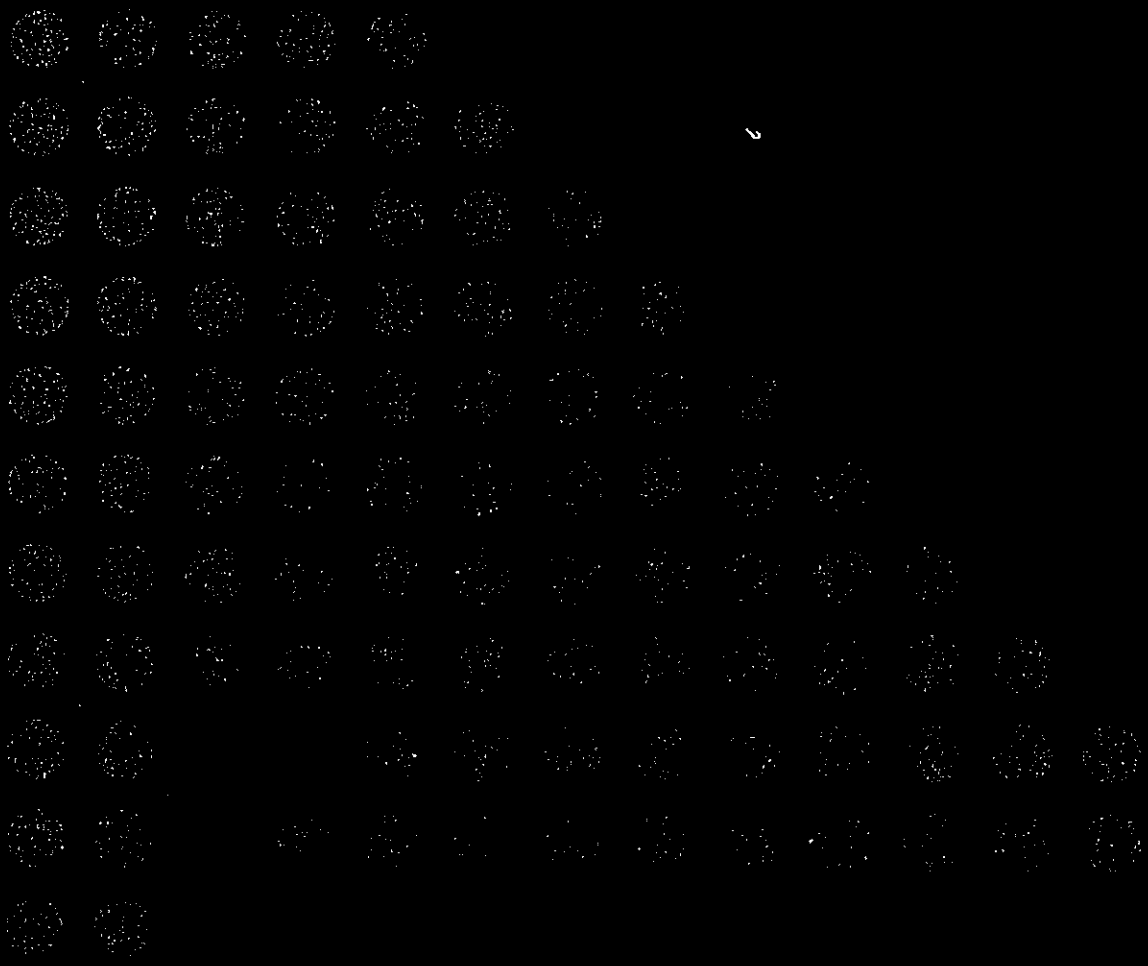
THE REPUBLIC OF THE PHILIPPINES

No.

社会開発協力部報告書

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

TECHNICAL REPORT 1
(GREATER CENTRAL LUZON AREA)



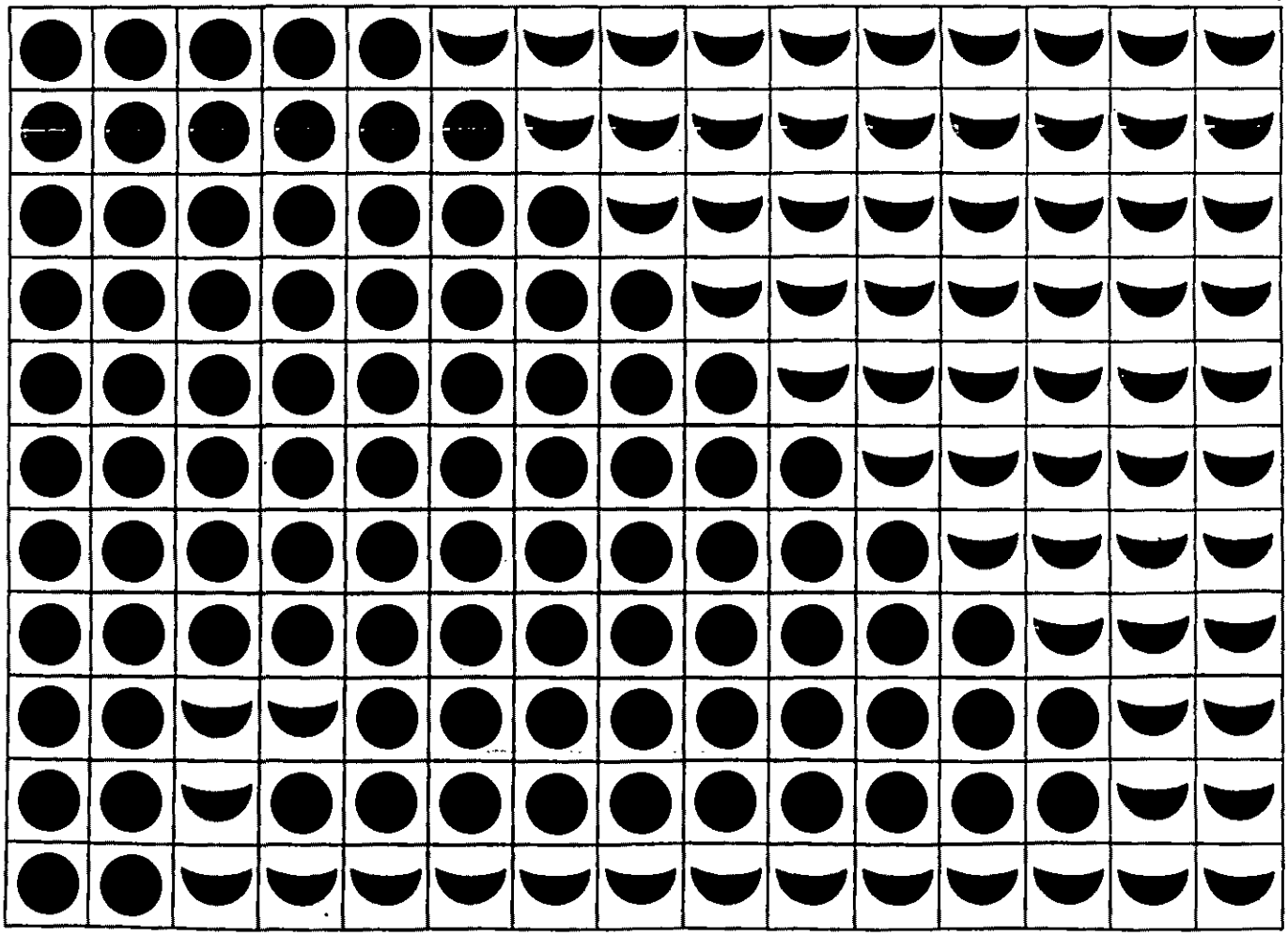
JAPAN INTERNATIONAL COOPERATION AGENCY

MARCH, 1985

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 Commumity Development
MMA	Metropolitan Manila Area
MNR	Ministry of Natural Rescoures
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. DEFINITION OF GREATER CENTRAL LUZON AREA (GCLA)

As the national capital, Metro Manila (MMA, embracing four (4) cities and thirteen (13) towns with an aggregate population of 5,925,804 in a total area of 636 km^2) has played a leadership role in the economic and social development of the Philippines. Although this role is to continue in the future, the Philippine government has adopted a policy of regional development where local development is to be promoted and the concentrated influx of population and industry into MMA is to be curbed in order to achieve more a balance development nationwide.

Economic and industrial growth, however, today is not confined to Metro Manila but is active as well in the regions adjacent to the capital area. In fact, no longer is there a recognizable differentiation in developmental levels between Metro Manila and the agricultural and mountain villages surrounding it. It is now necessary to think of this whole region as one entity.

Due to its proximity to Metro Manila, with its large consumer markets, its many urban functions, and its importance as a transportation and transport base for the nation, the contiguous region maintains a relatively high level of development, significantly higher than in other regions of the country. This is true for all sectors such as agro-forestry, marine products, manufacturing, and the service industries. Accordingly, along with Metro Manila this contiguous region is recognized as an extremely important region supporting the national economy, and it should be developed in close harmony with the development of MMA itself.

This contiguous region within a radius of some 100 km from MMA, including Regions III and IV, is hereby defined as the Greater Central Luzon Area (GCLA) (Fig. 1.1.1).

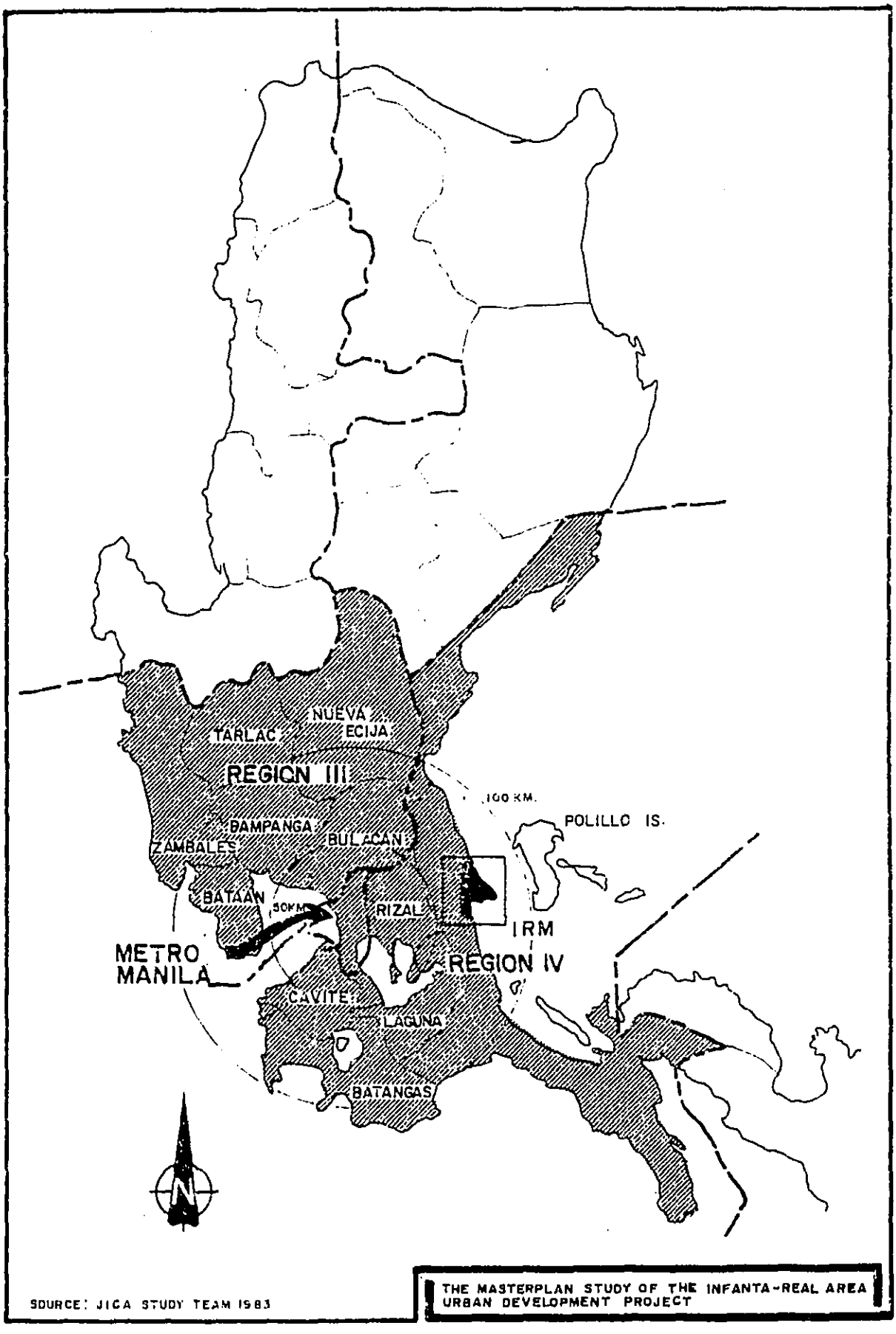

FIG. I.1.1 THE GREATER CENTRAL LUZON AREA

2. STATUS OF THE GCLA

The Philippines is an archipelago of many islands, and the sea and air routes comprise the main arteries of national transport and transportation. The capital city, Manila, not only serves as the only base for domestic sea and air transport but also acts as the Philippines' gateway for international transportation.

2.1 Population and Social Make-up

Because of its position as the base of the nation's domestic and international transportation systems, MMA has attracted a high concentration of population and industry.

Although the concentrated influx of population into MMA continues today, the rate of population growth (annual basis) in the capital has been declining from 4.88% in the 60's to 4.10% in the 70's. At the same time, the rate of population increase in the GCLA around Manila (Regions III and IV) was 3.04% in the 1970's, which was higher than the national average of 2.75% during the same period (Table 2.1.1).

When viewed in terms of social dynamics in contrast to MMA which experienced a sharp decline in immigration into the city between the 1960's and the early 70"s, the region surrounding the capital switched in balance from excessive emigrations to immigrations in this period with the rate of immigration into the region doubling.

When also viewed on an inter-regional basis (Fig. 2.1.1), the area contiguous to MMA experienced a surplus in immigrations both in relation to MMA and areas outside the GCLA. This shows that this region not only serves to absorb population from all areas of the nation but also receives population distributed from MMA itself.

Table 2.1.1 Population and GRDP (1970-1980)

	Philippines		CCLA		MMA		Neighboring Area of MMA		Region III		Region IV	
Population												
Year	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
Population	36,694,468	48,098,460	11,018,917	15,439,257	3,996,695	5,925,884	7,052,282	9,513,393	3,615,496	4,802,793	3,436,786	4,710,580
Annual Rate	2.75		3.43		4.10		3.04		2.88		3.20	
Share (%)	100	100	30.0	32.1	10.9	12.3	19.2	19.8	9.9	10.0	9.4	9.8
GRDP (Total)												
Year	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981
GRDP	53,528	96,185	27,280	52,249	16,182	29,504	11,098	21,746	11,664	8,509	6,434	12,237
Annual Rate	6.0		6.7		6.5		7.0		6.2		7.5	
Share (%)	100	100	51.0	54.3	30.2	31.7	20.7	22.6	8.7	8.8	12.0	13.8
Primary*1												
GRDP	15,457	24,608	4,344	6,279	0	0	4,344	6,279	1,778	2,445	25,66	3,384
Annual Rate	4.8		3.8		0		3.8		3.2		4.1	
Share (%)	100	100	28.1	25.5	0	0	28.1	25.5	11.5	9.9	16.6	15.6
Secondary *2												
GRDP	15,582	33,914	9,890	23,791	6,453	15,369	3,438	8,422	1,516	3,121	1,922	5,301
Annual Rate	8.0		9.2		9.1		9.4		7.5		10.7	
Share (%)	100	100	62.7	70.0	40.9	45.3	21.8	24.8	9.6	9.2	12.2	15.6
Tertiary												
GRDP	22,289	37,613	13,046	22,179	9,729	15,135	3,316	7,095	1,370	2,943	1,946	4,102
Annual Rate	5.4		5.5		4.5		7.8		7.9		7.7	
Share (%)	100	100	58.5	54.0	43.6	40.2	14.9	18.7	6.1	7.8	8.7	10.9

*1: Agriculture, Fishing and Forestry
*2: Mining/Quarrying, Manufacturing and Construction

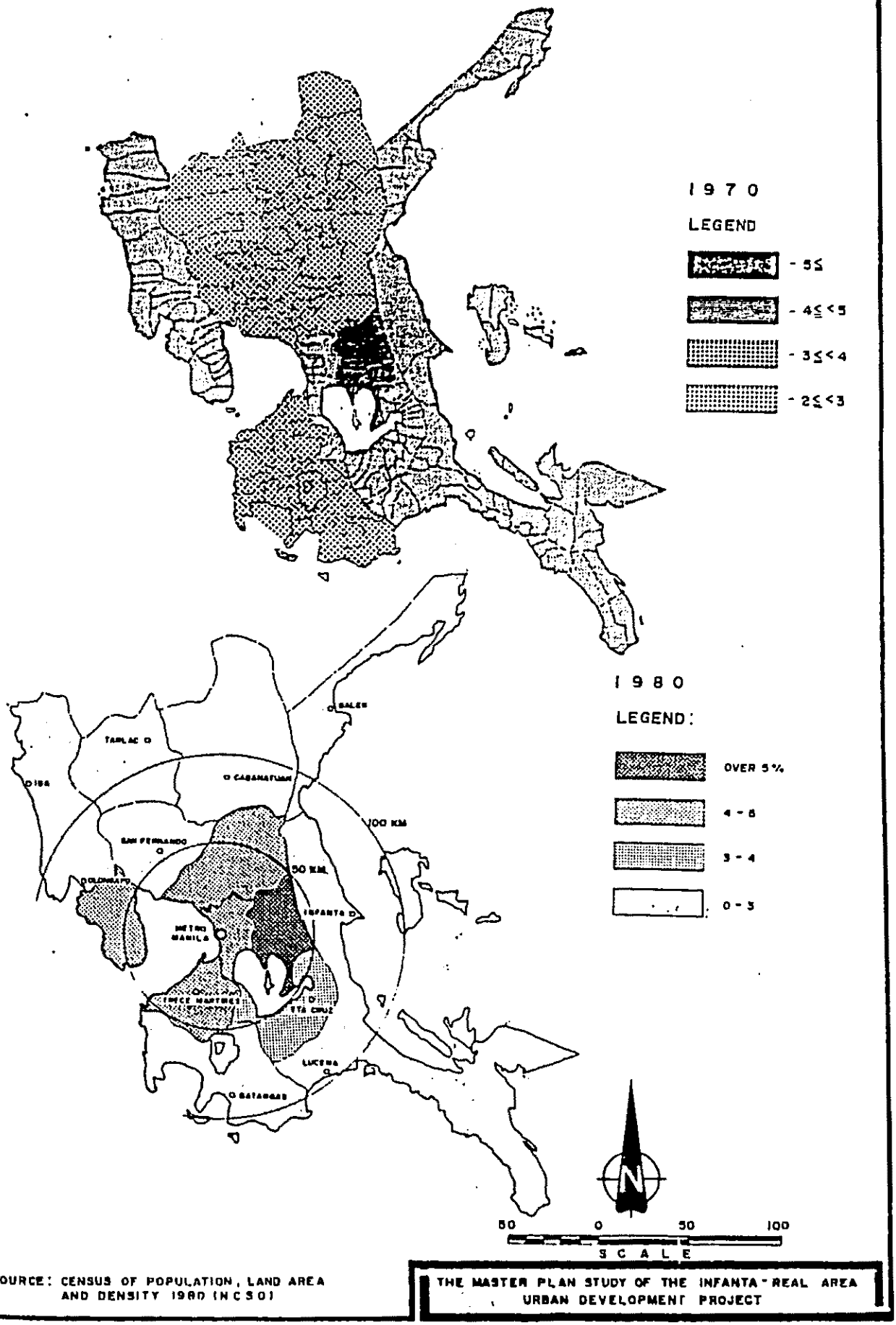

FIG. 2.1.1 ANNUAL GROWTH RATE OF POPULATION BY PROVINCE

The population of the GCLA grew from 11 million in 1970 to 15.4 million in 1980, representing a national share of 30.0% and 32.1%, respectively.

According to the forecasts of the NCSO, the population of the Philippines is expected to increase from 48.1 million in 1980 to 65.4 million by the year 2000. During the same period, the population of the GCLA is seen to grow to 23.6 million.

In terms of population growth rate, in contrast to a national rate of 1.55% per year, the rate for the GCLA is 2.16%. As a result, the share of the national population residing in the GCLA shall soar to 36.1%.

In the future, as seen from the above, the GCLA shall continue to play a major role in absorbing the nations populace. This responsiblity shall be especially heavy particularly in the region bordering on MMA.

2.2 Industry, Economy

The total value of industrial output in the GCLA occupies a majority share (54.3%) of national figures, and in the secondary industrial sector the share is as much as 70% (compared to a 32.1% share in population) (Table 2.1.1).

The ratios for MMA and its adjacent region are given in the above table. What is particularly noteworthy is the fact that the rate of increase in both the overall value of industrial output and the output values for the various industries was higher in the adjacent region than in MMA itself for the period 1970 to 1980. The percentage of the national industrial output which as produced in the contiguous region grew from 20.7% in 1970 to 22.6% in 1980, thereby, indicating the growing importance of the region in the development of the nation's economy.

In addition to the residential and industrial spillover directly related to the concentration of population in Manila, another reason for the rising importance of the region may be said to be the superiror economic and industrial development which is possible in the region owing to its proximity to the capital with its large consumer markets.

For example, as seen from the situation in mineral resource shipments (Fig. 2.2.1), in Rizal and other provinces around Manila the value of shipments of non-metallic minerals is especially large. This is probably due to activity in the cement and gravel industries in order to meet demand in the capital city. Meanwhile in agriculture, etc., because of low transport costs a relatively small-scale farming structure is found, engaging in fruit and vegetable cultivation for shipment to Manila.

Based on these conditions, the NEDA has forecast and planned for a future GRDP (1987) as shown in Table 2.2.1.

When this is compared with actual figures for 1981, in contrast with a national average of 5.88% per year, the rate of increase in MMA must be 6.27% and that in the GCLA, 5.89%.

Furthermore, when viewed in terms of contribution to the increase in the national GRDP during this period, the rate for the GCLA must be 54%, i.e. greater than half of the increase in national production. The rates for MMA and for the region adjacent to Manila must be 34% and 20%, respectively.

These rates correspond very closely to the current national shares held by each region. Therefore, while aiming for a well-balanced development in the long term, expansion of the industrial output of each region is seen to be desirable along the current ratios in order to maintain and develop the Philippine economy in the short and mid term.

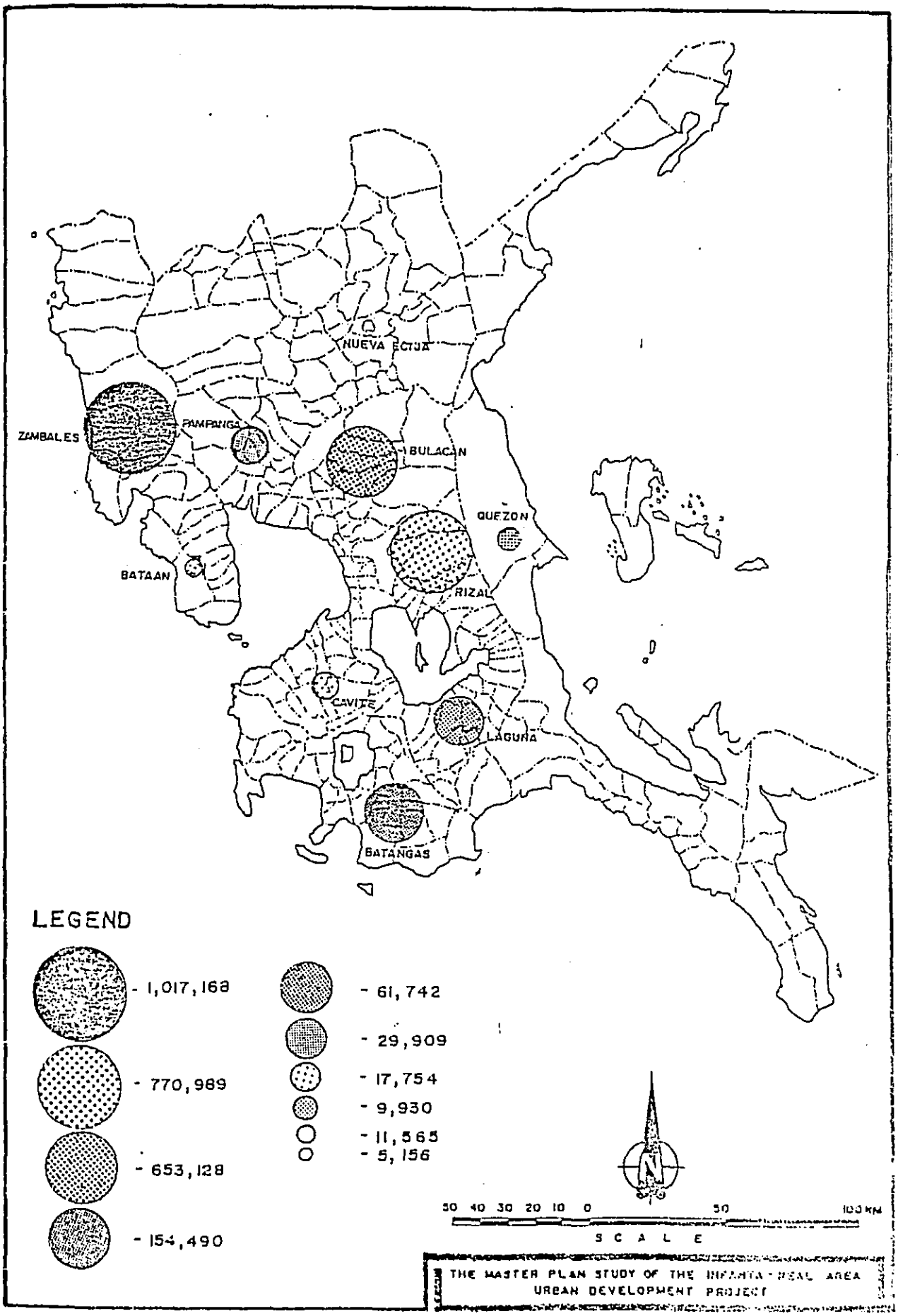

FIG.2.2.1 PRESENT CONDITION OF MINERAL PRODUCTION (1981)
REGION III & IV

Table 2.2.1 Projection of GRDP
1981-1987

(million pesos at 1972 prices)

	1981	1987	1981-1987	Annual Rate	1981-1987 Rate of Contribution in the National Increase
Philippines	96,789	136,399	39,610	5.88%	100%
GCLA	52,249	73,633	21,384	5.89	53.99
MMA	30,504	43,928	13,424	6.27	33.89
Neighboring Areas of MMA	21,745	29,705	7,960	5.34	20.10

Source: JICA Study Team

2.3 Status of the GCLA

Achieving well-balanced development of the nation by curbing the concentration of population and industry in the capital city of Manila and by promoting regional development, is one of the Philippines' most fundamental national policies today.

However, as shown above, the concentrated influx of population and industry into Manila is continuing. On the other hand, local development still requires a considerable amount of time before the causes of population outflow can be eliminated at their source.

Given this situation, the GCLA alone, unlike all other islands in the archipelago, is in a superior position due to its ontiguous location bordering on Manila. And infact, this region more than any other serves a receptacle for the population and industries of the capital.

Accordingly, while striving to carry out local development in the long term at a steady pace elsewhere also, for the time being it is important to develop the GCLA on a full scale in order to sustain and develop the Philippine economy today.

This also indicated the necessity of recognizing that the economic and social leadership role should be played by Manila and the GCLA as one unit.

3. INTERNAL STRUCTURE OF THE GCLA

3.1 Topography and Natural Condtions

The major structural elements in the topography of the Greater Central Luzon Area may be described as follows: the Sierra Madre mountain range along the west coast; and a group of volcanoes in the south. These mountains are laid out in a ring surrounding the plain containing Laguna de Bay, Manila Bay and Manila (Fig. 3.1.1).

In the north, this central plain connects with the Pampanga plain; in the south, it joins the lowlands along the shore of Laguna de Bay. The topography of the south consists of volcanic peaks, with tablelands fingering their way between them.

On the east coast, the Sierra Madre mountain range presses close against the sea and there is almost no flat land (Fig. 3.1.2).

The climate of the Philippines falls into four (4) patterns (Fig. 3.1.3). The west coast of Luzon experiences a rainy season (May to October) and a dry season (November to April). The east coast, on the other hand, has no clear dry season.

When viewed in terms of temperature, humidity and rainfall (Table 3.1.1 and, Fig. 3.1.4), the area displays the following characteristics: (1) Except for the period from June to September, the temperature in Infanta is 1 - 2° lower than in Manila. Antipolo, while experiencing the same patterns of fluctuation as Manila, is also 1 - 2° lower in temperature; (2) Whereas humidity reaches a peak in Manila between August and September, Infanta shows a contrasting pattern with lower humidity between May and August. Nevertheless, the humidity in Infanta averages in excess of 80% around the year. (3) Rainfall also shows contrasting patterns. Between June and September, rainfall is less in Infanta than in Manila; but on a yearly average Infanta receives 1.85% more rain than Manila.

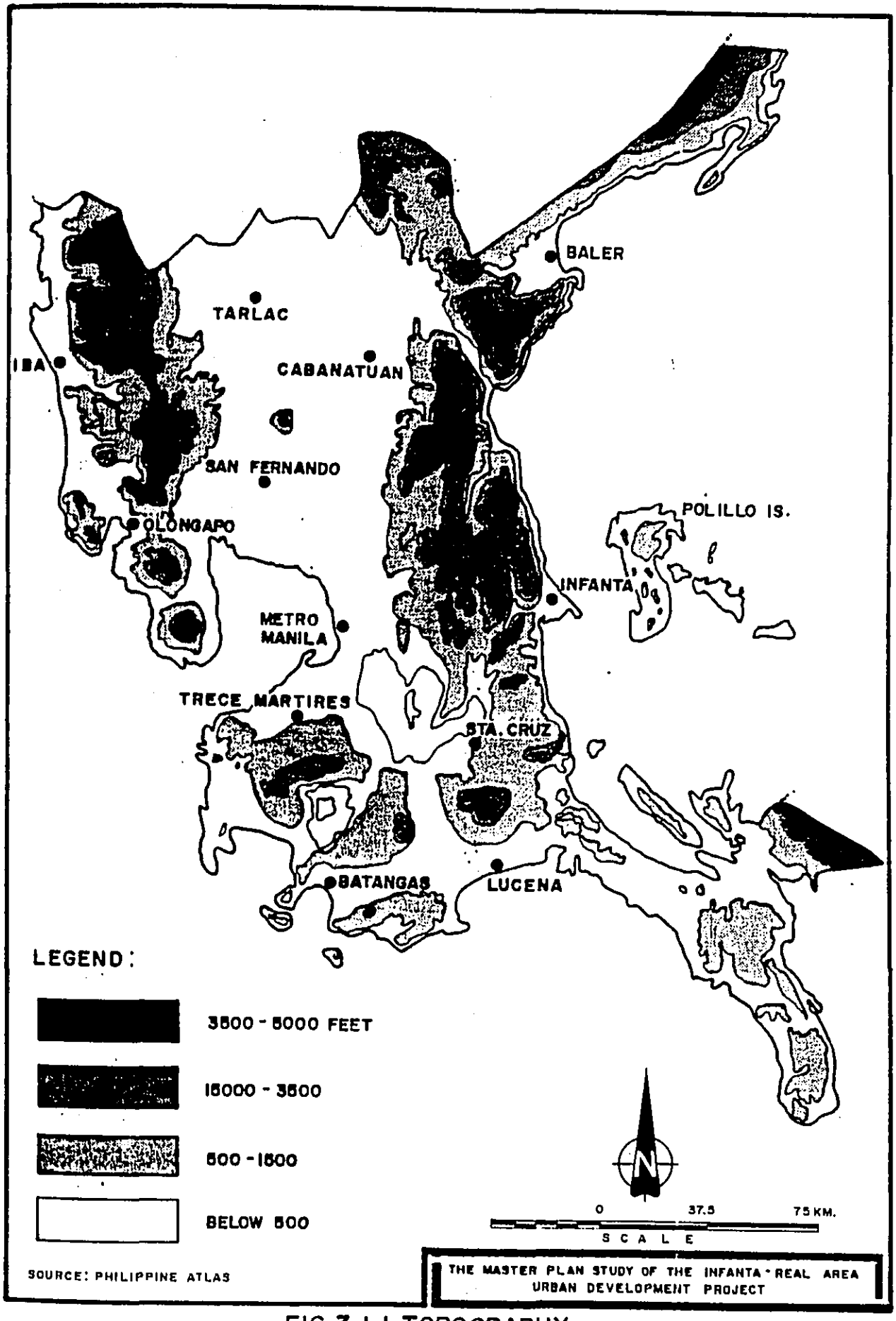

FIG. 3.1.1 TOPOGRAPHY

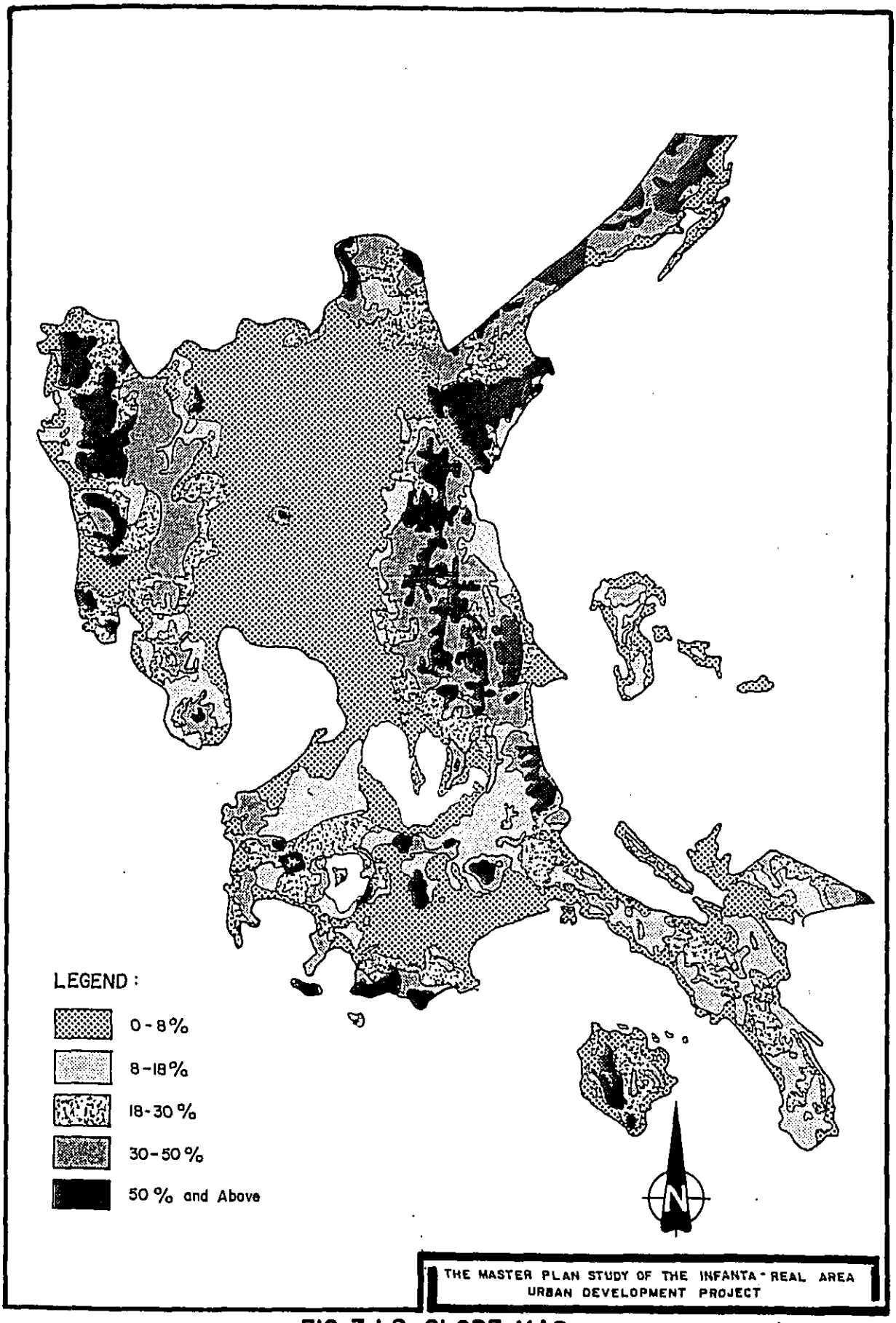

FIG. 3.1.2 SLOPE MAP

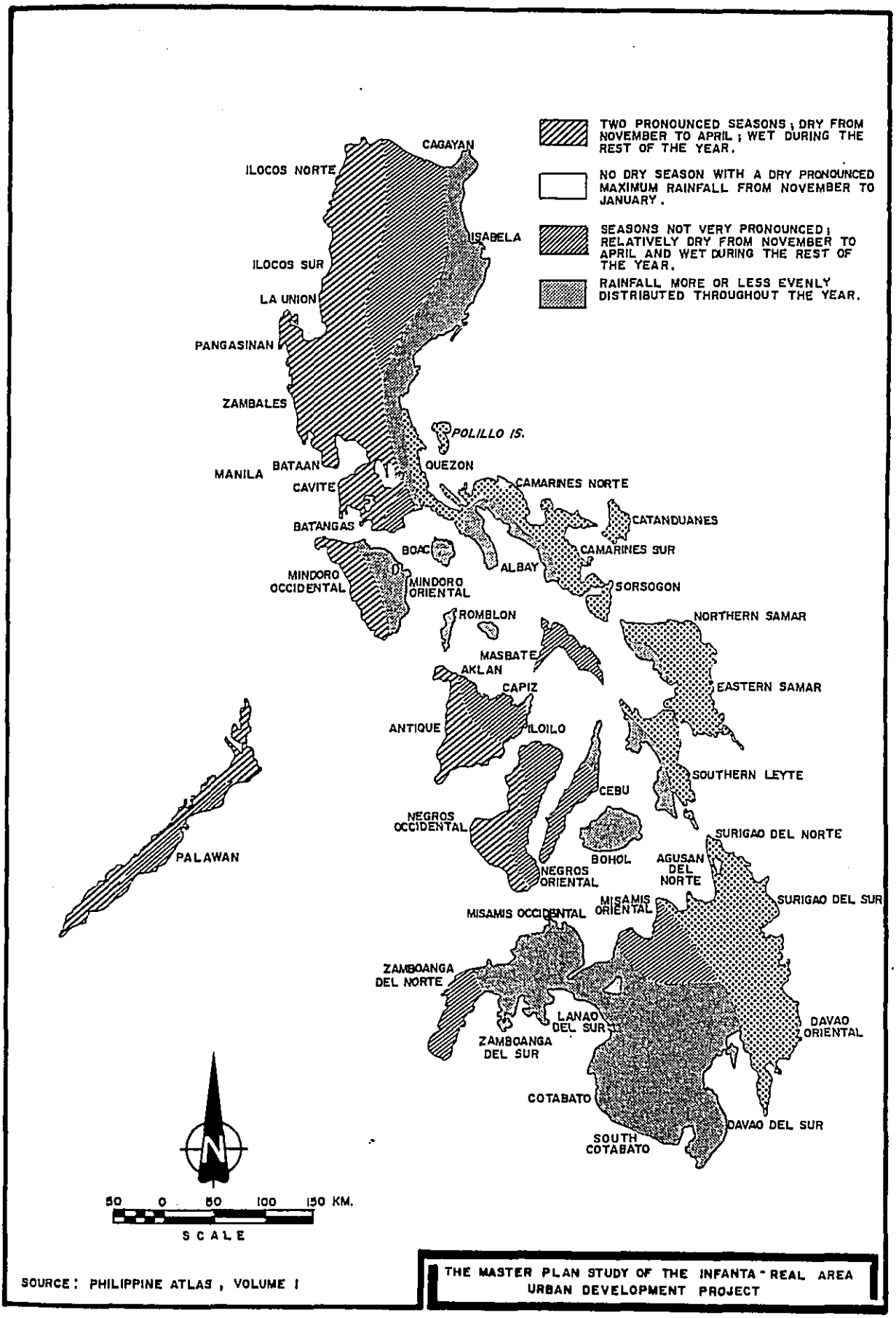

FIG. 3.1.3 CLIMATE MAP OF THE PHILIPPINES

Table 3.1.1 Comparison of Climate Data of GCLA

M E A N T E M P E R A T U R E

Name of Municipality	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Port Area of Manila	25.9	26.4	27.7	29.1	29.6	28.7	28.0	27.5	27.5	27.8	27.2	26.3	27.6
Infanta	24.6	24.9	25.9	27.2	28.2	28.5	28.1	28.1	27.7	26.9	26.3	25.3	26.8
Antipolo Rizal	24.6	25.4	27.0	28.2	28.1	27.3	26.2	26.2	26.1	26.2	26.6	24.8	26.3

H U M I D I T Y (%)

Name of Municipality	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Port Area of Manila	72	69	65	64	69	76	79	82	82	77	76	75	74
Infanta	87	85	84	83	81	80	81	81	82	85	86	87	84
Antipolo Rizal	77	73	66	70	71	82	89	86	87	84	81	80	79

M O N T H L Y R A I N F A L L D A T A (milimeters)

Name of Municipality	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Port Area of Manila	13.3	6.3	10.1	21.3	122.9	286.9	354.3	473.9	301.0	181.9	114.2	58.1	2,044.2
Infanta	379.4	241.6	183.5	192.0	199.3	216.7	236.6	227.7	297.3	503.5	572.8	537.4	3,787.8
Antipolo Rizal	26.4	17.3	27.5	42.2	189.5	525.9	555.0	591.3	461.5	263.4	189.9	116.3	2,804.2

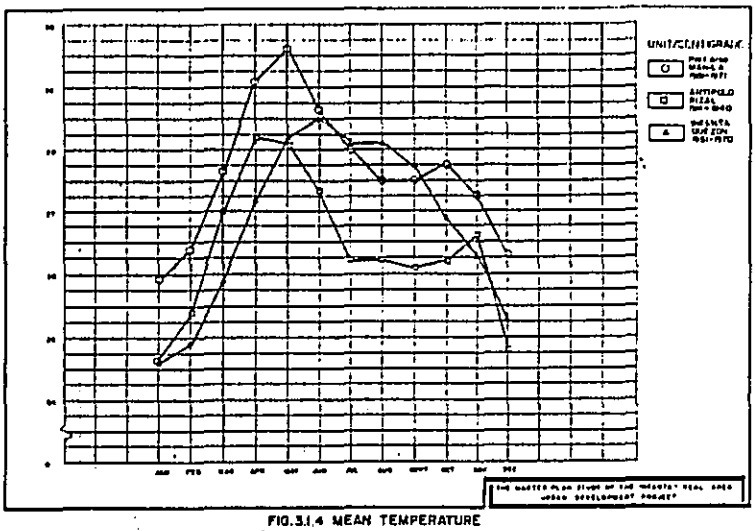

FIG.3.1.4 MEAN TEMPERATURE

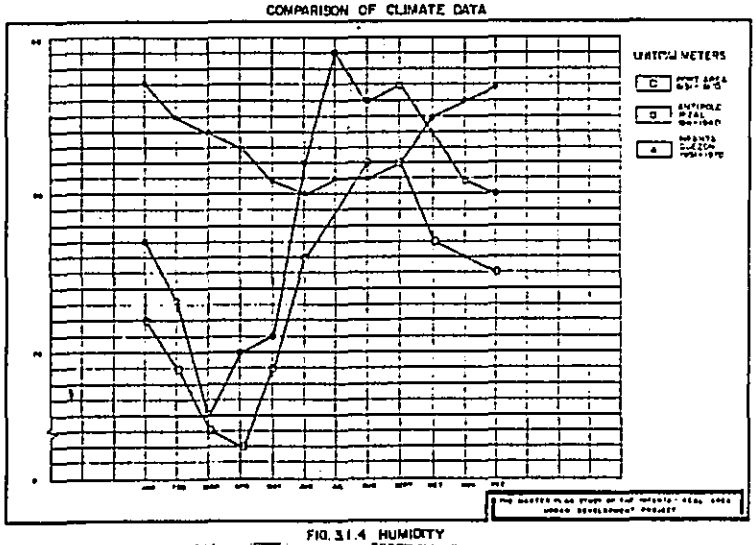

FIG. 3.1.4 HUMIDITY

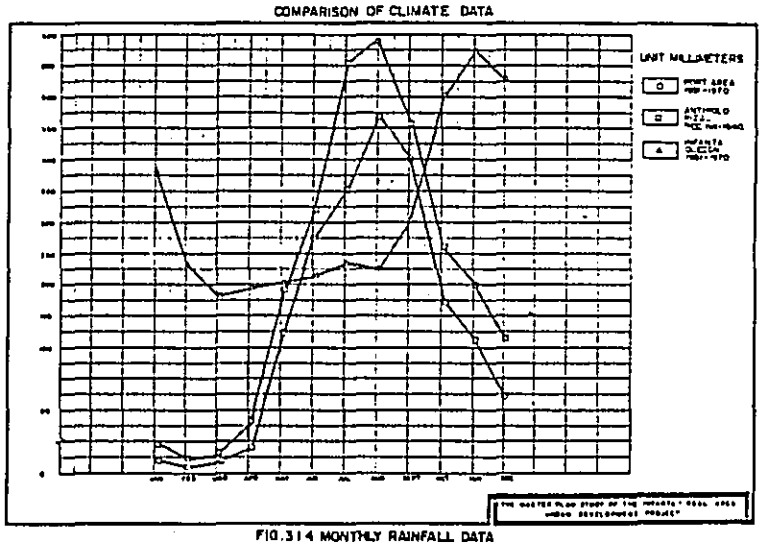

FIG.3.1.4 MONTHLY RAINFALL DATA

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FIG.3.1.4 COMPARISON OF CLIMATE DATA

The Philippines lies along the path of typhoons spawned in the Pacific. Infanta is not located in an area especially subject to typhoons (Fig. 3.1.5). However, compared with Manila and the other areas of the west coast, the east coast region is more frequently visited by powerful typhoons.

Geologically, the Pampanga plain comprises alluvial soil. The west coast area including Bulacan, Manila and Batangas is of volcanic ash soil. The Sierra Madre and east coast are of igneous rock structure (Fig. 3.1.6).

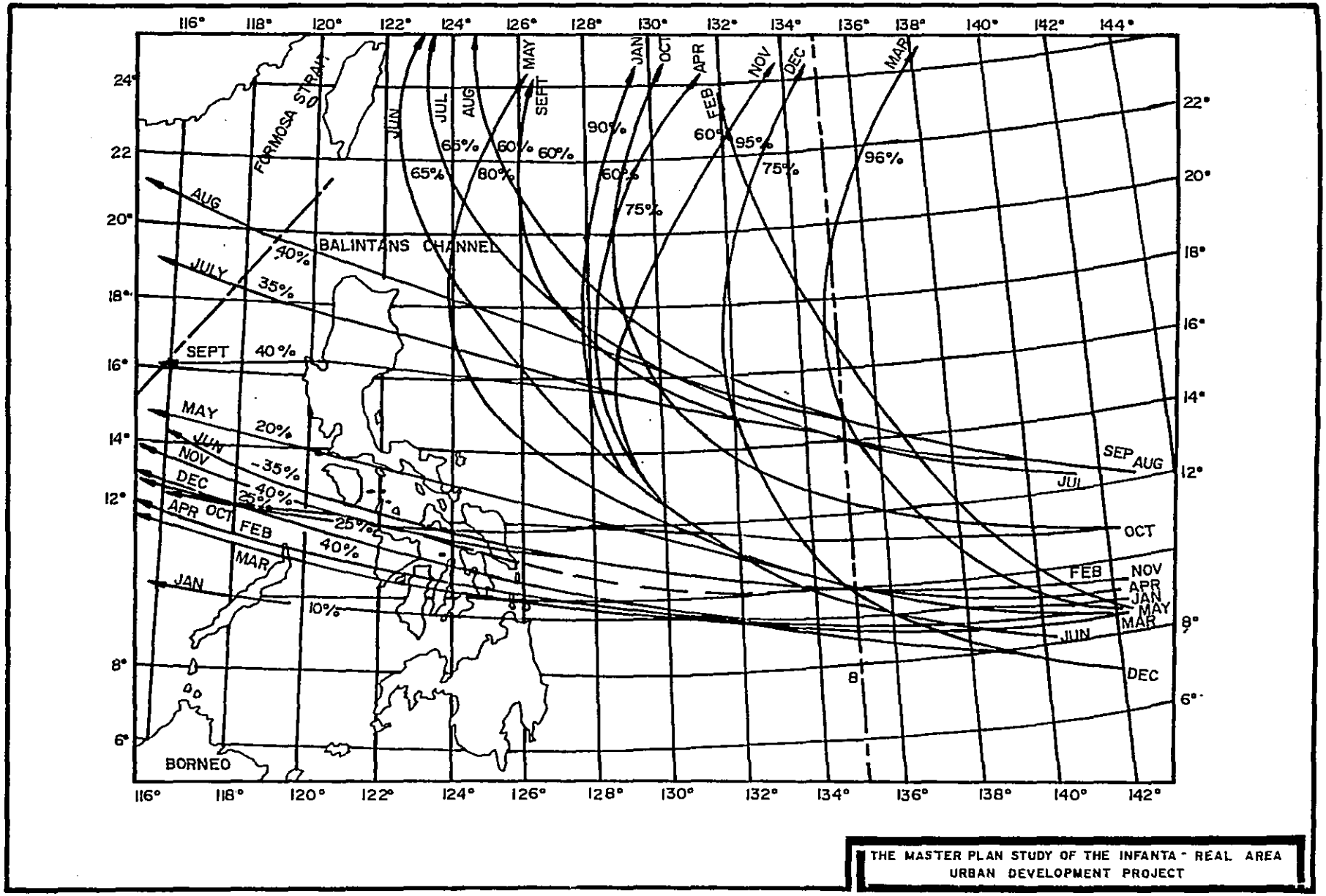


FIG. 3.1.5. MONTHLY TRACKS OF TYPHOON AFFECTING THE PHILIPPINES

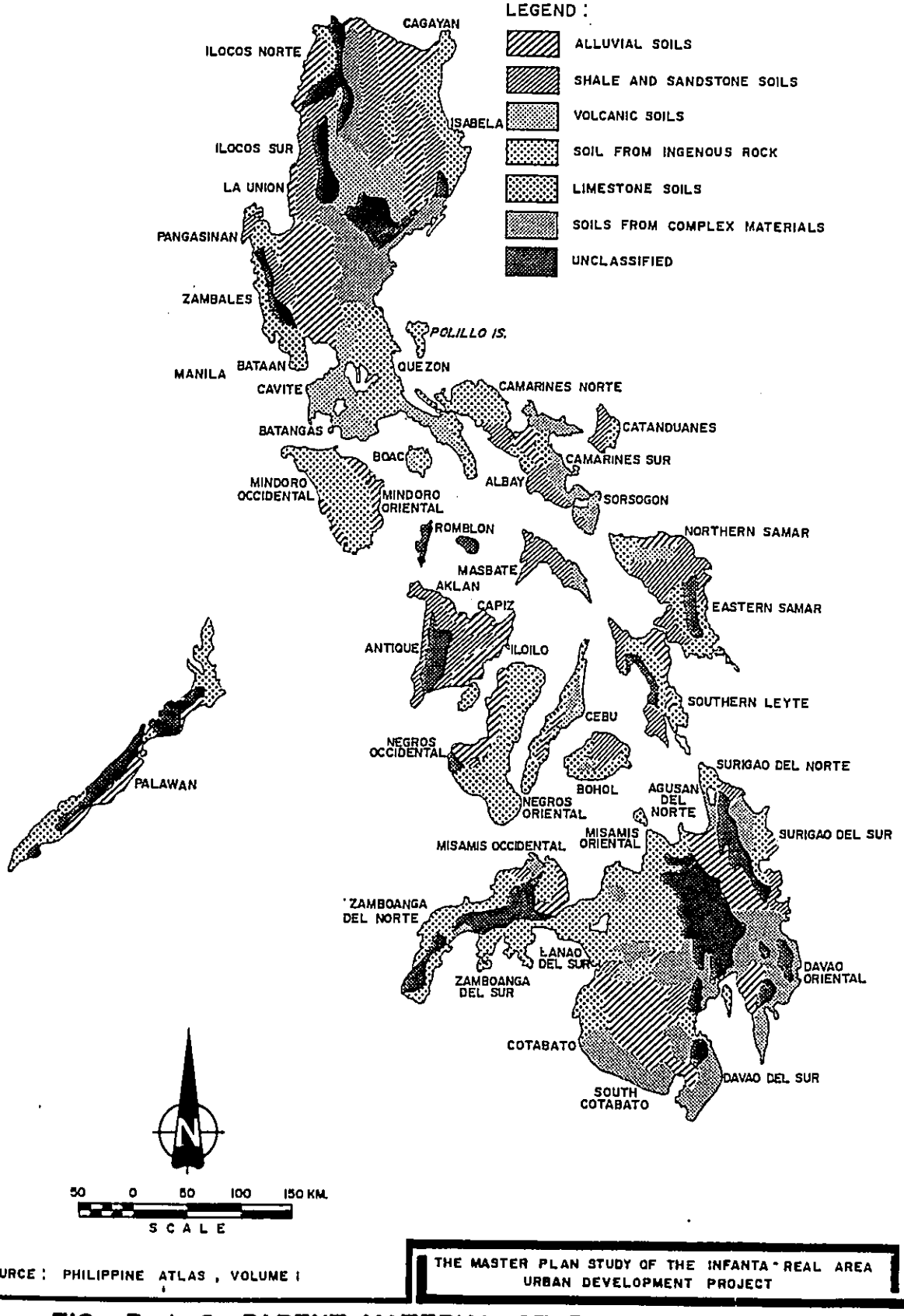


FIG. 3.1.6 PARENT MATERIAL OF PHILIPPINE SOILS

3.2 Population and Social Make-Up

1) Population

While the rate of population increase in the GCLA dropped from 4.14% in the 1960s to 3.43% in the 1970s in accordance with national trends, these figures wer 20 to 30% higher than those for the rest of the nation. As a result, the percentage of the national population living in the region has grown from 27.2% in 1960 to 30.0% in 1970 and 32.1% in 1980 (Table 3.2.1).

