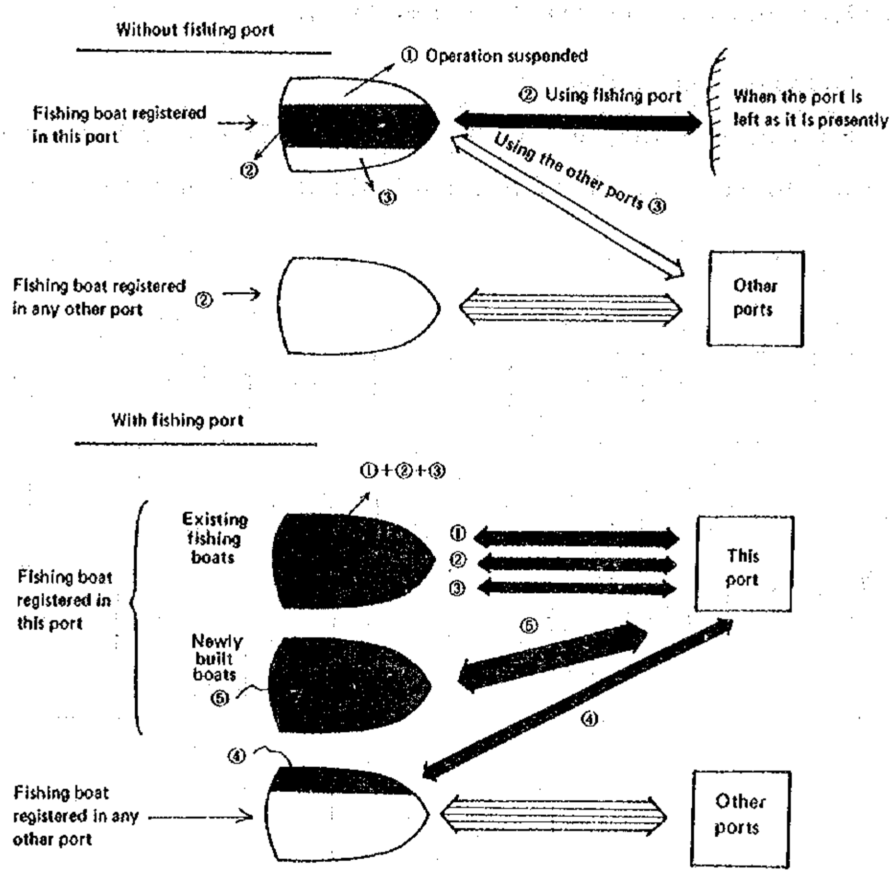
③ Entry of the registered fishing boats in this port which were unloading at the other ports.

④ Entry of the fishing boats registered in the other ports.

⑤ Increase of the incoming fishing boats owing to construction of new fishing boats.

For the foregoing changes, the economic analysis is made as set forth in the following.

From the character of the fishing port, it is not conceivable that the reduction in time of the sequence of mooring-landing-fishing out will change the frequency of operations or entries of the fishing boats greatly, so that the change ② is excluded from the analysis. Those increasing incoming boats which are under ③ and ④ will not bring about much change from the viewpoint of the national economy so that they are also excluded from the analysis. Thus, the objectives of the analysis are limited to the changes ① and ⑤. For the change ⑤, while the construction of port



※ (Shadowed part in this chart are the fishing boats using this port.)

Fig. 4-13 Change in the form of use of the fishing port.

facilities would generate benefits, corresponding increases in fishing boats costs would take place.

Conditions for estimation and the results of estimation will be described later.

2) Improvement in the degree of freshness of fish catches

Upon construction of the fishing port, the freshness of the catches is improved greatly due to increase in the supply of ice on one hand and to improvements in the handling and carrying techniques. Consequently, the mean price of the fishes unloaded at the port will rise, and generating much benefit adding the increase in the fish production (assumptions and procedures of estimation are described later).

3) Method of estimation

Estimation of the net benefits from 1) and 2) above will be made according to the procedure illustrated in the flow chart of Fig. 4.14.

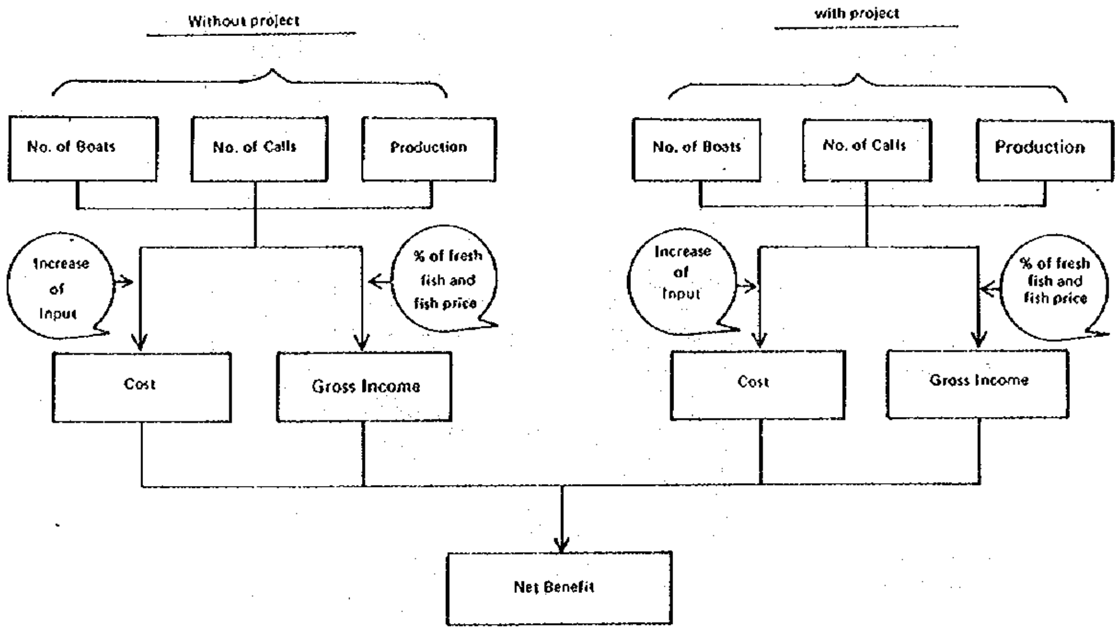


Fig. 4-14 Estimation procedure of net benefit.

