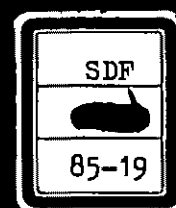
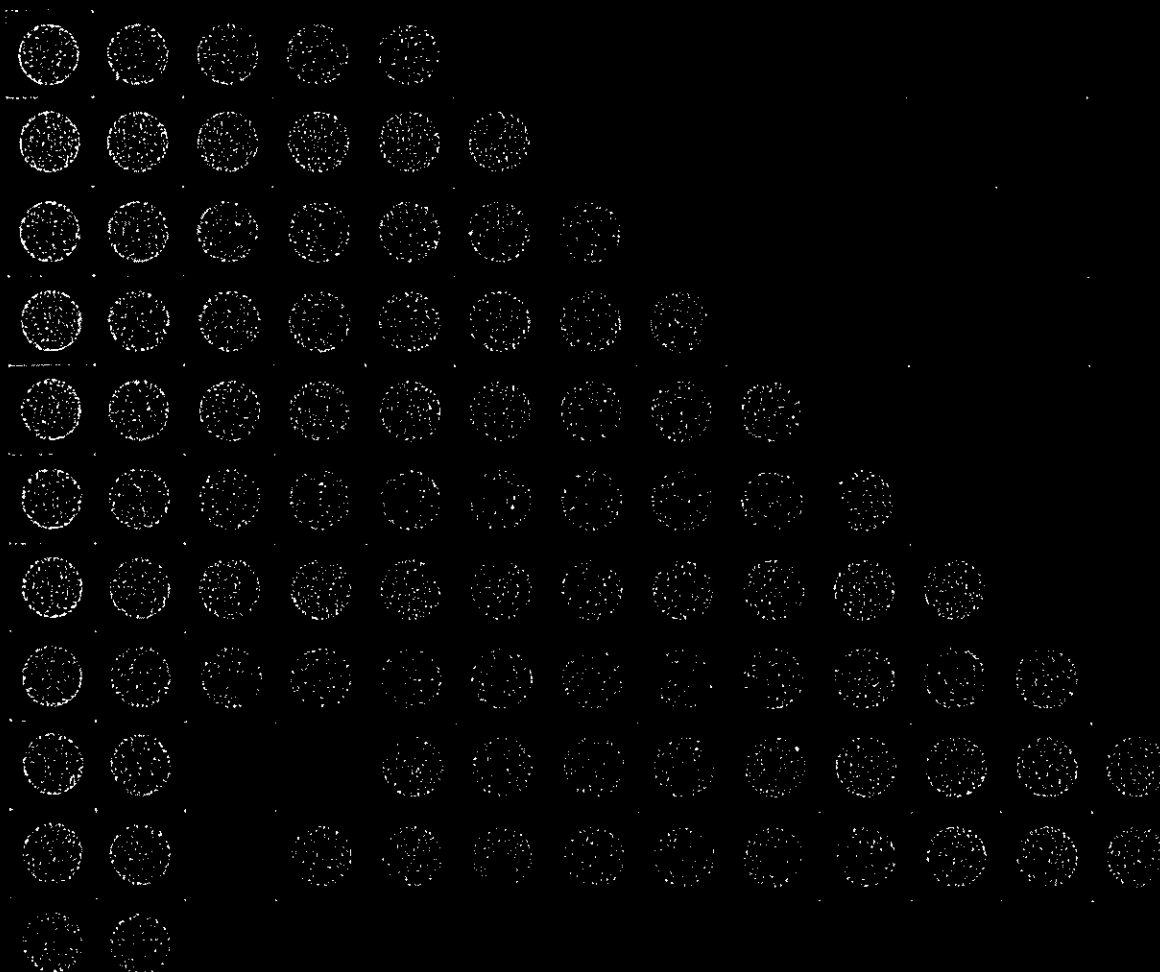


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MASTER plan study of THE INFANTA-REAL AREA URBAN DEVELOPMENT PROJECT

TECHNICAL REPORT 3
(INDUSTRIAL AND SOCIAL DEVELOPMENT PLAN)



JAPAN INTERNATIONAL COOPERATION AGENCY

MARCH, 1985

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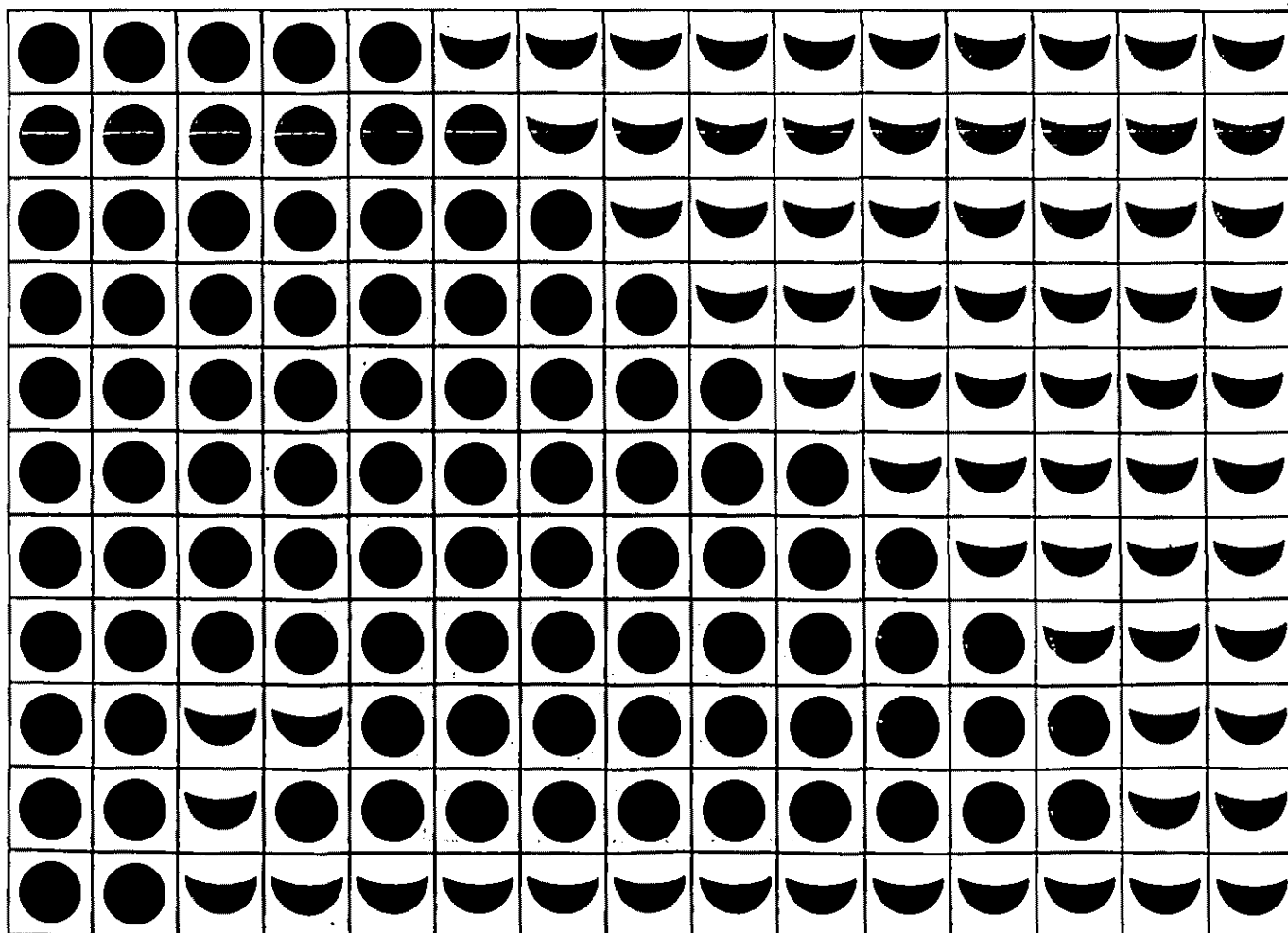


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THE GOVERNMENT OF
THE REPUBLIC OF THE PHILIPPINES

MASTER plan study of THE INFANTA-REAL AREA URBAN DEVELOPMENT PROJECT

TECHNICAL REPORT



JAPAN INTERNATIONAL COOPERATION AGENCY

MARCH, 1985

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ABBREVIATION

AAC	Annual Allowable Cut
AADT	Average Annual Daily Traffic
BAEXT	Bureau of Agricultural Extension
BAT	Bureau of Air Transportation
BFAR	Bureau of Fisheries and Aquatic Resources
BHS	Barangay Health Station
BOL	Bureau of Land
BUTEL	Bureau of Telecommunications
EIRR	Economic Internal Rate of Return
EPZ	Export Processing Zone
FIDC	Fishery Industry Development Council
FIRR	Financial Internal Rate of Return
FRP	Fiber Reinforced Plastic
GCLA	Greater Central Luzon Area
GRDP	Gross Regional Domestic Product
HSDC	Human Settlements Development Corporation
HSRC	Human Settlements Regulatory Commission
ICT	International Container Terminal
ILIPSCO	Infanta Lighting and Power Cooperative
IPTS	Inter-Provincial Telephone System
IRM	Infanta Real Module
IRR	Internal Rate of Return
JICA	Japan International Cooperation Agency
LWUA	Local Water and Utilities Administration
MHS	Ministry of Human Settlements
MLGCD	Ministry of Local Government and Community Development
MMA	Metropolitan Manila Area
MNR	Ministry of Natural Resources
MOTC	Ministry of Transportation and Communications
MPWH	Ministry of Public Works and Highways
MWSS	Metropolitan Waterworks and Sewerage System
NACIDA	National Cottage Industries Development Authority
NAS-NEDA	National Accounts Staff, National Economic and Development Authority
NCSO	National Census and Statistics Office
NEA	National Electrification Administration
NEDA	National Economic Development Authority
NEPC	National Environmental Protection Council
NIA	National Irrigation Administration
NPC	National Power Corporation
NWRC	National Water Resources Council
PAGASA	Philippine Atmospheric Geophysical and Astronomical Service Administration
PCA	Philippine Coconut Authority
PFMA	Philippine Fish Market Authority
PICOP	Paper Industries Corporation of the Philippines
PLDT	Philippine Long Distance Telephone Company
PPA	Philippine Port Authority
PT & T	Philippine Telephone & Telegram Co.
QUEZELCO	Quezon Electric Cooperative
RCPI	Radio Communication of the Philippines
RHU	Rural Health Unit
RWDC	Rural Waterworks Development Corporation
SEAFDEC	South East Asia Fishery Development Center
WD	Water District

1 AGRICULTURAL DEVELOPMENT PLAN

1.1 Existing Condition

1) Climate

Climatic condition in Infanta- Real area is compared with the overall national condition in Fig. 1.1.1, but high humidity characterizes this area where relative humidity never falls below 80% throughout the year, much affecting vegetation in the area. Also, the heavy precipitation strongly affects agricultural activities in the area. No data is available on sunshine hours and pyrliometry.

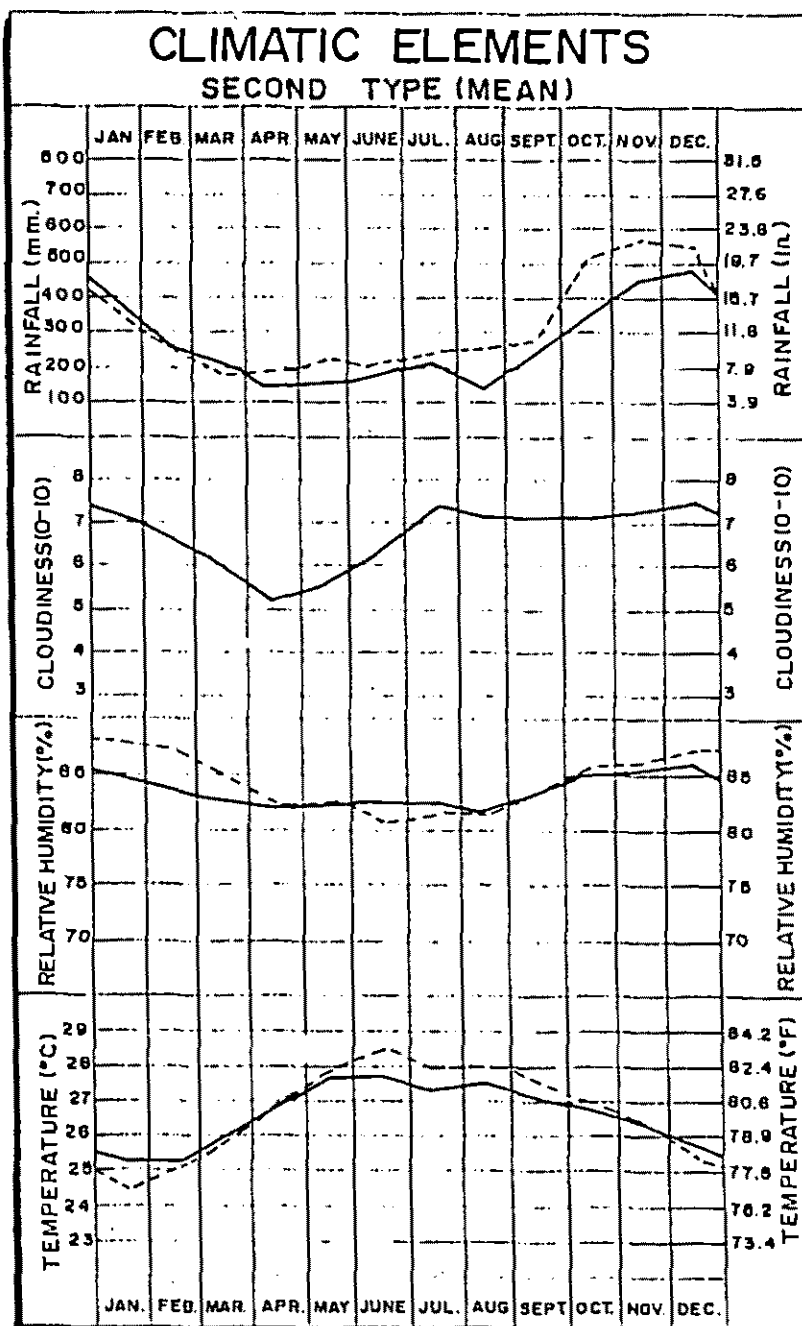
2) Geology

The general flat land of IRM is geologically classified as alluvium but of different formation--the east coastal area is sandbanks and the southern area is mangrove swamps and a river drift alluvion is also seen. The major crop of the flatland is rice, followed by coconuts, vegetables and bananas (Fig. 1.1.2).

The hilly or mountainous parts of the IRM are classified into sedimentary elaslies feldspar andesite phorphyry, pyroclastics and volcanic flows with interbed of fine sedimentary clastic and metamorphic rock. Most of these areas are under forest or coconut orchard.

3) Soil

In the Philippines, nationwide soil survey have been carried out since 1960. Such survey was done in the IRM in 1964 and 1965. The survey report classified the soil of IRM into four types as identified in Tehcnical Report No. 3.



————— MEAN FOR THE PHILIPPINES

- - - - - MEAN FOR INFANTA

OBSERVATION PERIOD : 1951-1970

THE MASTER PLAN STUDY OF THE INFANTA-REAL AREA
URBAN DEVELOPMENT PROJECT

FIG.1.1.1 CLIMATIC CONDITION OF INFANTA

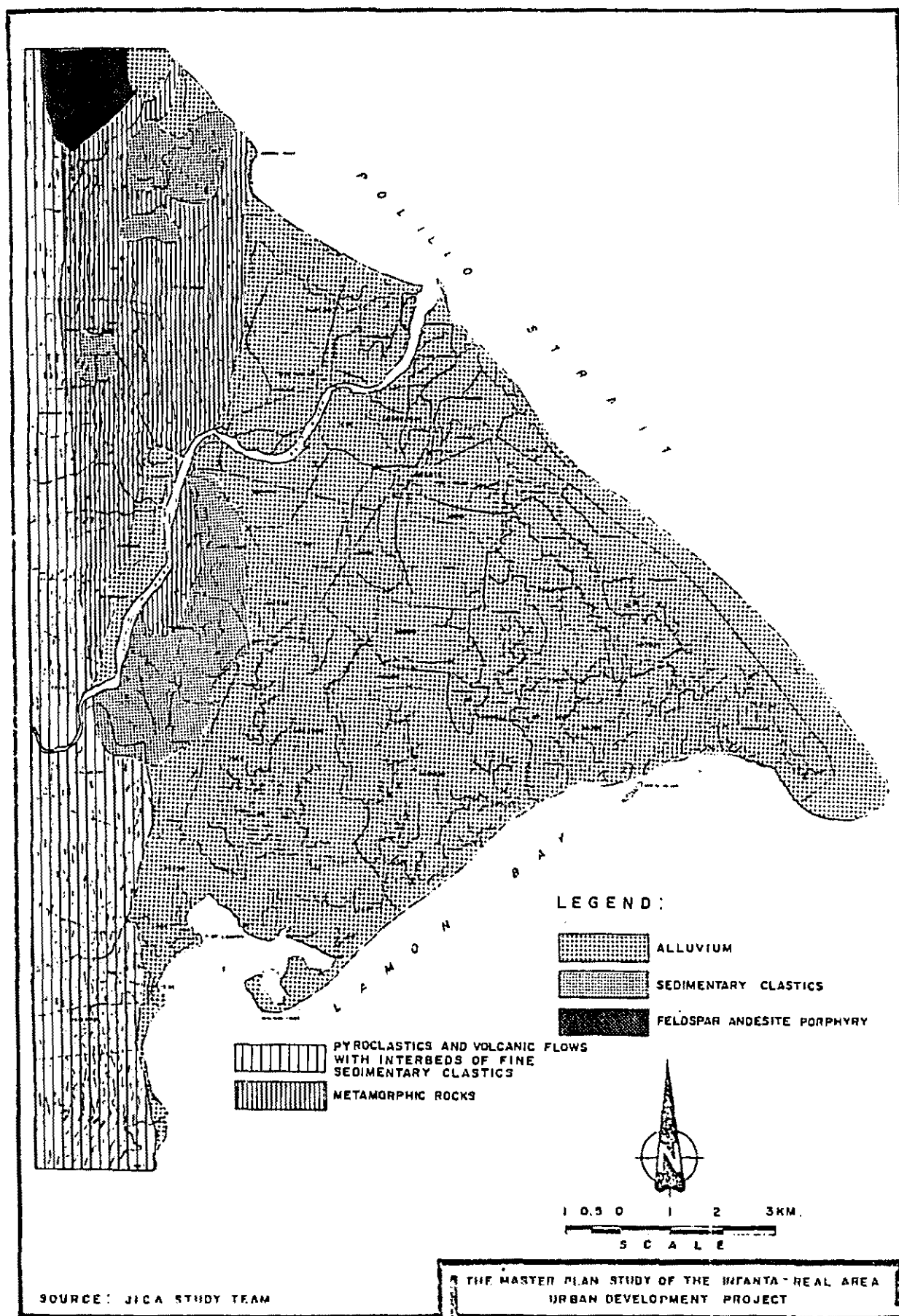


FIG. I.1.2 GEOLOGY MAP

4) Land Capability Classification

In the Philippines, land capability is classified into nine (9) categories according to soil type, slope and erosion. In addition, the following sub-classifications are stipulated (Table 1.1.1):

E --- (Erosion, runoff)

W --- (Wetness, drainage)

S --- (Root zone and tillage restriction)

According to this classification system, the soil of IRM is classified as follows:

I. Buguey Series ; Ds

II. Antipolo Series ; Be

III. Quingua Series ; A

IV. Hydrosol ; X

Then, according to the classification of Table 1.1.1, farming is possible in the IRM in its entirety except for the swamp area (IV, Hydrosol) (A.B.D). The peninsular part extending to Dinahican is of I. Buguey series and therefore, must be tilled very carefully or is better suited to pastureland or for afforestation (D). Various tillage restrictions are stipulated (S). The mountainous parts are of II Antipolo series and are suited for farming but the problem of erosion or loss of soil is present. The plains of General Nakar and Infanta are of Quingua series and are most suited for agriculture without any attendant problems. Thus, said plains are the only good farming land in IRM.

5) Agricultural Land

The majority of agricultural land in IRM of 3,250 hectares is covered by coconut orchards followed by 2,819 hectares under rice. Diverse crops cover the remaining 375 hectares as it was indicated in Technical Report No. 3. (Their ratios to the total IRM area are 21.3%, 18.5% and 2.5% respectively.)

Table 1.1.1 Land Capability Classification

Class	Description
Class A	Very good land; can be cultivated safely; requires only simple but good farm management practices.
Class B	Good land; can be cultivated safely; requires easily applied conservation practices.
Class C	Moderately good land; must be cultivated with caution; requires careful management and intensive conservation practice.
Class D	Fairly good land; must be cultivated with extra caution; requires careful management and complex conservation practices. Best suited to pasture or forest.
Class L	Level to nearly level land; too stony or very wet for cultivation. Suited to pasture or forest with good soil management.
Class M	Steep, very severely to excessively eroded or shallow for cultivation. Suited to pasture or forest with careful management.
Class N	Very steep, excessively eroded, shallow, rough or dry for cultivation. Suited to pasture with very careful management and definite restrictions. Best suited to forest with very careful management.
Class X	Level land, wet most of the time, cannot be economically drained. Suited for farm ponds or for recreation.
Class Y	Very hilly, mountainous, barren and rugged. Should be reserved for recreation and wildlife.

Source: Bureau of Land

By municipality, rice covers the largest 2,316 hectares in Infanta while coconut orchards covers a smaller 1,868 hectares. In General Nakar, coconut orchards cover the majority of land but as much as 453 hectares are under rice.

The general vegetation of the IRM is as follows: Coconut trees widely cover IRM area but their distribution pattern is such that in the flatland part coconut tree area extends in T shape along Agos River and the coastal line while hillside slopes are generally covered by coconut trees. In other words, in the sandbank area along the coastal line from Abiawin to Binolosan and Dinahican, coconut trees are well maintained as in plantations forming a large coconut producing area. Coconut trees are also planted on land in General Nakar with the elevation of five meters up to about 100 meters above sea. Well maintained coconut orchards are also seen on Agos River banks with the elevation of three or meters or more.

Nipa palms are distributed along small creeks between mangrove forests and the shoreland (588 hectares) and are used for brewing nipa wine or for roofing.

6) Agricultural Activities

(1) Rice and Coconut Cultivation

The cultivation conditions are summarized of rice and coconut, the two major crops of IRM as previously stated.

a) Paddy Rice

The rainy season crops is planted in June to November and the dry season crop in December to May. Of the many varieties of rice now being planted, the most is IR-42 and 52, according to the result of an interview survey. Recommended fertilization is 200 kilograms per hectare of compound fertilizer N-16 P-20 K-0 and 100 kilograms per hectare of Urea N-46. The use of insecticides and herbicides is also recommended but not practiced. Farm machines are yet to be introduced.

NGA buys rice from farmers at the price of 1.8 pesos per kilogram under the minimum rice price system but farmers often sell to brokers or rice mills. According to the provincial economist of NPA, the handling rate in Infanta in 1983 was 12.5 pesos per bag (50 kilogram), trucking rate was 1.75 pesos per bag, polishing fee was Ten Pesos (P10.00) per bag and the polishing rate was 65%.

The activities are summarized by municipality as follows:

INFANTA

Of the total area of 2,316 hectares under rice in Infanta, 66.8% or 1,548 hectares was under double cropping, 27.9% or 647 hectares was under single cropping and 5.2% or 121 hectares was rain-fed paddies.

The most of Infanta plains (1,071 hectares) is covered by the Agos River Irrigation System which is now under rehabilitation with World Bank fund. In addition 622 hectares is covered by a common irrigation system. Total irrigation coverage is 73.1%.

Binolasan and Dinahican in the coastal area are not covered by an irrigation system, and rain fed rice is cultivated only in the rainy season because brackish water permeates during the dry season.

There are thirteen (13) mills in Infanta and they charge Ten Pesos (P10.00) for polishing a 50-kilogram bag of rice (the fee is common throughout IRM). Rice cultivation is more emphasized upon in Infanta than in Real or General Nakar. Extension programs are actively carried out.

REAL

With a limited flatland area, rice is not very prosperous in Real where a total of fifty (50) hectares is under rice of which thirteen (13) hectares is irrigation and is under double cropping.

GENERAL NAKAR

The entire paddy area of 453 hectares is under double cropping of which 336 hectares or 74.2% (same as in Infanta is irrigated.)

b) Coconut

From 1975 to 1983, coconut area increased but yield per unit of land decreased in IRM and Polillo Islands together (see Table 1.1.2). Decrease in unit coconut production is also true with entire Region IV and is common to areas where coconut orchards are kept by small holders. Direct causes of coconut production decrease are the following two:

- (i) Aging of coconut trees;
- (ii) The spread of Cadang-Cadang disease and black beetles.

Coconuts picked in IRM are shipped as picked (shells) to Metro Manila or Laguna, and those produced in Polillo Island are made into copra and shipped 60% via Real and 40% via Mauban or Atimonan (see Fig.1.1.3). PCA is engaged in tests and extension work for the improvement of coconut productivity in IRM and Polillo Island. Particularly, PCA recommends the variety called Mawa which is claimed to bear twice the nuts of the conventional variety per tree.

Table 1.1.2 Area Planted, Estimated Number of Bearing Trees
and Yield per Tree of Coconut (1974-75, 1982-83)

Municipality	Area Planted(ha)		Estimated No. of Bearing Trees ¹ (B)		Copra Productions (kg.) (C)		Yields per ha. (kg./ha.) (C/A)		Trees per ha. (B/A)	
	1975 ¹)	1983 ²)	1975 ¹)	1983 ²)	1975 ¹)	1983 ²)	1975 ¹)	1983 ²)	1975 ¹)	1983 ²)
1. General Nakar	1,730	4,951.4	545,335	1,084,809	5,150,824	5,544,623	1,821.3	1,119.8	315.2	219.1
2. Infanta	2,156	3,942.3	618,539	581,600	3,573,769	2,792,622	1,657.6	754.0	286.9	147.5
3. Real	1,603	3,194.1	381,845	354,800	2,206,216	1,813,333	1,376.3	567.7	238.2	111.1
Sub-total	5,489.012	12,087.8	1,545,717	2,021,209	8,930,809	10,330,578	1,627.0	854.6	281.6	167.2
POLILLO ISLAND										
1. Panulukan	3,775	3,595.4	69,676	675,925	402,572	3,454,728	106.6	960.9	18.5	188.0
2. Polillo	5,307	16,215.3	1,283,811	3,055,246	7,417,575	15,615,702	1,397.7	963.0	241.9	188.4
3. Burdeos	2,655	4,058.1	1,160,734	462,913	6,706,463	3,899,333	2,526.0	960.9	437.2	188.0
4. Jomalig	2,677	4,165.4	157,583	783,097	910,480	4,002,496	340.0	960.9	58.9	188.0
5. Patnanugan	2,308	4,600.4	405,959	846,071	2,345,541	4,324,365	1,016.3	960.9	175.9	188.0
Sub-total	16,722	52,570.5	3,077,763	6,123,252	17,782,631	31,296,626	1,063.4	960.9	184.5	188.0
Total	22,211	44,658.4	4,623,480	8,144,461	26,713,440	41,627,204	1,202.7	952.1	208.2	182.4

Source: 1) Philippine Coconut Authority Survey and Evaluation Division

2) PCA

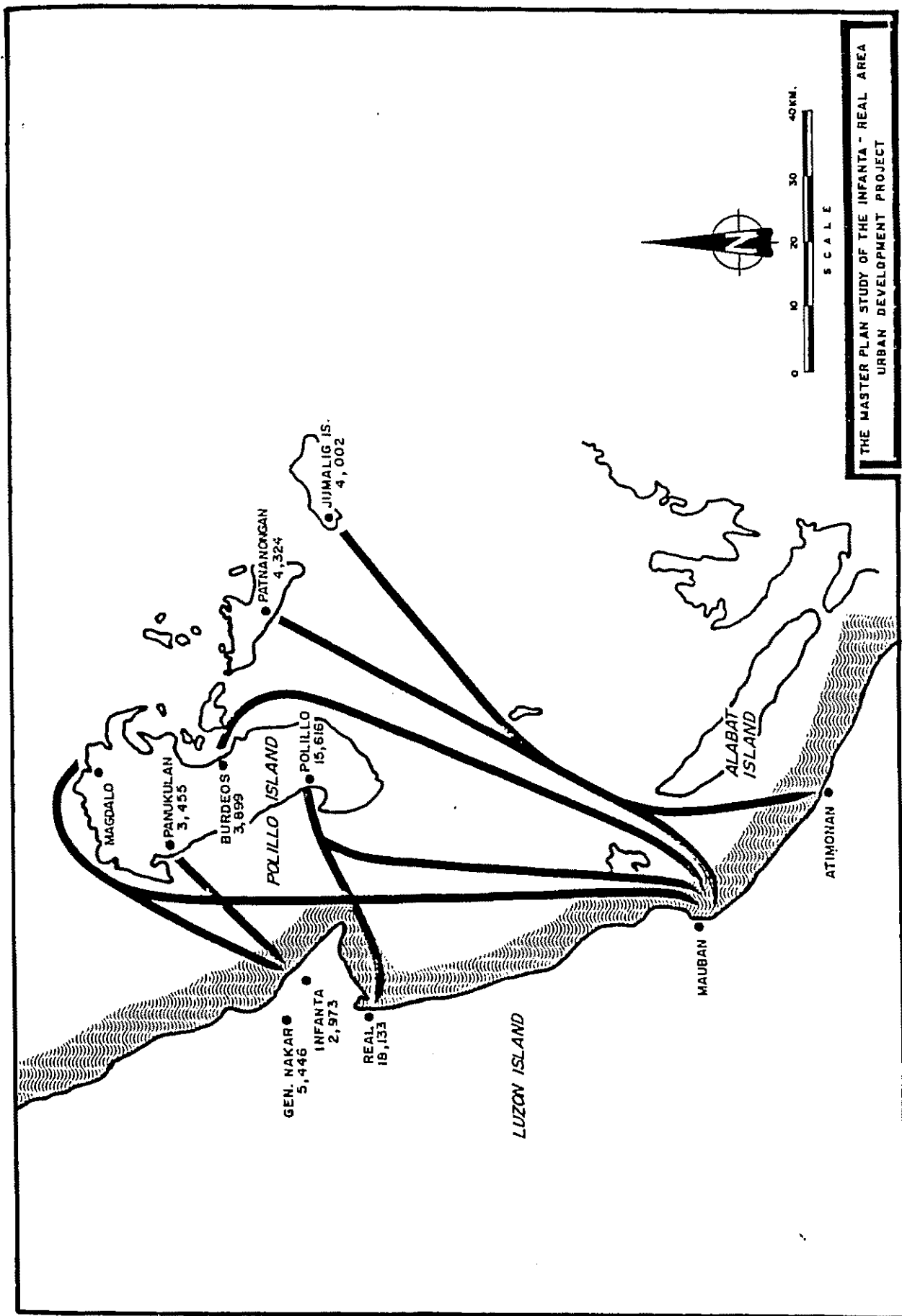


FIG. I.1.3 TRANSPORTATION ROUTE OF COPRA (M.T.)

By municipality, coconut production is as follows:

INFANTA

A total of 3,942 hectares is under coconut, and total coconut production is 2,792,622 kilograms most of which are shipped to Manila or Laguna with only a small portion made into copra.

REAL

3,194 hectares is under coconut according to PCA and coconut production is recorded at 1,813,333 kilograms, most of which are shipped to factories in Manila or Laguna. Average size of coconut cultivation area per farming family is 1.5 hectares.

GENERAL NAKAR

Coconut planted area covers 4,951 hectares, the number of bearing trees was 1,084,809 and total coconut production was 5,544,623 kilograms.

Coconut orchards in IRM cover 3,250 hectares which is only 26.9% of the three municipalities total of 12,088 hectares. (By municipality, IRM accounts for 27.3% of General Nakar, 47.4% of Infanta and 1.0% of Real.)

1.2 Major Agricultural Development Projects (On-going)

1) Irrigation System

The irrigation systems existing in IRM are as shown in Table 1.2.1. Of these systems that in Infanta was completed by the National Irrigation Administration (NIA) in 1959 (with 8.2 kilometers of main canal and 39.7 kilometers in total of 19 laterals).

The Agos River Irrigation System Rehabilitation Project was formulated by NIA in 1973 and is presently being implemented. The improvement of this irrigation system (see Fig. 1.2.1) is summarized in Table 1.2.2. The major elements of improvement are:

(i) The rehabilitation of the existing canal network (47.8 kilometers) and the construction of six laterals (8.2 kilometers);

(ii) The rehabilitation of twenty nine (29) canal structures and the construction of 44 such structures.

(iii) Construction of intake and drainage canal (83.5 kilometers)

(iv) Farm road development (79.2 kilometers)

The timing of this irrigation system rehabilitation work coincided with the aging of coconut trees and coconut orchards are being converted into rice paddies in small units.

Table 1.2.1 Existing Irrigation System

System	Municipalities Covered	Potential Service Area (ha)	Irrigation Area		Type of Diversion	Source of Water Supply	Reliable Flow (liters/Sec)	
			Wet	Dry			Wet	Dry
National IRR System								
Agos Ris	Infanta	1,071	1,071	1,030	Canal	Surface	5,400	
Communal IRR System								
Maligaya CIS	Gen. Nakar	13	13	13	Dam	Maligaya Creek	249	80
Masikap CIS	Gen. Nakar	19	19	19	Dam	Magsikap Creek	220	115
Tigbi CIS	Infanta	11	11	11	Dam	Tigbi Creek	60	20
FSDC Assisted								
Anoling FCIS	Gen. Nakar	159	159	50	Canal	Agos River	5,000	2,500
Pump IRR System								
1) G. Nakar 29 units	Gen. Nakar	145				Ground water		
2) Infanta PIS 159 units	Infanta	611				Surface water & Ground water		
3) Real PIS 3 units	Real	13				Surface water & ground water		
Communal IRR Project								
Batangsa PCIP	Gen. Nakar	60	60	-	Pump	-		
Panbanan PCIP	Gen. Nakar	25	25	-	Pump	-		
Infanta - 1693								
Gen. Nakar - 336								
Real - 13								

Source: NIA

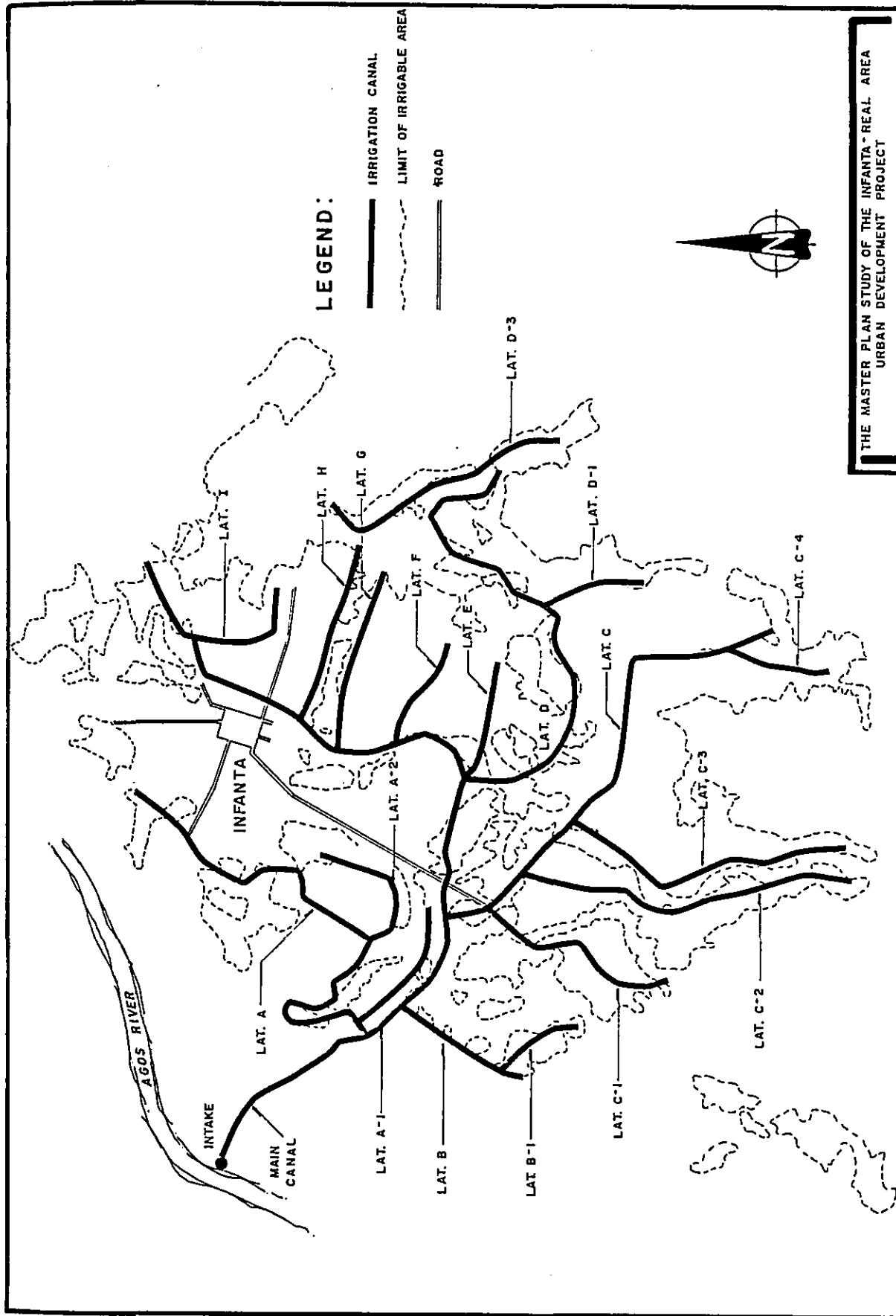


FIG. I.2.1 AGOS RIVER IRRIGATION SYSTEM

Table 1.2.2 Outline of Engineering Work-Areas

Facilities	Present	Project
a. Area	Equipped Area=1,000 ha	Extension Area=200ha Proposed Service Area=1,200 ha
b. Diversion Work	Enclined type without weir	
c. Irrigation Canals	Density=46.Xm/ha	Density=46.7m/ha.
Main Canal	1 line - 8.1 km	Rehabilitation Main Canal: 1-8.1km
Laterals	19-39.7lmm	Laterals: 18-39.7lmm Const.: 6-8.2km
d. Canal Structure		<u>Rehab.</u> <u>Const.</u> <u>Total</u>
Control (No.)	15	3 19 22
Conveyance	47	21 24 45
Headgate (No.)	20	5 - 5
Protective (No.)	6	- 1 1
e. On-farm Facilities		
Farm Ditches	15.7km (16m/ha)	61.4 km(51 m/ha)
Farm Drains	- km (-m/ha)	37.8 km(32 m/ha)
f. Drainage System		<u>Improve-</u> <u>ment</u> <u>Const.</u> <u>Total</u>
Project Drain (km)		- 30 30

Source: NIA

2) Coconut Hybrid Pilot Farm and
Regional Nursery Program

The average yield of coconut per unit of land has notably shrunk particularly in Region IV due to very extensive farm management by small orchard holders, the aging of coconut trees in the absence of active replanting program and the spread of blight and insects as a result of failure to fertilize.

In counter to this situation, the Philippine Coconut Authority (PCA) has carried out various tests, experimentations, and extension services for the purpose of improving coconut productivity under the Coconut Hybrid Pilot Farm and Regional Nursery Program. The three municipalities and Polillo Islands are also covered by this program. Various experiments have been made in the five key result areas designated in the three municipalities. Major effort items are: the extension of hybrid (MAWA), nursing, and blight/inspect extermination (Table 1.2.3).

