REPUBLIC OF THE PHILIPPINES

PHILIPPINE PORTS AUTHORITY

THE STUDY
ON
THE DEVELOPMENT PROJECT
OF THE
PORT OF SAN FERNANDO

FINAL REPORT

MARCH 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to the request of the Government of the Republic of the Philippines, the Japanese Government decided to conduct a survey on the Development Project of the Port of San Fernando and entrusted the survey to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a survey team headed by Mr. Takashi Hazama, Executive Director of the Overseas Coastal Area Development Institute of Japan, several times from February 1983 to February 1984.

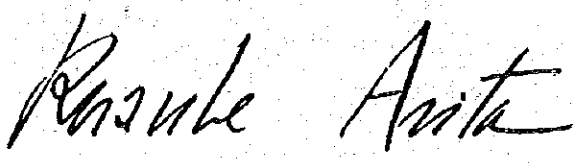
The team exchanged views with the officials concerned of the Government of the Republic of the Philippines over the Project, and conducted field surveys and collected reference materials.

After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to all the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

MARCH, 1984



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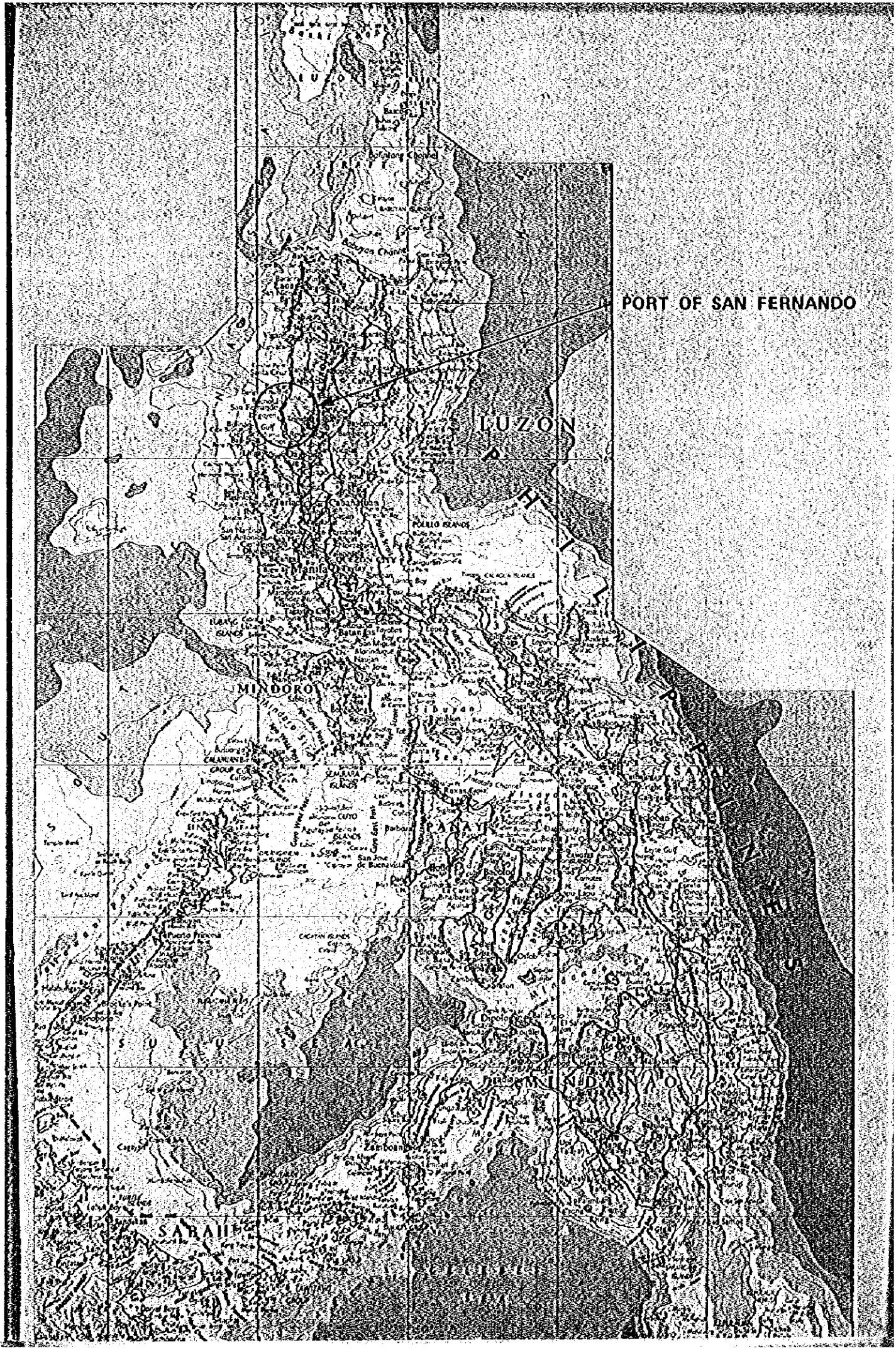
Japan International Cooperation Agency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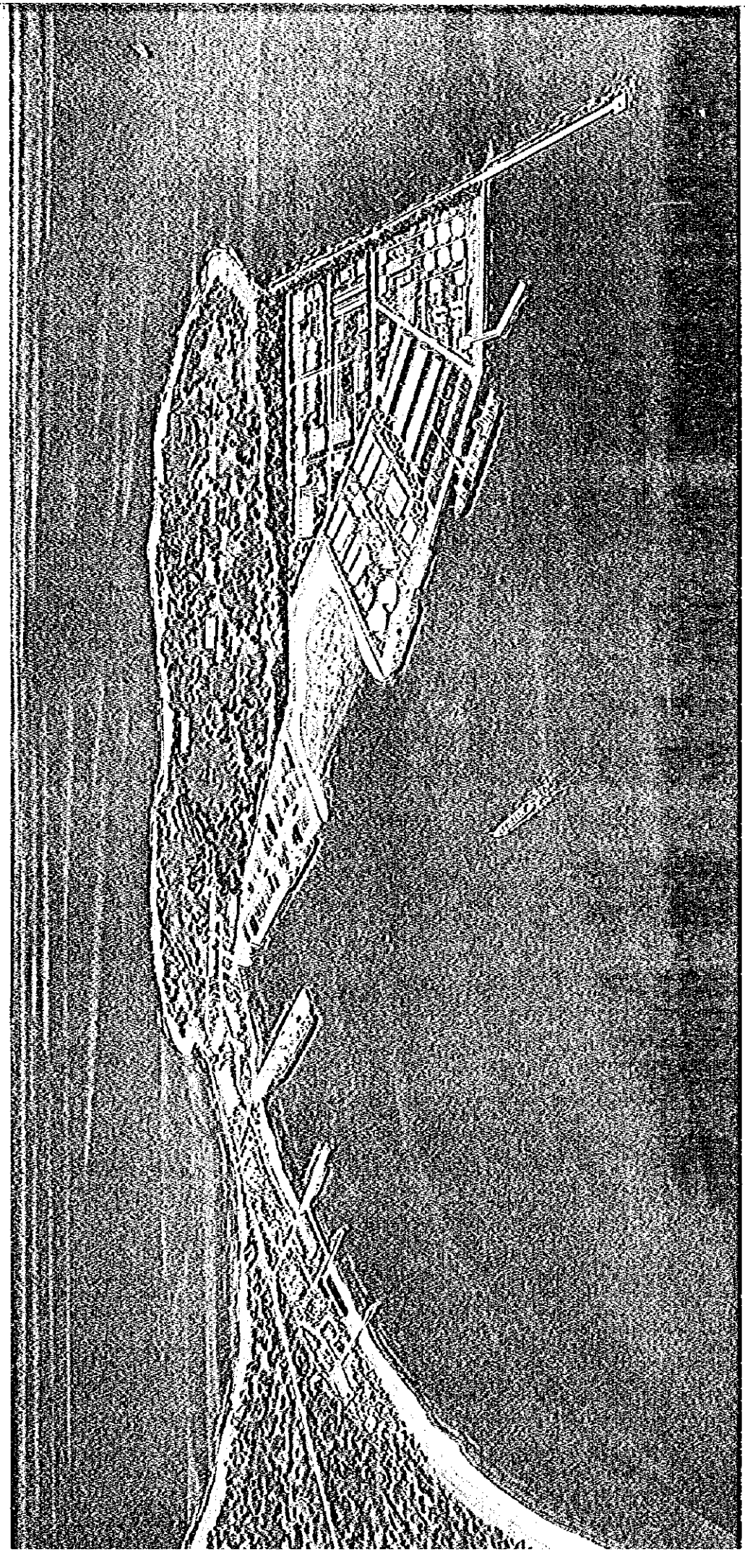

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$1 = ₱14

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GLOSSARY

The following are acronyms/abbreviations used herein:

Acronym/Abbreviation	Title
ADB	Asian Development Bank
BCI	Bacnotan Consolidated Industries Incorporated
BCGS	Bureau of Coast and Geodetic Survey
DWT	Dead Weight Tonnage
EPZ	Export Processing Zone
EPZA	Export Processing Zone Authority
ERR	Economic Internal Rate of Return
FAO	Food and Agricultural Organization of the United Nations
FRR	Financial Internal Rate of Return
GDP	Gross Domestic Product
GNDP	Gross National Domestic Product
GNP	Gross National Product
GRDP	Gross Regional Domestic Product
GRT	Gross Registered Tonnage
GT	Gross Ton (s)
IBRD	International Bank for Reconstruction and Development
JICA	Japan International Cooperation Agency
MHS	Ministry of Human Settlement
MLLW	Mean Lower Low Water
MT	Metric Ton (s)
NCA	National Coal Authority
NCC	Northern Cement Corporation
NCSO	National Census and Statistics Office
NEDA	National Economic and Development Authority
NTPP	National Transportation Planning Project
OECF	Overseas Economic Cooperation Found
₱	Peso (s)
PAGASA	Philippine Atmospheric Geographical and Astronomical Service Administration
PNOC	Philippine National Oil Company
PMU	Port Management Unit
PPA	Philippine Ports Authority
RT	Revenue Ton (s)
$	United States Dollar (s)
¥	Japanese Yen

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CONCLUSION AND RECOMMENDATIONS

CONCLUSION

1. Necessity for the development of the Port of San Fernando

The Port of San Fernando is located at the geographical and economic center of Region I and plays a role as an important sea terminal in northern Luzon.