Estimation of the net benefit is made according to the formula.

$$\text{Net benefit } B = GI - C$$

$$GI = B_1 + B_2$$

$$C = C_1 + C_2 + C_3 + C_4$$

where GI : Increment in Gross Income,

B_1 : Increment in Gross Income due to increase in the annual output of catches,

B_2 : Increase in Gross Income due to improvement in the degree of freshness of the fish catches,

C : Increment in the cost,

C_1 : Increment in the depreciation cost of the fishing boat,

C_2 : Increment in the maintenance cost of fishing boat,

C_3 : Increment in the running cost of fishing boat, and

C_4 : Increment in the cost of ice.

Formulas for estimation of B_1 and B_2 constituting items of the gross income are:

① B_1 is increment in gross income due to increase in the output of fish catches

$$B_1 = (Q^1 - Q^0) \left\{ r^0 \cdot P_f + (1 - r^0) Ps \right\}$$

and

② B_2 is increment in gross income due to improvement in the degree of freshness of the fish catches

$$B_2 = Q^1 \cdot (r^1 - r^0)(Pf - Ps)$$

where Q^1 : Output when there is a fishing port,

Q^0 : Output when there is no fishing port,

r^1 : Degree of freshness when there is a fishing port,

r^0 : Degree of freshness when there is no fishing port,

P_f : Price of fresh fish, and

P_s : Price of spoiled fish.

Basic conditions for estimation are as given below.

① Number of fishing boats, fishing boat calls and output of fish catches.

Table 4-14 Number of fishing boats, boat calls and output.

Project	Type of Boats	1981 No. of boats	1981 Calls	1981 Production (t)	1990 No. of boats	1990 Calls	1990 Production (t)	2000 No. of boats	2000 Calls	2000 Production (t)
With project	Purse Seiner	8	190	3,800	17	425	9,900	24	600	11,900
	Trawler	39	1,974	15,000	69	3,450	30,700	123	6,150	46,400
	Total	47	2,164	18,800	86	3,875	40,600	147	6,750	58,300
Without project	Purse Seiner	5	120	2,400	5	135	2,700	6	145	2,900
	Trawler	25	1,263	9,600	27	1,355	10,300	29	1,461	11,100
	Total	30	1,383	12,000	32	1,490	13.000	35	1,606	14,000

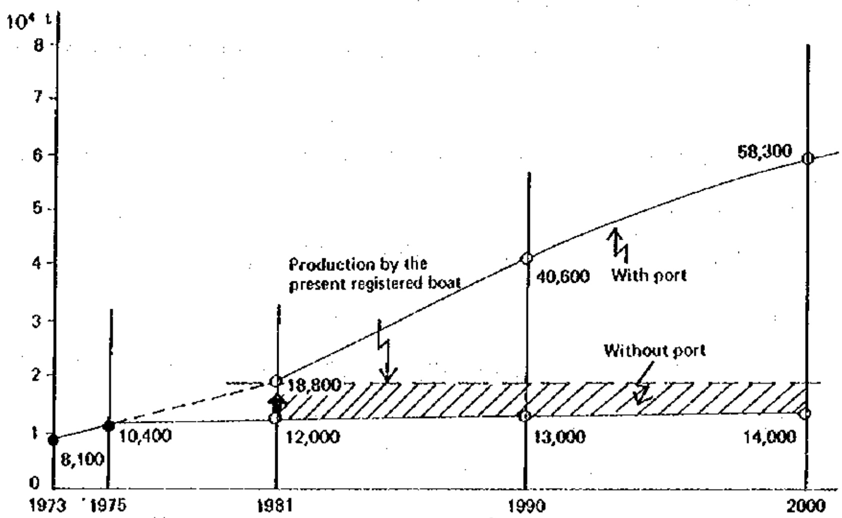


Fig. 4-15 Forecasted fish production with and without fishing port.

Table 4.14 and Fig. 4.15 show the values with all of the fishing boats coming into this port taken as objectives, and these values are subjected to the following procedure for estimation of the net effect of the fishing port project to the national economy. That is, assuming that there is no increase in the number of days per expedition of fishing operation and that the fishing boats using the port are all of the registered boats in this port, there is obtained, by subtracting the fishing boats using the other ports from the foregoing forecasted value, the increment in the incoming fishing boats due to the fishing boats aving the operation suspended reopening the operation and the fishing boats newly built. This value is taken as a basis of calculation in the following estimation.

② Fish prices

According to Table 4-15, the prevailing fish (fresh fish) prices average 6 ₱/kg, whereas the price is estimated at 6 ₱/kg for fresh fish and 1.5 ₱/kg for spoiled fish.