Table 1.2.3 The Three Municipalities and Polillo PCA Activities (1983)

* Towns	* K	R	A	I	* K R A II			Well Managed Hybrid	Established Nurseries	Established Hybrid Farms	Target	Fertilized Coco Farms	Controlled Pest Diseases	Cover Cropped Coco Farms	Cultivated Coco Farms
1. Infanta	11			11		26	3	21	1	11					
2. Real	2			4		26	12	4	4	3					
3. Gen. Nakar	2			7		26	4	4	7	5					
4. Polillo				15		19	11	7	9	6					

Target	* K	R	A	II	* K R A IV			* K R A V		
					Inter cropping PCA Financed	Inter cropping Self - Financed	Target	Farmers Training/Conferences	Special Projects	
1. Infanta	16			2		7	17	187		1
2. Real	16					13	17			
3. Gen. Nakar	16					29	17	7		
4. Polillo	12					5	13			

* : KRA = Key Result Area

Source : PCA

1.3 Agricultural Development Potentials and Agro-Productivity Improvement Program

Agricultural development potentials rest in the following three areas:

(i) The improvement of rice productivity will be possible if agricultural technology is improved through better nursing, cultivation, and transplanting, change or shortening of harvesting period, and the adjustment of cultivation period during the rainy season through the improvement of irrigation systems (as represented by the Agos River Irrigation System Rehabilitation Project) and the rationalization of water management.

(ii) Although rice paddy area may not be increased substantially in the IRM, the improvement of average yield of rice per unit of land will be possible through the active introduction of agricultural technology including the intensification of cultivation, the practice of fertilization and the spray of agricultural chemicals just as promoted by the Masagana 99 Program (a campaign to improve yield to 99 cavan or 5,000 kilograms per hectare).

(iii) Average yield of coconut per unit of land will be improved in the near future by putting into practice the results of various tests and experiments now being conducted for the purpose of coconut production increase in the three municipalities as mentioned in the preceeding sub chapters.

Taking these elements into consideration, the future production of rice and coconuts have been estimated as follows:

RICE

With the completion of irrigation system development projects, the successful accomplishment of Masagana 99 program and the introduction of agricultural technologies for production increase, the yield of rice is estimated to increase to 4950 kilograms per hectare (the Masagana 99 target) in 1992 and to 10,000 kilograms per hectare by the year 2000. Due to the conversion of coconut orchards into rice paddies by the completion of irrigation systems and the loss of paddies due to urban development, rice cultivation area will be 2,565 hectares (see Technical Report No. 5). Presently, agricultural land area (net) is 2,279 hectares which is 80.8% of gross agricultural land area (including unexploited land and canals). The farm ratio will be improved from said 81% to 92% by the year 2000 through the intensification and high density utilization of land. Estimated rice yield of 23,600 M.T. per year at 2000 is supposed to help IRM to be food self-sufficient (Tables 1.3.1 and 1.3.2).

COCONUT

Although it is difficult to make a precise forecast of future coconut production increases, the production is estimated to increase from the 41.628 tons (copra base) in 1983 to 63,754 tons by 1992 and to 93.312 tons by the year 2000, in view of the 5% per annum production increase target of the Philippines and of the above discussed efforts for productivity improvement (Table 1.3.3).

The IRM represents only 30.7% of the total coconut production in the three municipalities (in 1983). Coconut cultivation area in the IRM will shrink from the 3,250 hectares in 1983 to 2,178 hectares (see Land Use Plan) due to urban development but this reduction will little affect the total production quantity of the three municipalities.

Table 1.3.1 Paddy Production (IRM)

	Yield (kg/ha)	Paddy Field (ha)	Production (mt)
1983	2,375	2,279	5,413
1992	4,950	2,330	11,500
2000	10,000	2,360	23,600

Source: JICA Study Team

Table 1.3.2 Paddy Field

	1983	1992	2000
Paddy Field (Gross, ha)	2,819 ha	2,682 ha	2,565 ha
Net Rate	81 %	87 %	92 %
Paddy Field (net, ha)	2,279 ha	2,330 ha	2,360 ha

Source: JICA Study Team

Table 1.3.3 Coconuts and Copra Production

	1983			
	Coco Plantation (ha)	Yield (nuts/ha)	Harvest (1000 nuts)	Copra (mt)
Polillo	32,570	4,324	140,835	31,297
Three Municipalities	12,088	3,846	46,488	10,331
IRM	3,250	4,387	14,258	3,169
Polillo and Three Municipalities	44,658	4,208	187,323	41,628
1992				
Polillo	32,250	6,708	218,480	48,551
Three Municipalities	11,467	5,966	68,412	15,202
IRM	2,629	6,806	17,893	3,965
Polillo and Three Municipalities	44,037	6,515	286,892	63,754
2000				
Polillo	32,570	9,911	322,800	71,733
Three Municipalities	11,016	8,815	97,106	21,579
IRM	2,178	10,055	21,900	4,867
Polillo and Three Municipalities	43,856	10,136	419,906	93,312

Source: JICA Study Team

The crushing capacities of coconut oil mills existing in Metro Manila and Laguna/Quezon area are listed in Table 1.3.4 which indicates that 40,000 ton mill can be considered as a medium sized mill. Such an oil mill will be feasible in the IRM if all coconut production of Polillo Island can be brought to IRM even if some of the coconuts produced in Real will be shipped to Laguna, etc.

Discussions heretofore can be summarized into the following agricultural production improvement programs for IRM:

(i) Rice

The productivity of rice is to be improved through the completion of the presently implemented Agos River Irrigation System Rehabilitation Project and through the extension of agricultural technology. For the purpose of intensive rice cultivation intensive readjustment of paddy field will be carried out.

(ii) Coconut

Approximately 1,000 hectares of coconut orchards will be converted for increased rice production purposes or urban development but the groups of orchard to remain in IRM will be intensified and improved through replanting and the introduction of new varieties.

(iii) Vegetables, Fruits, and Livestock

In addition to rice production increases, critical to the self-supply of food in IRM will be the increases of production of vegetables, fruits and livestock to the levels adequate to feed the future population of 100,000 to 150,000.

Table 1.3.4 Crushing and Storage Tank Capacities
of RP Coconut Oilmills (As of
December 30, 1982)

		Crushing Capacities		Storage Tank Capacities	
		Daily Rated Capacity (Copra MT)	Annual Rated Capacity (Copra MT)	Crude Oil (MT)	Coco (MT)
METRO MANILA					
PLANT SITE					
1. Imperial Veg. Oil Co.	Pandacan, Manila	310	93,000		4,000
2. Internationa Oil Factory	San Juan, Metro Manila	288	86,400		700
3. Metroplex Commodities	Muntinlupa, Metro Manila	275	82,500		3,500
4. Procter & Gamble, PMC	Tondo, Manila	250	75,000		2,400
5. Phil. Refining Co.	Paco, Manila	250	66,000		2,700
6. Royal Ind'l. Dev. Corp.	Murphy, Quezon City, M.M.	210	63,000		1,500
7. Central Veg. Oil Co.	Paco, Manila	150	45,000		2,000
8. Liberty Oil Factory	EDSA, Quezon City, M.M.	100	30,000		1,600
9. Crystal Oil Milling	Tandang Sora, Quezon City, M.M.	100	30,000		500
		1,903	570,900		18,000
LAGUNA/QUEZON AREA					
10. San Pablo Mnfg. Corp	San Pablo City	500	150,000		2,550
11. Lucena Oil Factory	Lucena City	340	102,000		3,780
12. Coco-Chemical Phils. Inc.	Atimonan, Quezon	268	80,400		5,700
13. Royal Mnfg. Corp	Lucena City	125	37,500		800
14. Southern Luzon Coconut Oil Mill	Mulanay, Quezon	200	60,000		6,900
15. PCY Oil Mnfg. Corp	Sta. Cruz, Laguna	150	45,000		1,000
16. New Sun-Ripe Coconut Prod.	Magdalena, Laguna	55	16,500		400
17. Red V Cocnut Product	Lucena City	50	15,000		920
18. Atson Coco, Inc.	San Pablo city	50	15,000		100
19. Unideco Consolidated Mfg.	Lucena city	50	15,000		800
20. Laguan Insular Commercial	Cabuyao, Laguna	50	15,000		500
21. Peter Paul Phils. Corp.	Candelaria, Quezon	40	12,000		400
22. Mina Oil Mills	Cabuyao, Laguna	25	7,500		200
23. Blue Bar Coconut Phils.	Tiaong, Quezon	27	8,100		200
24. Franklin Baker Co.	San Pablo City	27	8,100		200
25. People Ind'l & com'l Corp.	Cavite City	25	7,500		300
26. Quezon Cahmion Oil Mill	Candelaria, Quezon	25	7,500		300
27. Apo Oil Mill	Candelaria, Quezon	25	7,500		300
Sub-Total		2,032	609,000		25,250

Source: Industry report to UCAP

2. FISHERIES DEVELOPMENT PLAN

2.1 Present Status

2.1.1 Fishermen and Fish Landing

1) Fishermen and Fishing Boats

The results of Field Survey (1983) and FIDC data (1980) are shown in Tables 2.1.1 and 2.1.2. respectively. Number of fishermen is slightly increased, 44 persons, during these three years. Number of fishing boats (banca) is also increasing from 520 boats in 1980 to 591 boats in 1983.

General Nakar has small number of fishermen. Number of fishhouses and fishermen in Real shows a large difference which is understood because many fishermen's main living source is agriculture. Fishermen in Infanta is mainly engaged in fishery only.

Fishermen per boat indicates some meaningful difference of Real from others, that is 2.4 in Real, 1.8 in Infanta, and 1.3 in General Nakar.

2) Fishing Boat Size

Most of the boats engaged in local fishery are bancas with a length of 32 feet or less and are operated by a crew of two to four. The smallest is a 7-foot boat without motor power. Boats for river fishing are 7-feet, non-powered, without an out-rigger and are found only in Infanta.

Commercial fishery is now carried out only in Real and the average size of boats used is 8 tons.

Table 2.1.1 Number of Fishermen and
Fishing Boats (IRM, 1983)

	Number of Fishhouse	Number of Fishermen	Number of Bancas		Total
			w/ Motor	w/o Motor	
Infanta	303	496	210	70	271
Real	168	697	243	49	292
General Nakar	34	37	23	5	28
Total	505	1,230	467	124	591

Source: JICA Study Team

Table 2.1.2 Number of Fishermen and
Fishing Boats (The Three
Municipalities, 1980)

	Number of Fishermen	Number of Bancas		Total
		With Motor	Without Motor	
Infanta	680	180	60	240
Real	506	255	25	280
General Nakar	-	-	-	-
Total	1,186	435	85	520

Source: FIDC

3) Fish Landing

According to the statistics of Real Office of BFAR, the quantity of fish landing at Landing Centers for Infanta-Real and Polillo are 34,485 kilograms of local fishery and 147,542 kilograms of commercial fishery for a total of 182,027 kilograms in 1982. Because this quantity is estimated at 60% of the total landing in the Area, the total landing quantity is estimated at about 303 tons.

According to another BFAR data, the quantity of fish landing in Infanta Fisheries District is 1009.3 tons of local fishery and 134.3 tons of commercial fishery, for a total of 1,143.6 tons.

Also according to FIDC data, total catches are varied in range of 248 tons to 2580 tons (see Tables 2.1.3 and 2.1.4).

There is no concrete evidence available to determine which of the above varying sets of data is most reliable. Thus, using information revealed through interviews with fishermen, the quantity of fish landing in Infanta-Real Area is roughly estimated around 1900 tons per year as follows:

(i) Number of fishing boats in Infanta-Real totals 591;

(ii) Number of operational days totals 200 days per year;

(iii) Average daily catch totals 16 kilograms (an estimate based on the average daily catch of 3 to 30 kilograms by gill netting and pole-and-line fishing, the major fishing activities);

- (iv) Estimation formula:
 $16\text{kg} \times 200 \text{ days} \times 591 \text{ boats}$
 $= 1891 \text{ tons}$

Likewise, the quantity of fish landing on Polillo Island where fishery operation somewhat differs from that in Infanta-Real Area is roughly estimated 4800 tons as follows:

(i) The total number of fishing boats in Polillo is estimated at 932 from BFAR statistics, of which 391 are believed to be small, non-powered boats. Thus, the number of boats engaged in the major activities such as: gill netting, pole-and-line fishing and bag netting is estimated at 550 of which 30 are engaged in bag netting during the anchovy season.

(ii) The number of days consumed for fishing using the anchovy bag netting is estimated at 60 which is half of the season from July to October. For gill netting and pole-and-line fishing, the number is estimated at 200 per year.

(iii) Expected catches by the anchovy bag netting is in a range of 400 kilograms and 2500 kilograms and average catch is assumed as 1500 kilograms. Gill netting or pole and line catches -30 kilograms and average catch is considered as 20 kilograms.

- (iv) Estimation formula:

$$1,500 \text{ kg} \times 30 \text{ boats} \times 60 \text{ days} + 20 \text{ kg} \\ \times 200 \text{ days} \times 520 \text{ boats} = 4,780 \text{ tons}$$

As thus estimated, the total fish landing in Infanta-Real and Polillo as a whole roughly comes 6700 tons per year.

Table 2.1.3 Fish Unloading in IRM
(According to FIDC)

	1978	1979	1980	1981
Infanta	-	277 ^t	177 ^t	-
Real	1,654 ^t	855	345	248 ^t
Sub-total	1,654	1,132	522	248
Polillo	-	323	42	-
Total	1,654 ^t	1,455 ^t	564 ^t	248 ^t

Source: FIDC

Table 2.1.4 Fish Unloading in IRM
(According to Another
Information of FIDC)

Real	1,500 ^t	
Infanta	1,080 ^t	
Sub-total		2,580 ^t
Polillo	2,260 ^t	
Burdeos	350 ^t	
Jomalig	420 ^t	
Sub-total		3,030 ^t
Other Area	190 ^t	190 ^t
Total		5,800 ^t

Source: FIDC

2.1.2 Fishery Activities and Catches

While one of the major fishing activities in Polillo is being done with the use of bag netting and pole and line fishing are being used for the major fishing activities in Infanta-Real Area. Fishing activities in Infanta Real Area and main catches are explained below.

1) Fishery at Sea

(1) Gill Net

a) Drift Gill Net

The five pieces of nylon nets are connected to form a 200 to 500-meter drifting fill net. Nets are available in three mesh sizes: 4 to 5 inches, 1.5 to 2 inches, and 1 inch or less. The boat has a crew of 4 (Fig. 2.1.1).

Four to Five Inch Gill Net

Fishing grounds are in Polillo Narrows. Fishermen from Infanta and General Nakar fish in waters north of Agos River estuary. Fishing grounds are mostly three to fifteen fathoms deep, but operation is possible down to 50 fathoms. Major catches are tuna and kaiwari (saurel family) totalling 3 to 15 kilograms, or sometimes 400 to 500 kilograms caught in one operation (one day or one night).

1.5 to 2 Inch Gill Net

The location and depth of the fishing grounds are the same as above, but in Polillo most of them measures 12 fathoms deep. Main catches are three-spined sticklebacks, saurel and mackerel. Daily catch is reported to total three to seventeen kilograms.

One Inch or Less Gill Net

The fishing grounds are also located in the Polillo Narrows but has shallow waters from one to seven fathoms. Main catches are sardines and gray mullets. Daily catch is from 10 to 30 kilograms with a minimum of fifty (5) kilograms.

Largaretta (Sardine Gill Net)

In addition to the above, Polillo fishermen use a unique sardine gill net called largaretta which is 16 fathoms long and 14 fathoms deep. The net is hung along the boat and is illuminated from the other side so as to attract fish into the net. the season is November to about April.

b) Bottom Set Gill Net

The size and fishing grounds for bottom gill nets are about the same as drift gill nets. The net is used for catching a wide variety of fishes, namely: barracuda, offshore sardine, saurel, mullet, crabs, etc. (Fig. 2.1.2).

(2) Pole-and Line Fishing

Pole-and-line fishing is the major activity in local fishery, mostly with use of a 32-feet, 2-men boat. Fishing grounds are located in the Polillo Narrows, particularly the waters north of Agos River estuary. Coastal waters around Polillo Island are good pole-and-line fishing grounds. The Union Reef and Yellow Rock located at the mount of Polillo Bay are particularly good fishing grounds for Groupers.

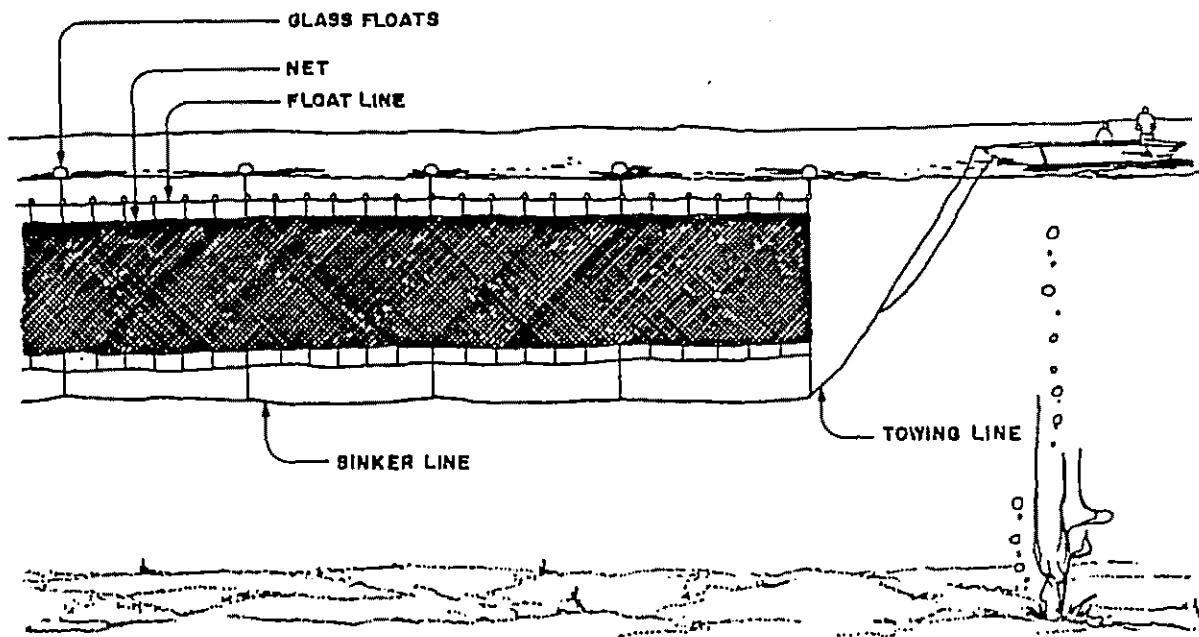


FIG. 2.1.1 A DRIFT GILL NET

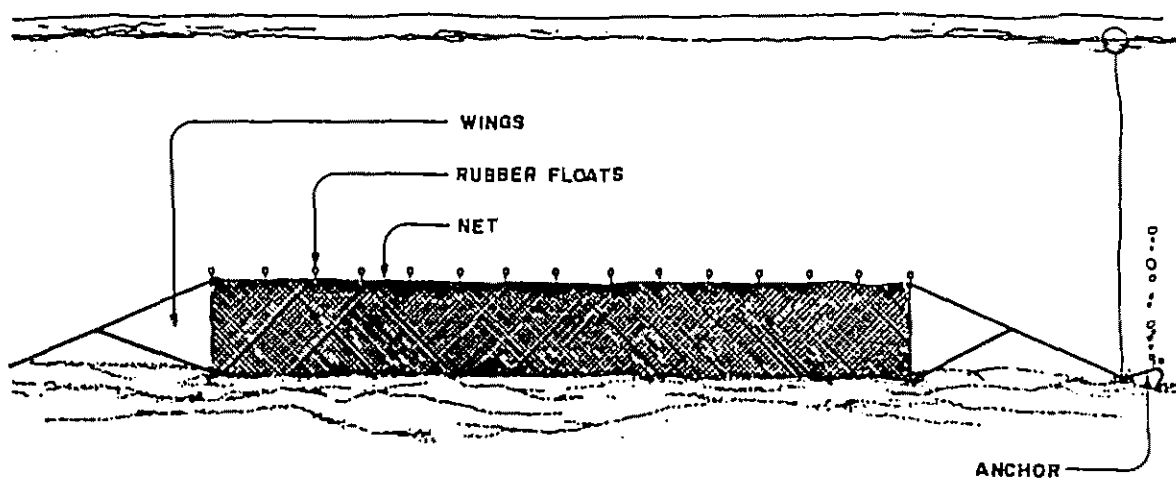


FIG. 2.1.2 A BOTTOM SET GILL NET

The depth of fishing grounds varies depending on the kinds of fish to be caught but measures usually from 20 to 60 fathoms. Because of the sea condition, especially from March to September, about four operations per week is usual. Daily catch per the 2-men boat is from 10 to 30 kilograms. Major catches are Spanish mackerel, saurel, barracuda, mullet, three-spined stickleback, sea breams, groupers, frigate mackerel, etc. Of these fishes, saurel family fishes account for the largest quantity.

(3) Bag Net

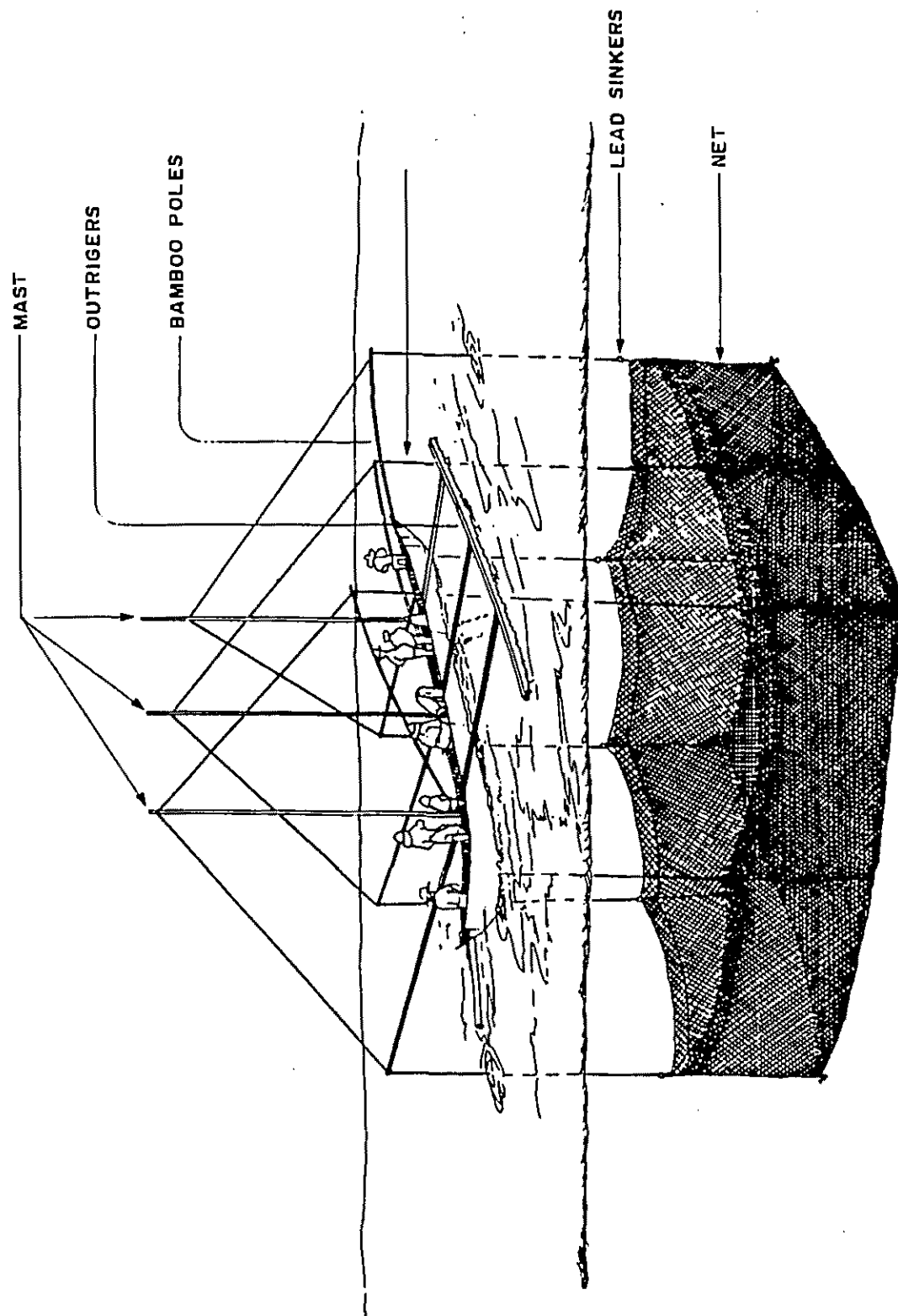
Bag net is a square net hung from each of the two bamboo poles projected from both sides of banca. The length of the net depends on the size of the banca, but is usually from 30 to 50 feet. The brightness of the fishing light is adjusted when fish gathers near the light so as to guide the fish into the net, and the net is raised (see Fig. 2.1.3).

The major catch is the dark anchovy called Indian anchovy, taukang, (*Stolephorus indicus*). The season is July to October. August and September are considered the best months to catch saurel.

To catch fish, fishermen sail out before the sun sets and work until the sun rises. They do not work in the moonlight because of the need of light to lure fish into the net. Nightly catch is from 20 to 100 five-gallon cans or kilograms. Anchovies are mostly dried, and the weight ratios is four to five kilograms of raw fish to one kilogram of dried fish.

(4) Beach Seine

Beach seines are mostly not so large, with a sleeve of 40 to 60 fathoms and a bag about four fathoms. The mesh is usually one inch or smaller. Seine is operated by eight to ten fishermen, often with the help of their families. Fishing by seine is often done in the early hours of the morning, but is also done during daytime if the sea is calm (see Fig. 2.1.4).



A TYPICAL BAG NET

THE MASTER PLAN STUDY OF THE INFANTA - REAL AREA
URBAN DEVELOPMENT PROJECT

FIG. 2.1.3 BASNIG (Pillipino)

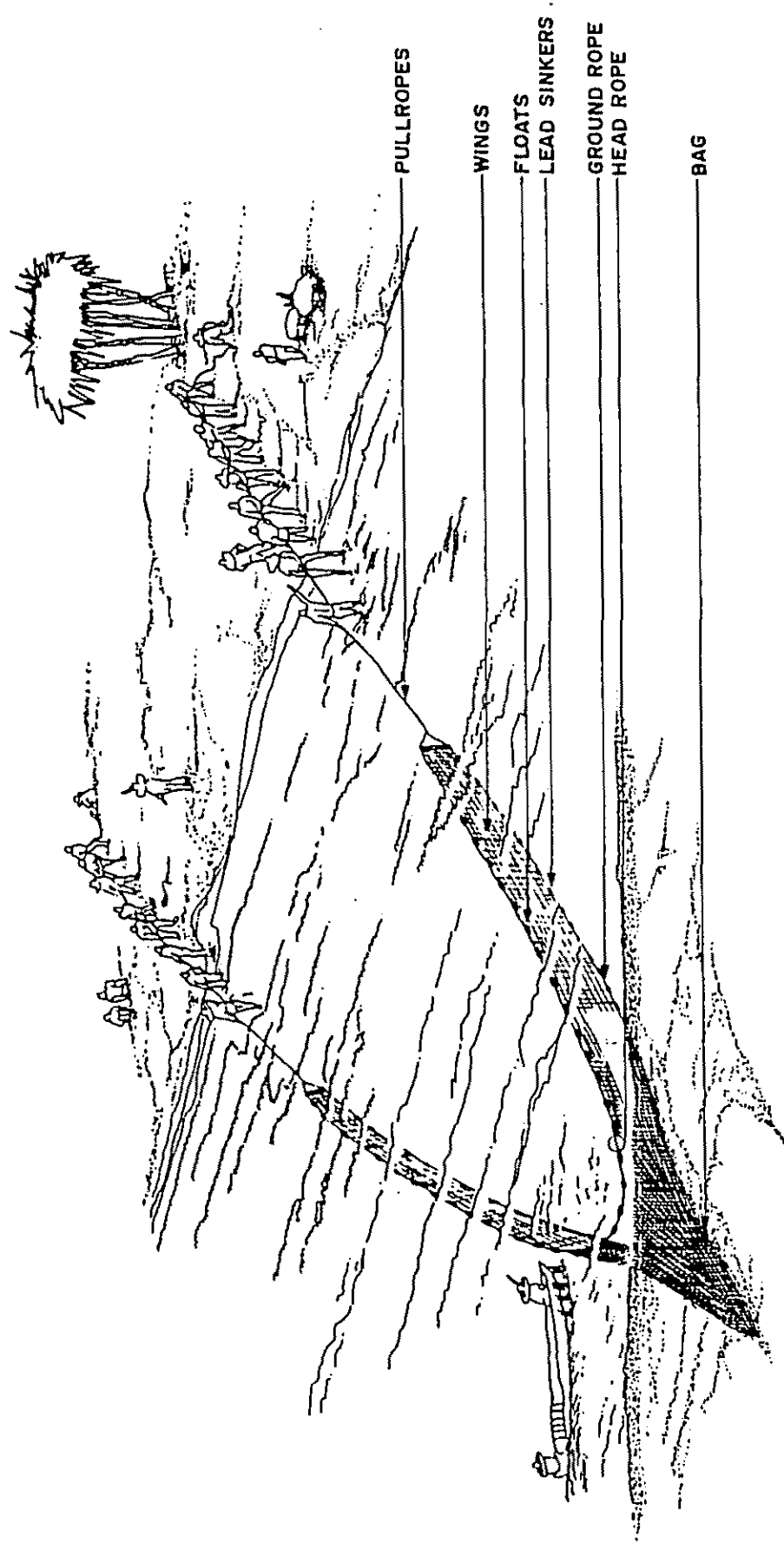


FIG.2.1.4 PUKOT (Pilipino), A TYPICAL BEACH SCENE

A large variety of fish is caught with a seine from small pelagic surface fishes such as anchovy, offshore sardine, saurel, white sillginoid, grunt, grouper, rabbitfish, sea bass, frigate mackerel, yellowfin tuna, squid cuttlefish, prawn and shrimp, lobster and, at times even turtle.

(5) Bottom Set Longline

Bottom set long lines are not used much, but are used to catch demersal bottom fishes. Catches are mostly groupers, grunt, gizzard shad and sea breams.

(6) Fish Corral

A fish corral is a fishing gear similar to the fixed net, except that the fish corral is made of primitive palisades of tree branches or wire mesh, instead of a net. Fish corrals are often seen in Southeast Asia (see Fig. 2.1.5). Catches are fishes which come to very shallow waters at high tide, such as mullet, gray mullet, sillaginoid shrimp, prawn, crab, and squid.

(7) Miscellaneous Gears

In addition to the above, troll lines are used to catch frigate mackerel and yellow-fin tuna. Spears, traps, filter nets and fish nets are also used in small scale primitive fishing to catch barracuda, grouper, sea breams, turbot, shrimp, prawn, crab, and squid.

Fresh water fishing is done in Agos River with the use of a fish shelf called saplag in the local language, a troll line called talakitok, and a stationary pole called pamitin, as well as a longline. The catches are only enough for home consumption.

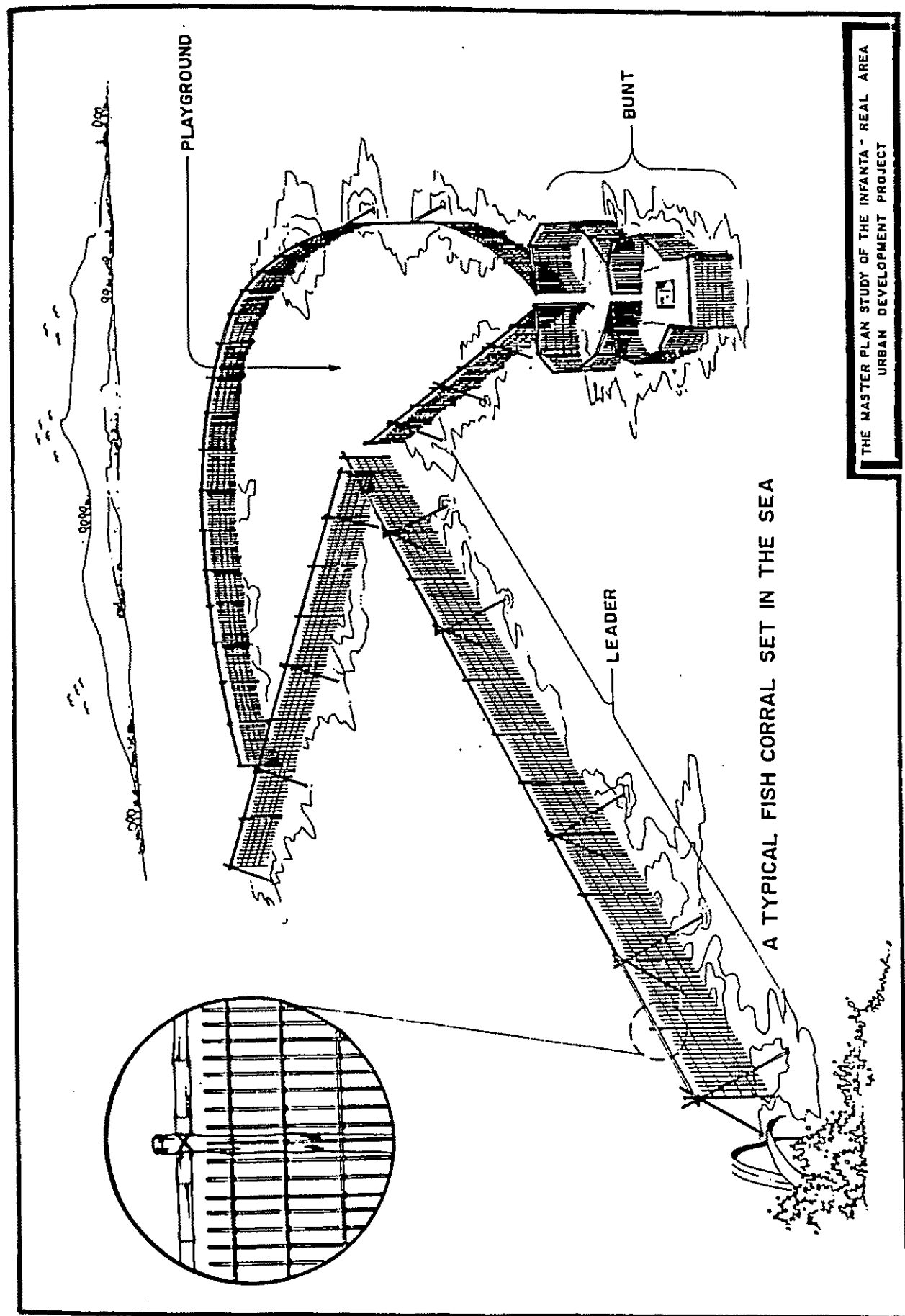


FIG. 2.1.5 BAKLAD (Tagalog)

2.1.3 Distribution

Several fish dealers operate in Infanta, Real, and Polillo. They purchase fish from fishermen, pack the fish with ice in small lots, and carry it to the consumption areas using jeepneys. The purchase price is mostly left to these middlemen, who provide fishermen not only with funds for banca construction, but also living expenses. In the absence of an ice plant, ice in wooden or styrol boxes is bought from Santa Cruz by jeepney and like for the price of 30 to 40 Pesos. Registered vendors sell fish for local consumption.

There are eleven (11) designated landing centers in Infanta: 5 in Real; 6 in General Nakar for the study area total 22; and 37 in Polillo Islands for a grand total of 59. These landing centers, however, have almost no facility.

Fishes are classified into four classes for pricing, and their landing price (to fishermen) and wholesale prices are Twelve Pesos (P12.00) per kilogram for Class 1 fishes, Eight (8) to Twelve (12) Pesos for Class 2, Seven Pesos (P7.00) for Class 3 and Four (4) to Six (6) Pesos for Class 4.

Class 1 fishes included grouper, gray mullet, red snapper, sillaginoid, Spanish mackerel, sabahi, cuttlefish, and so forth totaling 18 kinds of fish. Class 2 includes barracuda, grunt, saurel, yellow fin tuna, etc. for a total of 20 kinds. Classes 3 and 4 include sardine, offshore sardine, trubot, goby, and so forth totalling 35 kinds (according to Real Office of BFAR).

2) Fish Pond Fishery

In Ifanta-Real area, 89 entities are engaged in pond fishery using a total registered area of 978 hecaters, privately owned or leased from the National Government, according to BFAR statistics. Difference between the 978 hectares and the 680 hectares indicated by on-the-map survey using a planimeter is probably because the fair porportion of registered area is not clearly set off as a fish farm. Cultured in these fish farms are milkfish and a very limited quantity of tiger prawn.

No statistics is available and the estimation for production quantities is difficult, but judging from the very extensive state of the activity, average milkfish production is estimated at 50 to 70% of the ponds allotted to prawns are said to produce 30 kilograms per hectare, and assuming 20% are amixture of prawns in milkfish ponds, the production is only about 6 tons.

2.2 Development Potentials

Fishery development, as a part of the urban development in Infanta-Real area, can be oriented in three different directions: (i) development through assistance given to fishermen in the area including Polillo; (ii) development through the establishment of a fishery base for the exploitation of fishery resources in Pacific waters; and (iii) development through the improvement of fish farming.

As for the first direction, much cannot be expected unless the fishermen will break away from the present minute scale banca fishery and primitive style of livelihood by aggressively improving their fishing methods. However, if adequate funds will be invested, the possibility of achieving a dramatic improvement is high, inasmuch as abundant fishery resources are available.

Practically, in view of the resources and of fishing grounds, about 90 three-five ton FRP boats will be able to be implemented. As for fishing methods, the longlining of tuna is very promising, in addition to the conventional method. Yellow fin tunas and big eye tunas weighing about 30 kilograms can be exported to Japan for consumption as sashimi (raw), and pole-and-line fishing of those tunas will become one of the attractions of local fishery.

Fishermen's income from conventional methods such as gill netting, bag netting, and pole-and-line fishing shall be dramatically increased through: (i) expansion of operational area; (ii) increase of operational days; and (iii) improvement of operational efficiency by the mechanization of fishing activities and, through continuous operation, be able to keep the catch fresh for a longer time, by the installation of fish tanks.

As of the second direction, immediate coastal fishery has now become one of the fishery activities because faster and larger fishing boats have been introduced. Even though it is appropriate to divide Pacific waters within the territorial waters of the Philippines into three (3) marine zones for the purpose of commercial fishery, particularly round haul netting, longlining, gill netting, and trawling of pelagic fishes in such waters, there is no fishery base in the northern Pacific coast of the Philippines as shown in Fig. 2.2.1. Therefore, fishery development in Pacific waters must begin with the development of a fishery base at the most suitable location of the Pacific.

Thus, the construction of a fishing port in Infanta-Real area at which the Pacific coast can be reached within a minimum of time and distance from the great consumption area of Manila, and the development of this port into a fishery based shall be feasible and important to fishery development in the northern Pacific coastal waters of the Philippines.