The port has three main piers and storage facilities, but they are generally aged and obsolete. As the result, many defects and inconveniences such as the long waiting time of vessels, difficulty to secure safety in berthing during monsoon season, mixture of dangerous cargo and other cargoes in one pier, etc. are being experienced in its port operation. To ensure safety and efficiency in port activities, improvement of such obsolete port facilities is considered urgently necessary.

The cargo volume handled at the Port of San Fernando was almost constant during the past several years. However, judging from the expanding tendency of economic activities in Region I as prospected in the national and regional long term development plans of the Government, the cargo movement through the Port will be most likely to increase in the near future to such an extent as necessitating the expansion of the cargo handling capacity of the Port.

To cope with these present and future issues, a development plan must be formulated for the Port of San Fernando and be implemented as timely as possible, which is also essential to the regional development.

2. Master plan

The master plan was formulated with the target year of 2000.

The cargo volume expected for the Port of San Fernando in the target year was estimated at 3,700,000 tons, as against the present level of around 1,000,000 tons, on the basis of the perspectives of the national and regional long term development plans, past and present records of the socio-economic activities in Region I, actual performance of the Port of San Fernando, and other related statistics.

To meet such an increase in the cargo movement, the master plan proposes the construction of eleven new berths, government and private, with a depth of more than −10 m, on the assumption that the existing piers (excluding the Shipside pier) and the PNOC pier which is now under construction will remain in use. The plan also contains the construction of a breakwater and other infrastructures and the reclamation of land for locating new industries. Further, it provides some space which is reserved for the future expansion of port facilities.

The sites for the construction of new port facilities were proposed to be located in the existing port area and in the western part of the San Fernando Bay adjacent thereto. Recently conducted natural conditions surveys and the analysis of obtained data reveal that there are no technical problems which will make it difficult to construct port facilities at the proposed sites.

The construction cost is roughly estimated at ₱1,400 million (May 1983 prices).

3. Short term development plan

The short term development plan has the year 1990 as its target year and contains the construction and improvement of port facilities which are considered urgently needed.

The cargo volume for 1990 on the basis of which the short term plan is to be formulated was estimated at 1,900,000 tons.

The main part of the plan is the construction of a new PPA pier at the site between the existing PPA pier and AG & P pier, removing the obsolete Shipside pier. The dimensions of the new pier are 50 m width and around 450 m length so as to accommodate at the same time two 15,000 DWT class ocean going vessels on the one side and one 50,000 DWT class bulk carrier on the other side. The plan also suggests that the dangerous cargo which is currently handled at the PPA pier and the Shipside pier should be concentrated on the PNOC pier with additional installation of facilities for receiving oil tankers.

The construction cost is estimated at P257,570 thousand (May 1983 prices) including the costs for the related facilities such as transit sheds and roads in the backup area.

4. Economic and financial appraisals of the short term development plan

1) Economic appraisal

The project will bring about the reduction of the berth waiting cost and the overland transportation cost as a result of the construction of new facilities. Also, plenty of intangible benefits are expected. According to the economic appraisal which took into account the monetary benefits only, the short term development plan will generate 22.9% of ERR.

2) Financial appraisal

PMU San Fernando will maintain its financial viability throughout the whole period of project life including construction period. It will be able to pay all expenditures and will have some surplus even after appropriating funds for the repayment of foreign loans and the payment of their interest. As to the profitability of the project itself, 4.1% of FRR can be expected. It well exceeds the weighted average cost of capital (2.1%).

Judging from the above, it is concluded that the short term development plan with the target year of 1990 will be feasible economically and financially.

RECOMMENDATIONS

1. The short term development plan should be implemented as soon as possible

As mentioned in the conclusion, the cargo volume at the Port of San Fernando is expected to increase along with the development of economic activities. While, on the other hand, the existing port facilities are not necessarily satisfactory, and the wooden Shipside pier, in particular, is obsolete and may not be able to keep up with the development of port activities. The construction of a new pier which constitutes the main part of the short term development plan should be started at the earliest possible time, so that the new pier can be put into service before the port cargo might see a marked increase. This is especially important when we consider that the removal of the Shipside pier, which is the pre-requisite for the construction of a new pier, naturally reduces the overall berth capacity of the port during the construction period (around two years) and might cause port congestion.

2. The master plan should be reviewed after the implementation of the short term development plan.

The master plan (target year 2000) was formulated based on the socio-economic frame of the "Long Term Philippine Development Plan up to the Year 2000" with careful assessment.

However, the economy is subject to constant flux, which might cause substantial change of the frame adopted in this study. In such a case, the master plan should be carefully reviewed in light of regional activities after the completion of the short term development project.

3. The wave observation should be continued

Topographically, the Bay of San Fernando is usually affected by invading high waves during the monsoon season. In this study, therefore, along with the site observation by wave recorder, careful assessment was conducted on the wave heights based on the available wind data including those of typhoons.

However, these data are not necessarilly satisfactory for the detailed estimation of the wave heights in the Bay, particularly the frequency of the height of invading waves in the monsoon season. It is therefore recommended that the wave observation be continued at the project site.

SUMMARY

SUMMARY

1. Profile of the Port of San Fernando and its potential

1) The Port of San Fernando is located at the geographical and economic center of Region I and supports the economic activities in northern Luzon as the only important sea terminal in this region.

2) The San Fernando Bay where the Port is located has fairly good natural conditions for port construction and operation. It has a spacious water area of more than 10 m depth which is capable of easily accommodating large ocean going vessels, except for the monsoon season when invading high waves usually affect the maneuvering of vessels and the cargo handling at berths. Other natural conditions such as soil conditions, littoral drift, etc. are generally favorable, although there are several spots where relatively soft strata were observed by the recent soil surveys.

Thus, in terms of natural conditions, the Port of San Fernando has great potential for becoming a larger scale port.

3) The Port has three main piers, the PPA pier, the Shipside pier and the Philex pier (in addition, the PNOC pier is now under construction). However, the overall condition of the existing piers is not necessarily good and the Shipside pier especially is aged and obsolete. Therefore, its maintenance and repair cost will grow to a considerable amount in the next several years.

In addition to the obsolecence of the piers, the Port presently has the following problems in its activities.

a) Difficulty in securing safe berthing due to high waves during monsoon season.
b) Long waiting time of vessels
c) Shortage of cargo handling equipment
d) Handling of dangerous cargo at the same pier at the same time as other cargoes.

In view of the necessity for ensuring safe and efficient port operation and also of the expected increase of port cargo, the Port is required to take early remedies for these shortcomings.

4) Judging from the topographical and economic conditions, there are no other potential ports for the large sea terminal in Region I. Therefore, with necessary improvement and timely extention of port facilities, the Port will be able to better function as a major gate in Region I and contribute to the development of regional economy.

2. The present status and future prospects of Region I

1) Region I, which can be defined as the hinterland of the Port, had a population of 3.54 million in 1980 accounting for 7.4% of the country's total. The average annual growth rate of its population in 1975 – 1980 period was 1.62%, which is lower than the national average of 2.6%.

2) In 1981, the GRDP amounted to ₱3.6 billion which accounted for only 3.8% of the GNDP. The region's economy grew annually by about 6.1% on the average during the period 1978 – 1981. The service sector accounted for 38.1% of the GRDP, agriculture 37.0% and industry 24.9%. This structure remained almost same during the past four years.

3) The demographic and economic profiles of Region I in the target years, 1990 and 2000, were forecast on the basis of the analyses of the Region's actual performance, the "Five Year Regional Development Plan 1983 – 1987 (Region I)", the "Long Term Philippine Development Plan up to the Year 2000", and other related plans. Table-1 gives the projected GRDP, population and per capita GRDP in the target years, together with those of 1982.

Table-1 Forecast of GRDP, Population and per Capita GRDP in Region I

	GRDP at 1972 price (million ₱)	Population (.000)	Per Capita GRDP (₱)
1982	3,657	3,668	997
1990	6,415 (7.3%)	4,185 (1.7%)	1,533 (5.5%)
2000	13,470 (7.7%)	5,101 (2.0%)	2,641 (5.6%)

Note: The figures in parentheses in the columns of 1990 and 2000 show the compound annual growth rate during the period 1982 – 1990 and 1990 – 2000, respectively.

3. Cargo forecast

1) The future cargo volume was estimated by two different approaches, macroscopic and microscopic. Taking into account the values obtained by these two methods the cargo throughput at the Port in 1990 and 2000 was forecast as given in Table-2.

Table-2 Summary of Future Cargo Traffic

(.000 MT)

	Actual			Estimated					
	1982			1990			2000		
	Foreign	Domestic	Total	Foreign	Domestic	Total	Foreign	Domestic	Total
Total Cargo Volume	559	483	1,042	1,282	618	1,900	2,680	1,020	3,700
Fertilizer	180	–	180	570	–	570	700	–	700
(of which Transhipment)	(98)	–	(98)	(420)	–	(420)	(420)	–	(420)
Cement	107	16	123	400	–	400	700	–	700
Oil Products	–	406	406	–	320	320	–	500	500
Coal	–	58	58	–	250	250	–	400	400
Mineral Ores	181	–	181	200	–	200	1,000	–	1,000
Others	91	3	94	112	48	160	280	120	400

2) In the macroscopic estimation, the total cargo handled at the port was forecast by the linear regression analysis of the GRDP and cargo volume. In applying this analysis, cement was excluded from the calculation for the reason that the volume of cement export has greatly fluctuated in the past years. As for GRDP, the actual performance and the expected values described in Table-1 were used.

3) In the microscopic estimation, the cargo volume was estimated by major items and added up to get the total volume. Individual forecasts were made mainly taking the following factors into consideration.

Fertilizer	;	The demand forecast based on the future agricultural production in Region I, and the demand for transhipment services in East Asian countries and the share of the Port of San Fernando
Cement	;	As for export, the import forecast of major South East Asian countries and the market share of cement produced in Region I As for domestic demand, per capita cement consumption rate and the future population
Oil products	;	Oil consumption per unit GRDP and future GRDP, and the the ratio of oil products handled at the Port to the future import of oil in the whole Philippines
Coal	;	The demand for fuel coal at cement plants
Mineral ores	;	The expected value added in the mining and quarrying, production plans of Philex and Lepanto and the share of the Port
Others	;	As for industrial materials, per capita steel consumption by per capita GRDP and the future population

4. Port construction site

1) Fig.-1 shows the alternatives for the port construction site, and their comparison made on the basis of the natural and socio-economic conditions surveys is shown in Table-3.