Table 4-15 List of fish prices (1977)

Species	Price ₱/kg	Species	Price ₱/kg
Anchovy	5.00	Mojarra	–
Barracuda	6.00	Moonfish	6.00
Big eyed scad	6.00	Moray	–
Bonit, Oceanic	5.00	Mullet	6.00
Caesio	6.00	Nemipterid	6.00
Cavalla	7.00	Pamfret	7.00
Cigar Fish	–	Parge	–
Crab	4.00	Parrot Fish	6.00
Crevalle	–	Porgy	–
Croaker	6.00	Prawns	32.00
Flatfish	6.00	Ray	5.00
Flying Fish		Round scad	6.00
Garfish	5.50	Sardines	5.00
Gizzard Shad	–	Sea Catfish	5.00
Glass Fish	5.00	Shark	4.50
Goatfish	5.00	Shrimp	Osbon-₱ 24.00
Goby	6.00	Siganid	7.00
Grouper	8.00	Silver Bar	5.00
Grunt	7.50	Skipjack	–
Hairtail/Cutlass	5.00	Slipmouth	5.00
Hardtail	5.00	Snapper	7.00
Herring	5.00	Squid	6.00
Leather Jacket	–	Surgeon Fish	5.00
Lizzard Fish	5.50	Swordfish (Sail)	–
Mackerel, Chub	6.00	Threadfin	–
Mackerel, Sp.	7.00	Tuna (Yellow Fin)	6.00
Mackerel, Frigate	–	Whiting	5.50

"Fish Caought Summery Table, 1977" Regional office, BFAR, Nage City.

③ Degree of freshness

The present ice plants in Naga City have the capacity to make 90 tons ice a day, and if the plant is operated for 300 days a year, it is 27,000 tons/year. If 30% of this is used for maintenance of the freshness of fishes, quantities of ice for such use are 8,100 tons/year currently.

The present fish production is 10,400 tons by trawlers and purse seiners. The ice used for maintenance of the freshness of fishes loaded on the boats and those after landing is 1.5 ton per ton of fishes for both kinds of boats. Accordingly, 15,600 tons of ice are required for maintaining the freshness of fishes. The maximum supply of ice being 8,100 tons presently, 7,500 tons of ice (48%) are in shortage. Assuming some several percentage of fish catches are damaged during the process of carriage, the percentage of spoiled fishes was taken as 50%. This represents the percentage when there is no fishing port. When the fishing port is available, nearly all of the fishes are maintained in the fresh condition through supply of ice and improved handling techniques. Here, to consider the effect accruing from supply of ice and the improvement of fish treatment, the rate of spoiled fishes, when the fishing port is available, is assumed to be decreased up to 25%.

④ Fishing boat construction cost and annual maintenance cost.

The fishing boat construction cost and annual maintenance cost are as shown in the following table.

Table 4-16 Fishing boat construction cost and annual maintenance cost.

₱

Type of Boat	Gross Ton	Construction Cost	Annual maintenance cost		
			Repair	Fishing nets, etc.	Total
Purse Seiner	60.6	202,000	10,100	66,667	76,767
Trawler	55.0	183,333	9,167	66,667	75,834

Note 1): The fishing boat construction cost is assumed to be 3,333 ₱ per gross ton.

(Calculated as 1 ₱ = 30 ¥)

2): The repair expense is assumed to be 5% of the construction cost.

3): Fishing nets, etc.

Purse seiners	66,667 ₱/year
Trawlers	66,667 ₱/year
Bagnetters	13,333 ₱/year
Small boats	Negligible

4): The fishing boats are assumed to be usable for 8 years.

⑤ Fishing boat running cost

This comprises the wage and salaries, fuel cost, water service fee, crew meal expense, etc., and the basic figures for estimation are as shown below.

Table 4-17 Fishing boat running cost per expedition.

₱

Type of Boats	Days per expedition	No. of crew	Average expedition times per year	Crew meal per expedition	Wages per expedition	Water consumption		Operating hours per day	Horse power (H.P.)	Fuel consumption	
						ℓ	₱			ℓ	₱
Purse Seiner	14	20	25	840	4,200	8,400	8	16	391	16,641	33,282
Trawler	7	18	50	378	1,890	3,780	4	241	300	9,576	19,152

Note 1): Fuel - 0.19 ℓ/hp.hour.

2): Fuel unit price - 2P/ℓ

3): Water - (1) Trawler, 30 ℓ/day.

(2) Purse seiner, 30 ℓ/day.

(3) Bagnetter, 20 ℓ/day.

4): Water unit price - domestic water, 0.5₱/m^3; and industrial and commercial water, 1.0₱/m^3.
Here, the latter is employed (0.001 ₱/ℓ).

5): Wage and salaries - 15₱/man day (average of the unskilled and the skilled labourer.

6): Meal expense - 3₱/man day.

⑥ Ice cost

Use of ice by both boats is 1.5 ton per ton of fishes.

For the unit price, the market price of 120₱/t is used.

4) Estimation

① Net benefit due to increase in the output of fish catches ₱ 99,986,000

② Net benefit due to improvement in the freshness of fish catches ₱ 166,280,000

③ Total net benefit ₱ 266,266,000

(2) Other benefits

The other benefits which the fishing port improvement brings about are listed in the following.

1) Improvement in self-sufficiency of fishery products.
2) Modernization of fisheries upon accumulation of various functions.
3) Encouraging investments.
4) Stabilization of fish prices.
5) Creation of employment opportunities.
6) Acquisition of new techniques.
7) Protection from the destruction of river bank.
8) Formation of new urbanized centre.

8-3-4 Evaluation

The result of economic evaluation on construction of the Camaligan fishing port is as follows.