While the rate of population increase in Manila has been declined, it still remains extremely high. Also, the share of this population occupied by the GCLA has expanded from 33.5% in 1960 to 38.4% in 1980 (Table 3.2.2).

On a province-by-province basis, in the 1960s all provinces except Tarlac exceeded the national average in population growth. In the 1970s, the provinces having the highest rate of population increase above the national average were concentrated in the region adjacent to Metro Manila, i.e. Bataan, Bulacan, Cavite, Laguan and Rizal.

When a comparison is made of population distribution in cities, towns and villages in 1970 and 1980 (Fig. 3.2.1 and 3.2.2), it is seen that the concentration of population has intensified in the north-south direction, around Metro Manila and the Pampanga plain in the north and from the west shore of Laguna de Bay to Batangas and Lucena in the south.

As shown in the accompanying population distribution maps (Fig. 3.2.3 and 3.2.4) which show the average annual rates of population increase in the cities, towns and villages for the periods 1960 to 1970 and 1970 to 1980, in contrast to the 1960s when cities, towns and villages with high rates of population increase were widely scattered, in the 1970s high growth rates were seen only in the regions near Manila.

Table 3.2.1 Population by Province

	1960 Feb. 15	1970	1980	Annual Growth Rate 1960-70	1970-80
Philippines	27,087,685	36,684,468	48,098,460	3.06	2.75
GCLA	7,346,867	11,018,977	15,439,257	4.14	3.43
MMA	2,462,483	3,966,695	5,925,884	4.88	4.10
Region III	2,525,379	3,615,496	4,802,793	3.65	2.88
Bataan	145,323	216,210	323,254	4.05	4.10
Bulacan	514,346	737,975	1,096,046	3.68	4.03
Nueva Ecija	608,362	851,294	1,069,409	3.42	2.31
Pampanga	617,259	907,275	1,181,590	3.93	2.68
Tarlac	426,647	559,708	688,457	2.75	2.09
Zambales	213,442	343,034	444,037	4.86	2.61
Region IV	2,359,000	3,436,786	4,710,580	3.83	3.20
Batangas	618,414	926,308	1,174,201	3.12	2.40
Cavite	378,138	520,180	771,320	3.24	4.02
Laguna	472,064	699,736	973,104	4.01	3.35
Quezon	653,426	983,324	1,236,422	4.17	2.32
Rizal	173,958	307,238	555,533	5.85	6.10
Infanta		21,653	27,814		2.54
Real		10,079	14,463		3.68
G. Nakar		8,569	12,127		3.53
Total		40,301	54,404		3.05

Table 3.2.2 Population by Province

	1980	1990	2000	Annual Growth Rate 1980-1990	Annual Growth Rate 1990-2000
Philippines	48,098,460				
NCR	5,925,884	7,866,900	9,652,867	2.87	2.07
Region III	4,802,793	5,988,328	6,964,483	2.23	1.52
Bataan	323,254	467,078	609,935	3.75	2.71
Bulacan	1,096,046	1,360,449	1,568,768	2.18	1.43
Nueva Ecija	1,069,406	1,321,037	1,518,067	2.14	1.40
Pampanga	1,181,590	1,446,543	1,673,373	2.04	1.47
Tarlac	688,457	838,820	954,025	1.92	1.30
Zambales	444,037	554,401	640,311	2.24	1.45
Five Provinces	4,710,580	5,921,479	6,968,762	2.31	1.64
Region IV	6,168,452	7,977,276	9,467,732		
Batangas	1,174,201	1,443,407	1,642,401	2.09	1.30
Cavite	771,320	1,095,227	1,300,776	3.57	1.73
Laguna	973,104	1,204,801	1,441,920	2.16	1.81
Quezon	1,236,422	1,407,998	1,635,749	1.31	1.51
Rizal	555,533	770,046	947,916	3.32	2.10

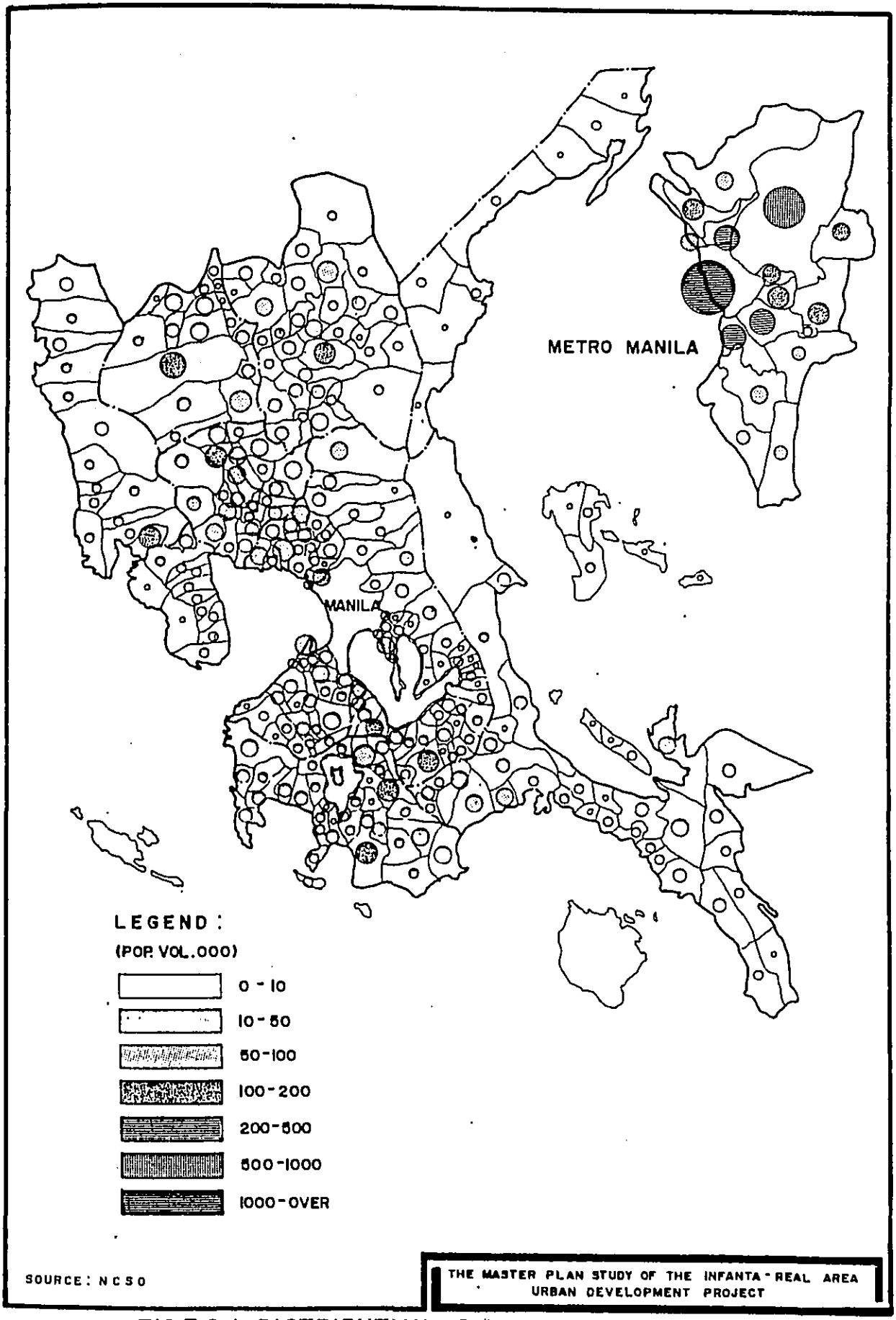


FIG.3.2.1 DISTRIBUTION OF POPULATION - 1970

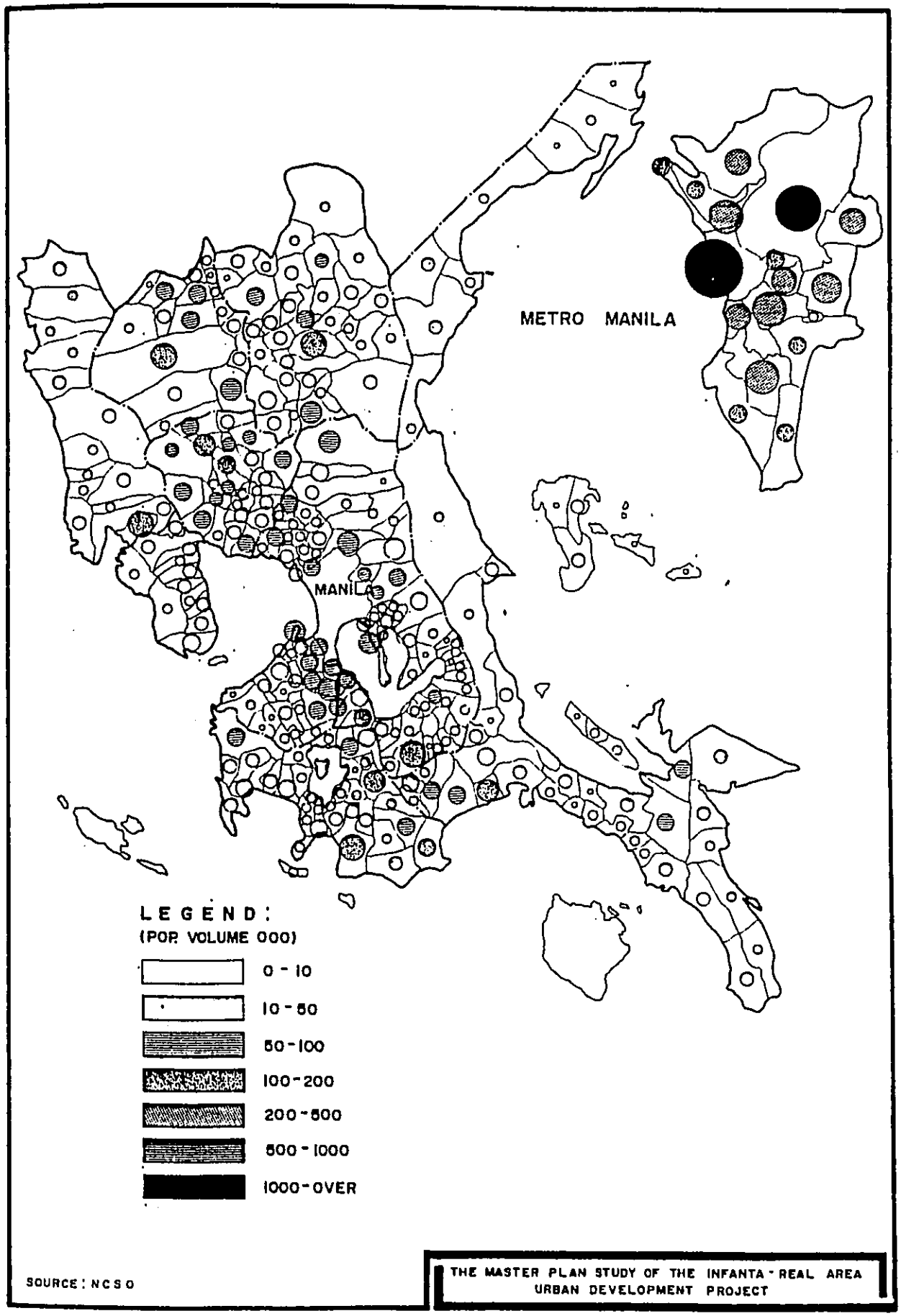


FIG.3.2.2 DISTRIBUTION OF POPULATION - 1980

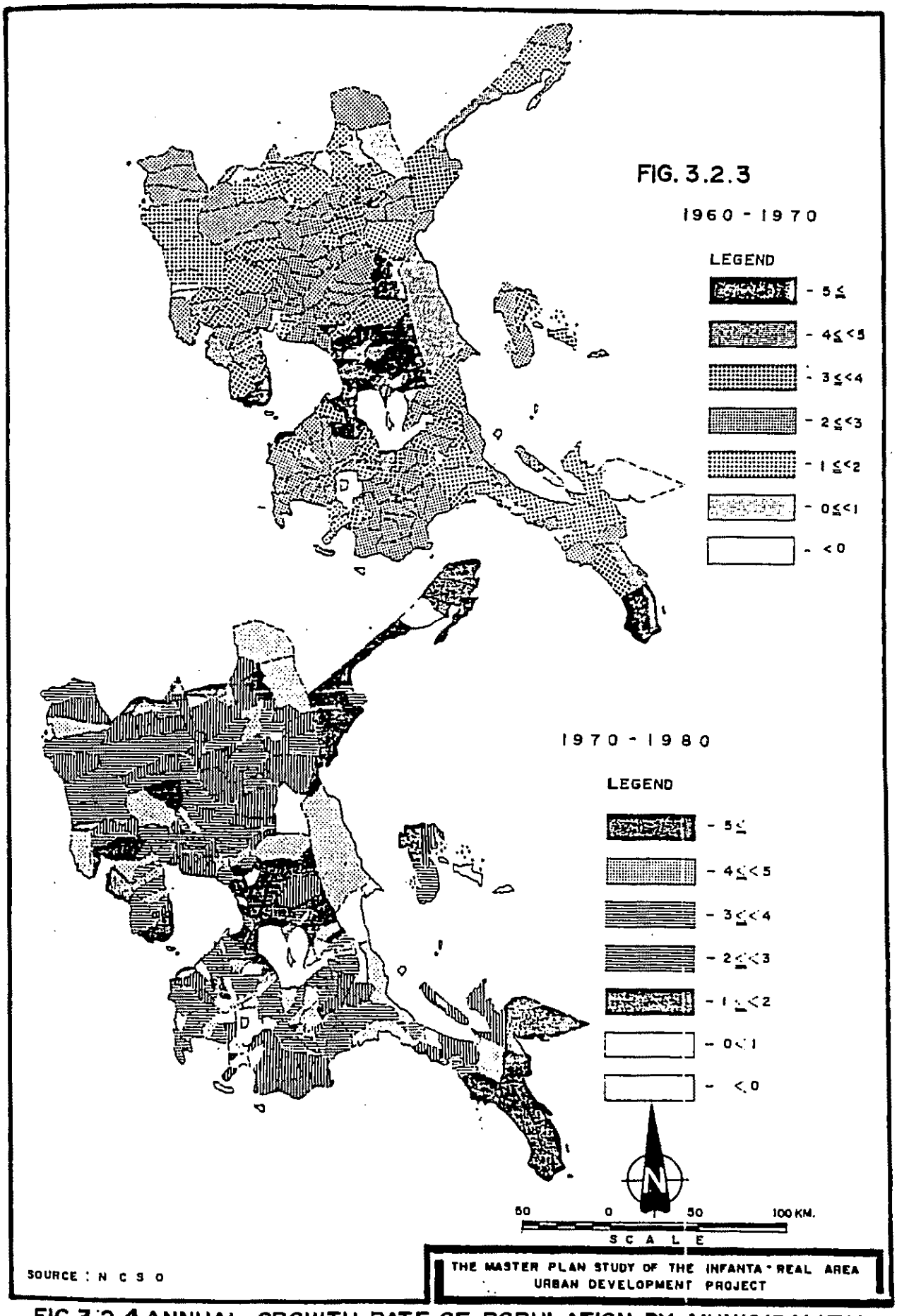


FIG.3.2.4 ANNUAL GROWTH RATE OF POPULATION BY MUNICIPALITY

2) Influx, Outflux of Population

As for the rate of influx/outflux of this region, from the 1960s into the early part of the 1970s a sharp decline occurred in Manila, a shift from emigrations to immigrations was seen in Region III, and the rate of influx into Region IV doubled, leading to an ongoing increase in population distribtuion (Table 3.2.3).

The rates of immigration into the cities, towns and villages of each province for the periods 1970 to 1975 and 1975 to 1980 are shown in Tables 3.2.4. In the latter period, in addition to the four provinces adjacent to Metro Manila, two other provinces show a high rate of immigration: Bataan and Zambales. The increase in Bataan was due to construction and use of an export processing district; in Zambales, the growth was the result of development of mines in west coast region.

In terms of inter-regional social movements (Fig. 3.2.5 and Table 3.2.7), several main characteristics may be seen. (i) The largest factor behind social growth in Regions III, IV and Manila was the influx of population from regions outside the GCLA; (ii) While the influx and outflow between Metro Manila and Region IV were almost balanced, emigrations out of Metro Manila into Region III exceeded the immigration therefrom.

In contrast to the above social growth, as seen in the varying birth rates for each region, natural growth was extremely high in Metro Manila and particularly low in Region IV (Table 3.2.6).

Table 3.2.3 Rate of Influx/Outflux of Population

	(per 1,000 persons)	
	1969-1970	1970-1975
MMA	127.14	6.7
Region III	-27.92	5.9
Region IV	8.72	14.0

Source: NCSO

Table 3.2.4 Rates of In-migration into the Cities of Each Province

Persons

	1970-1975			1975-1980		
	Total	Urban	Rural	Total	Urban	Rural
MMA	151,193	71,316	52,372	804,566	804,566	0
	(10.11)	(6.25)	-	(15.90)	(15.90)	0
Region III						
Bataan	13,473	6,503	5,873	30,422	17,608	12,814
	(6.04)	(12.20)	(3.60)	(11.34)	(14.67)	(8.64)
Bulacan	69,586	49,115	18,044	66,166	34,511	31,655
	(7.77)	(11.32)	(3.98)	(7.18)	(7.06)	(7.30)
N. Ecija	30,397	14,680	14,204	30,640	8,918	21,722
	(3.79)	(8.55)	(2.29)	(3.41)	(3.76)	(3.28)
Pampanga	33,119	18,692	11,856	34,939	31,120	3,819
	(3.79)	(6.90)	(1.99)	(4.53)	(5.92)	(0.82)
Tarlac	17,076	7,369	8,874	16,935	4,815	12,750
	(3.14)	(7.81)	(2.00)	(2.90)	(3.90)	(2.69)
Zambales	29,516	18,537	9,925	25,9[illegible]	17,351	8,405
	(8.34)	(10.48)	(5.79)	(6.86)	(7.81)	(5.47)
Region IV						
Batangas	16,433	7,443	8,223	29,226	8,055	21,171
	(1.88)	(5.86)	(1.11)	(3.05)	(4.73)	(2.59)
Cavite	42,493	30,628	9,591	66,694	54,395	12,299
	(7.79)	(12.53)	(3.57)	(10.20)	(13.81)	(4.73)
Laguna	28,936	18,477	9,146	60,903	45,797	15,106
	(4.23)	(5.37)	(2.74)	(7.44)	(9.11)	(4.78)
Quezon	49,595	22,234	26,124	50,391	16,643	33,748
	(5.32)	(8.41)	(3.96)	(5.35)	(5.89)	(5.12)
Rizal	519,042	344,841	157,897	78,667	62,579	16,088
	(15.96)	(12.10)	(46.90)	(17.00)	(17.96)	(14.04)

Note: ( ) is In-migration rate(Immigration/Total Population)
Source: Present residence of Private Household Population 5 years and over by previous place of residence

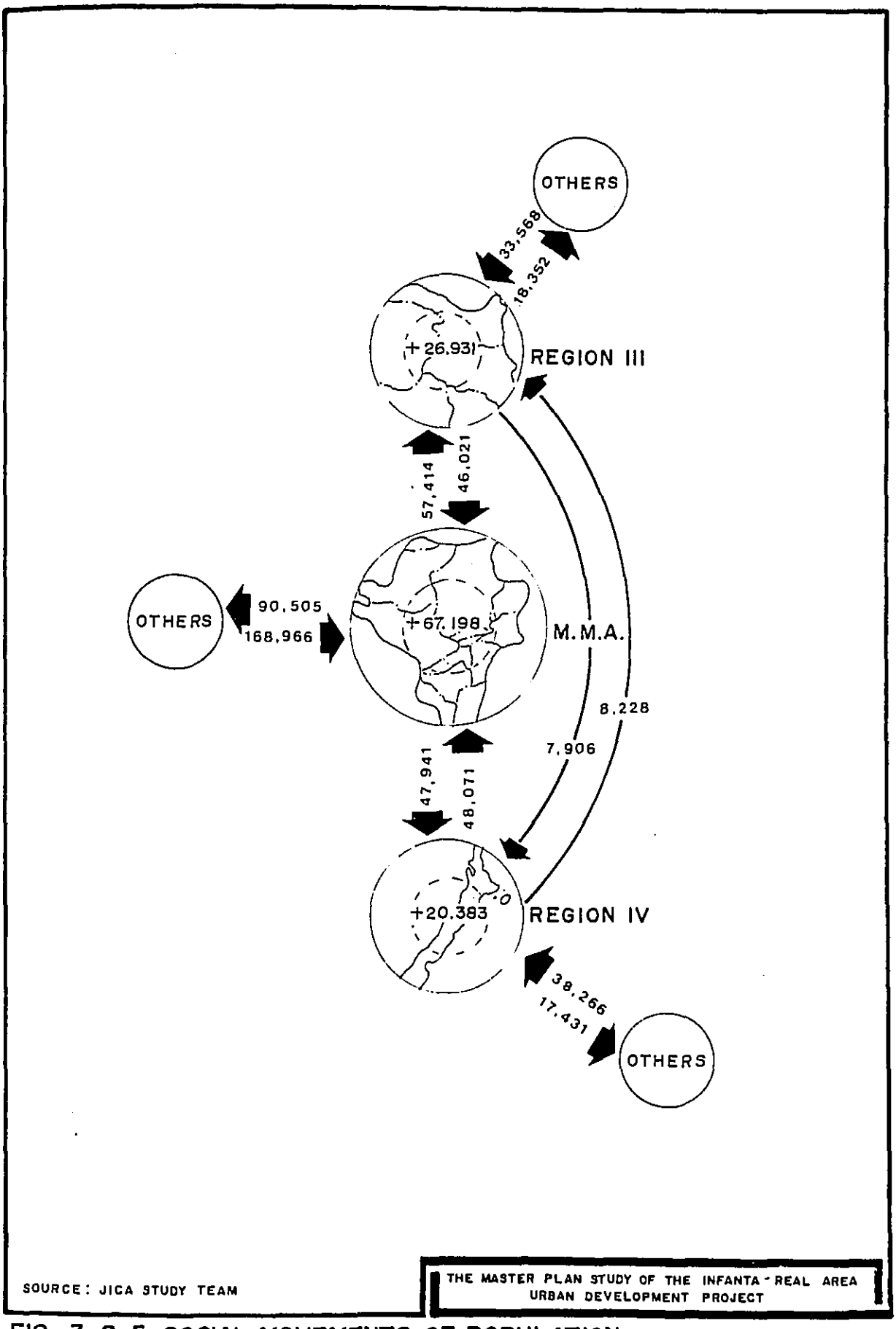


FIG. 3.2.5 SOCIAL MOVEMENTS OF POPULATION

Table 3.2.5 Inter-Regional Social Movements of Population

D/O	MMA	Reg. III	Reg. IV	Others	Total
MMA	-	46,021	48,069	168,966	263,056
Region III	57,414	-	8,228	33,568	99,210
Region IV	47,941	7,906	-	38,266	94,113
Others	90,505	18,352	17,431	-	-
Total	195,860	72,279	73,728	-	887,910

Source: NCSO

Table 3.2.6 Birth Rates for Region

Per 1,000 Person	1979
	Birth Rate
Philippines	31.1%
M.M.A.	39.3
Region III	32.3
Region IV	29.4

Source: NCSO

3) Household Income

Within the GCLA, as the economy has developed in a outerly direction (as explained below), household income in Region IV in the south (Luzon part only) is higher than that in Region III in the north.

Although household income in the provinces in Region IV is on the rise overall, a wide gap is seen between the levels in the various provinces and this gap is continuing to widen (Table 3.2.7).

The growth rate in houshold income between 1971 and 1981 was highest in Rizal and Cavite Provinces, respectively. This high rate was common to both farming families and urban households.

Since 1981, the rise in household has been achieved primarily in urban families, and the incomes of households in farming villages have either levelled off or slightly declined. (The growth rate among farming households is high in Batangas).

Among urban families, growth in household income has been most conspicuous in Rizal. In contrast, in Quezon an actual retrogression has been seen within the region. Furthermore, there is considerable gap between the east and west coasts in this province (east low, west high). In the east coast region, the level in the Aurora-Infanta Real district is particularly low (Table 3.2.8).

Table 3.2.7 Household Income (In Pesos)

	1981			
	Average of All Households	Increase 1971-1981	Urban Household	Rural Households
Batangas	3,361	1.12	5,870	2,990
Cavite	6,315	1.63	7,248	5,424
Laguna	4,344	1.26	4,983	3,692
Quezon	2,315	1.15	3,223	2,057
Rizal	7,487	2.77	6,291	8,681

Source: NCSO

Table 3.2.8 Annual Growth Rate of Household Income (Average)

(In Pesos)

		1981	1982	Annual Growth Rate
Batangas	Total	3,361	4,052	1.21
	Urban	5,870	5,771	0.98
	Rural	2,990	3,801	1.27
Cavite	Total	6,315	7,130	1.13
	Urban	7,248	9,083	1.25
	Rural	5,424	5,603	1.03
Laguna	Total	4,344	4,913	1.13
	Urban	4,983	6,690	1.34
	Rural	3,692	3,609	0.98
Quezon	Total	2,315	2,796	1.21
	Urban	3,223	4,134	1.28
	Rural	2,057	2,396	1.15
Rizal	Total	7,487	8,898	1.19
	Urban	6,291	9,236	1.47
	Rural	8,681	8,490	0.98

Source: NCSO

3.3 Economy

In the period from 1971 to 1981 the annual growth rate of regional industrial output in the GCLA was 21.0% nominally and 6.7% in real terms. These figures were higher than the national rates of 19.8% and 6.0%, respectively, achieved during the same period (Table 3.3.1).

As a result, the GCLA's share of the gross national product rose from 51.0% in 1971 to 54.3% in 1981. (Table 3.3.2)

On the other hand, the share of the GCLA's gross product which originated in Metro Manila (based on the real-terms figures) declined from 59.3% in 1971 to 58.4% in 1981. The share for the adjacent Region IV, however, grew from 23.6% in 1971 to 25.3% in 1981.

This trend was especially strong in the urban industries (i.e., all industries and mining). While Metro Manila's share of the GCLA's gross regional product dropped from 71.6% to 67.1%, the share occupied by both Regions III and IV, whose share increased from 15.8% to 20.1%. This can be interpreted as a "southward" movement of the economy.

In Metro Manila, the share occupied by the manufacturing industries in the GCLA gross product grew from 67.2% to 69.0%, thereby pointing to the continued concentration of such activities in the capital. All other industries (except agriculture, forestry, marine industries and mining) in Metro Manila, however, showed a reduction in their regional share.

In Region IV, the rate of increase in gross industrial product between 1971 and 1981 exceeded the national average and the GCLA average in the manufacturing industries, construction, electricity and water supply, transport and communications, commerce and the service industries.

Table 3.3.1 Gross Domestic Product (in million pesos at current prices)

	Philippines			Greater Central Luzon Area			MMA			Region III			Region IV		
	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate
1. Agriculture Fishery and Forestry	14,780	69,359	16.7%	4,027	16,665	15.3%	0	0	0	1,635	6,351	14.5%	2,392	10,314	15.7%
2. Mining and Quarrying	1,187	6,849	19.2	301.5	1,715	19.0	0	0	0	27.3	1,120	45.0	2,742	595	8.1
3. Manufacturing	11,417	75,152	20.7	7,591	60,237	23.0	5,080	36,123	21.7	1,130.0	8,778	22.8	1,318.0	15,336	27.2
4. Construction	1,781	26,238	30.9	7,265	15,494	7.9	696	8,407	28.3	184	3,022	32.3	121.0	4,065	42.1
5. Electricity Gas and Water	375	3,345	24.5	318.8	2,385	22.3	286.4	1,900	20.8	20.8	290	30.1	11.6	795	32.6
6. Transportation and Communication	2,172	19,618	24.6	1,544.5	12,896	23.6	1,238.0	8,417	21.1	117.2	1,533	29.3	189.3	2,946	31.6
7. Commerc e	11,631	72,377	20.0	5,938	38,557	20.6	4,009.0	22,509	18.8	711.0	6,824	25.4	1,218.0	9,224	22.4
8. Services	6,777	31,836	16.7	4,352	20,436	16.7	3,503.0	16,328	16.6	405.0	1,908	16.8	444.0	2,200	17.4
9. Total	50,119	304,774	19.8	25,073.8	168,385	21.0	14,812.4	93,684	20.2	4,230.3	29,826	21.6	6,031.1	44,875	22.2

Table 3.3.2 Gross Domestic Product (in million pesos at constant prices of 1972)

	Philippines			Greater Central Luzon Area			MMA			Region III			Region IV		
	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate	1971	1981	Annual Growth Rate
1. Agriculture Fishery and Forestry	15,457	24,608	4.8%	4,344 *1)28.1%	6,279 *1)25.5%	3.8%	0	0	0	1,778.0 *2)40.9*	2,445 *2)38.9%	3.2%	2,566.0 *2)59.1%	3,834 *2)61.1%	4.1%
2. Mining and Quarrying	1,282	2,175	5.4	323.1 25.2	538 24.3	5.0	0	0	0	29.5 9.1	248 47.0	23.7	293.6 90.9	280 53.0	Δ0.4
3. Manufacturing	12,611	23,959	6.6	8,488 57.3	18,504 77.2	8.1	5,710.0 67.2	12,759 69.0	8.4	1,286.0 15.2	1,955 10.6	4.3	1,501.0 17.7	3,790 20.5	9.7
4. Construction	1,889	7,830	15.3	1,079 57.1	4,759 60.8	16.0	752.0 69.7	2,610 54.8	13.3	200.0 18.5	918 19.3	16.5	127.0 11.8	1,231 26.9	25.5
5. Electricity and Water	440	999	8.5	376.7 85.6	721 72.2	6.7	338.4 89.8	582 80.7	6.1	25.1 6.7	82 11.4	12.6	13.2 3.5	57 7.9	15.8
6. Transportation Communication	2,184	5,040	8.7	1,567.7 71.8	3,313 65.7	7.8	1,259.5 80.3	2,149 64.9	5.5	121.0 7.7	380 11.5	12.1	187.2 11.9	784 23.7	15.4
7. Commerce	12,484	19,695	4.7	6,441 51.6	10,569 53.7	5.1	4,369.0 67.8	6,322 59.8	3.8	786.0 12.2	1,813 17.2	8.7	1,286.0 20.0	2,434 23.0	8.6
8. Services	7,179	11,878	5.2	4,660 64.9	7,576 63.8	5.0	3,762.0 80.7	6,082 80.3	4.9	438.0 9.4	667 8.8	4.3	460.0 9.9	827 10.9	6.0
Total excd. 1 and 2	36,789	69,402	6.6	22,612.4 61.5	45,442 65.5	7.2	16,181.9 71.6	30,504 67.1	6.5	2,856.1 12.6	5,815 12.8	7.4	3,574.4 15.8	9,123 20.1	9.8
Total	53,528	96,185	6.0	27,279.5	52,249	6.7	16,181.9	30.504	6.5	4,663.6	8,508	6.2	6,434.0	13,237	7.5

1)* Philippines; 100%
2)* Greater Central Luzon Area: 100%

In Region III, although the construction, electricity and water, transport and communiocations, and commercial industries all exceeded the national GCLA growth rates, the manufacturing industries and service industries fell below these averages, indicating their lack of vigor during the 10-year period from 1971 to 1981.

Agriculture, meanwhile, grew at a rate in Regions III and IV below the national average. Even so, agriculture accounted for nearly 30% (28.7% in Region III, 29.0% in Region IV) of the gross regional product, which placed this category in the number 1 position among all industries. (Table 3.3.3)

Table 3.3.3 Composition of GRDP by Industry

	Philippines		Greater Central Luzon Area		Metro Manila Area		Region III		Region IV	
	1971	1981	1971	1981	1971	1981	1971	1981	1971	1981
1. Agriculture, Fishery and Forestry	28.9	25.6	15.9	12.0	0	0	38.1	28.7	40.0	29.0
2. Mining and Quarrying	2.4	2.3	1.2	1.0	0	0	0.6	2.9	4.6	2.1
3. Manufacture	23.6	24.9	31.1	35.4	35.2	41.8	27.6	23.0	23.3	28.6
4. Construction	3.5	8.1	4.0	9.1	4.6	8.6	4.3	10.8	2.0	9.3
5. Electricity, Gas and Water	0.8	1.0	1.4	1.4	2.1	1.9	0.5	1.0	0.2	0.4
6. Transporatation/ Communication	4.1	5.2	5.7	6.3	7.8	7.0	2.6	4.5	2.9	5.9
7. Commerce	23.3	20.5	23.5	20.2	27.0	20.7	16.9	21.3	20.0	18.4
8. Services	13.4	12.3	17.1	14.5	23.2	19.9	9.4	7.8	7.1	6.2
Urban Industry (Sum up of 3 to 8)	68.7	72.1	82.9	87.0	100.0	100.0	61.3	68.4	55.4	68.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: NCSO

3.4 Industry

3.4.1 Industrial Structure

On the basis of the industrial structure of gainfully employed workers, the provinces of the nation can be divided into three categories: (i) agricultural (where agricultural workers compose greater than 50% of the work force); (ii) commercial and services-oriented (where more than 50% of all workers are engaged in these areas); (iii) composite industrial (where there is no concentration in a specific industry). (Table 3.4.1)

Provinces belonging to the first category include Tarlac, Nueva Ecija, Aurora and Quezon, all of which lie on the outer perimeter of the GCLA (100 km radius). The second category is occupied by Metro Manila, at the center of this region.

The four provinces bordering on Manila are situated between the two areas just described (50 km radius). Their industrial structure is of a composite nature and included not only agriculture but also manufacturing, commerce, etc. The four provinces are Bulacan, Cavite, Rizal and Laguna.

Among these four, only Rizal has a higher proportion of tertiary industries than secondary industries. (Table 3.4.2 and 3.4.3)

Table 3.4.1 The Number of Industrial Establishment

ustrial up/ vince	1	2	3	4	5	3-5	6	7	8	9	6-9	1-9
	77 (11.7)	0 (0)	4,140 (71.0)	11 (19.0)	602 (19.2)	4,753 (72.5)	4,730 (82.8)	802 (79.6)	2,333 (81.2)	3,121 (69.4)	10,986 (78.0)	15,816 (74.1)
km radius	249 (37.9)	20 (39.2)	1,029 (17.6)	18 (31.0)	31 (4.7)	1,078 (16.5)	383 (6.7)	73 (7.2)	218 (7.6)	416 (9.2)	1,090 (7.7)	2,437 (11.4)
acan	76 (11.6)	4 (7.8)	373 (6.4)	6 (10.3)	7 (1.1)	386 (5.9)	119 (2.1)	18 (1.8)	60 (2.1)	98 (2.2)	295 (2.1)	761 (3.6)
al	51 (7.8)	9 (17.6)	222 (3.8)	5 (8.6)	11 (1.9)	238 (3.6)	70 (1.2)	22 (2.2)	21 (0.7)	68 (1.5)	181 (1.3)	479 (2.2)
guna	7 (10.2)	6 (11.8)	347 (5.9)	4 (6.9)	9 (1.4)	360 (5.5)	153 (2.7)	21 (2.1)	81 (2.8)	161 (3.6)	416 (3.0)	849 (4.0)
vite	55 (8.4)	1 (2.0)	87 (1.5)	3 (5.2)	4 (0.6)	94 (1.4)	41 (0.7)	12 (1.2)	56 (1.9)	89 (2.0)	198 (1.4)	348 (1.6)
0km radius	331 (50.4)	31 (60.8)	666 (11.4)	29 (50.0)	27 (4.1)	722 (11.0)	600 (10.5)	133 (13.2)	322 (11.2)	961 (21.4)	2,016 (14.3)	3,100 (14.5)
taan	20 (3.0)	2 (3.9)	63 (1.1)	1 (1.7)	8 (1.2)	72 (1.1)	21 (0.4)	8 (0.8)	20 (0.7)	40 (0.9)	89 (0.6)	183 (0.9)
mbales	24 (3.7)	12 (23.5)	19 (0.3)	2 (3.4)	2 (0.3)	23 (0.4)	56 (1.0)	27 (2.7)	43 (1.5)	298 (6.6)	424 (3.0)	483 (2.3)
mpanga	10 (1.5)	0 (0.0)	206 (3.5)	8 (13.8)	5 (0.8)	219 (3.3)	168 (2.9)	28 (2.8)	86 (3.0)	286 (6.4)	568 (4.0)	797 (3.7)
rlac	16 (2.4)	0 (0.0)	53 (0.9)	2 (3.4)	0 (0.0)	55 (0.8)	62 (1.1)	11 (1.1)	29 (1.0)	50 (1.1)	152 (1.1)	223 (1.0)
eva Ecija	46 (7.0)	2 (3.9)	101 (1.7)	4 (6.9)	9 (1.4)	114 (1.7)	99 (1.7)	17 (1.6)	57 (2.0)	72 (1.6)	244 (1.7)	406 (1.9)
rora	29 (4.4)	0 (0.0)	9 (0.2)	0 (0.0)	0 (0.0)	9 (0.1)	9 (0.2)	12 (1.2)	4 (0.1)	7 (0.2)	32 (0.2)	70 (0.3)
ezon	46 (7.0)	13 (25.5)	90 (1.5)	4 (6.9)	0 (0.0)	94 (1.4)	108 (1.9)	15 (1.5)	35 (1.2)	110 (2.4)	268 (1.9)	421 (2.0)
tangas	140 (21.3)	2 (3.9)	125 (2.1)	8 (13.8)	3 (0.5)	136 (2.1)	77 (1.3)	16 (1.6)	48 (1.7)	98 (2.2)	239 (1.7)	517 (2.4)
LA	657 (100.0)	51 (100.0)	5,835 (100.0)	58 (100.0)	660 (100.0)	6,553 (100.0)	5,713 (100.0)	1,008 (100.0)	2,873 (100.0)	4,498 (100.0)	14,092 (100.0)	21,353 (100.0)

urce: NCSO

dustrial Group

1. Agriculture, Fishery/Forestry
2. Mining/Quarrying
3. Manufacturing
4. Electricity, Gas/Water
5. Construction
6. Wholesale/Retailtrade
7. Transportation, Storage/Communication
8. Financing, Insurance/Real Estate, Business Services
9. Community, Social/Personal Services

Table 3.4.2 Household Population Gainful Workers 10 Years Old and Over (Major and Minor Industry)

	All Industries	Agriculture Forestry Fishing	Mining Quarrying	Manufacturing	Electricity Gas, Water Sanitary	Construction	Commerce	Tranportation/ Communication Storage	Services	Industry not adequately classified
Region III	1,210,930	480,8181	5,757	164,351	4,325	81,970	127,359	76,069	241,622	28,559
	100%	39.7%	0.4%	13.6%	0.4%	6.8%	10.5%	6.3%	19.9%	2.4%
Bataan	74,974	29,592	248	9,888	527	6,081	9,117	4,500	14,449	573
	100	39.5	0.3	13.2	0.7	8.1	12.2	6.0	19.3	0.8
Bulacan	328,373	89,652	2,081	82,698	1,435	23,402	40,730	25,224	57,722	5,330
	100	27.3	0.6	25.2	0.4	7.1	12.4	7.7	17.6	1.6
Nueva Ecija	257,032	155,831	307	15,455	331	9,184	20,088	12,069	39,296	4,471
	100	60.6	0.1	6.0	0.1	3.6	7.8	4.7	15.3	1.7
Pampanga	266,576	85,091	208	36,017	1,079	28,741	32,780	18,101	59,111	5,448
	100	31.9	0.1	13.5	0.4	10.8	12.3	6.8	22.2	2.0
Tarlac	169,379	88,918	339	13,780	510	8,198	14,284	9,179	30,681	3,490
	100	52.5	0.2	8.1	0.3	4.8	8.4	5.4	18.1	2.1
Zambales	114,594	31,734	2,574	6,513	443	6,364	10,360	6,996	40,363	9,247
	100	27.7	2.3	5.7	0.4	5.6	9.4	6.1	35.2	8.1
Region IV	2,277,586	550,072	7,779	470,924	13,650	124,333	288,311	150,661	634,878	14,729
	100	24.2	0.3	20.7	0.6	5.5	12.6	6.6	27.9	0.7
Batangas	308,152	147,874	312	48,074	972	12,047	37,270	14,998	42,717	3,915
	100	47.9	0.1	15.6	0.3	3.9	12.1	4.9	13.9	1.3
Cavite	182,632	55,554	1,331	21,874	911	11,724	21,928	14,381	42,239	12,690
	100	30.4	0.7	11.9	0.5	6.4	12.1	7.9	23.1	6.9
Laguna	241,490	87,957	1,062	49,455	1,153	11,327	29,979	12,969	45,554	2,216
	100	36.4	0.4	20.5	0.5	4.7	12.3	5.4	18.9	0.9
Quezon (Including Aurora)	308,050	201,835	524	24,519	486	7,481	22,031	10,260	37,386	3,528
	100	65.5	0.2	7.9	0.2	2.4	7.2	3.3	12.1	1.2
Rizal (including Metro Manila)	1,237,262	56,879	4,550	327,002	10,128	81,754	177,285	98,053	466,882	14,729
	100	4.6	0.4	26.4	0.8	6.6	14.3	7.9	27.7	1.2

Table 3.4.3 Household Population Gainful Workers 15 Years Old and Over As of 1980 (Major and Minor Industry)

	All Industries	Agriculture Forestry Fisheries	Mining Qurry-ing	Manufac-turing	Electricity Gas, Water Sanitary	Construc-tion	Commerce including: Finance Real Estate Business Services	Transport Communi-cation Storage	Services Community Personal Services
MMA	2,096,443	122,621	5,959	462,218	17,778	141,045	435,941	221,051	659,313
	43.72	9.63	28.52	55.39	49.42	39.6	57.47	51.35	57.89
Region III									
Bataan	101,623	34,571	340	20.705	1,052	9,720	9,921	7,313	16,925
	2.10	2.71	1.63	2.48	2.92	2.73	1.3	1.7	1.49
Bulacan	356,425	104,833	2,415	75,130	3,260	31,589	45,409	34,923	55,587
	7.36	8.23	11.56	9.01	9.06	8.87	5.99	8.11	4.88
N. Ecija	282,380	175,799	147	9,971	1,138	11,368	23,144	16,270	34,826
	5.83	13.8	0.70	1.2	3.16	3.19	3.05	3.78	3.06
Pampanga	328,794	99,427	1,120	37,526	1,964	44,315	43,913	27,852	68,225
	6.79	7.81	5.36	4.5	5.46	12.44	5.79	6.47	5.99
Tarlac	131,166	99,846	147	11,439	1,071	12,148	18,180	12,781	32,850
	2.70	7.84	0.70	1.37	2,98	3.41	2.4	2.97	2.88
Zambales	127,735	41,515	4,621	5,633	830	9,129	12,307	9,385	42,212
	2.64	3.26	22.11	.69	2.31	2.56	1.62	2.18	3.71
Region IV									
Aurora	27,465	19,425	10	1,147	21	579	1,364	983	3,136
	0.57	1.53	0.05	0.15	0.06	0.16	0.17	0.22	0.28
Batangas	362,531	162,485	686	52,856	1,653	23,609	46,713	22,418	49,893
	7.48	12.76	3.28	6.28	4.6	6.63	6.16	5.21	4.38
Cavite	231,239	72,163	1,271	25,374	1,951	22,656	30,548	24,318	51,174
	4.77	5.67	6.08	3.05	5.42	6.36	4,03	5.66	4.49
Laguna	304,582	99,176	907	61,270	2,585	20,329	38,532	24,230	54,824
	6.27	7.78	4.34	7.34	7.19	5.71	5.08	5.63	4.81
Quezon	323.594	208,478	1,081	21,955	1,014	12,953	33,209	13,454	39,332
	6.67	16.37	4.94	2.64	2.82	3.64	4.38	3.13	3.45
Rizal	171,348	33,254	2,242	49,230	1.656	16,737	19,418	15,466	20,678
	3.54	2.61	10.73	5.9	4.6	4.7	2.56	3.59	2.69
Total	4,845,325	1,273,593	20,896	834,454	35,973	356,177	758,599	430,444	1,138.975
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.4.2 Location and Distribution Pattern

1) Distribution of Agricultural and Forestry Land

Land for agricultural and forestry use forms a basic pattern corresponding to the topographic and natural conditions described above. That is, the lowland stretching north from Manila and the area along the shore of Laguna de Bay are broad agricultural lands primarily used in rice cultivation. In the tableland which gently rises toward the south, hillside farming is carried out to produce products such as fruit (especially mangoes), coffee and bananas. Farther south, farmlands are used for production of coconuts, reaching as far as Infanta Real. (Fig. 3.4.1).

Forest lands stretch along the east coast of Luzon from the northern trip as far as Quezon, with greatest conentration in the Sierra Madre mountains.

The land to the east of Manila, unlike that to the south and north, is broad hilly grassland which remains unused at present.

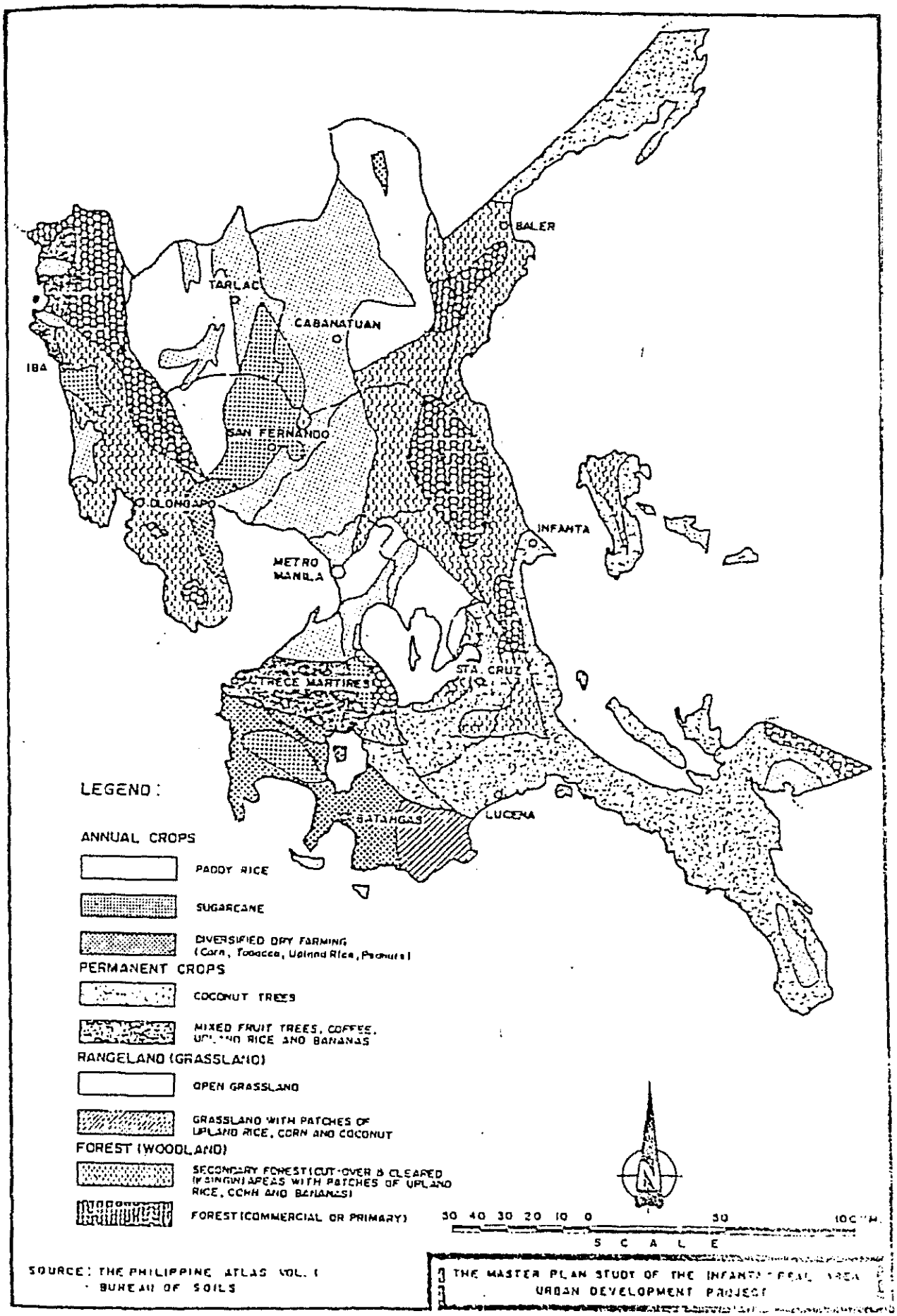


FIG. 3.4.1 AGRICULTURAL LAND USE

2) Marine Industries

Owing in part to the location of Manila and the consuming urban market along the South China Sea side of Luzon, marine products are unloaded primarily on the west coast. The sea on the western side of the Philippines has nearly reached MSY (Maximum Sustainable Yiled). (Fig. 3.4.2)

Development of the sea on the eastern, i.e. Pacific side of Luzon is lagging due to (i) the long transport distances necessary because of the limited sea routes from the Pacific side to the South China Sea side, and (ii) rhe lack of good roads for transporting marine products cross-island to Manila should they be unloaded on the east coast.