2) Site 1 and Site 2 in Fig.-1 are recommended for the master plan, but Site 2 is best suited for the short term development plan with the target year of 1990.

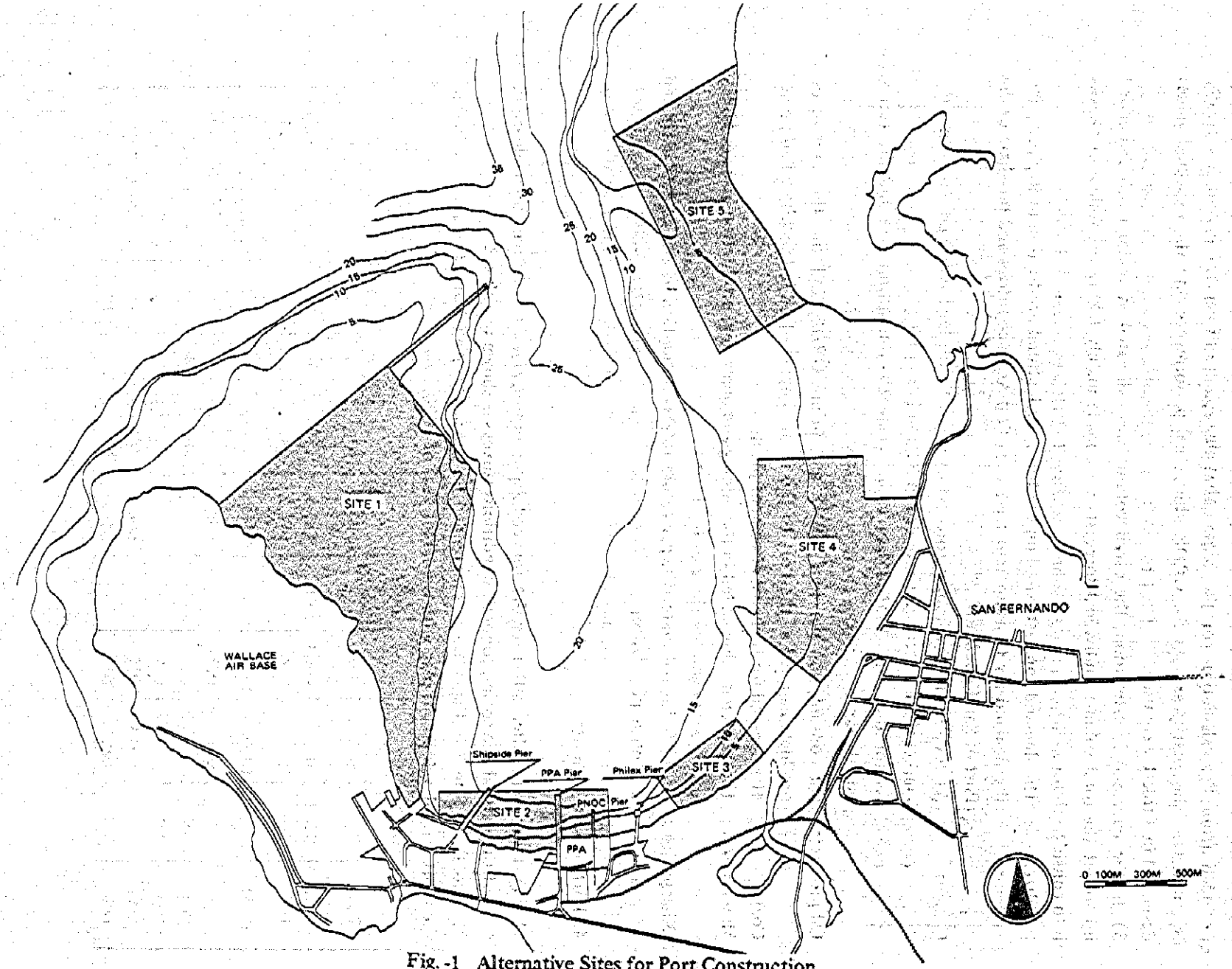


Fig. -1 Alternative Sites for Port Construction

Table-3 Comparison of Alternative Sites

Alternative Site	Advantages	Disadvantages	Tentative Conclusion
1	o less effect by waves o easy to acquire large space by reclamation o easy access to the existing port area o remote from town center		eligible site
2	o possible to make efficient use of the existing port area o easy to maintain the functional relations with the existing facilities	o some effect by waves	eligible site (for the short term development plan)
3		o some effect by waves o difficult to acquire enough space for port activities o separated from the existing public port by the Philex pier	
4	o possible to get large space by reclamation o adjacent to town center	o subject directly to waves o remote from existing port area o to lose the natural beach adjacent to town center	
5		o inroad of NNW and NW waves o remote from the existing port area	

5. Master plan and short term development plan

1) Taking into account the cargo handling capacity of each berth and other factors, the number of berths necessary for the expected cargo volume was calculated as shown in Table-4.

Table-4 Number of Berths in Service in 1990 and 2000

	1983	1990	2000
PPA	2	5 (3)	8* (3)
Shipside	2	Removed	–
PNOC	1 (Under Construction)	2** (1)	2
Berth owned by Private Sector	1		6

Note: 1) The number in the parentheses shows the number of new berths to be built during the period 1984 – 1990 or 1991 – 2000
2) Existing PPA pier is assumed to be used only for port service boats in 2000 because of its narrow width (*)
3) One berth is used for oil tankers (**)

2) Taking into account the natural conditions of the site such as water depth, wave direction, etc. and on the basis of the following considerations, the layout plan of port facilities was prepared;

a) to ensure the safety of port activities
b) to ensure the efficiency of port activities
c) to be flexible for future development
d) to be economical in the construction cost

3) Three alternatives were prepared as illustrated in Figs.-2, 3 and 4. The difference among the three is only the portion which is to be implemented under the short term development plan.

4) As a result of careful comparisons of the three alternatives which were made on the various factors as shown in Table-5, it is concluded that Case-3 (Fig.-4) is superior to the other two cases. Table-6 gives the outline of Case-3, and Figs.-5 and 6 illustrate the land use plan.

Table-5 Comparison of the Alternatives for the Short Term Development Plan

	Maneuvering of Vessel	Influence of Invading Waves on Vessel at Berth	Efficiency of Cargo Handling	Initial Investment and Construction Plan	Others (Flexibility)
Case 1	△	×	○	○	–
Case 2	△	△	○	×	–
Case 3	○	○	△	○	○

Note: ○: Excellent △: Some Problems ×: Poor

Table-6 Outline of the Master Plan (Case 3)

	Master Plan
Number of Berths	16 (2)
PPA	8 (2)
Others	8
Land Area (ha)	120 (20)
Length of Breakwater and Shore Revetment Facing Offshore (m)	1,800
Rough Construction Cost (million ₱)	1,400 (200)

Note: The figures in parentheses indicate the amounts corresponding to the future expansion

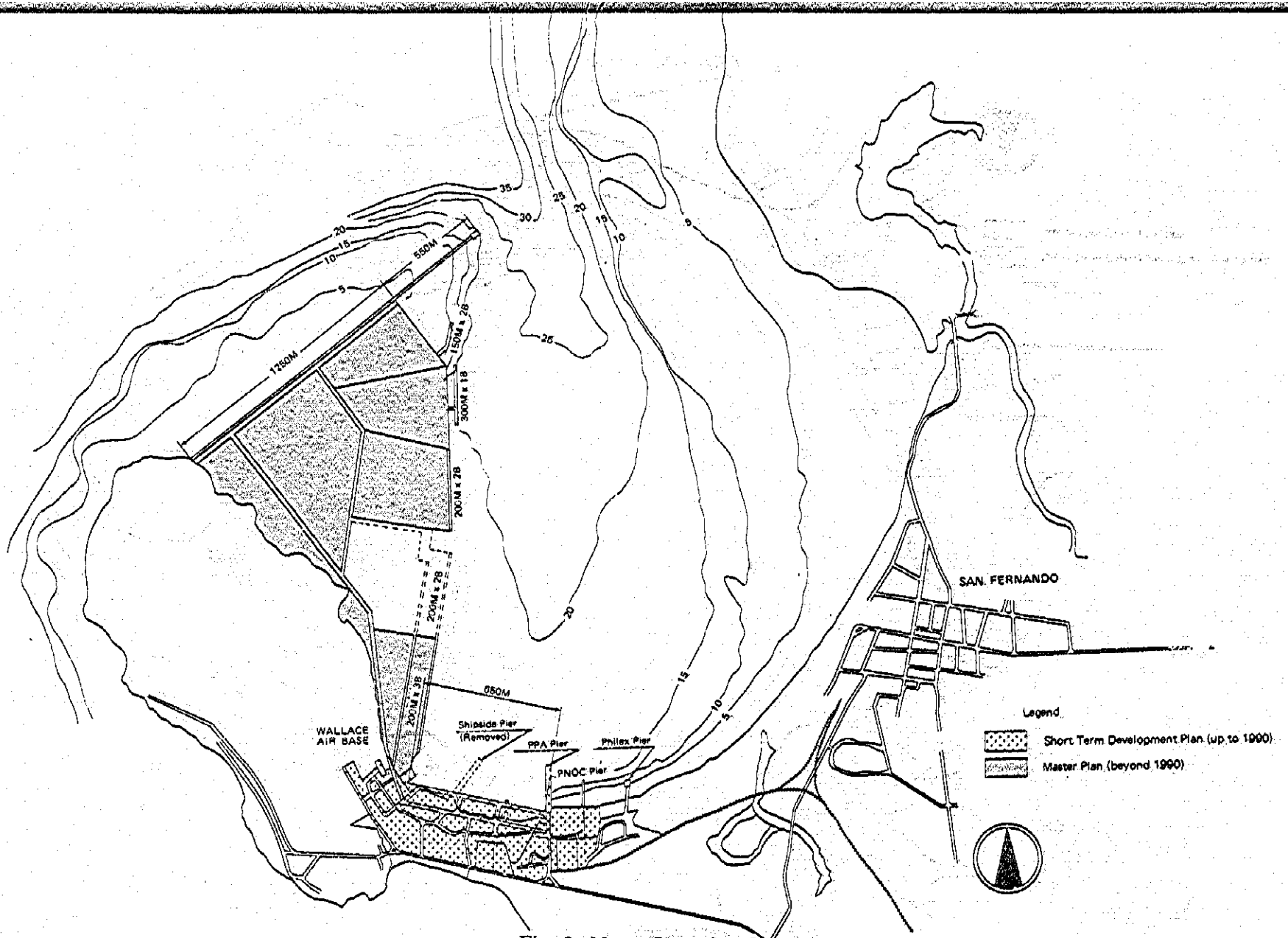


Fig. -2 Master Plan (Case I)