With the net present value at ₱121,787,000 (¥3,653,610,000 upon exchange rate at 1₱=¥30), cost benefit ratio at 1.79 and internal rate of returns at 24.4%, the project is considered to be appropriate from the national economic point of view.

9-1 Financial Analysis

Construction of the Camaligan fishing port is carried out as one of the fishing port construction programs of the Government of the Republic of the Philippines for promotion of the fisheries industry and is, therefore, a highly public project requiring infrastructural investments.

Management of the fishing port will be made by PFMA under the Government of the Republic of the Philippines. Here with the fishing port considered as an independent economic unit, it will be examined what conditions will have to be satisfied mainly for insuring soundness in the management, and upon the result of the examination, necessary proposals will be made.

9-2 Main Factors of Financial Analysis

9-2-1 Usage of the fising port

The number of fishing boats using the port, frequency of entry and fish landing amount, which constitute the basic data for financial analysis, are set forth in Table 4-18.

Table 4-18 Annual number of using fishing boats, frequency of entry and fish landing amount.

Item	Year	Purse Seiner	Trawler	Total
No. of Boats	1981	8	39	47
	1990	17	69	86
	2000	24	123	147
No. of Calls	1981	190	1,974	2,164
	1990	425	3,450	3,875
	2000	600	6,150	6,750
Fish production (tons)	1981	3,800	15,000	18,800
	1990	9,900	30,700	40,600
	2000	11,900	46,400	58,300

9-2-2 Method of estimation of the revenue of fishing port

(1) Sources of revenue

Here, the revenue of the fishing port is limited to the fees for use of the facilities related to handling of fish catches and supply of material to the fishing boats and the profit from sales of ice when the ice plant and cold storage facilities are operated directly by PFMA.

(2) Method of estimation of the revenue

Basic data for estimation of the revenue and the items of revenue are represented in Fig. 4.16. The method of estimation of the revenue is illustrated in Fig. 4.17.

Basic data 1
1. No. of boats
2. No. of Calls
3. Fish Productions

Basic data 2	
1	Gross tonage
2	Days per expedition
3	Running hours per day
4	Horse power of boats
5	Fuel consumption
6	No. of crew
7	Days for repair per year
8	Expedition per year
9	Ice consumption
10	Capacity of Vehicles
11	Mooring time at the port

↓

Revenue	
1	Harbour due
2	Berthing fee
3	Quayside conveyance fee
4	Ice conveyance fee
5	Fuel conveyance fee
6	Levy on fresh water sold to fishing boats
7	Levy on fish brought to the market by land transportation vehicles
8	Fee for use of the market hall
9	Fishing boat repair fee
10	Parking fee
11	Charge for overstay at the unloading area
12	Annual registration fee
13	Ice sales

Fig. 4-16 Basic data for estimation of the revenue and items of estimation.

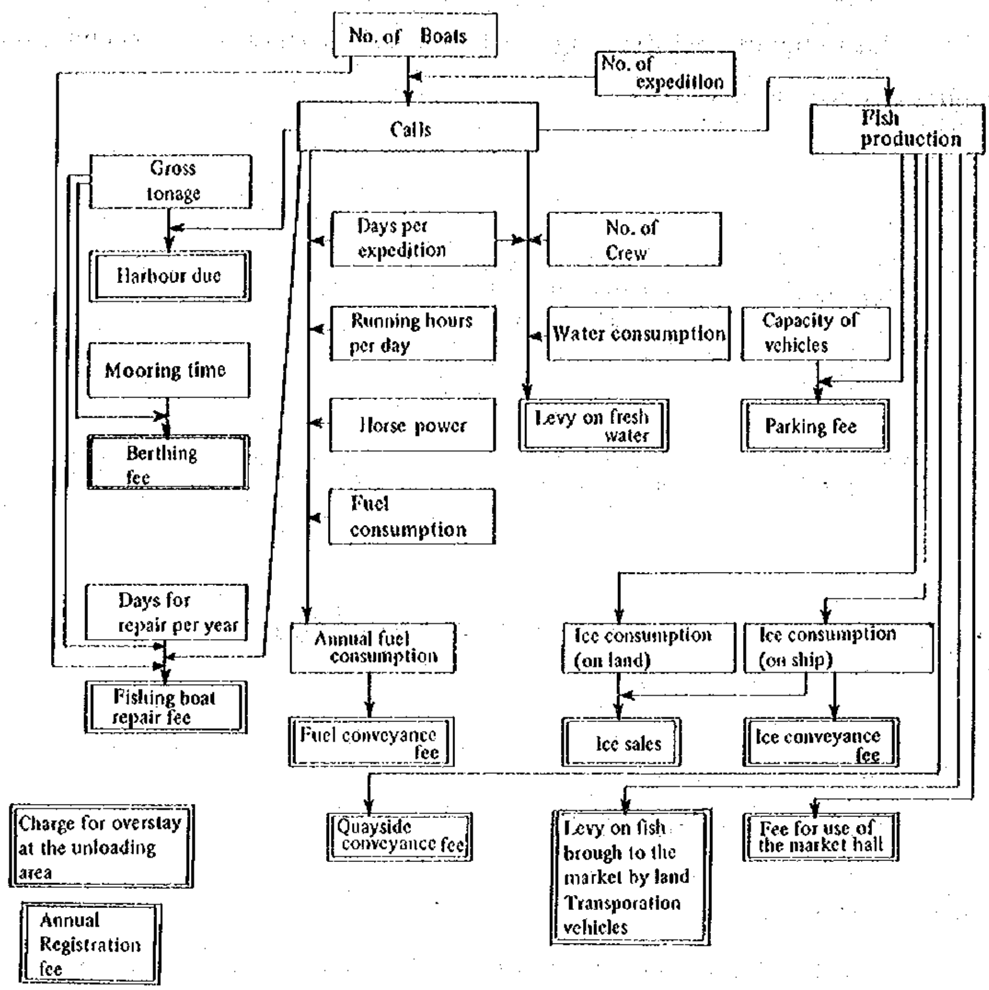


Fig. 4-17 Method of estimation of the revenue.