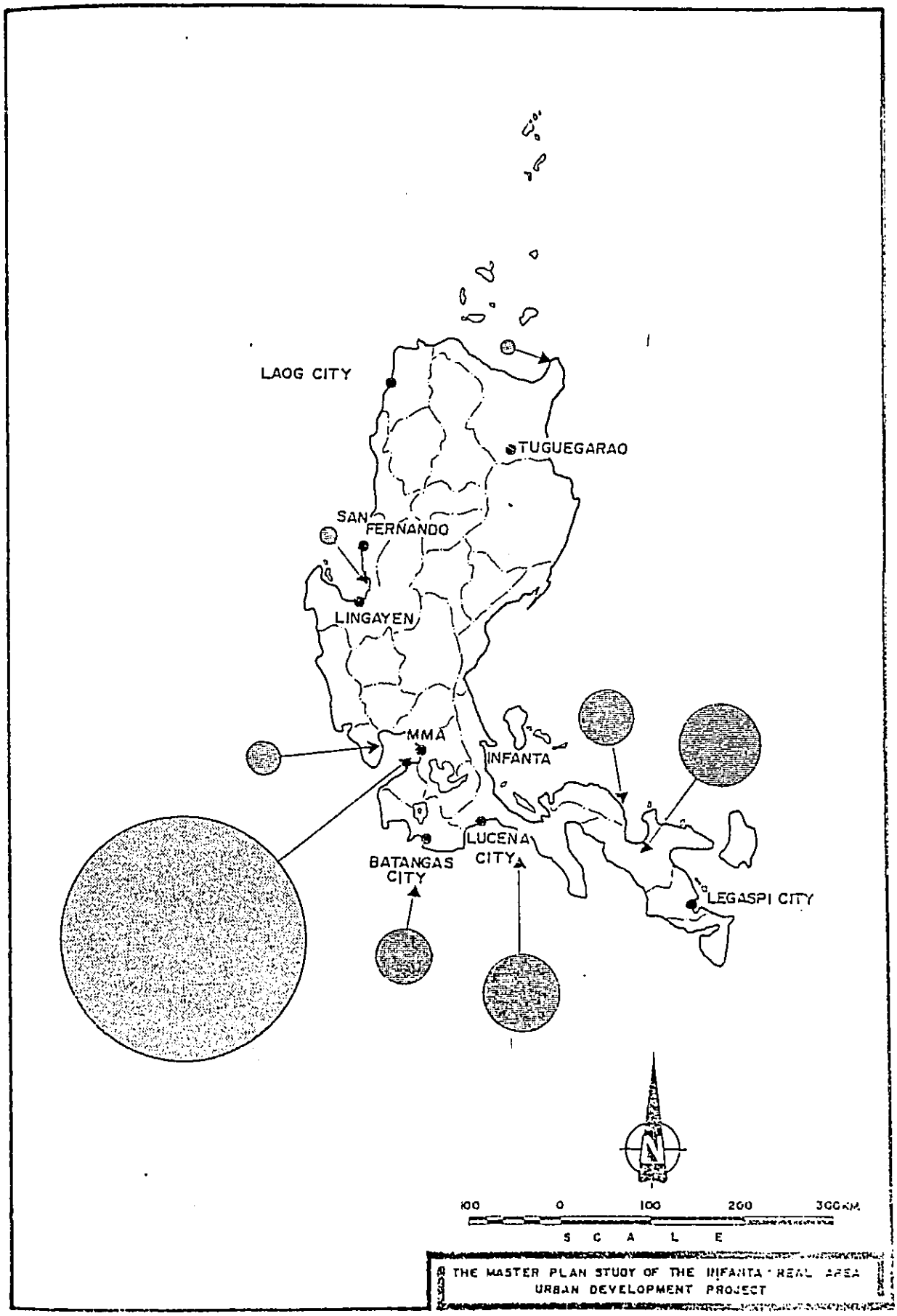


FIG.3.4.2 MARINE FISH LANDING BY COMMERCIAL FISHING VESSELS

3) Manufacturing Industries, Commerce, Service Industries

The manufacturing industries are heavily concentrated in Metro Manila, with a total share of 72.5% for the GCLA. Another 16.5% are located within a 50 km radius of the capital, and another 11.0% within a radius of 50 to 100 km.

Within the 50 km radius, the manufacturing industries are packed into a north-south belt formed from spillover from Metro Manila (Fig. 3.4.3). This belt virtually ends at the 50 km radius mark. A second concentration of manufacturing industries also stretches eastward from Manila, but ends at the 30 km point. Manufacturing industries beyond 50 km from Manila are found at scattered bases in major cities such as Lucena and San Fernando.

The same pattern exists for commercial and service industries (Fig. 3.4.4), i.e. these industries extend along an axis within a radius of 50 km and then are concentrated in several urban centers beyond that radius.

Analysis of the various provincial percentages (excluding Metro Manila) of gainfully employed workers engaged in the service industries vs. the total population reveals that the four provinces bordering on Metro Manila are relatively high (0.04). The only other province showing a smilarly high percentage is Batangas (0.04), owing to the commercial strength of the port and harbor here. (Table 3.4.4)

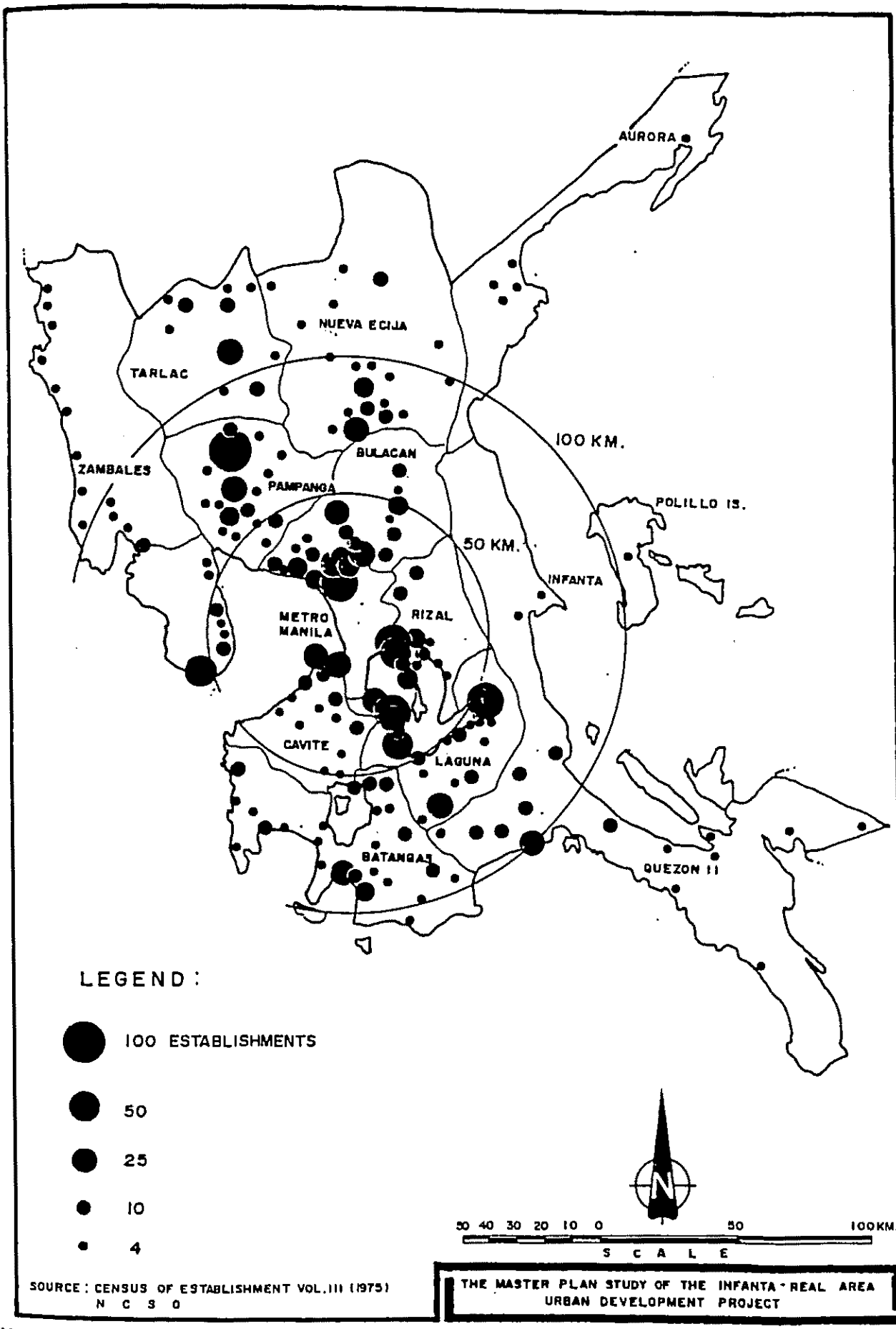


FIG. 3.4.3 GEOGRAPHICAL DISTRIBUTION OF MANUFACTURING ESTABLISHMENTS
(MINING, QUARRYING, MANUFACTURING, ELECTRICITY, GAS, WATER AND CONSTRUCTION)

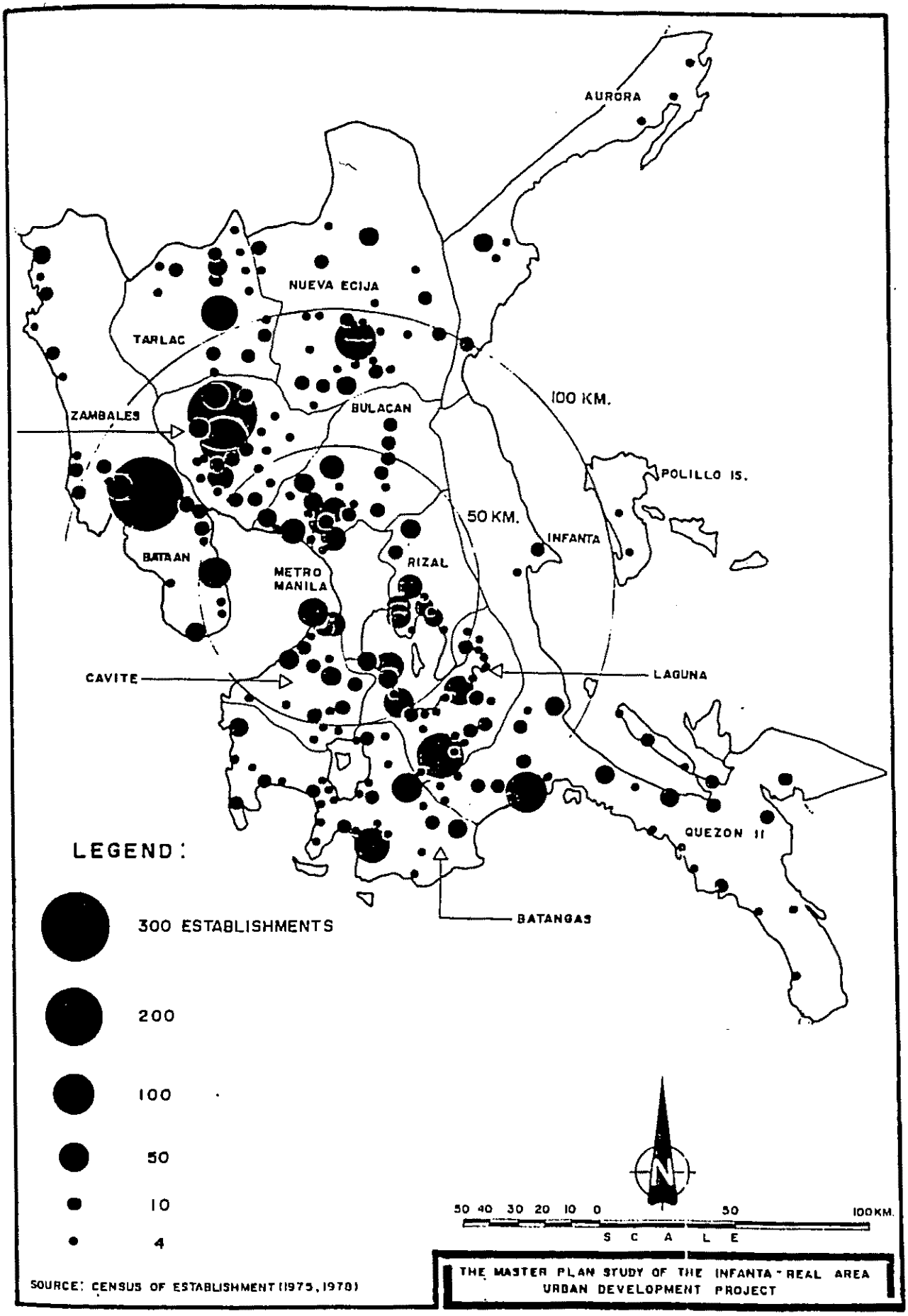


FIG. 3.4.4 GEOGRAPHICAL DISTRIBUTION OF COMMERCIAL SERVICE ESTABLISHMENT (WHOLESALE/RETAIL TRADE, TRANSPORTATION, STORAGE, COMMUNICATION, FINANCING, INSURANCE, REAL ESTATE, BUSINESS SERVICES COMMUNITY, SOCIAL, PERSONAL SERVICES.

Table 3.4.4 Tertiary Industry Employed Workers Vs. the Total Population

	1980
M.M.A	0.074 person/person
Bataan	0.031
Bulacan	0.041
Nueva Ecija	0.022
Pampanga	0.037
Tarlac	0.026
Zambales	0.028
Batangas	0.040
Cavite	0.040
Laguna	0.040
Quezon	0.027
Rizal	0.035

Source: NCSO

The major characteristics of each province in terms of industrial location are as described below:

(i) Quezon is the leader by a wide margin in the number of establishments engaged in agriculture, forestry and marine products;

(ii) Mining/quarrying is especially common in Zambales, Quezon and Rizal;

(iii) Manufacturing industry-related businesses are especially numerous in the north (Bulacan, Pampanga) and south (Laguna). A high percentage is also found to the east in Rizal, although the level is only about 2/3 that of Laguna or Bulacan;

(iv) Provinces having a large number of businesses engaged in commercial or service industries are Laguna, Zambales and Pampanga.

The number of commercial and service establishments in Pampanga may be considered to be the result of two factors : (1) the fact that this area serves as a rely center between cities such as San Fernando and Angeles in the north (Regions I and II) and Manila, and (2) the fact that this area is the urban base of Pampanga's expansive central grainbelt plain.

Similarly, Laguna's relatively high percentage of commercial and service establishments is due to development owing to the influence of Metro Manila and to the fact that cities such as San Pablo srve as both relay points and as urban centers in the region.

The distribution of industries on a city, town and village basis is shown in Fig. 3.4.5 to 3.4.13.

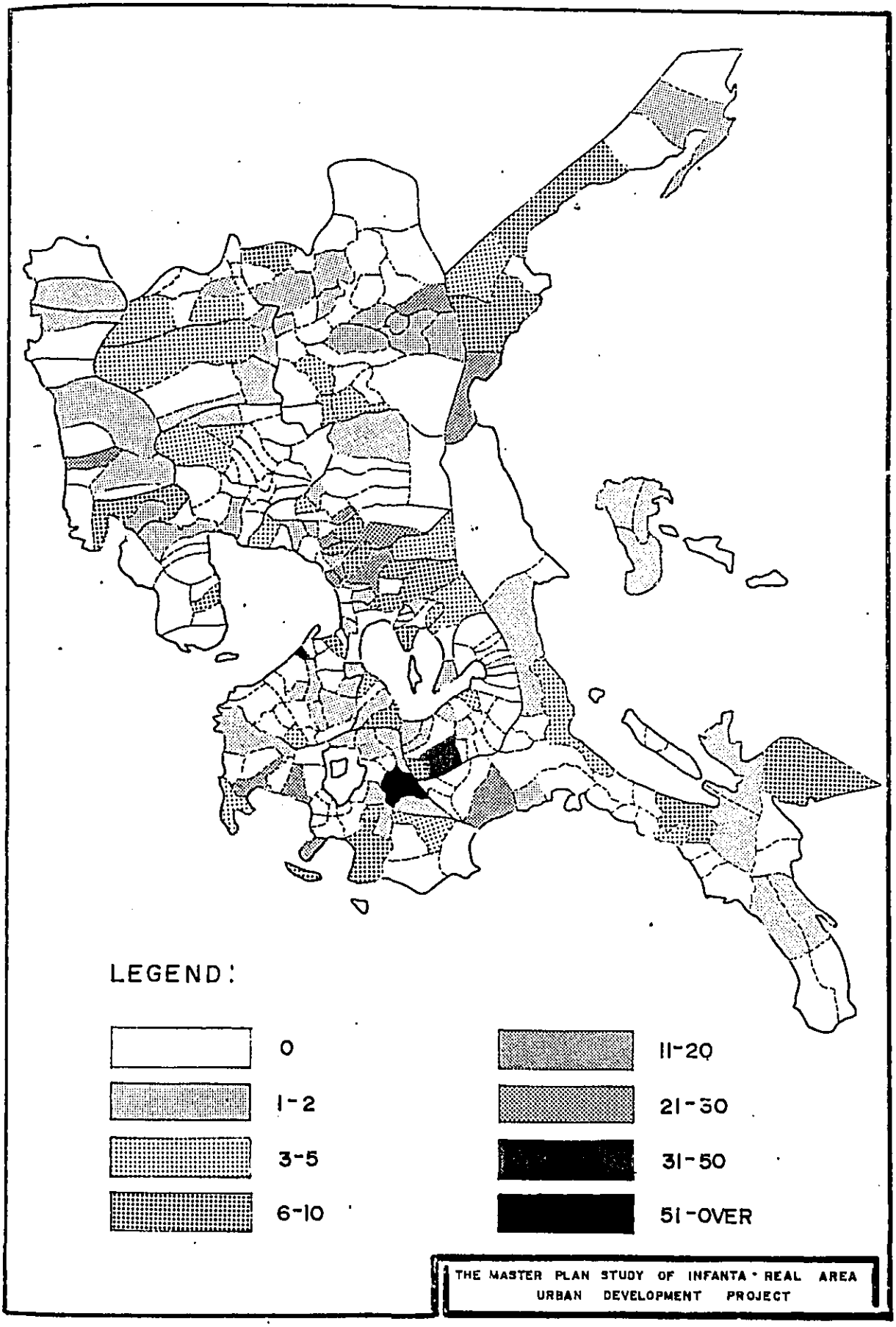


FIG. 3.4.5 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS
(AGRICULTURE, FISHERY & FORESTRY-1978)

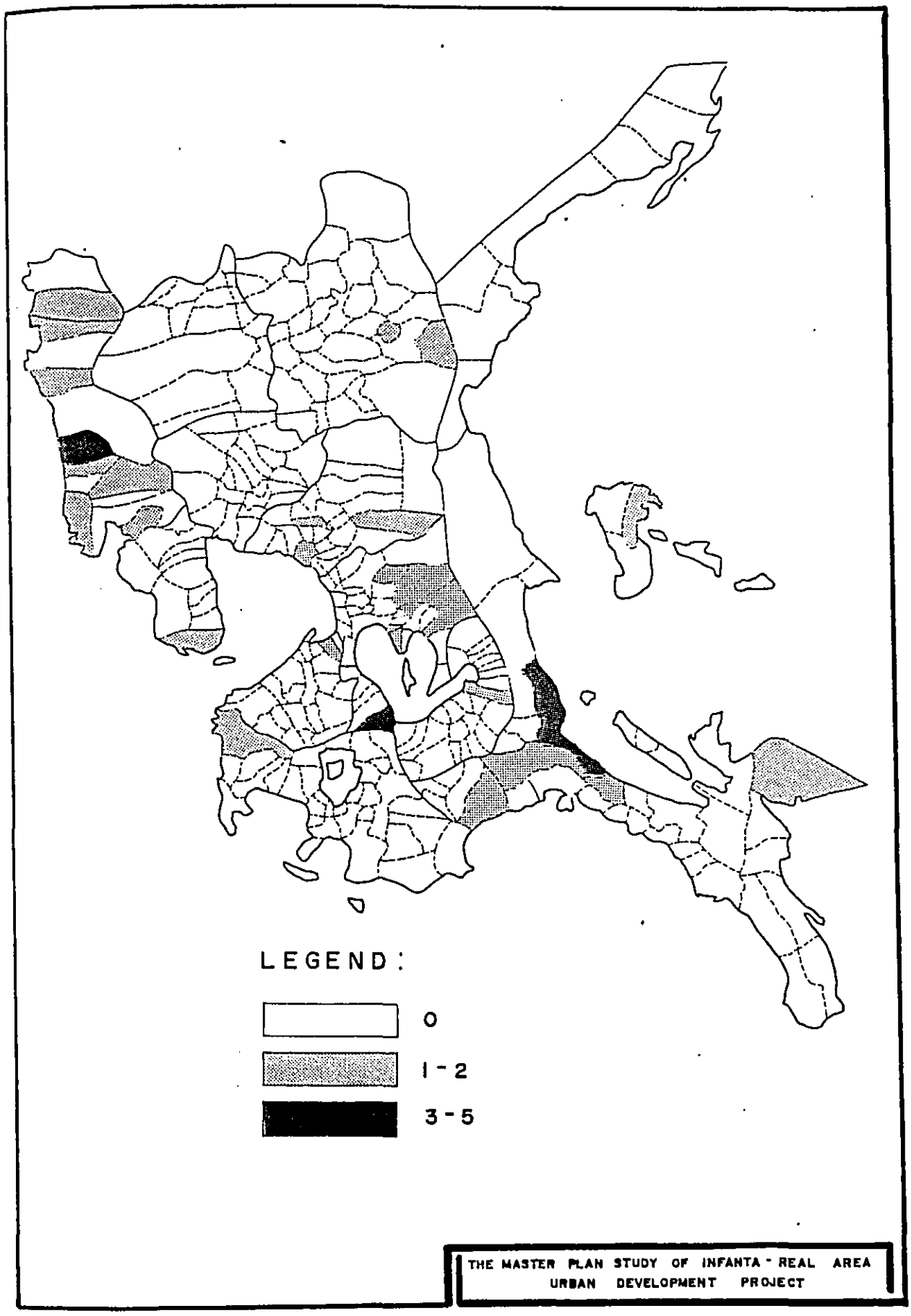


FIG. 3.4.6 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS
(MINING AND QUARRYING - 1978)

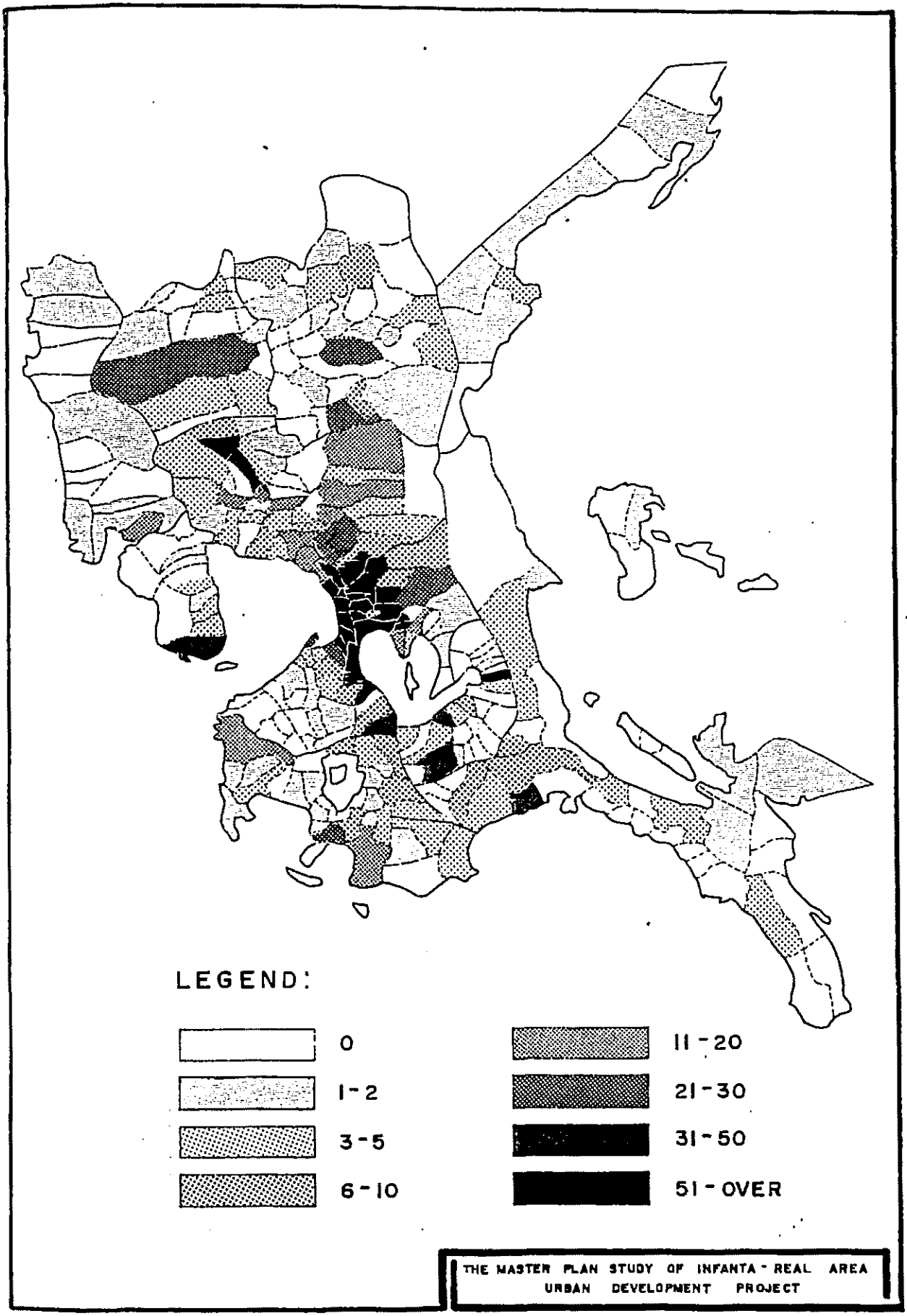


FIG. 3.4.7 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS (MANUFACTURING-1978)

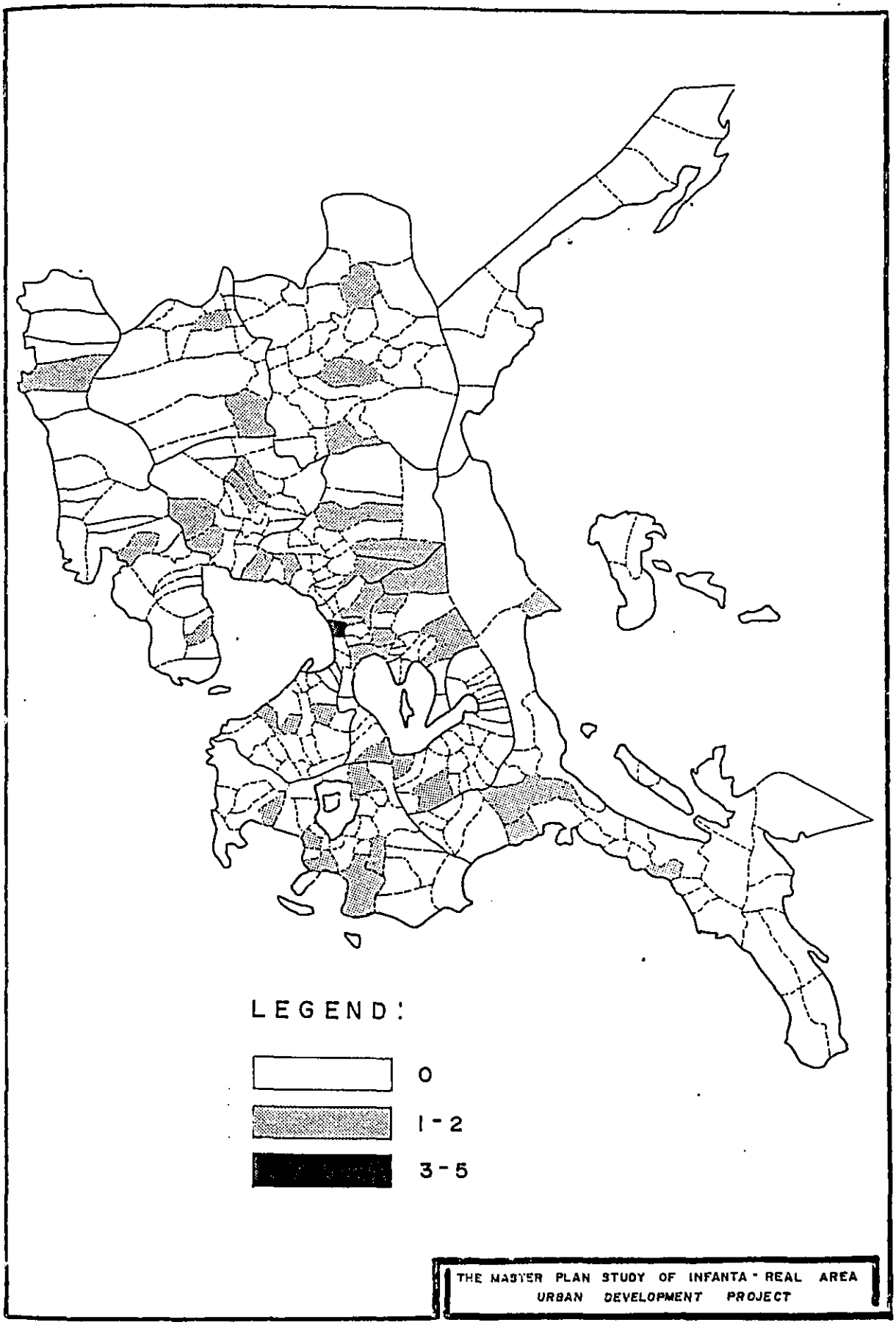


FIG.3.4.8 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS
(ELECTRICITY, GAS & WATER - 1978).

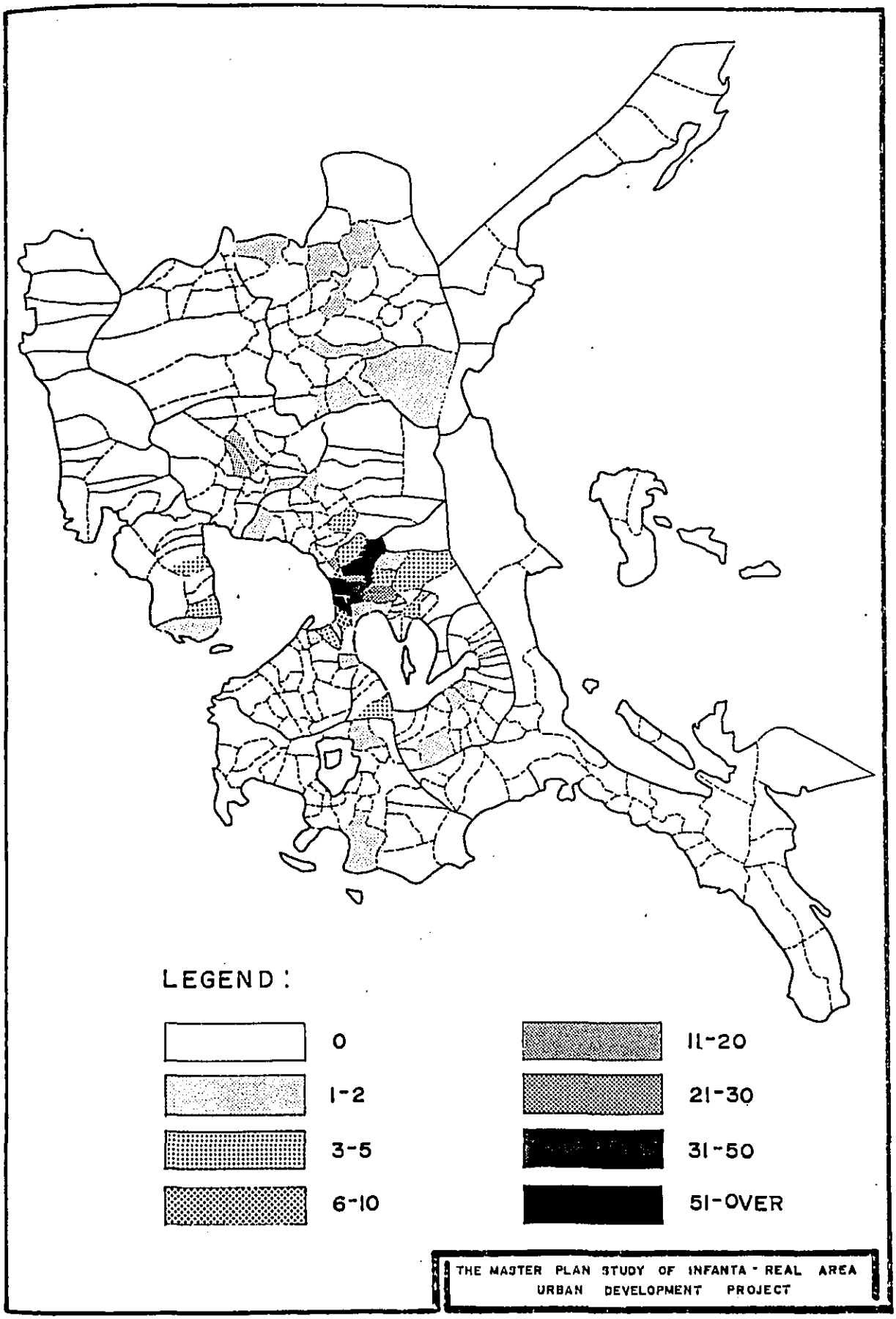


FIG. 3.4.9 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS (CONSTRUCTION-1978)

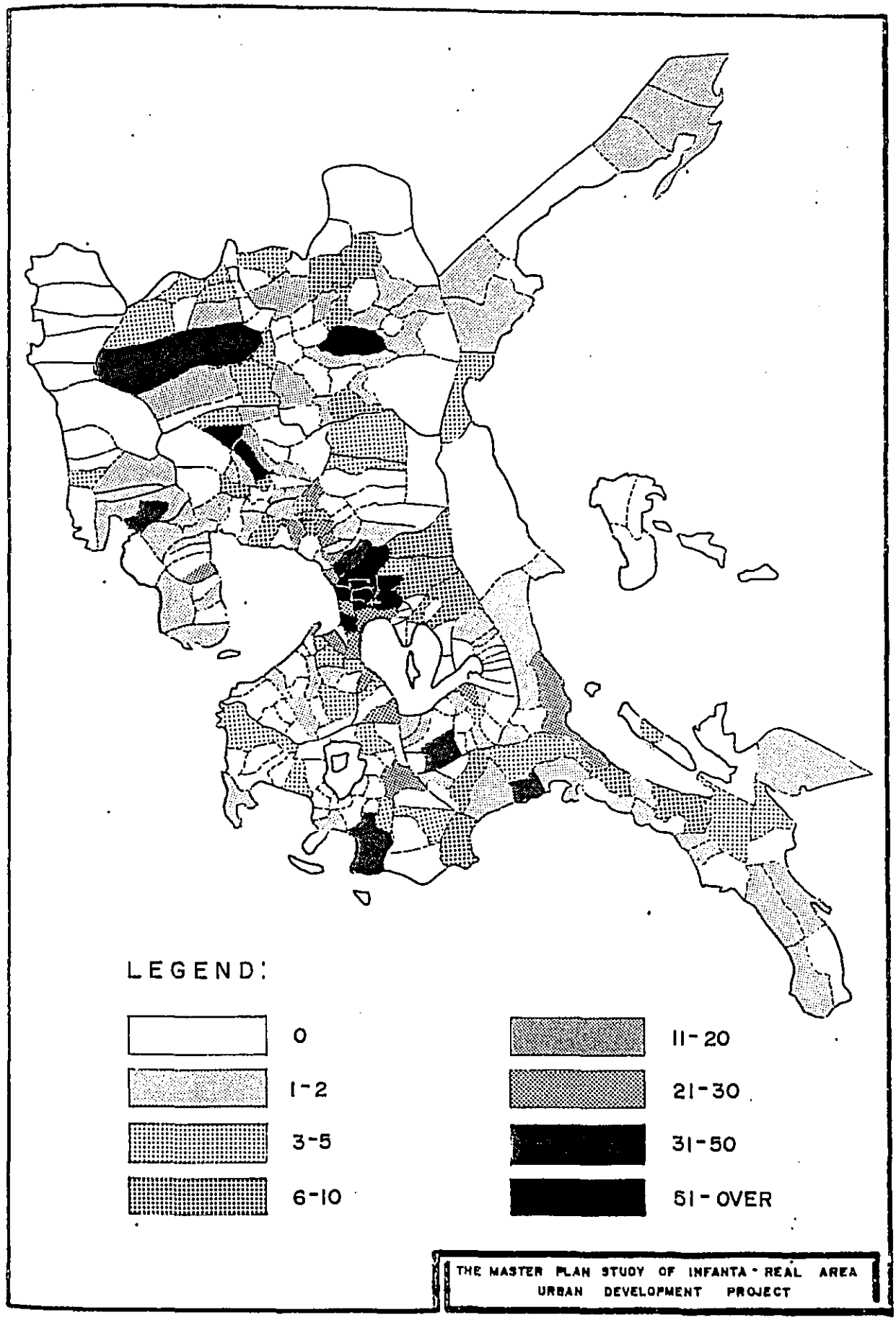


FIG. 3.4.10 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENT (WHOLESALE & RETAIL TRADE-1978)

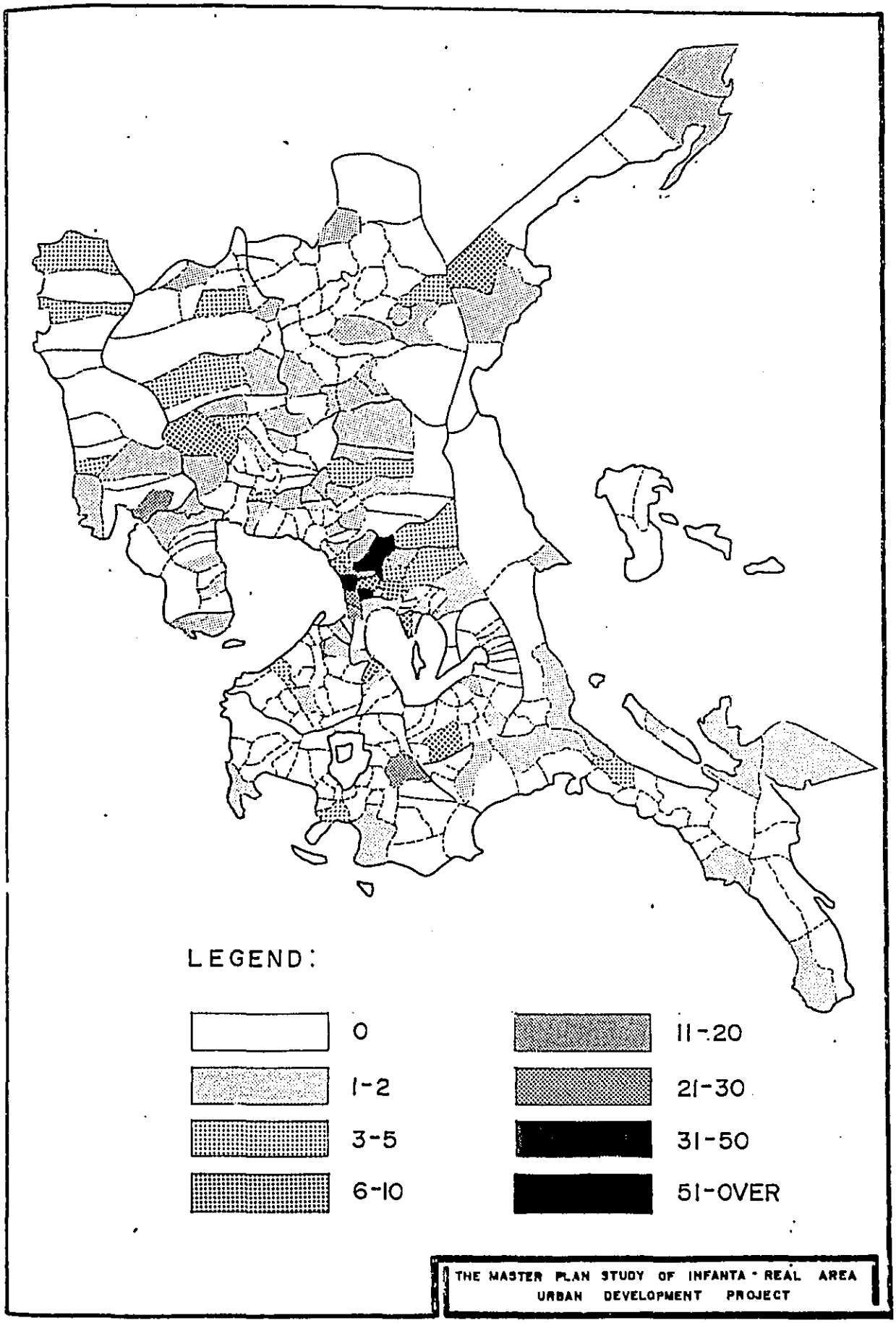


FIG. 3.4.11 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS (TRANSPORTATION, STORAGE & COMMUNICATION-1978)

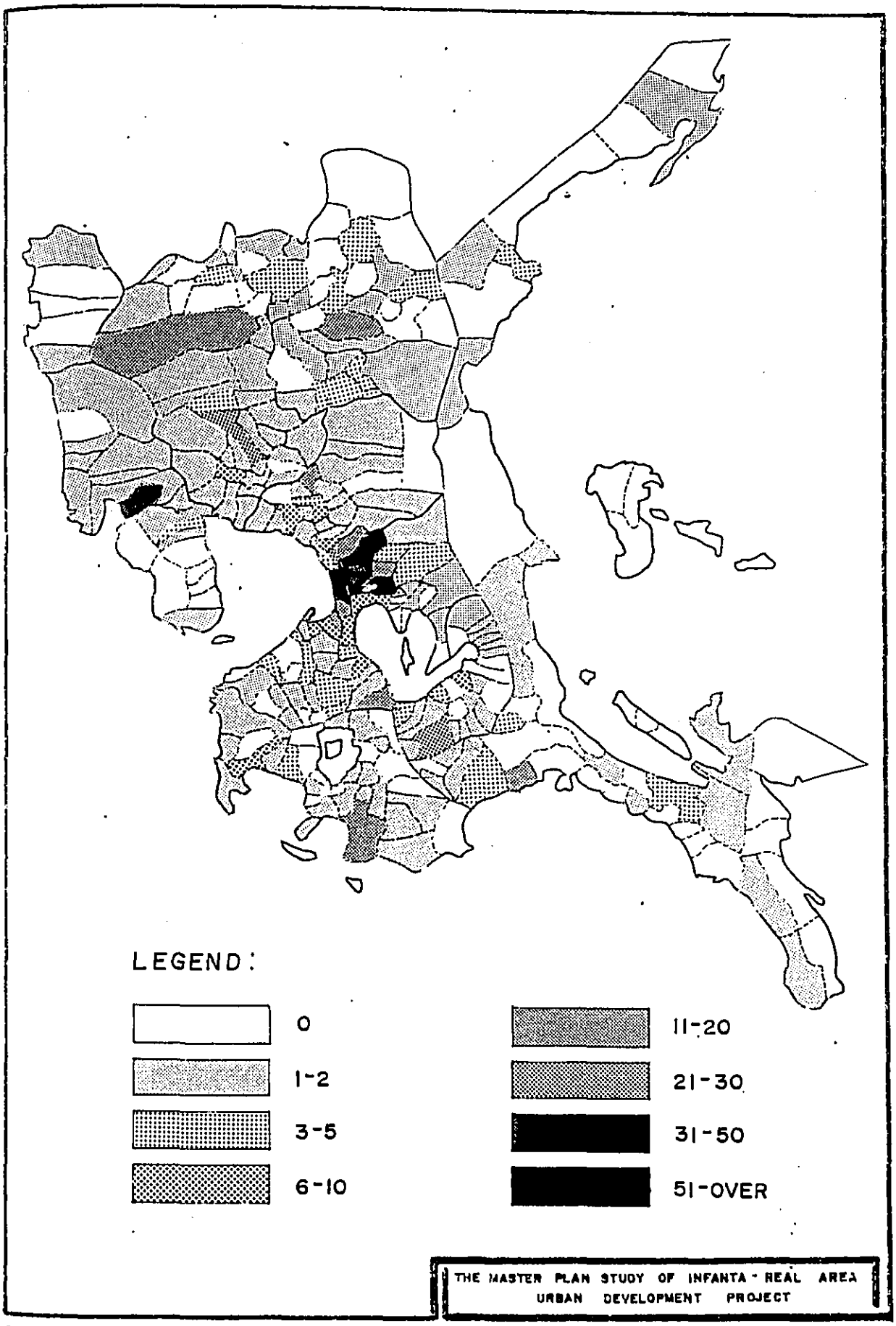


FIG.3.4.12 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS
(FINANCING, INSURANCE, REAL ESTATE & BUSINESS SERVICE-1978)

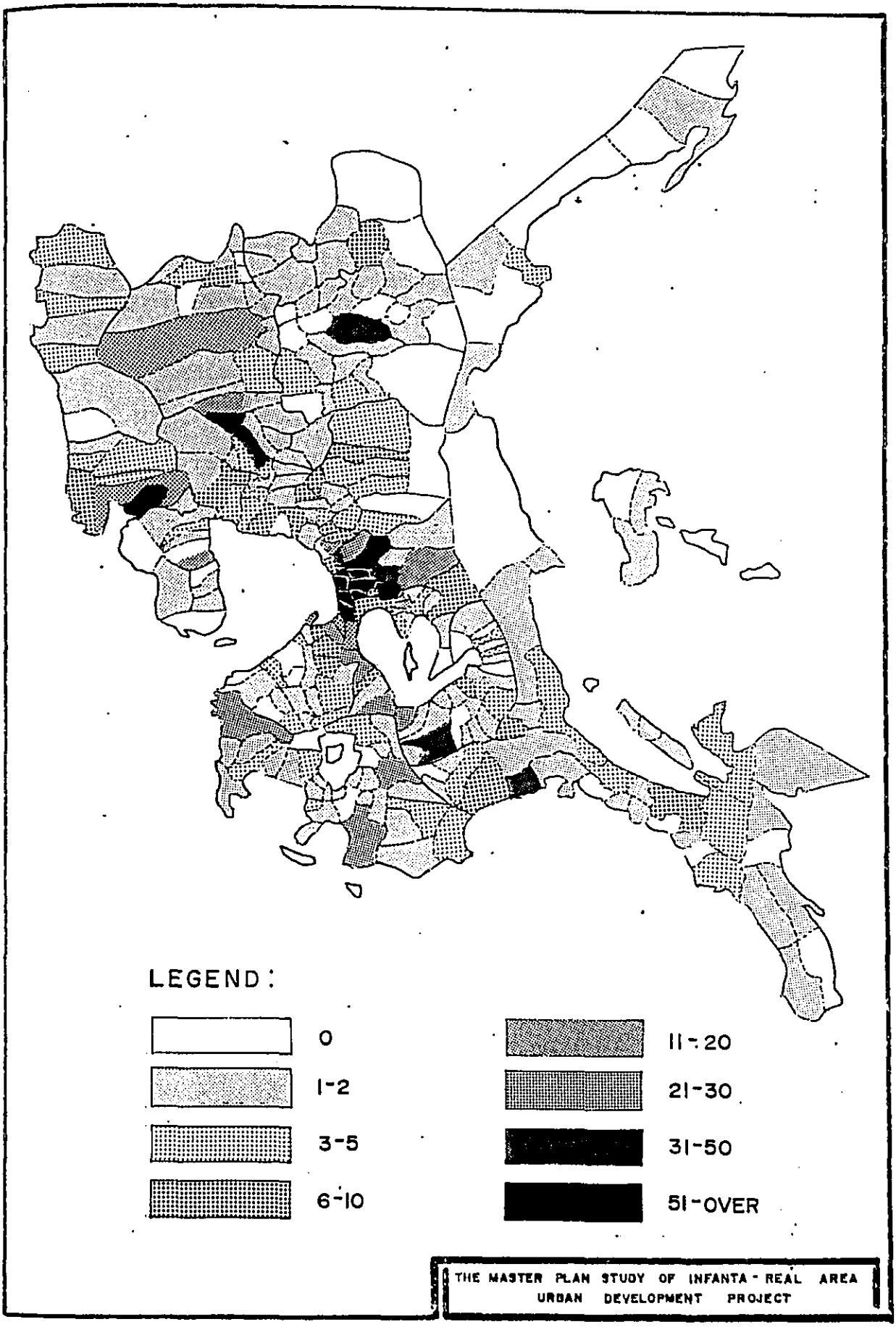


FIG. 3.4.13 DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS
(COMMUNITY, SOCIAL & PERSONAL SERVICES - 1978)

3.5 Urban Composition and Regional Stucture

When urbanization is analyzed based on the percentage of the population living in cities vs. the total national population, the Philippines shows a statistic of 37.3%.

In comparisons with this national figure, urbanization is proceeding at an even faster pace in the GCLA: Region III, 41.8% Region IV, 43.4% (Metro Manila, 100%). Also, urbanization within the region is especially strong toward the south.

The ratios of urban population in each province show that urbanization is spreading out from Metro Manila, wit a percetage exceeding 50% in all provinces witin a 50km radius of MMA. As shown in Chapter 2, the main reason for the increase in population in this region can be siad to be urbanization.

