THE REPUBLIC OF THE PHILIPPINES

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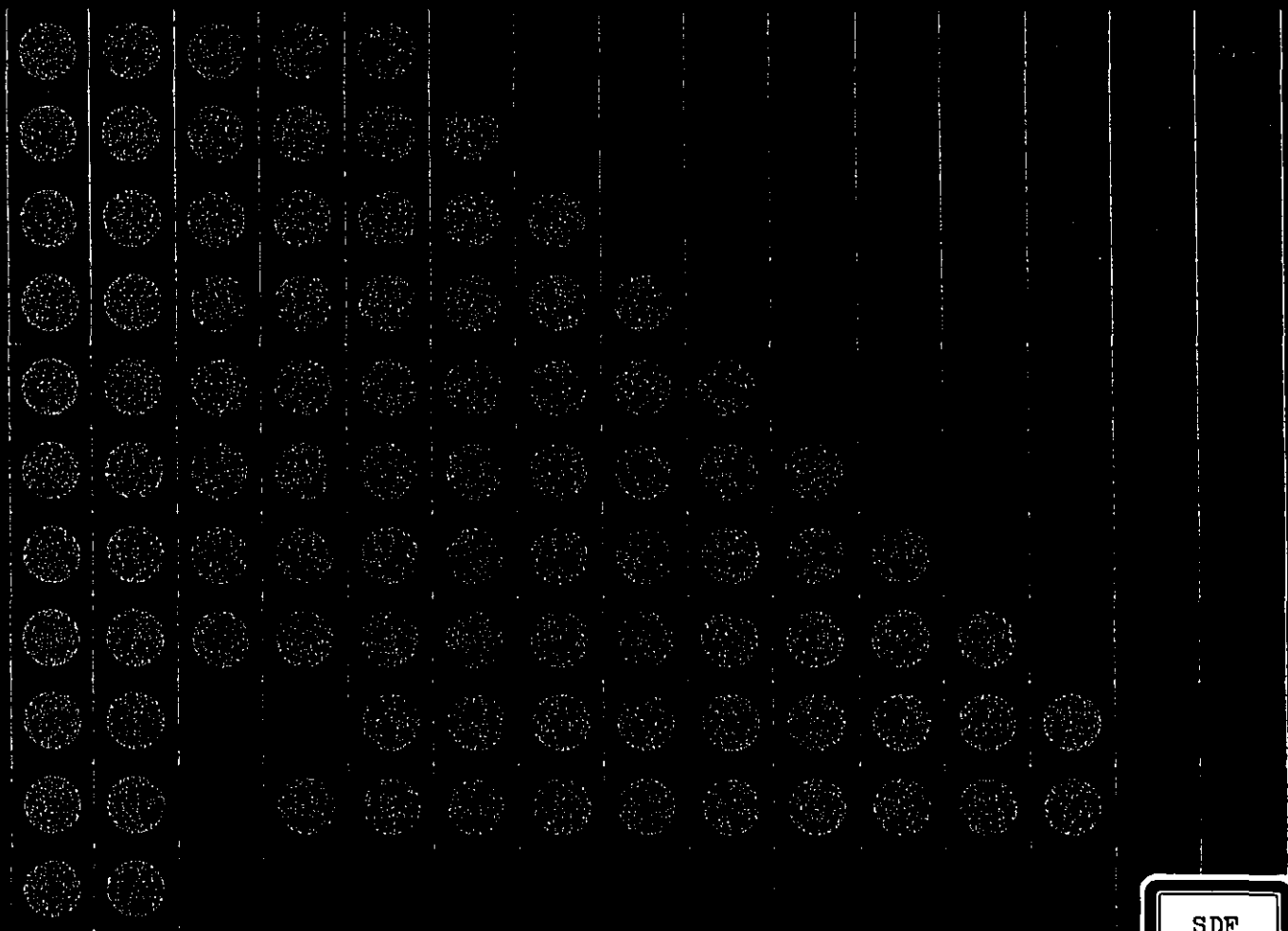
MASTER PLAN STUDY OF THE INFANTA-REAL AREA URBAN DEVELOPMENT PROJECT

TECHNICAL REPORT 2
(INFANTA REAL AREA)