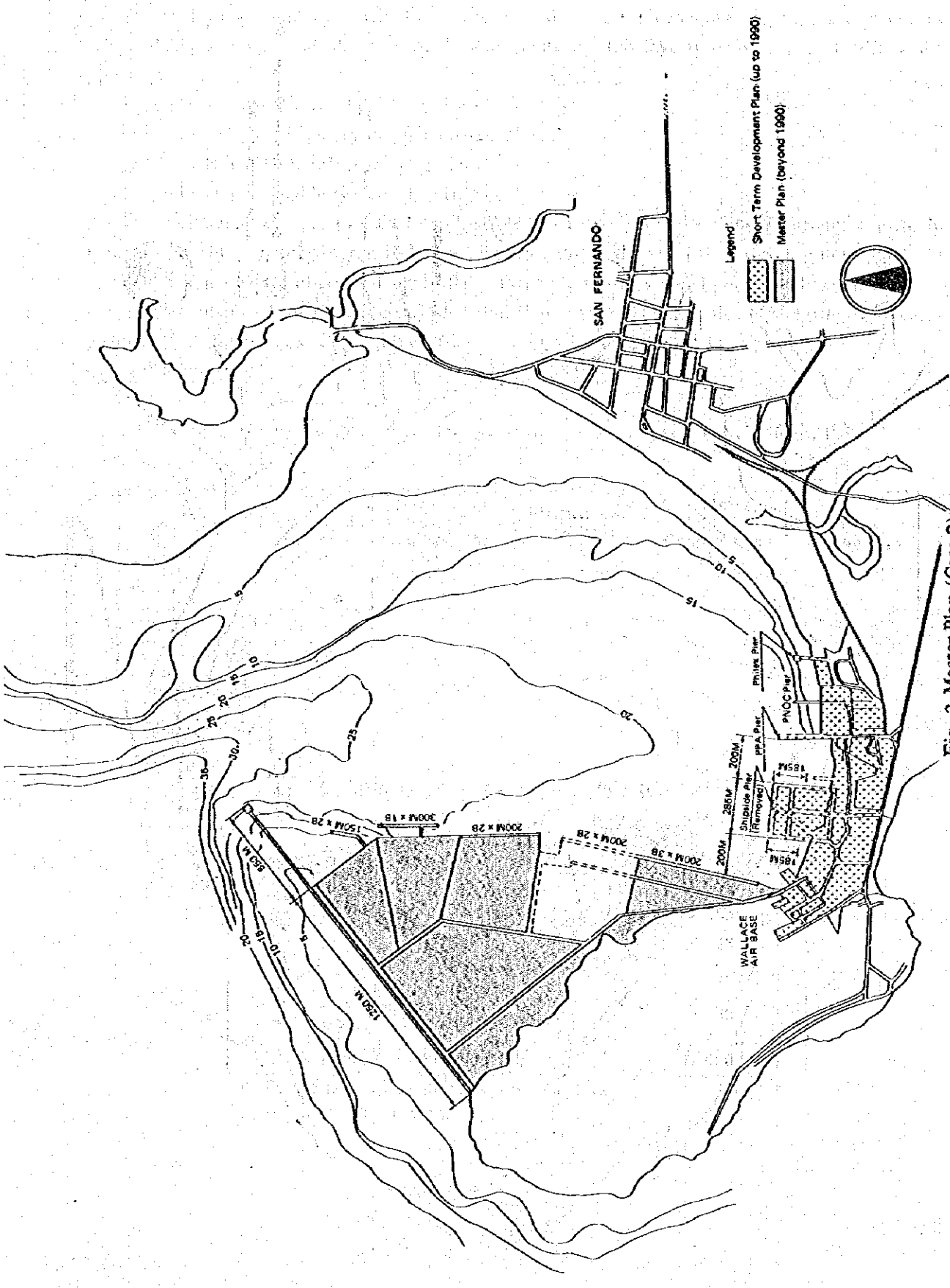


Fig.-3 Master Plan (Case 2)

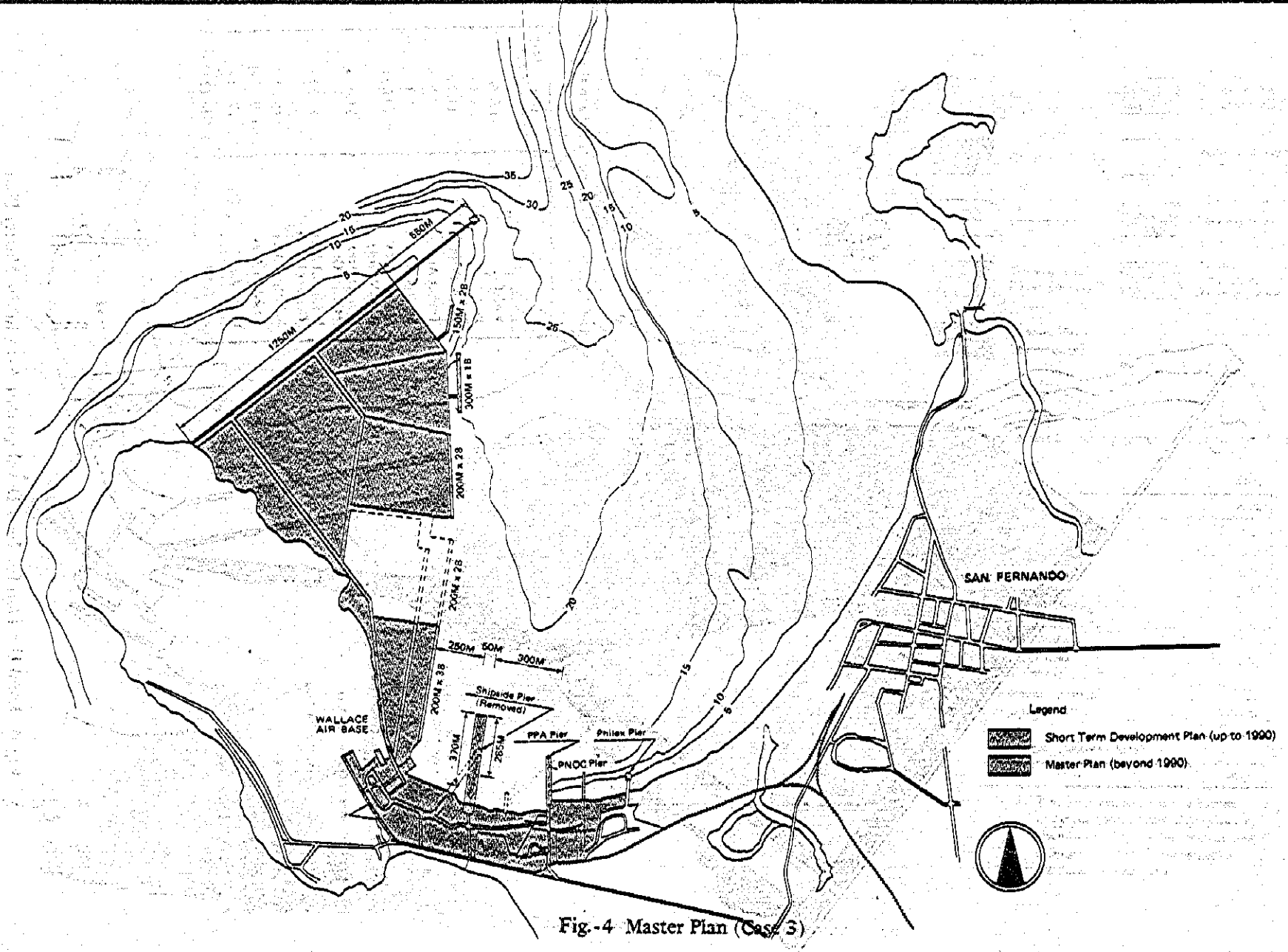
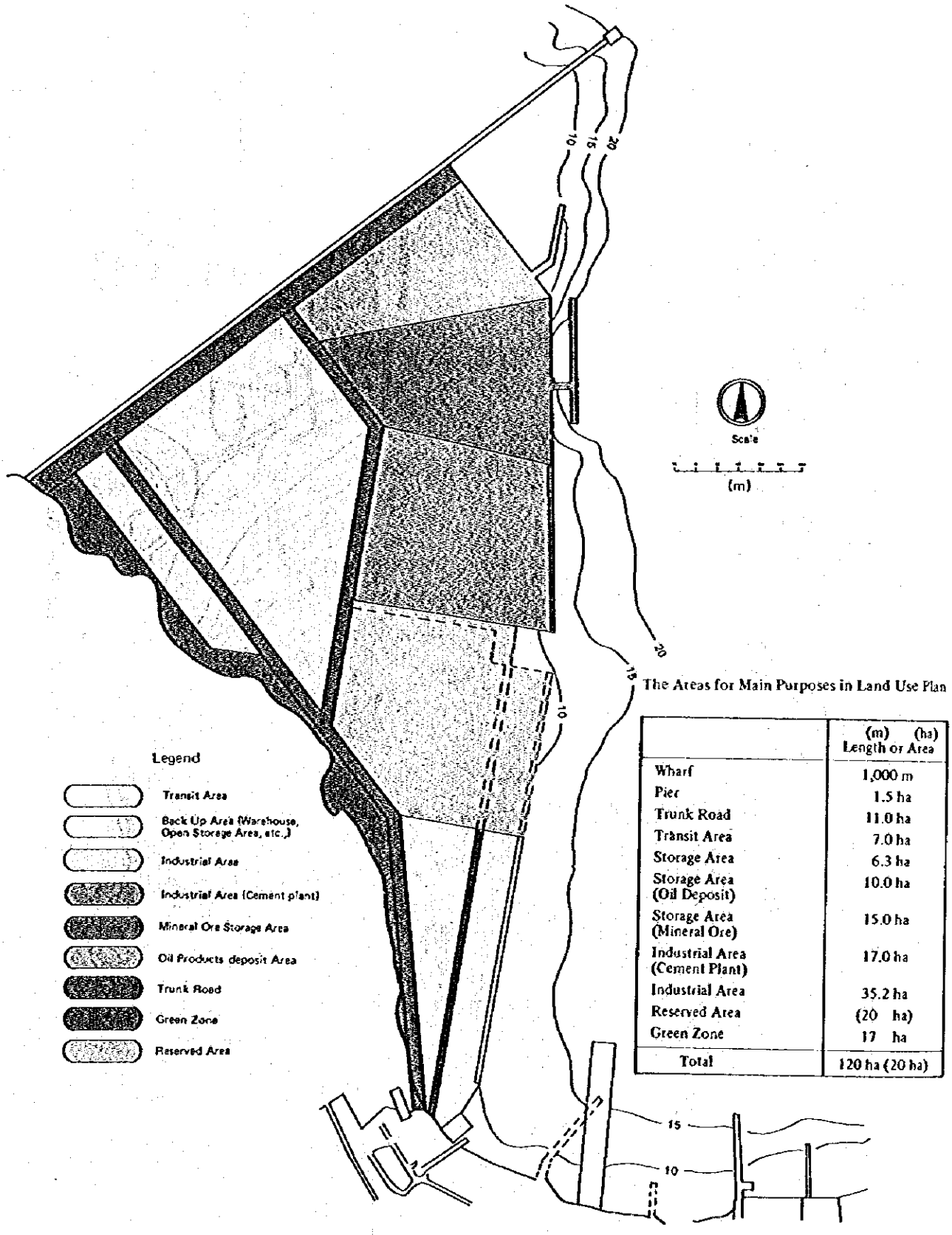