In the region between 50 and 100 km from Metro Manila, urbanizaton has proceeded at a rate less than 30%. This includes the provinces of Batangas, Quezon, Tarlac and Nueva Ecija. An exception is Zambales, which, in spite of its location, has a high urbanization rate of 59.1%. This phenomenon is attributable to the existence of Olongapo and to the advanced development of the local mining industry.

Urbanization is closely tied to the development of the region. As shown in Table 3.5.1, the relationship between household income and urbanization reveals that as income rises, the rate of urbanization increases. In this manner, urbanization plays an important role in local development.

Table 3.5.1 The Relationship between Household Income and Urbanization

	X Household Income 1981 4th Quarter	Y Urbanization 1980
Batangas	3,361 Pesos	17.0%
Cavite	6,315	59.8
Laguna	4,344	61.0
Quezon	2,315	29.1
Rizal	7,487	75.0

$Y = 0.01X + 1.66 \quad (r = 0.86)$

Source: NCSO

Fig. 3.2.3 and 3.2.4 show the population distribution for the cities, towns and villages of the region. Fig. 3.5.1 shows the distribution of urban population. From this information, the regional composition and urban distribution for the GCLA may be summarized as follows.

The urban composition of the GCLA can be categorized into the three patterns described below. They form a linear configuration each having influence on the other and leading to their development -- forming what is known as a "growth corridor" (Fig. 3.5.2).

(i) A continuous industrial-oriented urban form directly projecting out of Manila as far as radial point of 50 km;

(ii) Urban bases along the seacoasts which develop in conjunction with ports and harbros (other than Manila) serving as nodes in the marine transport system tying Luzon to the other islands in the nation;

(iii) Urban centers by lying midway between Manila and above two urban forms, serving as the nuclei of the agricultural belt and as relay points between the urban areas described above.

The regional structure of Luzon and the GCLA forms along this growth corridor which runs in the north-south direction.

As just stated, this corridor begins in Metro Manila and runs along the axis through urban centers within a 50 km radius of the capital, then through regional nuclear or relay cities in the central region (primarily engaged in agriculture and forestry), and on to port cities serving as nodes in the nation's marine transport system.

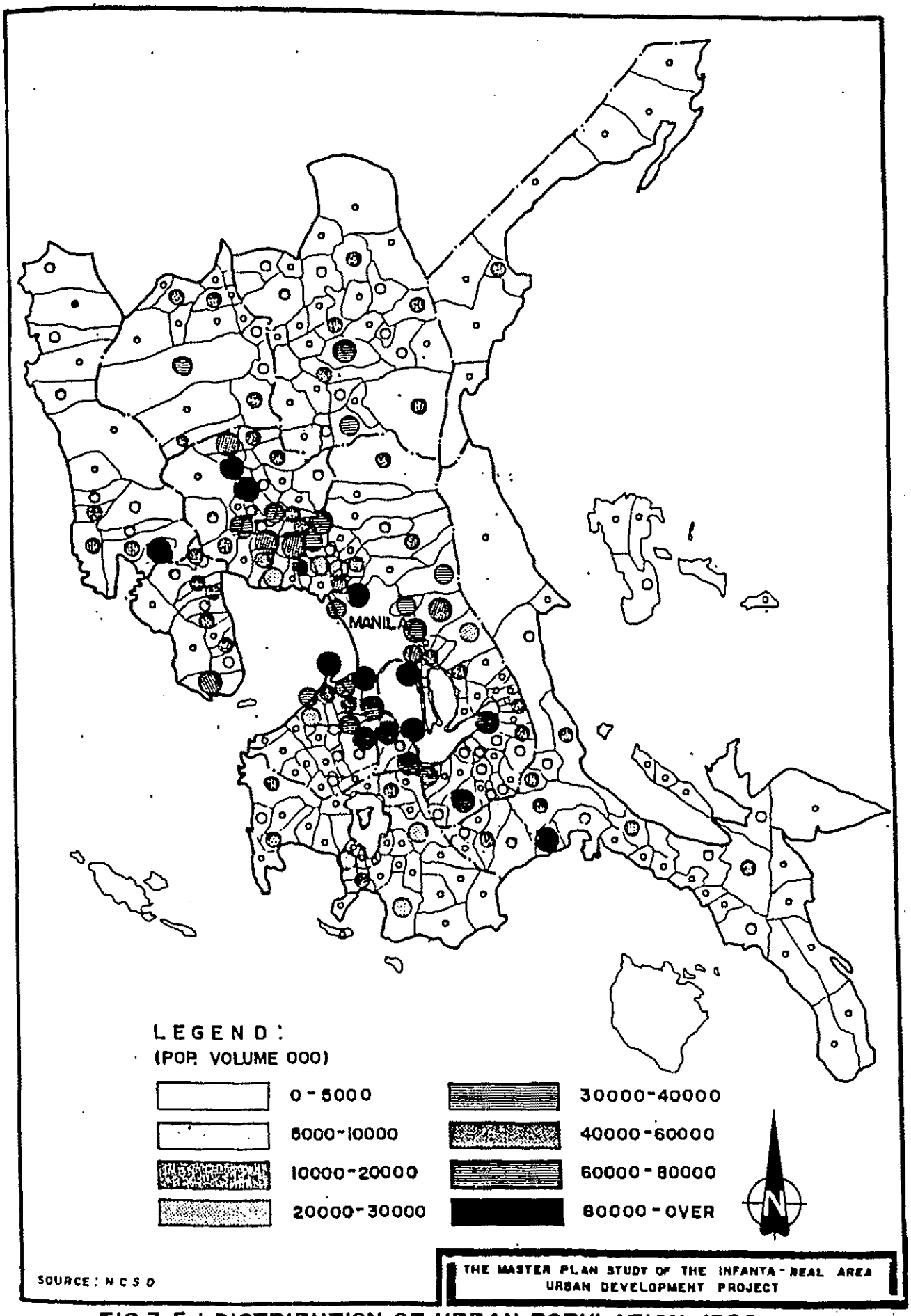
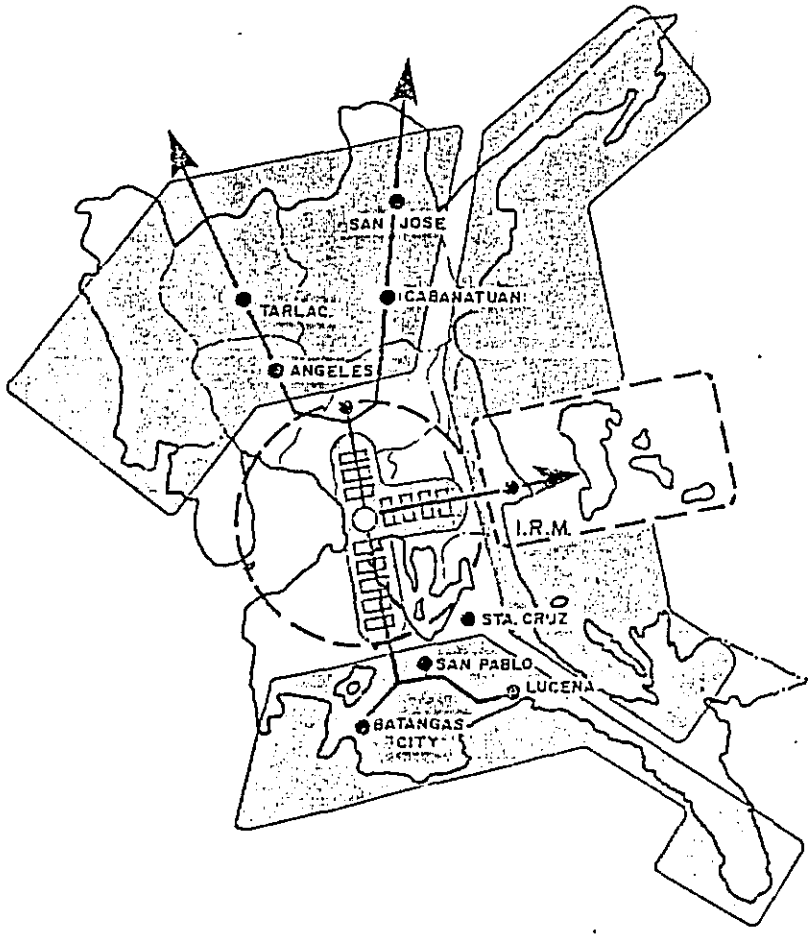


FIG.3.5.1 DISTRIBUTION OF URBAN POPULATION-1980



SOURCE: JICA STUDY TEAM

THE MASTER PLAN STUDY OF THE INFANTA REGIONAL AREA URBAN DEVELOPMENT PROJECT

FIG. 3.5.2 REORGANIZATION OF REGIONAL STRUCTURE AND FORMATION OF EASTERN GROWTH CORRIDOR

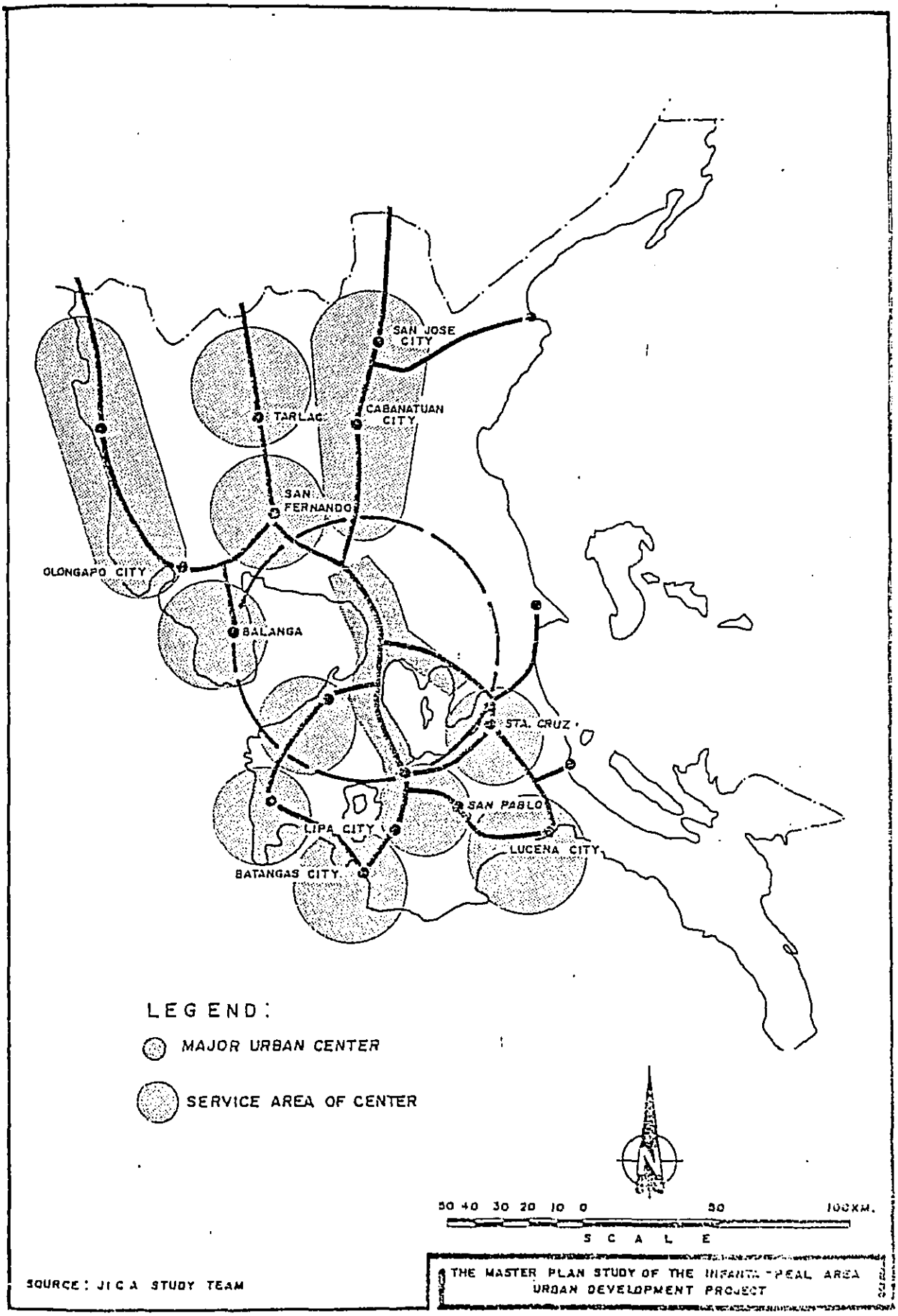


FIG. 3.5.3 REGIONAL STRUCTURE AND MAJOR URBAN CENTER

As seen in the figure, the axis of Luzon's and the GCLA's regional activities runs north-south centered on Manila. In the north, this axis breaks off into two branches, one toward Cagayan Valley and the other toward Ilocos Norte (Region I). In the south, the growth corridor also divides into two branches after passing along the west shore of Laguna de Bay, one branch running toward Lucena and the other toward Bata-gas.

In addition, a very slight form of development is under way in he four directions which follow:

(i) Toward the west coast of Region IV (MMA-Cavite-Batangas);

(ii) MMA-Santa Cruz-Lucena (east coast);

(iii) Toward the west coast of Region III (San Fernando-Olongapo-Bataan);

(iv) Toward the east coast (San Jose-Baler).

These directions are clustered along the so-called north-south axis and cover the entire GCLA area. Compared with the north-south corridor, their level of development is extremely low, although the need for developing these areas is well recognized.

3.6 Roads and Automobile Traffic

1) Road Network

The road network of Luzon runs in a north-south line with Manila at its center (Fig. 3.6.1). This is due to topographical features, namely, the flatland which spreads out north and south of Manila, which has promoted the development of cities along this line. In contrast, owing to the presence of the Sierra Madre running north-south along the east coast of the island, there are almost no roads along the eastern side.

The two main arteries of Luzon are centered on Manila: the Manila North Road (MNR) in the north and the Manila South Road (MSR) in the south. In the northern part of the island, the MNR extends north along the west coast and the Cagayan Valley Road runs parallel to this in the center of the region toward Cagayan.

With these three roads serving as the island's backbone, access roads branch off toward the island's main cities to form an island-wide network.

The construction of expressways is also proceeding at an increasingly rapid pace each year. The Manila North Expressway (MNE spans approximately 80 km between Manila and Angeles and, in parallel with the MNR, serves as a vital transport artery for industrial goods in the northern Manila region. In a similar manner, the South Luzon Expressway (SLE) stretches some 54 km from Manila to Calamba, following a course along the west shore of L-guna de Bay. This route is also serving as an aid in the development of the southern Luzon (Cavite, Laguna, Batangas). All of these expressways are scheduled to be extended in accordance with the economic growth of the Metro Manila area.

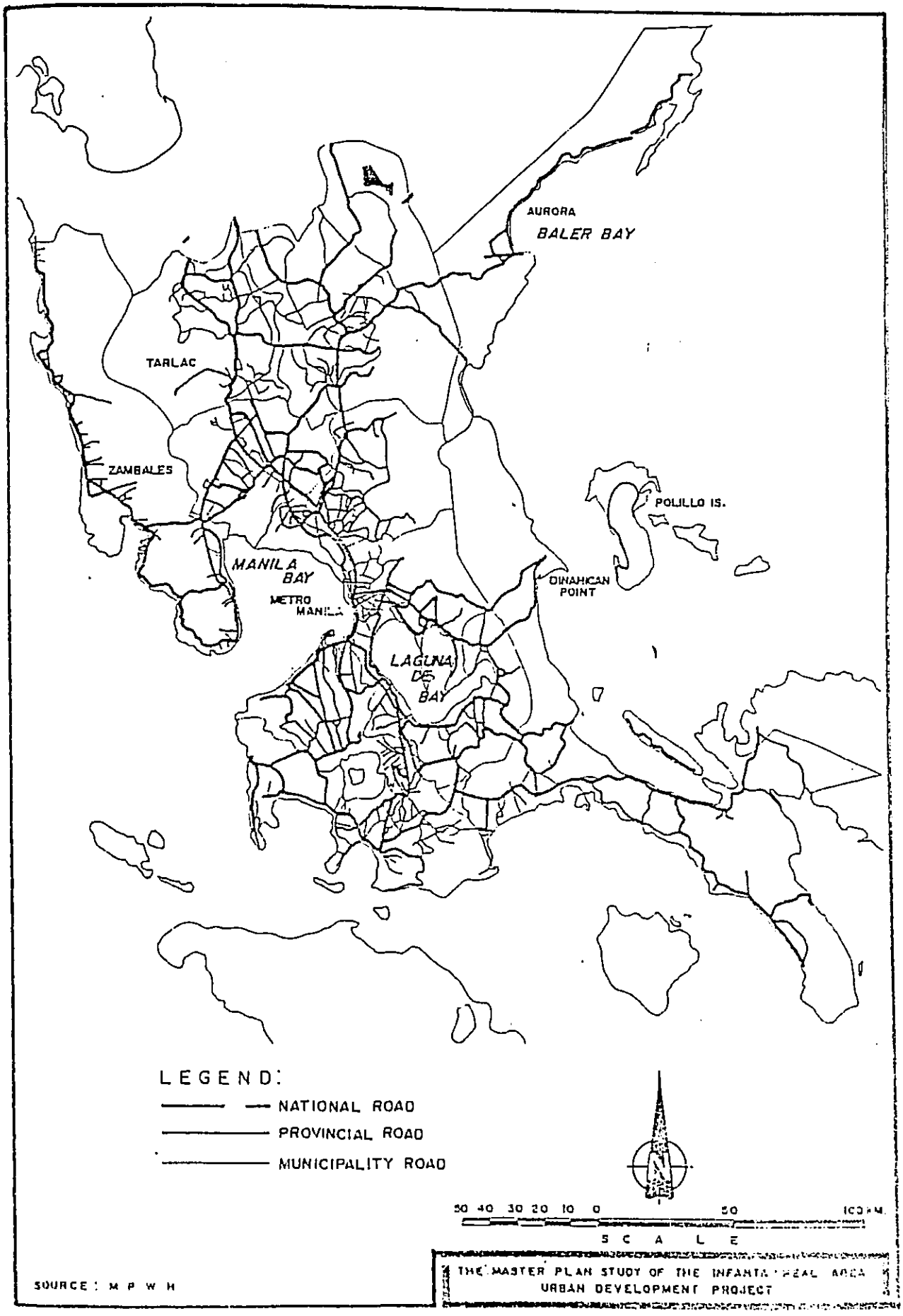


FIG. **3.6.1** TRUNK ROAD NETWORK OF GCLA

On the other hand, the Manila East Road serves as the main road heading east, connecting Manila with the main cities to the north of Laguna de Bay. East of Famy, however, the only road is a sub-standard (gravel) road which runs as far as Infanta.

2) Status of Road Improvement

Philippine roads are categorized into four standard levels: national, provincial/city, municipal and barangay. The total lenght of all roads in the nation is approximately 154,500 km. Of this figure, some 23,800 km, or only 15%, are national roads, which serve as the major arteries of the nation. Moreover, with the exception of Metro Manila nearly all roads, on the other hand, account for no less than 55% of all roads.

The aggregate length of all roads in the GCLA is approximately 25,700 km, representing some 17% of the national total. Of this figure, national roads comprise some 4,400 km, or 17% of the regional network.

In terms of the ratio of road length to total land area, the values for each region are as follows: Region III, 0.69 km^2; Region IV-A, 0.54 km^2, MCR, 4.16 km^2. Region IV-A has the lowest ratio, almost matching the national average (0.51 km^2). Quezon Province is especially low, with ratio of only 0.24 km^2, which is second in the GCLA only to Aurora (Fig. 3.6.2).

The rate of paved roads (rate of paved roads (%) = (pavement road length/total road length) x 100) in the GCLA is as follows: Region III, 19.2%; Region IV-A, 25.8%; MCR, 34.5%. In all cases, these figures are considerably higher than the national average of 12.%%. It should be noted that while the MCR's rate exceeds 30%, the rates for local areas generally lags behind at between 20% and 30%. Reasons for this divergence are the low rate of pavement of sub-standard barangay roads and the poor pavement rate of provincial/city roads even compared with that of municipal roads. As a result, in general pavement of roads may be said to be deficient.

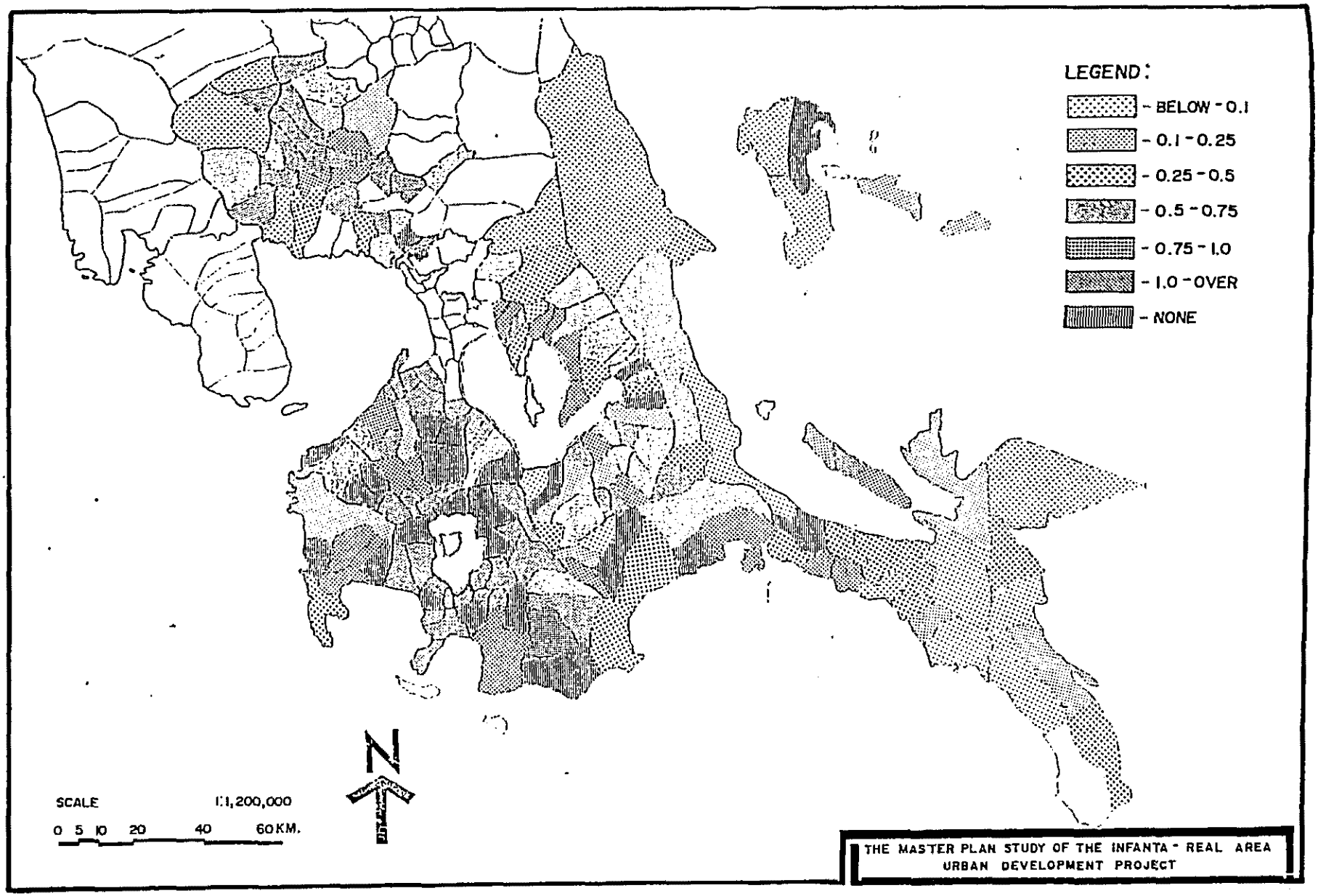


FIG.3.6.2 ROAD KILOMETERAGE PER LAND AREA

Seen on a province by province basis, the level of road pavement is particularly low in Aurora and Quezon in the east coast region and in Nueva Ecija, Tarlac and Pampanga in the region north of Manila. While the ratio of road pavement in Aurora and Quezon is low for all categories of roads, in Nueva Ecija, Tarlac and Pampanga the level is especially low for barangay roads, thereby causing the overall drop in the pavement percentage for these provinces (Fig. 3.6.3).

The average travel times from MCR to the major cities are as follows: 50 km/h for distances up to 400 km, 40 km/h for distances beyond 400 km (Figs. 3.6.4 and 3.6.5).

For cities along the north-south axis where roads are in good condition, travel times are fast. Cities such as San Fernando, Malolos, Tarlac and Lasbans?, all of which are situated along the expressway, can be reached from Manila in less than one hour and are sites of heavy concentrations of manufacturing industries. On the other hand, due to poor road conditions, cities such as Baler and Infanta on the east coast require more than twice the travel time to reach, in spite of the fact that they lie at an equal physical distance from the capital as the north-south axis cities just mentioned. Beyond the 100 km radius from Manila road density decreases and road conditions deteriorate, resulting in travel times averaging 35 km/h, i.e. 5 km/h slower than the rate for cities within 50 km radius.

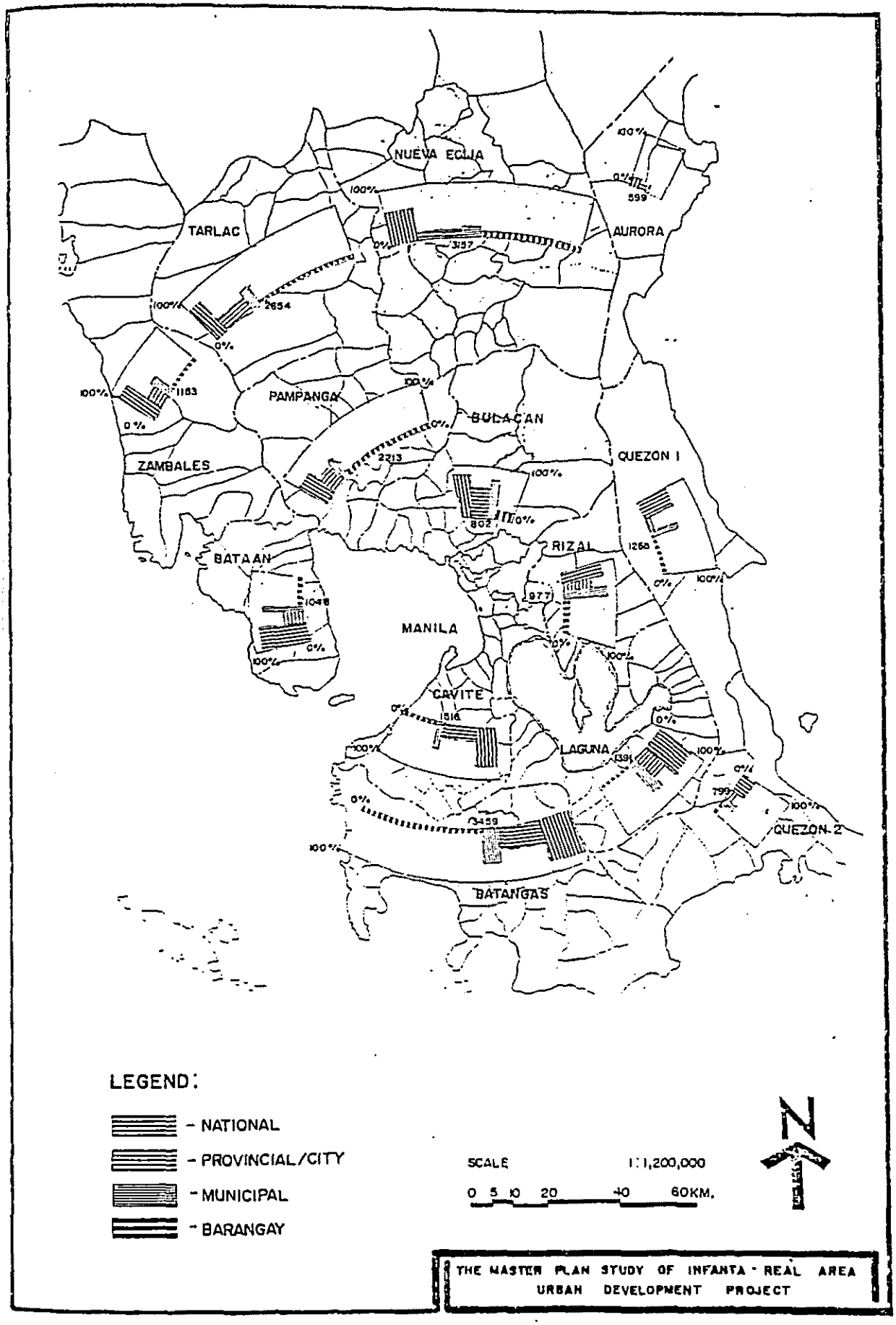


FIG. 3.6.3 THE RATE OF PAVEMENT ROAD

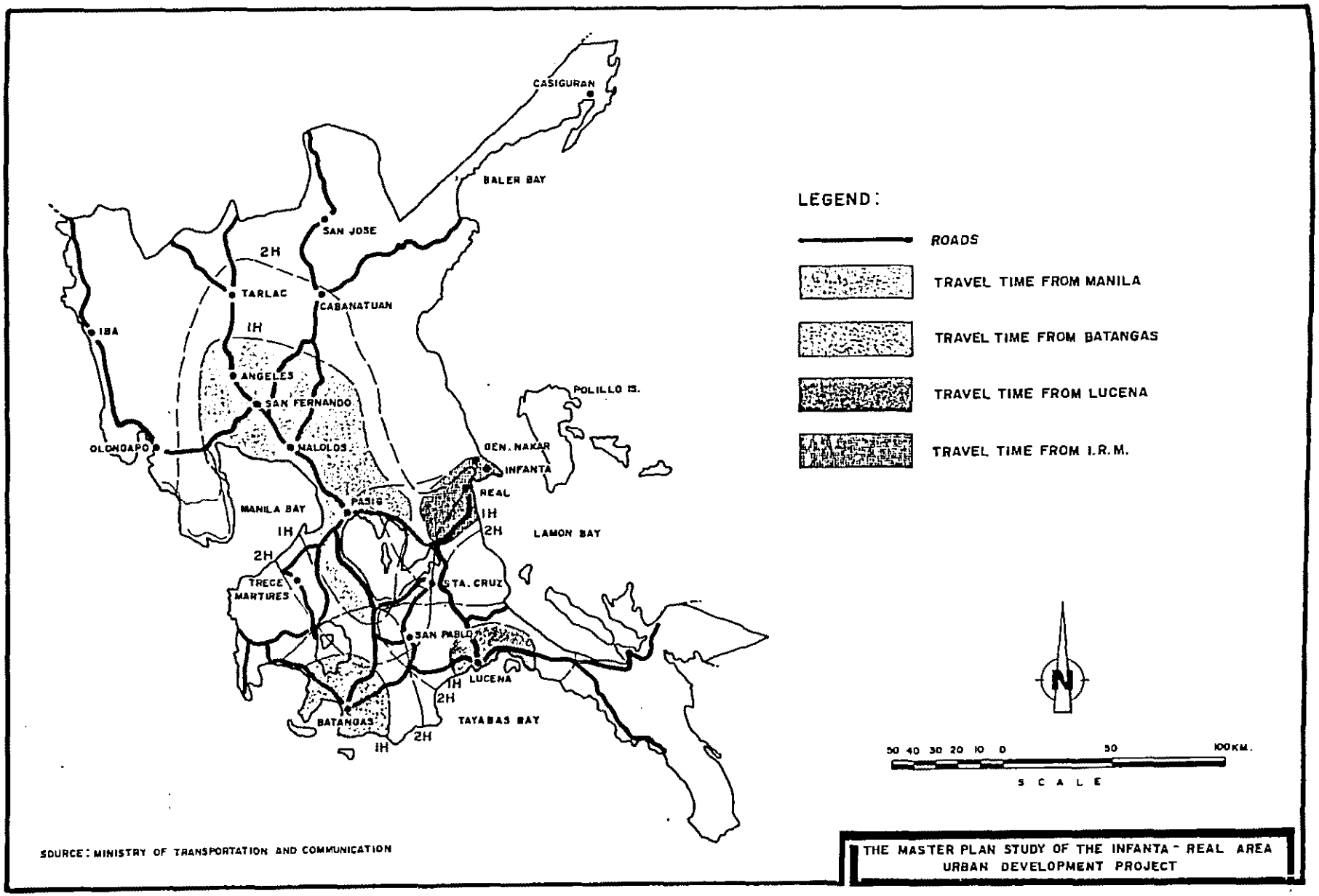


FIG. 3.6.4 TRAVEL TIME MAP

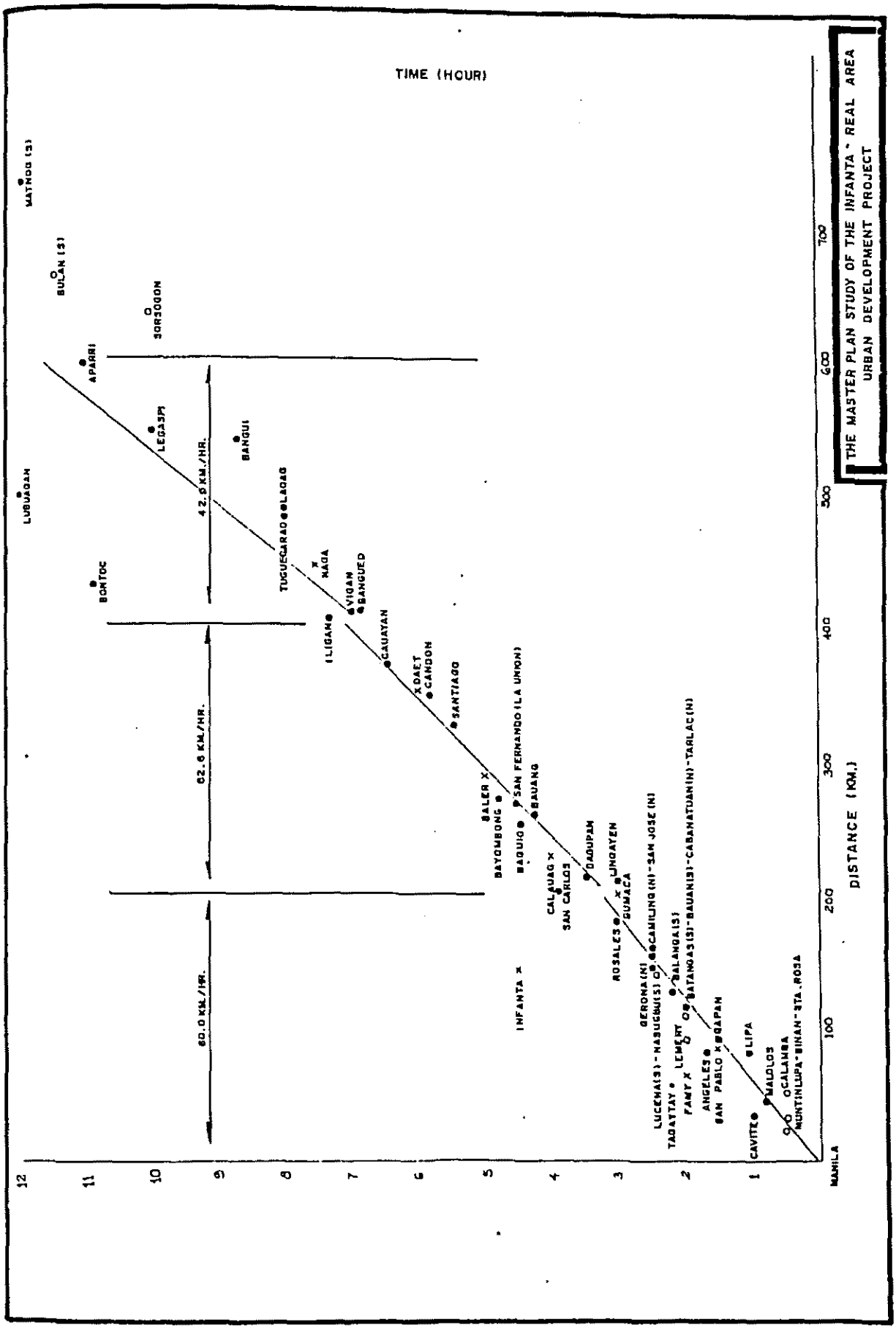


FIG. 3.6.5 TRAVEL TIME DISTANCE FROM MANILA

3) Automobile Traffic Volume

Automobile traffic in the GCLA is distributed primarily in the north and south directions. centered on Metro Manila (Fig. 3.6.6, Traffic Flow Map based on the 1980 survey of the MPWH).

The sector with the highest traffic volume (except for the region from EDSA to central Manila) is on the Manila South Expressway between Nichols and Bicutan, which receives approximately 50,000 vehicles/day. Beyond this point as far as Alabang, daily traffic averages 30,000 vehicles. In the region north of Manila, the sector between EDSA and Bocaue on the Manila North Expressway has ahigh traffic rate of 35,000 vehicles/day, and the Manila North Road which runs parallel has a rate of approximately 16,000 vehicles/day making for a combined total of 51,000 vehicles/day.

The farthest point from Manila within which traffic volume exceeds 110,000 vehicles/day is located on the north road network at Sto. Tomas on the MNR and at San Jose on the Cagayan Valley Road, i.e. about 150 km from the capital. In the south road network, the same point occurs approximately 100 km south on the MSR connecting Batangas, Lucena abd Tagaytay. In the east, however, traffic volume exceeds 10,000 vehicles/day only as far as Taytay on the Manila East Raod, a distance of only 25 km from Manila. This circumstances is the result of poor road conditions due to topographic restrictions and the fact that there are no satellite cities in the eastern region with a concentration of industry (Fig. 3.6.7).

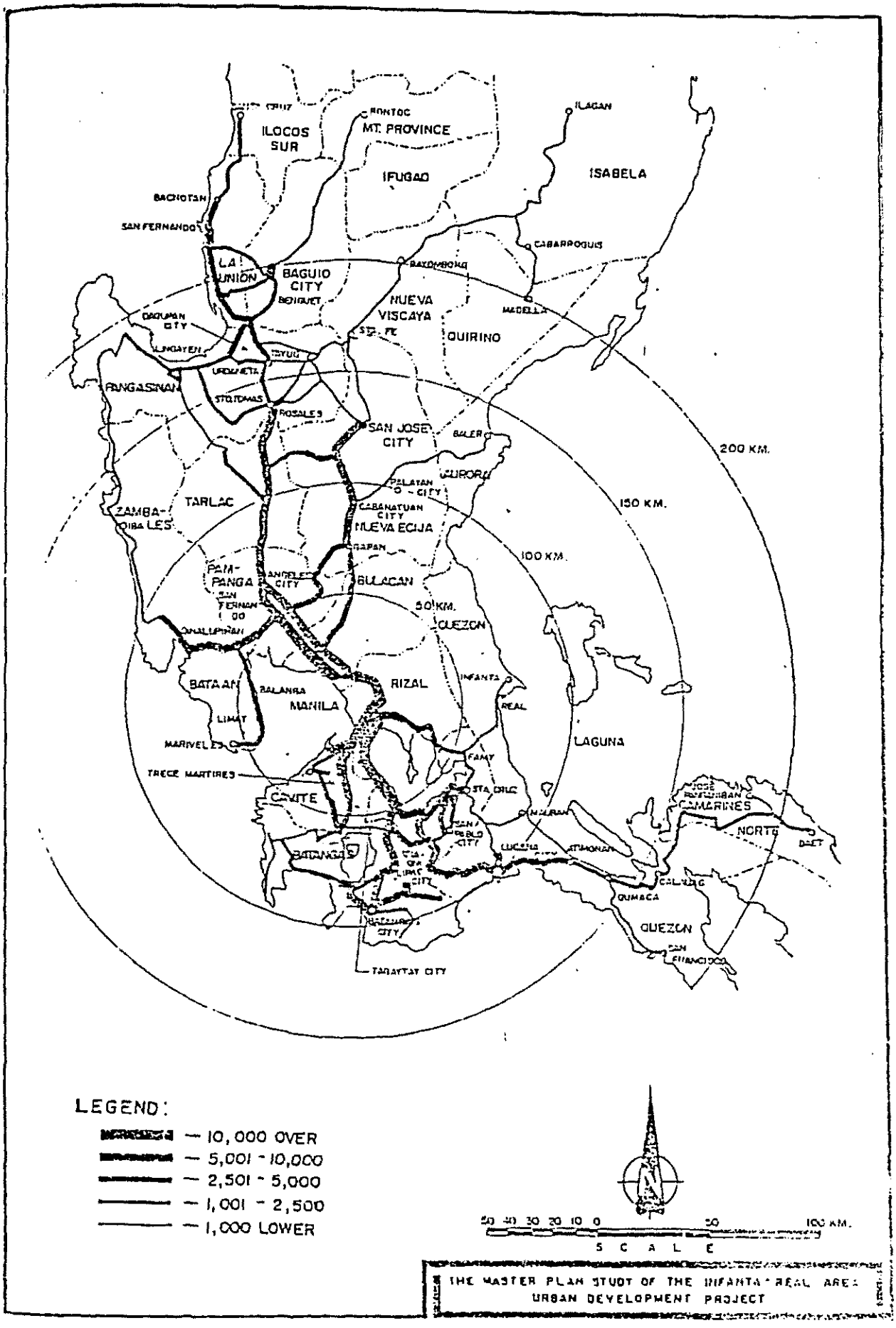
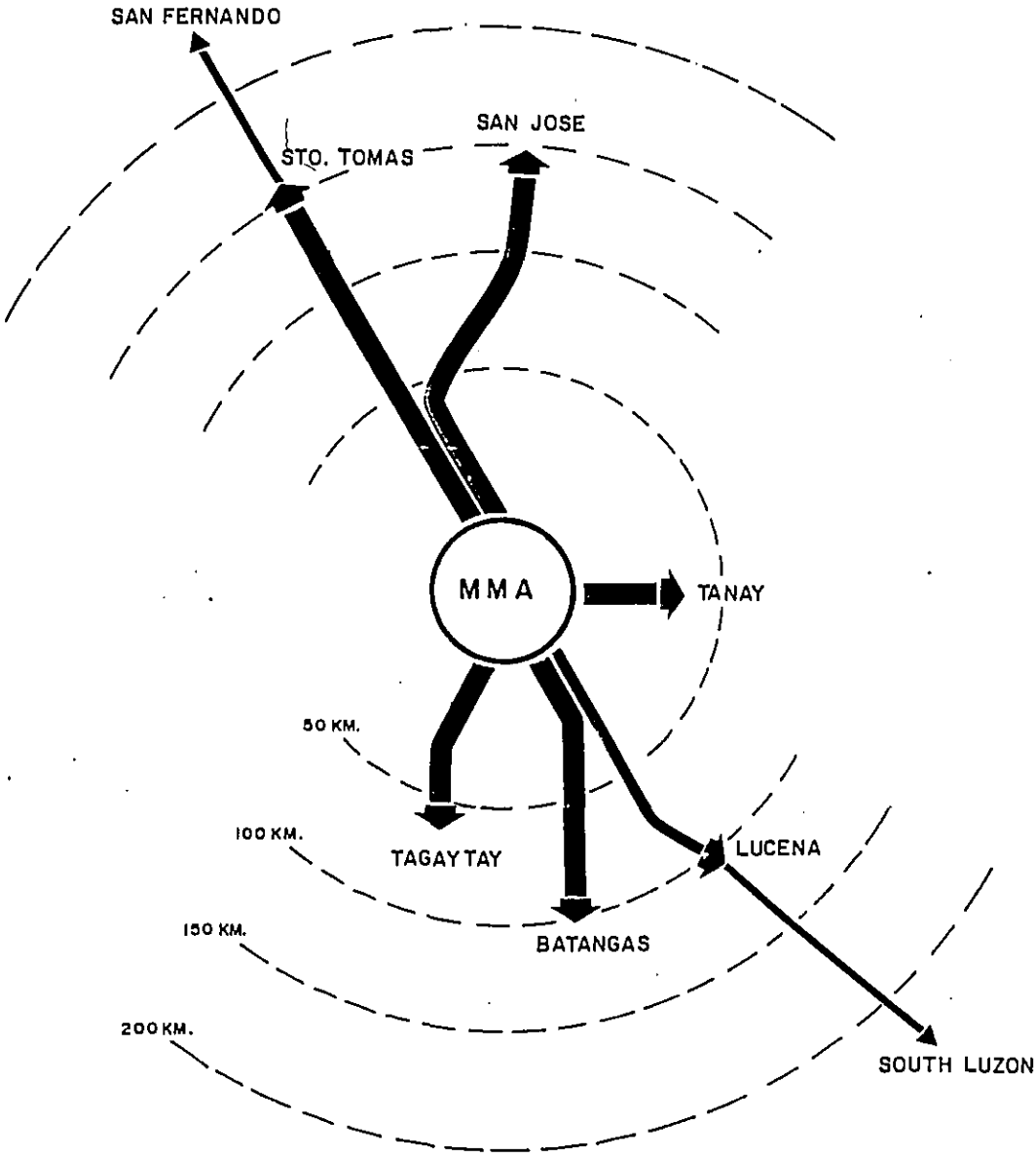


FIG. 3.6.6 TRAFFIC FLOW MAP



SOURCE: JICA STUDY TEAM

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FIG. 3.6.7 MAIN TRAFFIC FLOW

4) Automobile O.D. Characteristics

Nearly all vehicles travelling in the GCLA have Manila as their final destination. To the north, ties are strongest with Lingayen, San Fernando, Baguio and San Jose in the south, heaviest traffic volume is seen between Manila and Batangas, followed by Laguna and Lucena. In contrast with the north, in the south traffic does not necessarily all flow toward Manila. Owing to Batangas; function as a satellite city of Manila, a relatively large flow of traffic is seen commencing in Batangas and heading toward neighboring cities, e.g. Laguna. (Based on OD survey of MNR and MSR conducted by MPWH in 1981) Figs. 3.6.8 through 3.6.11 show desire line of vehicles per day. Survey points were located between 60 and 80 km from Metro Manila, i.e. nearly outside the capital area).

In terms of traffic pusposes, approximately 12% of all passenger vehicle traffic was related to commuting to work/ Business trips accounted for some 40% of passenger car traffic. These two categories thereby together make up 52% indicating the strong urban function of Metro Manila within a range of 80 km. Visiting is also high on the list of traffic purposes with a share of approximately 20%.

As for the transport of cargo roads, in the areas both north and south of Manila farmgoods account for a share of greater than 50% of all items transported. Goods leaving Manila consists primarily of processed foods, oil and other products. In reflection of their home industries, the Cagayan Valley Road is largely used for transport of lumber, and the MNR for transport of cement.