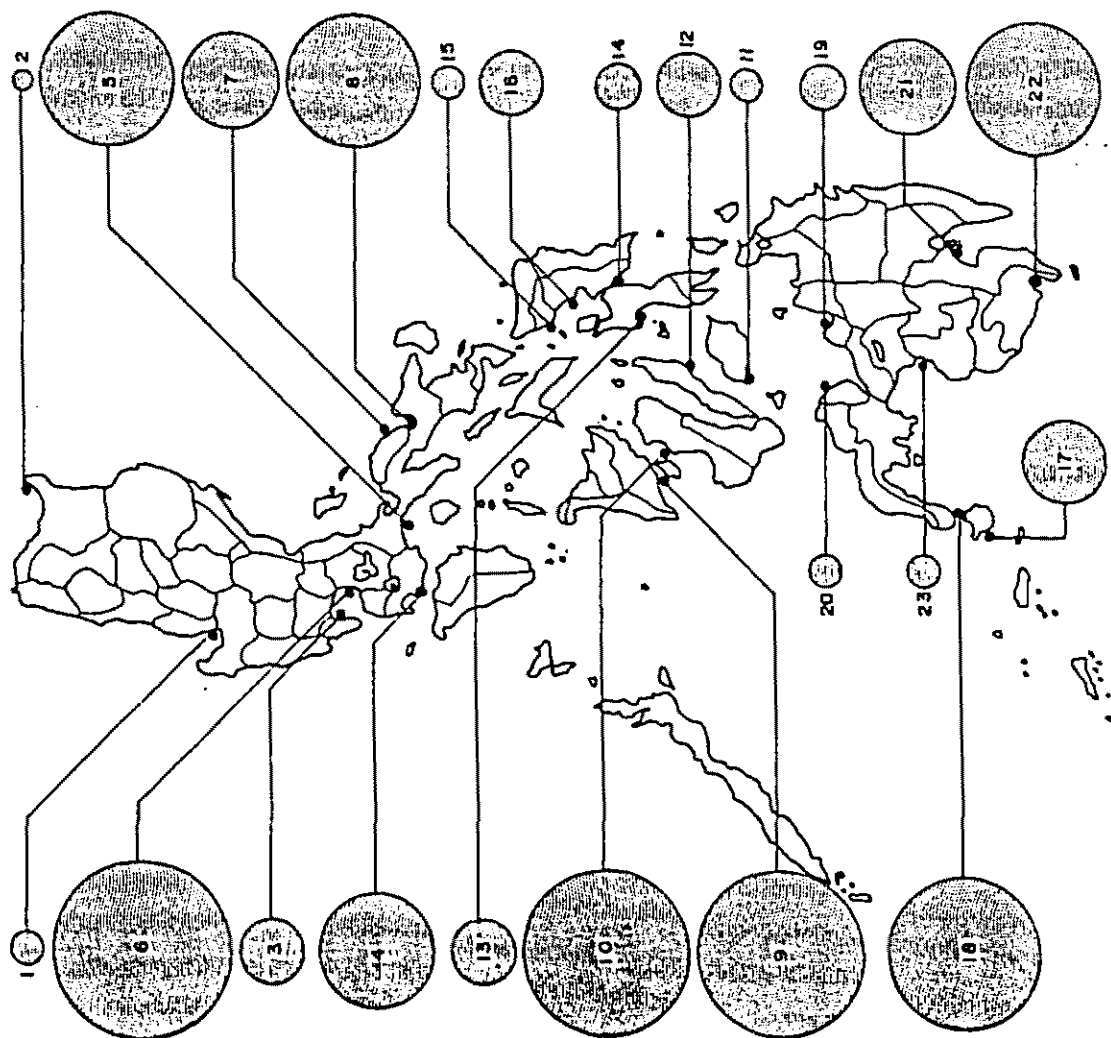
For fishery development in Pacific waters, much can be expected from round haul netting without using payau (the type which uses payau cannot grow much due to the sea condition), particularly the sardine, saurel, and mackerel whose fishing grounds have moved southwards and away to a time and distance of four days from Manila. Therefore, round haul netting of these fishes shall start earlier than other activities and shall be followed shortly by the start of round haul netting of bonito and tuna.

Half of the total pelagic (surface fish) catch in Pacific waters are estimated at 60000 tons of bonito and tuna and 100,000 tons of sardine, saurel and mackerel or 30,000 tons and 50,000 tons, respectively shall be landed at Real Port, when opened.

As for the third direction, a total of 1,500 hectares of fish farms can be expected to become available by developing 600 hectares or one-third (at a maximum; because of regulatory forestry resource and marine life hatching ground protection), of the presently unexploited 1,800 hectares of the total 2,800 hectares of mangrove swamps found in Infanta-Real area in addition to the existing fish farms of 978 hectares.

QUANTITY OF MARINE FISH LANDED BY COMMERCIAL FISHING VESSELS BY MAJOR LANDING SITES

LANDING SITE	QUANTITY (MT.)
1. DAMORTIS, LINGAYEN GULF	720
2. STA. ANA, BABUYAN CHANNEL	396
3. ABUCAY, MANILA BAY	2900
4. BATANGAS CITY, BATANGAS COAST	8028
5. LUCENA CITY, TAYABAS BAY	14977
6. NAVOTAS, METRO MANILA	14725
7. MERCEDES, SAN MIGUEL BAY	6312
8. NAGA CITY, SAN MIGUEL BAY	17146
9. ILOILO CITY, GUIMARAS STRAIT	51937
10. BACOLOD CITY, GUIMARAS STRAIT	51819
11. TAGBILARAN CITY, BOHOL STRAIT	950
12. MANDAUE, CAMOTES SEA	2792
13. ORmoc CITY, CAMOTES SEA	2182
14. TACLOBAN CITY, LEYTE GULF	1290
15. CALBAYOG, SAMAR SEA	882
16. CATBALOGAN, SAMAR SEA	2061
17. MALUSO	3446
18. ZAMBOANGA CITY, BASILAN STRAIT, Z. DEL SUR	32474
19. OPOL, MACAJALAR BAY, MISAMIS ORIENTAL	1096
20. ORCQUIETA, ILIGAN BAY, MISAMIS OCCIDENTAL	779
21. DAVAO CITY, DAVAO GULF	6132
22. GEN. SANTOS, SARANGANI BAY, COTABATO	14263
23. PARANG, MORO GULF, COTABATO	754
TOTAL	371061



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FIG.2.2.1 COMPARISON OF MARINE FISH LANDED BY COMMERCIAL FISHING VESSELS BY MAJOR LANDING SITES

The price of milkfish, the main fish now cultured is low and its extensive cultivation is difficult since it feeds on plankton. Therefore, substantial increase in the production value of milkfish per unit farm area cannot be expected.

It is believed that utilization of the entire 1,500 hectares of fish farm for the cultivation of black prawn, sugpo (*penaeus monodon*), whose productivity is high and can be a foreign exchange earner through exportation, and thus, provide a large number of employment opportunities including those engaged in its processing, is much preferred. An annual production of 5,000 tons of prawn can be expected through extensive cultivation of the 1,500 hectares.

Also possible is the fish cultivation in creeks and mangrove swamp areas. In Polillo bay, cultivation is through the use of pens or cages. Oyster culture is another possibility on the east coast of Polillo Island but little can be expected from fresh water fish culture.

When fishery development has been accomplished in all of these three directions, the following shall become indispensable: ice making; refrigeration; freezing; prawn processing; and tuna and sardine canning facilities. If anchovy landing shall sufficiently increase, fishmeal and fish feed factories may also become necessary and if agar-agar and oyster culture shall flourish, factories for their processing may be needed.

Therefore, the development plans shall include the establishment of public and private office spaces, a radio station, ice making, refrigeration and freezing facilities, canning factory, slipway for fishing boat repairing, and engine and fishing gear repair shop, oil and water supply facilities, and cafeteria and welfare facilities for fishermen and factory workers in addition to the fishing port itself with landing facility and fish market. Maintenance of the freshness of fish before distribution is an important key to fishery development. Therefore, road development shall be a prerequisite to successful development to minimize time and distance of distribution.

2.3 Development Plan

In view of the following present condition of the fishery industry in the Philippines: its characteristics; resources evaluation; the state of Infanta-Real area; and the orientation and potentials of fishery development as a part of urban development in said Area, a fishery development plan was conceived for said Area.

2.3.1 Fishery at Sea

1) Fishery Development Research Boats

One 100-ton and one 20-ton multi-purpose fishery development research boats (FRP) shall be constructed for use in accelerating fishery development in Pacific waters particularly bonito, tuna, sardine, saurel, and mackerel. Twenty five 3-ton and 5-ton multi-purpose research boats (FRP) shall be constructed and for each of the following areas, 5 boats shall be assigned: Infanta, Real and General Nakar. At Polillo, 10 boats shall be assigned for use in redeveloping local fishery.

The 100-ton boat shall be designed for use in experimental operations like round haul netting, longlining, bag netting, gill netting, upright longlining, pole-and-line fishing, and trawling. It shall be equipped for conducting marine biological and resource research. If necessary, this boat shall also be utilized for carrying people, refrigerated fish, or sundry supplies. The type that does not use payau shall be emphasized on for round haul netting. Catch of large tunas shall be emphasized for longlining. The 20-ton boat shall also be used in a similar manner.

The 3-ton and 5-ton boats shall be used for experimental gill netting, longlining, pole-and-line fishing, trawling, and if necessary for carrying people, sundry supplies or other goods, and for miscellaneous chores.

2) Local Fishery

When the potentials of redeveloping local fishery has been proven by the experimental operation of the 5-ton and 3-ton research boats, modern fishing boats shall be introduced to replace the old boats. Such new boats shall include 50 of 5-ton boats and 50 of 3-ton boats, for a total cost of approximately 2,300 Million Yen inclusive of building and equipping costs. A total landing of 6,400 tons of 64 Million Pesos per year can be expected by these new boats.

If the present level of landing estimated at 10,500 tons per year is expected to increase by 30% to 13,600 tons of 136 Million Pesos per year, total fish landing, together with catch by the new boats, shall total to about 20,000 tons or 200 Million Pesos per year.

3) Commercial Fishery

With the feasibility of developing fishery in Pacific waters, particularly the round haul netting without payau, tuna longlining, and pole-and-line fishing, the use of the 100-ton research boat and the introduction of possibly about ten (10) commercial fishing boats can be expected. All of the ten new boats are assumed to be 40-ton boats such as described, which are more easily acquired than 100-ton boats:

Then, total commercial fish landing by the 10 boats, which will be built and equipped for the cost of about 1,440 Million Yen, will be 7,000 tons or 70 Million Pesos per year.

4) Fishery Base

The facilities required for the port to function as a fishery base shall include a landing center, fish market, public and private office spaces, radio station, ice, refrigeration, and freezing facilities, prawn processing and canning factories, stockpile yard, fish net drying yard, fish net repair shop, engine and gear repair shop, slipway, and oil and water supply facilities. The land needed for the construction of these facilities shall together with space for road, parking, and planting, be about 11.5 hectares.

The fish market, which shall be the central area in fish distribution, shall be administered by the Philippine Fish Market Authority (PFMA), who shall sell the fish through brokers (not the presently operating middlemen) by auction. Depending on the level of development, a retail fish market may also be established.

The estimated quantity of fish landing upon the completion of Real Port is shown in Table 2.3.1.

Assuming that the quantity of ice needed to pack the above estimated quantity of fish shall be one to one, and that ice shall be made at one location, ice making, refrigeration, freezing, and processing (including cultured prawn) facilities will be required as shown in Table 2.3.2.

Estimates on Table 5B assume centralized operations, but particularly with regard to ice making, small ice plants with a daily capacity of 5 to 10 tons may become necessary each in Infanta and Real, and even in General Nakar, where a small jetty shall be erected for loading ice into fishing boats.

Table 2.3.1 Expectable Catches and Unloading Amount in Real Fishing Port

	Bonito, Tuna	Sardine, Horse Mackerel	Constal Fish	Total
Total Fish Catch in Pacific Ocean Region	60,000	100,000	100,000	260,000
Unloaded Amount of Fish in Real Fishing Port	20,000	30,000	10,000	60,000
Fresh	2,000	7,200	7,500	16,700
Frozen	6,000	18,000	-	7,800
Canned	12,000	18,000	-	30,000
Processed (Salt Dry, Meal)	-	3,000	2,500	5,500

Source: JICA Study Team

Table 2.3.2 Processing Facilities of Catches

	Site Area	Factory Building Area	Capacity	Employee
Ice Plant	6,000 m ²	1,400 m ² 2 Story	300 ton/day Ice Storage	240 Persons
Freezin Plant and Cold Storage	10,000 m ²	3,400 m ²	35 ton/day	170 Persons
Canning Factory	25,000 m ²	10,000 m ²	130 ton/day Raw Material	1800 Persons
Prawn Processing Factory	3,000 m ²	1,000 m ²	15 ton/day Raw Material	150 Persons

Source: JICA Study Team

5) Fishery Training Center

A fishery training center is proposed for the purpose of training and developing local fishery leaders through lectures and practical exercises by the following 3-month courses:

- (i) Fishing boat operation and navigation;
- (ii) Operation, maintenance, and repair of engine and equipment;
- (iii) Marine products processing.

If 20 trainees are enrolled in each course, the number of trainees shall be 60 per year, and if the training shall be started in 1986, a cumulative total number of about 900 shall be through with their training in 15 years by the year 2000.

The scale of the proposed training are presented in Table 2.3.3.

6) Bonito/Tuna Research Institute

The establishment of a bonito/tuna research institute is proposed as the permanent base for conducting research, in collaboration with the Japanese tuna research organization and SEAFDEC of Bangkok, for the purpose of protecting and developing bonito/tuna resources in the Pacific waters, which shall be of vital importance to the Philippines, and other participating fishery nations, inasmuch as bonito and tuna are "international" migration fishes.

Table 2.3.3 Fishery Training
Center

	Site Area	Building Area	Employee
Administration Office	800 m ²	200 m ²	
Trainees' Dormitory	500 m ²	120 m ²	
Class Room			
Study Room			
Exhibition Room			
Practice Building	500 m ²		
Fishing Tools, Fishing Method		200 m ²	
Engine		100 m ²	
Total	1,800 m ²	620 m ²	15 Persons

Source: JICA Study Team

2.3.2 Pond Fishery

1) Prawn Culture

The plan is to reorganize the total 1,500 hectares of the existing new fish farms into 150 operational entities, each with a farm of about 10 hectares, and to have the 150 entities concentrate on raising prawn by forming a cooperative, which shall establish a hatchery engaged in the centralized hatching of roe supplied by BFAR for distribution to each fish farm. It will be advantageous if the hatchery shall be established in the cultivation center administered by BFAR. Each fish farm will be responsible for the supply of parent prawns for maturing at the center.

The varieties of prawn to be cultured shall be mainly tiger prawn (*Penaeus Monodon*).

Under adequately intensive operation, expected production shall be 5,000 tons per year, based on an estimated production of one to two tons per cycle per hectare and slightly under 2 cycles per year. The value of the 5,000 tons of prawns. The prawns shall be headed, frozen, and exported.

2) Pen Culture

Pen culture is a rather extensive method of fish culture with the use of a pen of 5,000 to 10,000 square meters, set at the depth of 2 meters or more in waters of rather stable bottom mud/sand. Suitable locations are found in the east side of Tictang River estuary in the east of Real and sedimentary parts of creeks running through mangrove swamp areas, where a total of about 50 pens can be set.

Cultured fish shall be mainly plankton feeders such as gray mullet and sabahi, which need no feeding. The naturally available roe of these fishes shall be collected for culture, but fingerlings and youngs can be caught and placed additionally into the pen.

Joint operation of each pen by 5 to 10 fishermen shall be desirable. Cultured fish shall be harvested from time to time as appropriate, and harvest quantity is estimated at about 2 tons per pen per year, for a total annual production, by 50 pens, of 100 tons.

3) Cage Culture

Cage culture is an extensive method of culturing high-priced fishes using a net cage, set at a depth of 5 to 20 meters in relatively fluid waters. A square net with 10-meter sides or a hexagonal net with 5-meter sides (bottom area of 100 to 130 square meters) will be appropriate for culturing relatively small demersal fishes. The depth of net setting and mesh size vary depending on the fish to be cultured, but standard mesh for fingerlings and youngs is half an inch and that for adult fish, 1.5 inches. Including that for fingerlings and youngs, three frame cages are connected into one set, and the fish is placed in the net of progressively larger mesh size as the fish grows larger.

Groupers (lapu-lapu), particularly the high-finned grouper (kalapo cromileptis altiveles), which inhabited around Polillo and the neighboring waters and is one of the most suitable for cage culture, together with rabbitfish (kitang).

Fingerlings and youngs for culture can be temporarily collected in the coastal waters and/or around Polillo Islands, but eventual centralization of roe production at the cultivation center for distribution is aimed.

Many locations suitable for cage culture are found in creeks running through the swamp areas of Infanta-Real Area, where a total of 100 sets of 300 cages can be set. Estimating yearly production at 900 kilograms per cage, total production for 300 cages will be 270 tons, valued at 3,000,000 Pesos. Exportation of live groupers to Hongkong and Singapore is expected.

4) Cultivation Center

The major activity of the center will be the production and supply of fish roe (adjusting production period so that over-harvesting will not result), the provision of guidance on fish farm operators, and the collection and primary processing (cleaning, etc.) of harvested prawns. The center shall have a detachment on Polillo for research and development of cage and oyster culture.

For the production of prawn roe, 60 tanks measuring 10 meters by 10 meters by 2 meters will be necessary.

The center will be manned by six technicians, eight managers, administrative clerks, 15 regular laborers, as well as part time laborers totaling about 300 working days per year.

SUPPLEMENTARY DISCUSSIONS: Fishery Resources

The findings of various surveys conducted on Philippine fishery resources are compared in Fig. 2A. The great variance between these findings indicates the importance of accomplishing a reliable survey prior to the adoption of the recommendations of this Report.

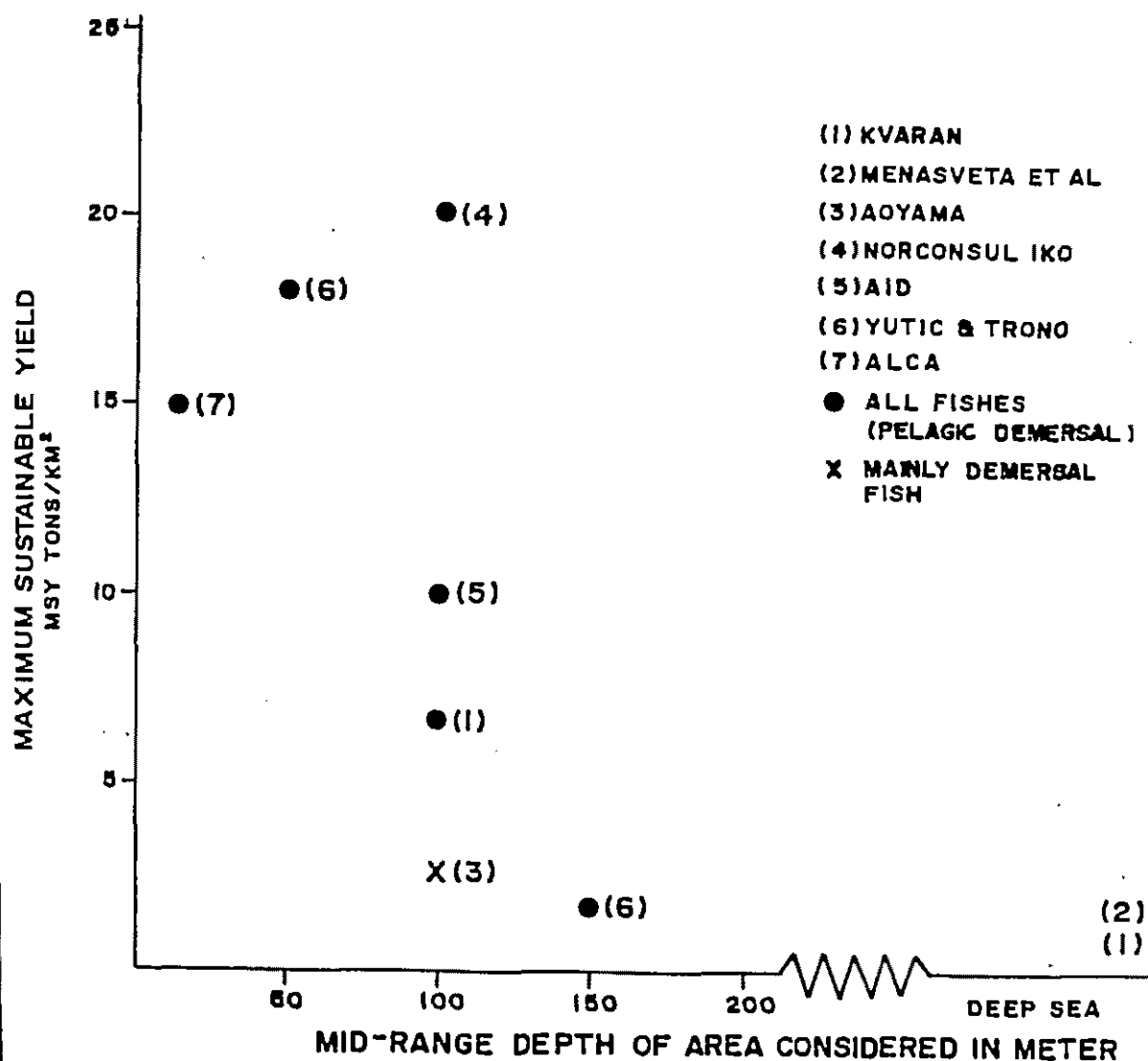
The recommendations of this Report are based on the following assumptions concerning fishery resources:

(i) MSY is 2,200,000 tons, in view of the fish catch totalling 1,250,000 tons believed to exceed MSY by a large margin. Even if fish catch is just being developed, and the quantity of pelagic fish resources in the Pacific waters are assessed as quite large, the coastal fishery is still much backward. If 30% of the 950,000 tons (difference between the 2,200,000 tons and the 1,250,000 tons) will result from the development of a new fishing port on South China Sea coast, the remaining 70% or 760,000 tons can be expected from the development of resources on the Pacific side.

(ii) Of the 670,000 tons, 470,000 tons will be pelagic fishes and 200,000 tons, demersal fishes at the rough ratio of seven to three between the two types of resources as used in resources evaluation. The resources subject to the operation of fishermen in Infanta-Real Area are estimated at several tens of thousand tons of pelagic and demersal fishes, but it is possible that bonito and tuna resources around Polillo Island can be evaluated as larger, when the result of experimental operations conducted by a private Philippine company is considered.

Source		Bottom Type, Depth, and Estimated Area	Estimate Annual Average Productivity mt ³ /km ²	Estimate of MSY x 1'000 mt demersal & pelagic	Total
KVARAN	1971	a) 200,000 km ² shelf area (0-200 m)	1.5 (demersal)	700	
		b) 200,000 km ² shelf area (0-200 m)	3.25 (in-shore pelagic)	650	
		c) 1,500,000 km ² deep water (200+m)	0.2 (off-shore pelagic)	300	1,650
MENASVETA ET AL	1973	a) Sulu Sea (200 + m)	0.5 - 0.65 (Pelagic)	604	
AOYAMA	1979	b) Shelf Area (0-200 m)	2.75 (demersal)	420	1,024
NORCONSULT/IKO	1975	185,000 km ² shelf area (0-200 m)	20.0 (all fishes)		3,700
AID	1977	185,000 km ² shelf area (0-200)	10.0 (all fishes)		1,850
YUTIC & TRONO	1977	a) 126,500 km ² shelf area (0-100)	18.0 (all fishes)		
		b) 139,300 km ² shelf area (100-200 m)	1.8 (all fishes)		
		c) 1,500,000 km ² deep water (200+m)	0.26 (all fishes)		2,914
ALCALA	1979	Reef Area (Sumilon Isl. Reserve)	15.0 (all fishes)		

Table 2.A COMPARISON OF PRODUCTIVITY ESTIMATES OF PHILIPPINES' SHELF AREA



SOURCE: ICLARM

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FIG.2.A VARIOUS ESTIMATES MSY (t/km.) IN PHILIPPINE WATERS BY DEPTH OF AREA CONSIDERED

(ii) Tolerance of Natural Condition

The types of industries feasible for location in the Area because of the following peculiar natural conditions are:

- o High Humidity
- o Frequent typhoons
- o Seaside location
- o A large range of tide

(iii) Freight Bearing Ability

Major markets for the products of industries which shall be located in Infanta-Real Area will be Quezon Province and Metro Manila. The greater the freight bearing ability of the product, the more competitive the product is.

(iv) Market Extensiveness

The factors which determine the geographic boundary of a market for a commodity include the characteristics of the consumer, transaction and distribution, system of social division of work, and international competitiveness of the commodity. How wide the market is determines the scale of production at which the industries that will be sited in Infanta-Real Area can operate. The following four levels of market extensiveness are conceived for screening:

- o A market covering Infanta-Real and Quezon Province;
- o A market covering Metro Manila and the central and southern parts of Luzon;
- o A market covering the entire Philippine Islands; and
- o An export market.

The types of industries which have been selected as feasible for location in Infanta-Real Area are categorized below. These criteria were screened against the check list shown in Fig. 3.2.1 and following the flow shown in Fig. 3.2.2.

3. MANUFACTURING INDUSTRIAL DEVELOPMENT PLAN

3.1 Present Status

No noteworthy manufacturing industry presently exists in Infanta-Real Area. The only industrial operations are lumber and wood products by one firm, handicrafts by one firm, and rattan furniture by two firms, whose products are shipped to Baguio and Laguna. These four firms fall under the NACIDA definition of family industry (with 250,000 Pesos or less assets at the time of registration with NACIDA).

3.2 Development Potentials

Industrial development potentials in Infanta-Real Area is considered from two view points. One is the induction of private investments by the development of necessary infrastructures; and the other is the introduction by the national government of an industry which will help the national economy and which, at the same time, will facilitate industrial promotion in the Area.

3.2.1 Types of Industries Feasible for Location in Infanta-Real Area

1) Possible Candidates

All of the industrial types which can be conceived from the first viewpoint are evaluated using the following criteria in order to select the type of industry feasible for location in Infanta-Real Area:

(i) Independence from Industrial Accumulation

Assembling industries like transportation equipment and electrical and precision machinery manufacturing must receive their supply of parts from related or peripheral industries. In order for such industries to operate competitively, the source of such supply and supportive service must be available within the time distance of not over one hour.

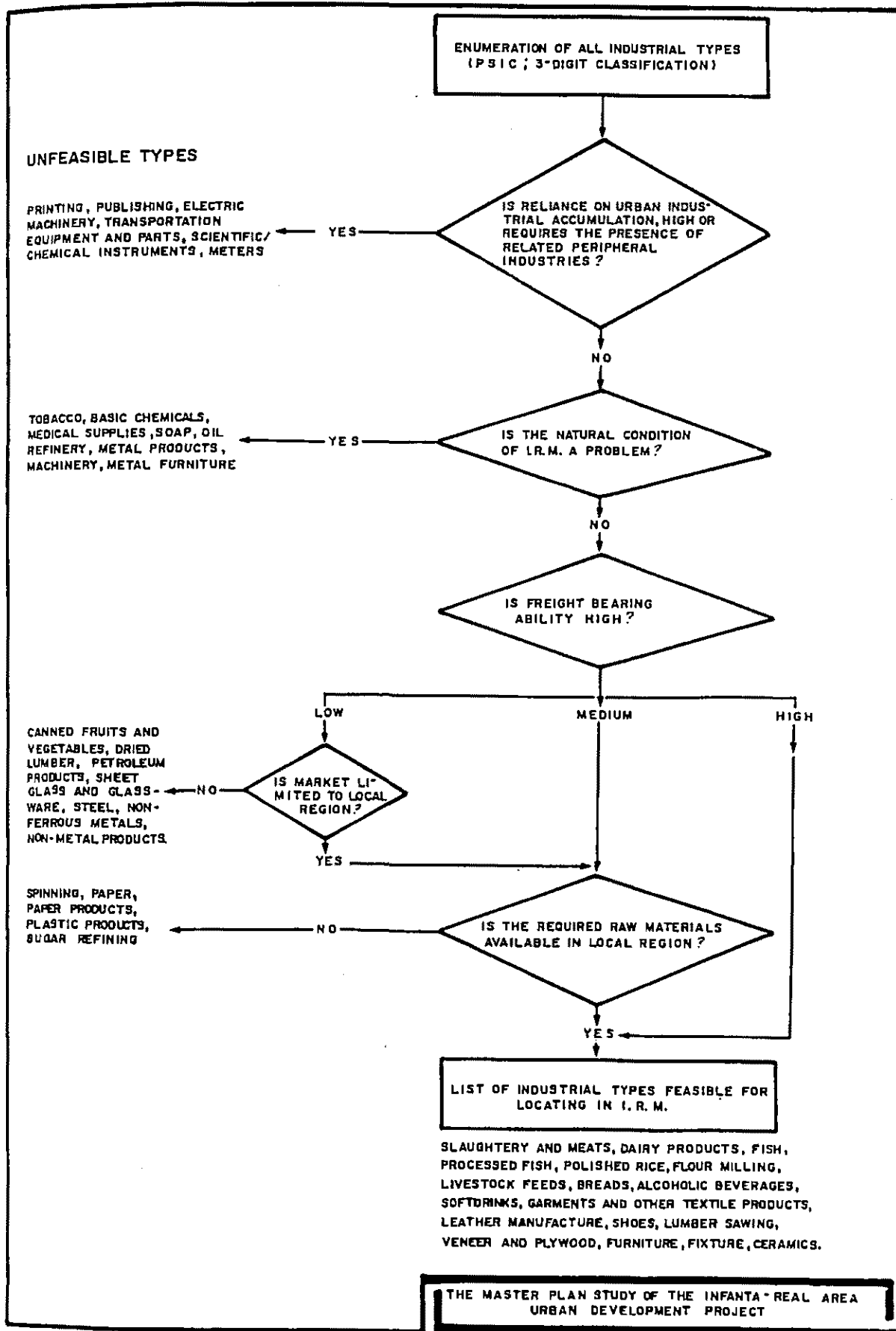


FIG.3.2.1 FLOW OF SELECTION OF INDUSTRIAL TYPES FEASIBLE FOR LOCATING IN INFANTA-REAL AREA

	INDUSTRIAL ACCUMULA- TION RELI- ANCE			FREIGHT BEARING ABILITY			MARKET				PROBLEM NATURAL CONDITION			
	L	M	H	L	M	H	LOCAL	CENTRAL LUZON	PHILIPPINES	EXPORT	HUMIDITY	TIDE RANGE	FREQUENT TYPHOON	COASTAL LOCATION
3111 SLAUGHTERY & MEATS	O			O										
3112 DAIRY PRODUCTS	O				O									
3114 CANNED FRUITS & VEGETABLES	O			O										
3115 FISH, PROCESSED FISH	O					O								
3116 COCONUT OIL	O			O										
3118 PLISHED RICE	O			O										
3119 FLOUR MILLING	O			O										
3123 SUGAR REFINING	O			O										
3128 LIVESTOCK FEED	O			O										
3127 BREAD	O			O										
3131 ALCOHOLIC BEVERAGES	O			O										
3134 SOFT DRINKS	O			O										
314 TOBACCO	O					O					O			
321 SPINNING	O				O									
322 GARMENTS & OTHER TEXTILE PRODUCTS	O					O								
323 LEATHER MANUFACTURE	O					O								
324 SHOES	O					O								
3311 LUMBER, VENEER, PLYWOOD	O			O	O									
3314 DRIED LUMBER	O			O	O									
332 FURNITURE, FIXTURE	O				O									
341 PAPER, PAPER PRODUCTS	O				O									
342 PRINTING, PUBLISHING			O			O								
351 BASIC CHEMICALS	O			O		O								
352 MEDICAL SUPPLIES, SOAP	O					O					O		O	
353 PETROLEUM REFINING	O			O									O	
354 PETROLEUM PRODUCTS	O			O									O	
355 RUBBER PRODUCTS	O				O									
356 PLASTIC PRODUCTS	O				O									
361 CERAMICS	O			O										
362 GLASS, GLASSWARE	O			O										
363 CEMENT	O			O										
369 OTHER NON-METAL PRODUCTS	O			O										
371 STEEL	O			O										
372 NON-FERROUS METALS	O			O										
381 METAL PRODUCTS		O		O									O	O
382 MACHINERY		O				O							O	O
383 ELECTRIC MACHINERY			O			O					O		O	O
384 TRANSPORTATION EQUIPMENT & PARTS			O			O							O	O
385 SCIENTIFIC/CHEMICAL INSTRUMENTS, METER			O			O					O		O	O
386 METAL FURNITURE		O			O								O	O

FIG. 3.2.2 CHECKLIST FOR SELECTION OF INDUSTRIAL TYPES
FEASIBLE FOR LOCATING IN INFANTA-REAL AREA

Population Dominated Industries

- o Meat slaughterhouses
- o Dairy products
- o Polished Rice, flour milling
- o Bread, alcoholic beverage, soft drinks
- o Ceramics

"Footloose" Industries

- o Garments and other textile products
- o Shoes and other leather products manufacturing.

Resource Based Industries

- o Fish, processed fish
- o Coconut oil
- o Livestock feed
- o Lumber, plywood
- o Furniture, fixtures

2) "Footloose" Industries

This type of industry can be located wherever relative advantages are present in terms of labor force, land, electric power, water supply, tax, etc., rather than being dominated by the factors of raw material and market.

It is unlikely that any of this type of industry shall be located in Infanta-Real Area, in view of the fact that tax incentive is offered in Bataan EPZ, where 94 hectares of vacant lots are available, and in Cavite, where 268 hectares are available (both close to Manila), and the fact that the Pampanga EPZ Project is making progress.

3) Resource-Based Industries

This type of industry can be classified as forestry-based, fishery-based, and coconut-based. Their resources potentials will be discussed below (their location feasibility and scale of operation shall be discussed under the next title).

(1) Forestry Production Potentials

IRM functions as the point of collection of timbers from falling sites in Isabel and Cagayan Provinces in the northern Pacific coast. Presently, there is an establishment which brings the timbers to Real, saws them in Real, and delivers the lumbers to Manila.

The available quantity of timber supply, which will be needed to support wood product industry is estimated with the aim that IRM shall function as a distribution base, gathering timbers and lumbers from Quezon, Isabel, and Cagayan Provinces by coastal boats and achieving some value added by further processing such forestry products.

For the three coastal Provinces, total annual allowable cut (AAC) is 1,626,000 cubic meters, of which 73,000 cubic meters is for Quezon Province (in 1981, see Tables 3.2.1 and 3.2.2). In the case of Quezon Province, it is possible that the ban placed by a Presidential Decree on timber cutting even by a licensed logger will be lifted in 1987 or 1988, when the quantity that can be cut is said to be 100,000 to 300,000 cubic meters, provided that the maximum of 300,000 cubic meters is allowed only when industrial tree plantation is realized.

Table 3.2.1 Allowable Cut of Timber
Licenses Per Year

Province	Number of Licensee	Area	Allowable Cut (Year)
Cagayan	14	659 x 10 ³ ha	1001 x 10 ³ m ³
Isabela	13	423	552
Rizal	-	-	-
Quezon	2	42	73

Source: Philippine Forest Statistics, 1981
Bureau of Forest Development

Table 3.2.2 Capacity of Sawmills (1981)

Province	Number of Sawmills	Capacity	Available Log/Year
Cagayan	10	585 m ³ /Day	212 x 10 ³ m ³
Isabela	22	917	252
Metro Manila	-	-	-
Rizal	9	507	203
Quezon	6	278	111

Source: Philippine Forest Statistics, 1981
Bureau of Forest Development

(2) Fishery Resources Potentials

The potentials of the unexploited fishery resources in the coastal and offshore waters of Quezon Province cannot be discussed in terms of statistical values. The Study Team estimates (as stated earlier) the following potentials:

Prawns (culture only):
Maximum of 5,000 tons per year

Tuna, Sardine and the like:
80,000 tons per year

Since fishery resources in the offshore waters of the Pacific coast of Luzon are unexploited, any estimate of their quantities can be set off by a substantial margin. However, the quantities estimated above are sufficient for the fishery product processing industry to be feasible.

(3) Coconut (Copra) Production Potentials

Coconut production in IRM and Polillo Island is expected to increase from the 41,628 tons (copra base) in 1983 to 63,754 tons by 1992, and 93,312 tons by the year 2000.

4) Scale of Resource-Based Industries

In view of the resources potentials discussed, the feasible scales for resource-based industries are estimated below:

(1) Timber Processing Industry

Under the assumption that 200,000 cubic meters of timber will be brought from Isabela Province and 100,000 cubic meters from within Quezon Province, both per year, and assuming that timber will be sawn and made into plywood and particle boards and that downstream processing will be accomplished in IRM, the production capacities of the various timber processing factories in IRM are expected to be:

Plywood Factory:

160 (domestic average to 300 (maximum scale) cubic meter per day

Veneer Factory:

100 (Philippine average) cubic meters per day

Particle Board Factory:

100 tons per day (large scale)

With these capacities, the value of their product shipment is estimated at 206,700,000 Pesos per year (see Table 3.2.3). The presence of a particle board factory will add to the efficiency of the timber processing industry in IRM as a whole through the utilization of waste materials from lumber sawing and plywood making.

(2) Fish Processing Industry

The scale of fish processing industry is estimated as follows (see Table 3.2.4):

Frozen Prawn:	3,000 Tons per year
Frozen Fish :	6,000 Tons per year
Canned Tuna :	7,800 Tons per year

Industries related to fish processing are ice making and fish meal.

(3) Coconut Oil Extraction Industry

Assuming that about 65% of coconuts produced in Infanta-Real Area and Polillo Island will be crushed for oil extraction, annual coconut oil production quantities are estimated at 41,400 tons in 1992, and 60,700 tons in the year 2000. At the rate of 300-days operation per year, these quantities are converted to the following daily productions: 66 tons in 1992, and 270 tons in 2000. The level of production in 1992 can be classified as medium scale and the level in 2000 as a large scale, when compared with the crushing capacities of RP Oil Mills, presented in Fig. 3.2.3.

Related to the coconut oil industry is activated carbon manufacturing. No discussions will be made beyond the mere mention of a possibility of such an industry, because many activated carbon plants which are conveniently situated for obtaining the raw material, as can be seen from the comparison of Fig. 3.2.3 and Fig. 3.2.4, are currently shut down.