9-2-4 Method of cost estimation

The items of cost are wage and salaries, maintenance expense, depreciation and interests on loans.

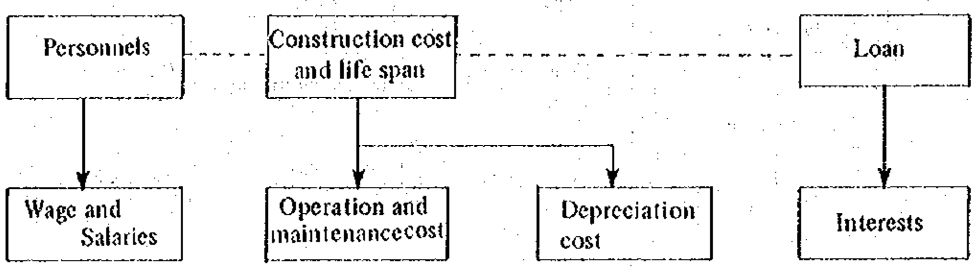


Fig. 4-18 Method of cost estimation.

9-3 Revenue of Fishing Port

9-3-1 Harbour due

This is a fee collected from the fishing boats entering the port according to the gross tonnage of the respective boats, and the unit of the fee is 0.6 (₱/gross tonnage per entry).

The calculation formula is

$$0.6 \times (\text{Gross tonnage}) \times (\text{Number of entries}).$$

The gross tonnage of the respective types of fishing boats is as shown in Table 5-18.

Table 4-19 Gross tonnage of using fishing boats.

Item \ Type of Boats	Purse Seiner	Trawler
Gross tonage	60.6	55

The revenue is as shown in Table 4-20.

Table 4-20 Revenue from harbour due.

Year	Harbour due	Boat Calls
1981	72,215 ₱	2,169 calls
1985	97,588	2,927
1990	129,303	3,875
1995	177,035	5,313
2000	224,766	6,750

9-3-2 Berthing fee

This is a fee for use of the berth to be collected from the fishing boats utilizing the fishing port according to the gross tonnage, and the units of the fee are as showin in Table 4-21.

Table 4-21 Unit of berthing fee.

Gross tonage (GT)	GT<10	10≦GT<100	100≦GT<200	200≦GT
Unit fee (P/time)	10	12	14	16

The calculation formula is

(Unit fee)×(Number of entries).

The revenue is scheduled in Table 4-22.

Table 4-22 Revenue from berthing fees.

Year	fee	Boat Calls
1981	26,028 ₱	2,169 calls
1985	35,127	2,927
1990	46,500	3,875
2000	81,000	6,750

9-3-3 Quayside conveyance fee

Where the fishes are conveyed on the quay, this is a fee for use of the facility, and the unit of the fee is 1.25₱ per tub.

The tub has a capacity of 40 kg so that the calculation formula is

$$1.25 \times \left(\frac{1000}{40}\right) \times (\text{Landing amount}).$$

The revenue is then presented in Table 4.23.

Table 4-23 Revenue from quayside conveyance fees.

Year	fee	fish production
1981	587,500 ₱	18,800 tons
1985	890,278	28,489
1990	1,268,750	40,600
1995	1,545,313	49,450
2000	1,821,875	58,300

9-3-4 Ice conveyance fee

This is a fee for conveyance of ice supplied to the fishing boats. The ice is supplied to the trawlers, and its quantity is the same to that of the fish catches landed. The unit of the conveyance fee is 0.09398 (₱/block). The calculation formula is

$$0.09398 \times \left(\frac{1000}{50}\right) \times (\text{Quantity of fish landed (for trawlers)}).$$

provided 1 block = 50 kg.

The revenue is as shown in Table 4.24.

Table 4-24 Revenue from ice conveyance fees.

Year	fee	fish production (Purse Seiner, Trawler)
1981	35,338 ₱	18,800 tons
1985	53,551	28,489
1990	76,316	40,600
1995	92,951	49,450
2000	109,586	58,300

9-3-5 Fuel conveyance fee

This is the fee for conveyance of the fuel supplied to the fishing boats and is a fee for use of the fuel supply facility. The annual amount of consumption of the fuel is given by

(Number of entries)×(Days of expedition)×(Running hours a day) ×(Horse power)×(Main fuel consumption).

and the unit fee is 4 (₱/kℓ). The calculation formula is

$$4\times\left(\frac{1}{1000}\right)\times(\text{Annual fuel consumption}).$$

The original units required for calculation are of the values shown in Table 4.25.

Table 4-25 Original units concerning fuel consumption.

Item \ Type of boats	Purse Seiner	Trawler
days per expedition (day)	14	7
Running hours per day (hr)	16	24
Horse power (H.P.)	391	300
Fuel consumption (ℓ/Hp.hr)	0.19	0.19

The revenue is as shown in Table 4.26.

Table 4-26 Revenue from fuel conveyance fees.