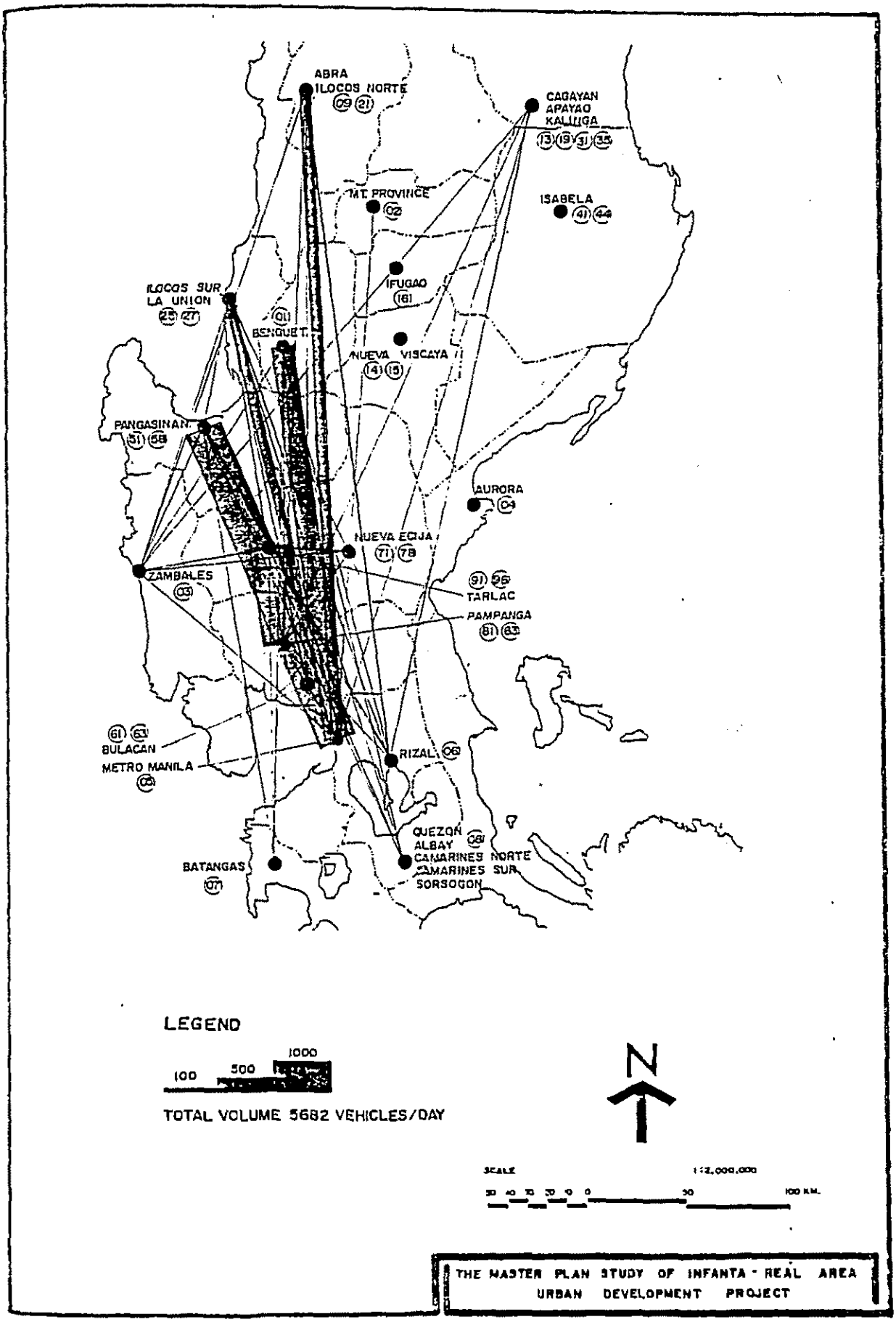


FIG. 3.6.8 DESIRE LINE OF VEHICLES PER DAY (ALL VEHICLES)
MANILA NORTH ROAD (BAMBAN)

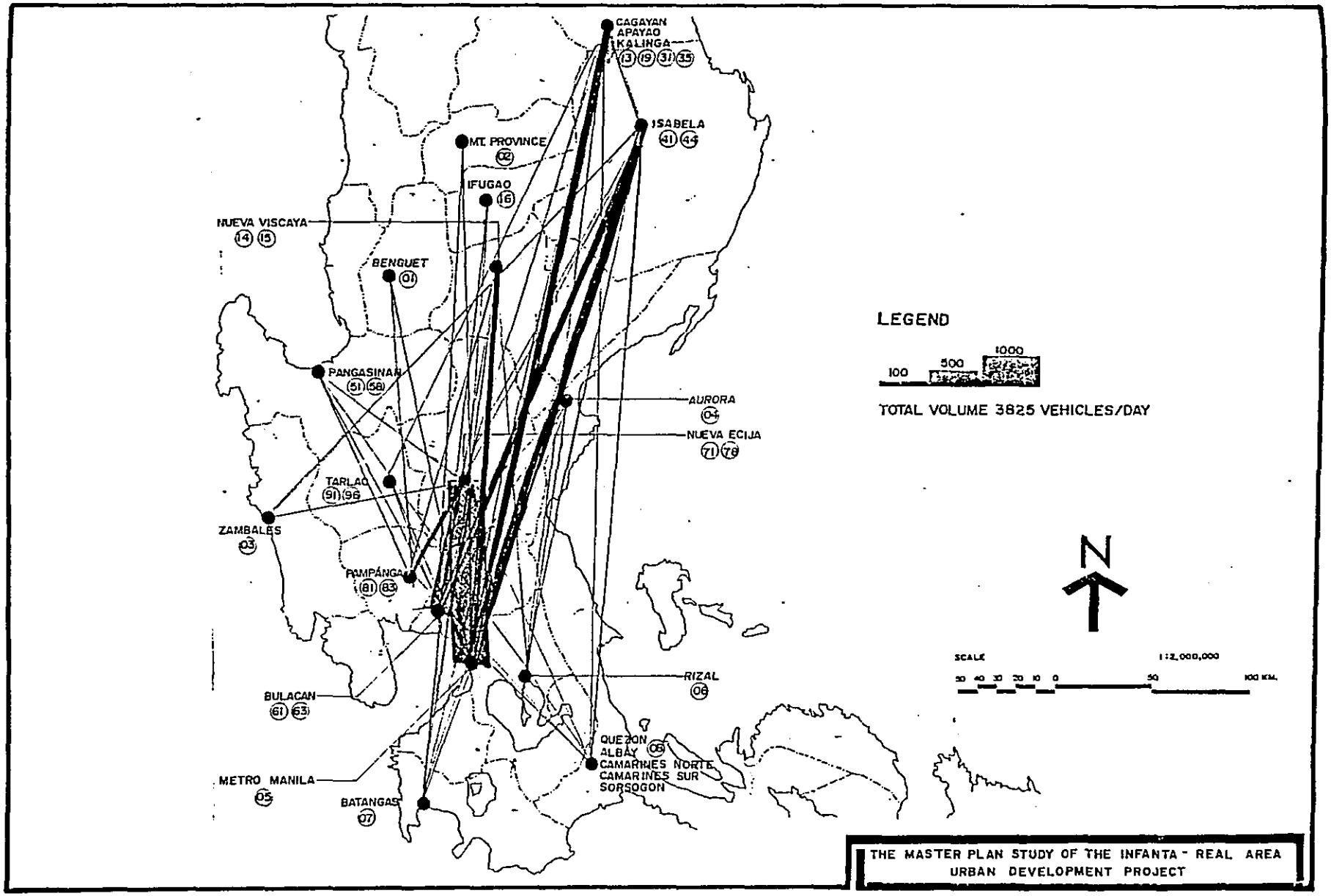


FIG. 3. 6. 9 DESIRE LINE OF VEHICLES PER DAY (ALL VEHICLES)
CAGAYAN VALLEY ROAD (PARCUTELA)

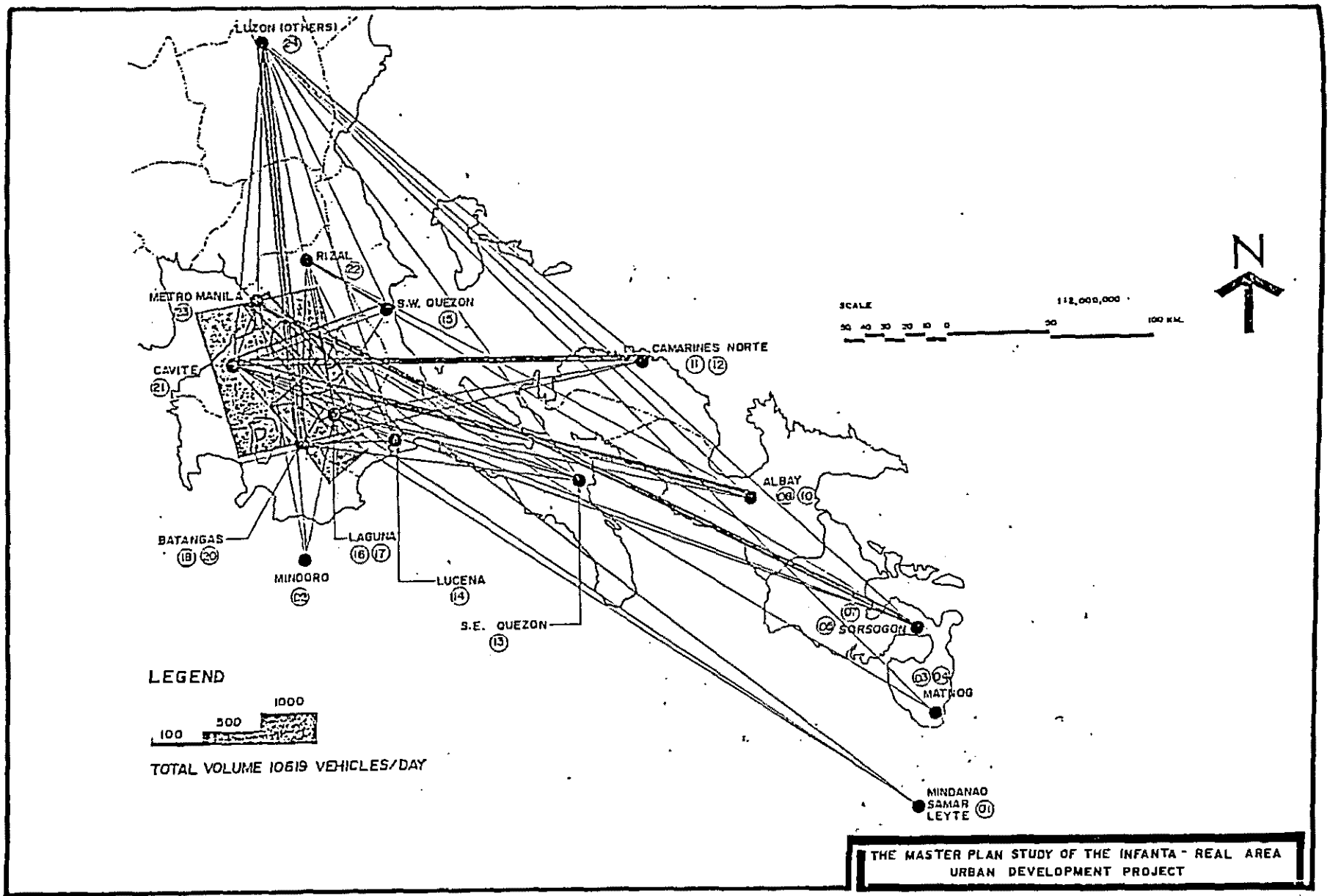


FIG. 3.6.10 DESIRE LINE OF VEHICLES PER DAY (ALL VEHICLES)
MAHARLIKA HIGHWAY (STO. TOMAS)

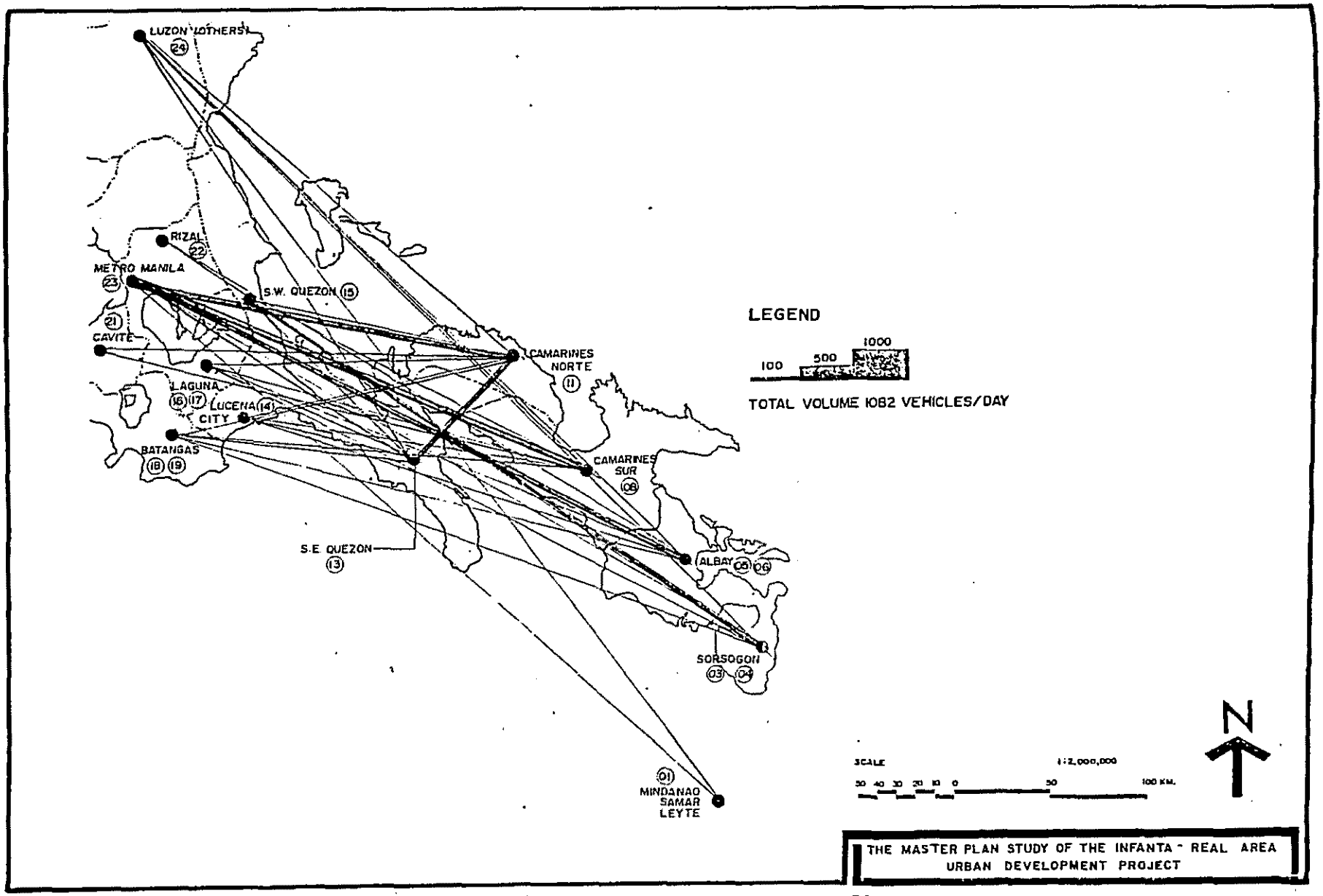


FIG. 3.6.11 DESIRE LINE OF VEHICLES PER DAY (ALL VEHICLES)
MAHARLIKA HIGHWAY (CALAUAG)

5) Road Improvement Planning in the GCLA

Twenty-eight road improvement projects in the GCLA are called for under the Five-Year Plan (1983-1987) of the Philippine Government. Nearly all of these projects are to be funded by overseas organizations such as the OECF, IBRD and ADB.

Some 40% of the projects involve road pavement improvement. The remainder involve road widening and bridge construction. Four new roads are to be constructed: a road between Bamban and Botolan (65 km) in Zambales and Tarlac Provinces on the west coast of Luzon, the EPZA. Circumferential Road (110 km) in Quezon.

Divided by region, in the north construction on the Cagayan Valley Road is to be centered on access road pavement improvement and bridge construction. On the west side of Luzon, the coastal road from Olongapo to Bugallon is to be improved (widened and paved) to enhance the west coast road network. In the south, a large number of road improvement project are planned for Cavite Province particularly aimed at the improvement of the Cavite-Batangas-Laguna area network (primarily pavement improvement). In summary, road network improvement planning is to be carried out in the north and south regions, and the only road improvement planned for the eastern sector of Luzon is the Marikina-Infanta Road (Fig. 3.6.12)

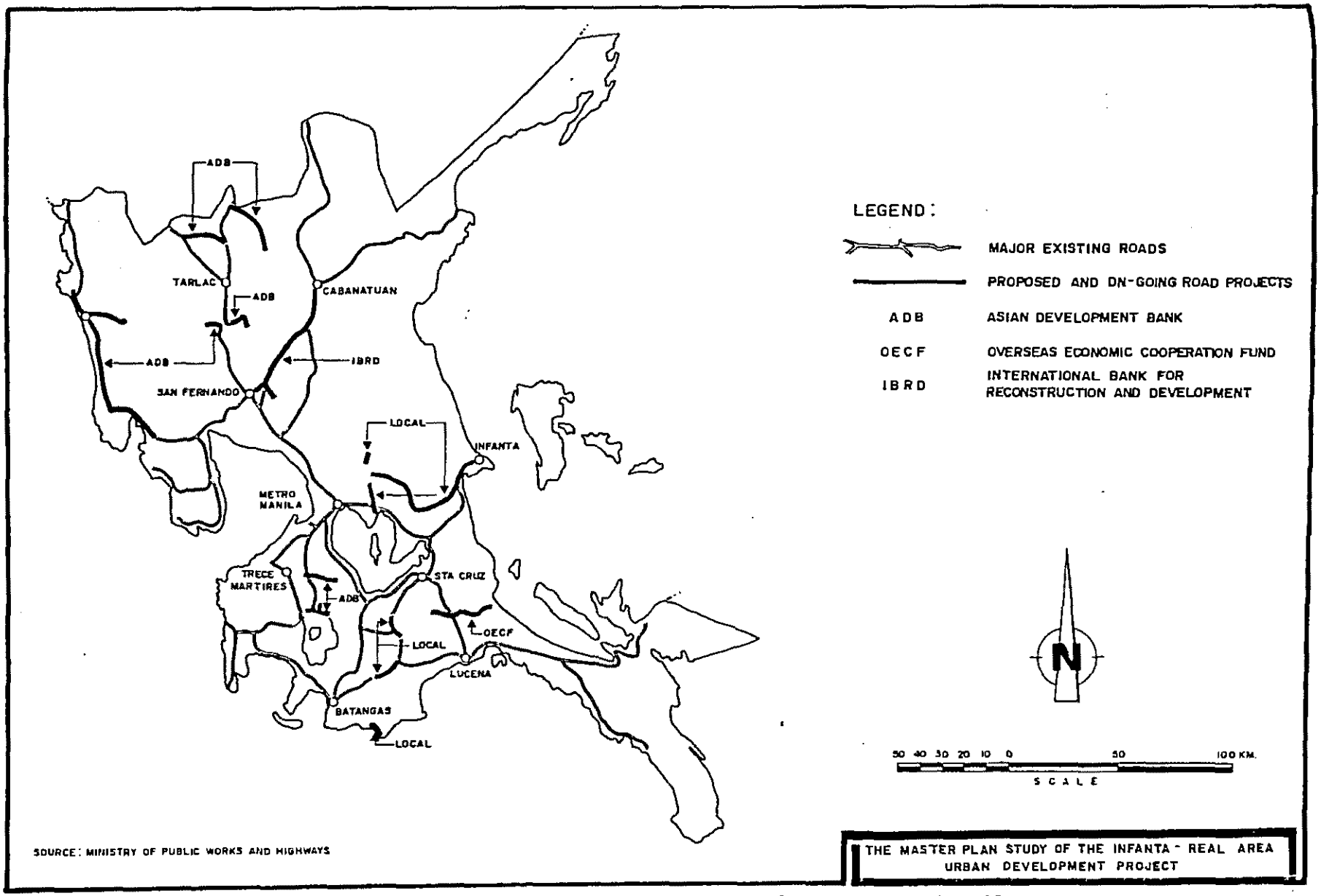


FIG. 3.6.12 PROPOSED AND ON-GOING ROAD PROJECTS

6) Problems in Road Traffic

The road and vehicular traffic related problems currently recognizable in the GCLA's traffic system may be categorized as follows:

(i) Road configurations depending on the Luzon's topographic features

Along the north-south axis runs an open flatland. The Sierra Madre mountain range runs along the east coast, dividing the eastern part. Accordingly, the road network runs in a linear configuration north-south and there is almost no east-west road network.

(ii) Concentration of traffic system in Manila

There is a wide divergence in the scale of economic social activity in Manila compared with that of other major cities. Due to Manila's function as the nucleus of Luzon, the traffic system -- both for human and cargo transport -- is heavily concentrated in Manila. Accordingly, the road system has developed in a radial configuration, with heavy and chronic traffic congestion found not only within Manila but also at the points of influx into the greater Metro Manila area.

(iii) Failure of road improvement to keep pace with economic social development

With the expansion of Metro Manila, development has proceeded broadly along the north-south axis extending out of the city. Road development, however, continues to advance in only a linear configuration, thereby giving rise to a distorted imbalance between supply and demand. Especially in the southern region, owing to the lack of vast land area, development has unavoidably proceeded over the complete land surface, and this is expected to lead to an ever greater imbalance in supply/demand in the future.

(iv) Slow travelling time due to sub-standard road conditions

With the exception of expressways such as the MNE and MSE and national road, nearly all roads in the GCLA have only two traffic lanes. Moreover, many of the access road to the major highways are unpaved. As a result, travel time in the GCLA is conspicuosly slow -- a situation which impedes the expansion of Metro Manila and the development of social activities between major cities. This problem is particularly severe for roads on the eastern part of the island.

3.7 Marine Transport and Port

1) Marine Transport

Because the Philippines is an archipelago of some 7,000 islands, marine transport is an indispensable means of transport vital to both daily life and industrial activities.

Both passenger and cargo transport is carried on with great frequency among the islands situated between Manila and Mindanao. According to a survey conducted by PPA in 1980, there are a total of 354 public and private ports nationwide. Of these, 116 are public and 243 (66%) are private. (Fig. 3.7.1)

The nation's ports fall into three types concentrating on:

(i) Foreign Cargo Transport
(ii) Domestic Cargo Transport
(iii) Domestic Passenger Transport

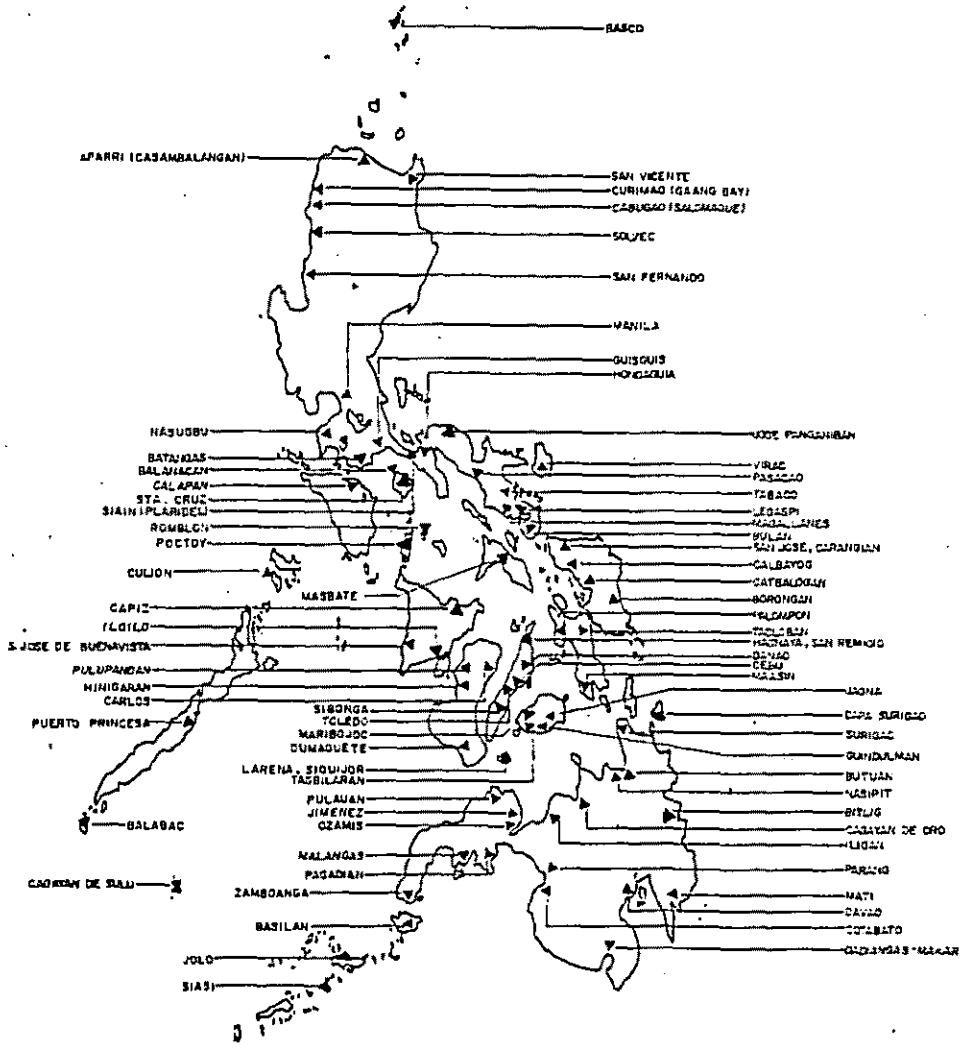
(1) Cargo Transport

The gross transport volume of all cargo nationwide in the Philippines is 72.6 million tons per year. Transport of foreign and domestic goods is almost evenly balanced, with the total volume of foreign cargo transported being 37.4 million tons, or 51.5%. Some 27.7 million tons, or 74%, of foreign cargo is unloaded at private ports.

Cargo transport is especially concentrated at Manila and Cebu Ports, together accounting for approximately 13 million tons, or 67.5%. The major ports can be categorized as follows (Fig. 3.7.2):

(i) Ports primarily engaged in transport of foreign cargoes: Manila, San Fernando, Batangas, Davao;

(ii) Ports primarily engaged in transport of domestic cargoes: Manila, Cebu, Iloilo, Zamboanga.



LEGEND

▲ - EXISTING PORTS

SCALE 1:10,000,000 KM.

250 200 150 100 50 0 250 500

N

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FIG. 3.7.1 LOCATION OF NATIONAL PORTS

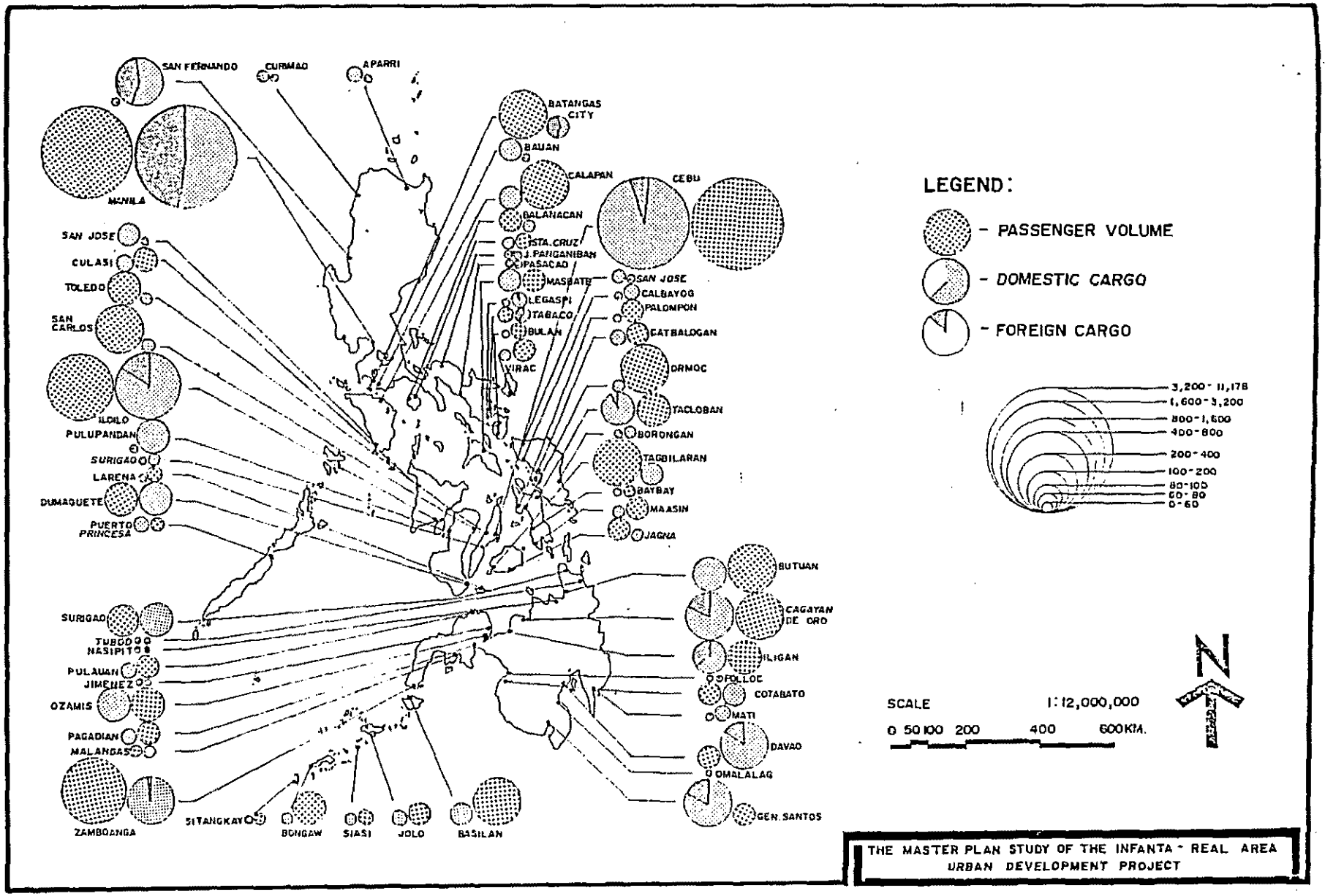

FIG. 3.7.2 PASSENGER TRAFFIC AND CARGO TRAFFIC AT PUBLIC PORTS (1980)

Generally speaking, public ports handling foreign cargoes are concentrated on Luzon (especially Manila) and Mindanao (especially Davao). The primary items handled are: in imports, grain, metals, chemicals, etc.; in exports, lumber, copra, sugar, cement, etc. Nevertheless, the bulk of foreign cargoes -- 55% -- is handled at the nation's private ports.

Transport of domestic cargo is, as in the case of vehicular traffic, highly dependent on and heavily concentrated in Manila. Although the items handled differs for each port, main items generally included grain, copra, corn and cement, so that agricultural products occupy a large share of domestic cargoes.

Domestic goods handled at Manila are most frequently transported between that port and Cebu, accounting for 28% of the national total. Next in ranking are Davao, Cagayan de Oro and General Santos. As a result, with the exception of Cebu the main ports are located on Mindanao. The goods handled by these various ports are generally as follows: Cebu; general cargo, consumer goods and empty bottles; Davao, general cargo, bananas and corn; Cagayan de Oro, general cargo, pineapples and corn; and General Santos, corn and pineapples. As seen, agricultural items and fruit form a major part of the cargoes handled; these items are largely destined for the consumer markets of Metro Manila. (Fig. 3.7.3.)

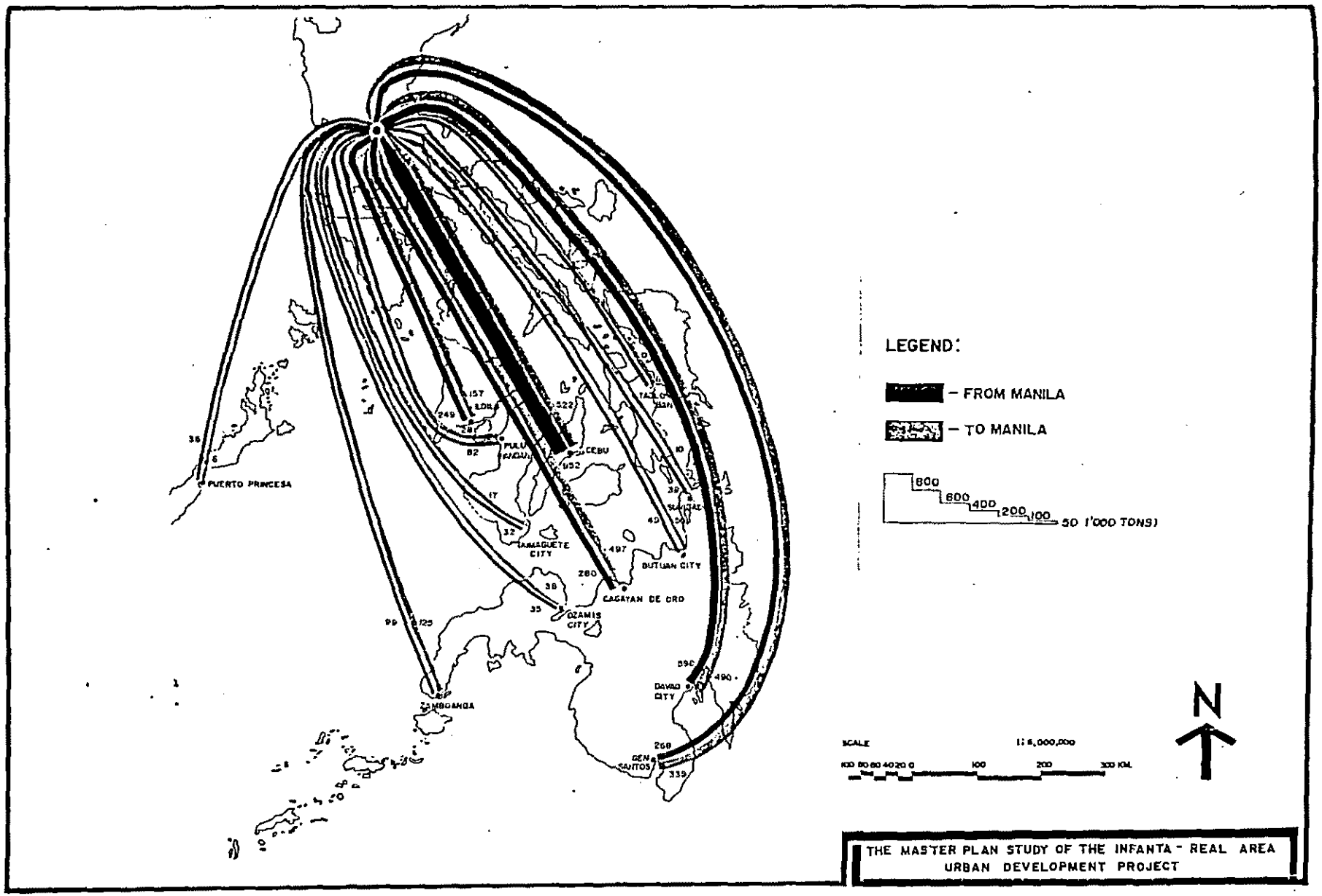

FIG. 3.7.3 CARGO TRAFFIC TO & FROM MANILA
(1980)

Characteristics of Major Ports

The main features of cargo transport in the major ports of the GCLA and the east coast are as described below (Fig. 3.7.4).

(i) Manila

- Manila Port is actually divided into three ports. Domestic cargo is handled at North Harbour; international cargo at South Harbour.

- The aggregate volume of domestic cargo handled is approximately 6 million tons, representing 45% of the national total.

- The largest share of domestic items handled is occupied by agricultural products, which arrive from Mindanao, Cebu and other islands in the south.

- The balance of incoming and outgoing goods is nearly even.

- The volume of international cargo transport is approximately 6 million tons, which is almost equal to the volume of domestic goods. Imports account for as much as 83% of this amount.

- The main products of international transport are: in import, consumer goods and industrial products including wood and lumber (53%) and copra.

- Domestic items destined for export are first transported from their production points to Manila by boat or land route. Very few of these items are exported in their raw material form and almost all are exported after they have been transformed into primary products at processing plants at the point of origin or in the vicinity of Manila. Petroleum and other imported chemical products are transported via land or sea to cities around the country.

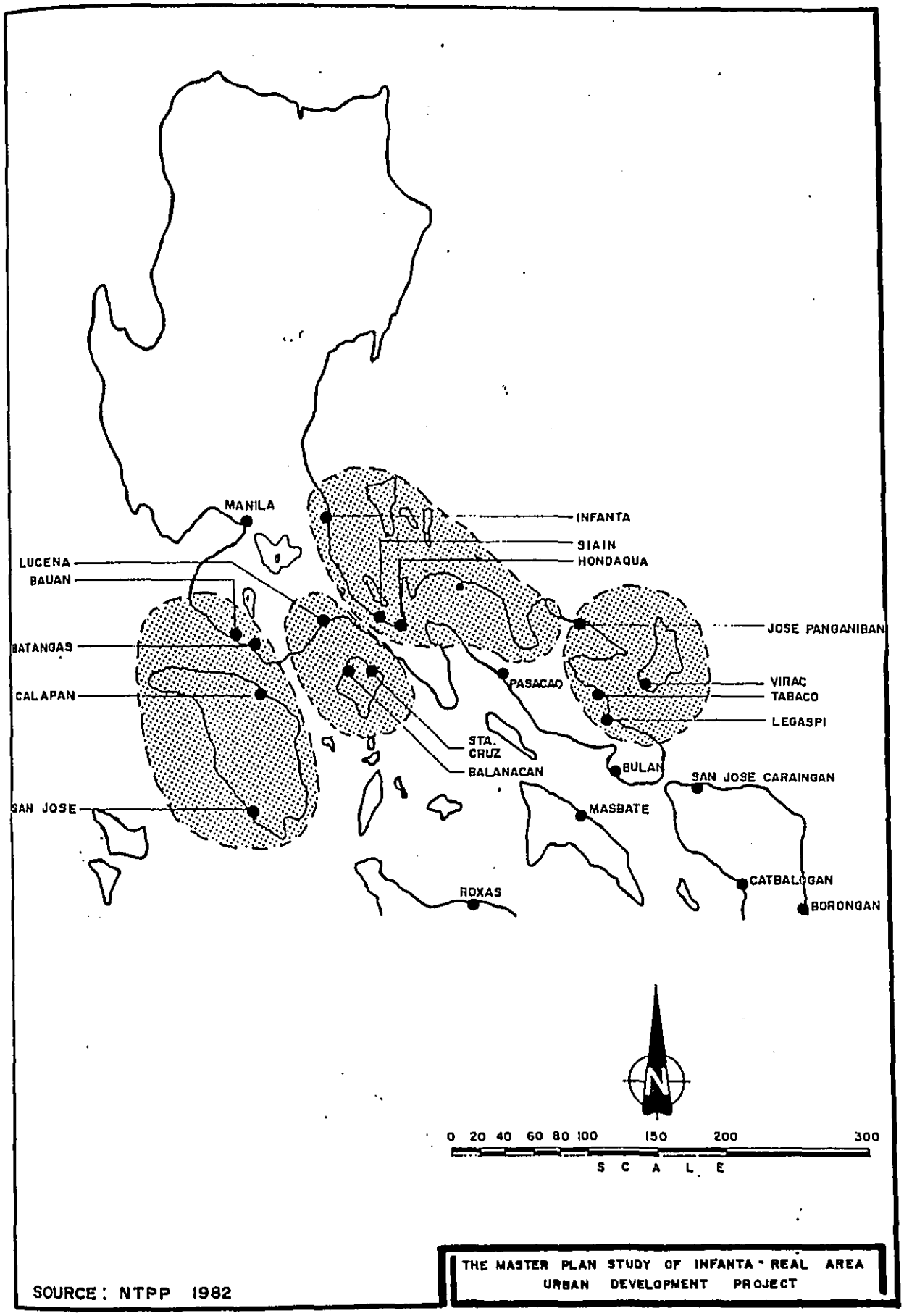

FIG.3.7.4 MAIN PORTS OF LUZON AND COVERING AREAS

(ii) Batangas

o The aggregate volume of transported goods was 360,000 tons in 1980, an increase by a factor of 1.24 over the figure for 1977. An almost even balance is seen between domestic goods and international goods, with the former registering a 52% share of 187,000 tons.

o Rice fills the largest place in the ranking of domestic goods coming into the port, accounting for 26%. This followed by lumber and fruit. Items leaving the port consist almost entirely of minerals and bottles.

o 71% of the domestic cargo entering the port comes from Calapan on Mindoro, and a smaller share from Visayas.

o While major domestic items entering the port are consumed in Batangas, the majority are transported to Manila or to the neighboring provinces of Laguna and Cavite.

o The main items of international transport are sugar and cement. The raw materials for these products are transported from production bases nearby and then processed in Batangas.

(iii) Lucena (Cotta)

o Cotta is not considered a favorable port due to the strong tidal effects resulting from its location in an inner harbor.

o Goods passing through the port are exclusively of domestic origin. Moreover, 75% of these goods are transported between Cotta and neigboring Marinduque.

o The main items handled at the port are rice, copra and other agricultural products. Almost all of these items are consumed in Laguna Province.

(iv) Major ports on the east coast (Legazpi, Tabaco, Jose Panganiban, Siasin, Infanta

o All ports are experiencing a decline in the volume of goods handled.

o In particular, owing to a reduction in copra production since 1978, a sharp decline has been seen in Jose Panganiban, Siasin and other areas with coconut forests.

o Compared with Batangas and port on the west coast, east coast port handle only about 10% the volume of goods.

o In addition to the falloff in copra production, other causes of the decline in cargo volume are the climate and geographical conditions.

o These ports lie in the regular typhoon route, which results in frequent disruptions of service.

o Poor geographical conditions refer to the slow travelling time between these ports and Metro Manila due to the lack of good roads.

o Siasin is in the process of transforming from a cargo transport port to a fishing port.

o The main goods handled at east coast ports are copra, lumber and cement. More than 70% of all goods are destined for neigboring islands, and a small portion to the Visayas and Mindanao islands.

o Almost no transport at these ports involves goods to/from Manila or overseas.

Product Flow Analysis

(i) Lumber

The major lumber-producing areas on Luzon are Region II in the north, centered on the Sierra Madre mountain range, and the and Camarines Sur regions in the Bicol.

Log is produced in greatest quantity in Region II, with a total of 948,000 cu.m., or 18.6% of the national total (5,100,000 cu. m.). by way of contrast, the Bicol area (Region V) produces only 125,000 cu. m., or 13% of the figure for Region II.

After processing at nearby lumbermills, the lumber is transported to market. 73% of the lumber produced in Region II is exported, following processing into plywood and veneer board at the ports of Irene, Aparri and Claveria.

Domestically, the main market of consumption is Manila, followed by Bulacan. Together these destinations account for 80% of the total transport volume. Truck transport is used almost exclusively for handling goods from Region III; from Bicol, transport is provided by truck (70%) and boat (30%) (Fig. 3.7.5).

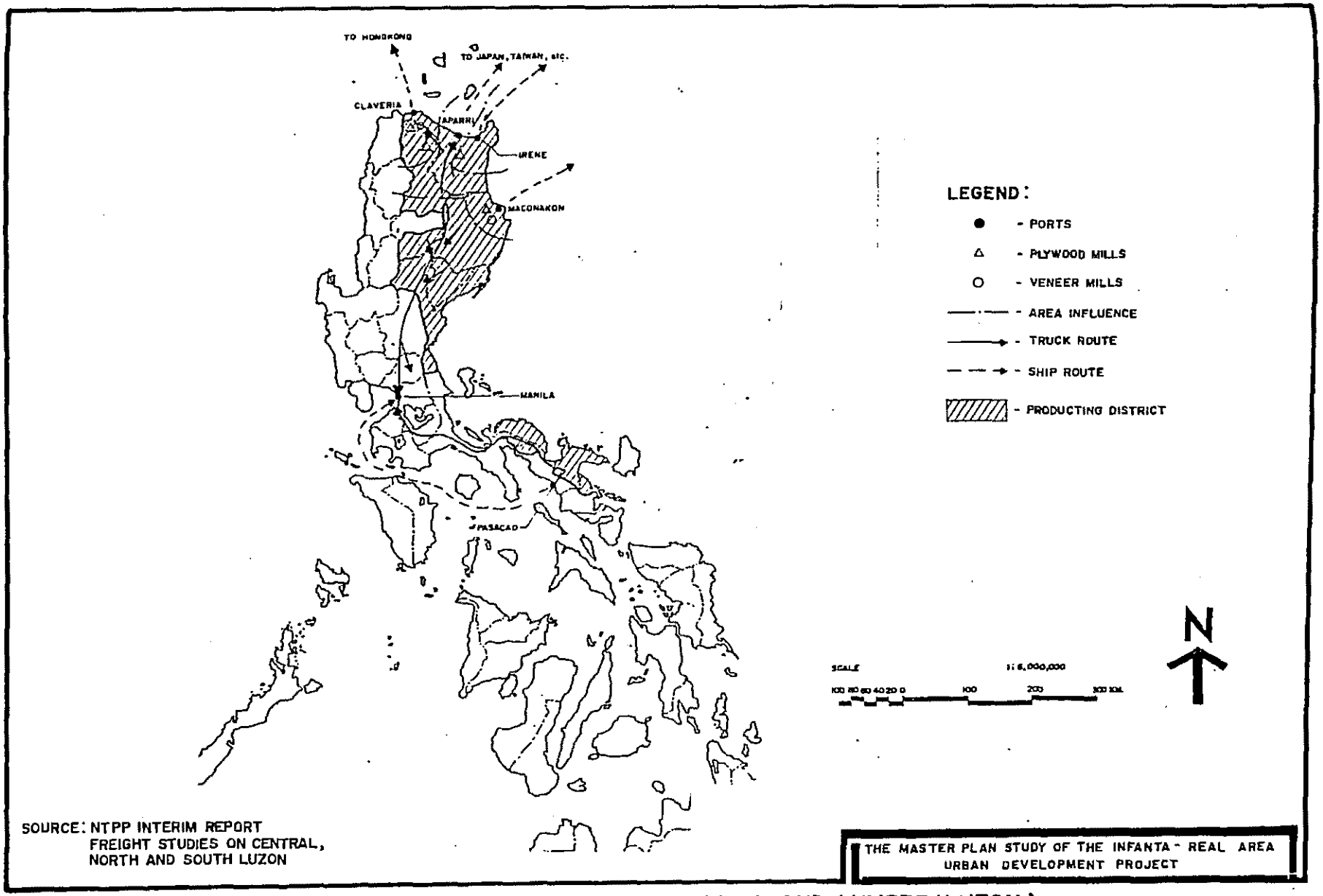

FIG. 3.7.5 TRANSPORT ROUTE OF LOG AND LUMBER (LUZON)

(ii) Coconuts

Copra is one of the Philippines' most important export items, ranking third of all export products in 1980 with a total value of US$820 million.

Nationwide, the Philippine produces 2,040,000 m.t. of coconuts per year, a drop of 20% compared to production volume in the period 1976-78. Coconut forests cover a total area nationwide of 3,126,000 ha. On Luzon, the greatest concentration is found in Region IV, where there are 548,000 ha. of coconut groves, representing 17.5% of the total. Region V contains another 353,000 ha, so that cumulatively these two regions account for 28.8%, thus pointing to the outstanding importance of this crop to the economy of Luzon. (Fig. 3.7.6)

Copra accounts for some 90% of the products derived from coconuts. (2% of copra is coconut oil. 83% of this coconut oils is export, and the remaining 17% is consumed domestically.

The major coconut oil processing plants are concentrated in nearby Mindanao, Quezon and in Manila. In Quezon, the largest number of such plants are located in Candelaria and Lucena. (Fig. 3.7.7)

On Luzon, the coconuts are generally transported by truck to the processing plants and the processed products are then shipped overseas from the ports. The main export ports on Luzon are Manila and Legazpi, with Manila accounting for nearly as 90% share. Outside Luzon, transport is performed almost entirely by ship. The main export ports are concentrated on the coconut-producing island of Mindanao and include Zamboanga, Iligan, Cagayan de Oro and Davao. (Fig. 3.7.8)

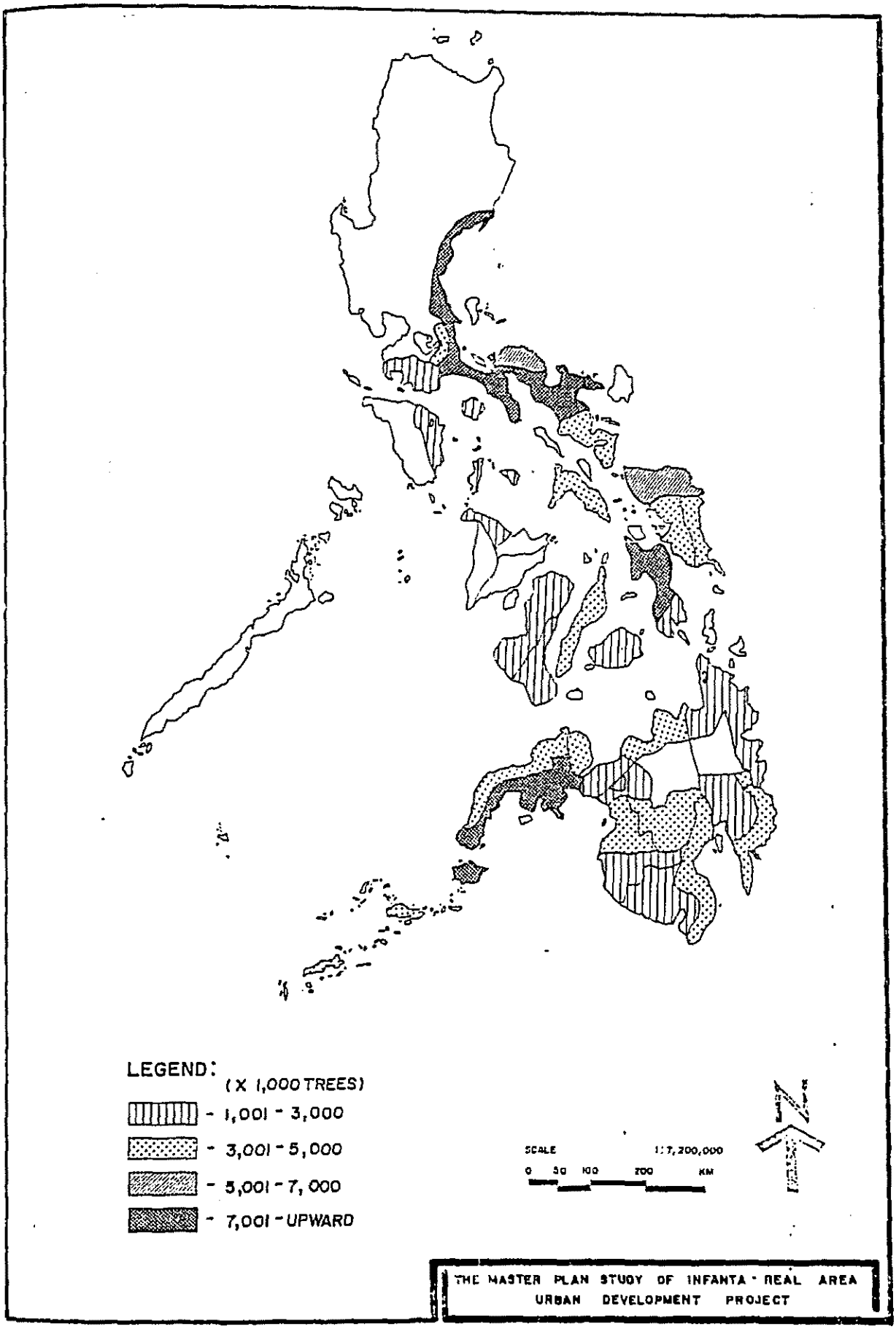

FIG. 3.7.6 PRODUCTION VOLUME OF COCONUT BEARING TREES BY PROV.