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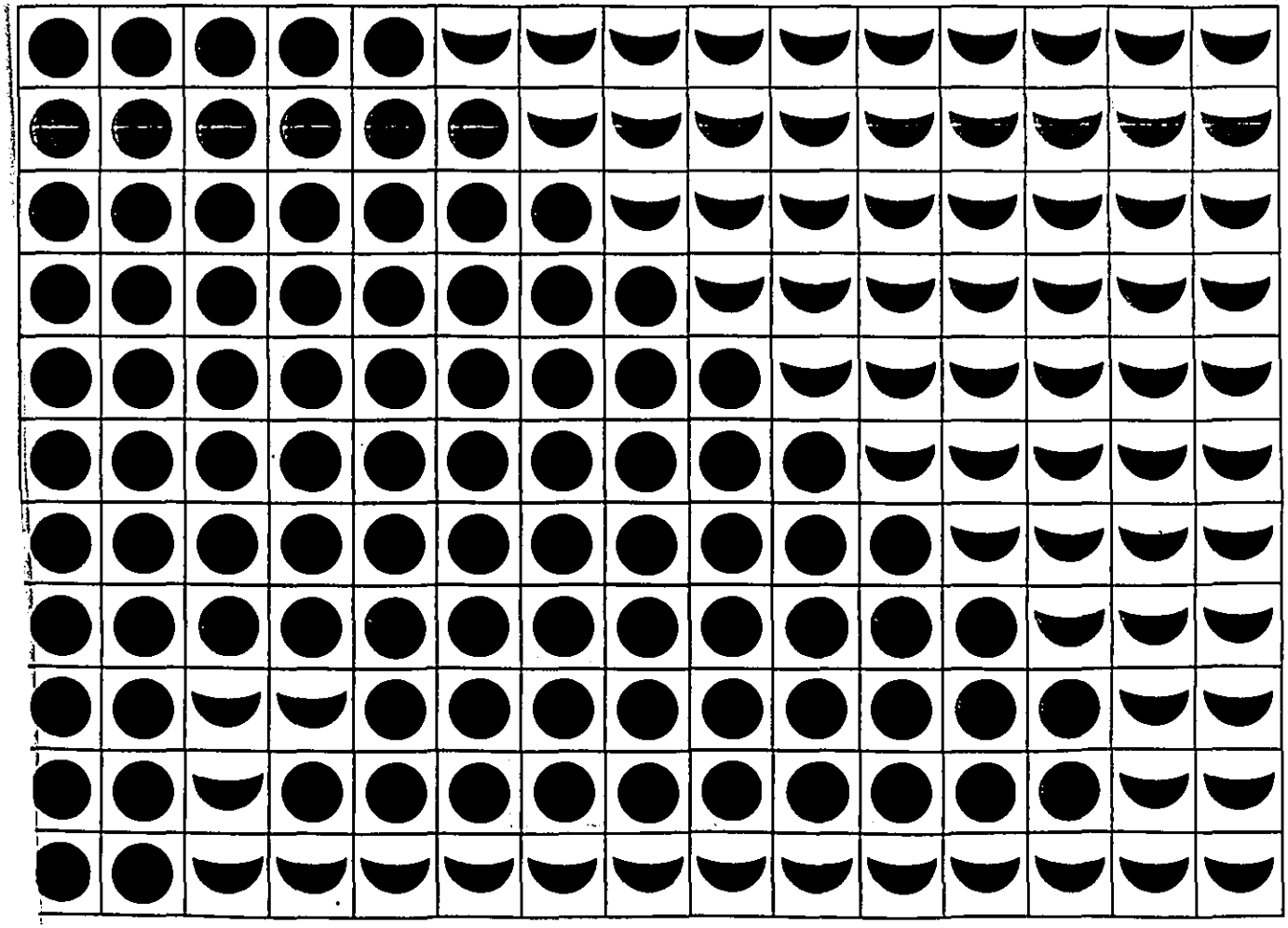
JAPAN INTERNATIONAL COOPERATION AGENCY

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

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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. DEMARKATION OF THE STUDY AREA

The 15270 hectares* area shown in Fig. 1.1 is demarkated as a Study Area for priority development in conformity with the aforementioned targets and development strategies.

It takes into consideration the following points:

(i) Covers all major projects to be implemented in the priority development area with unified characteristics;

(ii) Covers the principal municipalities of the region, such as Infanta, Real and General Nakar;

(iii) All major flatlands of the region are included in the project area for development purposes;

(iv) The hilly districts on the western side are included in the project area as long as they are suited for development.

It would have been convenient to adopt the boundary line of Barangay, as an administrative unit to demarkate the project area. For purposes of the study, the western side of the project area is demarkated at a meridian of 121 degrees and 15 minutes of east longitude because the administrative unit of Barangay is located deeply in the hilly district.

The northern extremity is demarkated by a line at 14 degrees 49 minutes latitude north. Due consideration was given to the potential development of the hilly districts of General Nakar, and the southern extremity is demarkated by a line at 14 degrees 38 minutes latitude north in order to include the village of Real in the project area.

Note: *Tentatively measured on map with scale 1/50000.

The seashore consists of the remaining part of the border line of the IRM area.

At the start of the survey, the area taken into consideration was approximately 13000 ha. based on the approximate demarkation of the Infanta Real Module, but in this study the planned study area has been expanded 15270 hectares in view of the above considerations.