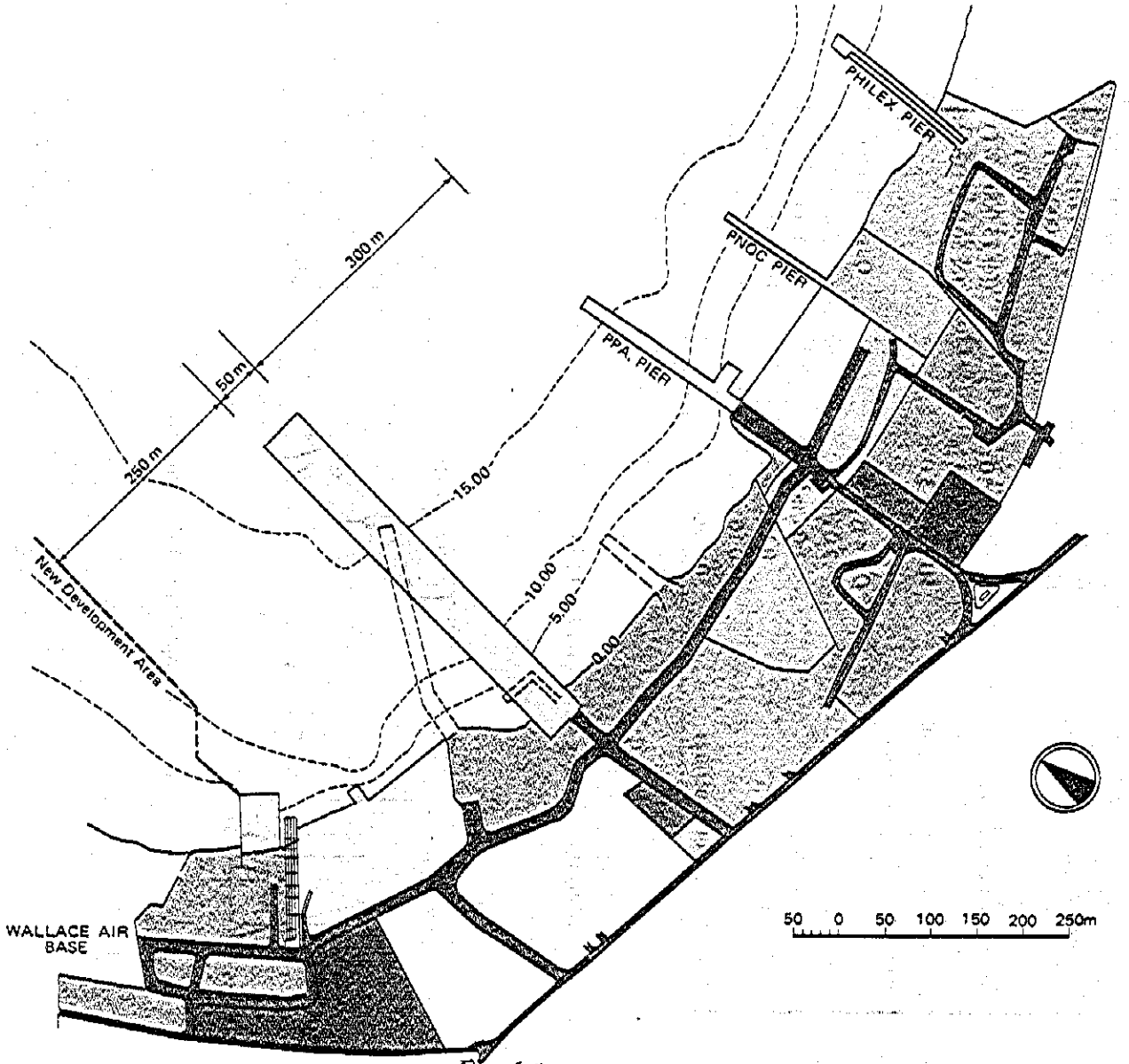
Fig.-4 Master Plan (Case 3)



The Areas for Main Purposes in Land Use Plan

	(m) (ha) Length or Area
Wharf	1,000 m
Pier	1.5 ha
Trunk Road	11.0 ha
Transit Area	7.0 ha
Storage Area	6.3 ha
Storage Area (Oil Deposit)	10.0 ha
Storage Area (Mineral Ore)	15.0 ha
Industrial Area (Cement Plant)	17.0 ha
Industrial Area	35.2 ha
Reserved Area	(20 ha)
Green Zone	17 ha
Total	120 ha (20 ha)

Fig -5 Land Use Plan for New Development Area in the Master Plan



Legend

- Pier
- Road
- Transit Area
- Storage Area (Open Storage)
- Storage Area (Warehouse)
- Storage Area (Oil Deposit)
- Administration Area
- Parking Area
- Others (Including Reserved Area)

The Areas for Main Purposes in Land Use Plan

(ha)

	Area
Pier	3.1
Road	4.1
Transit Area	8.0
Storage Area (Open Storage)	5.5
Storage Area (Warehouse)	2.5
Storage Area (Oil Depot)	6.0
Administration Area	1.3
Parking Area	0.5
Others (Including Reserved Area)	9.0
Total	40.0

Note: Total area includes the area covered under the Development-Right Grants given to the Shipside Inc. and the area belonging to the Oil Companies and the Philex Mining Corp.

Fig.-6 Land Use Plan for the Short Term Development Plan

6. Design, construction plan and cost estimate

1) In this study, the following design conditions were used for the construction of piers, wharves and a breakwater. (Table-7)

Table-7 Design Conditions

Tide level	HWL	MLLW + 0.910
	MSL	MLLW + 0.372
	LWL	MLLW – 0.200
Deepwater design wave		
	N-NW Direction	$Ho_{1/3}$ = 7.0 m
		$To_{1/3}$ = 11.0 sec
Seismic coefficient	0.15	
Shipsize	General cargo ship	15,000 DWT
	Bulk carrier	50,000 DWT
Water depth of the berth	MLLW –10 m	(for 15,000 DWT)
	MLLW –14 m	(for 50,000 DWT)
Crown height of the quay wall	MLLW + 3.0 m	
Surcharge load on the wharves		
	Open type wharf	Quaywall wharf
Ordinary	2.0 t/m²	3.0 t/m²
Extraordinary	1.0 t/m²	1.5 t/m²
Berthing velocity	0.15 m/sec	(for 15,000 DWT)
	0.10 m/sec	(for 50,000 DWT)
Design life time of structures	50 years	

With regard to the berthing structure, the following five types were studied.

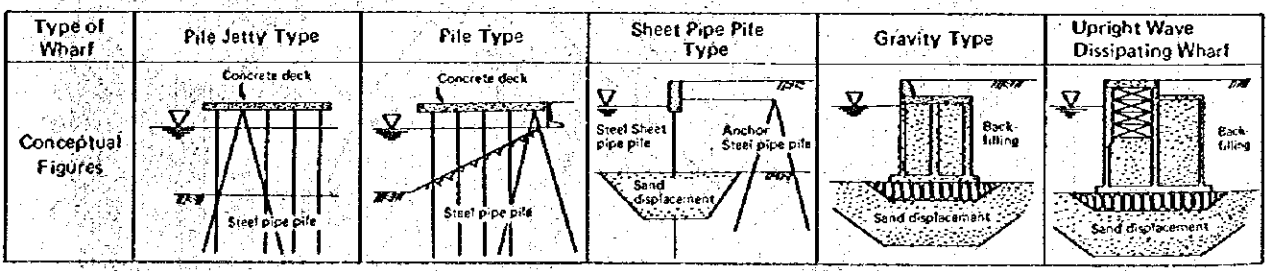


Fig -7 Comparison of Berthing Structures

They were checked and compared from various view points (layout of berthing facilities, design, availability of construction method and construction cost/period), and the conclusion was that the following structural type would be most suitable.

a) For the short term development plan ..... pile jetty type

b) For the master plan (beyond 1990) ..... pile jetty and pile types

The structures for the breakwater and revetment should be simple. Sloping types are recommended therefor, because they are easy to construct and economical.

2) In the case of the short term development plan, it will take three years before the new facilities are put into service, including the period necessary for the additional soil investigation, detailed designing, bidding and other preparations. The net period of the construction work is estimated to be two years. (Table-8)

The construction schedule of the master plan other than the portion executed under the short term development plan should be decided with consideration of the movement of cargo and other necessities at the Port as envisaged after implementation of the short term development plan.

3) The construction cost of the master plan is approximately ₱1,400 million (May 1983 prices), of which ₱257,570 thousand is for the implementation of the short term development plan (Case 3).