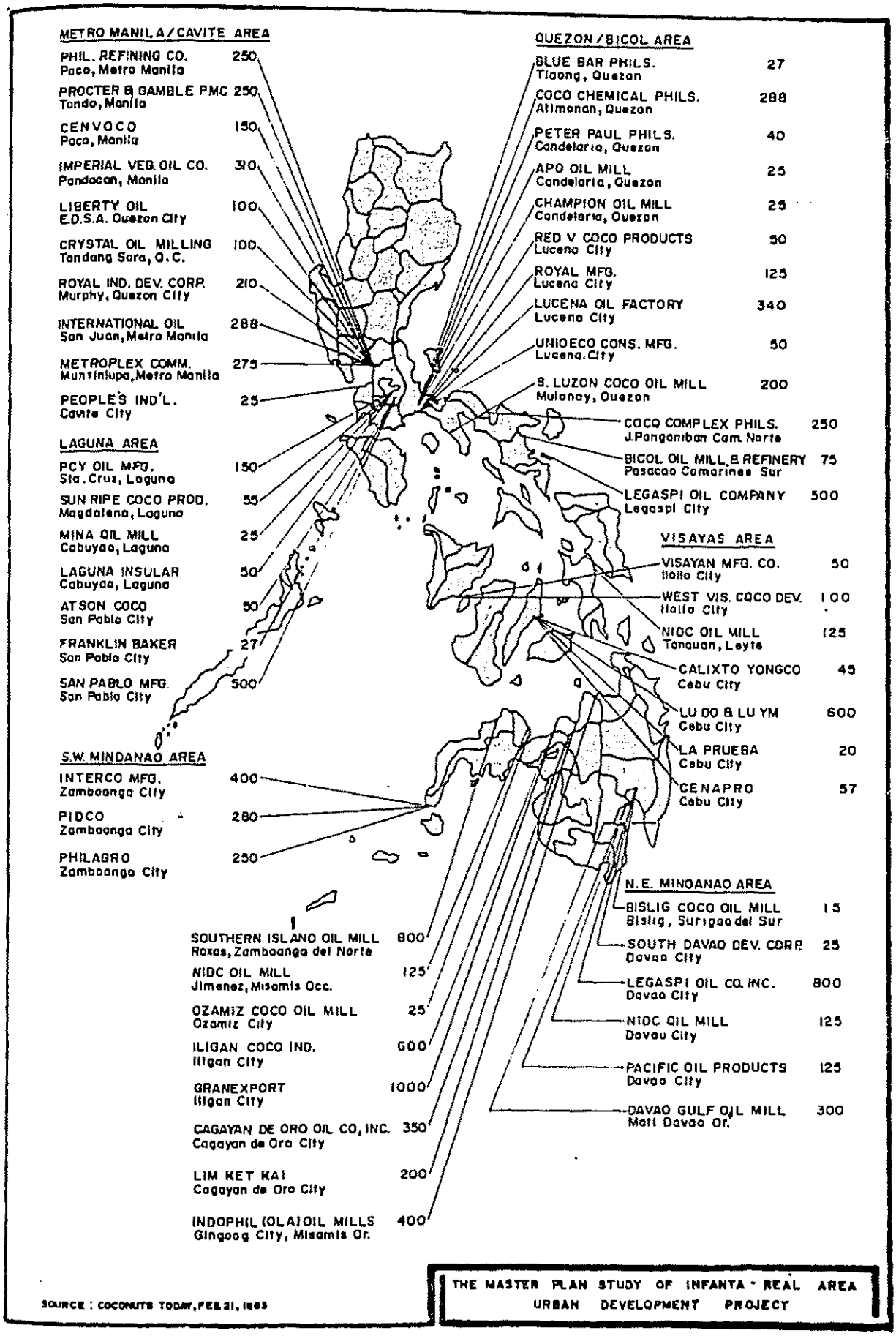

FIG. 3.7.7 EXISTING COCONUT OIL MILLS

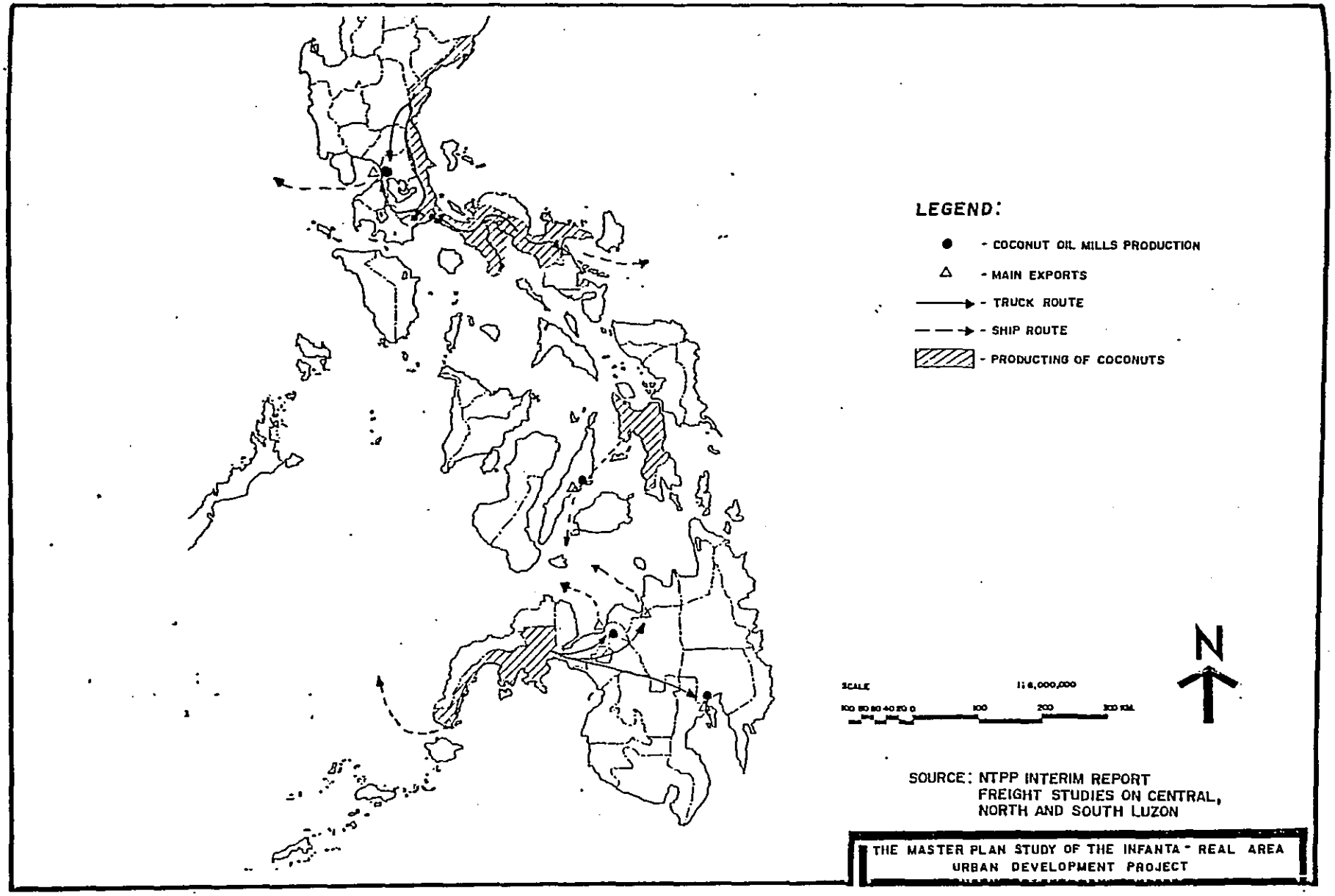

FIG. 3.7.8 TRANSPORT ROUTE OF COCONUTS

(iii) Other Related Goods

In addition to lumber and coconuts, other related products of Quezon and the Infanta region are Manila hemp and cement.

The largest area of Manila hemp production on Luzon is Bicol. In 1980 the region produced 56,000 tons, or 32.5% of the national total (172,000 tons). Although when compared with coconuts and other export items Manila hemp is not a large export industry, it has been growing annually. In the last 5 years, for example, the industry has grown by 3% per year. The major nations which import manila hemp are the U.S., Japan, U.K. and the nations of Europe.

The transport system for manila hemp is as follows: First the raw material is transported by truck from the production areas in Bicol to processing plants located in Laguna and Rizal. Here they are processed into products which are then transported by truck to Manila for export worldwide. While transport from Bicol to Laguna and Rizal is carried out over land, road conditions in this area are very poor and result in slow travelling time. The need for improvement of the road system is well recognized.

Cement produced from nation's lime resources is an important national product. Luzon is especially essential as it produces 3.19 million tons per year, representing 70.6% of the national total (4.52 million tons per year). In Rizal Province, the following cities produce the noted quantities: Rizal, 194,000 tons; Marinduque, 502,000 tons; Filipinas, 308,000 tons; Midland, 184,000 tons. Cumulatively this amounts to 1.19 million tons, which is 26.3% of the national total and 37.2% of the total for Luzon. The major portion of the cement which is produced is processed locally and exported for relatively large-scale projects.

Truck transport is used for between 80% and 90% of all cement transfers domestically, the remaining 10% or so being boat transport.

Cement processing plants are concentrated in Bulacan outside Metro Manila and in Antipolo, Tanay and other cities on the north shore of Laguna de Bay. Cement from Rizal Province is transported to processing plants on the north shore of Laguna de Bay; that from Bulacan, primarily to Norzagaray, from Visayas, to Legaspi in Bicol; and from Marinduque, to Batangas and Manila. From these various processing plants, the final product is shipped to the nation's consumer centers (mainly Metro Manila) or to Manila for overseas plant.

(2) Passenger Transport

The volume of passenger transport in the Philippines is 16.1 million persons per year, which represents a substantially large proportion of the national population of 48 million.

The major ports for passenger transport are Cebu, Manila, Iloilo and Zamboanga (Fig. 3.7.2.)

Even more so than with cargo transport, there is a strong concentration of passenger transport in the Manila area, particularly involving passengers arriving from Visaya and Mindanao. Passenger transport follows two major patterns: (i) direct transport to Manila and (ii) ferry passage from nation's various islands to the closest port on Luzon, followed by land (bus) transport to Manila. The boundary point dividing these two pattern may be recognized as follows: passengers coming from points as far as Mindoro and Masbate arrive in Manila by ferry and bus; those coming from points farther south arrive in Manila directly by boat or by plane. Also, passengers destined for points in northern Luzon almost all choose bus transport. (Fig. 3.7.9)

Extremely little passenger transport is carried out in eastern Luzon and it is limited to passengers travelling between Polillo Island and Infanta in Quezon Province and between Virac on Catanduanes Island and Tabaco in Camarines Sur Province.

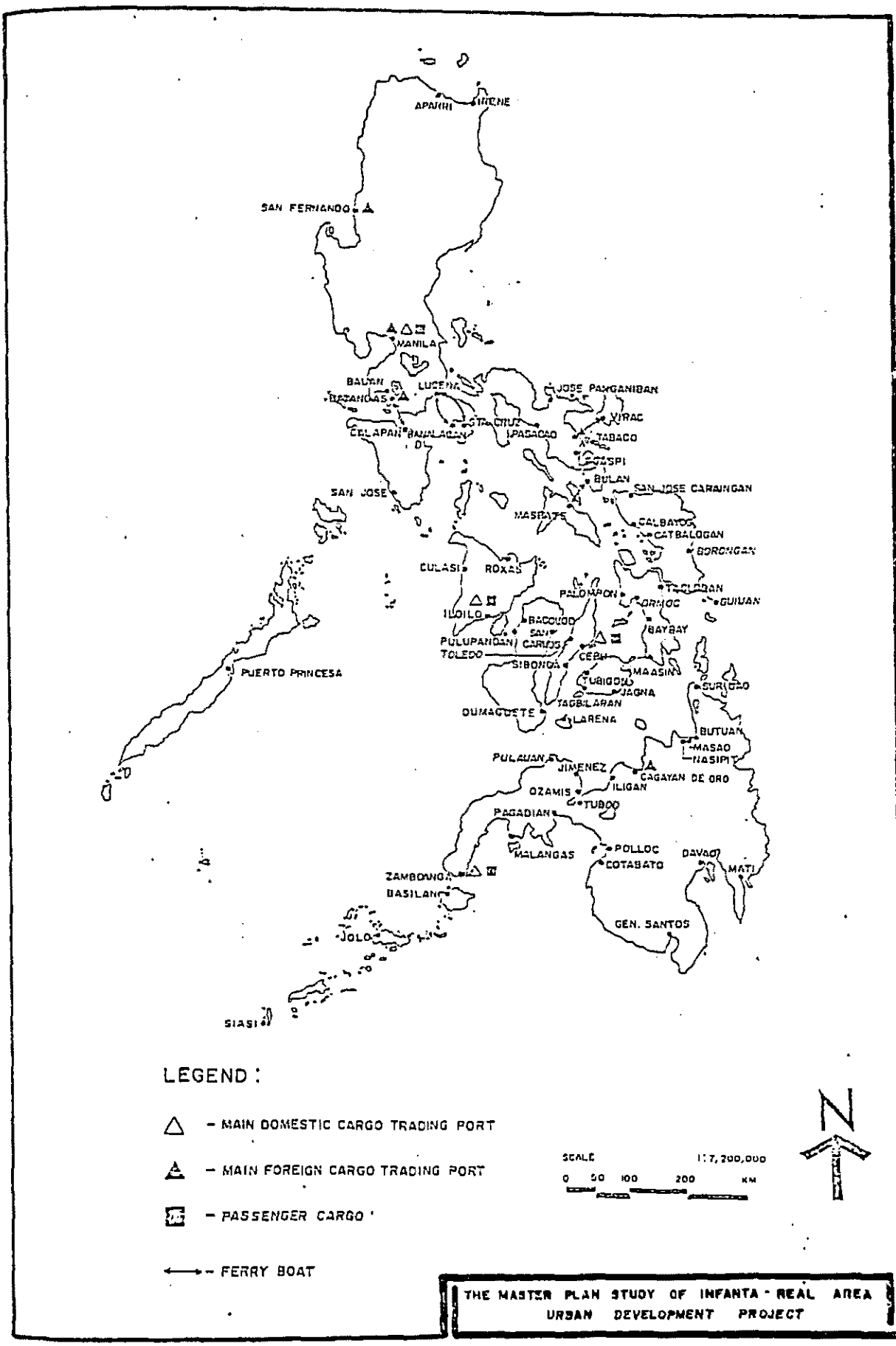

FIG. 3.7.9 MAIN PUBLIC PORTS
(TRAFFIC OVER 15000 TONS)

2) Outline of Finalized Harbor Plans

Under the terms of the Philippine Government's latest Five-Year Plan (1983-1987), 11 ports are to be expanded using a total budget of approximately P300 million. On Luzon these plans include expansion of the two ports of Lucena and Bauan with a budget of approximately P20 million each.

In addition, for the next Five-Year Plan to start in 1988, improvement is planned for 7 ports using an aggegrate expenditure of approximately P122 million. RO-RO (roll-on, roll-off) services are planned for 4 of the 7, namely, San Carlos, Toledo, South Cebu and South Negros.

These plans fundamentally aim at the improvement of ports in the southern part of the nation and are concentrated on Mindanao and Cebu (Fig. 3.7.10)

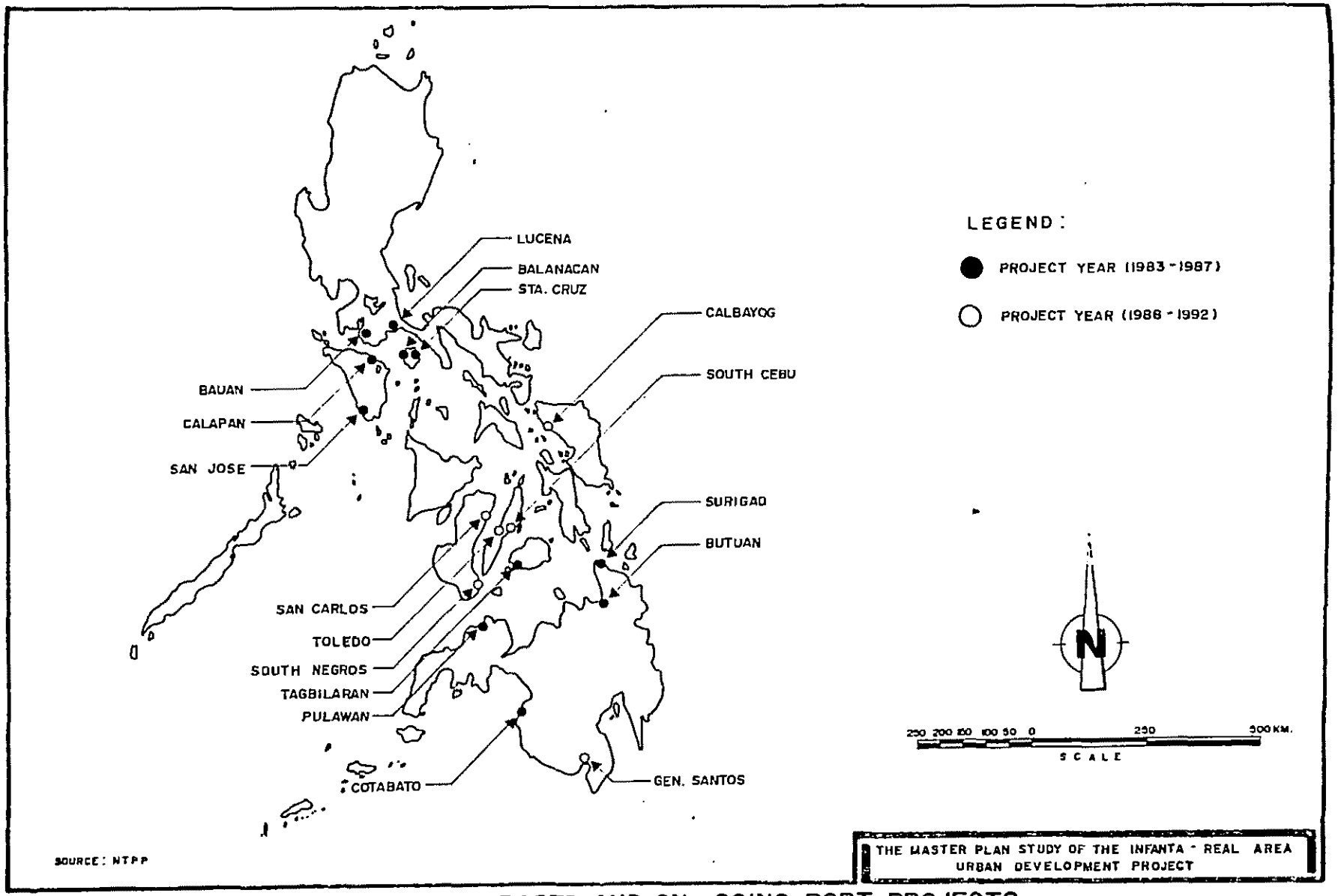

FIG. 3.7.10 PROPOSED AND ON - GOING PORT PROJECTS

3) Current Conditions and Problems Forecast for the Future

The present situation in marine transport and problems predicted for the future may be summarized as follows:

(i) Concentration of domestic cargo in Manila

At Manila Port, which currently handled 45% of domestic cargo, plans are under way in container transport, and the port's capacity is expected to grow posible until 1990. Road improvement is also planned in the port area, so no particular problems are anticipated.

Nevertheless, the volume of cargo is expected to grow at a rate of 4-8% between 1977 and 1991, increasing and becoming more concentrated as Metro Manila continues to expand.

Not all of the goods handled at Manila Port are consumed within Metro Manila, however, and a considerable amount of transport is required to other cities near Manila and from the production centers. In view of the present traffic congestion seen in the capital and surrounding areas, problems are more expected in land transport leaving Manila than in marine transport to Manila, and significant time losses are anticipated in carrying cargo from the production centers or to the consumer markets.

(ii) Decline of marine transport in the east coast region

Although land transportation remains underdeveloped on the east coast of Luzon land transport has deteriorated during the past 3 years.

(iii) Poor Local Airport Facilities

In general, local airports are equipped with short runways capable of accommodating only small propeller planes (BAC I-IIs). As a result. only a small number of passengers can be handled and a significant time loss is suffered, taking way from the inherent advantage of speed which should be offered by air travel. This situation in turn has led to an increase in airfares, resulting in a decline in the number of air passengers.

Plans for the future call especially for extension and widening of runways at airports in the southern part of the nation. When access is opened to larger aircraft at these airports, more air passengers are expected not only due to faster air service but also because cheaper fares shall be possible owing to larger passenger volume.

One of the major reasons which may be given for this decline is the falloff in production in the inland production areas. Another reason is the lack of a good harbor owing to topographic and meteorological conditions. Topographically, owing to the projection of the Sierra Madre mountains as far as the coast, there is minimal flat land and little physical space for a port. Meteorologically, the east cost, unlime the west, lies directly in the typhoon route.

As for the passenger transport, one feasible reason for the lacking development of a port on the east coast is the fact that there is no large island in the vicinity. The populations of the islands near the east coast are quite low compared with those near southern Luzon: Polillo 21,000; Alabat 11,000; Catanduanes 175,000. As a result, there is little demand for passenger transport and a minor-sized port is sufficient.

3.8 Air Transport and Airport

1) Current Status of Air Transport

There are 83 national airports in the Philippines, including 5 which also serve as international airport: Manila, Laoag, Cebu, Davao and Zamboanga. There are an addition 120 private airports.

Because the nation is composed of a large number of island, as with its ports, domestic air routes have a relatively long history of development. Almost every major island has its own airport. Domestic passengers in 1981 numbered approximately 5 million, which means that nearly 1 in every 10 persons in the nation (total population: 48 million) utilized domestic air transport during that year. This rate is extremely high (Fig. 3.8.1).

In 1980 the total number of passengers passing through Manila Airport was 4.36 million, representing 58% of the national total. Of this figure, 2.62 million -- or as much as 60% -- were international passengers. When compared with statistics in the 10-year period is a large 507%, in comparison with a low figure of 143% for domestic air traffic. Approximately 60% of all international passengers are tourists.

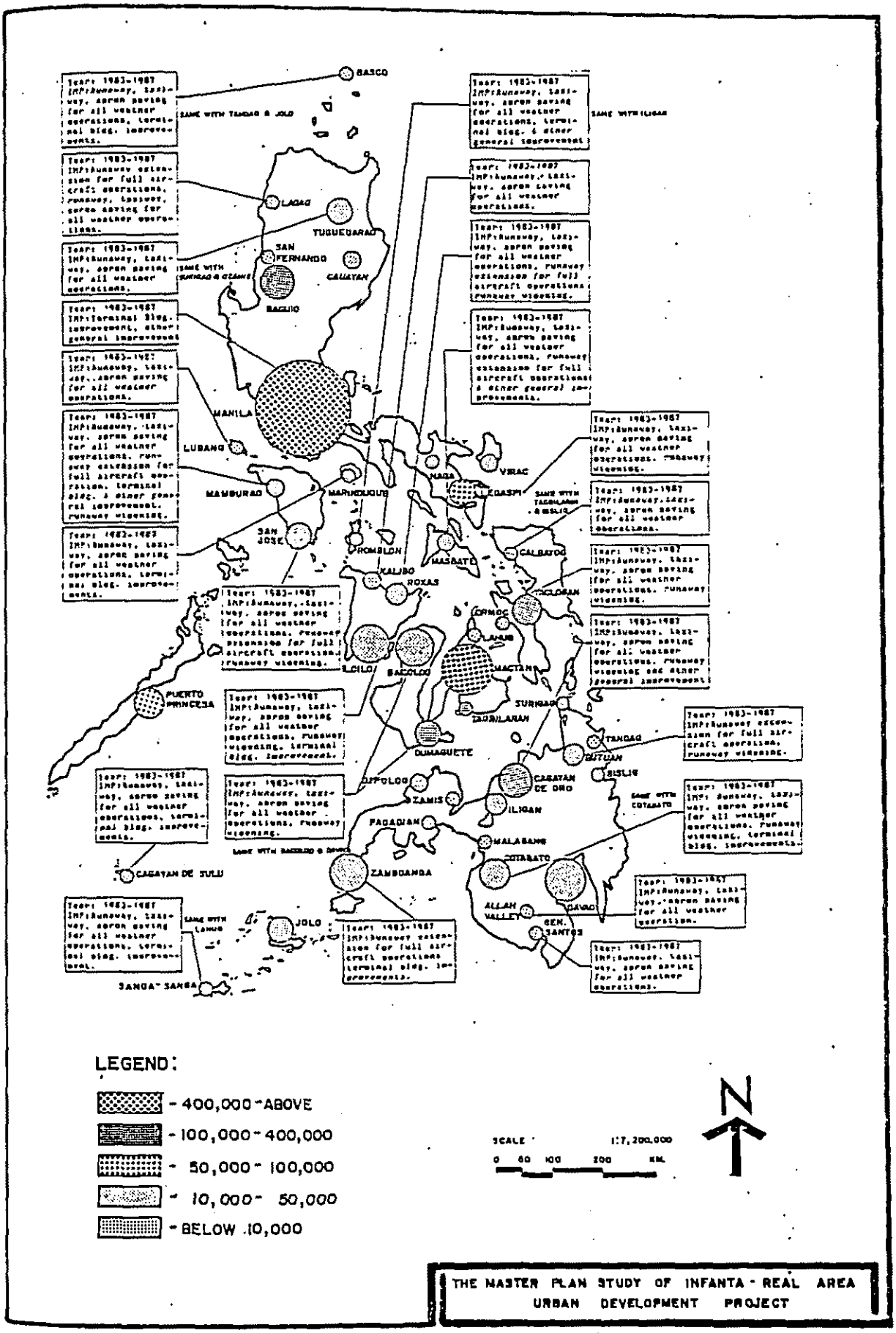

FIG. 3.8.1 AIRPORT PASSENGER MOVEMENTS (1980)

The most heavily travelled domestic air route is that between Manila and Cebu, with 500,000 users. Next is the Manila-Davao route with 190,000 passengers. Airports relatively close to Manila -- Legaspi, Naga, San Jose, Mamburao, Virac, etc. -- experienced a growth in passenger use until 1979. After fare increases in 1980, however, a 30% annual decline was seen, particularly on the Naga and Legazpi routes. In addition to the rising airfare, this situation was aggravated by the widespread introduction of low-cost air-conditioned buses which greatly boosted the convenience of travelling by ferry and bus. (Figs. 3.8.2 and 3.8.3)

According to an interview survey of users of major airports conducted by NTSSS in 1975, 66% of all passengers used air transport for business and 21% for pleasure. Also, when asked why they chose air transport over other means of travel, 37% cited speed and 26% answered convenience in making connections. (Fig. 3.8.4) Accordingly, in order to increase the number of air travellers in the future, it is necessary to improved in such facets as speed and to seek lower costs through large-volume passenger traffic. To achieve these goals, the nation's major local airports are now planning to change over from turboprops to jets (BAC I-II), including extension of runways to accommodate such aircraft. Airports north of Masbate, however, shall probably continue to lage behind owing to the time and cost advantages of travel by ferry and bus.

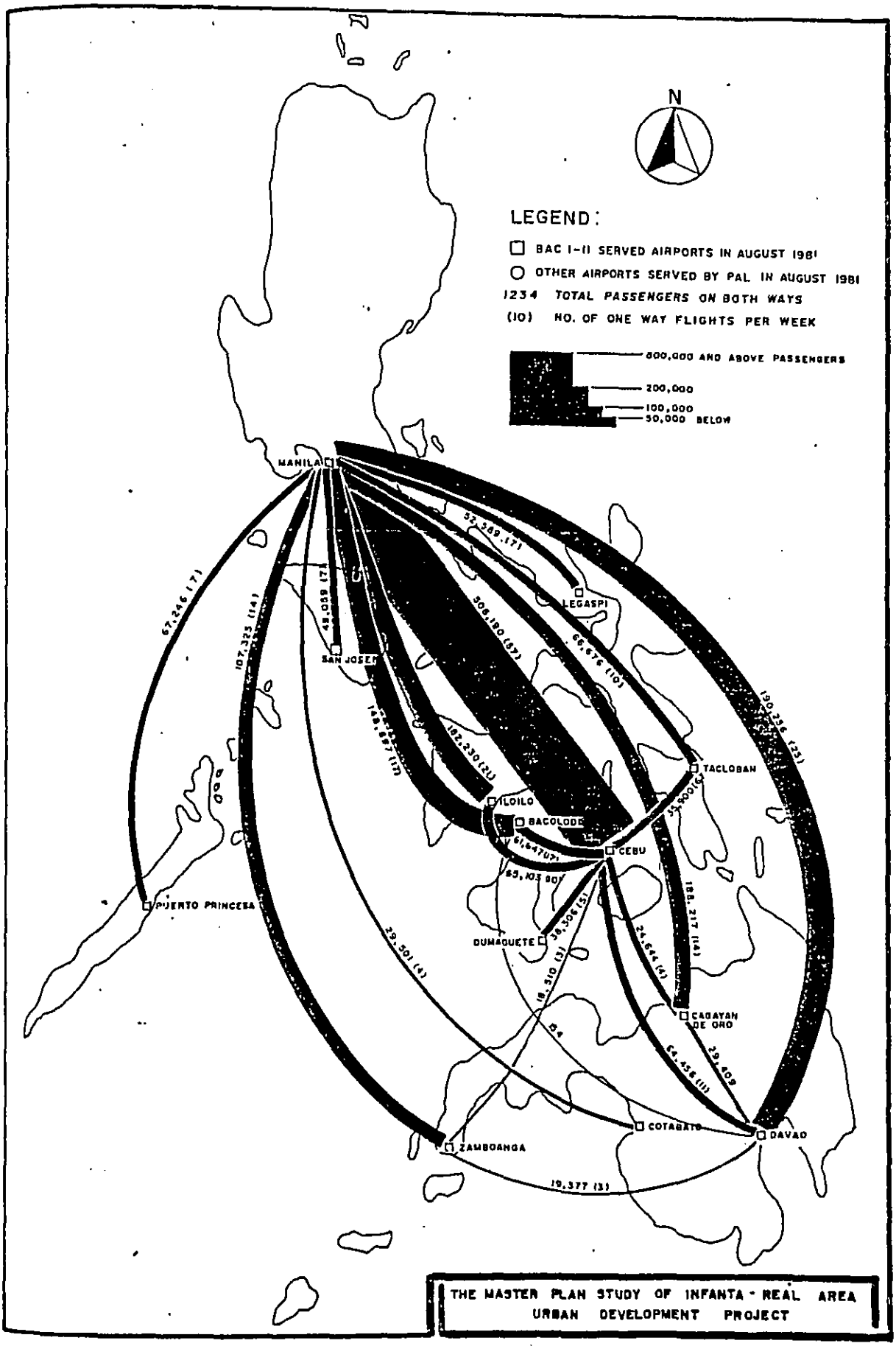

FIG. 3.8.2 AIR TRANSPORT PASSENGER MOVEMENTS (1981)
(TRAFFIC ON BAC I - II SECTORS)

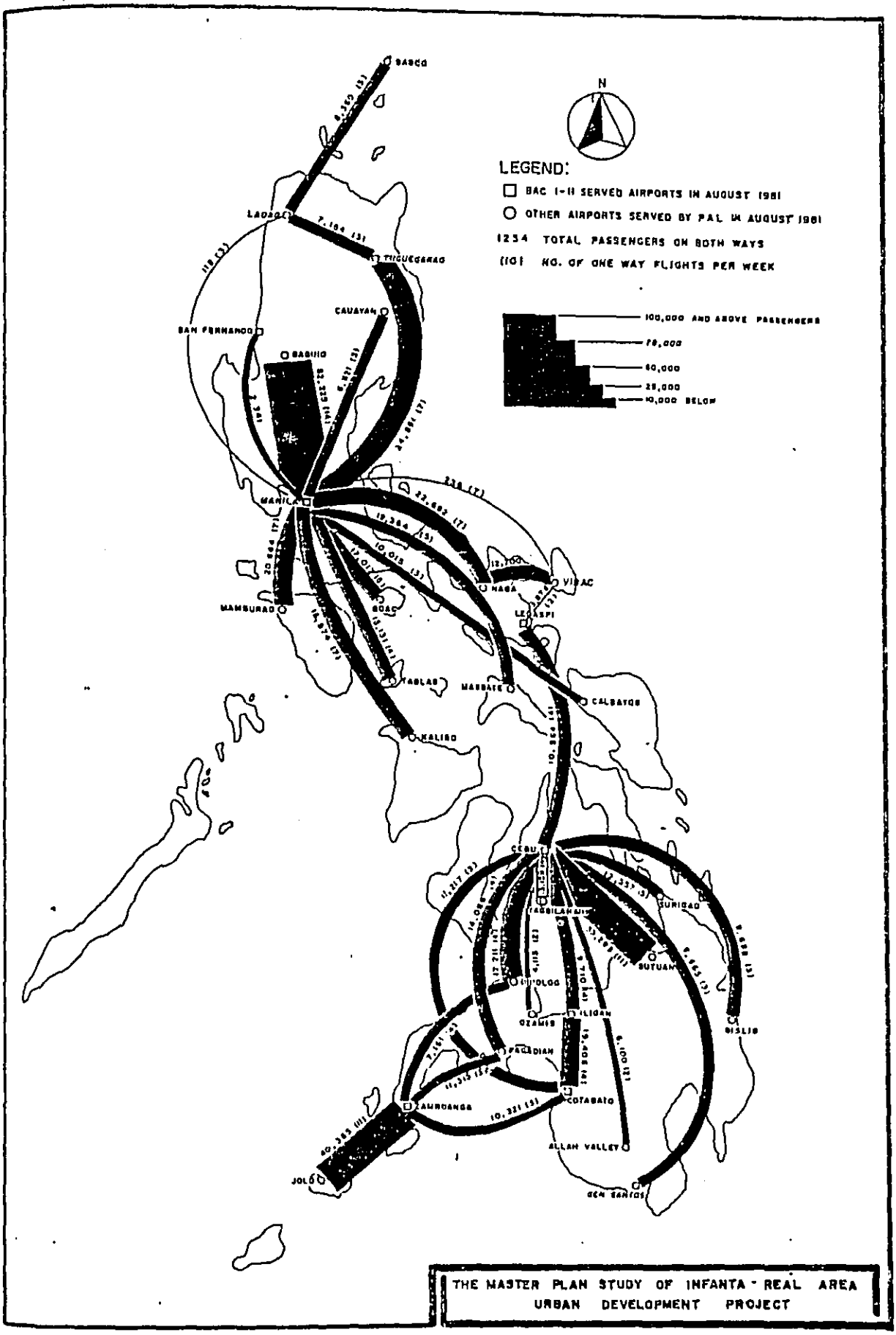

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FIG. 3.8.3 AIR TRANSPORT PASSENGER MOVEMENTS (1981)
(TRAFFIC ON TURBO - PROP SECTORS)

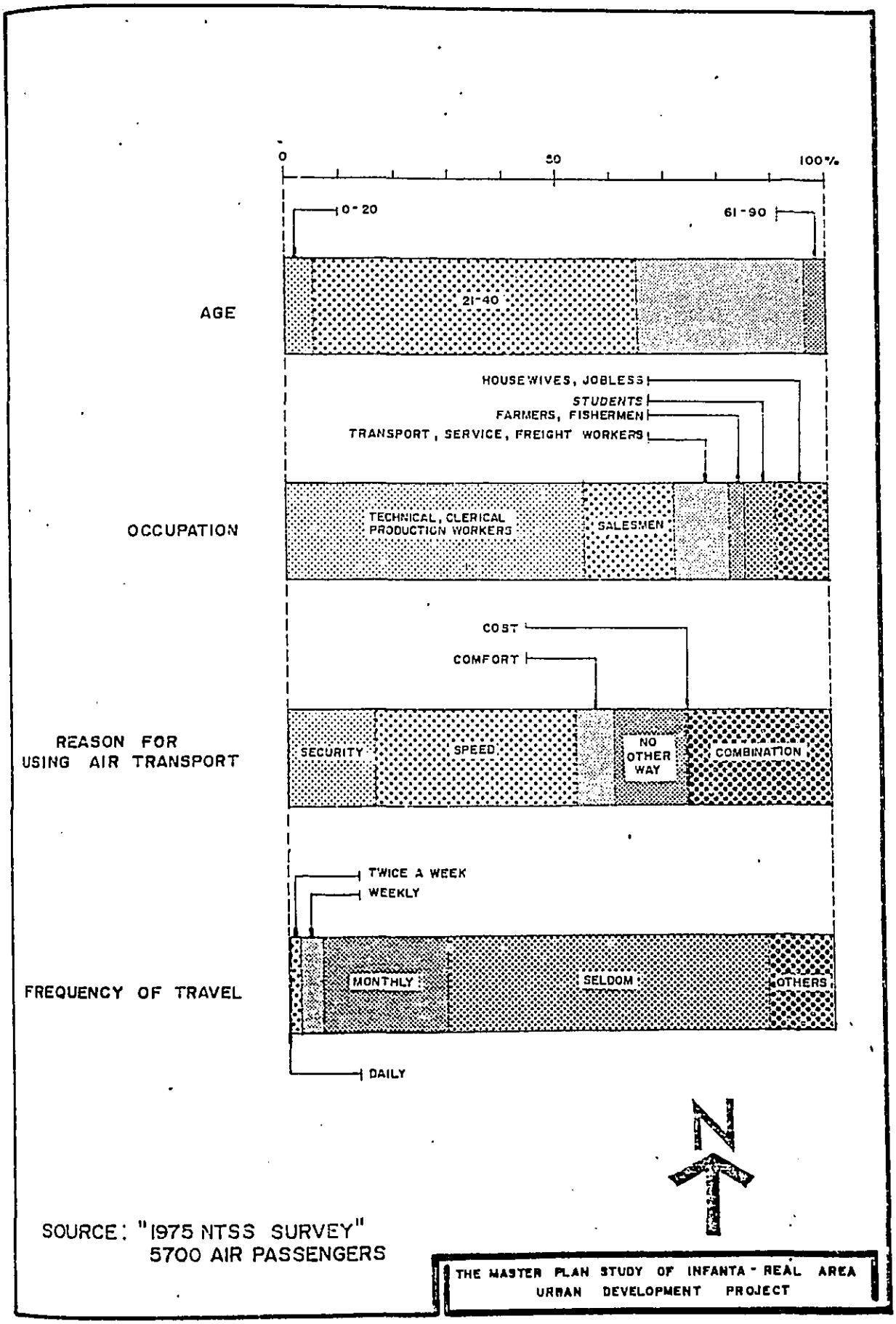


FIG. 3.8.4 AIR PASSENGER PROFILE

2) Outline of Adopted Airport Plans

Under the present Five-Year Plan (1983-1987), 39 of the nation's airports are slated for improvement. Total expenditures are budgeted at P61 million.

Regionally divided, improvement works planned for 13 airports on Luzon, 11 airports in the Visayas region, and 15 airports on Mindanao.

The most prevalent type of improvement called for is improvement of runways to cope with all weather conditions (30 airports). Other projects include runway expansion and widening and terminal improvement. Of the total amount budgeted, P200 million, or 32% is to be used for upgrading air traffic control facilities and services.

In the GCLA, airport improvement plans are to be carried out at two locations: Manila and Canlubang. At Manila, plans call for overall improvement including upgrading of terminal facilities. At Canlubang (Laguna Province), airport improvement is being undertaken as a part of plans to enhance Manila's airport facilities. Other plans for airports in the northern region of Luzon generally call for overall improvement of existing facilities. (Fig. 3.8.5.)

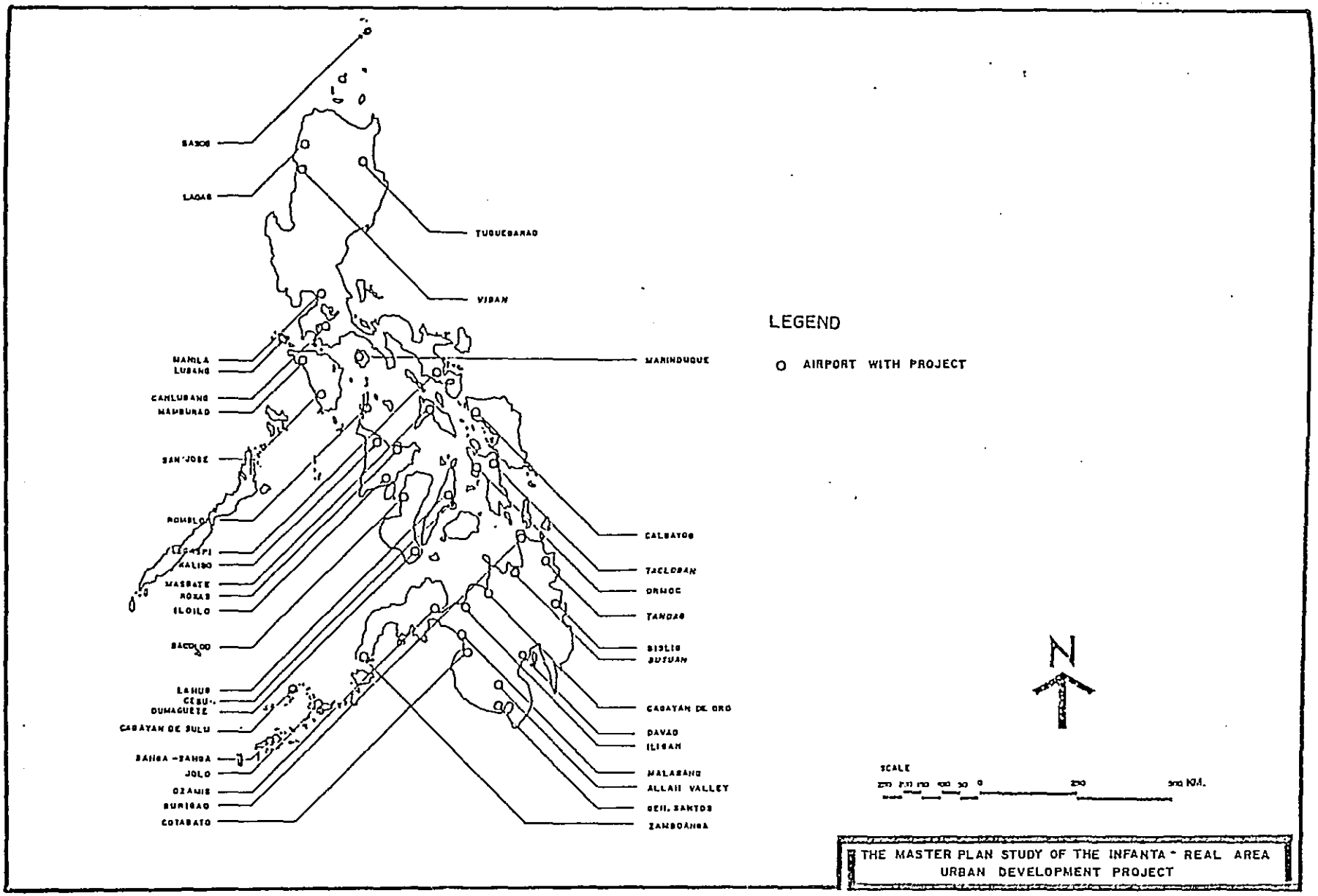


Fig. 3.8.5 PROPOSED AND ON-GOING AIRPORT PROJECTS

SOURCE: NTPP

3) Current Status and Problems Forecast for the Future

The present situation of the Philippines' airports and problems which are predicted to arise in the future may be summarized as follows:

(i) Cost and Time Disadvantages on Luzon

Three modes of access to Manila are offered: land, sea and air. At present, the road network has been largely developed and bus transport services improved, resulting in a shortening in travel time between Manila and local cities. Land transport is therefore in an advantageous position cost-wise and almost on a par time-wise. It is for this reason that a 30% dope was seen in air passenger traffic in the Bicol region between 1979 and 1980. And this trend can be expected to advance as improvement of the road system continues, with ever less dependence on airplanes.

(ii) High Passenger Cost

Airfares are high compared to land and sea passage fares. In particular, due to the recent development of the bus transport system on Luzon, a drop in air traffic in this region can be expected unless a sharp improvement in travel time service can be achieved. Accordingly, while air transport utilization remains high to areas relatively distant from Manila -- such as Tuguegarao and Laoag -- the number of air passengers is actually declining within a 400 km radius of Manila. This is the result of a breakdown in the balance between speed and cost in air service, leading to the relatively advatageous selection of land transport service. The movement away from air transport was made clear especially following the increase in airfares which was implemented in 1979.

(iii) Poor Local Airport Facilities

In general, local airports are equipped with short runways capable of accommodating only small propeller planes (BAC I-IIs). As a result, only a small number of passengers can be handled and a significant time loss is suffered, taking way from the inherent advantage of speed which should be offered by air travel. This situation in turn has led to an increase in airfares, resulting in a decline in the number of air passengers.

Plans for the future call especially for extension and widening of runways at airports in the southern part of the nation. When access is opened to larger aircraft at these airports, more air passengers are expected not only due to faster air service but also because cheaper fares will be possible owing to larger passenger volume.

3.9 Water Resources and Water Supply System

1) Water Supply in the GCLA

(1) Water Resources

The total quantity of water intake nationwide in the Philippines as of 1975 was 122.48 MCM^2/day (million cubic metes; estimate by Philippine Water Resources, NWRC, 1976)/ The estimated available capacity (surface water) at the same time was 704 MCM/day (90% availability). This means that only one-sixth of the available capacity was being utilized.

The GCLA (Region III and IV, including the islands of Region IV) is one of the nation's most abundant areas in terms of water resources, accounting for approximately 21% of the national total. The present volume of water use in the area's available capacity of 150 MCM/day. (Fig. 3.9.1., 3.9.2., Table 3.9.1.).

Water resources which may be potentially developed to meet the tight demand for water in the MMC environs are as follows (Fig. 3.9.3):

1) Development Potential

(i) Kaliwa River Basin
$23m^3/s$ (200ml/day)

(ii) Kanan River Basin
$38m^3/S$ (300ml/day)

(iii) Umiray River Basin
$13m^3/S$

(iv) Pampanga River Basin
$30m^3/S$

(v) Laguna de Bay
$30m^3/S$

(vi) Lower Marikina Basin Ground Water
no potential

Among these six, the Kaliwa and Kanan River Basins qualify as potentially developable water resources for the MMC in terms of ease of water construction and economic feasibility.

Note: Water Resources for Metro Manila, 1979, PICOREM]

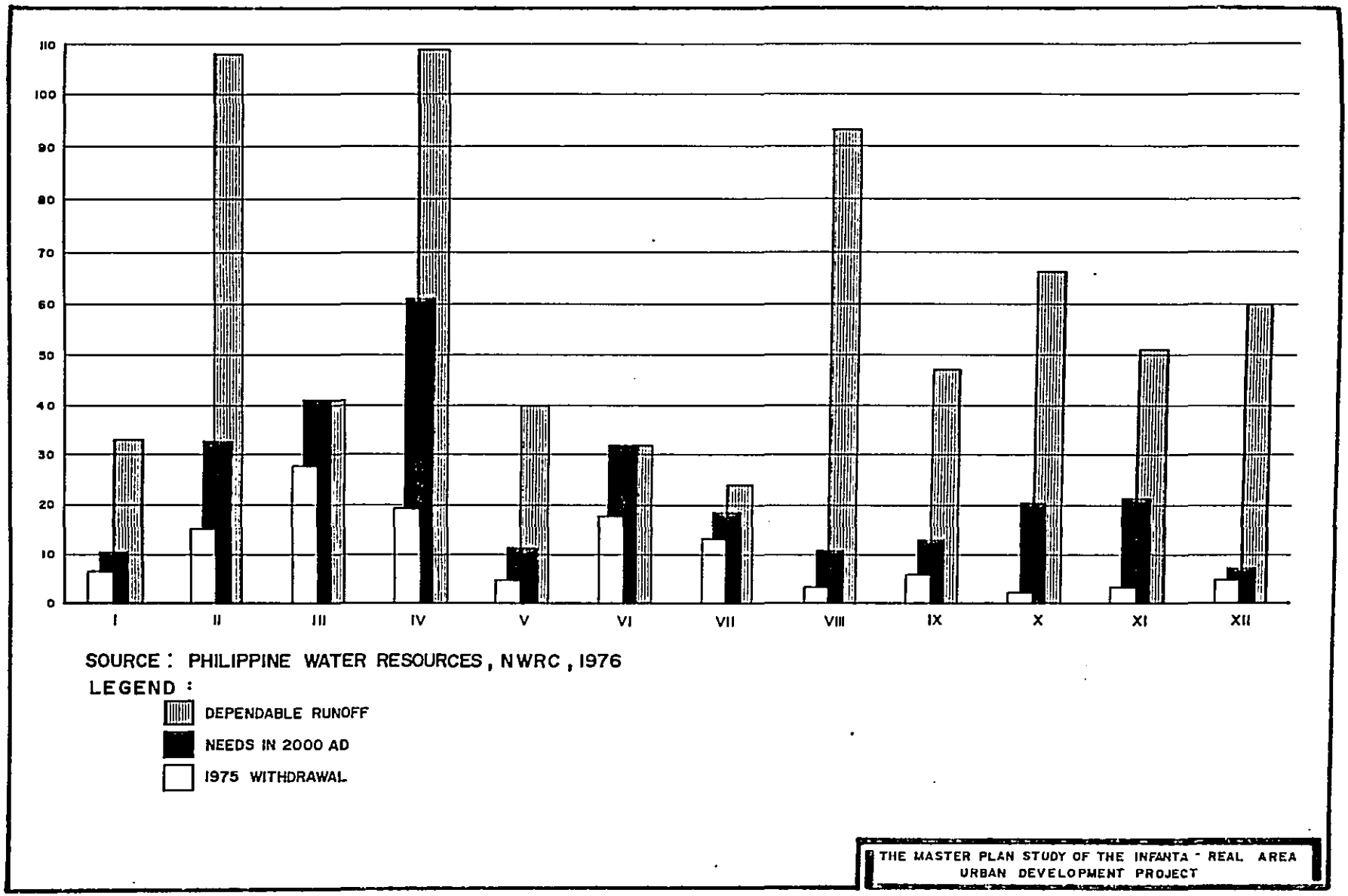


FIG. 3.9.1 WATER RESOURCES AND WATER USE

Table 3.9.1 Water Resources and Withdrawal

(million cubic meters)

Water Resourced Region	Daily Flow Available 1/ In Percent of Time Indicated			Total Withdrawal (daily)	
	50%	75%	90%	1975	2000
I. Ilocos	74	47	33	6.66	10.54
II. Cagayan Valley	179	141	108	16.06	30.34
III. Central Luzon	89	58	41	27.88	41.83
IV. Southern Tagalog	251	153	109	19.10	61.46
V. Bicol	80	49	40	4.52	11.52
VI. Western Vizayas	47	33	32	17.88	31.63
VII. Central Vizayas	45	31	24	12.92	18.12
VIII. Eastern Vizayas	162	105	93	2.77	10.96
IX. Southwestern Mindanao	74	55	47	5.79	12.39
X. Northern Mindanao	104	78	66	1.79	20.14
XI. Southeastern Mindanao	107	69	51	2.48	21.05
XII. Southern Mindanao	102	78	61	4.65	7.05
TOTAl 1,313		897	704	122.48	277.04

Source: 1/ Daily flow duration of 6 to 12 years record, Surface Water Supply Bulletin BWP
Philippine Water Rerources, NWRC, 1976

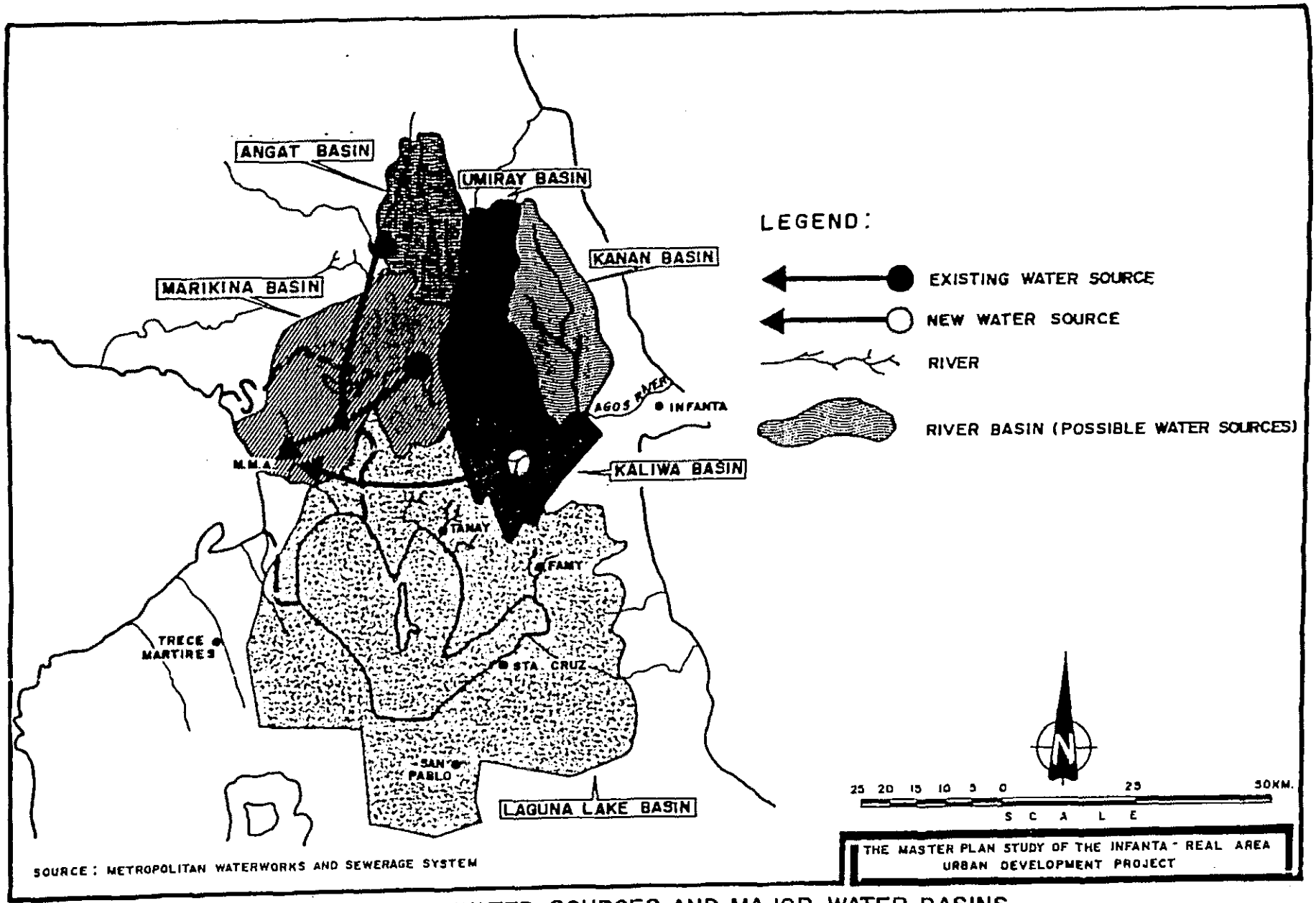


FIG. 3.9.2 WATER SOURCES AND MAJOR WATER BASINS

(2) Water Use

Based on the national water intake volume, water utilization patterns nationwide were as follows: agriculture (primarily paddy irrigation) 85%, domestic and public water 12%, industry (including hydroelectricity) 3%. (Fig. 3.9.3.)