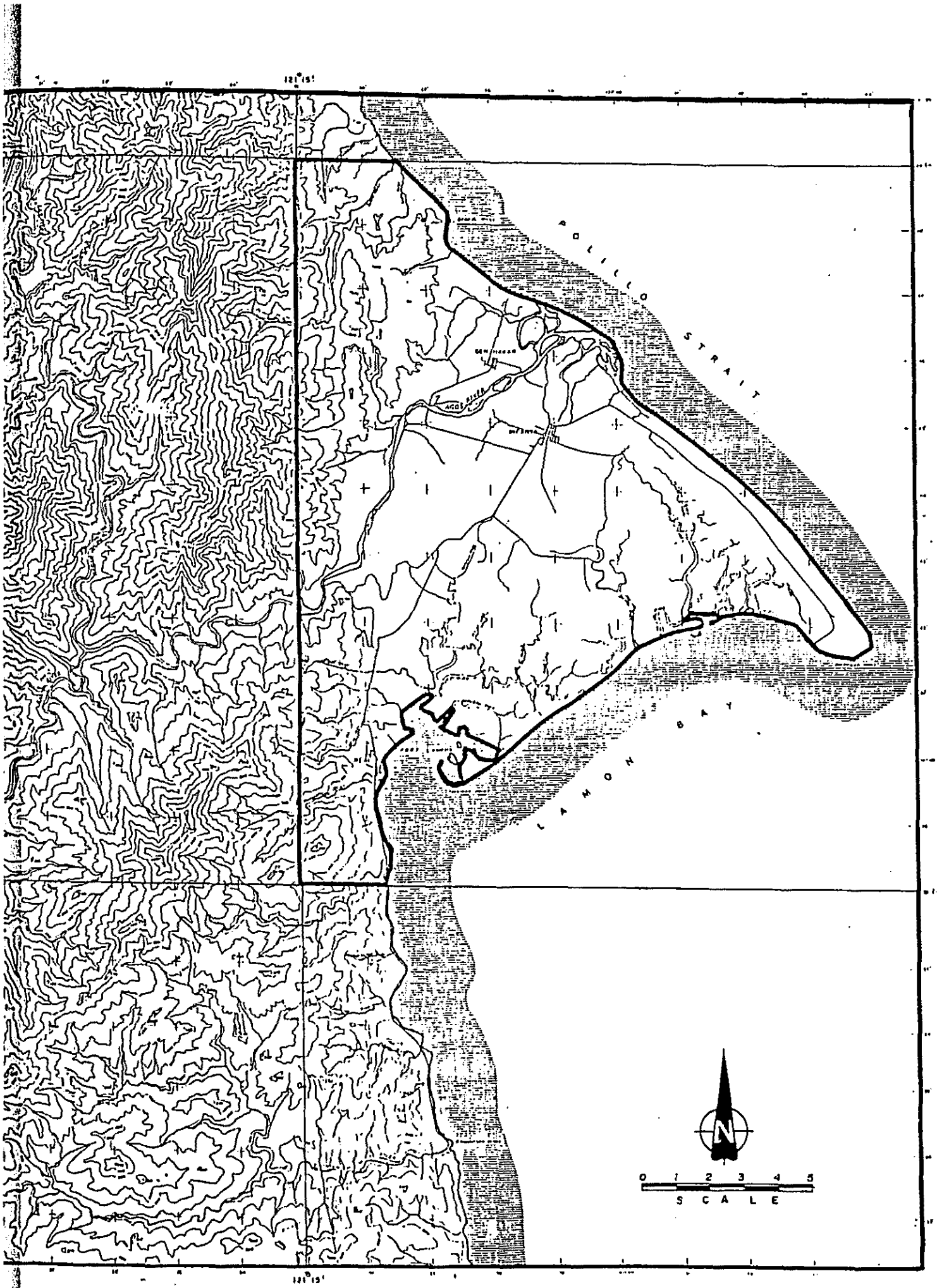


FIG. I.1 BOUNDARY OF PLANNING AREA (I.R.M.)

2. POSITION OF THE IRM AREA WITHIN THE THREE MUNICIPALITIES

2.1 Geographical Position

The three municipalities related to this study are located in a strip with an area of approximately 20 km width and 84 km length along the seashore (Fig. 2.1.1).

The study area is located in this shoreline 59 km from the northern extremity of General Nakar and 25 km from the southern extremity of Real.

In terms of access from the study area to the inland area (mountainous district), the only available road for land transportation at the present time is the service area of the Infanta road. Therefore, at present, the study area is practically isolated from the surrounding areas.

The study area, the shoreline of Real and mountainous district of Real is accessible by the aforementioned road. At present, the study area is located at the extremity of the area and is benefitted by this road.

On the other hand, barangays in General Nakar are not accessible municipality capital city through the use of land transportation because there is no road along the shoreline.