Table 3.2.3 Projection of Forestry Production
(In Case of Lifting a Ban of Cutting
in Quezon and Isabela Regions)

Product	Capacity of Factory	Required Amount of Timber	Consignment/Year
Plywood	160 m ³ /day ¹⁾	109 x 10 ³ m ³ /day.year	115.2 Mil. Pesos
	300 m ³ /day ²⁾	205 x 10 ³ m ³ /day.year	216.2 Mil. Pesos
Veneer	100 m ³ /day ¹⁾	58 x 10 ³ m ³ /day.year	49.5 Mil. Pesos
Particle Board	100 ton/day ²⁾	Utilization of logging waste	42.0 Mil. Pesos
Total	167 x 10 ³ m ³ /day ¹⁾		206.7 Mil. Pesos
	263 x 10 ³ m ³ /day ²⁾		307.7 Mil. Pesos

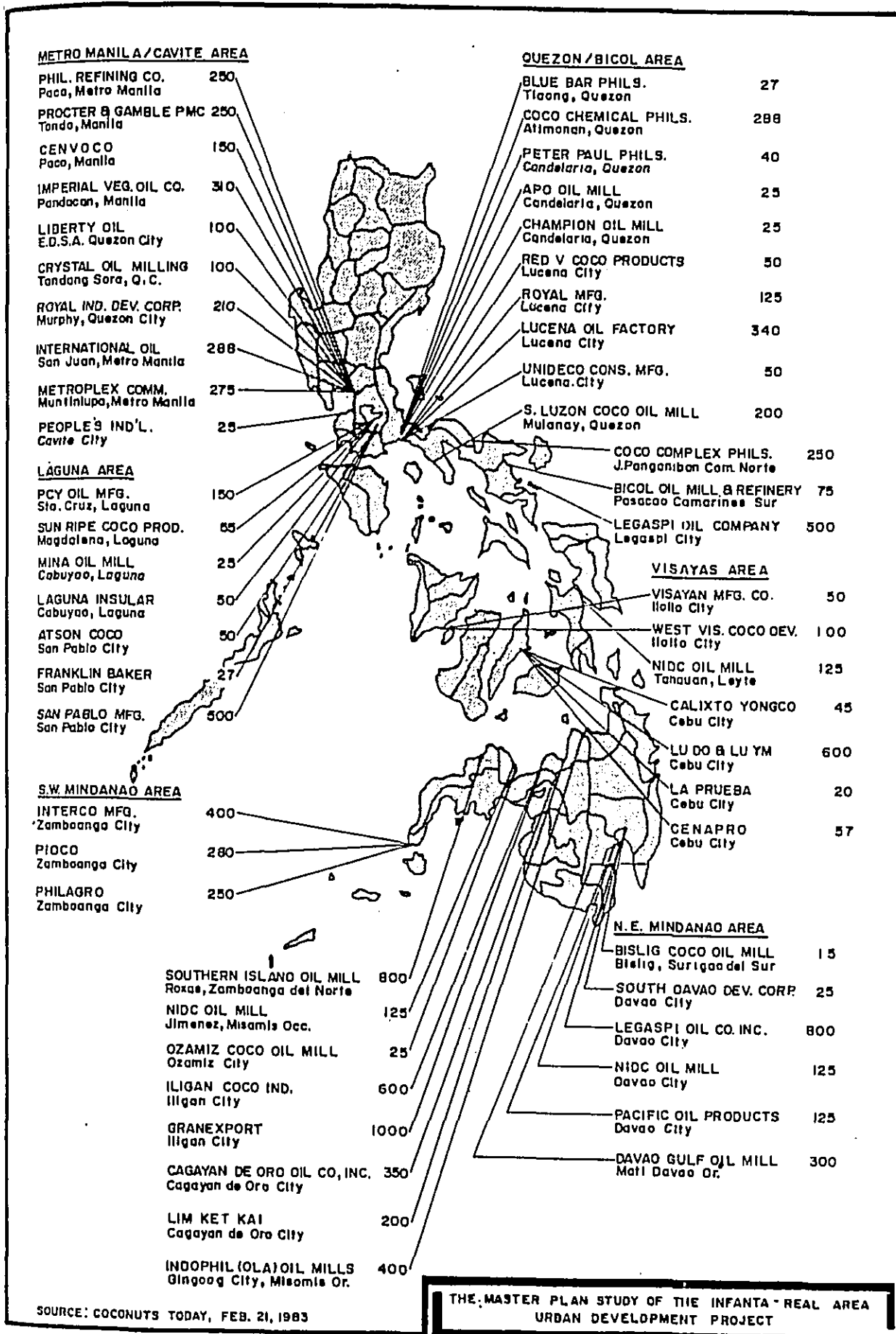
Note: 1): Average scale in the country
2): Large scale

Source: JICA Study Team

Table 3.2.4 Projection of Processed Fishery Production

Items	Amount of Resource (t/year)	Yield Rate by Processing	Production (t/year)	Unit Price at Factory	Consignment (mil P/year)
Frozen Prawn	5,000	0.6	3,000	60,000	180
Frozen Tuna	6,000	1.0	6,000	6,000	81
Canned Tuna	12,000	0.65	7,800	10,700	210
Canned Sardine	18,000	0.65	11,700	2,000	120

Source: JICA Study Team



SOURCE: COCONUTS TODAY, FEB. 21, 1983

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FIG. 3.2.3 CRUSHING CAPACITIES OF R.P. OIL MILLS
SHOWING PLANT SITES (M.T. COPRA PER YEAR)

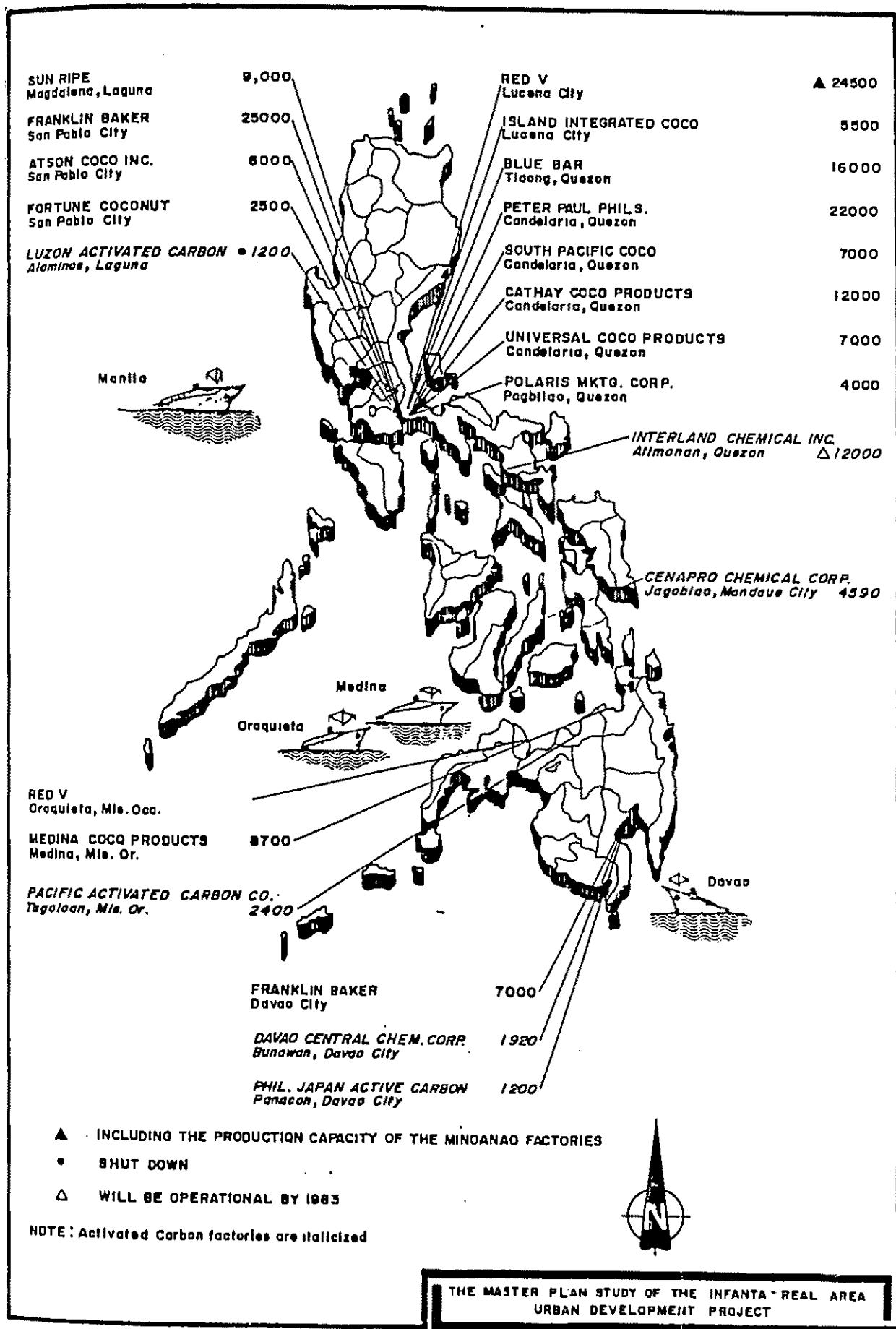


FIG.3.2.4 DESSICATED COCONUT & COCO SHELL ACTIVATED CARBON PLANTS SHOWING PLANT LOCATIONS, PORTS OF LOADING & CAPACITIES IN METRIC TONS PER YEAR.

3.2.2 National Policy-Guided Industrial Types

Various types of industries are screened for location in Infanta Real Area with the aim of: (i) promoting the eastern coastal area of Luzon Island for the development of Infanta Real Area; (ii) rearing import-substituting industries to produce key products whose demand and supply will be out of balance in the national economy as a whole, and (iii) creating nucleus industries for Infanta area offering large number of jobs.

The major crop of Luzon east coast is forestry products, and the feature of Infanta-Real area is the quantity of water in Real Port and Agos River. A search for water-consuming forest product processing industry or industries which will satisfy (ii) and (iii) above culminates to the identification of paper-pulp industry, which will be discussed hereunder.

1) Demand-Supply Balance

The presently low demand and future demand forecast are shown in Table 3.2.5. Assuming that the current total domestic demand in 1980 equals the quantity of supply, demand-supply gap in 1983 and in 1998 will be shown in Table 3.2.6.

On the other hand, the capacity of paper mill of PICOP is larger than the capacity of its pulp mill. For the elimination of this gap, the expansion of pulp making capacity of PICOP is now being planned as a part of the eleven large industries development program. Demand-supply situation, expressed in terms of paper quantity, when this expansion has been carried out is shown in Fig. 3.2.5.

Table 3.2.5 Present and Future Demand on Paper

	Present Domestic Demand 1980			Projected Domestic Demand			Annual Growth Rate 1998/1983
	Domestic	Imported	Total	1988	1993	1998	
Newsprint	80	20	100	110	135	165	4%
Printing/Writing	42	12	54	140	200	280	7%
Industrial Paper							
Sack Kraft		38	156	210	305	445	7%
Corrugating (Medium)							
Folding Boxboard	34	48	82	55	75	100	5%
Miscellaneous	48	6	54	80	85	95	2%
Total	322	124	446	595	800	1,085	6%

Source: 1) Processed Agro-forestry Products Department
Board of Investment, and PULPAPEL
2) Prospects for the Development of Pulp and
Paper Industries in the ASEAN, UNDP/FAO,
Rome, 1979

Table 3.2.6 Balance Sheet of Supply and Demand (1000t)

	1988	1993	1998
Newsprint	-10	-15	-65
Printing/Writing	-86	-146	-226
Industrial Paper (e.g. Kraft)	-51	-149	-289

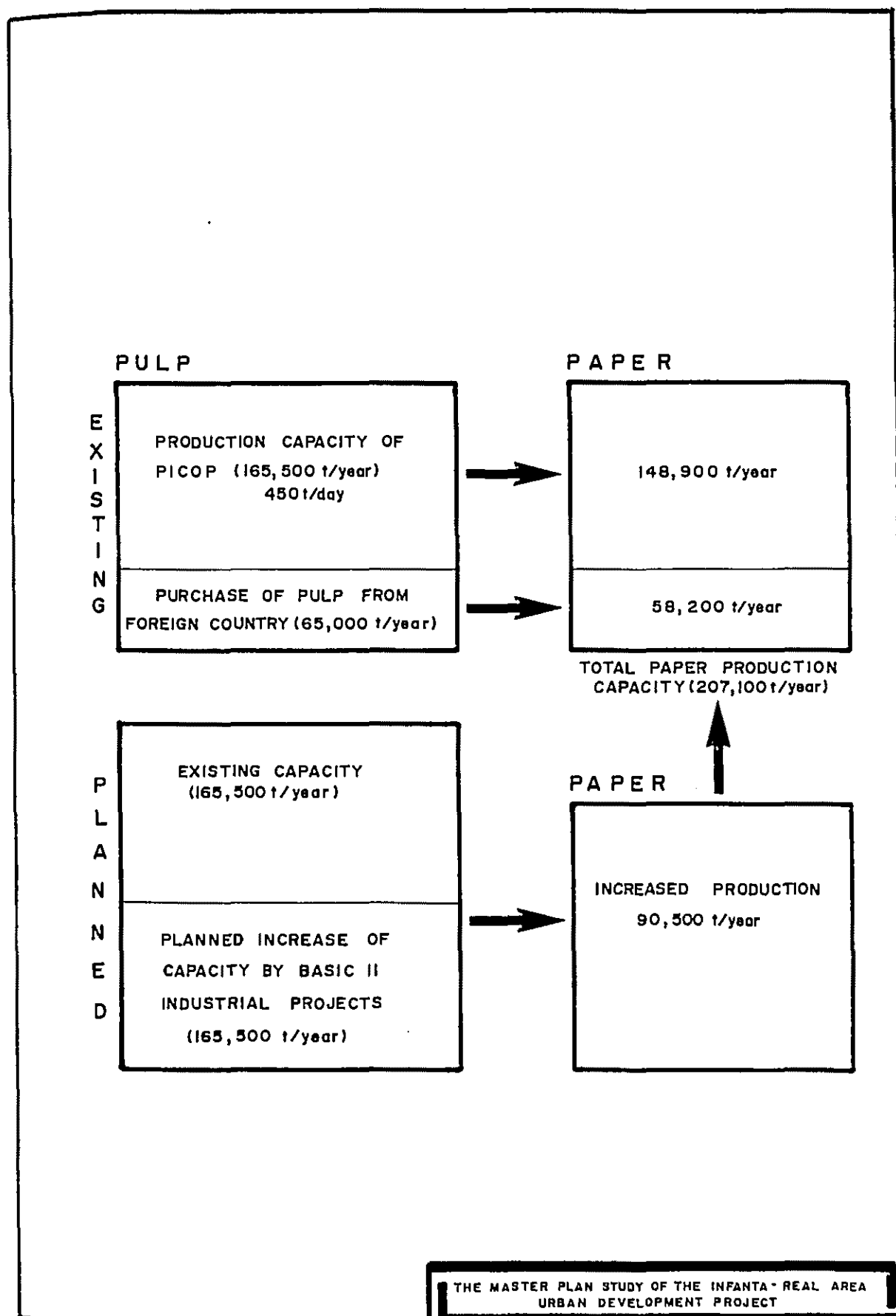


FIG. 3.2.5 PULP DEMAND SUPPLY BALANCE

As seen in Fig. 3.2.5, the actual result will be an increase in paper manufacturing capacity by 90,5000 tons per year. The breakdown of the new production quantity will be:

Newsprint	5,000 tons/year
Craft Paper	35,000 tons/year
Printing/writing	70,000 tons/year

Adding the new production quantity of PICOP to the quantity of supply in Table 5.3.6, supply of pulp in 1988, 1993 and 1998 are forecast to be short of demand as shown in Table 3.2.7.

Table 3.2.7 Balance Sheet of Supply and Demand of Paper with Consideration of Production Increase of PICOP (1000^t/year)

	Increased Amount of PICOP	Balance of Supply and Demand		
		1988	1993	1998
News Print	5	-5	-30	-60
Printing/Writing	70	-16	-76	-156
Industrial Paper	35	-19	-116	-254

2) Comprehensive Paper-Pulp
Factory Plan

As seen in Table 3.2.7, paper, particularly printing/writing paper, craft paper, and other industrial papers will be in short supply. Because a majority of those papers are consumed in Manila, a factory is to be located close to Manila, where the acquisition of raw material will be easy and where environmental problems are few. A number of such candidate locations are available in Luzon Province, but the location of such factory is considered in the mouth of Agos River in General Nakar.

In view of the quantity of resources available and the demand-supply situation, the factory will be planned with the production capacity (in terms of pulp quantity) of 80×10^3 TPA in the first phase and an increment of 90×10^3 TPA in the second phase.

The production scale is determined on the premises that the entire quantity of pulp needed will be supplied from own pulp plant, provided that 8,000 tons scrap paper will be used for the production of corrugated cardboard.

Pulp (craft method)	80,000 tons/year 1988 and after)
	170,000 tons/year (with 90,000 tons expansion in 1992)

This plan will make the new factory price competitive with PICOP (comprehensive pulp factory established in Surigao, Mindanao, under the national policy) both in terms of pulp making and paper making capacities. Other specification items are shown in Table 3.2.8.

The raw material procurement and shipping market for the existing comprehensive paper making factory shall be touched upon. The raw materials and products shipment destination at the time of the first phase work completion and at the time of the second phase work completion are summarized in Table 3.2.9.

A large scale afforestation work will be necessary for the purpose of securing pulp wood supply. The quantity thereof will be discussed in the Supplementary Discussions. The reforestation of 3,470 hectares shall bring a substantial economic impact upon the east coast area at large. The comprehensive paper manufacturing factory is for import substitution and will have no international competitiveness in terms of production scale and raw materials price.

Table 3.2.8 Assumption on Paper/Pulp
Plant Capacity

Capacity		
Paper Mill		
Printing/Writing	70x10 ³ TPA	70x10 ³ TPA (Increased Amount)
Corrugating Medium		10x10 ³ TPA
Pulp Mill (Incl. Electrolysis Plant)		
	80x10 ³ TAP	90x10 ³ TPA (Increased Amount)
Investment Cost		
Capital Cost of Paper/ Pulp Integrated Mill (Incl. Electrolysis Plant)	1.21 Bil. Pesos	1.32 Bil. Pesos
Running Capital Interest Construction	.22 Bil. Pesos	0.264 Bil. Pesos
Amount of Goods Flow		
Raw Materials		
Hardwood	272x10 ³ m ³ /yr.	574x10 ³ m ³ /yr.
Softwood	60x10 ³ m ³ /yr.	120x10 ³ m ³ /yr.
Waste Paper	-	8x10 ³
Chemicals	10x10 ³ m ³ /yr.	22x10 ³ m ³ /yr.
Utility		
Water		
Pulp	53,000 m ³ /day	113,000m ³ /day
Paper	35,000 m ³ /day	76,000m ³ /day
Electricity		
Pulp	3,890 KW	8,300 KW
Paper	6,800 KW	14,600 KW
Amount of Consignment		
Pulp	0.362 Bil. Pesos	0.88 Bil. Pesos
Paper	0.528 Bil. Pesos	1.122 Bil. Pesos
Value Added		
Consignmentx0.45	0.024 Bil. Pesos	0.051 Bil. Pesos

Source: JICA Study Team

Table 3.2.9 Raw Materials, Destination of Products
and Amount of Goods Flow

Pulp Annual Production Capacity	Raw Materials Products	Origin of Goods Destination	Course of Shipment
80,000/year	Tropical Hardwood	Quezon Province 72x10 ³ m ³ Cagayan Province 100x10 ³ m ³ Isabela Province 100x10 ³ m ³	Via Land Sea Sea
	Softwood	Abra 60x10 ³ m ³	Land
	Rock Salt	Abroad 2,480 ton	Land/Sea
	Soda Ash	Abroad 6,880 ton	Land
	Lime Stone	Rizal Province 3,000 ton & Manila Vicinity	Land
170,000/year	Printing and Writing Paper	Towards Manila 70,000 ton	Land
	Tropical Hardwood	Quezon Province 154x10 ³ m ³ Cagayan Province 214x10 ³ m ³ Isabela Province 214x10 ³ m ³	Via Land Sea Sea
	Softwood	Abra 129x10 ³ m ³	Land
	Rock Salt	Abroad 5,310 ton	Land/sea
	Soda Ash	Abroad 14,740 ton	Land
	Lime Stone	Rizal Province 6,430 ton and Manila Vicinity	Land
	Printing & Writing Paper	Towards Manila 150,000 ton	Land

Source: JICA Study Team

3.3 Development Plan

Development plan formulation assumes the immediate consolidation/development of port and roads, upon which the first to be developed will be tourism, followed by coconut oil extraction plant (the latter will experience a period of slump due to the time lag of coconut reforestation program). Marine products processing plant will be established only when the fishery port is completed and a certain level of fish landings is sustained.

While pulp-paper plant can start operation in 1992, in view of demand-and-supply situation, its commencement is delayed until after 1992 in order that orderly development will be achieved. A target will be 45% operation by the year 2000.

No development project will be considered with regard to lumber sawing, veneer processing, particle board making, and other wood processing industries, in view of the present ban on timber felling (Table 3.3.1).

Table 3.3.1 Progress of Projects

Items	(%)	
	1992	2000
Coconut Oil Mill	65	100
Canning (Fishery)	80	100
Freezing (Fishery)	80	100
Prawn Processing	80	100
Paper/Pulp	0	45
Tourism	80	100

Source: JICA Study Team

SUPPLEMENTARY DISCUSSIONS:

1. Feasibility of an Export Processing Zone in Infanta-Real Area

1) Present Situation of Export Processing Zones

As of 1983, four export processing zones (EPZ) are in operation in the Republic of the Philippines: Bataan, Baguio, Mactan, and Cavite. An additional zone in Pampanga will be opened in the future. Of these, the total area of industrial land is 416 hectares, of which (as of 1982) 162 hectares are occupied (see Table 3.A).

Of the land already used, about 60% is occupied as of 1983 as estimated (by Miss Liza Solidat, Nationwide Industrial Estate Program Manager).

The breakdown of 83 firms operating in EPZ is: 24 firms are in garments and textile products manufacturing; 8 are in electronics; and 6 are in electric machinery and equipment. In addition to these major ones, there are firms engaged in plastic and rubber products manufacturing, transportation equipment manufacturing, and metal processing.

The total shipment value from the three EPZ (excluding Cavite EPZ, which was opened in 1982) was 33 million Pesos in 1982, of which 27.61 million Pesos was exported value and 5.39 million Pesos was domestic shipment value.

Table 3.A Status Quo of Export Processing Zone

Name	Location	Opened (Year)	Planned Area of Industry	Area Occupied by Establishment	Consignment No. of Employees
Bataan EPZ	Mariveles, Bataan	1972	234 ha	140 ha	₱1,292 Mil. 19,151
Mactan EPZ	Mactan, Cebu	1979	119	11	168 Mil. 1,176
Baguio City EPZ	Baguio, Benguet	1980	63	11	443 Mil. 1,556
Cavite EPZ	Rosario, Cavite	1983	268	-	-
Pampanga EPZ	Angeles City, Pampanga	-	-	-	-

Source: Nationwide Industrial Estate Program, NEDA, 1982

2) Future EPZ Plans

The Export Processing Zone Administration (EPZA) conducted a survey for the selection of sites for new EPZs with the following aims:

i) Regional development industrialization particularly the dispersion of industries from Metro Manila;

ii) Expansion of employment opportunities and equitable distribution of income.

Of the developing areas of Luzon, EPZA surveyed Cagayan, Ilocos Norte, La Union, Batangas, and Albay Provinces in search for suitable land for EPZ. As a result, the following three are considered most promising:

i) Area No. 1: (Batangas City, Batangas Province)

ii) Tanguigan-Bungorin: (San Fernando City, La Union Province)

iii) Malilipot: (Albay Province)

The following two were in need of a large scale social infrastructure development and were not considered promising candidates:

i) Currimaos: (Ilocos Norte Province)

ii) Port Irene: (Cagayan Province)

The parameters of the three candidate EPZs and industrial types considered suitable are listed in Table 3.B.

3) Feasibility of Infanta Real EPZ

(1) The feasibility of Infanta Real as the site of an EPZ in the Greater Central Luzon Area is limited for the following reasons:

Table 3.B Prospective Candidate Site for
EPZ in the Future

	Batangas EPZ	San Fernando EPZ	Malilipot EPZ
Development Size	38.7 ha	48.5 ha	49.6 ha
Export Processing Zone	(13.9 ha)	(48.5 ha)	39.0 ha
Industrial Estate	(24.8 ha)	-	10.6 ha
Projected No. of Investors	60	40	45
Projected No. of Employees	16,200	12,200	13,250
Projected Establishment	Overcoat, Textile Industry, Machinery & Tools Manufacturing, Electric & Mechanical Goods Industry, Plastic & Gum Products, Metal Products Industry	Overcoat, Textile Industry Machinery Tool Manufacturing Electric & Mechanical Goods Industry, Plastic & Gum Products, Metal Products Industry	Overcoat, Textile Industry Machinery & Tools Manufacturing, Electric & Mechanical Goods Industry, Plastic & Gum Products, Metal Products Industry
Location	Batangas City Industrial Area Batangas Province	Tanguigan-Bungro, San Fernando, La Union	Malilipot, Albay Province

Source: Follow-up study of the Bataasn Export Processing Zone and Supplementary Feasibility Study for New Export Processing Zones, Jan. 1972

i) For the purpose of dispersing industries from Metro Manila, more than 300 hectares of land is available in Rosario EPZ, Cavite Province, and the new EPZ in Angeles City, Pampanga Province. As for Bataan EPZ, only 140 hectares is occupied (as of 1982) but additional industrial land of 84 hectares will become available under Phase II Plan and 106 hectares under Phase III Plan. Thus, it is estimated that a total of 490 hectares of industrial land will be available in EPZs in the Greater Central Luzon Area alone within the next five or ten years, if demand will be present.

ii) An important of EPZ location is the availability of access to an international port/airport. The number of firms locating in Bataan EPZ has not increase much beyond 50 since 1980, and one of the reasons therefore, is the need of transporting export goods from Mariveles to Manila Port spending seven hours by container trailers of 2.5 hours by car. In this regard, Cavite EPZ is not only within one hour from central Manila but also will become most highly demanded location when Rosario Port will be developed by the Philippine Ports Authority.

iii) Candidate location of EPZ are rated by EPZA as follows:

High Priority

- o Batangas: (Batangas City, Batangas Province)
- o Tanguigan-Bungorin: (San Fernando City, La Union Province)
- o Malilipot: (Albay Province)

Low Priority

- o Currimao: (Ilocos Norte Province)
- o Port Irene: (Cagayan Province)

"Infanta-Real Export Processing Zone" is conceived of in name, but no practical plans have been proposed or studied. It is believed that EPZA places a very low priority on Infanta-Real Area as a candidate location of an EPZ, at least for the time being.

2. Pulpwood Supply to the Comprehensive Paper-Pulp Plant

1) Source Forest

The raw material will be obtained by completely felling primeval mountain forests in the vicinity of Infanta-Real Area, which will subsequently be reforested. As for the composition of the primeval forest by timber use, the following result of survey over the other South forests is applied:

Pulpwood	60%
Lumber, plywood raw material	25%
Firewood	15%

The accessible rate is estimated at 70% assuming that 30% of the forests will be too steep for felling operation. Also from the other survey finding, average resource deposits is density estimated at 160 cubic meters per hectare.

2) Necessary Log Quantity

The quantity of logs needed for a plant with the capacity of 80,000 tons per year pulp base will be 332,000 cubic meters. For a 170,000 ton capacity, 694,000 cubic meters.

3) Log Production Rate

Relationship between felling area and log quantity is calculated by the following formula:

$$\begin{aligned}
 & \frac{\text{Log Supply Quantity (m}^3\text{/year)}}{\text{Average Deposits Density (m}^3\text{/ha)} \times \text{Accessible Rate} \times \text{Pulpwood Ratio}} \\
 & = \text{Felling Area (ah/year)}
 \end{aligned}$$

Therefore, in the case of a 80,000 ton factory:

$$\frac{332,000}{160 \times 0.7 \times 0.6} = 4,940 \text{ (ha/year)}$$

In the case of 170,000-ton factory

$$\frac{694,000}{160 \times 0.7 \times 0.6} = 10,327 \text{ (ha/year)}$$

4) Reforestation Program

Forests developing of pulpwood trees will be developed. Felling cycle will be 10 years.

The reforestation program will follow the following steps and will, therefore, require a period of ten years:

- i) Reforestation program tests of each tree variety;
- ii) Systematic technology development and economic assessment;
- iii) Economic assessment in commercial scale.

Once commercial production has started, yearly felling area (That is, yearly reforestation area) is calculated by the following formula:

$$\frac{\text{Pulpwood Log Consumption (m}^3\text{/year)}}{\text{Expected Harvest Quantity in 10 years (m}^3\text{/ha)}} = \text{Reforestation Area (ha/year)}$$

Assuming that expected harvest quantity is 10 years will be 200 cubic meters per hectare, the area which needs to be reforested each year in order to support a 80,000-ton factory will be:

$$\frac{332,000}{200} = 1,660 \text{ (ha/year)}$$

To support a 170,000-ton factory

$$\frac{694,000}{200} = 3,470 \text{ (ha/year)}$$

Therefore, total industrial tree plantation is assuming 30% of ores land is inaccessible in, the case of 80,000-ton factory:

$$\frac{1,660 \times 10}{0.7} = 23,714 \text{ hectares}$$

And in the case of 170,000-ton factory:

$$\frac{3,470 \times 10}{0.7} = 49,517 \text{ hectares}$$

4. TOURISM

4.1 Present Situation

4.1.1 Trend of Tourists

1) Trend of International Tourists

(1) Changes in Visitors

The number of foreign visitors to the Philippines steadily continued increase in the 1970s, but such increase has been somewhat stagnant since 1980 (Fig. 4.1.1). Such number reached one million in 1980 but subsequently dropped to under 900,000.

(2) Foreign Tourists by Country

Approximately 70% of foreign visitors are tourists, and the number of tourists was 627,000 in 1982. By country, Japanese represented a great majority of foreign tourists at 83%. Although Americans represented a majority of foreign visitors, the number of Japanese tourists was greater than the number of American tourists (Table 4.1.1).

The middle aged male predominancy of Japanese tourists has been shifted to greater numbers of young females, families, and aged couples.

After Japanese and Americans, the number of visitors from neighbouring Asian countries is after all, substantial, and their tourist ratio is similarly from 70% to 80%. Although the number does not represent a large portion of the total, visitors from West European countries are known for long duration of stay for a high ratio of individual visitors (as opposed to tour groups), and for prolonged stay at natural beaches with few artificial facilities.

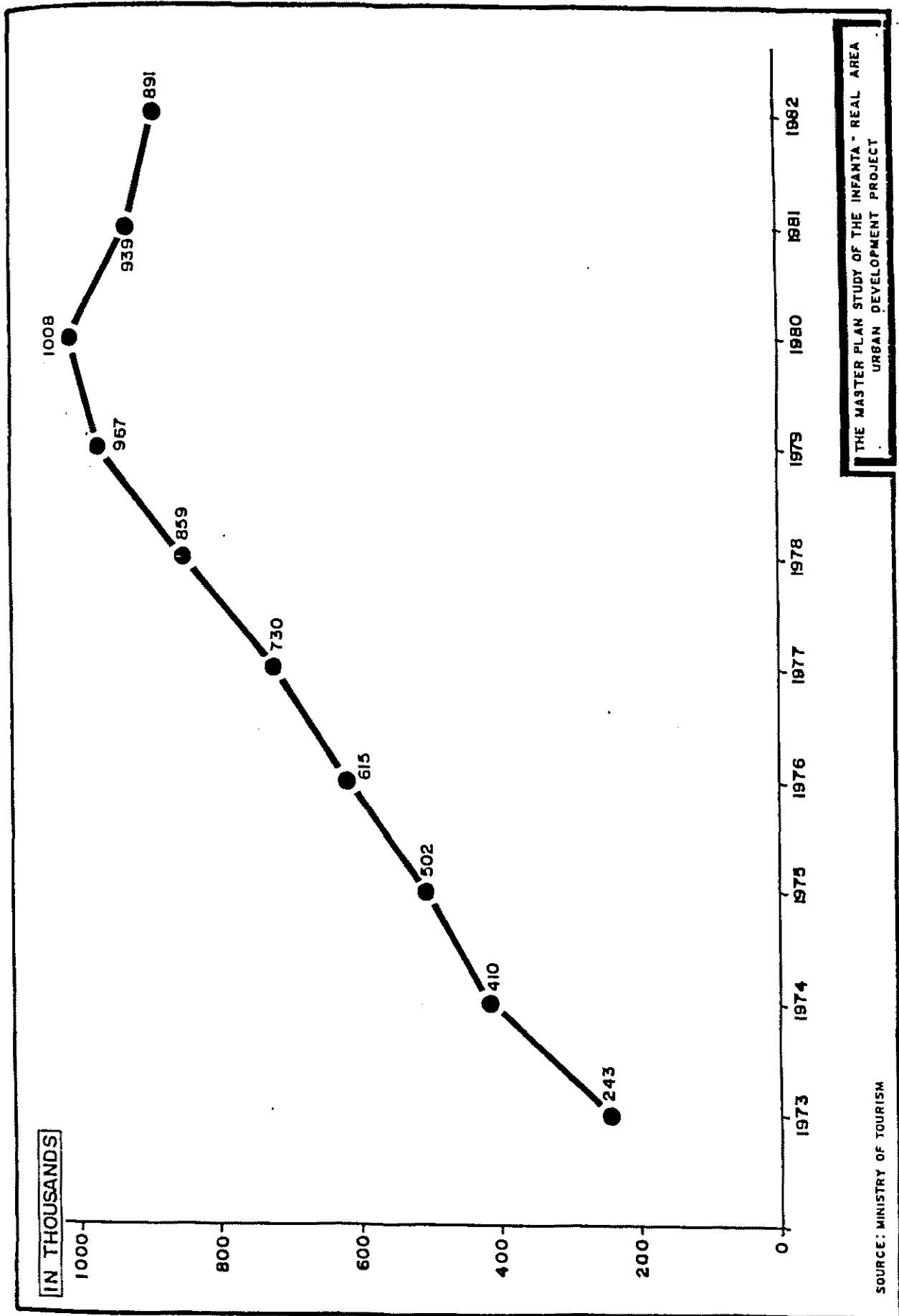


FIG.4.1.1 VISITOR ARRIVALS 1973 - 1982

Table 4.1.1 Number of Holiday
Tourist, 1982

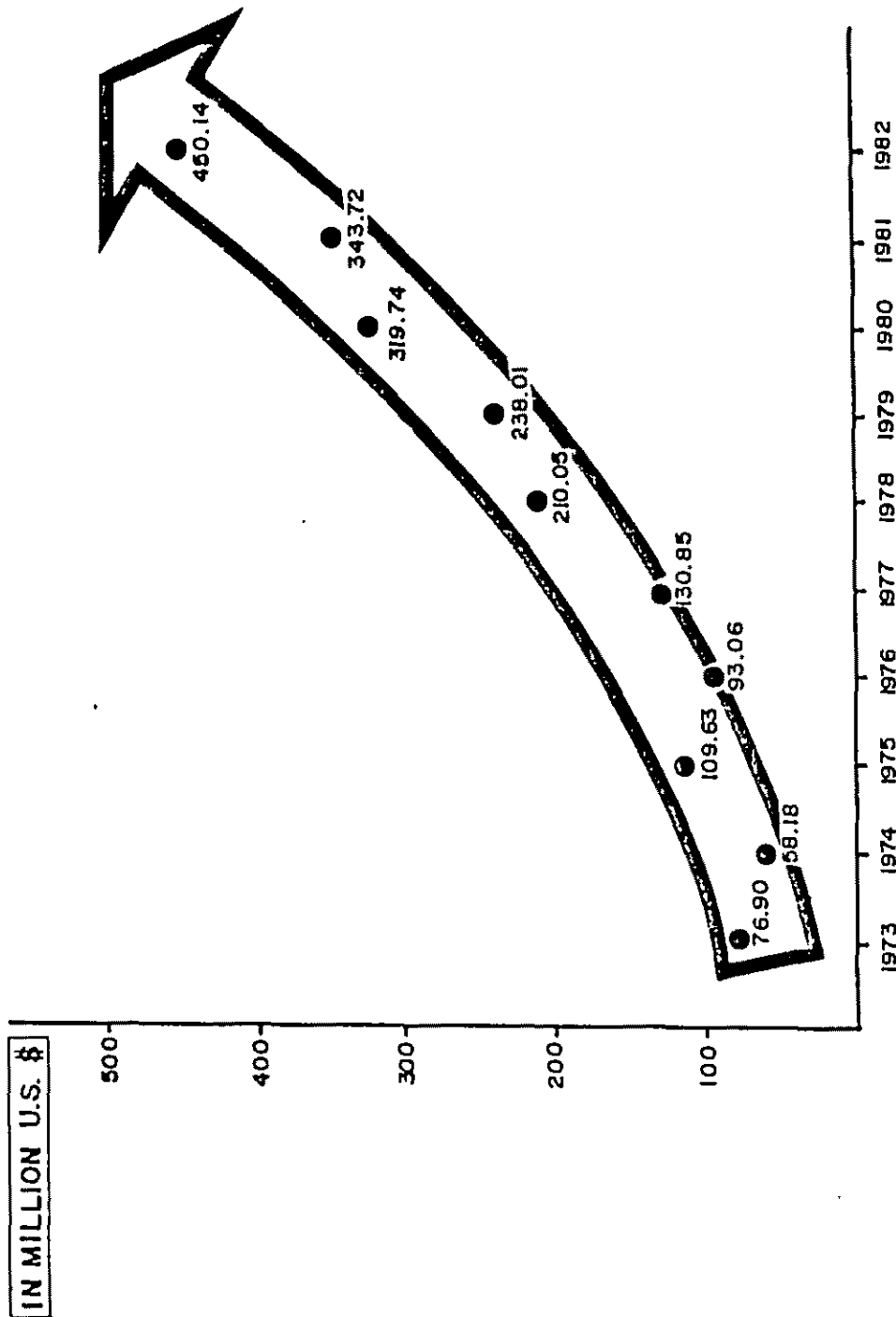
Travel Market	Total Tourist	% of Holiday Purpose	Number of Holiday Tourist	%
U.S.A	177,627	58.44	103,805	16.55
Japan	159,918	83.13	132,940	21.19
Hongkong	75,968	78.35	59,521	9.49
Australia	63,601	79.87	50,798	8.10
Taiwan	46,414	80.67	37,442	5.97
Singapore	34,004	72.64	24,701	3.94
W. Germany	28,559	77.01	21,993	3.50
Malaysia	25,381	77.14	19,579	3.12
U. Kingdom	23,857	62.97	15,023	2.39
Canada	16,922	75.12	12,712	2.02
Others	238,556	62.41	148,881	23.73
Total	890,807	70.43	627,395	100.00

Source: Statistical Report on Travel and Tourism/
Philippine, 1982

(3) \ Economic effects of Tourism

Despite the indicated slow increase in the number of tourists, tourism revenue has steadily increased (Fig. 4.1.2). In 1982, such survey reached 4,950 million Pesos, which surpasses the export value of coconut oil of 4,543 million Pesos as the second largest export item.

The substantial revenue, as it is, make it an important national policy to promote tourism in the Philippines. Diversified procatical ways are devised for tourism promotion including the holding of international conventions and conferences in the Philippines, in addition to tourists facilities development at various locations.



SOURCE: STATISTICAL REPORT ON TRAVEL & TOURISM/PHILIPPINES 1982
MINISTRY OF TOURISM

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URBAN DEVELOPMENT PROJECT

FIG. 4.1.2 TOURISM RECEIPTS 1973-1982

2) Tourist Flow

(1) Regional Distribution

International tourists are concentrated in western Luzon (Region I), Baguio (Region II), Metro Manila and vicinity (Region IV), and Cebu (Region VII), where advanced facilities are available. These four regions account for three-fourths of the total such tourists (Table 4.1.2 and Fig. 4.1.3).

On the other hand, domestic tourists are scattered to all regions, particularly in southern islands (Regions X and XI) in comparison with international tourists. In nationwide flow of tourists, the ratios of foreigners and Filipinos are approximately two to eight.

(2) Seasonal Fluctuation

Tourists are generally evenly distributed throughout the year as shown in Fig.4.1.4. The highest is about 100,000 in December for Christmas season, and the lowest is about 60,000 in September for rainy season. Maximum-minimum ratio is about 1.6.