In the GCLA, within region III no less than 93% of the total water intake is used for agriculture, especially rice cultivation, thus substantiating this region's title as the "granary of the Philippines." In contrast, within Region IV the percentage of total water utilization applied in agriculture falls well below the national average with only 67%, owing to the influence of MMA. This is followed by water for domestic and public use at 20% and industrial use at 12.7%. The ratio of water intake volume in the GCLA vs. the national total is approximately 38%. The GCLA is therefore not only rich in water resources, but is at the same time a large water consumption area centered on the urban concentration of MMA and the paddy irrigation of Region III.

Based on the estimations released by the National Water Resources Council (NWRC) for the year 2000, a water shortage is predicted in particular within Region III.

(3) Water Supply

Water supply systems in the Philippines fall into three levels. Level 1 derives water from point sources and is used primarily in agricultural areas. Level 2 relies on water from a common supply source for approximately every 5 households; this type of system is used in farm villages and in urban areas with lower population density. Finally, Level 3 comprises separate water supply systems for each household, as found in urban areas with dense populatons.

In 1980, the spread ratio (population served/total regional population) of Level 1 water supply systems was 18.8%; of Level 3 systems, 12.7% in GCLA. These level systems thereby account for a cumulative share of 31.5% [source: MPWH]. (Level 2 type systems are new to the region and are now under construction. No service is provided.)

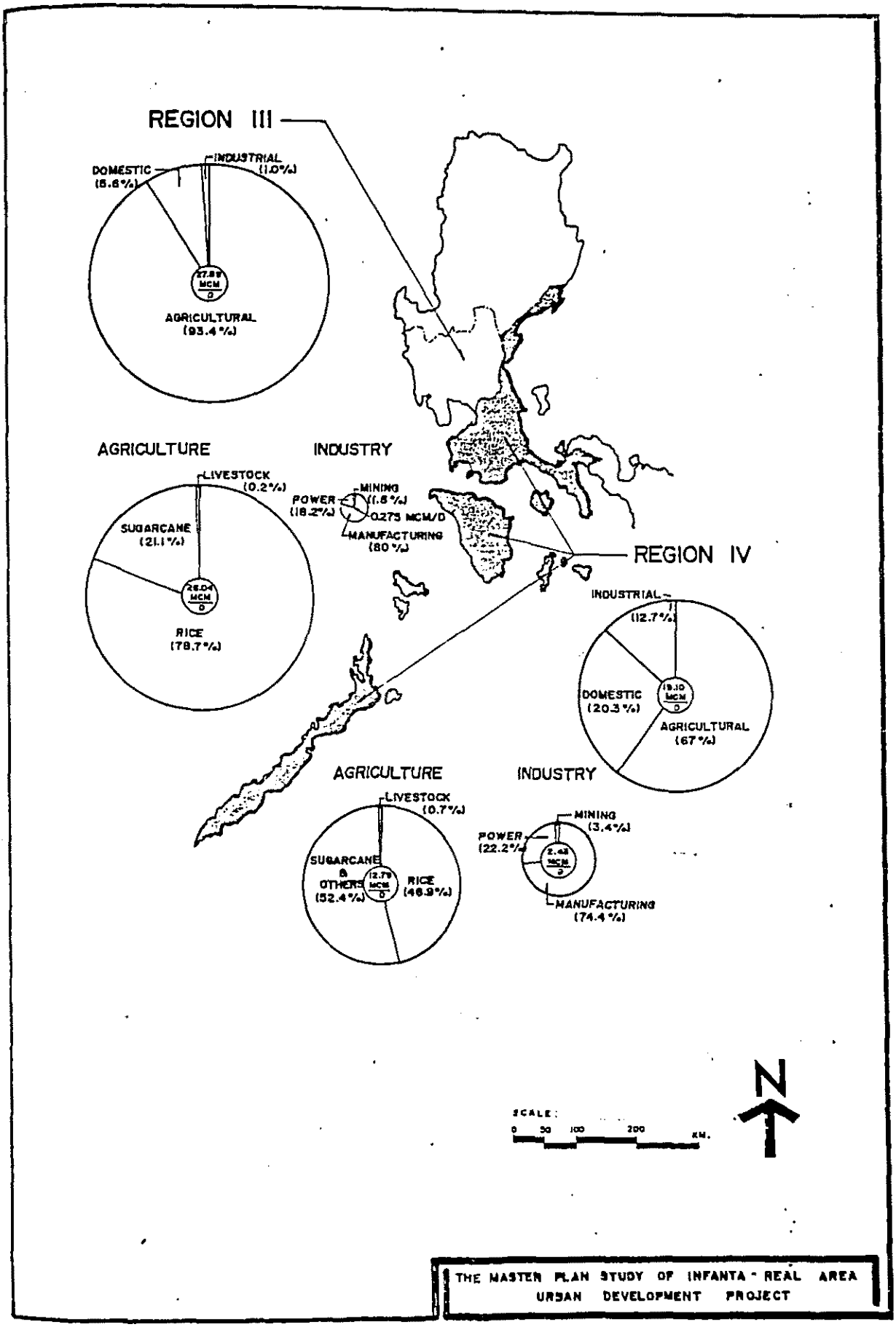


FIG.3.9.3 WATER USE OF REGION III & IV

2) Water Resources and Water Use in Metro Manila

(1) Water Supply

The major source of water (85%) for the Metropolitan Manila area is the Angat multi-purpose dam to the north. More minor water intake is drawn also from the Alat-Novaliches Rivers, the Marikina River and deep wells

According to the estimates of the MWSS, in 1980 the MWSS filled 54% (1,080 ml/d) of the total demand of 2,000 ml/d; 38% was supplied by private systems (almost all ground water pumps); and the remaining 8% of demand was not being filled.

MWSS' forecast of water demand for the year 2000 is 4,800 ml/d (2.48% population growth rate). In order to satisfy this demand, a large-scale water resources development program is needed.

Based on utilization purpose, as seen in Tabel 3.9.2. in 1981 some 49% of the total water used went for domestic use, 27% for commercial use and 24% for industrial use. It should further be noted that approximately 83% of the water for industrial use derived from pumped ground water.

In 1981, the average water demand per person for domestic use in Metro Manila was 217 l/day.

Note: 1) Angat Multi-Purpose Reservoir 1,135ml/d
Alat-Novaliches Rivers 110
Marikina River 30
Deep Wells 60
Total 1,135ml/d

2) Metropolitan Water and Sewerage System, in charge of water supply to Metro Manila and 10 cities and villages such Antipolo, accounting for a total areas of 148,000 hectares.

Table 3.9.2 Metro Manila Water Use

	Domestic	Commercial	Industrial	Total
MWSS Supply	559	338	70	1,017
Private Ground Water Supply	286	90	344	720
Total Supply	895	478	414	1,737

Source: Manila Water Supply III, MWSS, 1983

(2) Metropolitan Water Resources Development Plans (MWSP II, III)

As indicated above, of the total water demand in the Manila metropolitan area the MWSS at present supplies no more than 54%.

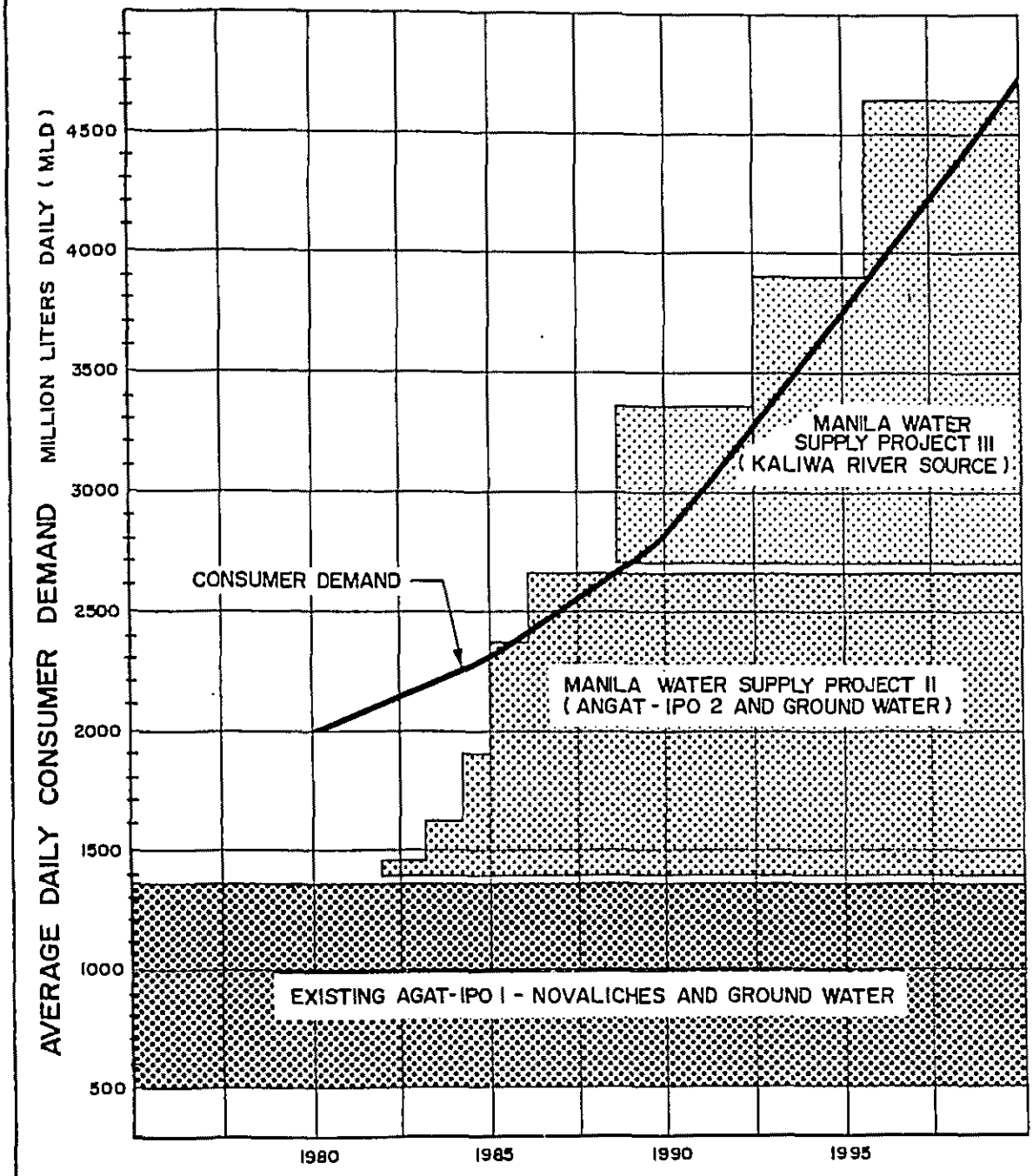
As shown in Fig. 3.9.4, the MWSS estimated that the water demand in the Manila metropolitan area (its service area) will more than double by the year 2000 to reach 4,800 ml/day, thereby necessitating large-scale water resource development in order to meet this need.

To cope with the increasing water demand, the MWSS is presently carrying out a vast water resources development program known as the Manila Water Supply Project II (MWSP II) and MWSP III. An outline of these projects is as follows:

(i) MWSP II (Construction perion 1975-1986)

As shown in Table 3.9.3, MWSP II is aimed primarily at expanding the supply capacity of existing facilities. In specific terms, the project calls for the construction of the Ipo 2 Dam (reservoir) upstream from the existing Ipo Dam, improvement of the existing headrace culvert, construction of a new water purification plant, etc. Plans call for these new and improved facilities to enable a supply capacity of 2,500 ml/day by 1986.

Nevertheless, according to demand forecasts of the MWSS, although the water demand in the Metro Manila area will momentarily be met by 1986, the situation shall aggravate thereafter once more.



SOURCE : DEVELOPMENT OF THE MANILA WATERWORKS AND SEWERAGE SYSTEMS , 1983 MWSS

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FIG. 3.9.4 DEMAND CAPACITY CURVES

Table 3.9.3 Project Components of MWSP II

1. Additional 10 Megawatt turbine-generator at Angat Multi-Purpose Dam to provide additional discharge and incidentally increase generated power; extension of Angat Auxilliary Powerhouse.

2. Construction of higher New Ipo Diversion Dam on The Angat River.

3. Concrete lining of one of the two existing Ipo-Bicti tunnels.

4. Construction of new 16 km. Bicti-Novaliches Aqueduck (No. 4) and extension of this aqueduct to the La Mesa Water Treatment Plant.

5. Construction of the New La Mesa Water Treatment Plant in the vicinity of the existing La Meas Dam.

6. Construction of a treated water aqueduct from La Mesa Water Treatment Plant to Bagbag.

7. Construction of a service reservoir at Bagbag.

8. Distribution system.

   - 216 kms. of primary distribution mains from 3,000 to 300 mm in diameter.

   - New water mains in approximately 200 areas of the service area totalling:

     ° 502 kms. of secondary distribution mains, from 250 mm to 100 mm in diameter

     ° 793 kms. of tertiary distribution mains, from 75 to 50 mm in diameter.

     ° Four new reservoirs, three with associated pump stations.

     ° Sundry modifications of existing pump stations and reservoirs.

     ° Associated distribution system items, including 3,000 fire hydrants, standpipes, 510,000 service connections and about 680,000 new meters.

Source: Development of the Manila Waterworks and Sewerage Systems, 1983, MWSS

(ii) MWSP III (Construction period 1986-1998)

In contrast to MWSP II which is a stopgap measure aimed at temporarily filling demand, MWSP III is planned as Manila metropolitan area through the development of new water resources.

Based on the results of studies performed by the MWSS over the past several year, of all potential water resources for the Manila metropolitan area the one judged most appropriate is the Kaliwa water system, i.e. the upstream area of the Agos River which flows into Infanta. At present, the detailed designs for this project have already been completed and construction access roads are being prepared.

The main components of the project are the Laiban Dam (main reservoir) to be constructed in Tanay in Rizal Province, a hydroelectric power generating plant and water purification plant to be constructed in Pantay, and the headrace culvert with tunnel to connect these various facilities (Table 3.9.4 and 3.9.5, Figs. 3.9.5, 3.9.6).

The planned supply capacity of this system is 22.1m^3/sec (approx. 2,000 ml/day), representing nearly a doubling of capacity after the completion of MWSP II (potential supply capacity: 2,500 ml/day).

MWSP III construction is planned in 4 phases.

According to material released by the MWSS ["Development of the Manila Water Works and Sewerage Systems"] MWSP III also has the potential to function as a future water resource for development of Lungsod Silangan.

Table 3.9.4 Construction Cost of MWSP III (1983)

Phase 1	(1982-1990)	₱1.42B
Phase 2	(1990-1993)	1.96
Phase 3	(1994-1997)	1.53
Phase 4	(1997-1998)	0.67
Total		₱5.58B

Source: Development of the Manila Waterworks and Sewerage System, MWSS, 1983

Table 3.9.5 Project Component of MWSP III (Phase I)

1. 113-meter high concrete-faced rockfill dam
2. Hydropower plant
3. 800 Mld treatment plant
4. Distribution system
   - Primary (100 kms of water mains ranging in sizes from 300 mm to 3,000 mm diameter).
   - Secondary (400 kms of water mains ranging in sizes from 100 mm to 250 mm diameter).
5. One pumping station
6. 120 ML treated water reservoir
7. One service reservoir
8. 170,000 service connections and water meter.

Source: Development of the Manila Waterworks and Sewerage Syste, MWSS, 1983

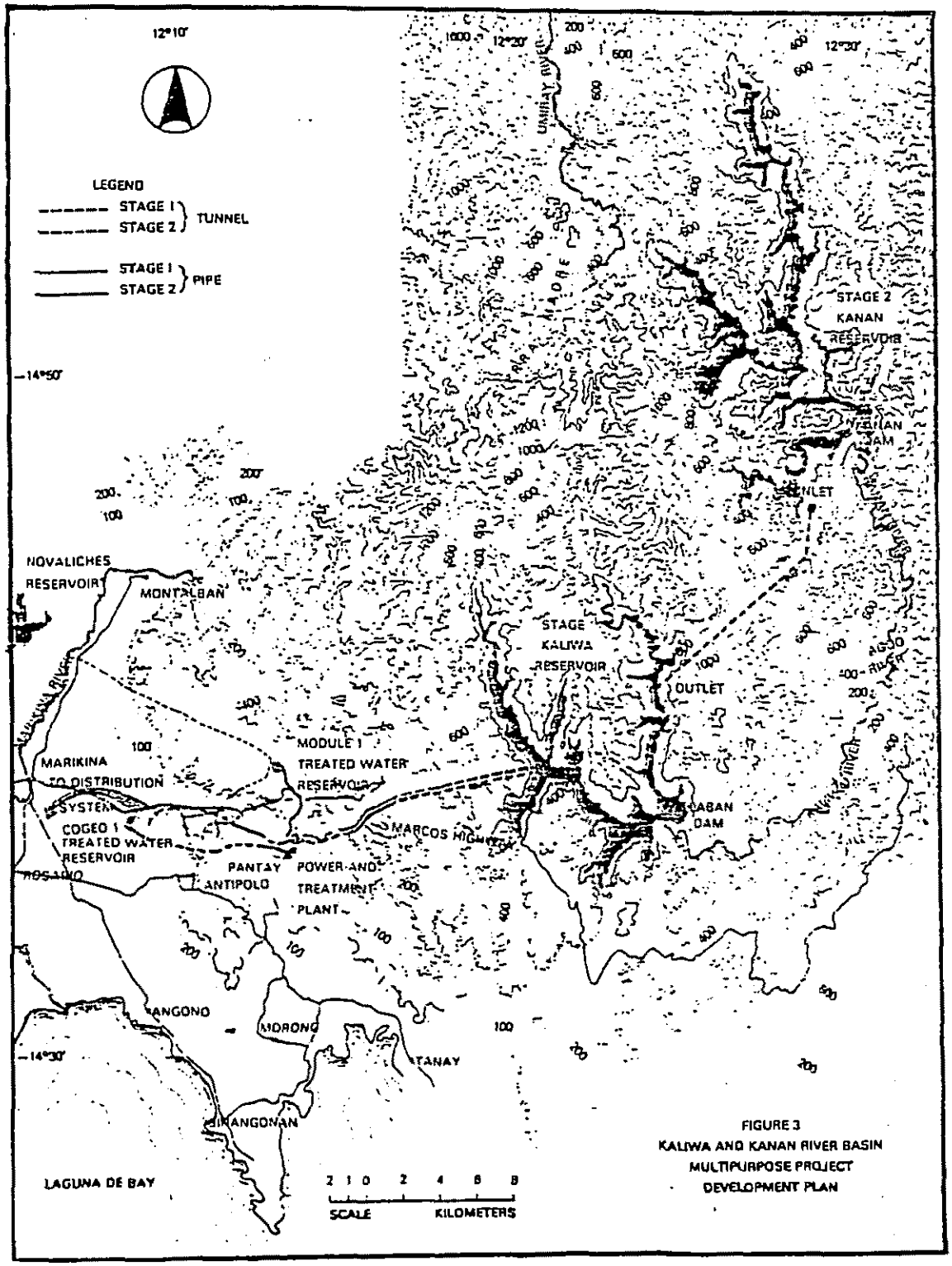
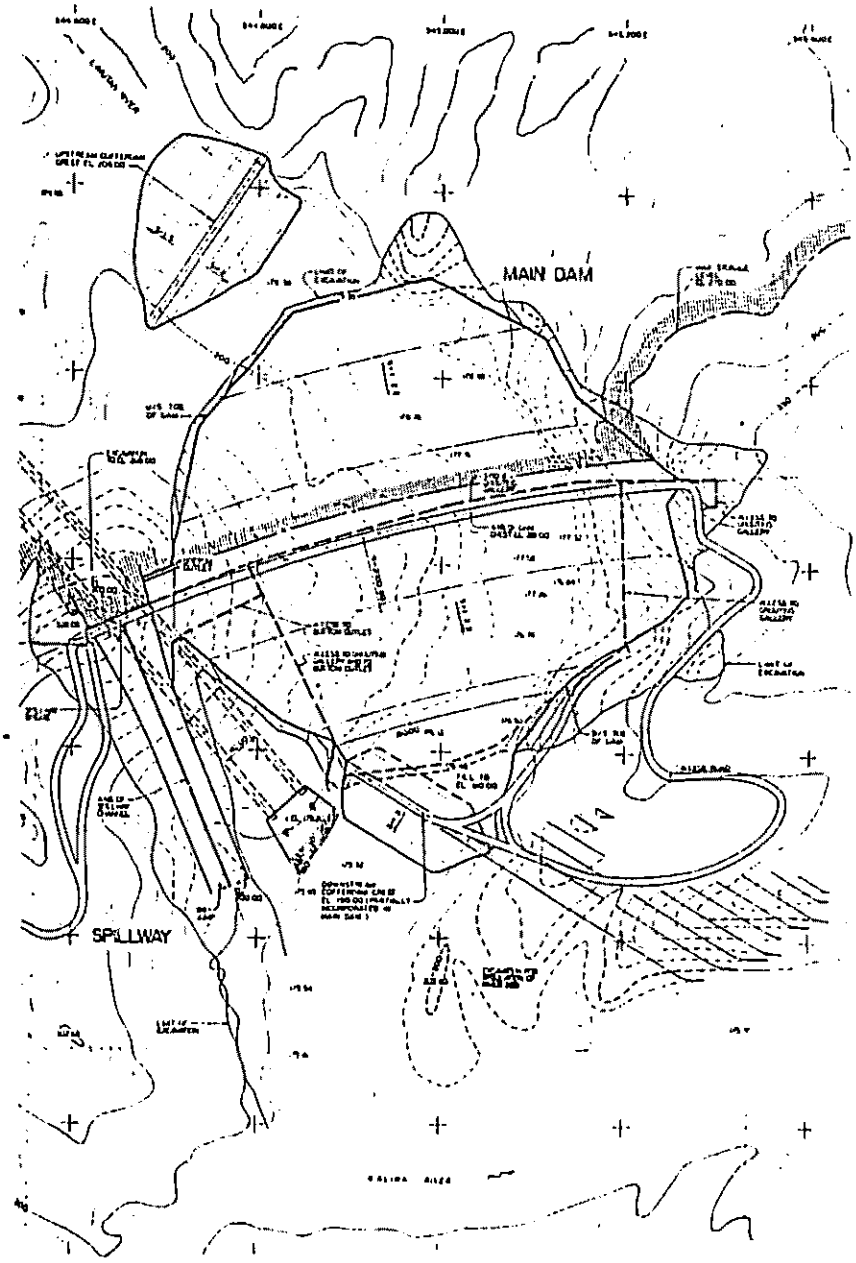


FIG. 3.9.5 MANILA WATER SUPPLY PROJECT III (MWSP III)



SOURCE: HIGHLIGHTS OF THE MANILA WATER SUPPLY PROJECT MWSS

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FIG. 3.9.6 LAIBAN DAM PLAN

3) Current Status and Problems Forecast for the Future

The current status of water resources and the water supply system and problems anticipated in the future may be outlined as follows:

(i) There is still no existing master plan on the regional level regarding the use and management of water resources in the are under discussion (Regions III and IV, particularly the eastern corridor). Only the adjustment and administration of water use rights are being carried out by the National Water Resources Council (NWRC), making it difficult to plan water resource usage comprehensively.

(ii) The organizations in charge of constructing and upkeep of the public water supply system are divided according to the level of maintenance required, which makes it difficult to plan for maintenance of a water supply system integrating both farm villages and urban areas.

(iii) A sharp gap exists between and level of maintenance in the Manila metropolitan area and the eastern corridor.

(iv) Only about 54% of the total demand is being met by the Manila public water supply system (in particular, industries generally rely their own pumped ground water). In order to fill the additional current demand as well as future demand, a large-scale water resources development program is indispensable.

(v) If progress lags in the development of water resources in the Metro Manila area and if regulations are not enacted relating to ground water pumping, environmental problems already in evidence due to excessive pumping of ground water for industrial--- e.g. ground subsidence and contamination of ground water -- shall become even more serious in the future.

(vi) If both the Kaliwa and Kanan water systems were developed as water resources for the Manila metropolitan area, there is a danger that the downstream flow of the Agos River will drop to an extreme degree. In the event that demand for a large supply of water (including irrigatrion water) were to appear in the IRM region in the future, it would be necessary to carry out prior coordination with the MWSS projects.

3.10 Electric Power and Power Supply Systems

1) Present Situation

(1) Outline of Luzon Grid

On Luzon, the home island of the GCLA, an electric power trunk network known as the "Luzon Grid" supplies power primarily over 230kV transmission lines (Fig. 3.10.1).

The network is divided into two parts: the Northern System operating mainly on hydroelectricity and meeting the needs of Metro Manila, which consumes approximately two-thirds[1] of the power supplied by the Luzon Grid; and the Southern System which operates on geothermal power from Tiwi, etc. Inter-system connection via high-voltage (550kV) transmission lines is also planned, but not currently available (partially under construction).

As shown in Table 3.10.1, the maximum output of power generation facilities in the Luzon Grid is as follows: hydroelectricity 541 MW[2], geothermal power 220 MW 97%), and petro-thermal power 2,230 MW (75%). Dependence on petroleum is extremely high.

Note: 1) Luzon Extra High Voltage Transmission System Development Project, Feasibility Study Report, 1981, JICA.

2) in 1982

$$\frac{\text{Meralco Sales}}{\text{Luzon Grid Total Sales}} = \frac{8{,}523 \text{ mil. kwh}}{13{,}125 \text{ mil.kwh}} = 0.649 \ (64.9\%)$$

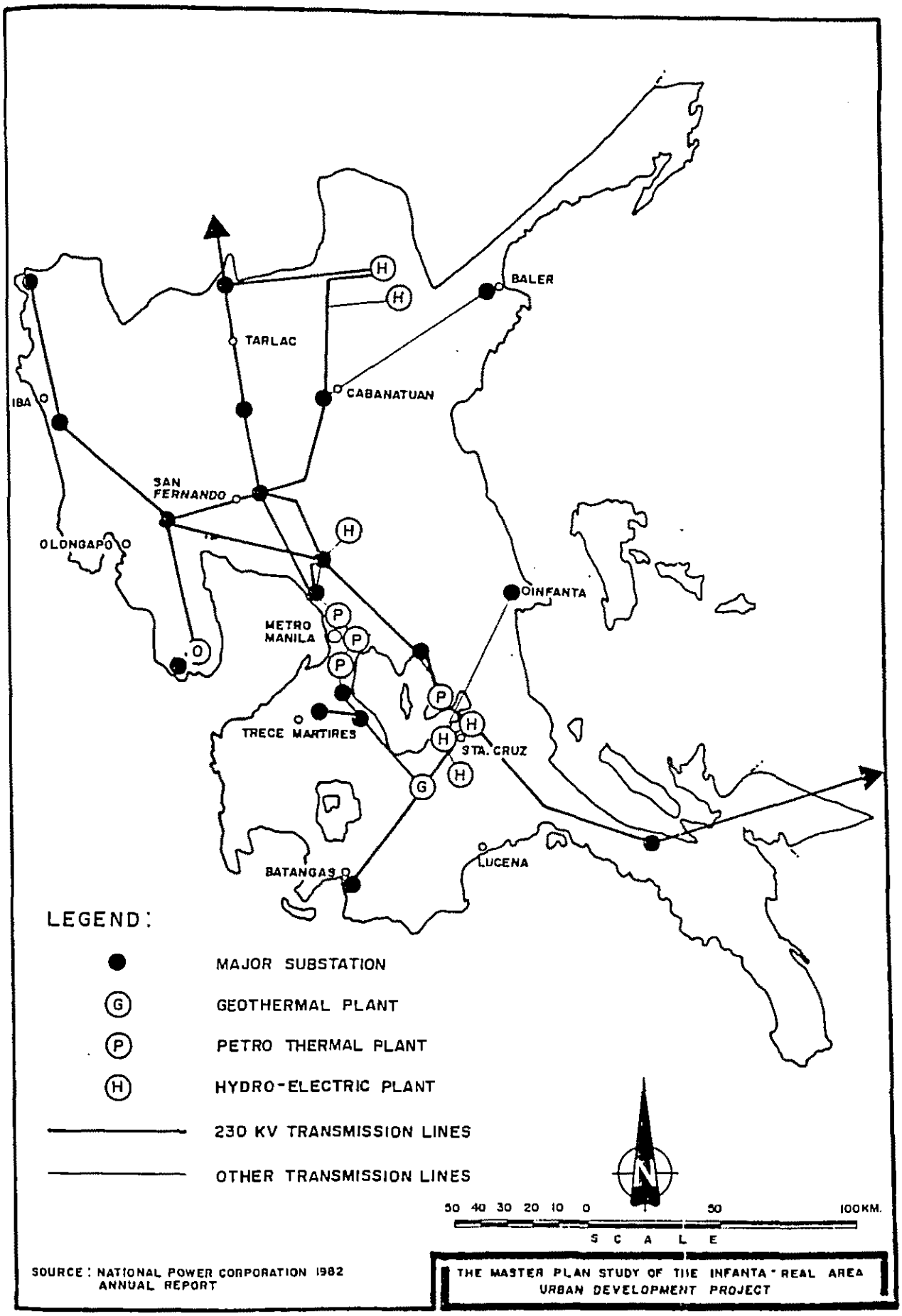

FIG. 3.10.1 LUZON POWER GRID

Table 3.10.1 Existing Power Stations in the Luzon Grid (as of the end of 1979)

Name of Plant	Installed Capacity (MW)			Dependable Capacity (MW)	Energy Capability (GWH)
	Hydro	Geothermal	Oil-fired Thermal		
HYDRO					
Ambuklao	75			50.9	459
Binga	100			85.1	610
Angat	218			150	505
Pantabangan	100			67	224
Caliraya	32			32	192
Botocan	16			15	60
Sub-total	541			400	2,050
THERMAL					
Bataan 1			75	72	473
Bataan 2			150	143	940
Malaya 1			300	290	1,905
Snyder 1			200	190	1,248
Snyder 2			300	290	1,905
Gardner 1			150	140	920
Gardner 2			200	180	1,182
Tegen 1			100	190	624
Tegen 2			100		624
Rockwell (1-5)			125	75	574
Rockwell (6-8)			180	150	985
Malaya 2			350	340	2,491
Sub-total			2,230	2,060	13,871
GEOTHERMAL					
Tiwi 1 & 2		100		100	959
Mak-Ban 1 & 2		100		100	
Sub-total		200		200	959
Total	541	200	2,230	2,660	16,880

Source: Luzon Extra High Voltage Transmission System Development Project Feasibility Study, JICA, 1981

The supply-demand balance in the Luzon Grid in 1979 showed a stable supply output of 2,660 MW versus a peak load of 1,960 MW. In other words, a reserve power of 700 MW (26%) was available, so that the demand is presently being met within the grid system.

However, the thermal power facilities of Rockwell, Tagen, etc. outside Manila, which serve as the prime sources of power for the Manila metropolitan area, are sorely deteriorating. Also, in recent years the Philippine Government has formulated a basic policy aimed at suspending or terminating petro-thermal power owing to higher oil prices, pollution control regulations, etc. As a result, a tightening in the supply and demand situation is forecast for the near future, depending on the progress made in developing electric power sources in the next few years.[3)]

The power consumption ratio for each sector in the Luzon Grid is as follows: industrial 46%, domestic 18.8%, commercial 23.4%, utilities 11.8% (Table3.10.2).

Note: 3) Luzon Exta High Voltage Transmission System Development Project, Study bReport, 1980, JICA.

Table 3.10.2 Power Consumption Ratio in the Luzon Grid

Gross Generation (GWH)	12,010
Residential	2,014
Commercial	2,508
Utilities	1,270
Industries	4,941
Total	10,733
Loss (%)	10.6

Source: Luzon Extra High Voltage Transmission System Development Project Feasibility Study Report, 1981

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(2) Power Distribution

While the rate of electrification in the GCLA -- 79% -- is high compared with the national average of 53% (Table 3.10.3), this is largely attributable to the high rate (93%) seen in the Manila metropolitan area and to the well-maintained First and Second Transmission Systems (Fig. 3.10.1).

All provinces contiguous with the Manila metropolitan area also have electrification rates exceeding 80%. But once the boundaries of this greater perimeter are passed, the rate falls dramatically (Fig. 3.10.2).

Table 3.10.3 The Rate of Electrification in the GCLA

Region	House Connections		%
	Potential	Actual	
Region III	776,000	603,408	78
NCR	1,223,000	1,389,836	93
Region IV	941,000	573,302	61
Total	2,940,000	2,316,546	79

Source: Status of Program Implementations, NEA (December 31, 1982)

Note: 1) Only MERALCO Cooperative

2) The Rate of Electrification = Total Households/Number of Electrified Households

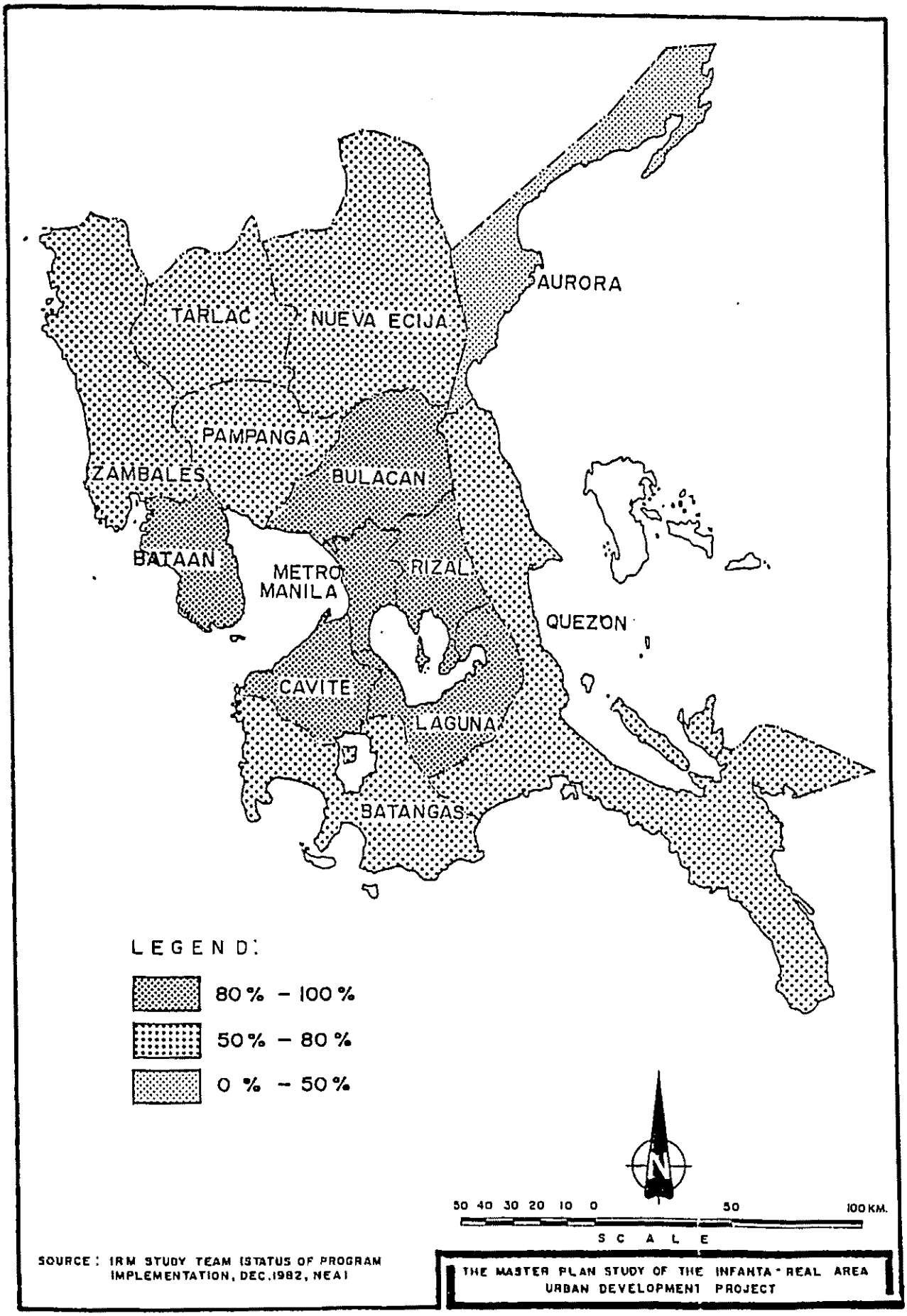


FIG. 3.10.2 PRESENT CONDITION OF ENERGIZATION

2) Existing Plans

(1) Luzon Grid Power Development Project

The National Power Corporation (NPC), which controls the power supply for the entire nation, has implemented a power development project for ten year period from 1981 to 1990.

According to this plan, the NPC has forecasted the growth in power demand within the Luzon Grid 7% per year, based on trends in the decade from 1970 to 1980. As seen in Table 3.10.4 and Figs. 3.10.3 and 3.10.4, in reflection of the government's policy the plan aims to reduce on petro-thermal powe and to place greater emphasis on other energy sources (especially domestic geothermal and hydro power).

According to the NPC, this facilities expansion plan shall be able to meet the kwh demand volume of the Luzon Grid during 1981 to 1980. However, the NPC also forecasts that under the plan a shortfall will result in terms of peak load by the following amounts: 263 MW in 1988, 513 MW in 1989, and 785 MW in 1990 (maximum unit repair and maintenance period).

Table 3.10.4 Luzon Power Grid Generation Expansion Program

Year	Plant Addition	Installed Capapcity (MW)						Dep. Cap.	Peak Demand	Res. Cap.	& Res	Energy Capability and Requirement (GWH)							
		Hydro	Geo Ther	Coal	Nucl.	Oil Ther	Total					Avail-able Energy (GWH)	Hydro	Geo	Coal Ther	Nucl.	Oil Ther	Total	Gene-ration Level	Sur-plus (DEF)
1980	Existing	542	440			2230	3212	2880	2070	470	23	19097	2050	2283			13871	18204	13133	5091
1981	Masiway (1x12)	554	440			2105	3099	2816	2240	236	11	48	2098	3176			13297	18571	13750	4821
82/83	Twi Geo 5 (55)	854	495			1925	3274	3016	2400	276	12	397	2261	3507			13510	19278	15080	4198
82/85	Kalayaan 2 (150)											150								
82/87	Kalayaan 1 (150)											150								
1983	Tiwi Geo 6 (55)	1214	550			1925	3689	3337	2565	432	17	397	2766	3970			13510	20246	16140	4106
83/6	Magat 1-4 (360)											1103								
84/7	Mak-Ban 5-6(360)	1214	660			1925	3799	3437	2745	352	12	794	3501	4367			13510	21378	17240	7028
1985	PNPP 1 (620) Coal Ther 1(300)	1214	660	300	620	1925	4718	4107	2940	767	26	3910 1989	3501	4764	1989	1684	13510	25448	18420	7028
1986	Tiwi Geo 7-8(110) Tongonan 4-5(100) Tongonan6-11(330)	1214	1210	300	620	1925	5269	4657	3145	1062	34	794 794 2382	3501	8734	1989	3639	13510	31373	21030	10343
1987		1214	1210	300	620	1925	5269	4707	3365	842	25		3501	8734	1989	3639	13510	31373	21030	10343
1988	Coal Ther II(300)	1214	1210	600	620	1925	5569	5027	3600	877	24	1989	3501	8734	3978	3856	13510	33579	22475	11104
1989		1214	1210	600	620	1925	5557	5056	3850	616	16		3501	8647	3978	3910	13510	33546	24020	9526
1990	San Roque H.E.	1604	1192	600	620	1925	5941	5339	4120	629	15	1153	4654	8607	3978	3910	13510	34659	25675	8984

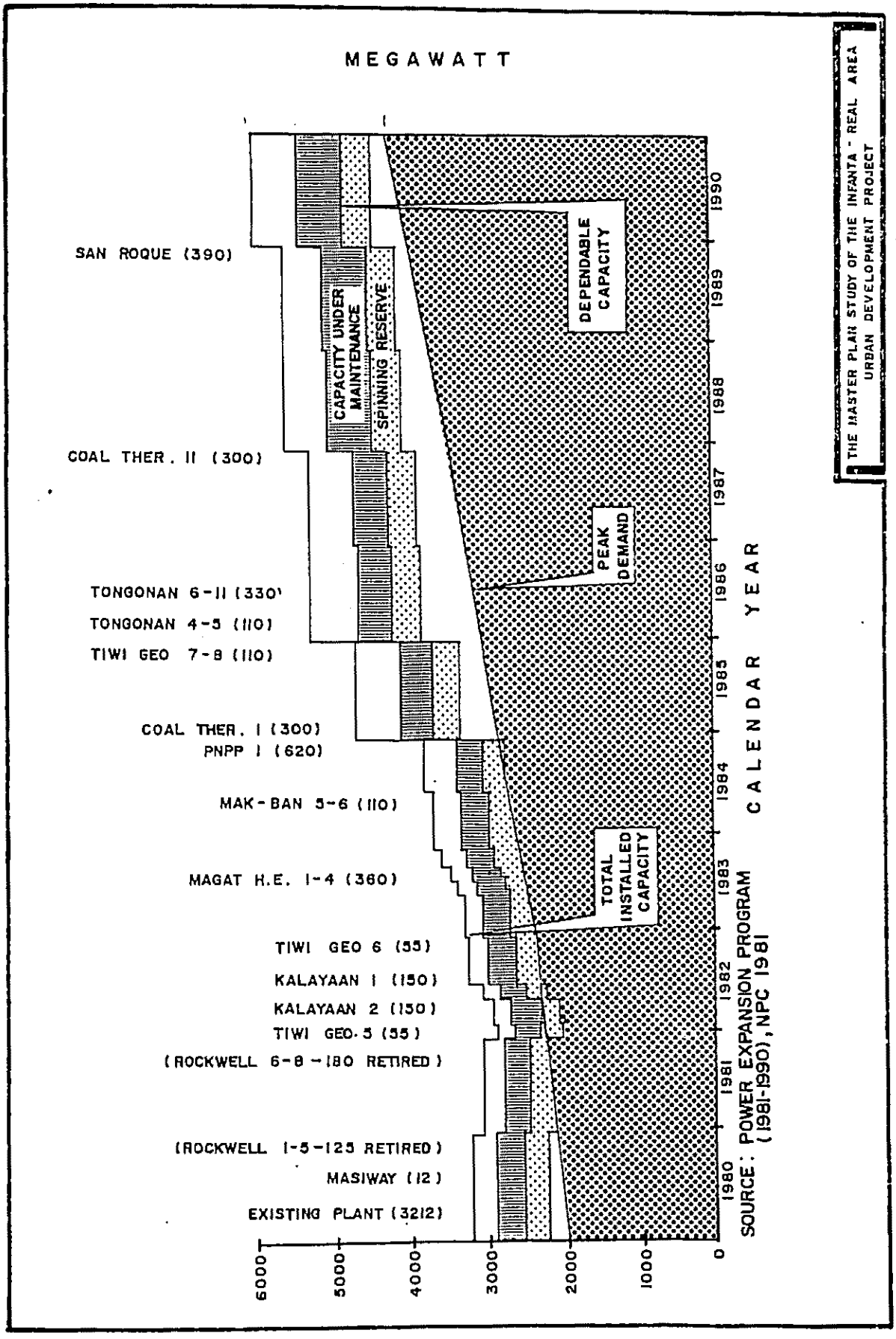


FIG. 3.10.3 LUZON GRID SYSTEM PEAK DEMAND & CAPABILITY CURVE

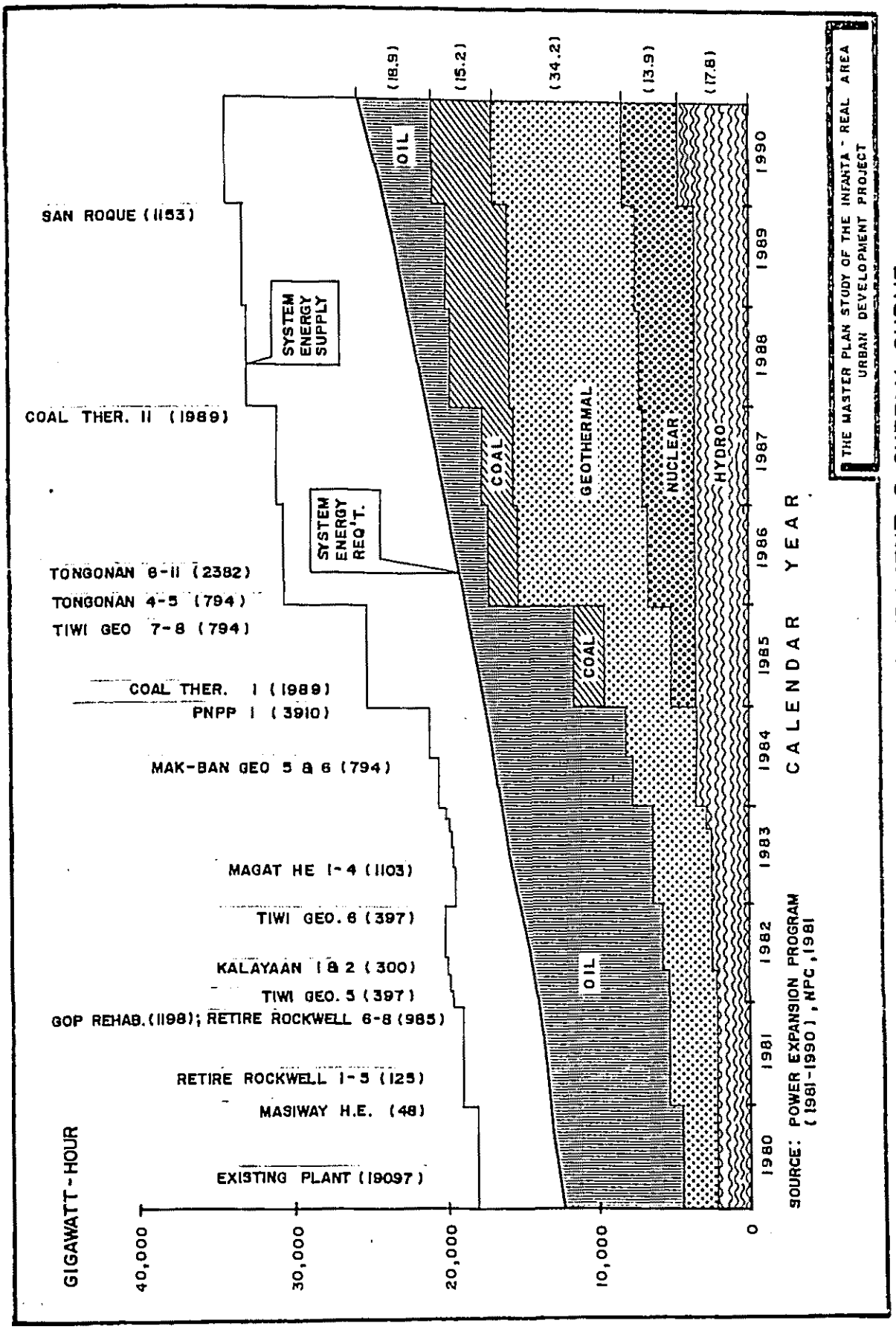


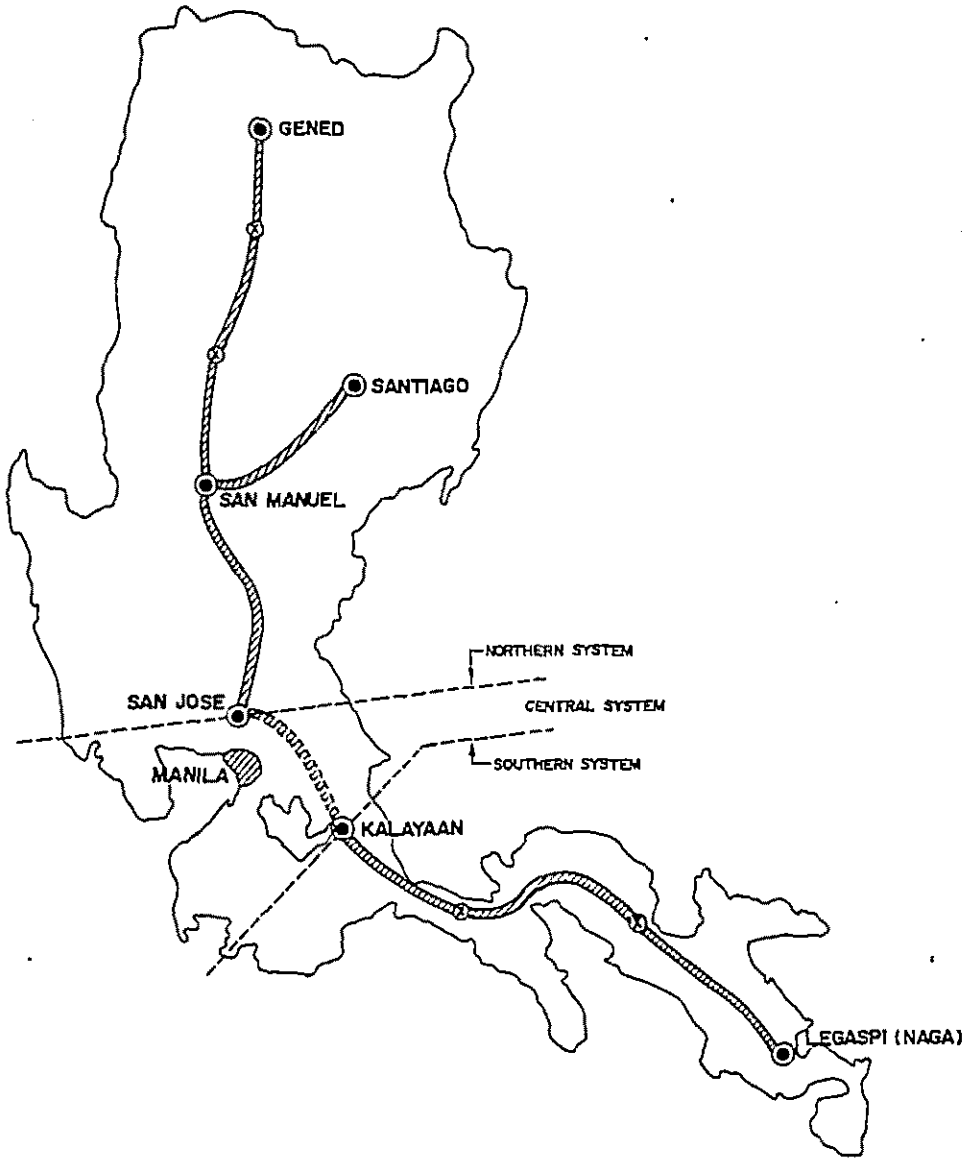
FIG. 3.10.4 LUZON GRID SYSTEM ENERGY REQUIREMENT & SUPPLY CURVE

(2) Extra High-Voltage Transmission Line Construction Project

The core of the power development plan under the execution by the NPC consists of hydroelectirc power in the south (Tiwi). These power facilities are located 300 to 400 km remote from MMA, where demand is highest, and with transmission over 230 kv lines, only a small power capacity can be transmitted owing to the distance involved.