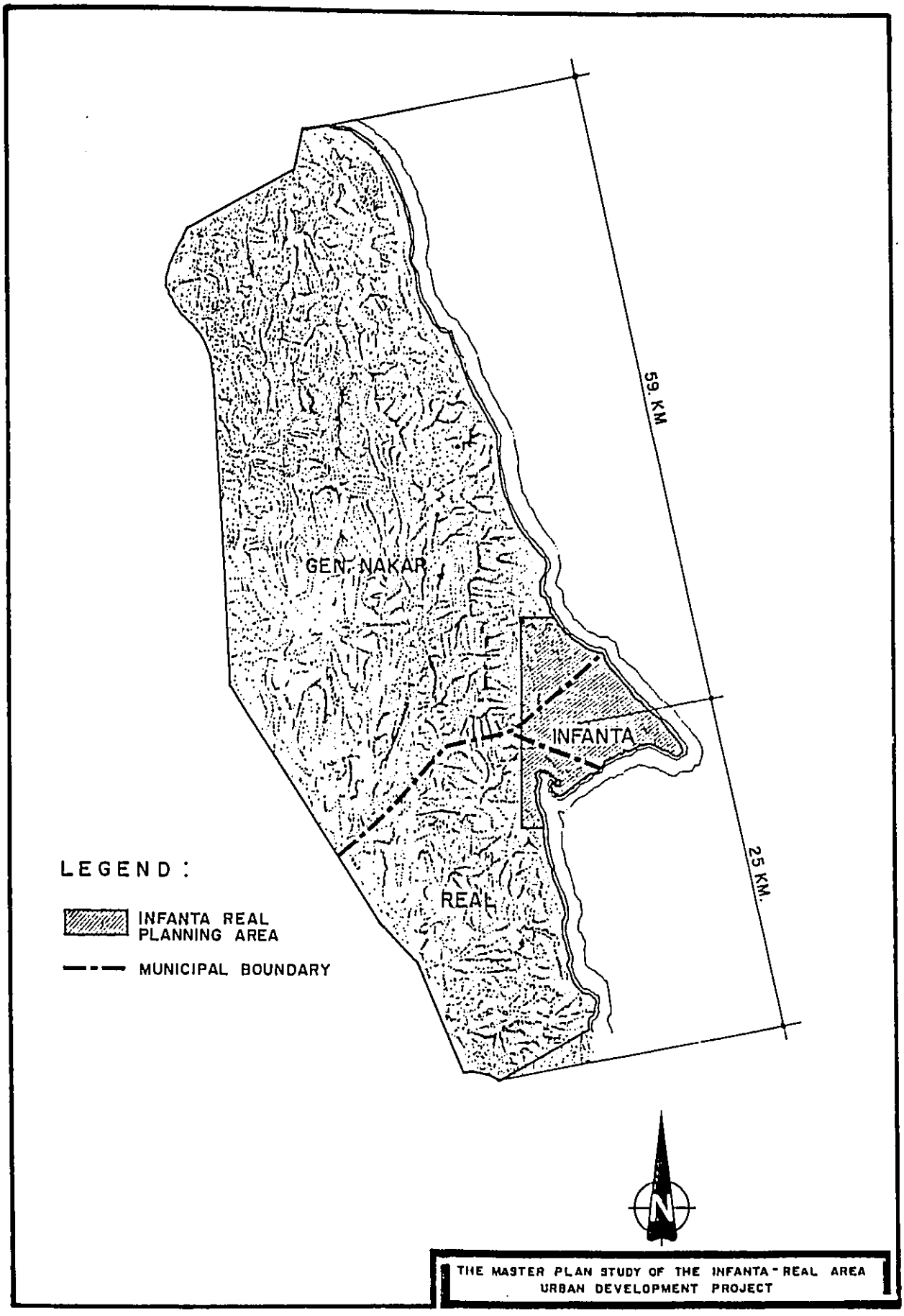


FIG. 2.1.1 LOCATION OF I.R.M. WITHIN THE BOUNDARY OF THE THREE MUNICIPALITIES

2.2 Socio-Economic and Industrial Position

The study area shares 7.5% of the total administrative areas of the 3 municipalities together. As for the relationship between the study area and each one of the cities, municipalities and villages involved, Infanta is the most important contributor with 64.7% and General Nakar and Real providing the remaining parts (Table 2.2.1).

As shown, the study area occupies only a small percentage of the three municipalities, but it must be borne in mind that all other parts are mountainous districts, and as a result, the project area occupies the most substantial part of the socio economic activities of the three municipalities with exception of minor portions of mountainous agriculture (coconut plantations) and forestry.

Population

As for the population, the percentage of the study area to the total of the three municipalities increased from 75.1% (1975) to 76.8% (1980). It may be safely said that practically all the total of the demographic growth in the three municipalities was occurred in the study area in view of its contribution (96.8%) to the increase of population in the three municipalities in the 1975-1980 period (Table 2.2.2).

The comparison of the said demographic growth with the natural growth shows that there is considerable demographic drainage from outside of the study area. It is presumed that this migration flow either converged in the study area, which is the center of the three municipalities, or was diverted outside the three municipalities.

The 1983 population is estimated on the basis of the trend of the 1975-1980 period. According to the results of these calculations, the study area is estimated to share 77.8% of the total population of the three municipalities, as shown in Table 2.2.3. In terms of the population of each municipality, the study area shares 100% of the population of Infanta, 45.3% of General Nakar and 61.7% of Real.

Primary Industry

The primary industry worker in the study area as of 1983 are estimated on the basis of the field survey. The situation outside the study area is as follows:

(i) According to the aforesaid estimation, the population outside of the study area as of 1983 is estimated to be 12653, which is shown in Table 2.2.2. Therefore, the change in the population is estimated to be negligible. It is then presumed that the composition of the employed population remained unchanged in the 1980-1983 period.

(ii) The primary industry workers outside of the study area as of 1980 are estimated on the basis of the NCSO census by alloting the primary industry workers living in rural area to inside of and outside the study area in accordance with the proportion of the rural population.

According to these estimations, the primary industry workers of the study area share 71% of the total of the three municipalities, which is lower than the demographic concentration percentage (77.3%). As for each municipality, the study area shares 36.7% of General Nakar and 48.4% of Real.