Table-8 Construction Schedule for the Short Term Development Plan, Case 3

Description	Unit	Quantity	1987												1988												1989											
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1. New Pier																																						
(1) Steel Pipe Pile	ton	9,900																																				
(2) Pile Driving	pcs	1,100																																				
(3) Concreting Work	m^3	21,000																																				
(4) Fender and Bollard	Ls	1																																				
(5) Cathodic Protection	Ls	1																																				
(6) Abutment	Ls	1																																				
2. Removal of Shipside Pier	Ls	1																																				
3. Dredging	m^3	4,500																																				
4. Transit Sheds	m^2	32,000																																				
5. Open Storage Yard	m^2	12,000																																				
6. Roads	m^2	12,000																																				
7. Utilities	Ls	1																																				
8. Temporary Facilities	Ls	1																																				
9. Mobi/Demobilization	Ls	1																																				
10. Engineering Study	Ls	1																																				
11. Engineering Supervision	Ls	1																																				

7. Economic appraisal

1) The purpose of the economic appraisal is to investigate whether the proposed short term development plan is feasible or not from the view point of national economy. Economic internal rate of return (ERR) is used for the evaluation of the degree of benefits compared to the costs.

2) The following shadow rates are applied to convert the amount of investment estimated at the market price into economic costs.

a) Shadow exchange rate 1.2

b) Shadow wage rate of unskilled labors 0.8

3) The following three items are incorporated into the calculation of ERR as quantifiable benefits in monetary terms.

a) Savings in berth waiting costs of vessels

b) Savings in land transportation cost

c) Incremental value added arising from fertilizer transhipment

4) The result obtained for the ERR is 22.9% for the base case

5) Sensitivity test was conducted, changing by 10% or 30% the assumptions on the four factors; cargo volume, construction cost, peso exchange rate and ship cost.

The results are;

Different Assumptions		ERR (%)
Cargo Volume	10% decrease	20.3
Construction Cost	10% increase	21.0
Peso Exchange Rate	10% decrease	21.6
Ship Cost	30% decrease	22.0

6) In addition to the benefits shown in 3), the following are identified as the major but intangible benefits.

a) Increase in employment opportunity both during and after construction

b) Support in attracting foreign investors to the Bacnotan Industrial Estate Plan and the San Fernando EPZ Plan

c) Impact on industrialization of Region I

d) Improvement of efficiency and safety in cargo handling

7) The results of the economic appraisal that the ERR of the base case well exceeds the Philippines' opportunity cost of capital (15%), and in addition, there are many intangible benefits which will be generated by the implementation of the short term development plan but were not taken into account in the calculation of the ERR clearly show that this project is fully feasible in terms of the Philippine national economy.

7. Financial appraisal

1) The purpose of the financial appraisal is to evaluate;

a) financial viability of PMU San Fernando as an operating entity

b) profitability of the short term development plan itself

2) Pre-requisites for calculation are;

a) The Shipside pier will be taken over by PPA in 1985.

b) New tariff structure with 135% tariff increase schedule are applied.

c) Projected PMU's accounting is calculated by the business accounting system.

d) Total investment is ₱257,570 thousand (May 1983 prices) at market prices.

e) Loan terms for the foreign currency portion (about 60% of the total investment) are:

Interest Rate ..... 3.5% annually

Maturity ..... 30 years including 10 years of grace period

3) PMU San Fernando can be regarded as financially viable. The operating ratio will be constant at around 45% during the whole project life. This ratio is better than the current level of 55 – 60%, and therefore, PMU San Fernando can remain as a profitable entity.

The cash flow statement of PMU San Fernando reveals that PMU San Fernando will still have some surplus even after appropriating funds from its own revenue for the repayment of foreign loans and the payment of their interest throughout the project life. Therefore, the PPA's financial burden to finance the local currency portion of the investment will be minimised.

The return on assets and the debt service ratio will be over 7% and 1.75, respectively, for the whole project life except for the several years in the early stage.

4) The FRR obtained is 4.1% for the base case, which exceeds the weighted average cost of capital (2.1%).

5) Sensitivity test was conducted changing by 10% the assumptions on the three factors; cargo volume, construction cost and peso exchange rate.

The results are;

Different Assumptions		FRR (%)
Cargo Volume	10% decrease	2.9
Construction Cost	10% increase	3.4
Peso Exchange Rate	10% decrease	3.7

6) Evaluation

Based on these results, the short term development plan can be concluded as fully feasible in terms of the viability of PMU San Fernando as well as the profitability of this project.

OUTLINE OF THE STUDY

Outline of the Study

1. Background

The Port of San Fernando is one of eighteen base ports in the Philippines and the most important center for economic activities and an established base for foreign trade in this region. Therefore, highly efficient port facilities are required in order to promote industrial and agricultural development in Region I.

Although the importance of the Port of San Fernando to the economic activities of the region is expected to increase, many of its present facilities are very old. Some facilities have deteriorated or become obsolete. The Port may not be able to keep up with increasing demands on it in the near future. It is in this context that the Republic of the Philippines has requested the Government of Japan to conduct the study on the Development Project of the Port of San Fernando.

The Japan International Cooperation Agency (JICA) organized and dispatched to the Philippines a preliminary study team in October 1982, and the JICA sent the Study Team in February through July, 1983.

2. Purpose and Study Method

The purpose of the Study is to formulate a master plan for the Port of San Fernando (target year 2000) and to prepare a short term development plan for the period up to 1990, including its feasibility study.

For this purpose, natural conditions survey, data collection and their analyses were conducted and hearings/discussions were held. In addition, the Team was able to fully exchange opinions/views with the Philippine counterparts throughout the course of the Study.

The following are the main contents of the study items.

1) Technical Investigation of Natural Conditions
2) Port Activities Forecast
3) Port and Harbor Planning
4) Design, Construction Methods and Cost Estimate
5) Economic and Financial Appraisal

3. Paticipants in the Study

1) Study Team

Team Leader	Takashi Hazama	The Overseas Coastal Area Development Institute of Japan (OCDI)
	Yoshikazu Kawasaki	OCDI
	Tomoo Amano	OCDI
	Shinsuke Kubo	OCDI

	Nobuyuki Matsuda	OCDI
	Makoto Arasawa	OCDI
	Makoto Yamamoto	OCDI
	Seijiro Fujiwara	OCDI
	Harumi Hosoe	OCDI
Coordinator	Takao Kaibara (Seiji Kaiho)	Japan International Cooperation Agency (JICA)

2) Counterparts

PPA Head Office

Prudencio B. Mercado, Jr.	Project Manager
Tomas G. Ileto	Deputy Project Manager/Port Engineer
Bernardita J. Samia	Port Economist
Francis Reyes	General Economist
Guillermo Cantalejo	Statistician
Albert E. Montenegro	Researcher
Rocelie Sandoval	Budget/Administrative Officer
Royce Herrera	Draftsman
Milagros R. Mendoza	Clerk-Typist
Elizabeth Alvarez	Clerk-Typist
Pedro Manuel	Utilityman

PMU San Fernando

Adolfo LL. Amor, Jr.	Port Manager/Co-Project Manager
Silverio Mangaoang, Jr.	Port Operations Officer
Xerxes Munar	Port Engineer
Flora Tuazon	Finance Officer
Claudio Garcia, Jr.	Assistant Port Operations Officer
Delia Balancio	Statistician
Romeo Rabe	Administrative Officer
Primo Bugayong	Port Police OIC

4. Organization Visited by the Team

Philippine Ports Authority, Manila
Port Management Unit San Fernando
Asian Development Bank
Bacnotan Consolidated Industries Incorporated
Bulk Indent Services Corporation
Caltex Philippines Incorporated
Commart Philippines Incorporated

Export Processing Zone Authority
Fertilizer and Pesticides Authority
Ministry of Energy (Bureau of Energy Utilization)
Ministry of Public Works and Highway
Ministry of Natural Resources (Bureau of Mines)
National Economic and Development Authority
National Transportation Planning Project
Northern Carriers Corporation
Northern Cement Corporation
Office of the Governor
Office of the Mayor
Philex Mining Corporation
Philippine Atmospheric Geographical and Astronomrical Service Administration
Philippine Cement Manufacturers Corporation
Philippine National Oil Company
Philippine National Railway
Port Management Unit Batangas
Port Management Unit Cebu
Port Management Unit Iloilo

CHAPTER I

OUTLINE OF REGION I

CHAPTER 1 OUTLINE OF REGION I

1-1 Geographical Profile

Region I is located in the northwestern portion of the island of Luzon. It is bounded on the northest by the Babuyan Channel, on the west by the South China Sea, on the east by Region II, and on the south by the Region III. (Fig. 1-1-1)

The region is composed of seven provinces, four cities, 172 municipalities, and 3,953 barangays. The provinces included are Abra, Ilocos Norte, Ilocos Sur, Pangasinan, Benguet, Mt. Province and La Union where San Fernando is located. The four cities within Region I include Baguio city, the summer capital of the Philippines. San Fernando is one of the municipalities.

The region's land area is about 21,000 km^2, or 7% of the country's total area (300,000 km^2), the fifth largest in the country.

1-2 Demographic Profile

Region I has a total population of 3.54 million as of 1980, an increase of 8.3% from 1975 and accounts for 7.4% of the country's total population (Appendix 1-1).

The province of La Union has a population of 453,000 constituting the second largest province in Region I in terms of population.

The average annual growth rate of population in Region I was 1.62% for 1975 – 80, which is lower than the national average of 2.6%. This may imply a high rate of migration to Metro Manila.

The labor force has been rapidly increasing from 1.15 million in 1977 to 1.34 million in 1979 with an annual growth rate of 8.0% (Appendix 1-2). Of the 1.28 million persons employed, 60.0% were agricultural workers. Industrial workers account for only 12.9%. The labor force increased by 193,000 during 1977 – 79, and almost 70% of this increase was absorbed by the agricultural sector.

As of 1980, the number of households in the region reached 651,000. The average household size was 5.4 persons with a mean monthly income of ₱939 (1972 prices) in 1981, which was about four times the mean income in 1971 (Appendix 1-3). However, the 1981 income was 24% (₱203) lower than the national mean income.