To remedy this situation, the NPC is planning integrate the entire Luzon Grid by connecting the northern and southern systems via 500 kv extra high-voltage transmission lines (Fig. 3.10.5 and Tables 3.10.5 and 3.10.6).

In the southern system (for the final stage of Tiwi geothermal) power generation), construction of 500kv transmission lines between Naga and Kalayaan (245km) and between Kalayaan and San Jose (80km) is currently scheduled for completion by October 1985. However, the construction of extra high-voltage transmission lines for the northern system is not included in the NPC's plans through 1990.



SOURCE: Luzon Extra Voltage Tranmission System Development Proj. Feasibility Study Report, 1980, JICA

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FIG. 3.10.5 OUTLINE OF FUTURE EHV TRANSMISSION SYSTEM

Table 3.10.5 SOUTHERN LUZON EHV TRANSMISSION PROJECT

I. PROJECT HIGHLIGHTS

Name of Project : Southern Luzon EHV Transmission
Location : Southern Luzon
Features : 325 Km Transmission Line
2,100 MVA Transformer Capacity

II. PROJECT COMPONENTS

A. Transmission Lines

	Length (KM)	Voltage (KV)	Cond. (MCM)	Structure & No. of Ckts.
1st stage				
a. Kalayaan-Naga	245	500	4x795	ST/DC
2nd Stage				
a. San Jose-Kalayaan	80	500	4x795	ST/DC

B. Substations

	Rating (MVA)	Voltage (KV)	No. of PCB (KV) 115	230	500
3rd Stage					
a. San Jose	2x300	500/230	-	4	8
	1x300	500/115	2	-	-
b. Kalayaan	1x300	500/230	-	6	8
c. Naga	3x300	500/230	-	9	9

Source: Power Expansion Program (1981-1990) NPC, 1981

Table 3.10.6 Northern Luzon EHV Transmission Project

I. PROJECT HIGHLIGHTS

Name of Project : Northern Luzon EHV Transmission
Location : Northern Luzon
Features : 423 Km. Transmission LIne
1,800 MVA Transformer Capacity

II. PROJECT COMPONENTS

A. Transmission Lines

	Length (KM)	Voltage (KV)	Cond. (MCM)	Structure & No. of Ckts.
Gened-Solano-San Jose	423	500	4X795	ST/DC

B. Sub-stations

	Rating (MVA)	Voltage (KV)	No. of PCB (KC) 115	230	500
Gened	-	-	-	-	3
Solano	2X300	500/230	-	-	9
San Jose	1X300	500/230	-	1	3
	1X300	500/115	1	-	3
Kalayaan	1X300	500/230	-	-	1

III. ESTIMATED COSTS (In Thousand)

	FOREX (U.S. $)	LOCAL (Phil. P)
Direct Cost	172,892	825,504
Administration	-	53,055
Sub-total	172,892	878,599
Engineering	13,795	55,707
Sub-total	186,687	934,266
Physical Contingency	9,334	140,140
Construction Cost	196,021	1,074,406

Source: Power Expansion Program (1981-1990), NPC, 1981

3.11 Telecommunications Systems

1) Outline of Wide-Area Telecommunication Network

Four microwave transmission routes exist independently within the GCLA [BUTEL (state), PLDT (private), PT&T (private), RCPI (private), and each has transmission branches varying according to VHF, etc. (Fig. 3.11.1). As the Figre shows, these branches are developed the north-south directions, in accordance with urban development itself. Almost no route is available to the east.

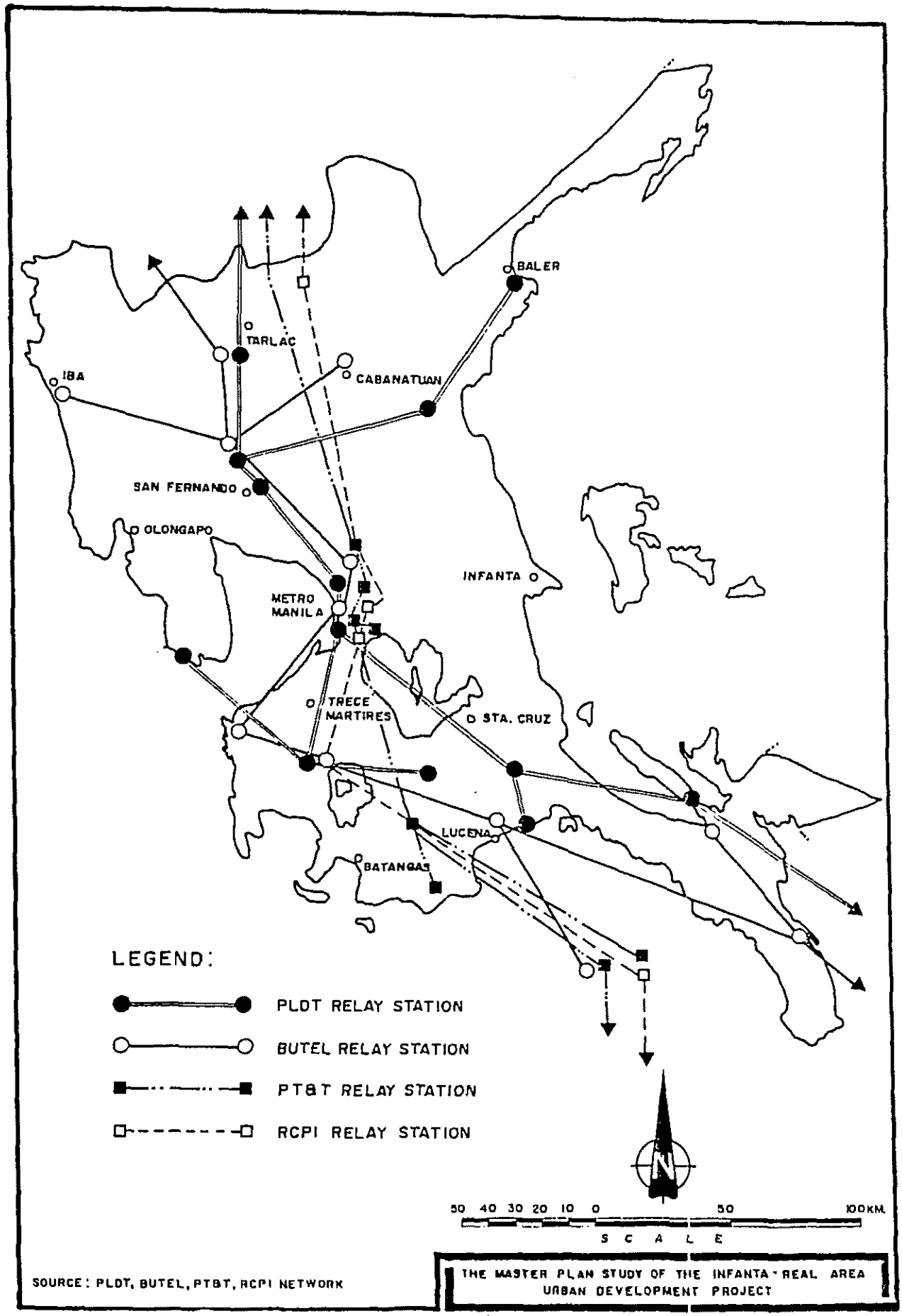

FIG. 3.11.1 MAJOR TELECOMMUNICATION NETWORKS

2) Current Services

(1) Telephone

As of June 1979 there were approximately 629,000 telephone sets in the Philippines. This averages to 1.3 sets per 100 persons. Telephones are most prevalent in urban areas where private companies hold franchises, with the greatest concentration being in Metro Manila, which has approximately 454,000, or some 72%, of the national total.

As shown in Fig. 3.11.2 telephone service in the GCLA is unevenly distributed in the profitable urban areas. Cities and villages receiving service in Region III account for only 33%, in Region IV for only 20% of the total numbers. When Metro Manila is discounted, the rate of telephone distribution for the GCLA is 25% (0.34 sets per 100 persons). In general, telephone service is available only in the street areas calles "poblacion" in the major urban areas; no service is presently available in agricultural or mountain areas.

In addition, owing to the overall tendency toward small capitalization due to the relatively small size of the servicing companies, facilities are deterioration. As a result, the poor state of connections between these facilities and the transmission routes is causing a reduction in the quality of service available outside the cities.

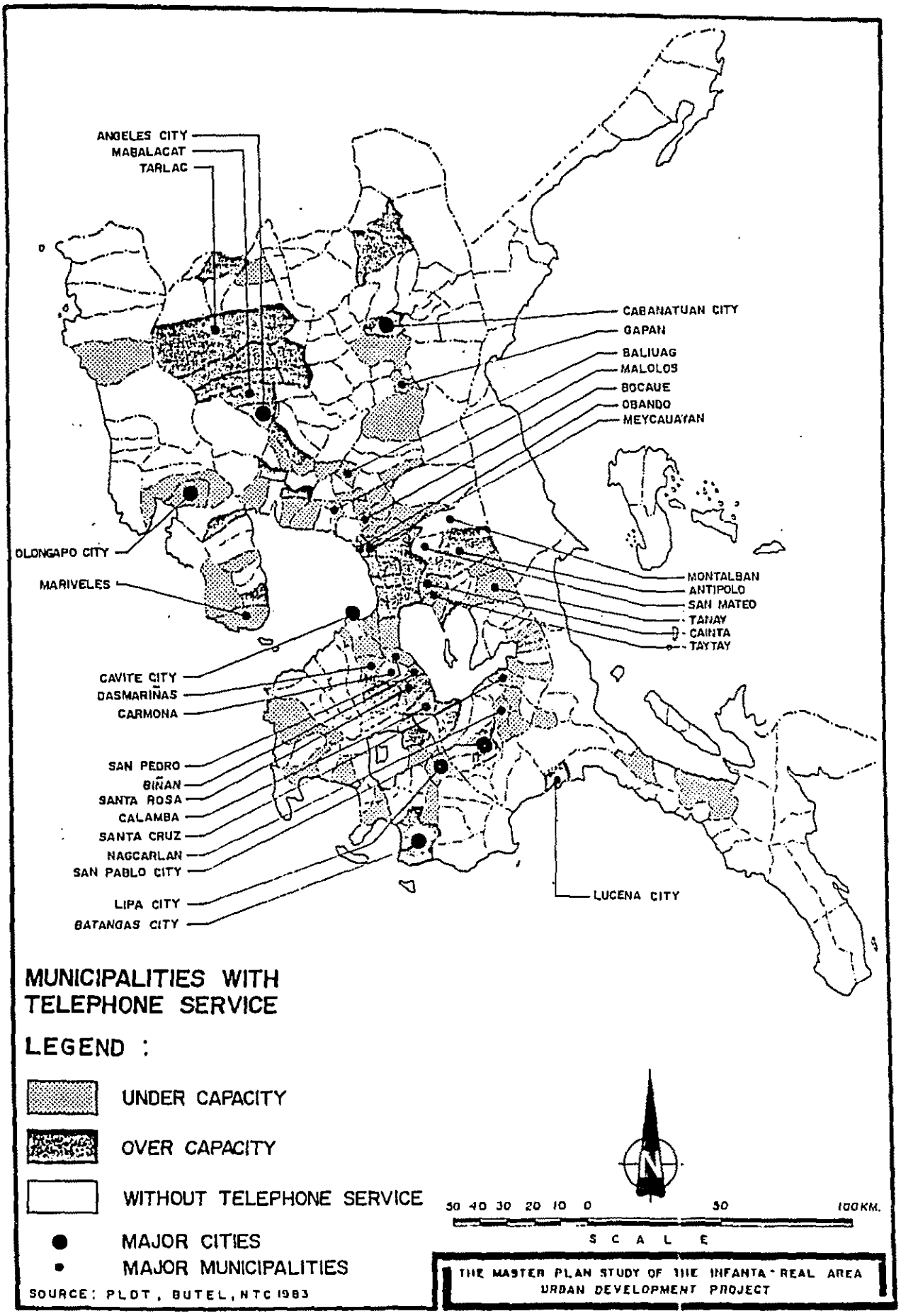

FIG. 3.11.2 TELEPHONE SERVICE AREAS

(2) Telegram

The number of telegrams sent nationwide in the Philippines each year averages approximately 41.9 million (statistics for 1977), or 1 telegram per person. Compared with Japan and other nations, this figure is extremely high, which is the result of the low rate of telephone distribution and to long waiting times involved when placing long-distance phone calls, all of which require waiting for the call to be put through.

The number of telegraph offices located in each province in the GCLA are as shown in Table 3.11.1. Among these, the main telegraph offices with a high "traffic rate" are connected with the telex switching system of the Manila Exchange, and VHF transmission and receipt of all public telegrams nationwide are performed in this way. Small, local telegraph offices with lesser traffic relay Morse Code transmission. (Fig. 3.11.3)

Table 3.11.1 Number of Telegraph Offices in Region III and IV (1979)

Region	Province	BUTEL	Private	Total
III	Bataan	14	4	18
	Bulacan	25	4	29
	Nueva Ecija	32	6	38
	Pampanga	21	7	28
	Tarlac	16	5	21
	Zambales	14	9	23
	Sub-total	122	35	157
IV	Batangas	33	7	40
	Cavite	22	5	27
	Laguna	31	9	40
	Marinduque	5	3	8
	Occ. Mindoro	13	2	15
	Or. Mindoro	14	6	20
	Palawan	18	8	26
	Quezon	44	10	54
	Rizal	17	0	17
	Romblon	16	3	19
	Sub-Total	213	53	266
	Total	335	88	423

Source: Preliminary Study on Telecommunication Network Development in Central Luzon, Philippines, JICA, 1980

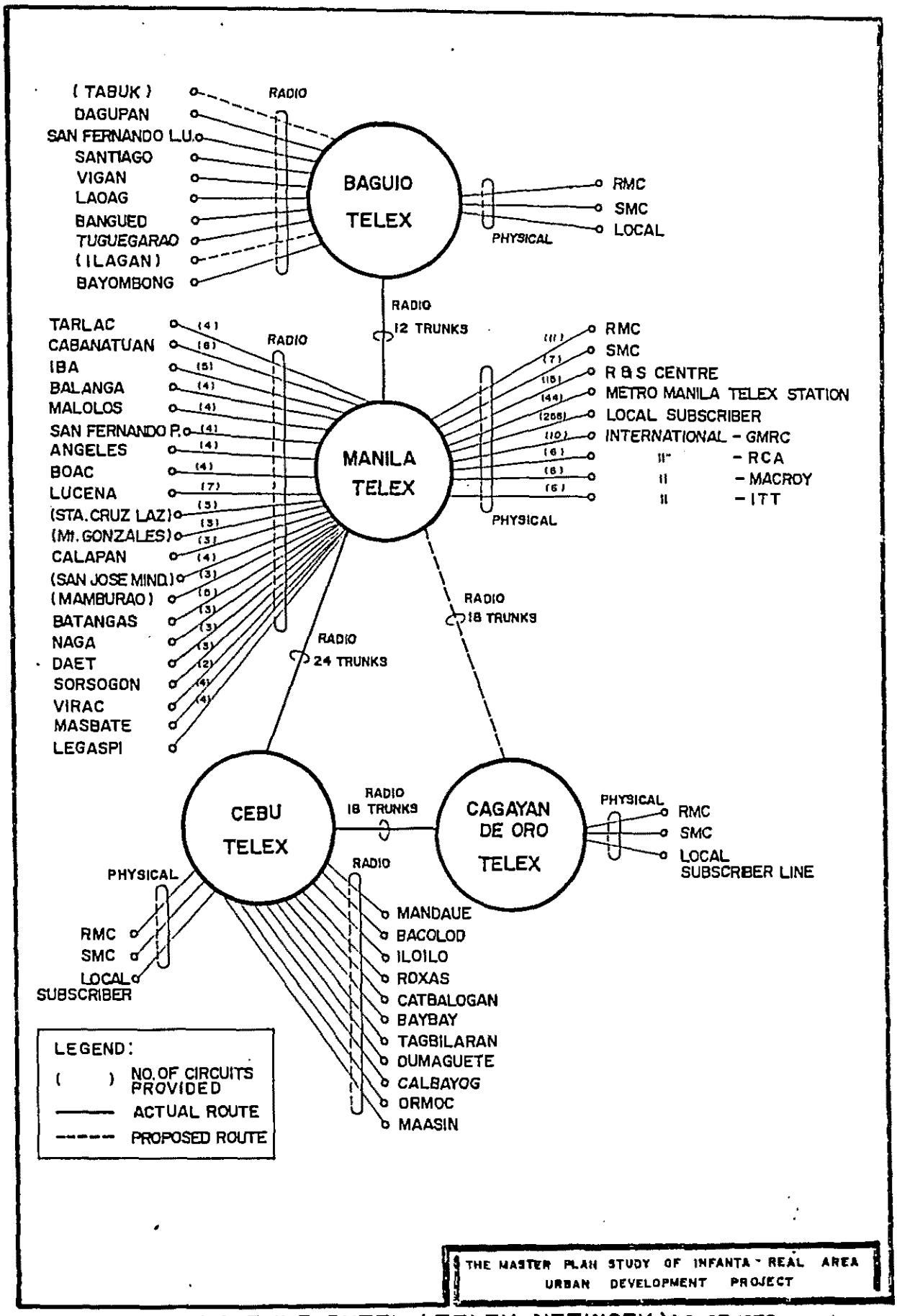

FIG. 3.11.3 BUTEL (TELEX NETWORK) AS OF 1979

3) National and Regional Telecommunication Facilities Improvement Plan

The basic policy on telecommunications in the new National Five-Year Development Plan calls for (i) rationalization of the telecommunications industry through amalgamation (regional and departmental) of the more than 60 existing telecommunication bodies, and (ii) placing the telephone industry completely in the private hands.

As of October 1983, the Philippine Government (Ministry of Transportation and Communication --- MOTC) was in the process of preparing the first phase of this plan, which is to include: (i) a national master plan for improving telecommunications facilities, (ii) a nationwide long-distance trunk transmission route network plan; and (iii) a facilities improvement plan bases on the division of the nation into three parts (northern Luzon, including Regions I and II; central region, including Regions III, IV and V; and the Visaya region, including all other regions).

The basic policy on telephone facilities improvement under the plan calls for an emphasis to be placed on municipalities (key development centers) forecasted to have a telephone demand exceeding 500 lines by 1990.

Measures also seem to be in the works whereby telegraph and telex facilities will be improved primarily by the state telecommunication bureau (BUTEL).

The plan for improving facilities in the central region (Regions III, IV and V) is presently being prepared largely by a Swiss consulting firms, with initial terms calling for the plan to be completed by the end of 1983.

4) Current Status and Problems Forecast for the Future

The current state of Philippines' telecommunication systems and problems expected to arise in the future are described as follows:

(i) Companies providing telecommunications services in the Philippines are divided into a complex variety of both public and private bodies, often of regional scope, and offering services only of a given type (telephone, telex, telegraph). This great complexity serves as an obstruction to the improvement of quality in telecommunication services nationwide (especially poor quality in national long-distance trunk transmission network, inadequate upkeep and maintenance of facilities due to insufficient capital, etc.).

(ii) Due to private ownership, companies providing services are concentrated in the relatively profitable urban areas, especially in Metro Manila. As a result, telephone service is extremely poor especially in the eastern corridor where there is almost no urban area.

(iii) Telephone, telex and telegraph networks all suffer from conspicuous deterioration from age. In addition to being inadequate in capacity, they all serve to lower the quality of telecommunication services (especially inability to make phone contact, poor connection, etc.).

(iv) Because of the basic policy to remove telephone services from the only state-operated telecommunications bureau (BUTEL) and instead place it completely in private hands, it is feared that even worse conditions will prevail in the eastern corridor region -- where the private PLDT already operates -- owing to the lack of profitable urban areas.

(v) In the telecommunications facilities improvement plan for Regions III, IV and V, now being prepared by MOTC, it is necessary to designate IRM as a high-priority region (e.g. as a key development center expected to have a future demand exceeding 500 telephone lines). For this reason, negotiations and cooperation must be undertaken with MOTC.

3.12 Urban Facilities

1) Educational Facilities

An overview of the state of educational facilities in the GCLA shows that a sufficient number of elementary and secondary schools are available to meet the needs of the population. A significant gap exists, however, in the scale of colleges located in the Metro Manila area and those in other regions (Table 3.12.1). With exception of the Manila area, all other regions generally have one college for every 60,000 to 100,000 inhabitants, although there are some minor variations from this pattern.

Fig. 3.12.1 represents a plotting of the scale of population in the municipalities in the GCLA (MMA expected) versus the number of colleges. With only a few exceptions, in municipalities with population of up to 80,000 inhabitants, there are no more than two colleges, In major regional municipalities with population exceeding 80,000, the number of colleges increases.

Table 3.12.1 Number of Educational Facilities and Enrollment (1980-1981)

Region	Elementary (Enrollment)	Secondary (Enrollment)	Tertiary (Coll.) (Enrollment)
NCR	760 Schools (791,761) 1,041 P/School	311 Schools (573,250) 1,843 P/School	190 Schools (523,069) 2,752 P/School
III	2,564 (859,291) 335	432 (303,009) 401	89 (73,411) 824
IV	3,732 (1,035,654) 277	766 (365,387) 477	138 (61,548) 466
Total	7,056 (2,686,706) 380	2,509 (1,241,646) 823	417 (658,028) 1,578

Source: 1982 Philippine Year Book

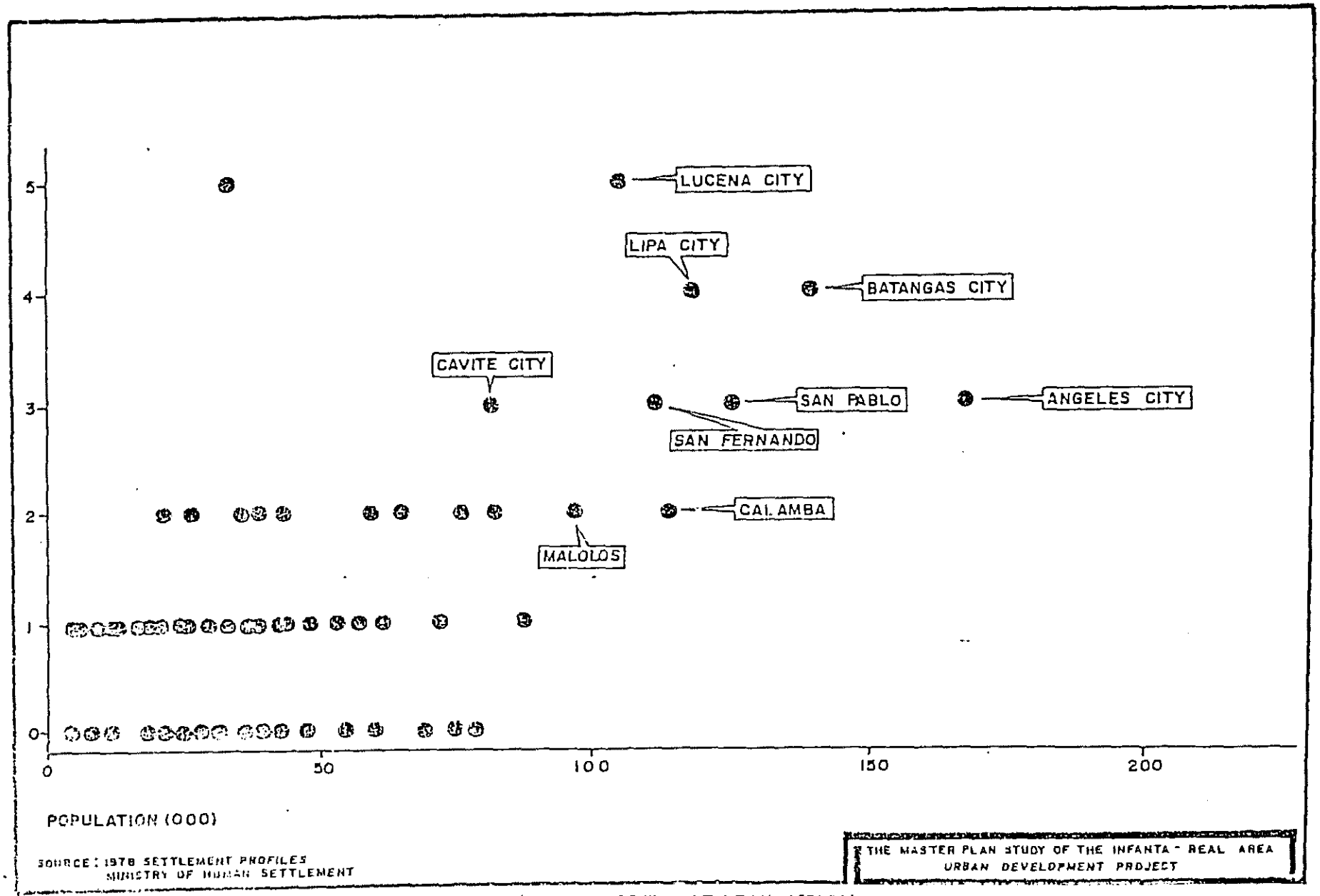

FIG. 3.12.1 COLLEGES / POPULATION

2) Medical Facilities

A similar analysis of the number of medical facilities in the GCLA reveals that one facility is generally available for every population unit of 25,000 to 50,000 inhabitants in each province (average number of hospital beds: 62 -- MMA statistics excluded).

Figs. 3.12.2 and 3.12.3 show the distributions patterns of the number of hospitals and beds, respectively, in each municipality in the GCLA. Batangas City, San Pablo, Lucena City, Lipa City and other main regional centers are better equipped, these figures shown than municipalities in the MMA periphery. (These municipalities near MMA have o far been unable to keep pace in medical facilities with rapid population growth).

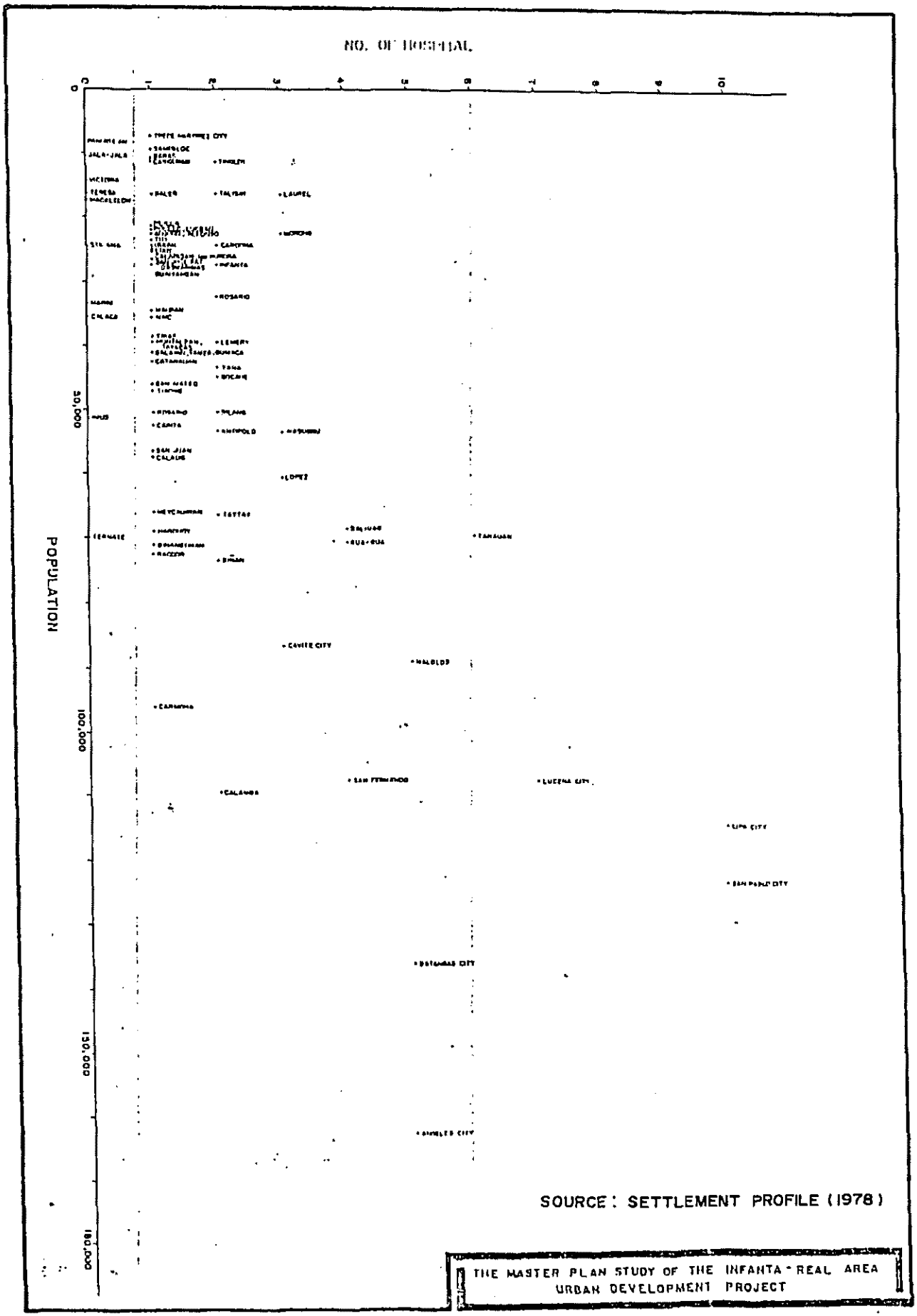

FIG. 3.12.2 POPULATION SIZE & NO. OF HOSPITAL

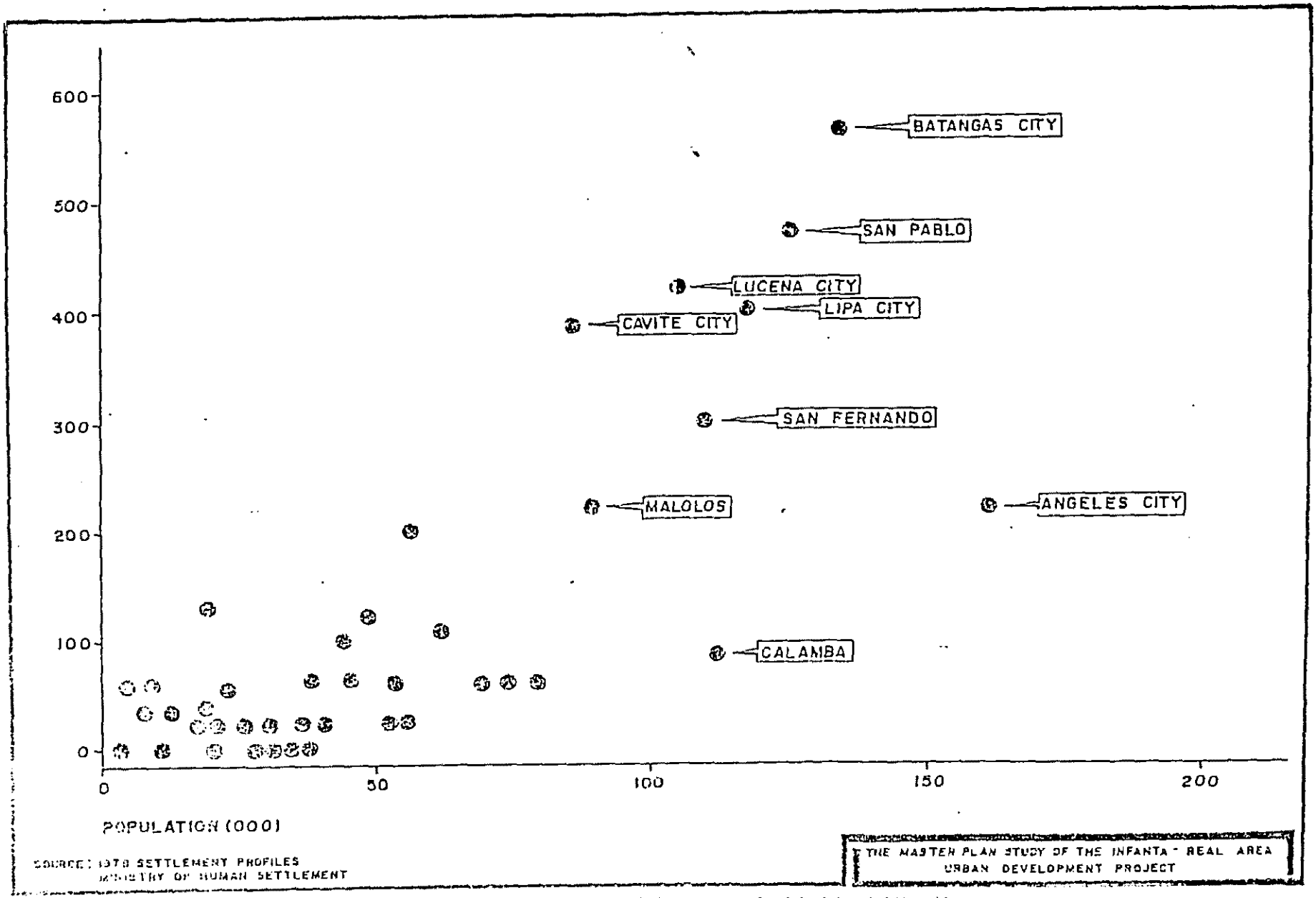

FIG. 3.12.3 MEDICAL FACILITIES (NO. OF BEDS) / POPULATION

4. THREE-PROVINCE DEVELOPMENT AND FORTIFICATION OF THE GCLA'S REGIONAL STRUCTURE

o As indicated in the previous chapter, opopulations and industrial density on Luzon and in the GCLA is heavily concentrated in the western regions -- in the area between Manila and San Fernando and Tarlac in the northern direction, and between Manila and Batangas in the southern direction.

The reason for this uneven distributions, as mentioned earlier, the existence on the western side of Luzon of what may be called the island's only true plain, running in the north-south direction. Through improvement of the land transport system in this region, development has consequently spread in these directions, including the development of urban facilities along this north-south axis.

The current state of development in the GCLA region is marked by a gradual expansion outward along this north-south axis (for example, Bataan Peninsula and Zambales on the west coast in Regions III, and Rizal Province east of Manila and the west coast of Cavite Province in Region IV).

o The relative importance and priority for development and improvement within the underdeveloped regions around Manila (Regions III and IV) in the GCLA are as described below:

(i) Compared with local growth pole development, these regions, unlike other islands or local regions, have a large potential for development (including industry) owing to the fact that land transport facilities are sufficient to take care of their needs, in view of their proximity to Manila.

In spite of their nearness to Manila, these regions still have rich reserves of unused natural resources (e.g., agro-fishery, mining and land resources). Due to the abovementioned ease of development in these regions, their development should be started as early as possible.

(ii) Development of other local regions (growth pole/poll of other islands areas) should be carried out on a long-term basis. During this period, in order to ease the decline in the Philippine economy and industry and to contribute in part ot their ongoing development, development of the unused resources around Manila should be undertaken on full scale in the mid-range view.

(iii) In spite of regulations on industrial movements into Manila, industry continues to concentrate toward the capital. This is due to the ongoing lack of the proper industrial environment in local areas. Accordingly, in regions such as these with relatively favorable industrial potential, development and improvement projects should be undertaken to fill in this gap. For this purpose, restrictions on industrial movement into the Manila area should be strengthened, without brining about a stagnation in the Philippines' industrial output.

o In provinces away from the norrth-south developmental axis centered on the expressways, the importance, priority and potential for development in Rizal, Laguna and Quezon Provinces are as follows: (Note: In Laguna Province although several cities on the west coast of Laguna de Bay are situated along the southern expressway, direct transportation services are not provided throughout the province owing to the physical obstruction caused by the presence of the lake).

(i) The eastern direction from Manila (Rizal and Quezon Provinces) has tradionally been neglected. Nevertheless, this area has a tremendous potential in terms of transportation conditions, and road improvement in this direction can be undertaken on an equivalent par with that already undertaken in the north-south direction (i.e., 2 hours transportation time to Manila). (No undeveloped province elsewhere has equally high potential in this respect).

In eastern part of Laguna Province, Laguna de Bay serves as a physical obstruction. If this obstruction is overcome through road improvement, there is a great potential for development in this area as well.

In these ways, development in this direction can be most effective.

(ii) Natural resources (agro-fishery and mining resources, etc.) in three provinces, particularly in the eastern sector, have not been adequately developed, and it is possible to promote development of industries in these provinces using these untapped resources as a basis.

Quezon Province, in particular, is the only province in the GCLA having a long coastline on the east. Although it is not little developed, great potential exsists for extending development to the east coast along the Pacific.

(iii) Comprehensive development of these three provinces is also possible. The three provinces have cumulative population of approximately 2,765,000 inhabitants, accounting for almost 60% (58.7%) of Region IV (GCLA). Also, through a strong interconnection among the coastal areas (Lucena, East Coast), the inland areas (agro-forestry region of Laguna Province, Santa Cruz), and the dense urban area of Manila and its environs, these three provinces have the potential to form a major economic and industrial sphere within the GCLA. Furthermore, by connecting Manila with the three provincial capitals on a direct axis, it is possible to foster the mutual development and cohesiveness of these regions. With the exception of the north-south axis, no other region has such scale or potential for development, and development of this region should therefore be given the highest priority in order to carryout and promote the ongoing development of the GCLA.

o The development of these three provinces should be promoted as comprehensive growth corridor axis connecting Manila, the inland area and the coastal area, including East Coast development.

In other words, this growth corridor -- like the north-south axis -- should create an interconnected economic and industrial linkage in which mutual effect is had by and on each other region, in terms of development of the coastal and inland areas and improvement of Manila and its environs. In concrete terms, this structure is as represented in Fig. 4.1.

(i) A central line is drawn as a growth corridor linking Manila with the capitals of the three provinces. This lines serves as the axis for the development of these provinces.

(ii) With Manila as the starting point, a dense urban area is formed out to a distance of 30 to 50 km.

(iii) Beyond this distance, in the hilly regions on the north and east coasts of Laguna de Bay and in the plain spreading along the lake's east coast, an agro-forestry region is developed. Santa Cruz, the capital of Laguna Province, is developed into the keystone of this central region and the major relay point with the coastal areas to the east.

(iv) Beyond this area along the axis, ports and cities serving as centers for marine products are situated as the gateway to the sea.

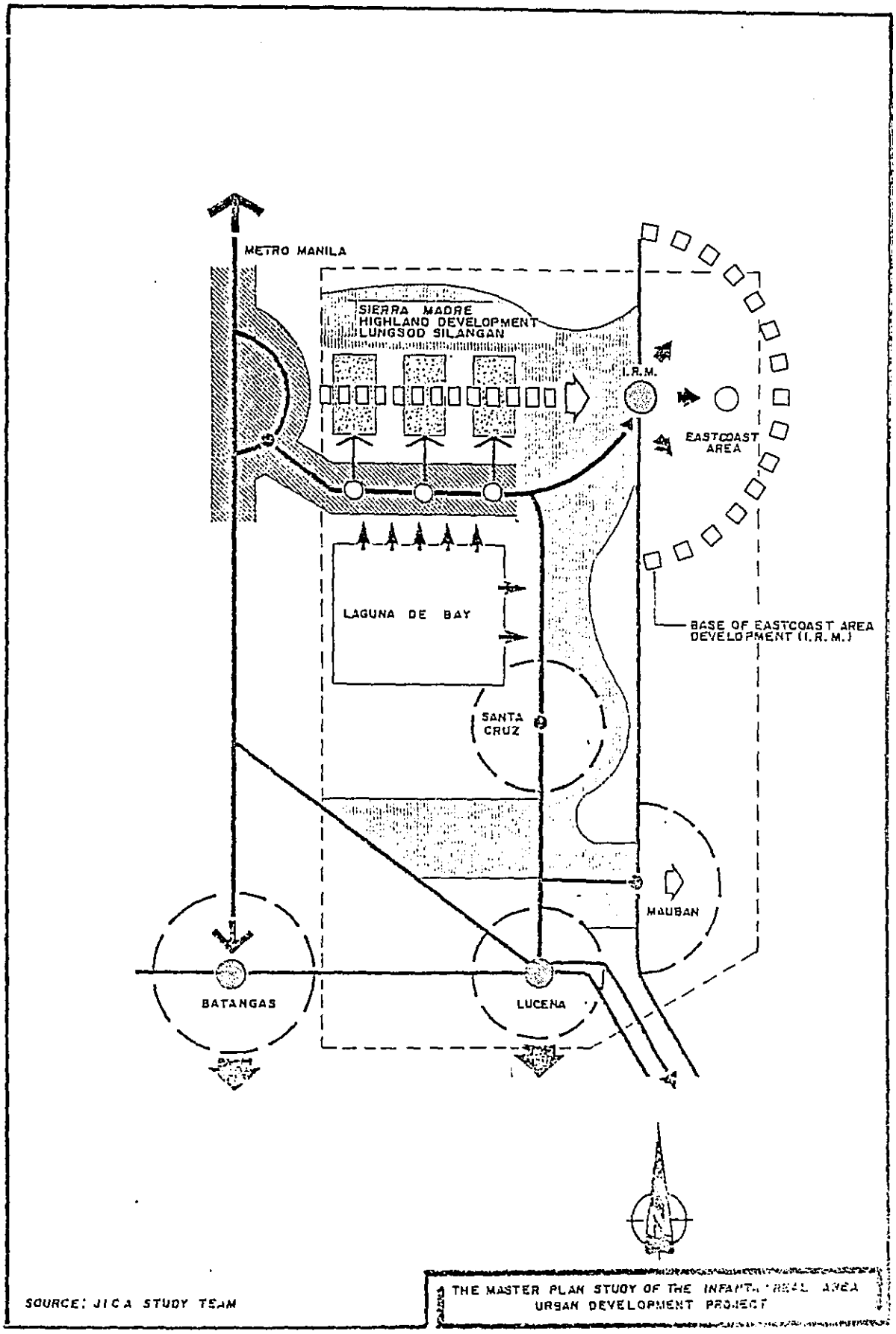

FIG. 4.1 EASTERN CORRIDOR AXIS

One such urban center is the existing city of Lucena. Two others are the IRM region and Mauban to serve as bases of the East Coast region. The latter two cities would share urban functions and form the basis for the development of the East Coast.

The above axis of development for the three eastern provinces would permit the development of a major economic sphere including the East Coast region. Not only would this serve as a basis for the economic expansion of the GCLA, it would permit the creation of a dual structure (Fig. 4.2) comprising the existing growth corridor in the west and the new growth corridor in the east, resulting in a stronger economic structure overall and giving greater elasticity and deversity in terms of industrial siting, distribution of populated areas, transportation, etc.

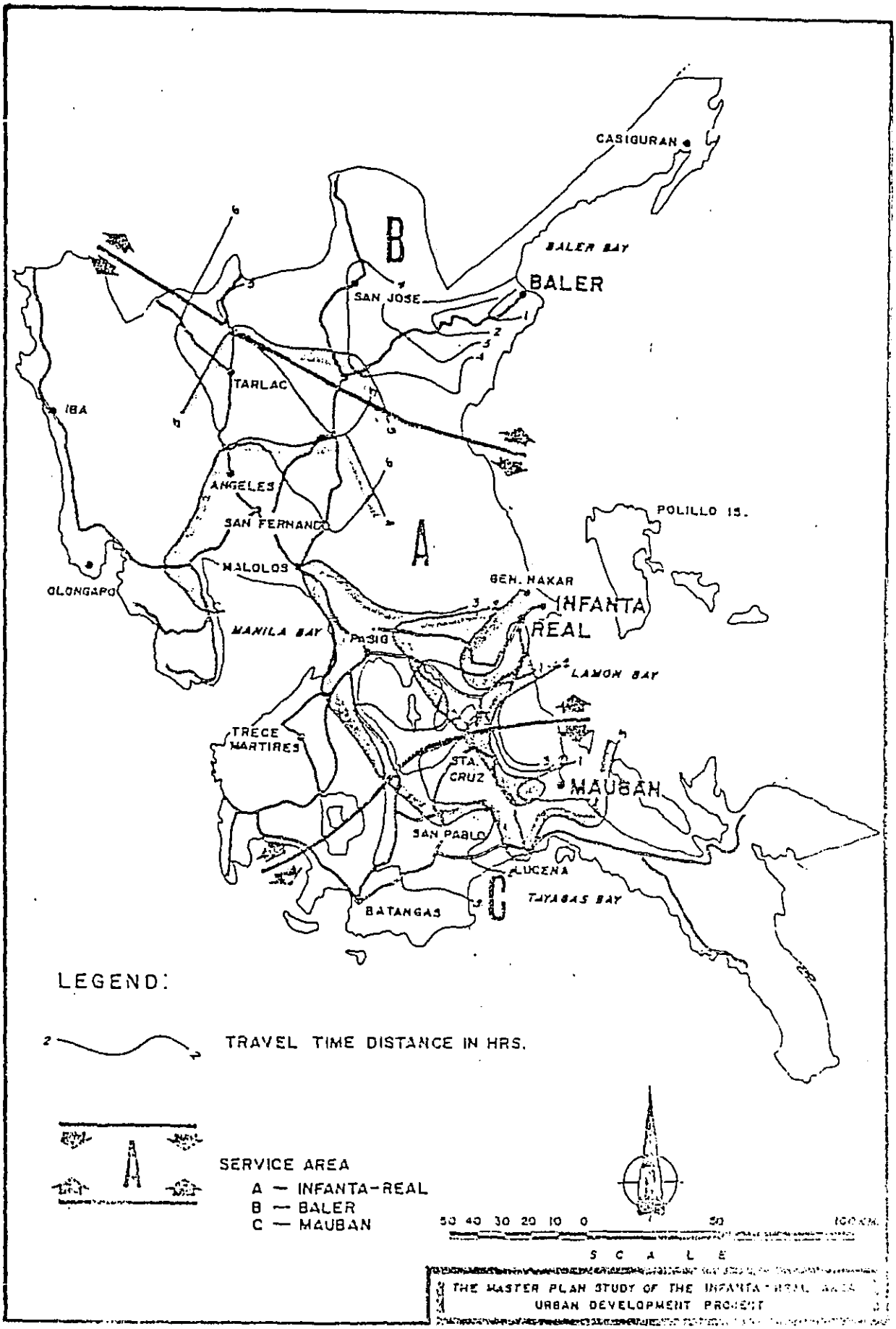

FIG. 4.2 SERVICE AREA OF BALER, INFANTA & MAUBAN

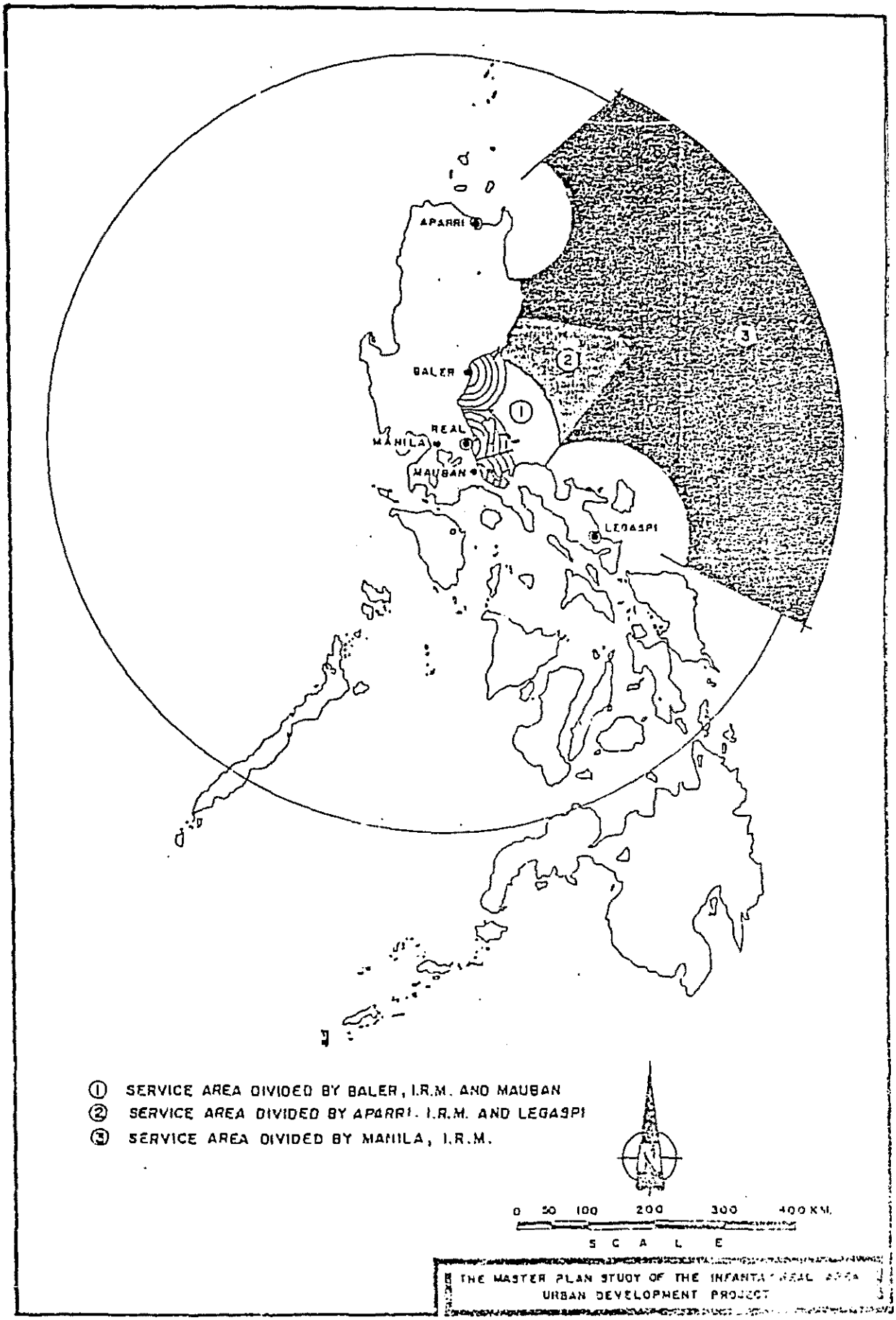

FIG. 4.3 HIERARCHICAL SERVICE AREA OF I.R.M.
BY MARINE TRANSPORTATION