Table 4.1.2 Distribution of Foreign
Visitor Travellers by
Region

Region	1980	1981	1982 (Jan-Jun)	Average
I	23.24%	1.55%	12.36%	12.38%
II	1.50	-	0.25	0.58
III	28.21	24.10	40.34	30.89
IV	19.82	22.93	15.58	19.44
V	3.69	3.18	2.58	3.15
VI	2.05	8.33	3.72	4.70
VII	9.91	24.26	1.91	12.03
VIII	0.84	3.79	3.70	2.78
IX	4.52	7.97	6.86	6.45
X	2.83	3.89	4.95	3.89
XI	3.39	-	7.53	3.64
XII	-	-	0.22	0.07
Total	100.00%	100.00%	100.00%	100.00%

Source: Study on Regional Distribution of Travellers
in the Philippines 1980, 1981, Jan-Jun 1982,
Ministry of Tourism

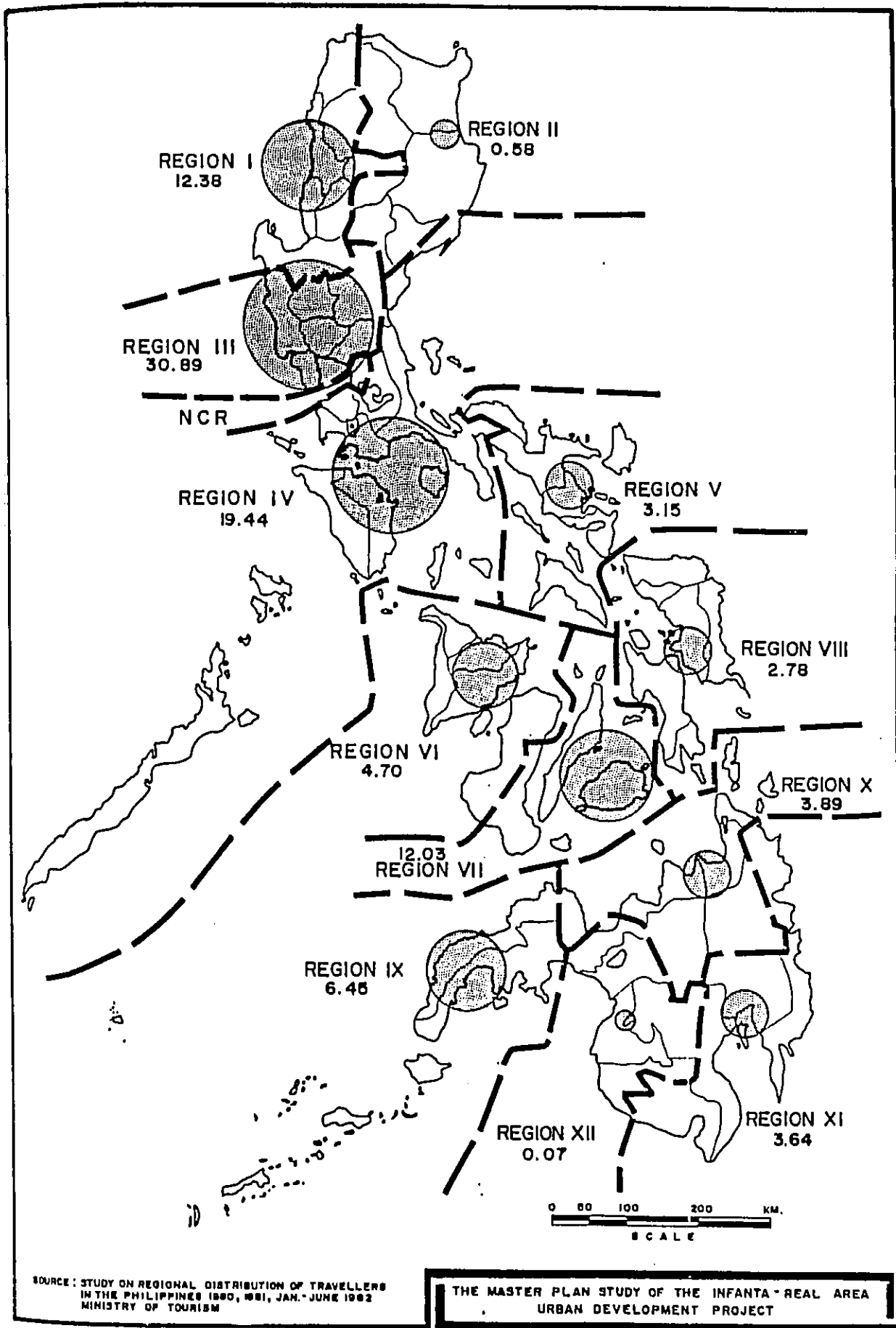


FIG.4.1.3 REGIONAL DISTRIBUTION OF FOREIGN VISITOR TRAVELLERS

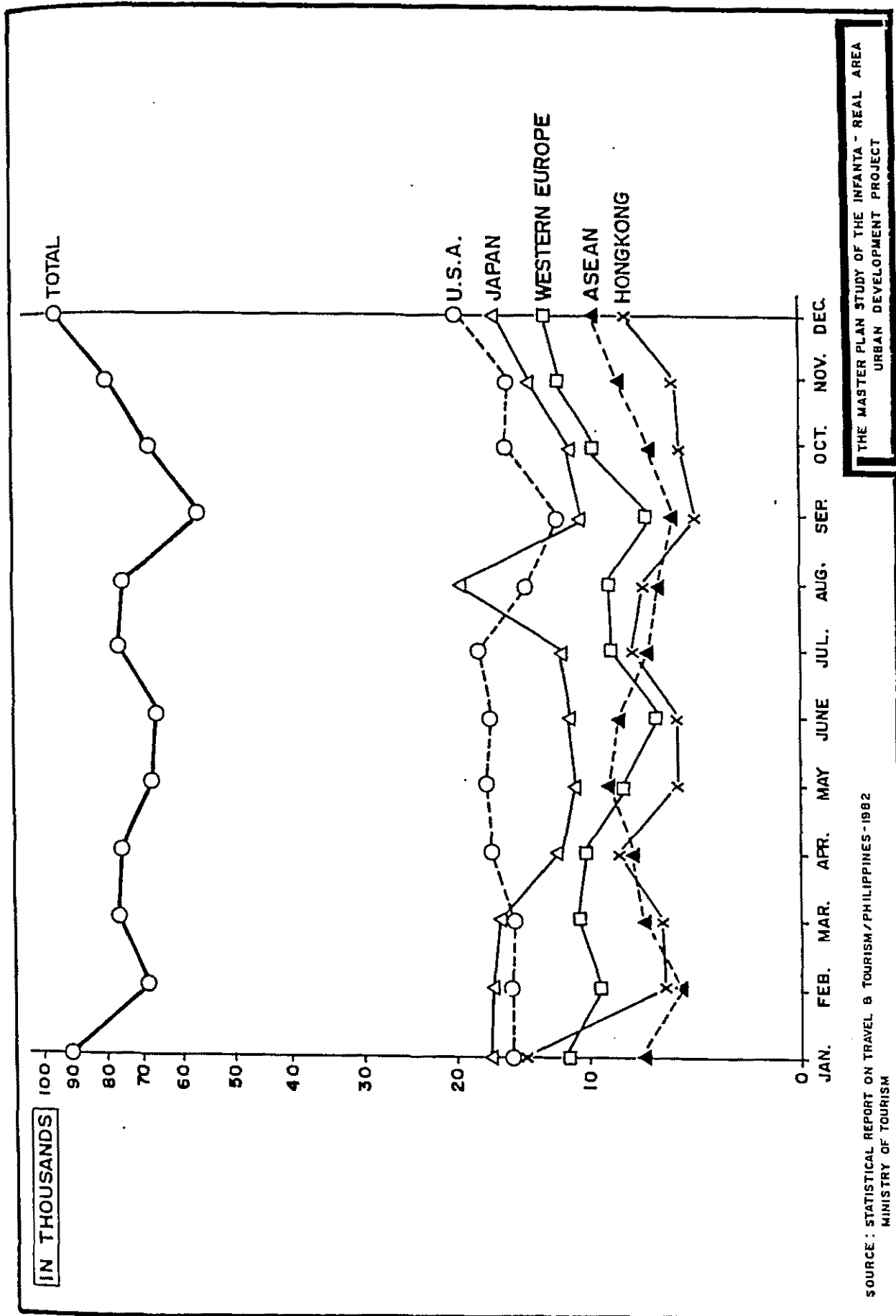


FIG.4.1.4 MONTHLY DISTRIBUTION OF VISITOR ARRIVALS 1982

4.1.2 Existing Tourists Resorts

1) Geographical Distribution

Tourists facilities development has progresses rapidly in recent years, and newly developed resorts are steadily increasing in Manila and the vicinity, Cebu Island, and other places. Many of them, however, are single facility resorts consisting of hotel and acillary sports facility. In this insular nation, an overwhelming majority of resorts are located seaside with only a several mountain/highland type resorts which have only a single shot facility with the exception of Baguio. Major seaside resorts are distributed throughout the nation as shown in Fig. 4.1.5. Beaches suitable for bathing, particularly for general public are few in Manila area (Fig. 4.1.6).

Dependency on small aircrafts for charter is a factor for discouraging the public from visiting remote or offshore island resorts. Regular flights are available to Baguio and Cebu, and direct charter flights from overseas are available particularly to Cebu airport. Development of more resorts are planned for area around Cebu, taking advantage of this airport and excellent natural conditions.

2) Classification of Existing Resorts

The existing resport are dissimilar in the quality of their resources, the level of their facilities, the policy of management, etc. The site characteristics of the existing resorts can be classified by their resources and facilities development as follows:

(i) Resource Reliant

Resorts which rely on their excellent natural resource with little facility investment. Even power and water supply systems are available.

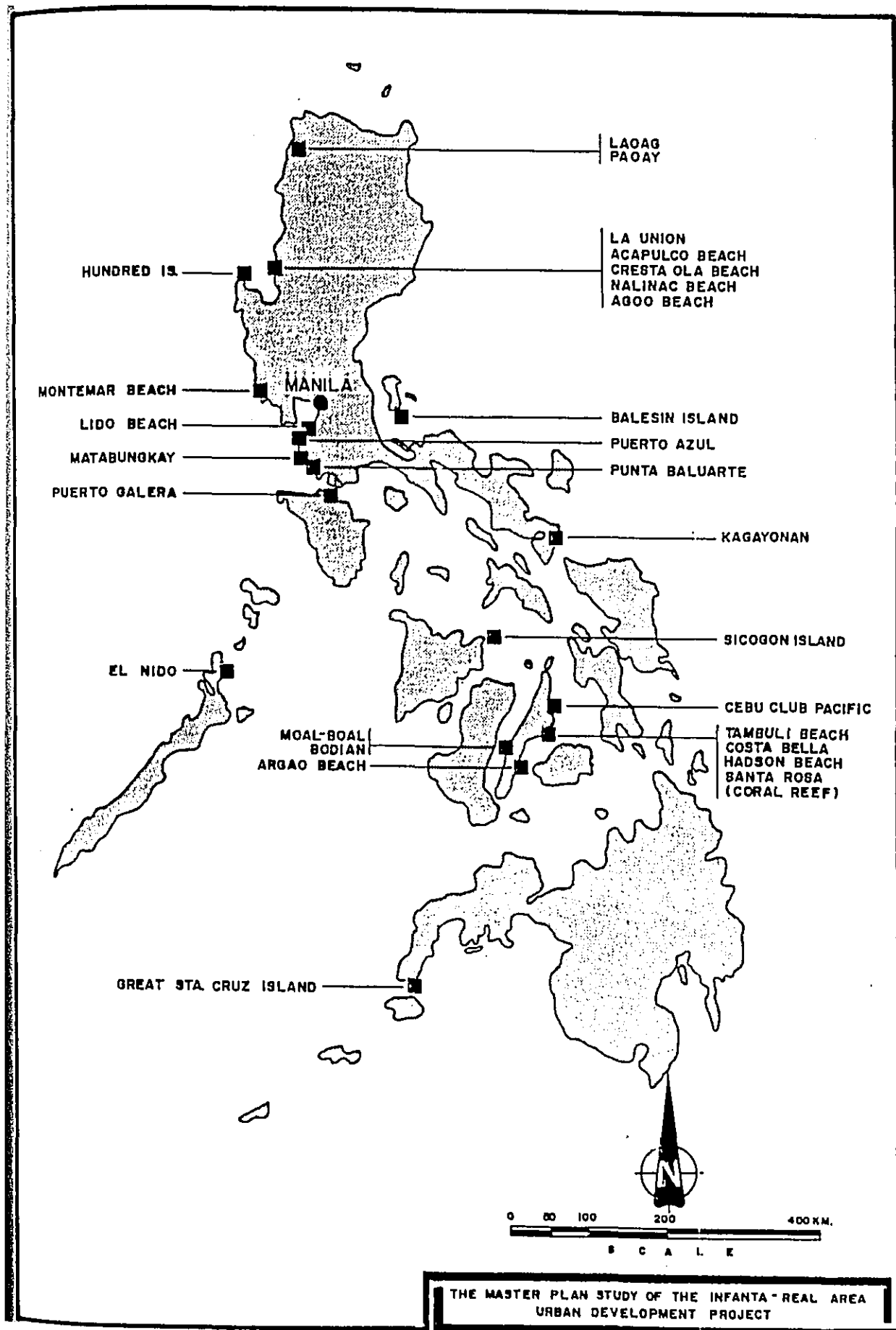


FIG.4.1.5 BEACH RESORTS IN THE PHILIPPINES

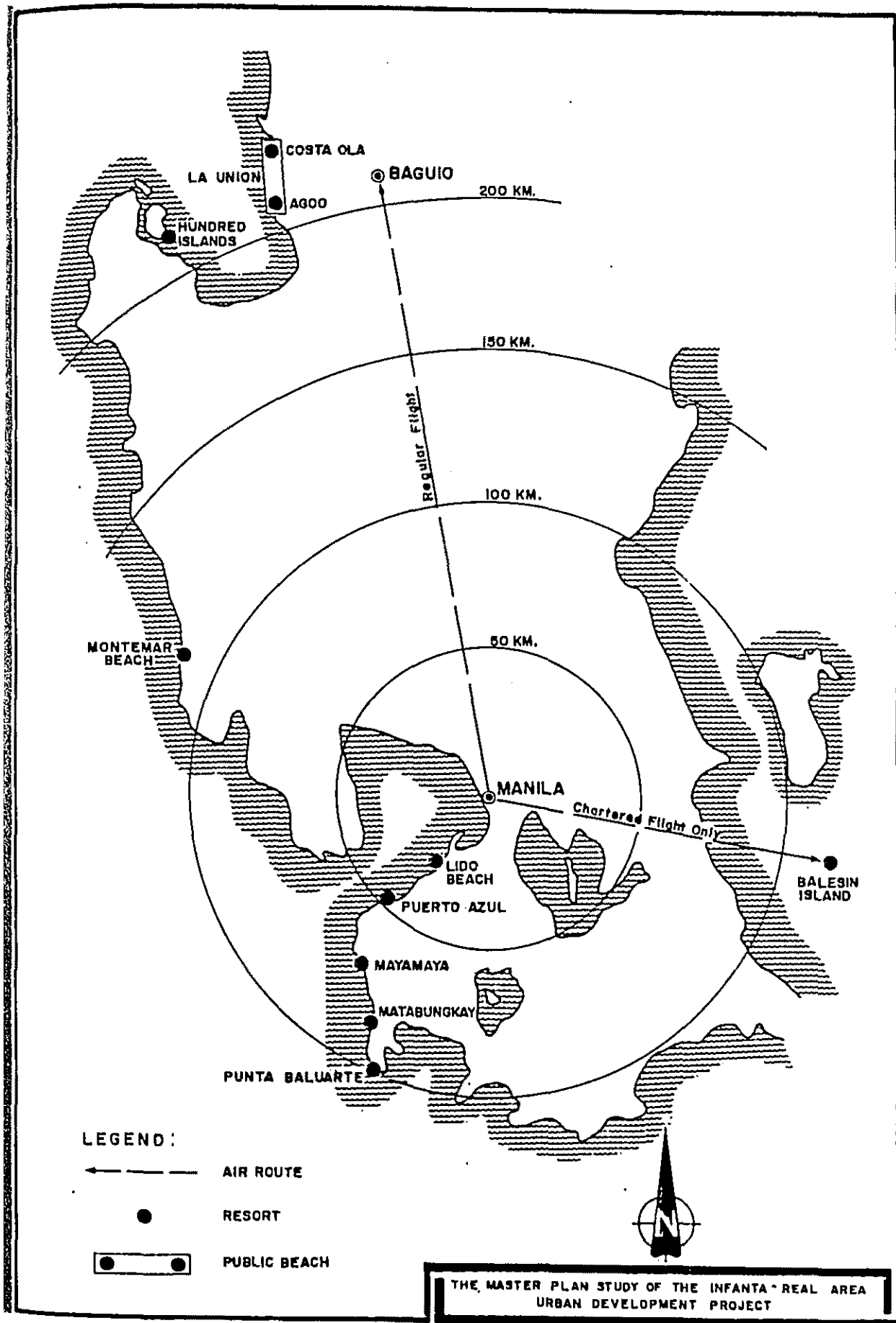


FIG. 4.1.6 BEACH RESORTS AROUND MANILA

(ii) Resources/Facility Reliant

Resorts with facility investments commensurate with the natural resources.. Expensive offshore island resorts and exclusive sections of public beaches fall in this category.

(iii) Facility Reliant

Resorts with only a reasonable quality of natural resources but which make merchandise of their excellent facilities. Many of them are located in the suburbs of a large city of advantageous marketability.

Typical resorts in these classifications are shown in Table 4.1.3. The existing resorts can also be classified by their business policy as follows:

(i) Memberships Only

Operated only for members, and facilities are developed only to the extent necessary for the members.

(ii) Membership and General Foreign Tourists.

Resorts open only to member Filipinos and on reservation basis, to foreign visitors at large. Many expensive resorts operate under this business policy.

(iii) Open to Public

Clients are not limited just as in the case of ordinary hotels. Client segregation is by the level of charge.

Typical examples of resorts in these classifications are shown in Table 4.1.4.

Table 4.1.3 Distinctive Character of Report

<u>Distinctive Character</u>	<u>Prototype</u>
Depending on Natural Advantage	Moal-boal, Puerto Galera, El Nido, Great Sta Cruz
Natural Advantage Plus Facilities	Tambuli, Argao, Sicogon, Balesin, La Union, Hundred Islands
Facility Oriented	Puerto Azul, Punta Baluarte, Agoo, Paoay, Kagayonan, Mayon Imperial

Source; JICA Study Team

Table 4.1.4 Management Policy of Report

<u>Management Policy</u>	<u>Prototype</u>
Member Oriented	Montemar, Maya-maya
Member plus Tourist from Abroad	Puerto Azul, Matabungkay
Open to Public	Punta Baluarte, Argao

Source; JICA Study Team

3) Facilities

Facilities catering to foreign visitors sustain a high quality level. Few of them, however, have a variety of support facilities to offer chances of different amusement activities. Almost none of them have a unique facility.

Major resort facilities are shown in Table 4.1.5, which indicates that, except for ocean activities, the facility which is commonly installed is swimming pool aside from tennis courts.

It appears that, of various lodging facilities, nipa roofed low-rises (row houses or separate cottages are popular.

4) Business Condition

Table 4.1.6, which shows the occupancy rates of resort hotels, indicates that their business condition is not too good in view that such rates are somewhat lower than 69.8% shown by first class hotels in the Philippines (1981).

Day visitors can be expected in addition only at Puerto Azul, in view of time distance from a large city.

Table 4.1.5 Facilities in Major Ports

	Puerto Azul	Punta Baluarte	Montemar	Matabungkay	Maya-maya	Tambuli	Argao
Hotel							
Medium Height	0			0			
Clustered		0	0			0	0
Cottage	0	0			0		
Condominium	0				0		
Beach	Δ	Δ	0	0	Δ	0	0
Wind Surfin	0	0	0	0	0	0	0
Sailing Boat	0	0	0	0			
Spin boat				0	0		
Banca	0	0		0	0	0	0
Divining					0	0	0
Swimming Pool	0	0	0	0	Δ	0	0
Tennis Court	0	0	0		Δ	0	0
Squash Court	0						
Golf Link	0	0	Δ				
Horseback Riding		0					
Bowling	0						
Cycling							
Picnic	0	0	0				
Turf Ground							
Casino							

0 High Standard
Δ Fair Standard

Source: JJCA Study Team

Table 4.1.6 Number of Staying Visitors in
Major Ports

Resort	Capacity*1	Occupancy	Total No. of Visitors
Argao	230 ^{*2}	50-60%	46,173 ^{*2}
Tambuli	104	60-70	24,674
Punta Baluarte	354	60	77,526
Montemar	184	-	-
Puerto Azul	860	45-50	149,103
Matabungkay	350	50-60	70,263

*1 Standard rooms accommodate two persons per room.
Independent cottages accommodate four persons per cottage

*2 Approximate value compute from average rate of operation

Source; JICA Study Team

4.2 Tourism Potentials

1) Optimistic Aspect

Future tourism development presents both optimistic and pesimistic aspects. Following are the optimistic aspects.

(i) History

Except for the stagnant situation in these two or three years, increase in the number of foreign visitors to the Philippines has been dramatic in a long run, and this trend is not believed to change easily.

(ii) Potential Demand

The five million people of Metro Manila alone is predicted to double by the year 2000 in creation of a gigantic demand. Precedents in advanced nations tell that the people of the Philippines, too, will have increasingly greater opportunities to enjoy leisure activities at various resorts. Also demand of foreign visitors will be great in view of geographic advantage (proximity particularly to Japan, a large market) and relatively low prices.

(iii) Rich Natural Resources

A nearly infinite number of nature's paradises exists on green-shrouded islands surrounded by clear water and blessed with abundant sunlight. As many new resorts as wished can be developed simply by the installation of an appropriate approach.

2) Pesimistic Aspect

The following can change situation for the worse:

(i) International Competition

A large number of seaside resorts presently exist in, and more will be opened in the future in areas surrounding the Philippines (see Fig. 4.2.1 for the distribution of existing foreign resorts), and both in terms of quantity and quality, international competition between the Philippines and those areas will intensify. Resolute efforts must be made, if the relative position of Filipino resorts, viz-a-viz, such foreign resorts is not to be given to deterioration.

(ii) Economic Slowdown

Some argue that strong tourism demand cannot be expected inasmuch as economic growth and accompanying personal income increase are hardly on the horizon. Certainly, the type of leisure time activities of the general public of the Philippines is not all bright.

3) Potentialities Materialization

In view of these aspects, tourism development in the Philippines has a high potentialities, if not easy to achieve, provided that the following requisites are satisfied:

(i) Implementation of Comprehensive Policy Measures

These policy considerations be given to infrastructural development, active introduction of private capitals, and others measures in a wide spectrum

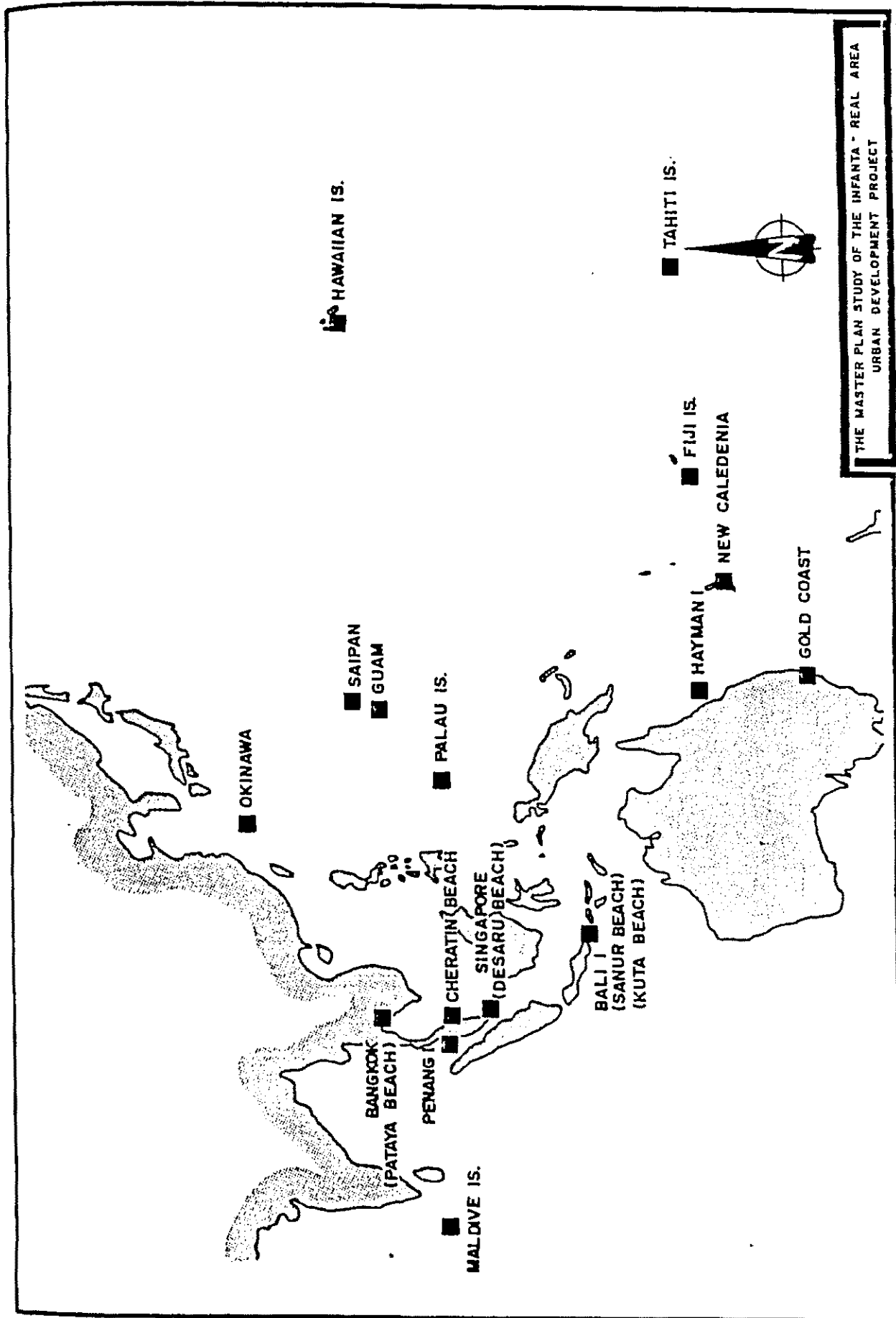


FIG. 4.2.1 BEACH RESORTS AROUND THE PHILIPPINES

(ii) Establishment of a Wide Area
Linkage

Improvement of the attractiveness of (or the establishment of safety and amenity in) Manila City itself and the connection of Manila city with various resorts by appropriate and easy means of access.

(iii) Sustainance of High Quality

Both tourist facilities and service must sustain an internationally competitive level.

(iv) Integration with other industries

The development shall not only satisfy the tourism demand but shall also contribute to the regional development through the development of local industries.

(v) Actualization of latent demand

The development shall have an effect of actualizing the latent demand by having originality, educational aspect, etc.

4.3 Tourism Development Plan

4.3.1 Basic Strategy

The basic strategy of the development shall be as follows;

- (i) A role to trigger and to control the regional development

The development shall become a leading industry in the initial period. A considerable investment shall be made to raise the image of the area.

- (ii) Two targets of development

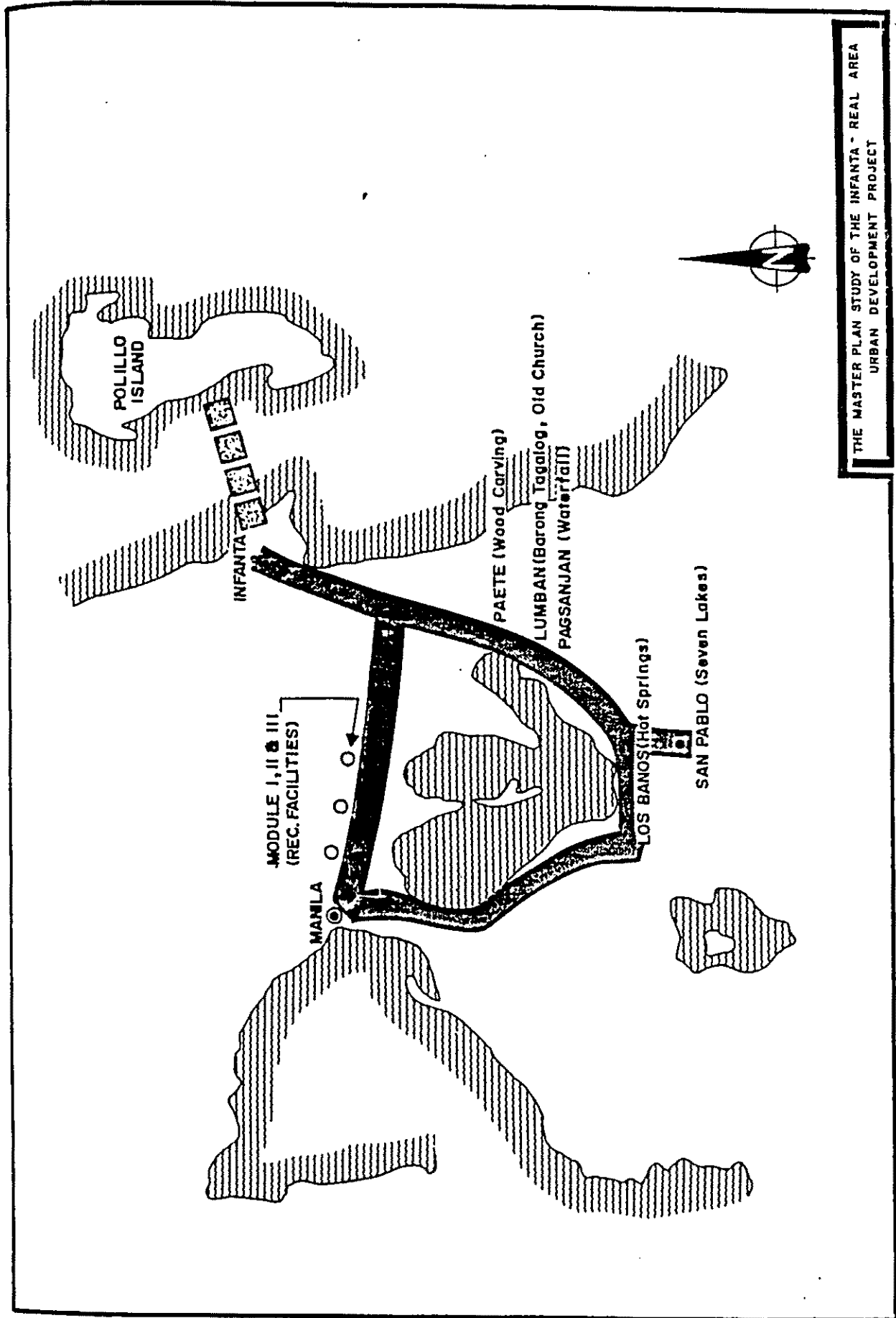
The development shall create both international level facilities and domestic and local level facilities in order to absorb the wide range tourist demand.

- (iii) Emphasis on ocean and Fishery

The priority shall be placed on the facility development that is strongly related with ocean and fishery activities.

- (iv) Formation of inter-regional tourist route and linkage

In order to supplement the scarce socio-economic accumulation, when limited only the the area, a inter-regional tourist route and linkage including towns and municipalities on the south shore of Laqana de Bav (Fig. 4-3-1).



4.3.2 Resources Assessment

1) Condition and Problems of the Area

(i) Sand Beach

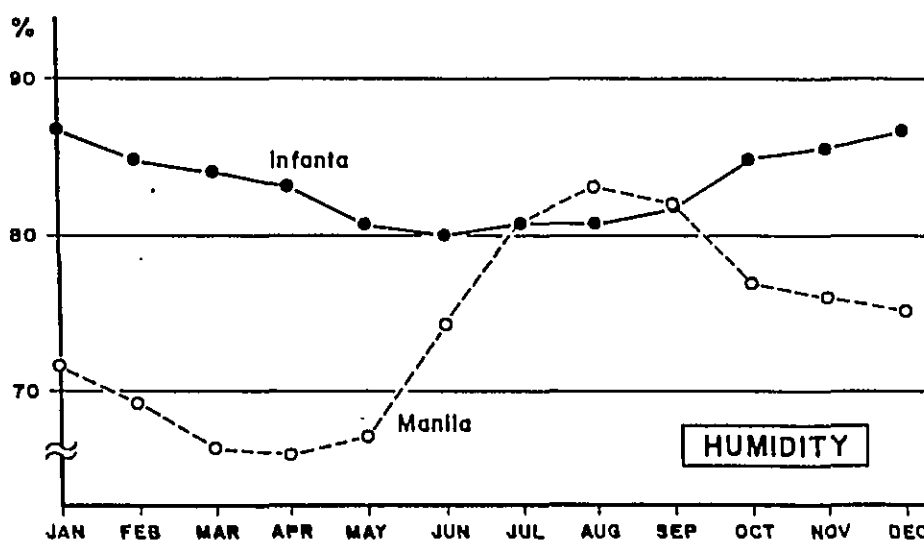
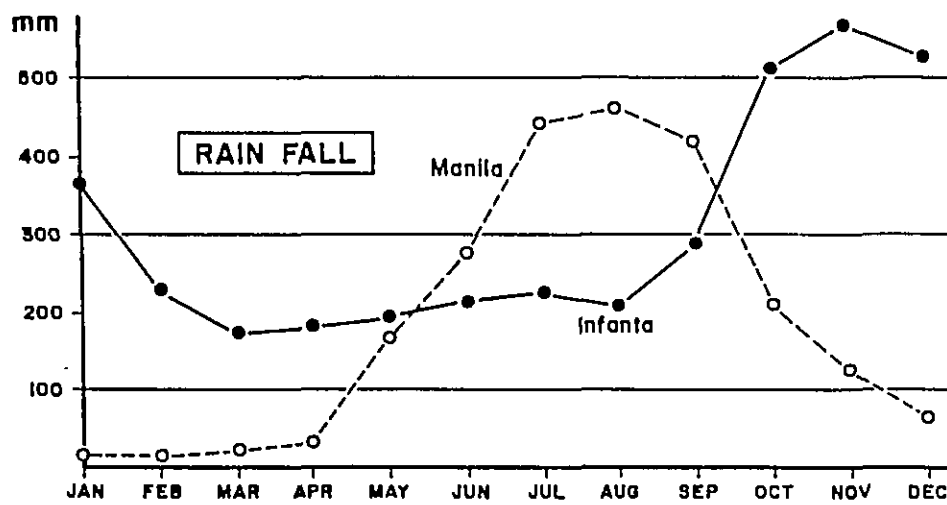
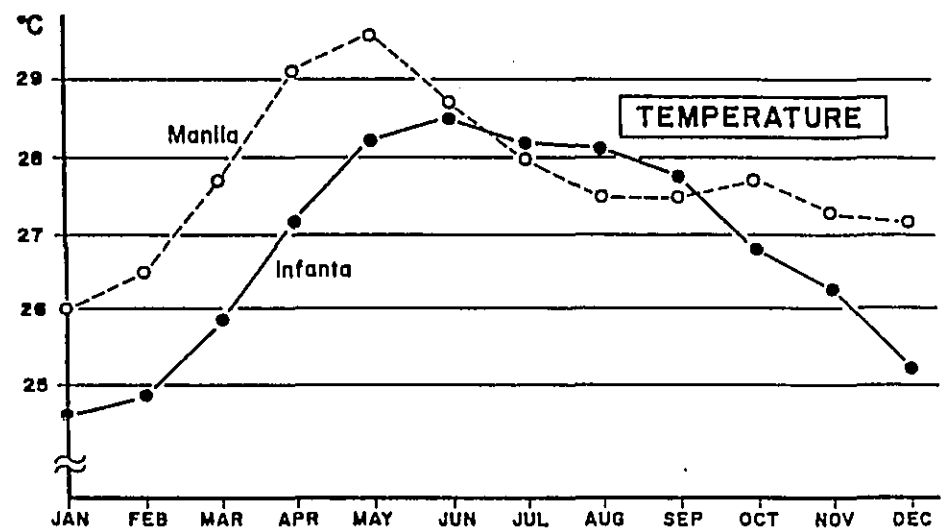
The sand is black, which appear inferior to white sand. The beach has a width of about 30 meters and hinterland partly covered with grass--generally forming a roomy expanse. The water depth suddenly increases, unlike a shoaling beach inside a cay. The beach line extends straight with no disturbance to monotony. The beach, which lacks the sense of being contained, generally resembles that in La Union.

(ii) Hinterland

A village (squatters) occupies a part of the beach, and the major roads are trimmed with houses. General southern area is swamp. In north, most of land other than that occupied by a village is used as rice paddies. A sizable piece of land is hard to find.

(iii) Air/Sea Climate

The weather condition is as shown in Fig. 4.3.2. Temperature is one or two degrees centigrade lower than in Manila, and the rainy season can be said the reverse of Manila. The mean temperature of 80° C does not make the weather ideal for prolonged stay. Typhoon damage cannot be ignored in development planning. Waves are generally not so high, and the rapid incline of the of the bottom unsuitable for surfing. Damage by shark has not been reported, and no obstacle to bathing/swimming exists.



THE MASTER PLAN STUDY OF THE INFANTA-REAL AREA
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FIG. 4.3.2 COMPARISON OF CLIMATE DATA

(iv) Miscellaneous

Within a two-hour reach from Manila, when realized, will be a great attraction, unequalled presently by other than Puerto Azul (Fig. 4.1.6). Meager cultural/social accumulation, including local industries, is a problem, but the retarded development can be very cause of lower prices than other resorts.

2) Development Orientation

The following ways are believed essential for the best utilization of existing resources and for covering shortcomings.

(i) Beach Sectioning

In order to save the beach from monotony, the beach should be divided into sections.

(ii) Swamp Utilization

Swamps cover a wide area of land. Ways should be devised to utilize them such as for adventure/exploratory sail course, adventure trail, and still water areas for sailing boats or row boats.

(iii) Hill Utilization

To make up for small beach area, the adjacent hills should be actively utilized.

(iv) Linkage With Surrounding Municipalities

Along with the utilization of the accumulation in key centers under this Plan, a wide area linkage should be established with surrounding municipalities.

(v) Introduction of Facility Reliant
Resorts

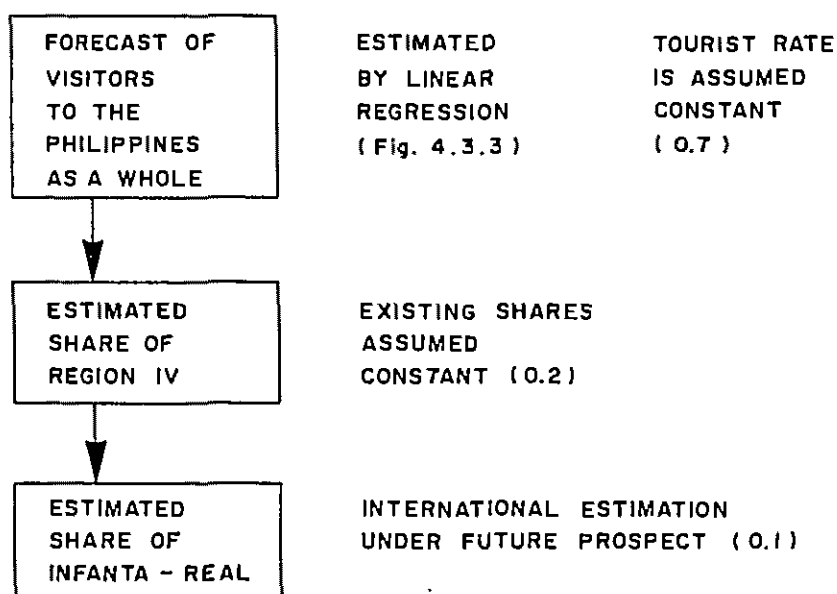
In order to aggressively attract the class of people who would not be attracted only by resources, sophisticated facilities should be drastically introduced.