Year	fee	Annual Fuel consumption	Boat calls
1981	88,451 ₱	22,113 kℓ	2,169 calls
1985	120,445	30,111	2,927
1990	160,438	40,110	3,875
1995	217,973	54,493	5,313
2000	275,508	68,877	6,750

9-3-6 Levy on fresh water sold to fishing boats

This is collected for the water supply to the fishing boats and is a fee for use of the facility.

The annual amount of consumption of water is given by

(Number of entries)×(Original unit of water consumption)×(Number of crew)×(Days of expedition)

and the unit of the fee is 0.5 (₱/ton). Then, the calculation formula is

$$0.5 \times \left(\frac{1}{1000}\right) \times (\text{Annual water consumption})$$

The original units required for calculation are of the values shown in Table 4-27.

Table 4-27 Original units concerning water consumption.

Item \ Type of boats	Purse Seiner	Trawler
Wate consumption (ℓ/person day)	30	20
No. of Crew (person)	20	18
days per expedition (days)	14	7

Table 4-28 Revenue from levies on fresh water sold to fishing boats.

Year	Levies	Annual water consumption	Boat calls
1981	4,538 ₱	9,077 tons	2,169 calls
1985	6,213	12,425	2,927
1990	8,306	16,611	3,875
1995	11,225	22,449	5,313
2000	14,144	28,287	6,750

9-3-7 Levy on fish brought to the market by land transportation vehicles

This is a fee for transportation of fishes from fishing boats to the market, and the unit of the fee is 0.50 (₱/tub). The calculation formula is

$$0.50 \times \left(\frac{1000}{40}\right) \times (\text{Landed amount of fish catches}).$$

The revenue is as shown in Table 4-29.

Table 4-29 Revenue from levies on fish brought to the market by land transportation vehicles.

Year	Levies	fish production
1981	235,000 ₱	18,800 tons
1985	356,111	28,489
1990	507,500	40,600
1995	618,125	49,450
2000	728,750	58,300

9-3-8 Fee for use of the market hall

This is a fee for use of the market hall, and the unit of the fee is 0.15 (₱/tub). The calculation formula is

$$0.15 \times \left(\frac{1000}{40}\right) \times (\text{Landed amount of fish catches}).$$

The revenue is as shown in Table 4-30.

Table 4-30 Revenue from fee for use of the market hall.

Year	fee	fish production
1981	70,500 ₱	18,800 tons
1985	106,833	28,489
1990	152,250	40,600
1995	185,438	49,450
2000	218,625	58,300

9-3-9 Fishing boat repair fee

Upon repair of a fishing boat, this is a fee for use of the facility to be collected according to the gross tonnage and the number of days of repair. The units of the fee are as shown in Table 4-31.

Table 4-31 Units of the fishing boat repair fee.

Gross tonage	GT<10	10≦GT<100	100≦GT<200	200≦GT
Unit fee	10	15	20	30

Accordingly, the calculation formula is

(Unit fee)×(Number of days of repair)×(Number of fishing boats).

The original units required for calculation are of the values shown in Table 4-32, and the revenue is as shown in Table 4-33

Table 4-32 Original units related to use of the repair facility.

Item \ Type of boats	Purse Seiner	Trawler
Gross Tonage(tons/boat)	60.6	55
Days for repair per year (day)	5	5

Table 4-33 Revenue from fishing boat repair fees.

Year	fees	No. of Boats
1981	3,525 ₱	47
1985	4,825	64
1990	6,450	86
1995	8,738	117
2000	11,025	147

9-3-10 Parking fee

This is a fee for the fish carrier trucks in use of the parking facility. The carrier trucks are of a fish loading capacity of 18 tubs/truck (720 kg/truck), and the parking fee is 5₱ a day or less.

The calculation formula is

$$5\times\left(\frac{1000}{720}\right)\times(\text{Landed amount of catches}).$$

Then, the revenue is as shown in Table 4-34.

Table 4-34 Revenue from parking fees.

Year	fee	fish production
1981	130,556 ₱	18,800 tons
1985	197,840	28,489
1990	281,944	40,600
1995	343,403	49,450
2000	404,861	58,300

9-3-11 Charge for overstay at the unloading area

This is a charge for staying over the standard time at the unloading area, but it is difficult to estimate such charge so that it is not counted here.

9-3-12 Annual registration fees

This represent the fees for registration of the brokers, wholesalers and shipowners but is not included here.

9-3-13 Ice sales

This represents the profit from sales of ice for maintaining the freshness of fishes. The wholesale price of ice is taken as 120 ₱/t, and its 20% or 24 (₱/t) is assumed to be the profit. The original units of the ice consumption are shown in Table 4-35. The calculation formula is

24 × 1000 × (1 × Landed amount of catches (trawlers) + 1/2 × Total amount of fish catches).

The revenue is given as shown in Table 4-36.

Table 4-35 Original units of ice consumption.

Unit: kg/fish kg

Item \ Type of boats	Purse Seiner	Trawler
Ice consumption (on ship)	1	1
Ice consumption (on land)	0.5	0.5

Table 4-36 Ice sales.

Year	Net Income	Ice consumtion (on ship)	Ice consumption (on land)
1981	676,800 ₱	18,800 tons	9,400 tons
1985	1,025,600	28,489	14,244
1990	1,461,600	40,600	20,300
1995	1,780,200	49,450	24,725
2000	2,098,800	58,300	29,150

9-4 Expenditures of Fishing Port

9-4-1 Personnel expense

The officials of the organization of administration of the fishing port are estimated at 21 persons. The monthly personnel expense is assumed to be ₱23,700. Then, with an allowance of 10% added, the annual personnel expense is estimated at ₱312,840.