Table 2.2.1 Size of the Study Area

	Administrative Zone (A)*2	Study Area (B)	(A)/(B)
General Nakar	134,330 ha.	4,340 ha.	3.2%
Infanta	13,600 ha.	8,800 ha.	64.7%
Real	56,380 ha.	2,130 ha.	3.8%
Total	204,310 ha.	15,270 ha.	7.5%

Source: *1 Measured by JICA Study Team
*2 NCSO

Table 2.2.2 Population of the Study Area

	1975	1980	1980-1975	Increasing Rate Per Annum
Total of Three Municipalities	50,253	54,404	4,151	1.6%
Study Area	37,763	41,780	4,017	2.0%
Out of Study Area	12,490	12,624	134	0.2%

Source: JICA Study Team

Table 2.2.3 Share of Major Indeces of Study Area to Municipal Zone (1983)

	Municipal Zone (A)	Study Area (B)	(B)/(A)
Population			
General Nakar	12,359*	5,593	45.3%
Infanta	29,410	29,410	100.0%
Real	15,257	9,412	61.7%
Total	57,076	44,423	77.8%
Employment in Primary Industry			
General Nakar	2,540	932	36.7%
Infanta	4,750	4,750	100.0%
Real	2,269	1,099	48.4%
Total	9,567	6,780	71.0%
Coconut			
General Nakar	4,951	1,350	27.3%
Infanta	3,942	1,800	45.9%
Real	3,194	33	1.0%
Total	12,088	3,250	26.9%
Forestry			
General Nakar	11,921	2,109	17.7%
Infanta	5,461	814	14.9%
Real	N/A	1,353	-
Paddy			
General Nakar	1,075	453	42.1%
Infanta	2,316	2,316	100.0%
Real	100	50	50.0%
Total	3,941	2,819	80.8%

* Sitio Salok is excluded

Source: JICA Study Team

2.3 Personnel Movements and Physical Distribution Position

1) Flow of Commodities

The flow of commodities in the survey area has strong relationship with Manila, both in the industrial and commercial sections. Approximately 80% of the commercial products transacted in the local market come from Manila, while approximately 90% of wood, one of principal products of the region and charcoal are set to the Manila Market.

The principal items composing the flow of commodities of the project area are as follows:

Inflow of Goods:

Clothes, canned good, grain, kerosene, ice, medicines, parts of automotive vehicles, daily necessities.

Outflow of Goods:

Wood carving, furniture, charcoal, rattan, etc.

The relationship between IRM and the Polillo Islands is shown in Fig. 2.3.1.

The following are two types of industry in the IRM area: one which inflow raw materials from nearby areas and outflow the products to other areas (principally Manila); and the other imports raw materials from other areas and sells the products such as haberdashery, bread, etc. in the local market.

In the wholesale and retail commerce, the sari-sari (variety) stores account for approximately 90% of the total number of establishments, and play a decisive part in the daily life of IRM. The primary importers of these commodities are the large sized retailer both in Real and Infanta. The small scale stores purchase these commodities from the said retailer and distribute them to the local consumers. Most of the commodities consumed in General Nakar and Polillo are purchased from Infanta and Real (Fig. 2.3.2).

As for foodstuff, the home consumption pattern prevails in IRM particularly in connection with rice and fish. However, Polillo Island and General Nakar rely on Real and Infanta for supply of basic foodstuff items such as rice, bread, and drinks.

With regard to the means of transportation of commodities, buses and trucks account for 50% each of the transaction with Manila. Approximately 70% of the trucks are operated by transportation companies and other kinds of enterprises outside the IRM area. Tricycles are the most popular means of transportation in the study area and accounts for 60% of the total transportation demand, followed by banca with 20% while jeepneys and trucks account for the remaining 20%. The frequency of transportation trips to and from Manila depends on the type of commodity handled; 1 to 3 trips per month in the case of industrial raw materials and products, and one trip per week for daily use miscellaneous goods and foodstuff (Fig. 2.3.3).

The outflow of industrial, agricultural and fishery products from the IRM to other areas is shown in the Fig. 2.3.4 in accordance with the establishment survey. Generally, more than 80% of the outflow are destined for Manila. As for the other destination areas: rattan is exported to Canlubang (Laguna), Waigabareru (Aurora), Atimonan (Quezon), etc.