4.3.3 Demand Estimate

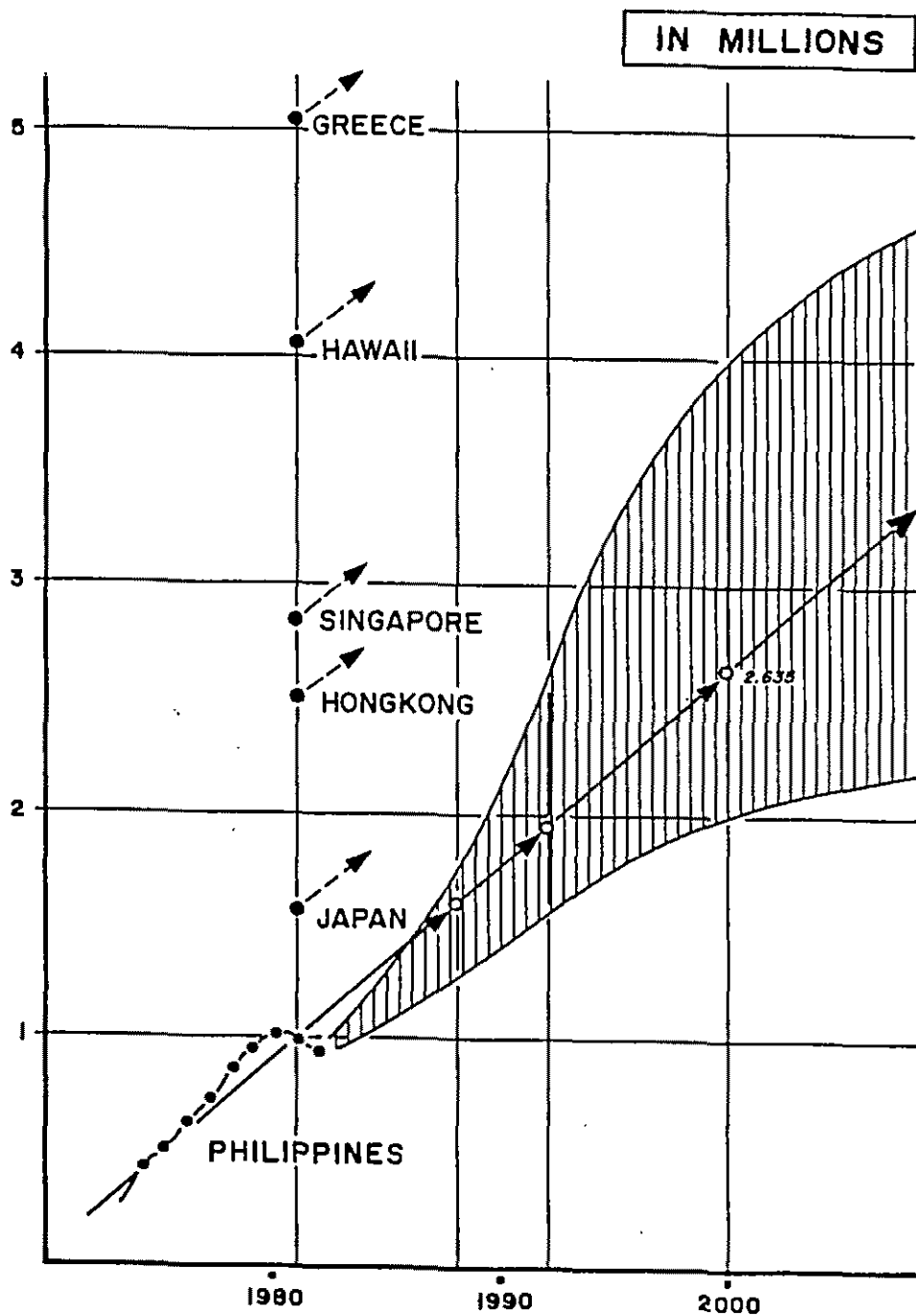
1) General Prospect

Fairly arbitrary assumptions have to be made in order to estimate demand in the area where there is almost no history of such a demand. Demand will be forecasted separately for international tourists and domestic tourists through the following method:

(1) INTERNATIONAL TOURISTS



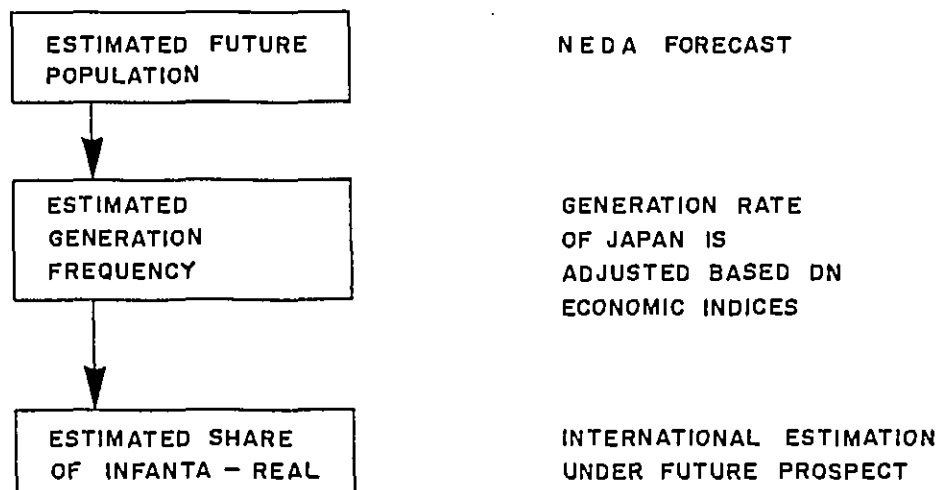
$$P = 2,635,000 \times 0.7 \times 0.2 \times 0.1$$
$$= 36,890 \text{ PERSONS}$$



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URBAN DEVELOPMENT PROJECT

FIG.4.3.3 FUTURE VISITOR ARRIVALS(POSSIBILITY)

(2) DOMESTIC TOURIST



	Population (Thousand Persons)	Generation Frequency	Share Ratio	Shared Volume
Metro Manila	9,633,000	0.07	0.1	68,000
Region III	6,954,000	0.04	0.1	28,000
Region IV	9,468,000	0.07	0.02	13,000
Total				109,000

2) Estimates of Staying and Day Visitors

The total number of staying visitors is estimated by assuming all foreign visitors are staying visitors and applying the ratio (about 30%) of Filipinos staying guests at major resorts.

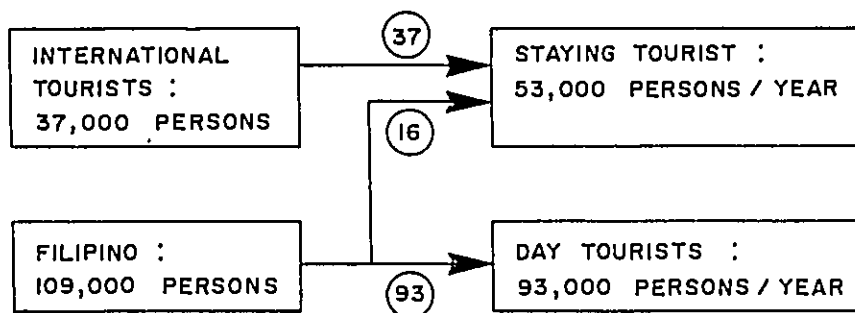
Number of staying visitors:
 $37,000 / (1 - 0.3) = 53,000$ persons

If a portion of the 109,000 domestic tourists is staying tourists, the number of domestic staying tourists is 16,000. Day tourists are estimated as follows:

$$109,000 - 11,000 = 98,000 \text{ persons}$$

In summary of the above, the number of visitors shall be as follows:

This figure represents a net value. If average stay is for four nights, the resort will in terms of total number of staying nights be four times as large as Puerto Azul.



4.3.4 Tourist Resorts Development Plan

1) Facilities

The kind of facilities that should be introduced to this area are determined from the following viewpoints (Fig. 4.3.4):

2) Facilities Combination

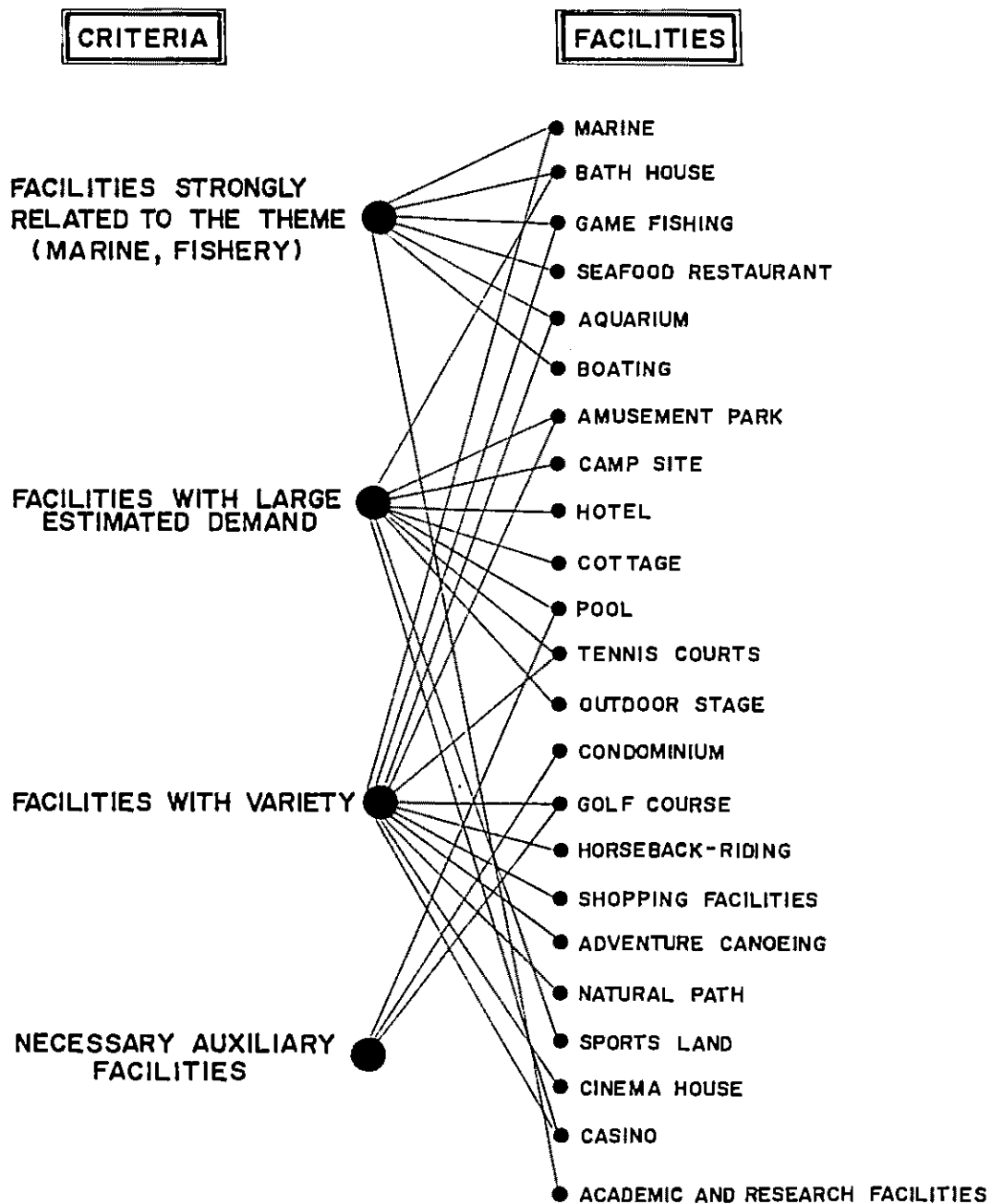
The selected facilities should be established in groups rather than individually for greater use convenience and better business. The grouping of such facilities in consideration of their functional relationships would be as shown in Fig. 4.3.5.

3) Zoning

For locating those groups of facilities, the suitable sites will be selected from the subject area by the following conditions:

- (i) Location facilitating the utilization of marine tourist resources;
- (ii) Location which are not swamps and rice paddies;
- (iii) Location with no existing village.

Fig. 4.3.6 shows the four locations thus selected whose pros and cons are compared in Table 4.3.1. The result is illustrated by Fig. 4.3.7. The entire area can be called a tourist zone consisting of zones with specific names and those without, which should be nature preservation zones. The marine and hotel zone at the tip of the peninsula should be made the symbol of this area by clearing squatters.



THE MASTER PLAN STUDY OF THE INFANTA- REAL AREA
URBAN DEVELOPMENT PROJECT

FIG. 4.3.4 CRITERIA OF FACILITY SELECTION

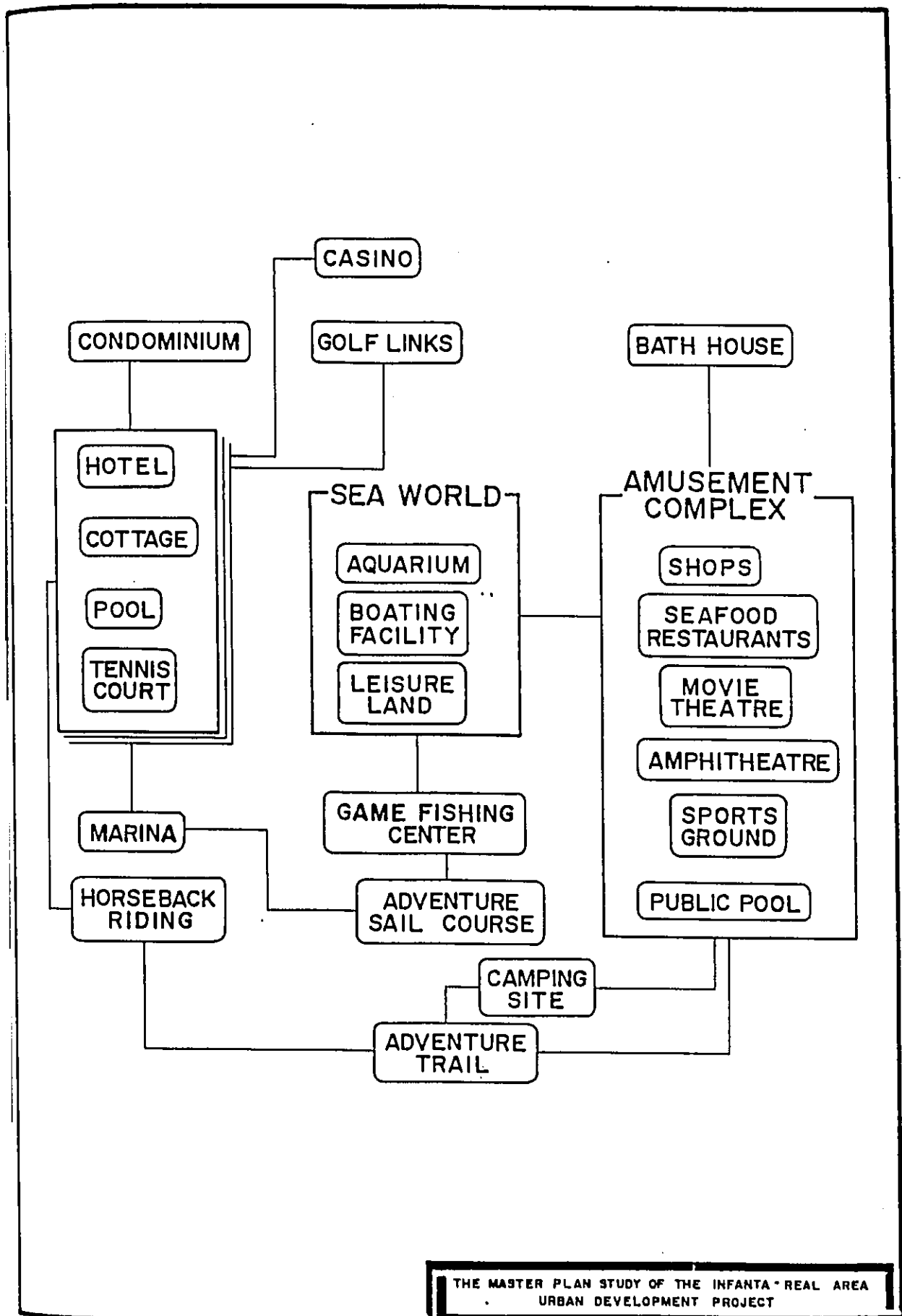


FIG.4.3.5 FUNCTIONAL RELATION OF FACILITIES

Table 4.3.1 Advantage/Disadvantage and Character of Each Site

Site	Advantage	Disadvantage	Character
A	<ul style="list-style-type: none"> - Parcel of land is large. - Combination of hill and seashore is possible. - Segregated location. 	<ul style="list-style-type: none"> - Sea side is of steep slope. 	<ul style="list-style-type: none"> - Independent type. - High class resort.
B	<ul style="list-style-type: none"> - Being hilly, soil condition is good. - Varied configuration produces enjoyable views. - Along the river, view is good. 	<ul style="list-style-type: none"> - Far from the seashore. - Probably surrounded by factories in the future. 	<ul style="list-style-type: none"> - Reserved (temporary use).
C	<ul style="list-style-type: none"> - Facing the sea. - Close to the town. - Possible connection with creeks leading to swamps. 	<ul style="list-style-type: none"> - Exposed to typhoons. - Houses are scattered around. - Lacks in unity and variety. 	<ul style="list-style-type: none"> - Concentrated facilities for public use.
D	<ul style="list-style-type: none"> - Distinguished location act as an edge of the cape. - Facing inner water as well. 	<ul style="list-style-type: none"> - Far from the town. - There is a group of houses at the point. 	<ul style="list-style-type: none"> - Cluster of hotels with yacht harbour.

Source; JICA Study Team

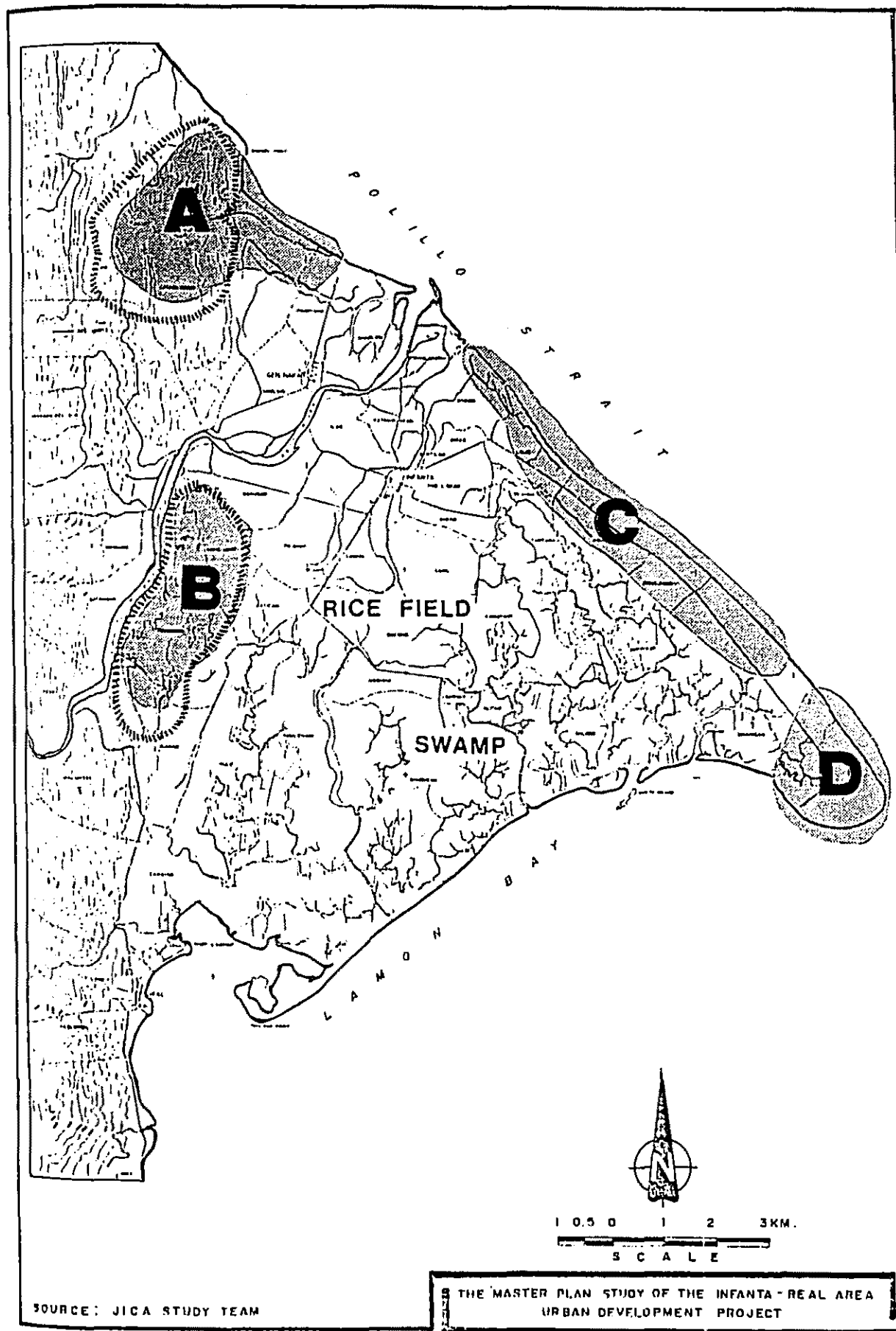


FIG.4.3.6 SUITABLE AREAS FOR TOURISM DEVELOPMENT

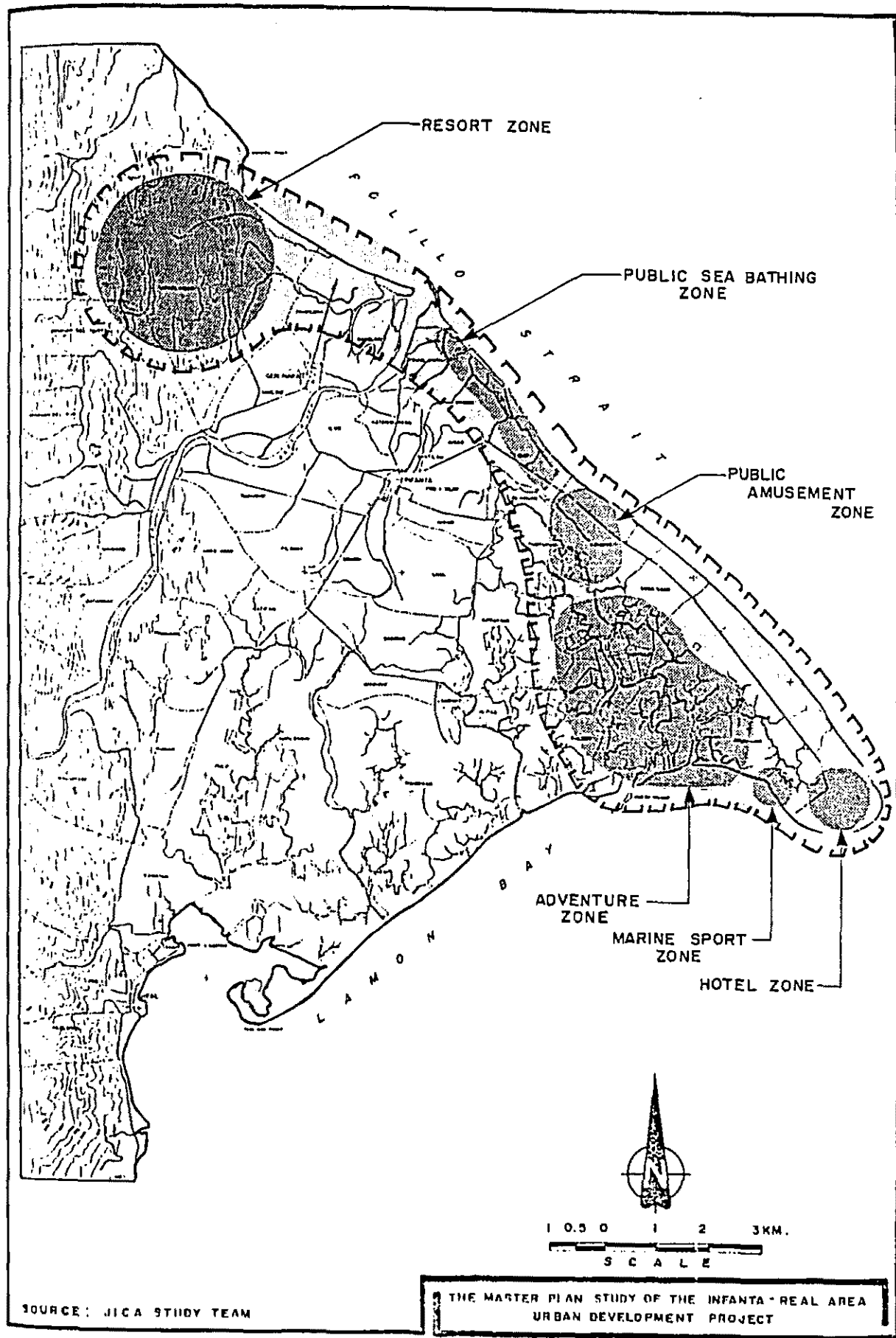


FIG. 4.3.7 ZONING MAP

4) Land Use Plan for Tourism Development

The land use plan delineated for the touristic area is shown in Fig. 4.3.8. This plan is drawn up by putting priority on the seashore area and by maintaining coordination with the land use plan of IRM as a whole described in Technical Report No. 5.

In other words, the area shown in the figure should be regarded as a seashore nature protection area and should be the object of total conservation of both natural environment and landscape.

On other hnd, the following schemes are considered for the sake of its use for touristic and recreational purposes.

(i) Central Facilities District

Convenience facilities, urban facilities, etc., are to be constructed concentratedly in this district in order to compose the base for visitors within the touristic area.

(ii) Resort and Outdoor Facilities District

Accommodations (cottages, etc.) and outdoor sport facilities are to be constructed in the natural environment of this district while conserving the natural greenery and environment.

(iii) Seashore Preservation Green Zone

Measures to preserve the shoreline, beaches and seaside trees that compose the most important touristic resources, and to promote sports, repose and recreation in a natural environment shall be implemented in this green zone.

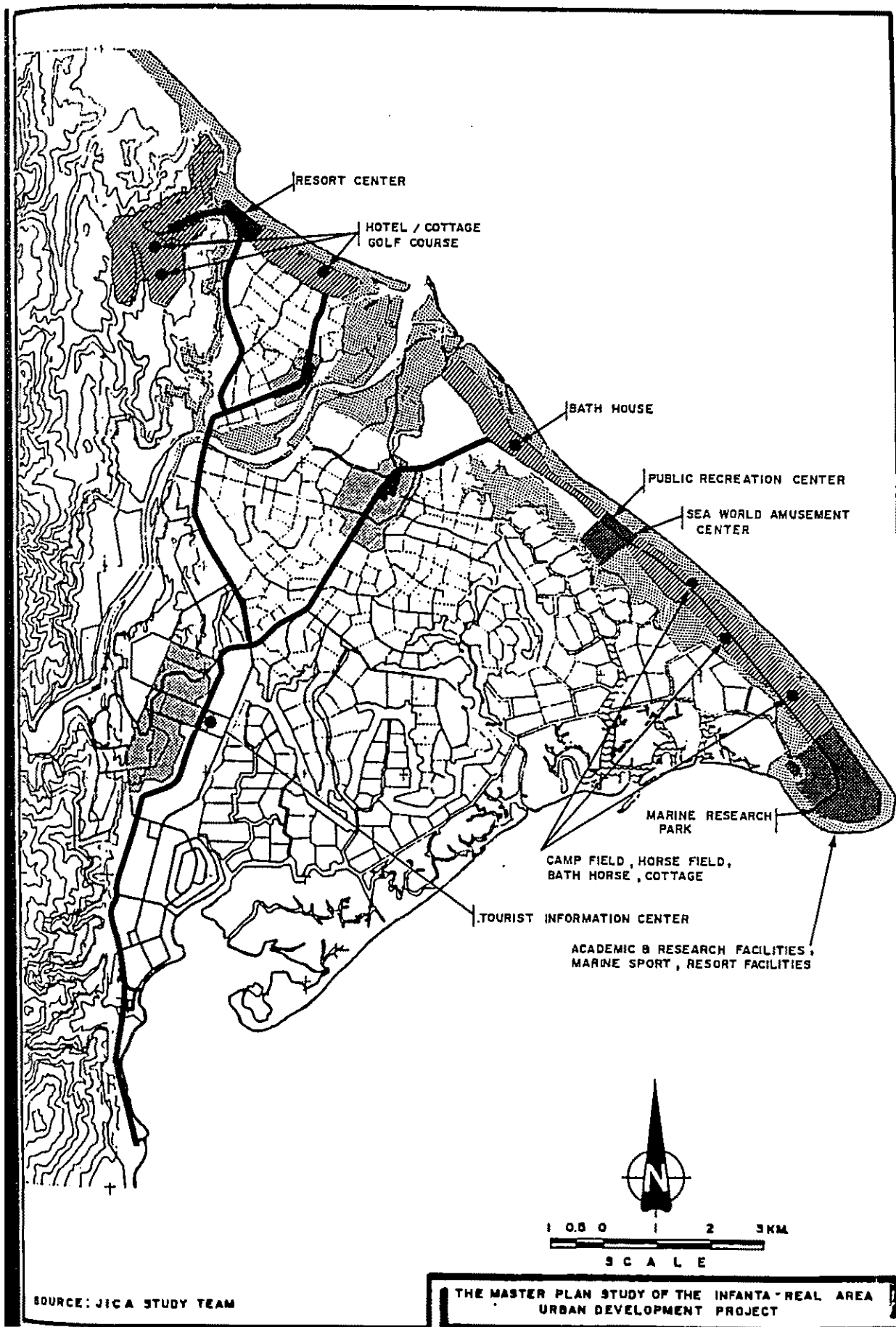


FIG. 3.4.8. LAND USE PLAN FOR TOURISM DEVELOPMENT

The central facilities district shall be arranged as follows, in compliance with the aforementioned zoning:

(i) Marine Research Park

An environmental of superior characteristics consisting of parks and green zone shall be created in the Dinahican district comprising the extremity of the peninsula with the purpose of attracting foreign tourists. From the functional standpoint, research scientific and quality accommodations and marine and outdoor sport facilities shall be concentratedly constructed in this district. (For details about the graphic representation of the development image of this district, refer to the idea for development of the principal district proposed in the land use plan).

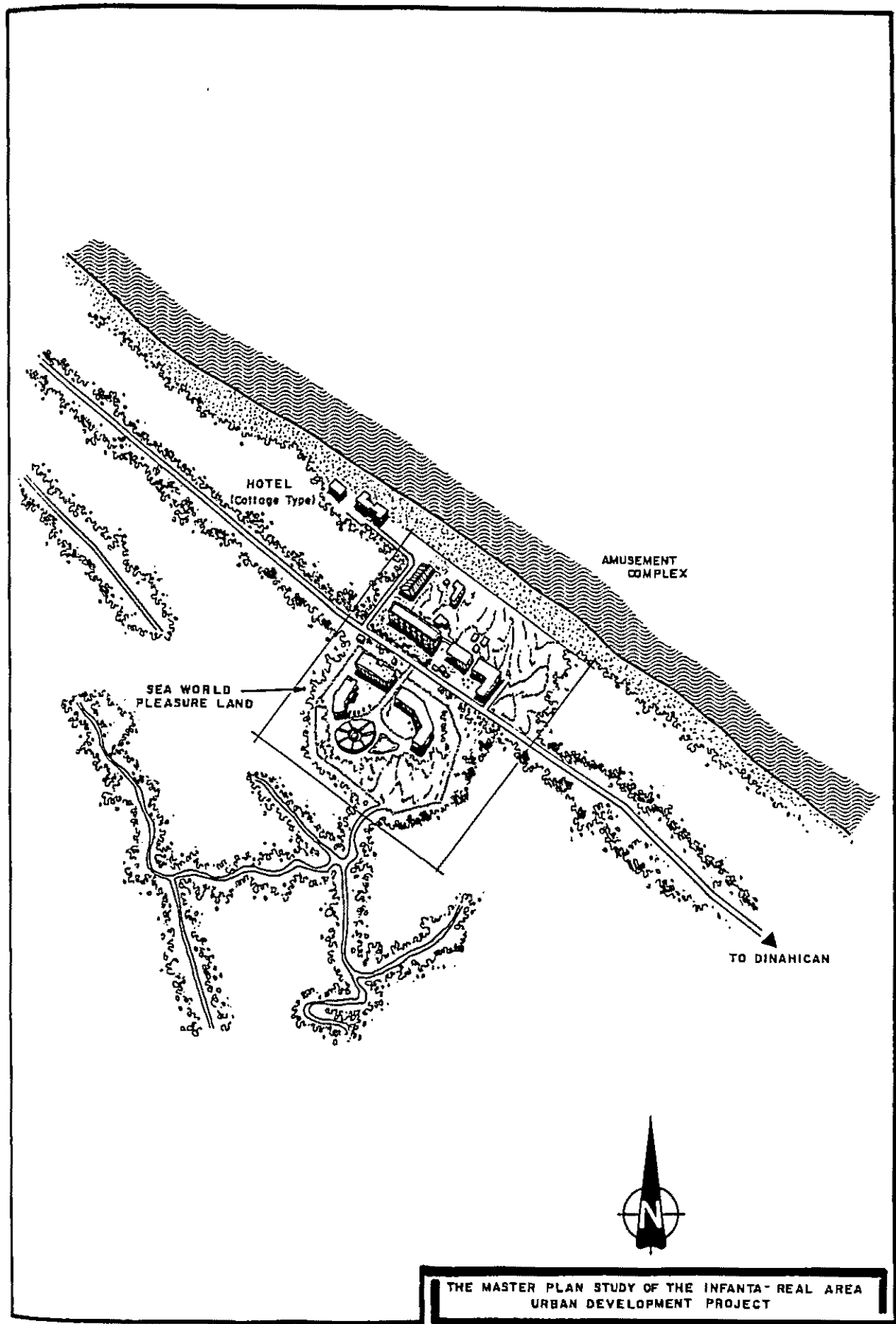
(ii) Public Marine Recreation Center

This center is aimed at being used for recreationla, swimming and other related purposes with integration of sea and beach and the following facilities shall be constructed in addition to the convenience facilities with the purpose of promoting leisure activities.

- ① Seaside-type leisure center (called sea world);
- ② Amusement center (shopping facilities, seafood restaurant, sports facilities, etc.)
(Development image diagram Fig. 4.3.9).

(iii) Resort Center

General Nakar has high potentiality for resort development in the area comprehended between the seaside and the hilly district. Convenience facilities of various kinds aimed at serving resort tourists shall be constructed in compact form in this municipality because it is particularly behind in terms of equipment of urban type convenience facilities (Development image diagram Fig. 4.3.10).



**FIG. 4.3.9 DEVELOPMENT IMAGE FOR PUBLIC
BEACH RECREATION CENTER**

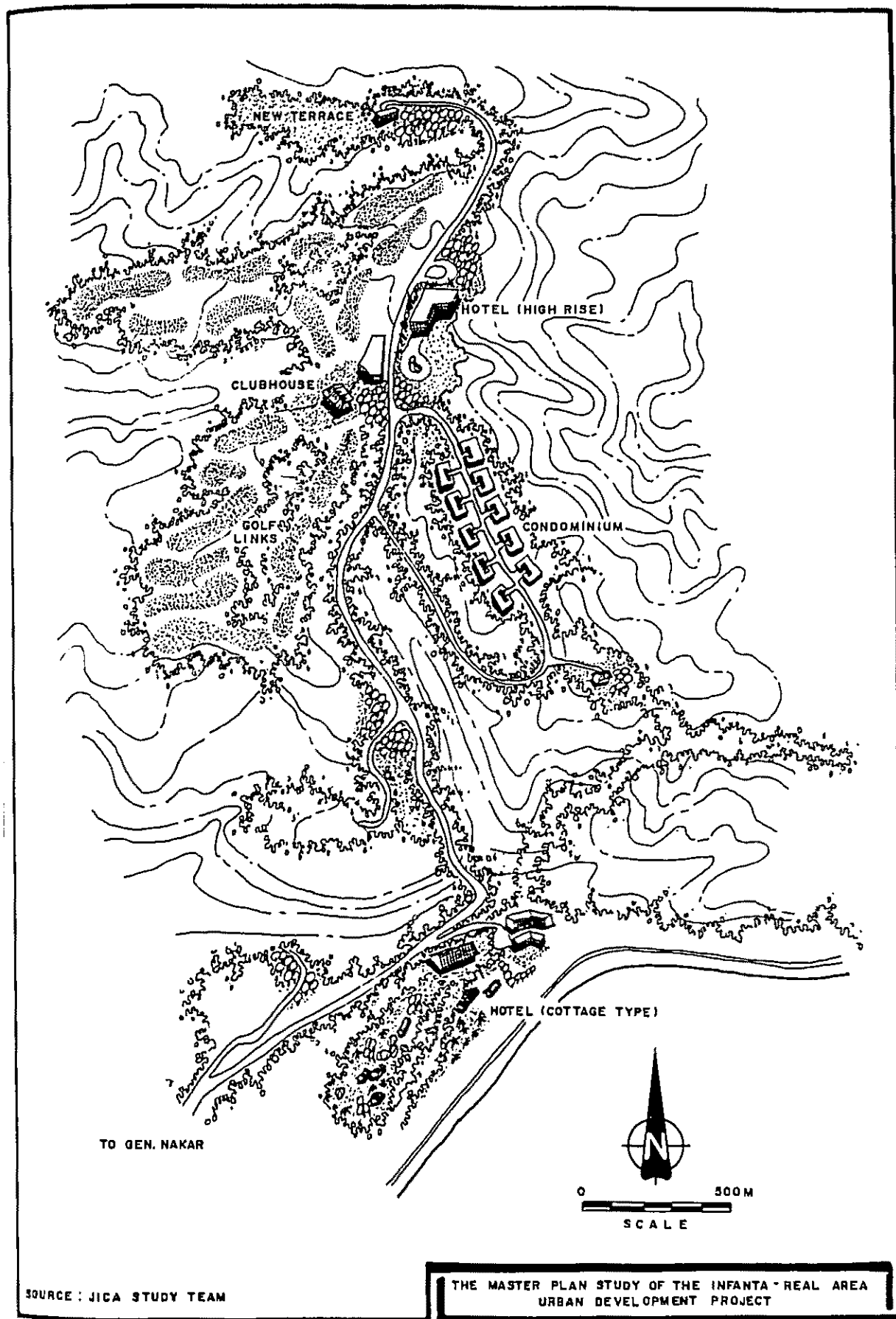


FIG. 4.3.10 DEVELOPMENT IMAGE FOR RESORT CENTER

Facilities indispensable to endeavor to create a picturesque and comfortable space in the study area as a whole by paying special attention to the landscape design along the shoreline not to mention the design of each one of the facilities in question. Care should be taken with every detail, such as the harmonization of the design of minute elements such as street lamps, signboards, markings, etc.

As for the existing houses, convenient measures such as plantation of vegetation, construction of fences, etc. should be considered in order to conceal them.

4.3.5 Facilities Plan

1) Lodging Facilities

The number of necessary beds is calculated on the basis of the total number of staying guests per year:

$$B = \frac{P \times N}{R \times 365} = 968, \text{ rounded to } 1,000 \text{ beds}$$

Where: B = Number of needed beds
P = Yearly number of staying visitors (53,000)
N = Average number of days of stay (4 per person)
R = Average occupancy rate (0.60)

At the rate of two beds per room, the number of necessary rooms shall be 500, which can be allotted to various types and years as shown in Table 4.3.2. At the rate of 300 rooms per high-rise hotel building and 100 rooms per low rise (including cottages), three locations are considered.

Table 4.3.2 Distribution of Rooms According to Types and Years

Type	1988	1992	2000
High Rise	0	200	200
Low Rise Cottage Type	200	200	300
Total	200	400	500

2) Activity Facilities

The facilities of major activities are installed for the following purpose. The content and necessary land space are calculated as follows:

(i) Golf Link

Golf link is to be incorporated into expensive resorts as a 18-hole champion course. Since it will be constructed on hilly part, an 80-hectare land area is to be prepared.

(ii) Bath House

A clean looking bath house with about 80 showers and changing rooms as central function shall be constructed as the base facility of beach for the public. With a cafeteria, total land space shall be about 600 square meters.

(iii) Amusement Center

Shopping center, seafood restaurant, movie theater, game center, etc. shall be located around a seaside plaza to create tourists activity center. Ancillary to it will be an open-air theater, swimming pool, mini-golf course, various athletic/sports grounds/courts and gymnasium. The complex shall be the source of activities throughout the year by holding various events. The size of shopping center shall be about 3,000 square meters, various shops about 3,000 square meters, restaurants and the like about 1,500 square meters and gymnasium, 4,000 square meters. The total land space including swimming pool and sports land shall be about 24 hectares.

(iv) Sea World

A leisure activities land on the theme of fish and the sea consisting of an aquarium. A berth as terminal of adventure sail course, game fishing. Land area shall be about 18 hectares.

(v) Camping Site

To be chiefly used for primary and junior high school children for summer schools but a space for family camping and motor camping site will be also established. Maximum capacity shall be 800 to be able to accommodate for the children of two grades at one time. The land shall be 20 hectares including the peripheral buffer zones.

(vi) Marina

A portion of swamp on the inland seaside of the peninsular tip shall be excavated to make a marina. A portion of swamp on the inland seaside of the peninsula tip shall be excavated to create still water pool for row boats and small sail boats. It will also function as the terminal of adventure sail course as well as base port for fishing and scuba diving activities in offshore waters and Polillo Island. The land shall be 5 hectares and marine shall be 15 hectares.

(vii) Miscellaneous

A horseback riding course shall be made partially utilizing sand beach. A picnic area shall be established on "uninhabited island" on the sea where a simple barbecue can be enjoyed, as the destination of the adventure sail course.

The land areas of these facilities are summarized in Table 4.3.3. Land for hotels shall be about 19 hectares as a total of the four locations as shown in Table 4.3.4.

Also, condominiums are to be introduced in order to offer a variety of lodging facility types and for the ease of fund generation. As for the scale, 50 single family condominiums will be constructed on the land of five hectares.

Utilizing its independent location, General Nakar can incorporate a golf link and condominiums.