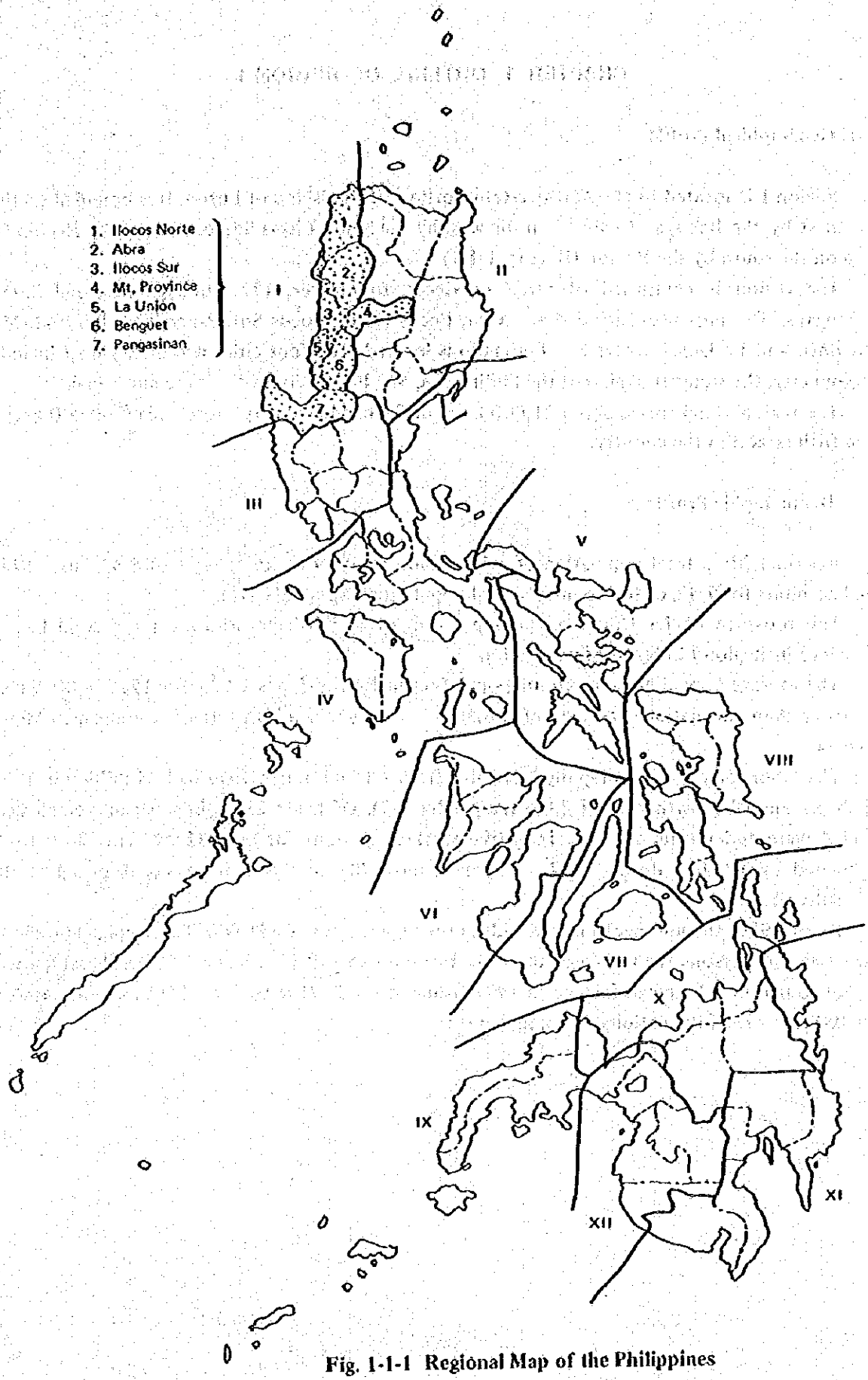


Fig. 1-1-1 Regional Map of the Philippines

1-3 Economic Profile

In 1981, the GRDP amounted to ₱3.6 billion (1972 prices) which accounted for only 3.8% of the GNP. The region's economy grew annually by an average 6.1% during the period 1978 – 81.

The service sector accounted for 38.1% of the total GRDP; agriculture 37.0% and industry 24.9%. This structure has remained almost same for the past four years. (Appendix 1-4)

1-4 Sectorial Performance

1-4-1 Agriculture

Since Region I faces the South China Sea in the west and has a mountaineous area in the east, plains proper for agriculture are generally small except for Pangasinan Plain and those scattered along the coast side of Region I (Appendix 1-5). Thus, Region I is not very suitable for agriculture. However, because of the lack of other industries, agriculture has been accounting for one third of the GRDP of Region I, as mentioned in the previous section.

In terms of crop production and crop area harvested, Region I accounts for around 5% of the national figures. (Table 1-4-1)

Table 1-4-1 Crop Production and Crop Area Harvested in the Philippines and Region I, 1981

	Unit	Philippines (a)	Region I (b)	Share of Region I (c)=(b÷a)
Production	(.000 MT)	29,508	1,345	4.6%
Value of Production	(million ₱)	42,368	2,451	5.7%
Crop Area Harvested	(.000 ha)	11,961	550	4.6%

90% of the crop area harvested is used for food crops and the rest for commercial crops (Appendix 1-6). Palay accounts for two thirds of the food crops. Historically the palay cultivation area has been nearly constant, subject to small fluctuations. The yield per hectare, however, is increasing gradually, due to adoption of appropriate technology and progress of irrigation (Appendix 1-7).

Of commercial crops, tobacco is most important in Region I and accounts for 64% of the total Philippine production.

1-4-2 Industry

Since Region I's agricultural resources are limited, the development of this region depends on the industrial sector. Among the sub-sectors in the industrial sector, mining already accounts for 18.2% of the total national mining production. Region I still has abundant mineral reserves including 1.6 billion tons of metallic ores (Appendix 1-8).

On the other hand, manufacturing in Region I accounts for only 0.7% of the Philippine total. In terms of investment, Region I has even smaller share of 0.2% (Table 1-4-2).

Table 1-4-2 Regional Distribution of Manufacturing Investments, 1977

Region	Investments	
	(.000 ₱)	(%)
I	392	0.2
II	425	0.3
III	7,231	4.3
IV	145,551	86.6
IV-A	1,738	1.0
V	3,302	2.0
VI	3,778	2.2
VII	3,025	1.8
VIII	150	0.1

Source: Bacnotan Industrial Estate Program Prefeasibility Study

Of the 9,417 manufacturing establishments in the region 97.2% were small-scale. Most of these establishments were in Pangasinan and Ilocos Sur. In 1981, existing NACIDA (National Cottage Industries Development Authority)-registered industries numbered 8,099 employing 23,812 workers and with aggregate capitalization of ₱73 million. For the same year, unregistered cottage industries numbered about 5,000. Of the 410 BOI (Board of Investments)-registered firms in the country in 1978, the region had 17, or 4%, namely; four firms were agro-based firms, 10 were mining and mineral processing firms, one was metal-based firms, and two were chemical-based firms.

An EPZ was established in Baguio (1980), as the third EPZ in the Philippines. Currently, 5 companies including Texas Instruments, Inc. are located there. In the future, 15 companies with a total of 15,000 employees are expected to locate in this EPZ. Another EPZ in Region I is planned near the Port of San Fernando, and a prefeasibility study has been completed for an industrial estate in Bacnotan, where, in all 60 companies are expected to locate.

1-5 Transportation

1-5-1 Highway transportation

Road network in Region I is shown in Fig. 1-5-1.

After the completion of the 1978 – 82 five year infrastructure program, the aggregate length of the road network in Region I reached 17,570 km. Of these roads, more than one half (61.0%) were categorized as barangay roads, about 27% as local roads (provincial/city/municipal roads).

The greater part of the road system, however, is still unpaved (Table 1-5-1). There were a total of 2,177 km of national roads in the whole region. Out of this total, about 53% was paved. As to provincial road (3,355 km in total), 27% was earth roads, 49% was gravel roads, 22% was made of concrete. In the case of barangay roads, 99% were unpaved.