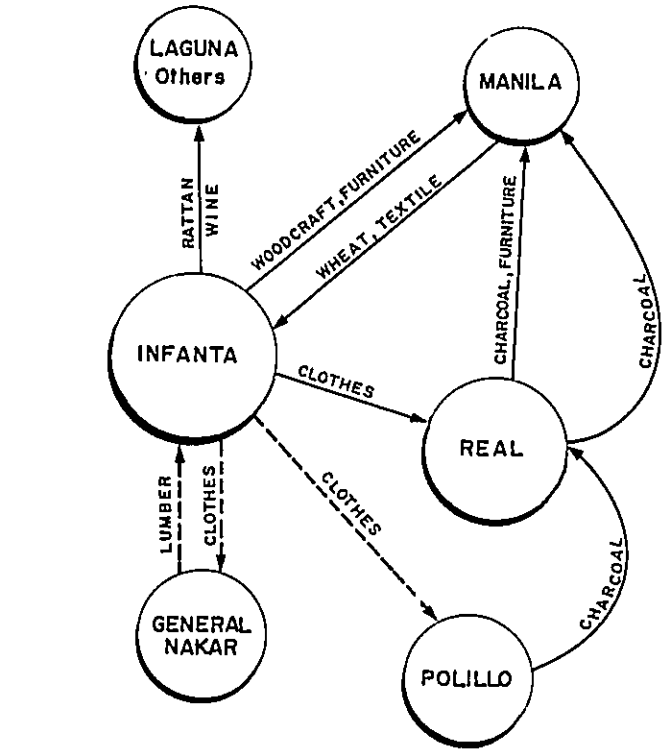


FIG. 2.3.1 DISTRIBUTION OF INDUSTRIAL PRODUCTS

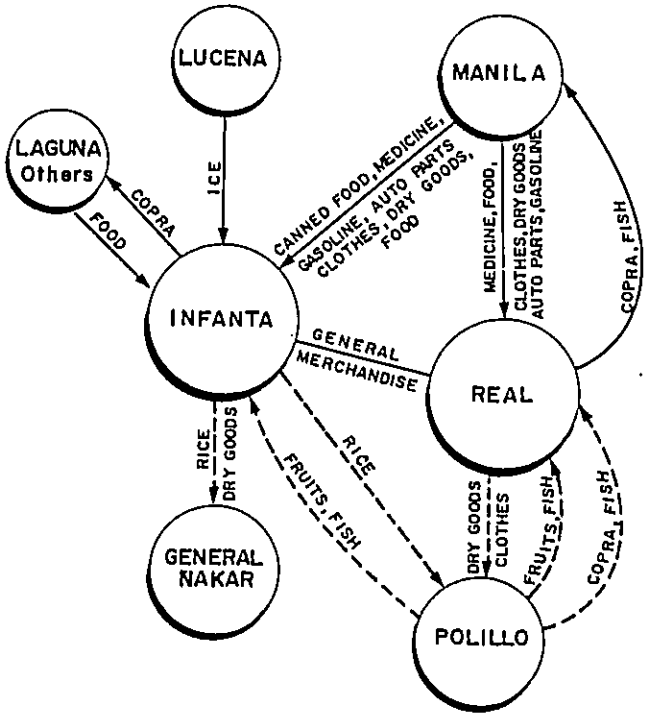


FIG. 2.3.2 DISTRIBUTION OF WHOLESALE & RETAIL TRADE GOODS

SOURCE: JICA STUDY TEAM

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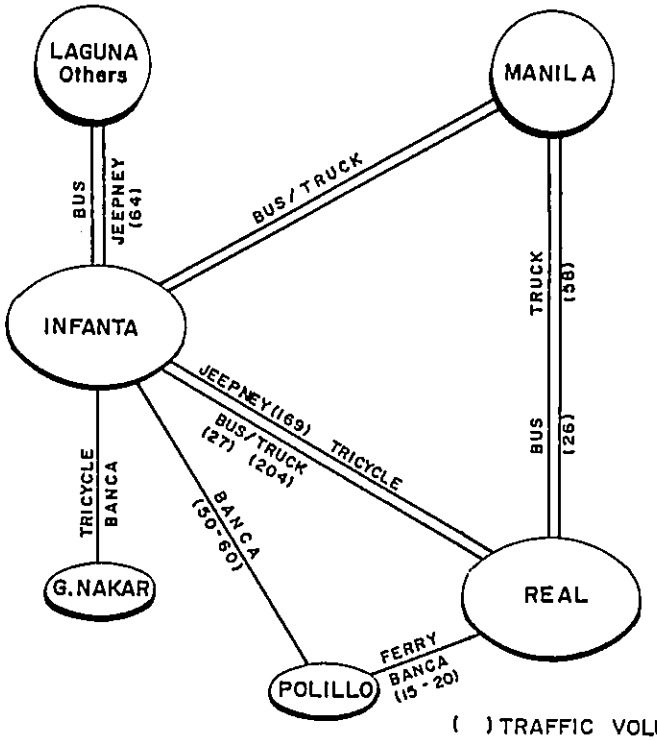