Table 4.3.3 Required Areas According to Types

Types	Rooms per Building	Total Floor Area M ²	Building Area M ²	Building Ratio	Site Area per Building	No. of Building	Total Area (ha)
High Rise	200	14,000	2,800	0.05	56,000	1	5.6
Low Rise Cottage Type	100	6,000	5,000	0.15	33,000	3	9.9
Total							15.5

Source: JICA Study Team

Table 4.3.4 Areas for Each Facility

Designation	Area (ha)	Remarks
Hotels	16	4 Blocks
Condominium	5	50 Units
Golf Links	80	18 Holes
Bath House	1	Building Area 100M ²
Amusement Complex	24	
Sea World	18	
Camp Site	20	
Marina	5	Land Area Only
Others	827	Incl. Reservation Area
Total	996	

Source: JICA Study Team

5. TERTIARY INDUSTRY

The number of tertiary industry workers per population as an indicator of the development level of such industry was only 0.09 in IRM Area in 1983 or 0.04 in the three municipalities in 1980 as compared with 0.204 in Lucena, and advanced city in Luzon in 1980.

Tertiary industry would grow (i) along the development of manufacturing/processing industries (particularly those with a large contribution to gross regional domestic products); and (ii) as the area becomes more and more the strategic base (or the traffic distribution and livelihood centers) of a greater area.

IRM shall be developed as the base of goods distribution and life for the east coastal greater area (the center of 250,000 population shepherd of living), and the expansion of manufacturing on the basis of primary products processing is predicted for it. Thus, it is predicted that tertiary industry in this area shall catch up with that in Lucena and the number of its workers is estimated to increase to 24,933 (sans construction), or the rate of 0.2 per population.

Under this growth condition based on the manufacturing sector development as established, the enhancement of its nature as the base for the greater area, the development potentials of tertiary industries in IRM discussed below.

5.1 Tertiary Industry Development Potentials

The tertiary industry which presently exists in IRM is chiefly to serve the living of the inhabitants and such population dominant service industry shall certainly achieve quantitative expansion (and management modernization) along with the future population increase. However, aside from this, there shall emerge new tertiary industry such as the following in view of the nature of the development plan for IRM:

- (i) Tertiary industries relate to commodity distribution; and
- (ii) Commerce and service business to meet sophisticated needs of the inhabitants.

1) Distribution-Related Service Industry

The opening of Real Port as a distribution port and fishing port shall result in the generation of a large volume of commodities for distribution which in turn shall cause the flow of people, information and capital.

The all of such distribution/flow functions are the very distribution related tertiary industry. Therefore, the full achievement of the function of Real Port cannot be expected unless such distribution related businesses will grow.

These distribution-related service business shall serve the entire IRM but shall mostly be located near the port and shall perform an an urban distribution port.

The representative of these businesses shall be:

- (i) Those which shall directly pertain to commodity distribution

Passenger and cargo transport (truckers and bus, jeepney and tricycle transport operators), stevedoring.

- (ii) Those which shall pertain to markets (primary products distribution)

Markets, wholesalers, retail stores

- (iii) Those which shall supply goods on service to the port (port-related service industry)

Ice making, refrigeration/
freezing, warehouses, various repair shops (boat
equipment, motor vehicles, radio sale/repair,
fishing gear sale/repair, etc.) oil' supply, etc.

(iv) Sales and service for port workers
and fishermen

Lodging facilities, restuarants, daily
necessity stores, various personal services,
amusement facilities.

(v). Miscellaneous

Finance, insurance, real estate
(office, houses), tourism (fishing, fish stores,
olkcrafts, etc.).

2) Sophisticated Commerce and Service
Business

The establishment of more sophisticated
commercial and service activities is feasible in
view of future improvement in household incoem in
IRm, the accummulation of 150,000 population and
living shall attract engineers, managers and
entrepreneurs who shall be able to meet such
demand shall contribute to the preparation of an
attractive environment for establishing factories.

Sophisticated commercial and service
businesses means speciality store, supermarkets
with a great variety of merchandise handling
highly fashionable, sociable and cultural
commodities as well as recreational business all
of which shall require an urbanistic shopping area
where people can enjoy shopping.

5.2 Forecast of Accumulation in Major Commercial Area

The future number of tertiary industry workers in IRM is estimated at about 19,700 (sans institutional workers), according to the estimation of economic and social framework.

If these workers shall be located in downtown area at the present rate of concentration (of tertiary workers) to Poblacion of 55.0%, the area of commercial land needed in the future shall be 54.2 hectares (at the net worker density of 200 per premises area), which shall be 6.3 times the area of present commercial land (8.63 hectares).

All of this necessary commercial land cannot be provided in the existing downtown area (94.2 hectares in all) but shall have to be shared by the following five as discussed in Chapter (Land Use Plan):

- (i) Existing (old) urban area commercial land (Infanta, Real and General Nakar);
- (ii) New Infanta downtown (the regional center);
- (iii) New Real downtown (Urban Distribution Area).

The quantity of future accumulation in these five commercial areas are predicted as follows:

(1) Tertiary industry is classified into (a) retailing utility, social and personal services (sans institutional sector); and (b) wholesalers, transportation, communication, warehouses, finance, insurance, and real estate.

The former increases in proportion to the accumulation of (population-dominant) while the latter increase in proportion to the accumulation of offices (office-dominant).

(2) The former (population-dominant) industries shall distribution in accordance with the population distribution as estimated for the year 2000 (see Table 5.2.1). It is assumed, however, that with regard to tertiary industries which shall be dominated by suburban population, the present urbanization rate of 55.0% shall remain constant and that they shall be located in the existing (old) urban area of each municipality (that is, it is assumed that the remaining 45.0% shall be located in surburban area).

(3) The workers engaged in the tertiary industry which shall be responsible to the number of offices are allocated in proportion to the total of (a) the number of workers engaged in various non-primary industrial development projects in the municipalities and (b) said number of workers engaged in the population-dominant tertiary industries.

Based on the result of this estimate, the major characteristics of future commercial areas in IRM are enumerated as follows:

(i) The largest commercial area shall be in the new Infanta urban area. However, most of the commercial workers shall be of population-dominant type businesses and thos commercial area shall be strongly characterized as livelihood base.

(ii) The existing Infanta downtown which is the existing commercial center of the regional also has high accummulation as a commercial area with agricultural population in the background.

Table 5.2.1 Distribution of Tertiary
Industry Employment (IRM)

	Gen. Nakar			Infanta			Real		
	Suburb	Build up area	Suburb	Build up area	New Build up area	Suburb	Build up area	New Build up area	
Population (2000)	6,000	5,000	37,000	20,000	50,000	3,000	15,000	14,000	
Population Responsive tertiary industry workers	-	688	-	3,333	4,130	-	1,375	1,156	
Establishment Responsive tertiary industry workers	-	1,429	-	1,715	1,638	-	562	1,935	
Total	-	2,117	-	5,048	5,768	-	1,937	3,091	

Source: JICA Study Team

(iii) Another new commercial nucleus to be formed shall be new Real downtown which shall be developed with distribution/fishing port and office dominant business workers shall be (the office-dominant business workers shall be (the largest in IRM) larger than the population/dominant business workers which indicates the characteristic of this area as the base of service to production activities in IRM.

(iv) By far the greatest source of tertiary workers in General Nakar shall be the paper-pulp plant (2,600 employees).

5.3 Tertiary Industry Promotion and Commercial Land Development

Commercial activities in IRM is expected to grow as the nucleus of the region as pointed out in 5.1 above. For this to happen, various commercial promotion measures must be taken.

Tertiary industry in this area is not expected to be the leading sector for regional development. The leading industry in this area is, as stated elsewhere, primary industry and primary products processing industry. Therefore, it is expected that tertiary industry shall follow these industries and shall grow as it shall perform a supportive of primary and secondary industries.

Of tertiary industries, those which shall lead, to some extent, the development of regional industries shall be tourism and distribution while tourism development shall be as discussed in Chapter 4, distribution business must be actively promoted along with the development of the distribution/fishing port.

Commercial businesses inevitably grow long with the vitalization of production activities and the accumulation of population, although appropriate commercial promotion measures must be taken, commercial environment liable to become bottleneck must be removed and physical facilities must be developed.

It is believed desirable that commercial area development in IRM be achieved in the following three areas in the priority order listed: (i) port commercial area; (ii) expansion of the existing commercial areas; (iii) development of sophisticated commercial area in the regional center.

1) Development of Port-Hinterland
Commercial Function

Development target in this commercial area is the enhance of distribution-related commercial functions, as stated in 5.1 (primary distribution, port-related industries, sales services, and miscellaneous). Particularly, the tasks to be performed from the viewpoint of downtown development are as follows:

(i) Past experience indicated that a port and its hinterland are prone to become an unsightly urban environmental but this area is the front door to the east coast area and as such must be developed with due care for the achievement of an esthetic value by the improvement of environment and efforts to create a novel urban fishing port in unity with a general fisheries center and as a tourism base and the inhabitants base of living.

(ii) A squatter area or an inferior housing area is liable to be formed in the backyard of a port but such shall be undesirable commercial environment to the locating entrepreneurs and visitors to the area. Therefore, care should be taken so as to furnish the inhabitants and the workers with adequate comprehensively developed housing areas and houses.

2) Commercial Land Development in the
Existing Downtown

The most serious of the many problems with commercial areas in the existing downtown is that they have developed in accordance with the pre-motorization standard. That is, they have not been conceived of as the commercial center of the greater east coast sphere of living or of the urban community with a population of over 100,000.

The larger the city, the more industrialized the society and the higher the income and level of living the greater reliance on motor cars. When increase motor cars flood the center of the existing downtown area, the street networks is far from being satisfactory in accommodating such traffic. Aslo, the blocks of land demarkated by streets are too small to accommodate for large intensive commercial facilities.

In consideration of these problems, as light as a population burden as possible is allocated to the existing downtown. However, as it can be known from commercial demand for the central area of Infanta, these existing downtowns shall have to continue to function as commercial centers for the neighboring agricultural areas.

The commercial areas existing in each municipality is 6.0 hectares in Infanta, 2.1 hectares in Real and 0.5 hectares in General Nakar whereas the areas needed in the future shall be (at the density of 200 workers per hectare) 25.2 hectares (4.2 times) in Infanta, 9.7 hectares (416 times) in Real and 10.6 hectares (19.4 times) in General Nakar. These future commercial areas shall account for 54% of the downtown area (the area where streets and blocks are well defined) of 46.8 hectares in Infanta, 70% of 35.6 hectares in Real and 90% of 11.8 hectares in General Nakar. Both in views of land demand and traffic be radically remodelled to become commercial areas.

Such remodelling can be on a gradual basis. However, because commercial demand on the existing downtowns shall be gradually mitigated throughout the project period up to the year 2000, as the gigantic demand for commercial land shall be met with in new Real downtown and the regional center to be established. The remodelling shall be in the following points:

(i) Revamping of the area for effective accommodation of motor traffic while achieving pedestrian vehicle separation for safe shopping activities;

(ii) Rearrangement of blocks and street so as that land can be used intensively in super blocks;

(iii) Creation of modern shopping street while securing sufficient parks and other open spaces.

3) Regional Center

The development of the regional center shall be in full scale when the population shall reach 100,000 or 150,000. Prior to that, basic development efforts shall concentrate on making this area nucleus to serve increased workers of the hospital, university and other facilities as well as the inhabitants of the hillside houses to be constructed in the adjacent area. In order that road development between Manila and IRM shall not result in the outflow of consumption from IRM but a high ratio of intra-area consumption shall be sustained this area must be developed as an amusement facilities, supermarkets, and so forth with a high amenity and urbanity as previously discussed.

6. SOCIAL DEVELOPMENT PLAN

6.1 Social Characteristics of the Area

6.1.1 Demography

The 1983 population of the planning area was estimated at 44,423 persons (7859 households) based on the result of the survey conducted by the Study Team.

The past transition of the rate of population increase of the three (3) municipalities combined (1970-1980) was 4.5%/annum during the former 5 year period (1970-1975) while the latter half was recorded very low at 1.6%/annum (1970 and 1980 census data). Taking the stable natural increase into consideration which is apparent from the census data (1975-1980 totalling 13.8%) into consideration, the tendency of the excessive out-migration during the past decade has been growing.

The 1983 population was composed of 39.1% of young population (Ages 0 to 14), 57.9% of productive population (Ages 15 to 64) and 3.1% of old population (Ages 65 and above). When compared with the national average, the young population is smaller in the composition while the productive population is large. The old population has about the same share as the national average.

Therefore, the dependency indicator (the total of the minor and aged population against 100 productive population) is naturally very low at 72.9 as compared with the national figure of 83.3.

6.1.2 Employment

The number of gainful workers at IRM in 1983 is estimated at 11,596, and its composition is shown in Table 4.2.1. The employment rate of population 15 years old and above is 43.0%. Taking the area's high ratio of productive population into consideration, a considerable number of unemployed population (especially in the area's leading industries such as agriculture and fishing) seems to exist.

Furthermore, the ratio of employed population against the total population (dependency indicator) of IRM area at present indicates that there are 3.83 dependent persons for every employed person while the national average ratio is dependent persons/one employed person. This likewise implies the existence of the underemployment.

Of the area's total working population, 11,596 persons in 1983, 47.8% are engaged in agriculture, 10.6% in fishery, and 0.1% in forestry totalling 58% (16,788 persons) of the total working population employed in the primary industrial sector.

There are only 8.8% or 1,022 persons engaged in the secondary industrial sector, and its majority belongs to the construction sector (6.3% of the secondary industrial workers) who are mainly workers engaged in public works such as road repair, etc.

The rest of the secondary industrial workers in the manufacturing industry are engaged in rice milling, pastry, nipa wine manufacturing, tailoring, wood carving, blacksmithing, and automobile repairing. All of these exclusive of sawing are cottage industry type manufacturing which cater to the daily service needs of the area's residents.

The workers in the tertiary industrial sector total 3,786 persons about half of which work in social and individual services such as administration, education, etc. The other half are engaged in whole sale retail and transportation which are mainly sari-sari store owners and tricycle drivers.

Based on the composition of the tertiary industrial workers described above, it can be estimated that the dominant classification of the area's tertiary industry are administrative services, retail and transport services.

As for other categories of the tertiary industry, social demand for such services and the consequent employment opportunity except some cinema houses and restaurants are still quite small at present.

The area's average annual household income is estimated from the survey result conducted by the Study Team in 1983 at 8,400 pesos/year which is very low when compared with the average figure of Region IV at 22,000 pesos/year (Luzon Island portion adjusted from the 1981 figure above). By municipality, Real has the highest income level at 10,800 pesos/year followed by Infanta at 8,300 pesos/year, then General Nakar at 5,900 pesos/year.

6.1.3 Social Services Standard

1) Public Utilities

The area depends for its water supply on ground water source such as spring and shallow wells, except for a part of Real where piped water supply system is in operation.

Electrification covers about 44% of the total households in the area (Region IV is at 61% in 1982) with a relatively extensive distribution network throughout.

Table 6.1.1 Educational Level (Elementary and Secondary Education)

Elementary School	Teacher Requirement	33.2	40.0	$\frac{\text{No. of Pupil}}{\text{No. of Teacher}}$
	Classroom Requirement	39.2	40.0	$\frac{\text{No. of Pupil}}{\text{No. of Classroom}}$
Secondary School	Teacher Requirement	25.5	50.0	Same as above
	Classroom Requirement	48.2	50.0	Same as above

In communications, besides the postal service and telegraph service to be mentioned later, there exists only one private radio telephone facility which has very poor connection with outside areas.

Drainage is dependent on existing creeks and rivers in the area. In the urban area, waste water is drained through earth ditches to the above mentioned creeks and rivers. However, stagnation occur very often, thus, degenerating the sanitary condition of the urban areas.

2) Social Services Facilities

The area's educational (elementary and secondary) level, when compared with the target level of MLGCD, has a higher number of teachers but about equal in class size. Likewise, it is relatively high even when compared with the Region IV average.

The area's literacy rate is estimated at 95% (December, 1983) which exceeds the national average of 90%.

As for higher education, there exists one community college which utilizes the existing facility of a high school and offers only night classes. According to the survey result in 1983 which shows a high percentage of students (one student in every 45 households) who go out of the area for better education opportunities, this college does not seem to provide, in essence, appropriate educational opportunities in the area.

At present, a provincial hospital with 25 beds exists covering the east coast area (including Polillo Island) and having a service population of 110,000. Therefore, according to the MOH standard, of one (1) bed for every 500 persons only 10% of the required demand at present (220 beds) is satisfied. (The national average in 1980 is 1 bed for every 573 persons.)

The number of existing Rural Health Units (RHU) satisfies the MOH standard of 1 unit in every municipality. But the number of Barangay Health Stations (BHS) does not meet the same standard of 1 unit for every 5,000 population (for the existing 6 units against the required demand of 9 units, the national average is 1 unit for every 6730 persons in 1980).

As for the result of the facilities for which MLGCD sets facility standards such as parks, libraries, and solid waste disposal, neither an ordinary park nor a library exists in the area at present. Solid waste collection service is now carried out in very limited areas of its poblacions (whereas a 100% collection is set as MLGCD standard).

There are facilities for postal and telegraph services but delivery takes a very long time. For example, to reach Manila, it takes two to four days for telegrams, and five to seven days for letters, which is unacceptably long.

In summary, the area's facility standard in social services is quite low, with an exception of education, when compared with the neighboring region (the Luzon Island portion of Region IV).

In order to satisfy the standards of MLGCD, a considerable improvement and development of facilities as well as administrative services shall be required.

6.1.4 Settlement Hierachy

When grasped on the concept of settlement hierachy, the expense of the residents' daily living in the IRM area shall be classified into the following seven (7) strata (Fig. 6.1.1):

(i) Basic Settlement

A basic neighborhood unit which has a homogenous livelihood based on the area's major industries such as farming and fishing.

(ii) Barangay

The smallest administrative unit consolidated under the leadership of a Barangay Captain (in many cases, retail stores, churches, barangay halls, etc. function as its core).

(iii) Barangay District

An aggregate of several barangays principally concentrated on a school zone such as an elementary school and/or high school and with large scale retail stores, establishments, transport nodes, etc. forming its core.

(iv) Municipality

An administrative unit composed of various barangays centering on a poblacion.

(v) IRM (Three Municipalities)

An area of geographical homogeneity in Infanta Plain centered on Infanta composed of the three municipalities of Infanta, Real, and General Nakar.

(vi) East Coast Region

A region of geographical homegenity in the east coast area of the Luzon Island centered in Infanta Plain (including Polillo Island).

(vii) Other Regions

Outside regions over the Sierra Madre (especially MMA).

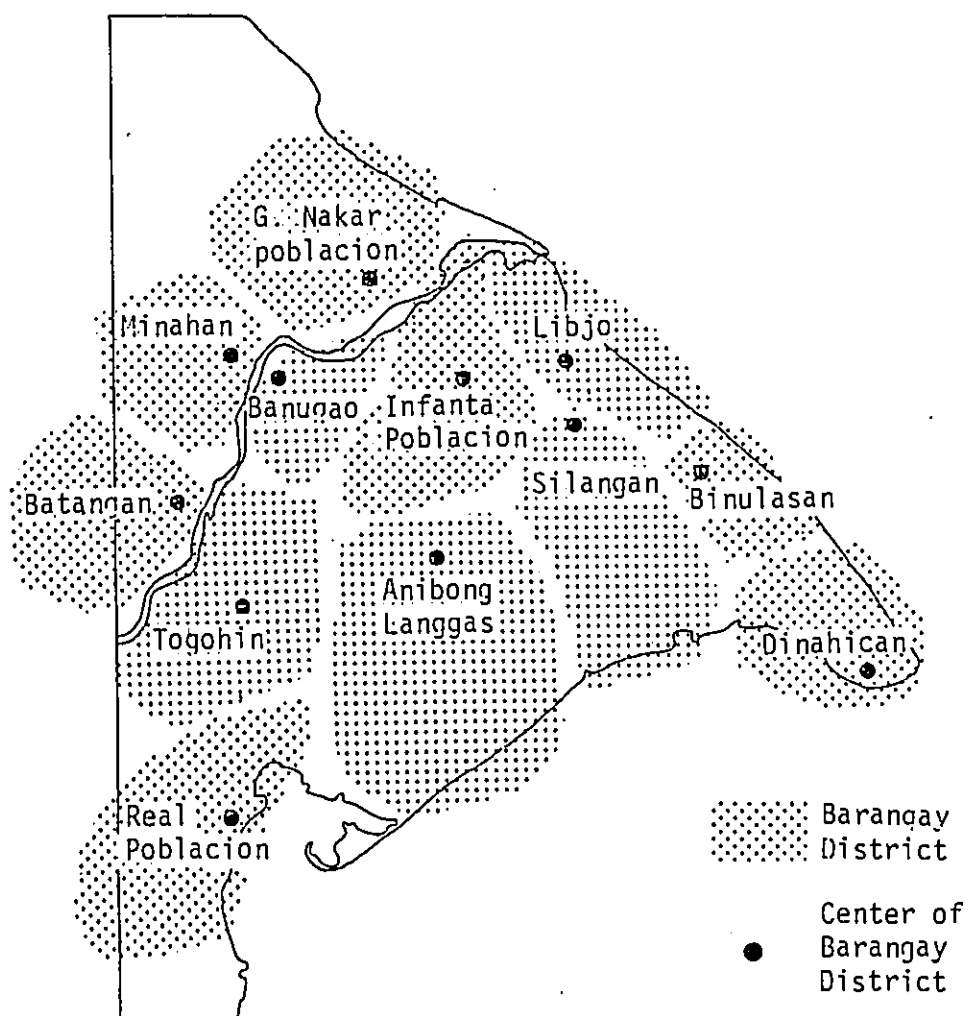
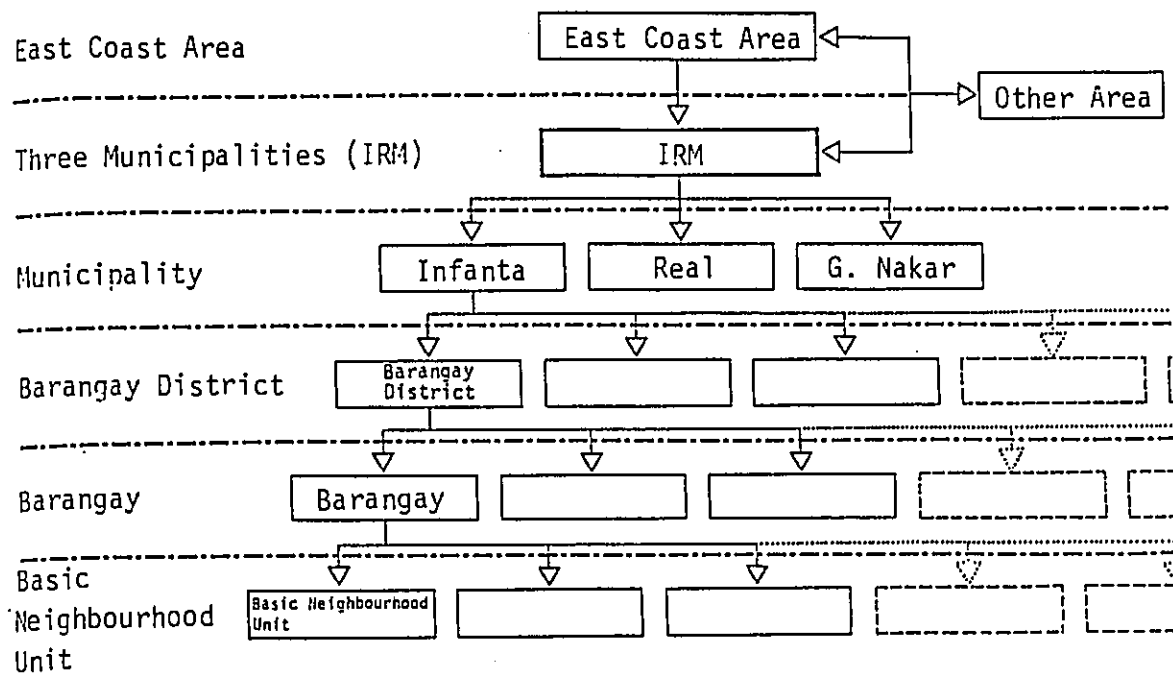


Fig. 6.1.1 Hierarchy of Settlement

6.2 DEFINITION OF SOCIO-ECONOMIC FRAMEWORK

6.2.1 Target Population

1) Forecast of Population Trends

The population of IRM was 44,420 persons as of December, 1983 which accounted for 3/4 of the total population of the three municipalities including the mountain area. The comparison of shares in the population of the IRM between 1975 and 1980 against the total population of the three municipalities, according to the census, reveals some increase from 75.% to 76.8%. The increase is attributed to the excess inflow of population into the IRM from the mountain area as mentioned in Chapter 2. The IRM population tend to migrate to Metro Manila and other urban areas, showing a pattern of population outflows to urban areas in search of education and job opportunities on the part of the male population, and subsequent outflow of the female population going after the males for marriage.

The overall population trend of the Philippines shows a sharp decline in birth rate due to the population control program. According to the forecast by NCSO, the reproduction rate will drop down to 1 or so on the national average by the year 2000. Based on past data of the decline in birth rate and trends of population distribution among municipalities, NCSO forecasts that the total population of the three municipalities would become 80,000 or so by the year 2000.

Estimates of future populations according to the trends mentioned in the foregoing are as listed in Table 6.2.1.

According to the estimates on the table, the future population in IRM would be roughly 56,000 by 1992, and 64,000 or so by the year 2000, accounting for approximately 80% of the total population of the three municipalities. As for

**Table 6.2.1 Future Population of IRM
by Trend**

	(Person, %)		
	1983	1992	2000
0-14 years	17,370 (39.1)	19,800 (35.6)	19,090 (29.7)
15-64 years	25,720 (57.9)	33,420 (60.1)	41,510 (64.6)
65 yrs. & over	1,330 (3.0)	2,390 (4.3)	3,660 (5.7)
Total	44,420(100.0)	55,610(100.0)	64,260(100.0)

Source: Estimated by JICA Study Team

the age structure, the childhood population shall show a sharp decline because of the outflow of the young and the reduced birth rate, with a net reduction in the 1990s.

The increase in the elderly population, on the other hand shall be dramatical, with a threefold increase by the year 2000 compared with the present.

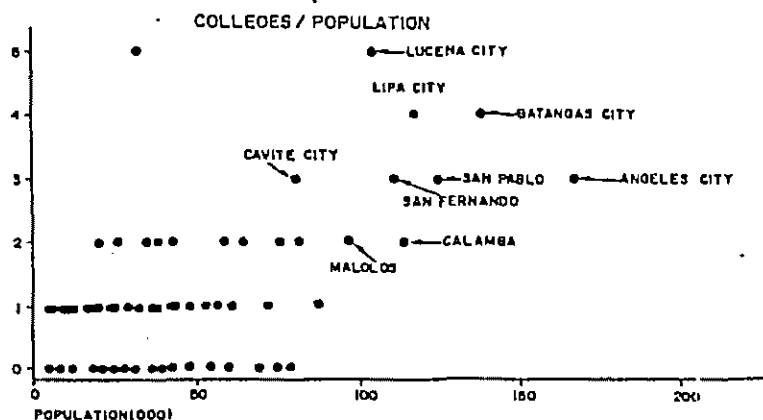
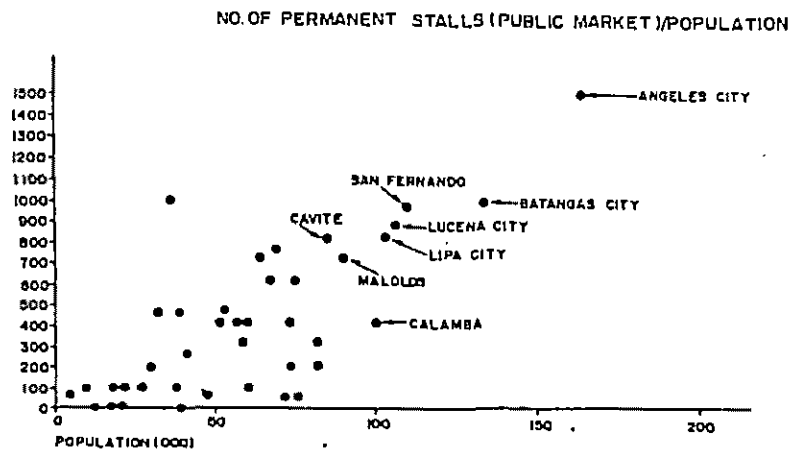
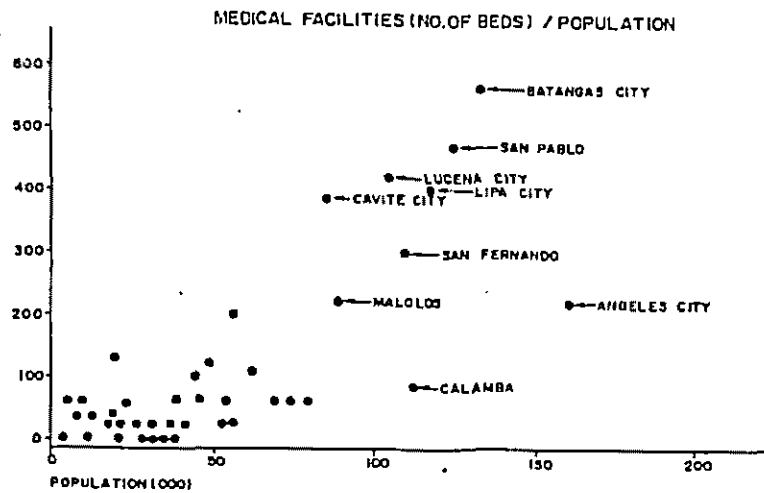
2) Population Size in Urban Centers

In the Comprehensive Human Settlements Plan of the Ministry of Human Settlements, the scale of cities in the year 2000 is specified as 250,000 persons to 1,000,000 persons for each regional center and a sub-center, of 20,000 to 80,000 persons for each primary and secondary urban center. In GCLA, Metro Manila holds the designation of a regional center under which 7 cities are designated as urban centers.

"Urban Center" refers to a self-contained, self-sustained community, which must be capable of providing not only employment opportunities for urban type industries but also opportunities for purchasing daily necessities, high level education and other social services including medical and cultural services of high quality for residents in the area concerned. In order to do so, population of a certain size to back up such functions is required.

The current relationship between the size of urban population and urban services shows that the degree of sufficiency of urban facilities shall increase rapidly when the population exceeds 100,000 persons or so. This means that each city with a population of 100,000 or more is providing a higher level of urban services supported by its particular economic foundation, with sufficient functions to serve as an urban center (Fig. 6.2.1).

Of the seven cities in GCLA mentioned above, the four cities of Batangas, San Pablo, Lipa and Lucena have populations in excess of 100,000 persons. Those cities, except for Lipa, are capitals of their respective provinces, with centralized administrative functions. Although



SOURCE: 1970 SETTLEMENT PROFILES
MINISTRY OF HUMAN SETTLEMENT

THE MASTER PLAN STUDY OF THE INFANTA-REAL AREA
URBAN DEVELOPMENT PROJECT

Fig. 6.2.1 NUCLEUS FACILITIES/POPULATION SIZE

rural areas are also included in the administrative region of such a city, it is obvious that a concentrated population of at least 100,000 is required in the urban areas.

Therefore, in order, for a city to function as an urban center, the accumulation of roughly 100,000 persons is necessary for the size of the urban population.

3) Planned Target Population

The four cities which are already advanced urban centers had each population in excess of 100,000 in 1980. These cities have been continuing their growths, and the population of each city is expected to reach 200,000 or so by the year 2000, approaching the size of a regional sub-center (see Fig. 6.2.2).

Taking account of such situations, IRM must have a population of at least 100,000 in order to function as the urban center in the east coast, with a more rapid pace of growth than those of advanced cities around it. In other words, IRM must assume a similar role as Lucena in the northern part of the province, as Lucena is playing its role as an urban center in the southern part of the same province, so that IRM and Lucena may coexist in the said province ensuring each position as an urban center.

The planned process of growth for IRM in comparison to the advanced urban centers is as follows:

(i) First of all, make efforts to increase the population to the present size of 100,000 held by the advanced cities, by the target year of 1992. At this point in time, the populations of each advanced city will reach the scale of 150,000, but the relative difference in population size shall be reduced from the present

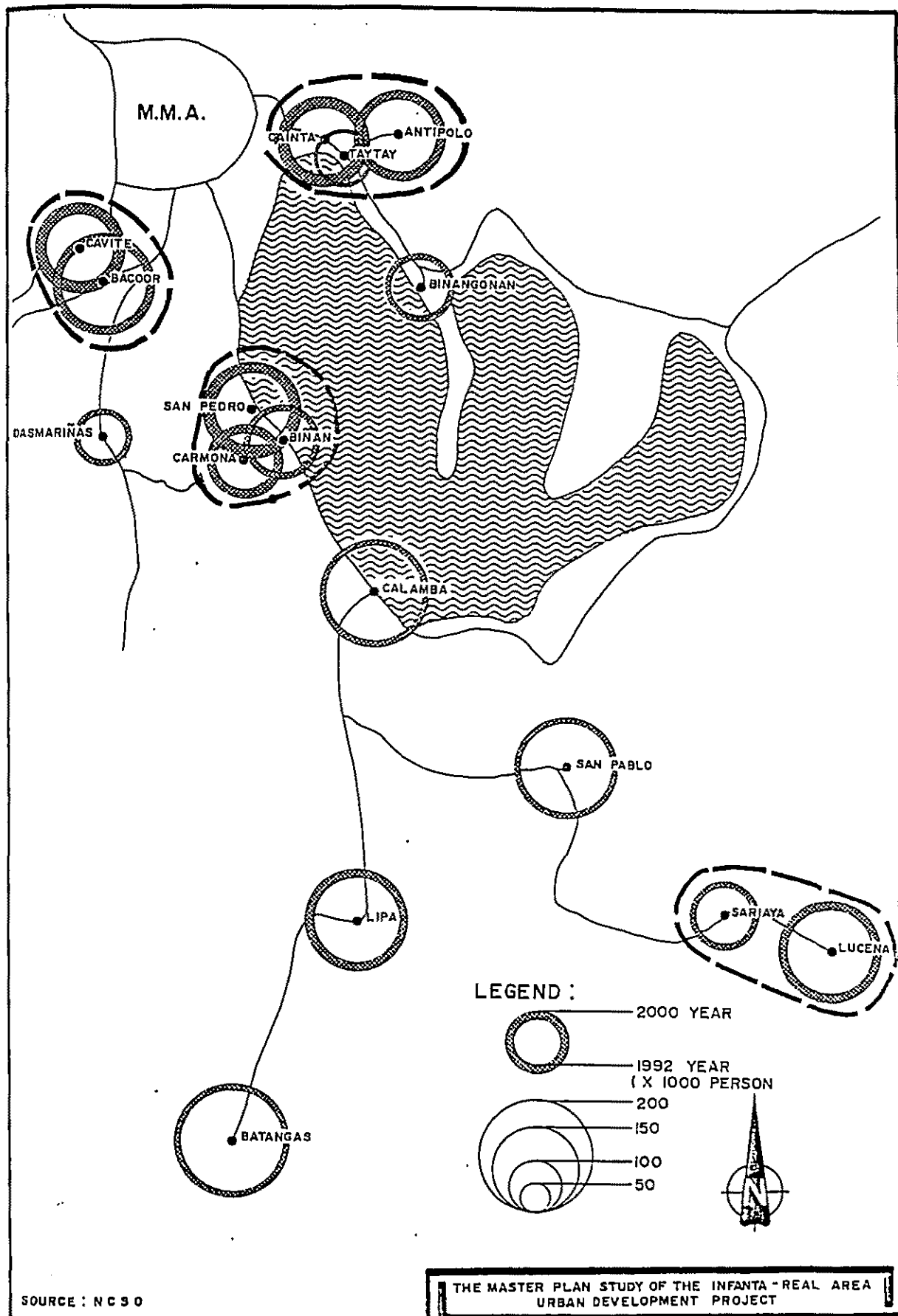


FIG. 6.2.2. PROJECTED POPULATION OF REGION IV

level of 1/2 to 2/3, with a sufficient absolute size of population capable of supporting a high degree of service facilities.

(ii) the next step will be to increase the population to 150,000 by the year 2000. This is the same size of population to be attained by the advanced cities in 1992, a stage at which functions of an urban center would be stabilized and reinforced, with some of the functions of a regional center beginning to take concrete forms.

The population size of 150,000 is slightly in excess of the current population of Batangas (144,000). Batangas City is a port city, in which textile and petrochemical industries have been developed. At the same time, it prospers as a base for sightseeing tours to nearby islands including the Mindoro Island. Speaking directly in terms of targets set for IRM, functions of a harbor and fishing port may play a key factor to develop agriculture and fishery industries as well as allied industries to process such products. Furthermore, the introduction of new industries will also be attempted to at least surpass the present level of Batangas by the year 2000 (Fig. 6.2.3).

As mentioned above, setting population targets of 100,000 by 1992 and 150,000 by 2000 means that the increase of 45,000 persons by 1992 and the increase of 85,000 persons by 2000 are expected over trend projections listed on Table 6.2.2. This necessitates the prevention of the outflow of the young age group to areas outside of the region seen in the past, the promotion of a "home-coming" movement for people already out of the region, and the inflow of population from mountain areas of the three municipalities out of commutable distances, as well as from the Polillo Islands or the southern part of the province, etc. Management and engineering staff from certain companies to be stationed in the region, may also contribute to the population increase, although the number may be insignificant. It is expected that the age structure in the future will have a higher ratio of the productive age group and smaller ratio of the elderly than those predicted by trend (Table 6.2.2).

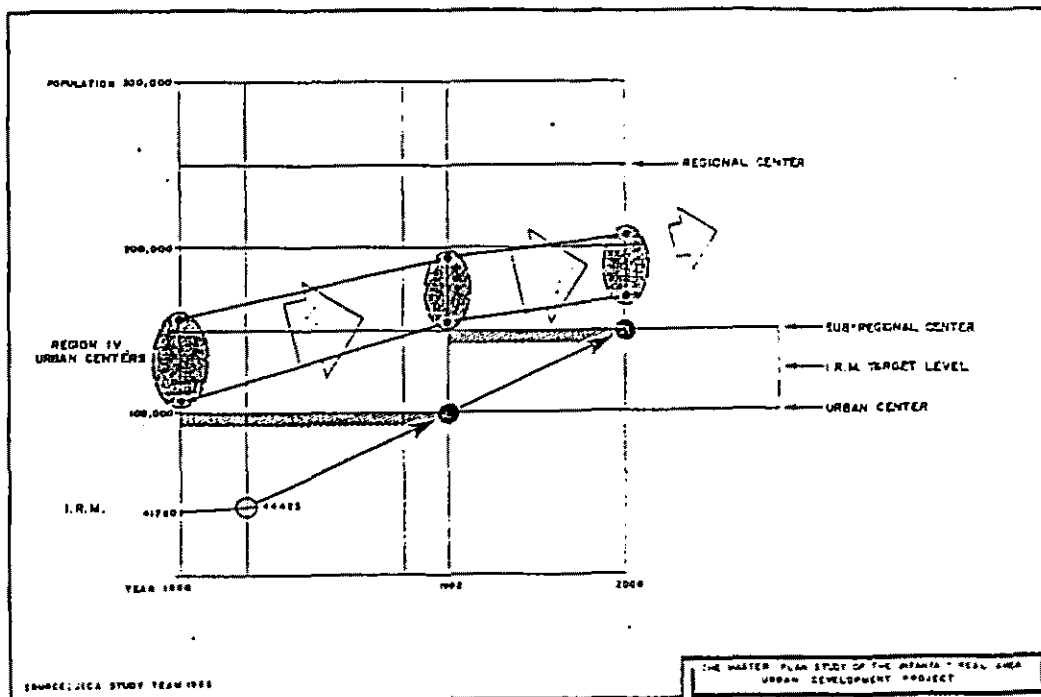


FIG. 6.2.3 TARGET POPULATION OF I.R.M.