9-4-2 Maintenance expense

As the annual maintenance expense of the fishing port facilities, 1.5% of the construction cost is taken, and an amount of ₱2,304,637/year is estimated.

9-4-3 Depreciation

The basic facilities are of longer lifespan so that they are excluded from the objects of depreciation, with the maintenance expense counted for them.

The functional facilities have the 15 years lifespan, with the salvage value set to 0. With the straight line method, the annual amount of depreciation is ₱2,917,534.

9-4-4 Interest on loan

The loan as the management entity is ₱95,620,000. The interest was then calculated at a rate of 3.5 percent. The principal repayment is done equally every year in 15 years after 1987 so that the interest payable after 1987 will decrease gradually.

9-5 Financial Evaluation

Income statement of the Camaligan fishing port and the cash flow are set forth in Table 4-37 and 4-38.

As the result of the foregoing financial analysis, it was found that it would be difficult financially for PFMA, to perform the operation of the fishing port as the independent entity. That is, repayment of the loan and payment of the interest of the fishing port construction cost requiring an enourmous amount of investment are hardly practicable, making it impossible to be grounded as an enterprise.

Accordingly, for the management of the fishing port to be operated soundly, all or considerable part of the fishing port construction should be carried out directly by the Government of the Republic of the Philippines so that the financial burden on PFMA, management entity of the fishing port after completion, would be reduced.

However, as seen from the result of the economic evaluation in Chapter 8, the development and improvement of the fishing port will bring about many economic effects and are thus worthy of investment.

Table 4-37 Income statement of Camaligan fishing port

(P)

Item \ Year		1979	1980	1981	1982	1983	1984	1985	1986
1. Revenues	Harbour due	—	—	72,215	78,558	84,902	91,245	97,688	103,931
	Berthing Fee	—	—	26,028	28,303	30,577	32,852	35,127	37,401
	Quayside Conveyance Fee	—	—	587,500	663,194	738,889	814,583	890,278	965,972
	Ice Conveyance Fee	—	—	35,338	39,891	44,444	48,997	53,551	58,104
	Fuel Conveyance Fee	—	—	88,451	96,449	104,448	112,447	120,445	128,444
	Levy on Fresh Water sold to Fishing Boats	—	—	4,538	4,957	5,375	5,794	6,213	6,631
	Levy on Fish brought to the Market	—	—	235,000	265,278	295,556	325,833	356,111	386,389
	Fee for Use of the Market Hall	—	—	70,500	79,583	88,667	97,750	106,833	115,917
	Fishing Boat Repair Fee	—	—	3,525	3,850	4,175	4,500	4,825	5,150
	Parking Fee	—	—	130,556	147,377	164,198	181,019	197,840	214,660
	Ice Sales	—	—	676,800	764,000	851,200	938,400	1,025,600	1,112,800
	Total	—	—	1,930,451	2,171,441	2,412,130	2,653,420	2,894,410	3,135,390
2. Expenses	Salaries and Wages	—	—	312,840					
	Repair and Maintenance	—	—	2,304,637	5,535,011	〃	〃	〃	〃
	Depreciation	—	—	2,917,534					
	Interest	1,019,783	2,693,130	3,346,695	3,346,695	3,346,695	3,346,695	3,346,695	3,346,695
	Total	1,019,783	2,693,130	8,881,706	8,881,706	8,881,706	8,881,706	8,881,706	8,881,706
3. Income before Depreciation and interest		0	0	△ 687,026	△ 446,036	△ 205,047	△ 35,943	276,933	517,922
4. Net Income		△ 1,019,783	△ 2,693,130	△ 6,951,255	△ 6,710,265	△ 6,469,276	△ 6,228,286	△ 5,987,296	△ 5,746,307
5. Accumulated Income		△ 1,019,783	△ 3,712,913	△10,664,168	△17,374,433	△23,843,709	△30,071,995	△36,059,291	△41,805,598

Item \ Year		1987	1988	1989	1990	1991	1992	1993	1994
1. Revenues	Harbour due	110,274	116,617	122,960	129,303	138,849	148,396	157,942	167,488
	Berthing Fee	39,676	41,951	44,225	46,500	49,950	53,400	56,850	60,300
	Quayside Conveyance Fee	1,041,667	1,117,361	1,193,056	1,268,750	1,324,063	1,379,375	1,434,688	1,490,000
	Ice Conveyance Fee	62,657	67,210	71,763	76,316	79,643	82,970	86,297	89,624
	Fuel Conveyance Fee	136,443	144,441	152,440	160,438	171,945	183,452	194,959	206,460
	Levy on Fresh Water sold to Fishing Boats	7,050	7,468	7,887	8,306	8,889	9,473	10,057	10,641
	Levy on Fish brought to the Market	416,667	446,944	477,222	507,500	529,625	551,750	573,875	596,000
	Fee for Use of the Market Hall	125,000	134,083	143,167	152,250	158,888	165,525	172,163	178,800
	Fishing Boat Repair Fee	5,475	5,800	6,125	6,450	6,908	7,365	7,823	8,280
	Parking Fee	231,481	248,302	265,123	281,944	294,236	306,528	313,819	331,111
	Ice Sales	1,200,000	1,287,200	1,374,400	1,461,600	1,525,320	1,589,040	1,652,760	1,716,480
	Total	3,376,389	3,617,378	3,858,368	4,099,357	4,288,315	4,477,274	4,666,232	4,855,190
2. Expenses	Salaries and Wages	312,840							
	Repair and Maintenance	2,304,637	5,535,011	〃	〃	〃	〃	〃	〃
	Depreciation	2,917,534							
	Interest	3,123,581	2,900,466	2,677,352	2,454,237	2,231,123	2,008,008	1,784,894	1,561,779
	Total	8,658,592	8,435,477	8,212,363	7,989,248	7,766,134	7,543,019	7,319,905	7,096,790
3. Income before Depreciation and interest		758,912	999,901	1,240,891	1,481,880	1,670,838	1,859,797	2,048,755	2,237,713
4. Net Income		△ 5,282,203	△ 4,818,099	△ 4,353,995	△ 3,889,891	△ 3,477,819	△ 3,065,745	△ 2,653,673	△ 2,241,600
5. Accumulated Income		△47,087,801	△51,905,900	△56,259,895	△60,149,786	△63,627,605	△66,693,350	△69,347,023	△71,588,623