FIG. 2.3.3 TRAFFIC VOLUME OF MAJOR TRANSPORT MODE

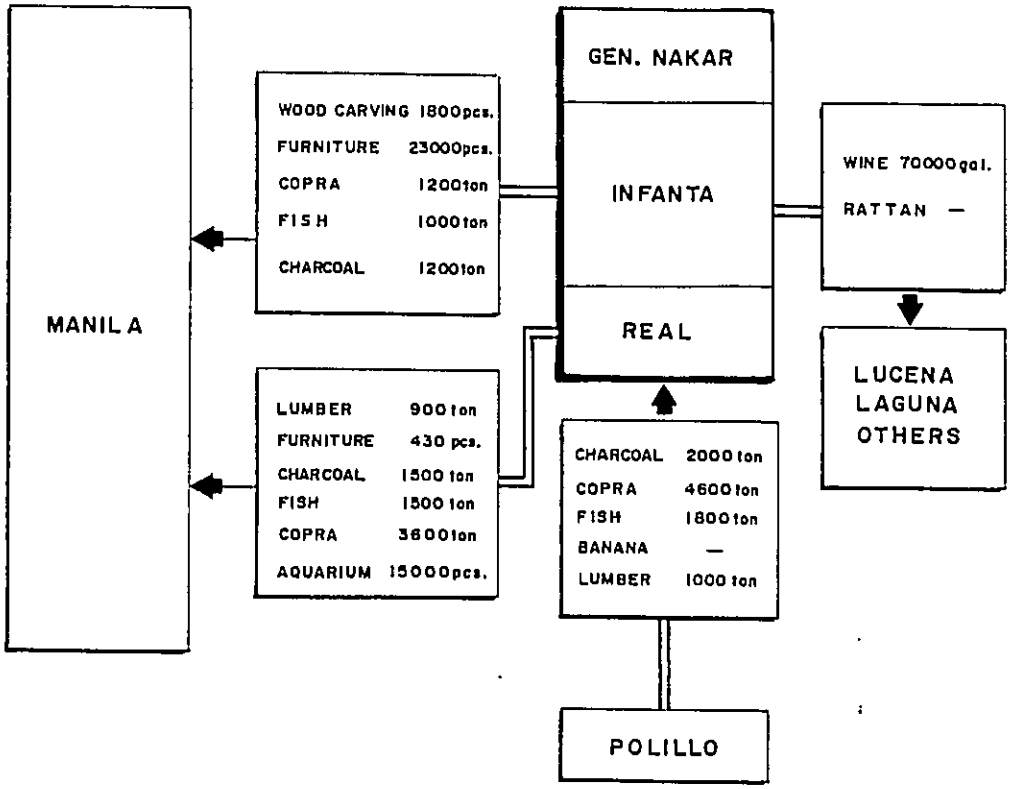

FIG. 2.3.4 DISTRIBUTION OF ANNUAL FREIGHT SHIPMENT

SOURCE: JICA STUDY TEAM

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

Most of the commodities produced in Polillo are transported to the market place in Manila via Real or Infanta with the exception of fishes. Most of these industrial, agricultural and fishery products except part of furnitures and copra are transported to Manila by means of trucks operated at a frequency of approximately 30 trips a day.

The freight of these products depends on the form of transportation, but the transportation cost by product in the case of using truck is shown in Table 2.3.1. The freight is practically united for products such as charcoal, fish, copra, etc., which are handled in larger volumes.

Table 2.3.1 Transport Cost (1983)

	Goods	Unit	Cost (₱)
Truck	Lumber	Ton	350
	Wood Curving	Ton	350
	Furniture	Ton	380
	Charcoal	Sack	5
	Copra	Kg.	0.1
	Fish	Kg.	0.5
	Aquarium	Piece	50
Banca	Charcoal	Sack	5
	Rattan	Piece	0.05
	Copra	Kg.	0.1
	Fish	Kg.	0.5

Source: JICA Study Team

2) Passengers Movements

Manila is an overwhelmingly strong magnet that exerts influence on the flow of passengers of the three municipalities. The absolute majority of the flow of passengers of IRM and Polillo is influenced by Manila. Results of this survey indicate that 64% of the flow of passengers of the three municipalities is towards Manila. This tendency is particularly pronounced in the case of salespeople and other service sector, where approximately 72% of the trips are to or from Manila. As for the frequency of these trips, the average of travellers is approximately 2.5 trips per month, while in the case of salespeople the frequency is much higher, with 2 to 3 trips per week. As for the destination of trip going to the capital city, 1.3 trips per week, indicating the geographic proximity of this area to Manila. As for other cities besides Manila, Laguna (San Pablo and Santa Cruz) accounts for 14% of the trips, showing the connecting relation in the business sector between IRM and the cities of the southeastern part of Laguna de Bay (Figs. 2.3.5 and 2.3.6).

As for the relationship between IRM and Polillo Islands, the flow of passengers is similar to the flow of commodities, i.e., the relationship to Infanta and Real is relatively weak. The shopping trips of people of General Nakar for miscellaneous daily necessities are comprised within the sphere of influence of Infanta. The trips related to the daily life of the population of Polillo are toward Infanta, while Real functions principally as a junction for trips destined to Manila.

Therefore, Infanta is a strategic point for the daily life of the people of Polillo and General Nakar, while Real functions as an independent center (Figs. 2.3.7 and 2.3.8).