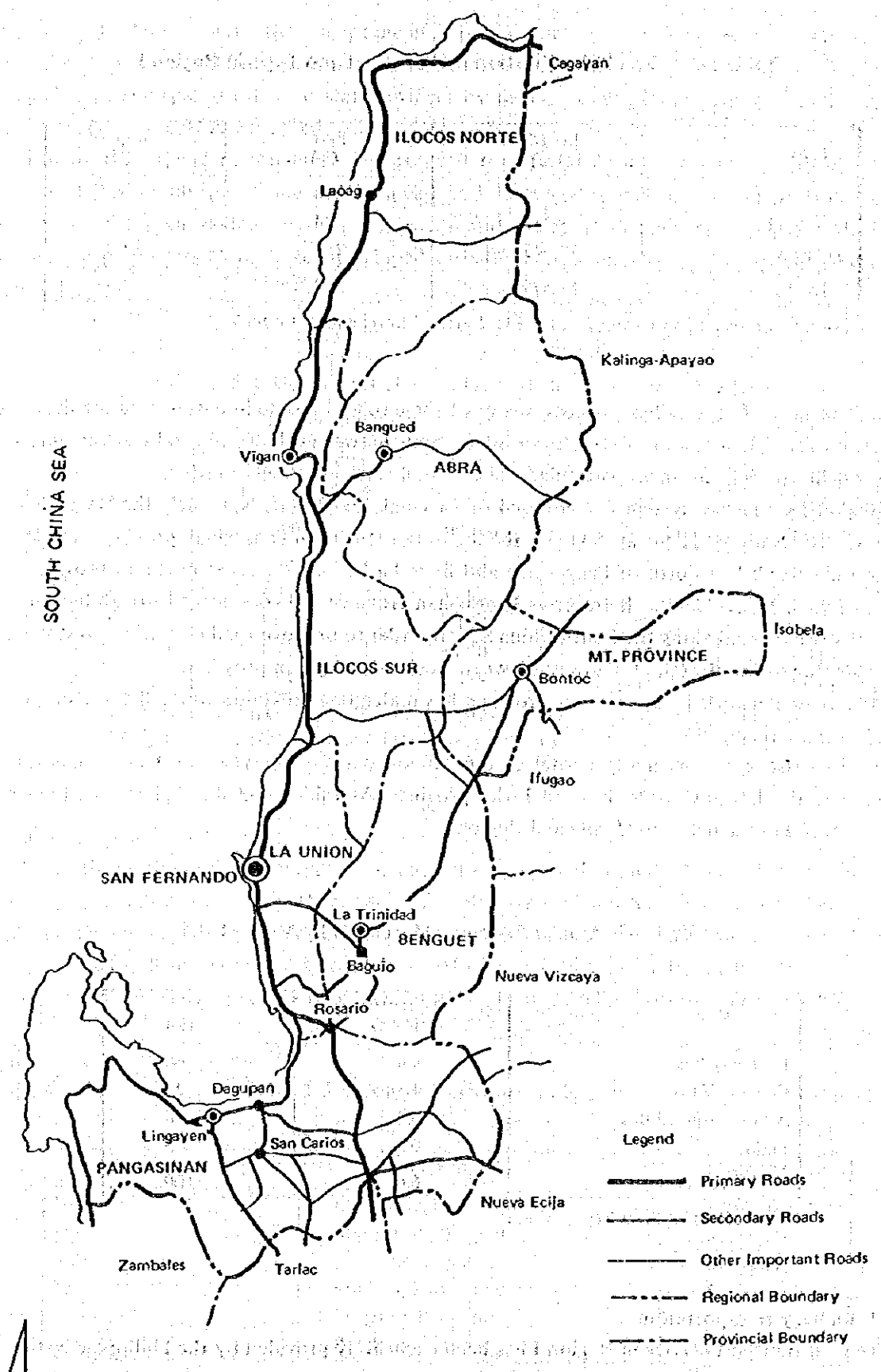


Fig. 1-5-1 Classification of Road Networks in Region I, June 1981

Table 1-5-1 Road Classification by Pavement and Type in Region I

Type	Length (km)	Paved (%)	Unpaved (%)
National	2,177	53	47
Provincial	3,355	24	76
Barangay	12,047	1	99
Total	17,579	12	88

Source: Ilocos Region Profile, Circa 1983: Regional Development Council

Due to lack of all-weather surfaces, many of these roads become impassable during the rainy season, and social, economic and cultural interactions between urban and rural areas are limited. Thus, qualitative improvement particularly in the rural areas is strongly needed.

Region I's highway system is composed of two major components, namely the Manila North Road (MNR, National Highway #3) and the highway network in Pangasinan province. The MNR is the only trunk line north of Pangasinan and links La Union and other northern provinces of Region I with Metro Manila. It traverses Pangasinan province and goes north through the narrow strip of plains spread along the South China Sea. In order to improve road conditions, restoration and widening of the stretch of highway between Rosario-Laoag is in progress.

The road network in Pangasinan province has undergone rehabilitation and therefore, road conditions are very good.

As to passenger movement, a total of 6.6 million persons per year are travelling between Manila and the Ilocos Corrider beyond Tarlac province. As Table 1-5-2 shows, buses are the most popular travel mode between Manila and Region I.

Table 1-5-2 Annual Passenger Movement by Mode, 1981

Mode	Passengers (million)	Share (%)
Economy Bus	4.4	66
Cars and Vans	1.5	23
Air Conditioned Bus	0.4	6
Train	0.3	5
Total	6.6	100

Source: NTPP Final Report Vol. II.

1-5-2 Railway transportation

The rail transport service in Region I has been exclusively provided by the Philippine National Railway (PNR) through its Main Line North (266 km), which runs from Central Manila to San

Fernando, La Union. With the exception of a 6 km commuter service line within the Metro Manila area, the Main Line North is entirely single tracked railway. An extension of its service leads to Baguio city and other coastal provinces by means of complementary motor service, but this has been temporarily cancelled.

Due to inadequate maintenance and renewal for several decades, there are still many old bridges. These conditions force severe speed and load restrictions on the Main Line North. Because of the poor system of operation and maintenance, rail transport has been losing both freight and passengers to the more developed and efficiently operated highway transport system. (Table 1-5-3)

Table 1-5-3 Operations of Main Line North by Selected Years

	Passengers		Freight	
	Passengers	Revenue	Tonnage	Revenue
	(.000)	(.000 ₱)	(.000 MT)	(.000 ₱)
1963 – 64	2,847	3,214	411	1,655
1968 – 69	1,797	3,695	151	660
1973 – 74	1,010	3,190	128	664
1977	1,720	8,620	45	440
1980	840	7,315	38	1,015

Source: PNR; data for 1963 – 64, 1968 – 69 and 1973 – 74 are quoted from the ADB Feasibility Study Report, 1977 data from NTSS Railways, Draft Final Report.

1-5-3 Air transportation

Since the Philippines is composed of more than seven thousand islands, air transportation is relatively developed and airports are scattered all over the country. In Region I, there are six airports. Of these, the one located in Laoag city is classified as international, Loakan Airport in Baguio city, San Fernando Airport in La Union and Vigan's in Ilocos Sur are secondary. Lingayen and Rosales Airports both located in Pangasinan are feeder airports. (Table 1-5-4)

Table 1-5-4 National Airports in Region I

Airport	Location	Classification
Gabu	Laoag City, Ilocos Norte	International
Loakan	Baguio City, Benguet	Secondary
Vigan	Vigan, Ilocos Sur	Secondary
San Fernando	San Fernando, La Union	Secondary
Lingayen	Lingayen, Pangasinan	Feeder
Rosales	Rosales, Pangasinan	Feeder

Source: NEDA Regional Office

The Philippine Air Lines (PAL) provides the main air transport service in the region. Flights are available daily in Baguio city and three times a week in Laoag city. The flights to San Fernando are temporarily cancelled.

1-5-4 Sea transportation

Region I has a shoreline of about 530 km along the west coast of northwestern Luzon. Along this shoreline there are six ports other than the Port of San Fernando, namely Currimao, Salomague, Sulvec, Dagupan, Sual and Bolinao. These ports, except Bolinao, are covered by PMU San Fernando, which also covers Masinloc in Zambales in Region III. (Fig. 1-5-2)

The Port of San Fernando is the base port in the region. A total of 1,000,000 tons of cargo were loaded and unloaded at the Port in 1982. The outline of the Port of San Fernando is described in detail in Chapter 2.

Among the sub-ports, which are under the supervision of PMU San Fernando, only Currimao is operational. It has a 200 m long, 15 m wide pier, a 235 m long causeway and 870 m^2 of warehouses. A total of 9 vessels called at Currimao in 1980, discharging general cargo and loading mineral ores and concentrates for export.

The proliferation of mining firms in the region is primarily due to its various metallic and non-metallic mineral reserves. Hence, most private ports covered by PMU San Fernando are owned by mining firms engaged in the export of mineral ores and concentrates.

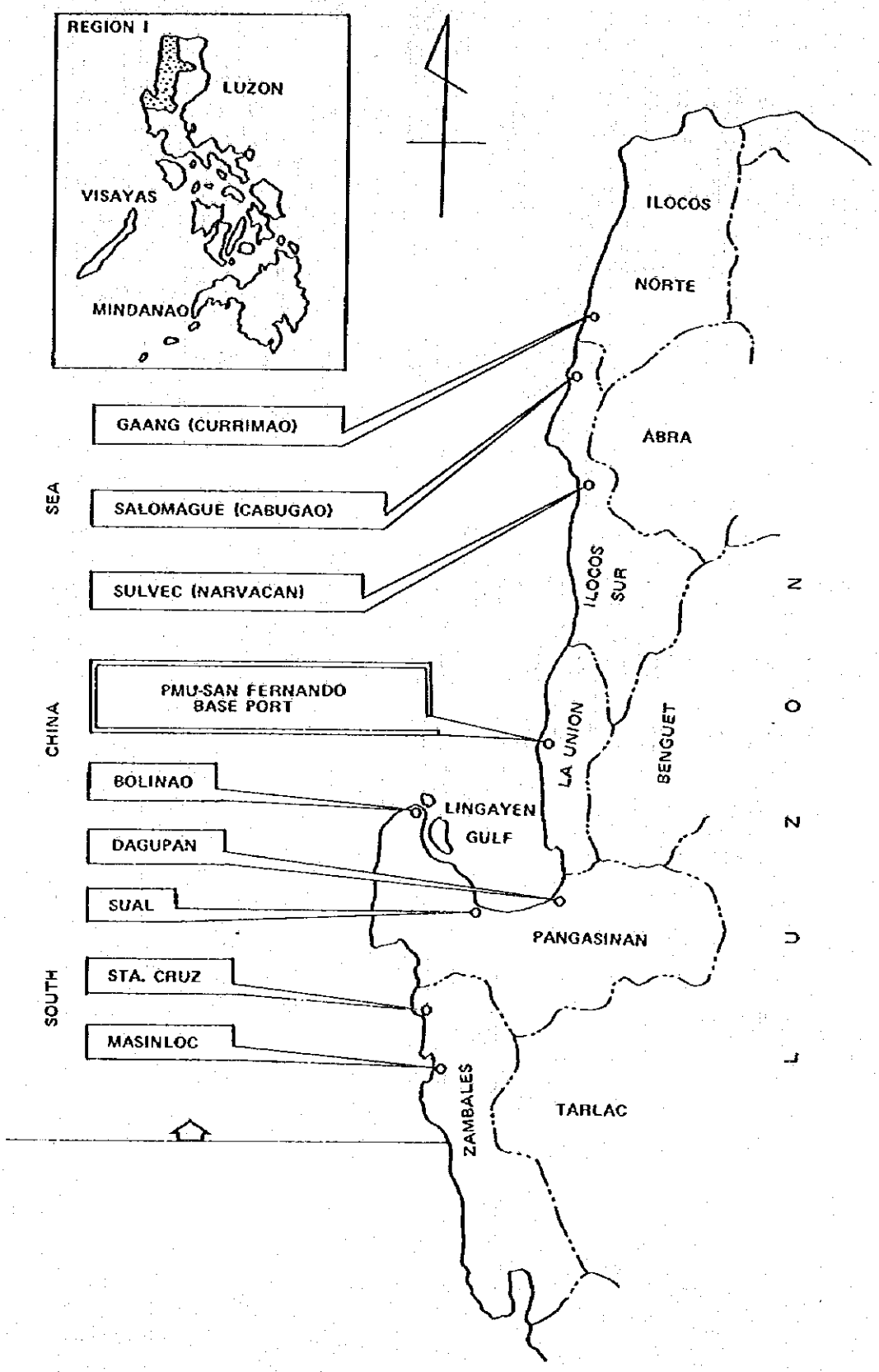


Fig. 1-5-2 Location of Base Port and Sub-Ports Covered by PMU San Fernando