Table 6.2.2 Future Planned Population
of I.R.M. by Age Group

	(Person, %)		
	1983	1992	2000
0-14 years	17,370 (39.1)	32,700 (32.7)	40,650 (27.1)
15-64 years	25,720 (57.9)	64,200 (64.2)	103,950 (69.3)
65 yrs. & over	1,330 (3.0)	3,100 (3.1)	5,400 (3.6)
Total	44,420 (100.0)	100,000 (100.0)	150,000 (100.0)

Source: JICA Study Team

6.2.2 Planned Target Population of Gainful Workers

1) Proper Way of Industrial Structure for Agro-forestry and Marine Industry Model City

A model city for agro-forestry and marine industries is aimed to accumulate the tertiary sector industries as an urban center, through balanced development of the primary and secondary industrial sectors. The balance of about 50% for the primary and secondary sectors as basic industries, and the remaining half for the tertiary sector as the service industry, with 50-50% share between the primary and secondary sectors could be used as a rule of thumb to attain this goal.

Fig. 6.2.4 shows the industrial structure of IRM, Lucena, Batangas and Metro Manila, and the scope of the industrial structure expected of the model city.

2) Planned Gainful Worker Population of IRM Classified by Industrial Sectors

The future population of gainful workers of IRM is so planned to maintain the current ratio of the gainful workers against the total population of 15 years or more, with planned ratios of 26% for the primary sector, 25% for the secondary sector and 40% for the tertiary sector in the year 2000 for the industrial structure, based on the combined ratios of Lucena and Langas, while taking account of the characteristic features of this region.

The number of gainful workers of the tertiary sector at that time is expected to reach 0.147 persons per capita, approaching the level of 0.151 persons per capita, equivalent to the combined ratio of gainful workers of both Lucena and Batangas as of 1980. If aspect as an agro-forestry and marine city will remain in 1992, but the accumulation of the tertiary sector per capita will approach the level of 0.136 persons held currently by Batangas (Table 6.2.3).

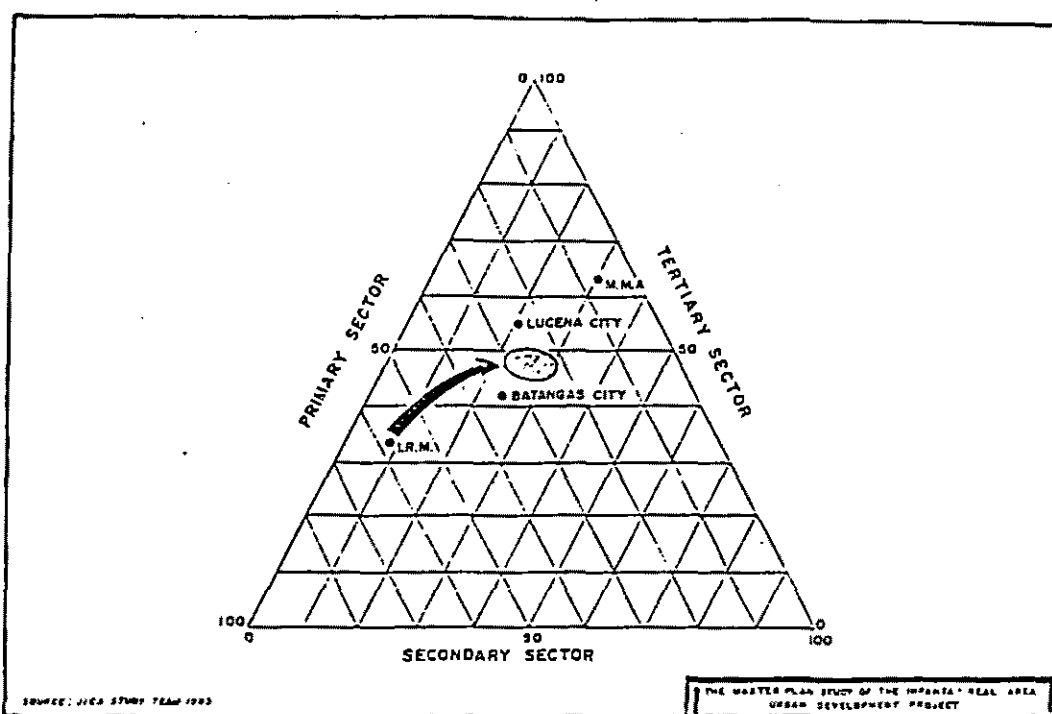


Fig. 6.2.4 TARGET RANGE OF INDUSTRIAL COMPOSITION FOR AGRO-FISHERY INDUSTRIAL MODEL CITY

Table 6.2.3 Future Gainful Workers of IRM by Industrial Sector

	(Person, %)		
	1983	1992	2000
Primary Sector	6,788 (58.5)	9,600 (0.334)	11,700 (26.0)
Secondary Sector	1,022 (8.8)	5,500 (0.192)	11,200 (25.0)
Tertiary Sector	3,786 (32.6)	13,600 (0.474)	22,100 (49.0)
Total	11,596 (100.0)	28,700 (100.0)	45,000 (100.0)

Source: JICA Study Team

6.2.3 Planned Target GRDP

1) Forecast of GRDP per Capita in Region IV

The current GRDP per capita in Region IV is assumed to be 10,200 pesos. According to the data given in the "Ten-Year Development Plan, 1978-1987", "Regional Development: Issues and Strategies" (NEDA, 1978), etc., the future GRDP per capita in Region IV is expected to attain the level of about 16,000 pesos/person in 1992, and about 23,000 pesos/person in 2000.

The average GRDP in Region IV will depend in many respects on the advanced region in the west, where the economic level is extremely high with the concentration of population exceeding the half of the total.

Quezon Province, in which IRM is located, has a relatively low income level, with the estimated GRDP of 70% of the average of the Region IV. Therefore, the GRDP should reach the level of 11,200 pesos/person by 1992, and 16,000 pesos/person in 2000, if Quezon Province grows at the same pace as the average of Region IV (Table 6.2.4).

2) Target GRDP of IRM

The GRDP per capita of IRM is presently about 3,900 pesos/person, less than 40% of 10,200 pesos/person, which is assumed to be the average level of Region IV. In order to reach the level of an independent city with the population of 100,000 by 1992, opportunities to gain relatively high incomes that may encourage the new inflow and to prevent the outflow of population will be necessary. This indicates the necessity to ensure a higher pace of income increase than the average of Region IV or that of Quezon Province.

Table 6.2.4 Future GRDP per Capita of
Region IV

(in peso)		
Year	GRDP per Capita	Growth Rate (%)
1983	10,200	5.13
1992	16,000	4.58
2000	22,900	

Source: Estimated by JICA Study Team bases on
the documents by NEDA

Quezon Province is at present divided into the following levels: (i) The high income level urban area at the South of the Province centered on Lucena City; and (ii) The low income level rural area at the north of the Province.

A target for IRM to become an urban center of the northern area with a medium income level by 1992 is set. The target GRDP/capita shall be set at 11,200 pesos, an estimated average GRDP/capita of Quezon Province in the same year.

In order to achieve this level, GRDP per capita should increase at a rate of 12.4% and population, to reach 100,000 population, at a rate of 9.4%. The same relationship can be observed between the two rates of Region IV for the period 1983 to 1992.

After 1992 up to the year 2000, a GRDP per capita shall grow at the same rate as Quezon Province to reach 16,000 pesos (Table 6.2.5).

Table 6.2.5 Future GRDP per Capita and GRDP of IRM

	1983	1992	2000
Population (in thousand)	44.4	100.0	150.0
GRDP per Capita (in peso)	3,860	11,360	22,400
GRDP (in million pesos)	171.4	1,120.0	2,400.0

Source: JICA Study Team

3) Forecast of Household Income

According to the growth of the GRDP per capita, the average annual household income shall also increase. The result of the estimate indicates an increase from 8,400 pesos/year in 1983 to 23,700 pesos, almost tripled, in 1992 (1984 price level), and shall reach 32,200 pesos/year in the year 2000.

6.3 Social Development Target (Future Image of Society)

As a consequence of the developments of various industrial sectors that has been proposed in the preceeding chapter, an economic base (specifically the increased employment opportunity and the improved income levels) shall be established based on which a new urban society shall be created in the east coast region.

The society shall have an ultimate target to become a model of a new urban center in the rural areas of the Philippines the the 21st century which grows on the basis of its development of local industry and natural resources. Furthermore, it shall set a national standard not only in economic aspects but also in social aspects.

In such a community, social equity and a humanistic living environment shall be materialized on the satisfaction of the Philippine's policy of social welfare, the eleven (11) Basic Human Needs¹, thus, creating a unique urban society in the east coast region.

In order to realize such a community, various existing social development measures through the local and central government bodies shall be implemented, with the goal of achieving the following future image of society:

¹ Water, food, power, shelter, sports, education, eco-base, clothing, eco-culture, and medical services.

6.3.1 Creation of Social System where Rural and Urban Societies can be Merged

This image is a social aspect of "a Model Urban Center for agro-forestry and marine product industries" that is proposed in Chapter 3.1.

By resolving simultaneously the natural urban and rural problems existing throughout the country (Enlarging disparity of household income, unemployment, formation of blighted area due to concentration of low income group, etc.; and poverty, unemployment, low social services standard, monotonous daily life, etc.), a community is provided where good quality urban services can be found in a harmonious, and good natural environment.

6.3.2 Society with Advanced Urban Functions

By the year 2000, about 70,000 persons (the target population of 150,000 - trend population without any development of 80,300) shall settle in IRM.

In order to absorb such in-migration and to achieve the projected urban society, provision of advanced urban functions especially medical services, education, and culture (either MMA or the other regional capitals) shall be essential.

Furthermore, by the provision of advanced urban functions, various development benefits of the IRM urban development can be reverted to the residents throughout the east coast region where the present service provision for facilities such as higher education and training, high standard medical services, advanced recreational facilities, cultural facilities etc. is quite low. Consequently, the centrality of IRM as the center of regional human settlements shall be enhanced.

6.3.3 Society with a Unique Character (Strong Urban Image)

Construction of an urban society shall be carried out which shall have strong individuality and a superb urban image so that the residents of the east coast region could be proud of its existence.

IRM has already its historical and traditional accumulation and characteristics which has been formed on the basis of its superb natural environment (such as self-sufficiency, small social disparity, diligence of residents, harmony of agriculture and fishery, high education level, etc.), and by developing these advantages further, a new individuality of the urban center and its social image which, is ideosyncratic to the east coast region, shall be created.

In such a basic orientation, internationalization of the urban society shall be another important task. It shall be done not only by developing tourism industry but also by materialization of social and other cultural activities in the society, thus, helping the society to improve and construct its superb social image. Finally, by implementing such measures, IRM could become parallel with MMA in terms of its social image.

6.3.4 Self-Sufficient Society

The city shall also become a model of construction and management of the future city in terms of self-sufficiency.

The introduction of construction and management systems shall be promoted which shall activate the private sector, and shall induce the participation of residents and other local bodies in construction, industrial, and social activities of society.

Furthermore, various social services shall be improved and strengthened in order to self-procure and self-manage the manpower, technology, and funding in the future, thus, enabling the establishment of a comprehensive urban management system which shall materialize the sound operation of the city even in terms of its financial aspect.

6.4 Basic Policies of Social Services Development

If industrial development of various sectors proposed in the Industrial Development Plan are to be materialized, the improvement of income levels and increase of employment opportunities based on such an economy in the future, as explained in section 6.2, would be warranted.

Furthermore, along this industrial development, various infrastructures which are the base of industrial development and at the same time an important aspect of people's daily living such as roads, power, water, telecommunications, etc., shall be developed as far as their essential parts are concerned.

In parallel with such development of an economic environment, there should be a development of a human settlement environment to supplement the formation of the urban center.

however, the development of an urban settlement environment shall include various social aspects. The Social Development plan of the study shall only consider such social facilities development which would be possibly implemented in a planned manner by the public sector; namely, education, medical services, culture, recreation, administrative services, and public housing.

The basic policies of facilities development shall be outlined in the following four (4) strategies:

(i) Development which materializes the social development objectives and planning framework.

Basic premise of the social infrastructure development is to materialize the aforementioned four (4) social targets (the urban images), and at the same time the planning framework of the economy.

(ii) Establishment of Integrated Service System on the basis of the Settlement Hierarchy

An organized facilities development to meet the requirements of each settlement hierarchy level of the East Coast Region, shall be carried out establishing an integrated social service system of each service sector in IRM. (Two (2) top settlement hierarchy levels: East Coast Region, and IRM shall have advanced unique and comparable facilities development standards to MMA or to regional capitals, and the lower three (3) hierarchy levels shall have the facilities development standards which the Ministry of Local Government and Community Development (MLGCD) established as the target for local government bodies (Table 6.4.1).

(iii) Development which corresponds to the progress of the area's urbanization and industrialization.

The facilities development shall be implemented corresponding to the development phases of IRM: (i) Base Preparation Period - to prepare bases of social services facility development to cope in advance with future urbanization and industrialization; (ii) Take-Off Period - to develop social services facilities in such manner as to maintain harmony of urban and rural areas against the rapid urbanization/industrialization and to alleviate simultaneously the existing urban and rural problems in the Philippines; and (iii) Advancement Period - to develop advanced social services facilities in order to support the 150,000 population and maintain its function as a regional urban center.

Table 6.4.1 Target Standards of MLGCD (1)

Service	Standard
A. Social Services	
1. Education and Culture	
(a) Teacher Requirement	-one (1) per 10 pupils (Elem.) -one (1) per 50 students (Secondary)
(b) Classroom Requirement	-one (1) per 40 pupils (Elem.) -one (1) per 50 students (Secondary)
(c) Public Library/ Reading Center	-one (1) per local government
2. Health	
(a) Medical Personnel	-one (1) Government Physician/ Municipal Health Officer (MHO) per 20,000 population -one (1) Public Health Nurse (PHN) per 20,000 population -one (1) Rural Health Midwife (RHM) per 5,000 population -one (1) Dentist per 20,000 population
(b) Health Center/ Hospital	
o Rural Health Unit/ City Health Center	-one (1) per municipality/ city for every 50,000 population
o Primary Hospital	-10 bed capacity
o Secondary Hospital	-25 to 50 beds
o Tertiary Hospital	-75 beds
3. Environmental Protection	
(a) Garbage Collection and disposal	-100% collection & disposal as scheduled
(b) Pollution Control	-Absence of air/water/industrial pollutants
4. Protective Services	
(a) Police Force	-one (1) policeman per 1,000 population
(b) Fire Protection Service	-one (1) fireman per 2,000 population -one (1) firetruck per 1,000 population

Table 6.4.1 Target Standards of MLGCD (2)

Service	Standard
5. Sports and Recreation	
(a) Municipality/City Park	-One (1) park with a minimum of 500 square meters in area per 1,000 population and maximum walking distance of 100-150 meters
(b) Sports and Athletics	-Public playfield/athletic field - minimum of 0.5 hectare per 1,000 population for an urban area. -one (1) sports facility per barangay
(c) Natural Environment Areas	-Presence of natural undistributed and scenic areas suitable for recreation, scientific and ecological significance consisting of forest, water resources and other land forms.
6. Public Buildings/ Facilities	
(a) Town/City Provincial Hall	-Presence
(b) Barangay Cultural Center/Hall	-Presence
(c) Health Center	-Presence
(d) Waiting Sheds	-Presence

Source: MLGCD

(iv) Focus of Facilities Development in Accordance with Settlement Hierarchy Level

In accordance with the settlement hierarchical levels (classifying the top two levels as Regional and the lower three levels as District), the focus of facilities development to materialize the social development targets set in the preceeding sections shall be placed as follows:

Regional - Core urban facilities development which shall contribute to the actual function of the advanced urban functions and society of unique individuality, shall be carried out taking into consideration the phasing of urban development.

District - A system of facilities development according to the MLGCD standards on general community level in order to accomplish the following: (i) Harmony of urban and rural communities (mutual alleviations of urban and rural problems); and (ii) self-sufficient and self-contained society (provision of residents participation opportunity, efficiency of administrative services, appropriate construction of low-cost public housing, opportunity provision of manpower training and development).

(v) Efficient and Proper Allotment of Administrative Activities Among Different Administration Levels

Provision of social services is generally carried out by natural cooperation and coordination (funding, construction, operation) among national, provincial and municipal governments. Therefore, a clear and efficient system of activity (responsibility) allotment among such government levels shall be considered in order to establish the comprehensive social service system (Table 6.4.2).

Table 6.4.2 Sharing Pattern of Social Services (General)

Service	Shared	Purely Local
Social	<ul style="list-style-type: none"> o education, culture and manpower development o health and welfare o environmental protection o protective services o housing o population control 	<ul style="list-style-type: none"> o Sports and recreation o library/reading center o welfare services o refuse management
Economic	<ul style="list-style-type: none"> o public works and highways o power and communication systems o water and sewerage o agriculture 	<ul style="list-style-type: none"> o local infrastructure utilities/facilities (municipal buildings, public markets, etc.) o water and sewerage o agriculture
Political	<ul style="list-style-type: none"> o judicial and prosecution 	<ul style="list-style-type: none"> o local registration
Administrative	<ul style="list-style-type: none"> o auditing o treasury functions o tax assessment o o 	<ul style="list-style-type: none"> o revenue generation o planning and budgeting o executive direction and control o other administrative support services

Source: MLGCD

A system describing the importance of facility development in each service sector and in different settlement hierarchy is shown in Fig. 6.4.1.

6.5 Educational Development Scheme

One of the distinctive characteristics of the IRM Area is its relatively high level of educational standards. Therefore, it shall be the basic policy of educational development to utilize these characteristics and the existing stock of facilities in order to promote the creation of the society with distinct nature as proposed by the social development plan.

Along this basic direction, the following three (3) objectives can be identified for the educational development:

(i) Development of a Comprehensive Educational System from Elementary Thru Higher Education levels

Construction of the urban society shall be carried considering the manpower which shall be brought into IRM during the initial phase of urban development. However, for the continuous and self-contained city growth and management in the future, an efficient provision of educational opportunity and development of manpower shall be materialized thru the comprehensive system of education covering the different levels of education from elementary thru higher education.

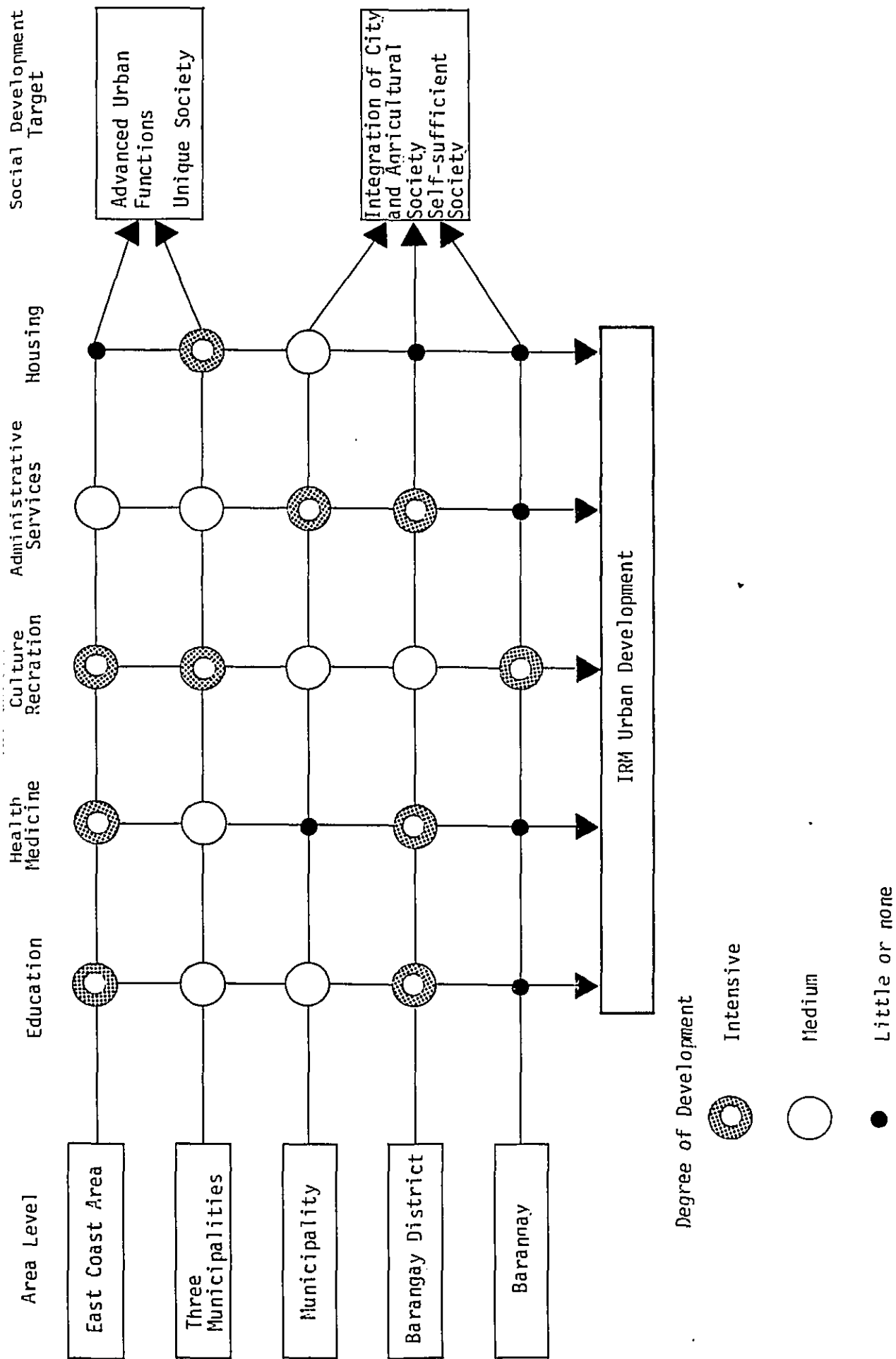


Fig 6.4.1 System of Social Services Facilities Development

(ii) Organized Development of Educational Facilities Responding to Population Increase

Elementary and secondary educational facilities play an essential role for the provision of recreational opportunity, cultural, and social educational activities, as core facilities on the basic human settlement level.

IRM is already composed of different secondary settlement units (Barangay Districts) centering on the elementary and secondary educational facilities. Thus, a controlled and planned development of the elementary and secondary facilities especially for the urban population who shall be in-migrating into IRM to a considerable extent shall be one of the essential prerequisites for construction of an orderly settlement hierarchy (especially basic neighborhood settlement units) in the future.

(iii) Formation of a Unique Educational Environment

An educational center in the east coast region shall be created in IRM on the basis of providing unique educational opportunity utilizing the area's industrial characteristics (stable agriculture and fishery industry), thus, contributing to the image formation of the city and development of future man power.

Concretely speaking, an importance shall be placed on the development of higher educational facilities with emphasis on agriculture and fishery of various vocational training schools responding to the needs of local industries, and a regional manpower development (training) center tied up with the administration services.

6.6 Health and Medical Services Development Scheme

A return of investment in the health and medical services is generally great and various positive social impacts can be listed such as the improvement of productivity in various industrial sectors due to health improvement, improvement of student attendance ratio, decrease of birth rate due to family planning, and other health and medical education, etc.

As explained in Chapter 6.1.3, the present level of health and medical services in IRM is very low when compared with the national standard. The improvement of the sectoral system of service provision, shall be an essential factor in the future city growth and in the creation of the proper human settlement environment.

Furthermore, coordination with the private sector shall be very important considering the Philippine's present dependency ratio of medical services (47% of the total number of beds, 1981). Although, the present ratio of the private sector in IRM is still quite low, this coordination shall be one of the basic policies of health and medical services development in order to materialize a comprehensive regional medical system embracing both public and private sectors.

The basic direction shall be classified into the following objectives:

(i) Development of Public Medical Services System

During the initial and intermediate phases of the urban development, the needs of private sector services shall be very small for example when the area's income level is considered, thus, necessitating the inexpensive and proper provision of health and medical services by the public sector during said stages.

To materialize this objective, a comprehensive system which deals with health improvement, disease protection, medication, rehabilitation, manpower development, etc., shall be established. The system should basically utilize the existing network of BHS, RHU, CHC, and hospitals and should strengthen it. Specifically, in order to maintain the self sufficiency and to enhance the central functions of the regional medical service system, construction of facilities which shall provide advanced medical services and develop manpower in the medical sector shall be essential in the future.

(ii) Promotion of Private Medical Services

The amount of investment which shall be allocated for the public medical services is limited and the location of private medical service facilities shall become likely according to the future urbanization (specifically due to the improvement of income levels). Therefore, promotion of private medical services shall be necessary to supplement the public medical service system (the medical services between the central hospital and BHS). Furthermore, participation of the private sector in community (neighborhood) level medical services, health education/guidance, promotion of the open system (registration systems of private doctors for public hospital and medical services), etc. shall be enhanced strengthening private-public sector coordination. The proposed system of health/medical services provision is shown in Fig. 6.6.1.

6.7 Cultural and Recreational Services Development Scheme

Social services such as cultural and recreational services play, together with commercial and amusement services, an essential role in forming attractive features of a city, being a social infra-structure which provides daily amenities to the people.

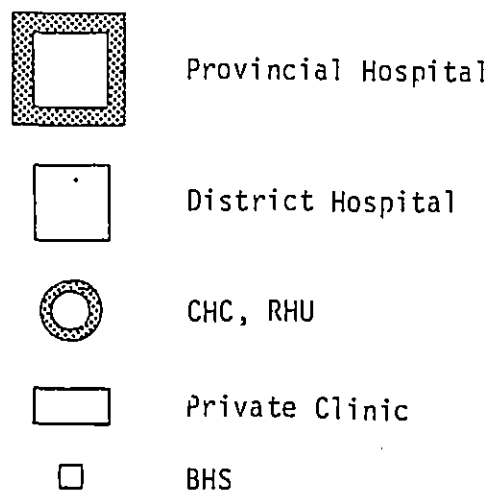
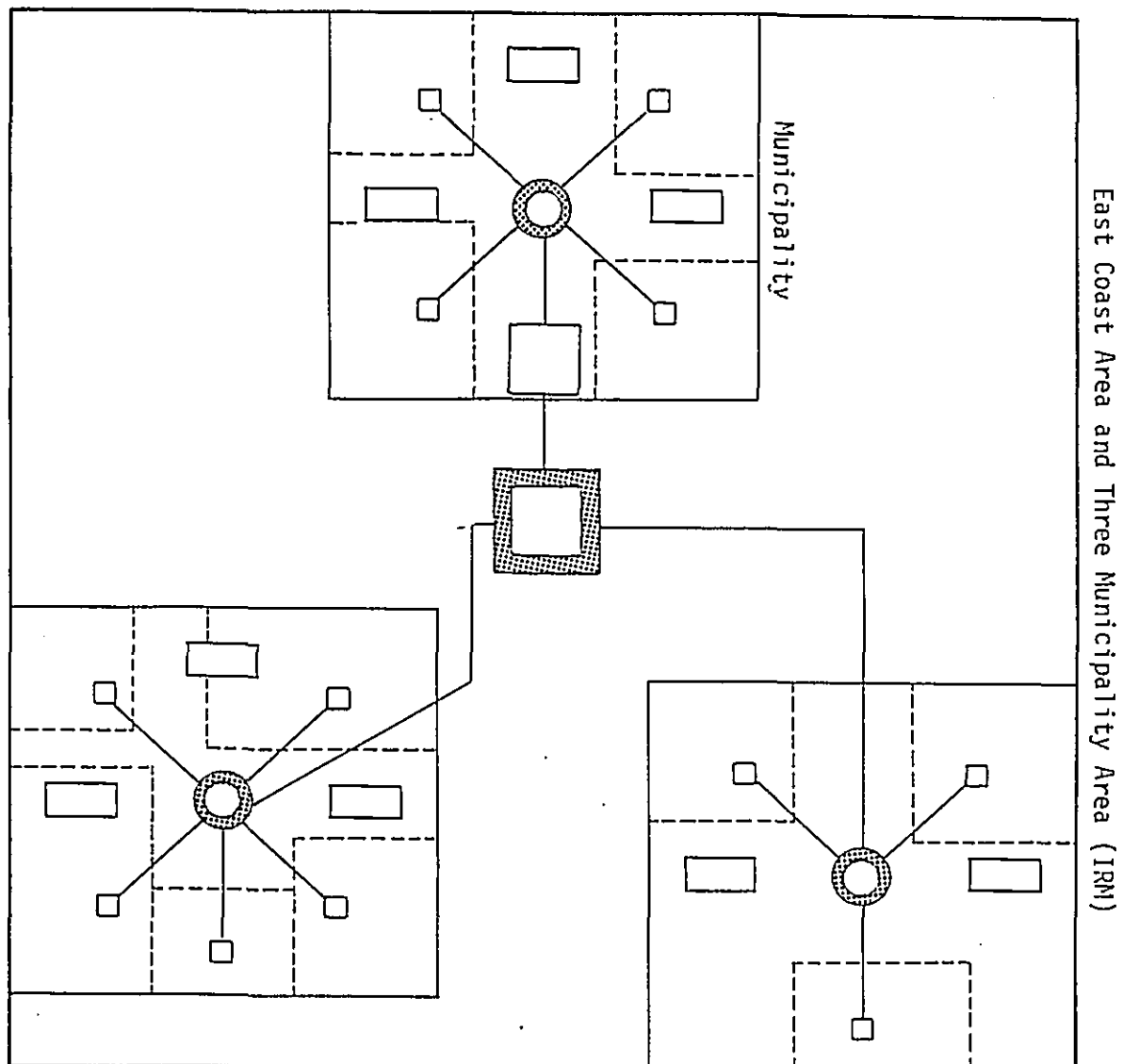


Fig. 6.6.1 System of Health/Medical Facilities Development

Therefore, the residents' active participation in cultural and social education activities and promotion of a unique local culture shall be an essential factor in identity formation as an urban center in the east coast region and the creation of a unique society in IRM.

Accordingly, construction of social service facilities which can provide opportunity for such activities and formation of environment where integrated cultural and recreational activities may be promoted utilizing sufficiently the facilities and services of other sectors (education, medical services and administration) shall be emphasized.

Based on the above policy, the following objectives shall be proposed:

(i) Establishment of an Integrated Environment of Cultural and Recreational Activities based on the Settlement Hierarchy and Network Formation with other Social Services Facilities.

Centering on the cultural and recreational facilities (the east coast region and IRM level), opportunity for the residents' cultural and recreational activities shall be provided on the basis of network utilizing social services facilities (education, medical services and administrative services) developed on each level of settlement hierarchy.

To be concrete, utilizing library cultural/assembly facilities and sports facilities as core facilities an integrated and unique environment of cultural and recreational facilities shall be created on the basis of network formed by community level facilities such as elementary/secondary educational facilities, and administrative and park facilities, thus, minimizing the gap with MMA.

(ii) Activation of Cultural and
Recreational Activities which Promote the
Residents' Participation

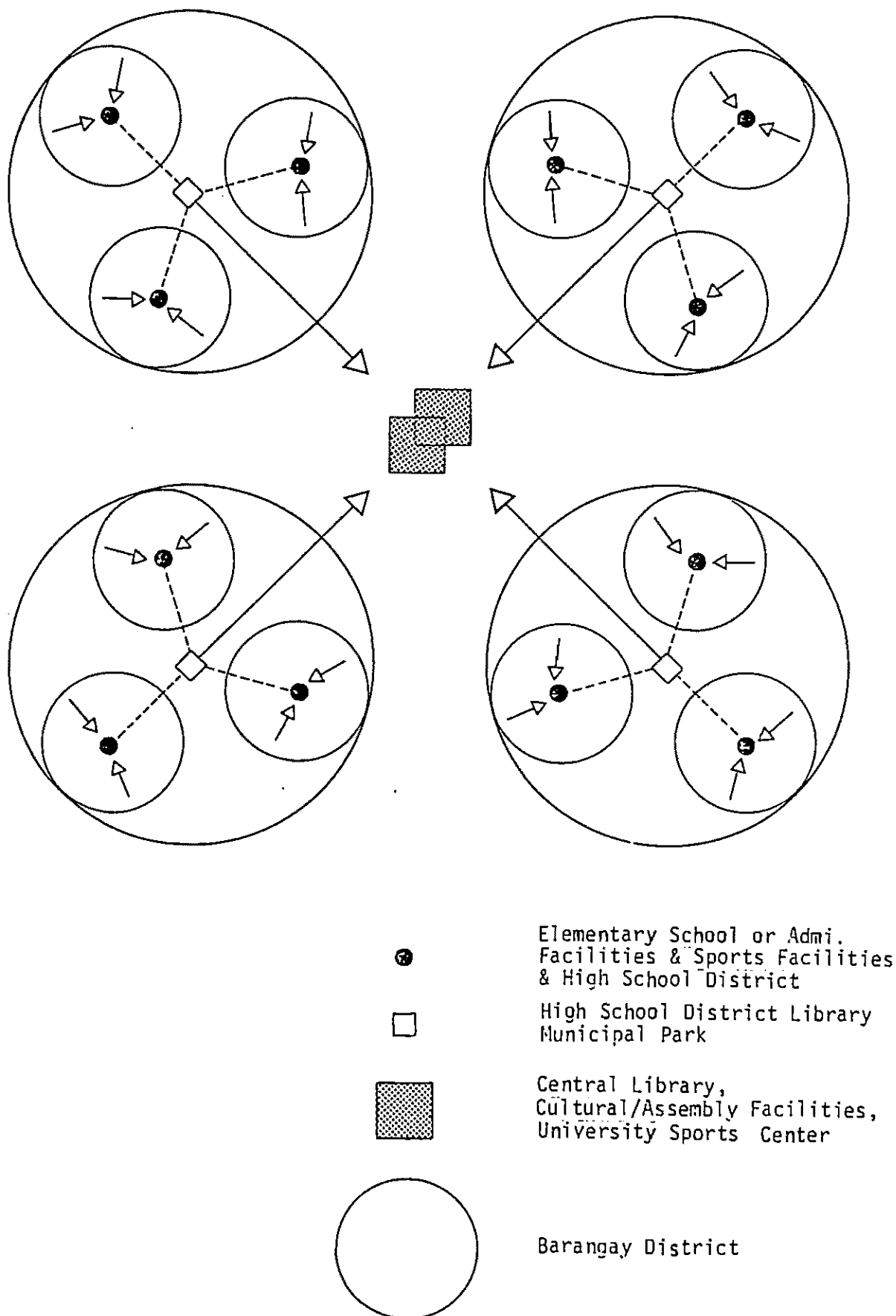
Based on the above network, public measures such as the provision of social services on the basic settlement level and promotion of the area's traditional, cultural, and other social activities, shall be implemented. The residents' participation in the activities shall especially be promoted by the sponsoring of cultural activities, provision of access to cultural information, and coordination with public organizations (radio station, religious groups, etc.).

Furthermore, the introduction of national level information/cultural activities shall be sponsored at the university, central library, cultural facilities, etc. for the residents of the east coast region. Fig. 6.7.1 shows the system of facilities development.

6.8 Administrative Service Development Scheme

The subject services in this section are the administrative services excluding the already mentioned education, health/medical services, and culture/recreation; namely such services as administration, postal service, police, fire protection, and social welfare.

As mentioned earlier, the degree of allotment of responsibility and activities (funding, construction and operation) among different government levels (National, provincial and municipal) varies considerably. Therefore, efficient provision of services shall need the effective allotment among the sectors and government levels.



6.7.1 System of Culture & Recreation Services Development

Moreover, these administrative services should cover the whole area of IRM like education and health/medical services, consequently, responding to the physical expanse of the IRM's urbanization in the future differentiation of at least two (2) levels of functions, shall be necessary as follows:

(i) Centralized control function to orchestrate over-all activities; and

(ii) Provision function to actually provide services to the area.

In addition to the efficient provision of services, consolidation of administrative works among different sectors and centralization/consolidation of service facilities among the sectors shall be necessary on the basic settlement level.

The following are the basic policies of each sector:

(i) Administrative Works

Responding to the growing demand of administrative/clerical works as the future urbanization proceeds, construction and expansion of facilities and organization of clerical works on the municipal level shall be carried out.

Moreover, consolidation of national and provincial government offices shall be materialized in order to coordinate the clerical work of different sectors on different government levels.

(ii) Postal Services

In line with the improvement of administrative facility of each municipality (Municipal Hall), improvement of postal service facility shall be carried out at the same time to improve the service level. And also a centralized facility shall be constructed to handle incoming and outgoing mails in bulk and, consequently, to make the service more swift and efficient.

(iii) Police/Fire Protection

The existing facilities and service system on each municipality level shall be improved, and cooperation with the private sector shall be strengthened. In order to cope with future urbanization, an integrated headquarters to be constructed shall orchestrate the municipal level services.

(iv) Social Welfare

Social services such as vocational training, day care center, nutrition, family planning, etc. are strongly related with other social services (education, health/medical services, and culture/recreation). It is desirable that the provision of such social welfare services shall be carried out in coordination with the provision of other social services (especially at utilization of facilities and activities on community level).

Furthermore, cooperation with private sector organizations is essential in this sector (for example, Philippine National Red Cross, Catholic Relief Services, UNICEF, etc.). A regional welfare center to be constructed shall coordinate the public social welfare services with such private organizations, thus, improving the level of social welfare services in the east coast region as a whole.

6.9 Housing Development Scheme

Housing is the basic infrastructure of a human settlement, thus, influencing the peoples' quality of living to a considerable extent.

The provision of good quality housing appropriate for the area's income level shall also be an essential factor in the IRM urban development considering the vast influx of future urban population and achievement of its social development target (construction of a model urban society which maintains the average standard of urban living). And more importantly, the guiding function of the planned provision of housing to create good living environment and urban land shall be stressed again in the IRM urban development.

Presently, housing provision in the Philippines is heavily dependent on the private sector and, therefore, in IRM development, coordination of private and public sectors and private sector participation shall be promoted considering such circumstances.

However, when it comes to actual and planned provision of housing, the role to be played by public housing provision in the IRM urban development shall be quite important.

In this section, the basic policy of housing provision as one component of the Social Development Plan is discussed below:

(i) On the basis of existing housing loan systems (SSS, DBP, NHMFC, etc.) and joint venture system, the participation of the private sector in housing construction shall be actively promoted. Thus, strengthening the coordination of the public and private sectors.

(ii) The ratio of investment regarding public housing against the total housing investment (including direct construction and loan) shall be set at 25% considering the importance of public housing and which exceeds by 5% the target ratio of the National Shelter Program.

(iii) The subject income bracket for the public housing provision shall be the middle and low income groups excluding the top 20% high income group. The main target shall be the overall improvement of living standards for the subject group on the average.

(iv) The planning period shall be divided using such period as a border when the average household income reaches sufficient level enabling the residents to construct their own housing on the soft term housing loan basis. The former period shall be subject to direct construction of public housing by the public sector, and the latter period to development of the housing loan system.

(v) In order to alleviate the Philippines' perennial squatter problem, such public housing measures as construction of low cost housing, and site and services, shall be implemented for the low income group (the existing squatters and in-migration low income group) during the initial and middle stages of the Development.

6.10 Integration of Sectoral Schemes

The relationship between the Social Development targets set in 6.3 and basic policies of each sector are shown in Fig. 6.10.1.

Social Development Target

Basic Policies by Sector

Society with
Integration of City
and Agricultural Area

Education

Development of Inter-related
Educational System
Facility Development Responding
to Population Growth
Formation of Unique Educational
Environment

Society with Advanced
Urban Functions

Health Medicine

Development of Public Medical
Service Systems
Promotion of Private Medical
Services

Society with Distinctive
Characteristics

Culture Recreation

Development of Integrated
Environment of Recreation &
Culture according to Settlement
Hierarchy
Vitalization of Culture-Recreation
Activities by Citizen Participation

Self-Sufficient Society

Administrative Services

System of Effective Services and
Functional Allotment

Housing

Coordination of Private &
Public Sector,
Private Sector Participation
Housing Provision emphasized on
middle-low income bracket
Integrated System of Housing
Developments with direct
construction and Loan Utilizations

Fig. 6.10.1

Social Development Targets and Basic Policies by Sector

JICA