Item \ Year		1995	1996	1997	1998	1999	2000		
1. Revenues	Harbour due	177,035	186,581	196,127	205,673	215,220	224,766		
	Berthing Fee	63,750	67,200	70,650	74,100	77,550	81,000		
	Quayside Conveyance Fee	1,545,313	1,600,625	1,655,938	1,711,250	1,766,563	1,821,875		
	Ice Conveyance Fee	92,951	96,278	99,605	102,932	106,259	109,586		
	Fuel Conveyance Fee	217,973	229,480	240,987	252,494	264,001	275,508		
	Levy on Fresh Water sold to Fishing Boats	11,225	11,808	12,392	12,976	13,560	14,144		
	Levy on Fish brought to the Market	618,125	640,250	662,375	684,500	706,625	728,750		
	Fee for Use of the Market Hall	185,438	192,075	198,713	205,350	211,988	218,625		
	Fishing Boat Repair Fee	8,738	9,195	9,653	10,110	10,568	11,025		
	Parking Fee	343,403	355,694	367,986	380,278	392,569	404,861		
	Ice Sales	1,780,200	1,843,920	1,907,640	1,971,360	2,035,080	2,098,800		
	Total	5,044,149	5,233,107	5,422,065	5,611,023	5,799,982	5,983,940		
2. Expenses	Salaries and Wages	312,840							
	Repair and Maintenance	2,304,637	5,535,011	〃	〃	〃	〃		
	Depreciation	2,917,534							
	Interest	1,338,665	1,115,550	892,436	669,321	446,207	223,092		
	Total	6,873,676	6,650,561	6,427,447	6,204,332	5,981,218	5,758,103		
3. Income before Depreciation and interest		2,426,672	2,615,630	2,804,588	2,993,546	3,182,505	3,371,463		
4. Net Income		△ 1,829,527	△ 1,417,454	△ 1,005,382	△ 593,309	△ 181,236	230,837		
5. Accumulated Income		△73,418,150	△74,835,604	△75,840,986	△76,434,295	△76,615,531	△76,384,694		

Table 4-38 Cash-flow schedule of Camaligan fishing port

(₱)

	Item \ Year	1979	1980	1981	1982	1983	1984	1985	1986
1. Source of Funds	Equity	34,057,541	40,078,733	–	–	–	–	–	–
	Loan	58,273,291	37,346,576	–	–	–	–	–	–
	Gov. Project Allotment	1,019,783	2,693,130	4,033,711	3,792,731	3,651,742	3,310,752	3,069,762	9,203,473
	Depreciation	–	–	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534
	Net income	△ 1,019,783	△ 2,693,130	△ 6,951,255	△ 6,710,265	△ 6,469,276	△ 6,228,286	△ 5,987,296	△ 5,746,307
	Total	92,330,832	77,425,309	0	0	0	0	0	6,374,700
2. Uses of Funds	Construction	92,330,832	77,425,309	–	–	–	–	–	–
	Loan Amortization	–	–	–	–	–	–	–	6,374,700
	Reinvestment	–	–	–	–	–	–	–	–
	Total	92,330,832	77,425,309	0	0	0	0	0	6,374,700

	Item \ Year	1987	1988	1989	1990	1991	1992	1993	1994
1. Source of Funds	Equity	–	–	–	–	–	–	–	–
	Loan	–	–	–	–	–	–	–	–
	Gov. Project Allotment	8,739,369	8,275,265	7,811,161	7,347,057	6,934,985	6,522,911	6,110,839	5,698,766
	Depreciation	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534
	Net income	△ 5,282,203	△ 4,818,099	△ 4,353,995	△ 3,889,891	△ 3,477,819	△ 3,065,745	△ 2,653,673	△ 2,241,600
	Total	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700
2. Uses of Funds	Construction	–	–	–	–	–	–	–	–
	Loan Amortization	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700
	Reinvestment	–	–	–	–	–	–	–	–
	Total	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700

	Item \ Year	1995	1996	1997	1998	1999	2000		
1. Source of Funds	Equity	–	–	–	–	–	–		
	Loan	–	–	–	–	–	–		
	Gov. Project Allotment	5,286,693	48,637,631	4,462,548	4,050,475	3,638,402	3,226,329		
	Depreciation	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534	2,917,534		
	Net income	△ 1,829,527	△ 1,417,454	△ 1,005,382	△ 593,309	△ 181,236	230,837		
	Total	6,374,700	50,137,711	6,374,700	6,374,700	6,374,700	6,374,700		
2. Uses of Funds	Construction	–	–	–	–	–	–		
	Loan Amortization	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700	6,374,700		
	Reinvestment	–	43,763,011	–	–	–	–		
	Total	6,374,700	50,137,711	6,374,700	6,374,700	6,374,700	6,374,700		