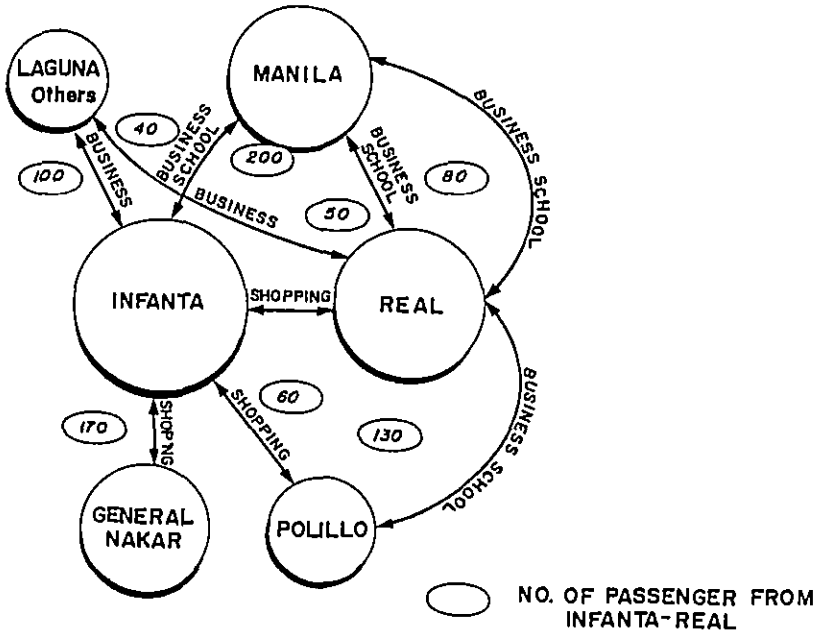

FIG. 2.3.5 PASSENGER FLOW PER DAY

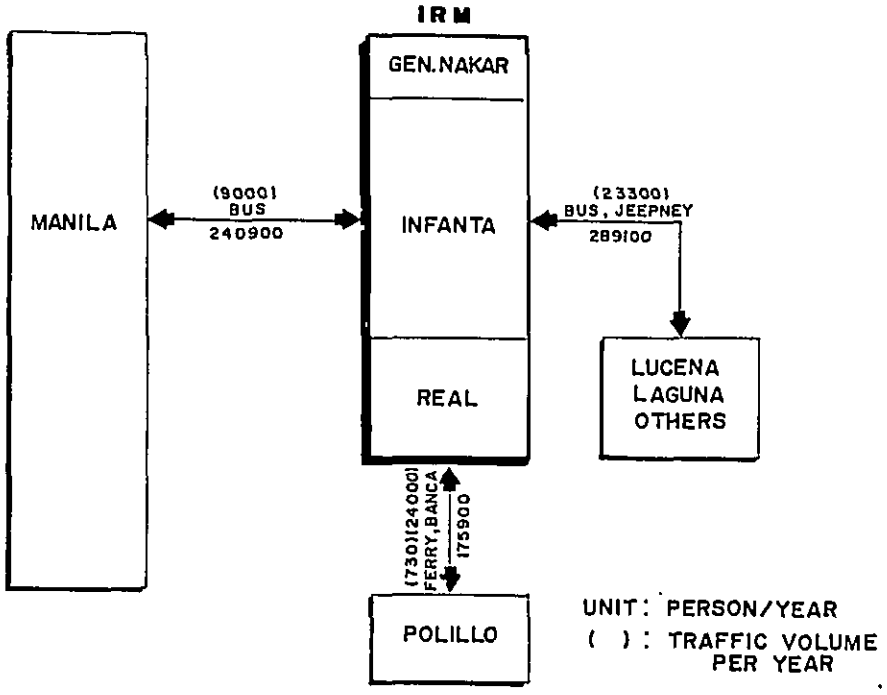

FIG. 2.3.6 PASSENGER FLOW OF I.R.M.

SOURCE: JICA STUDY TEAM

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URBAN DEVELOPMENT PROJECT

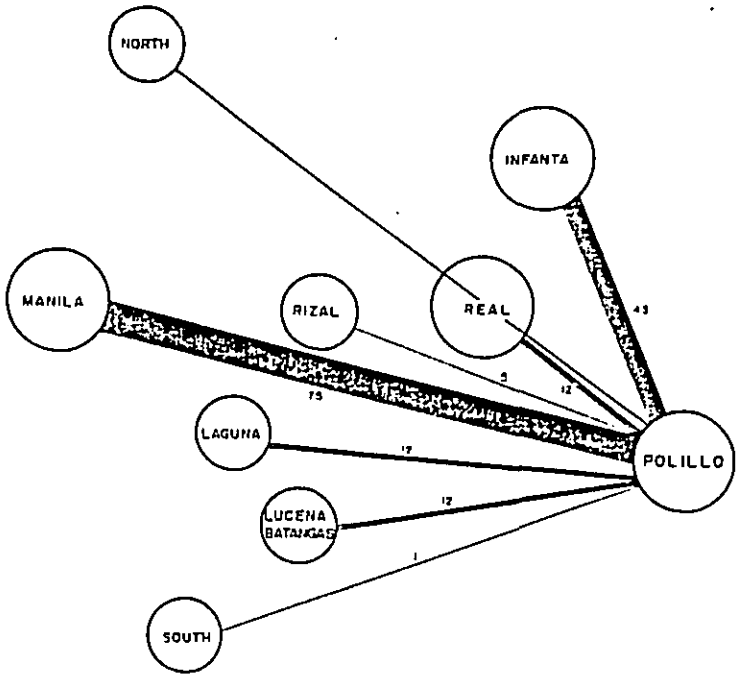


FIG:2.3.7 FERRY O.D. TRIPS (TO POLILLO, PERSON/DAY)

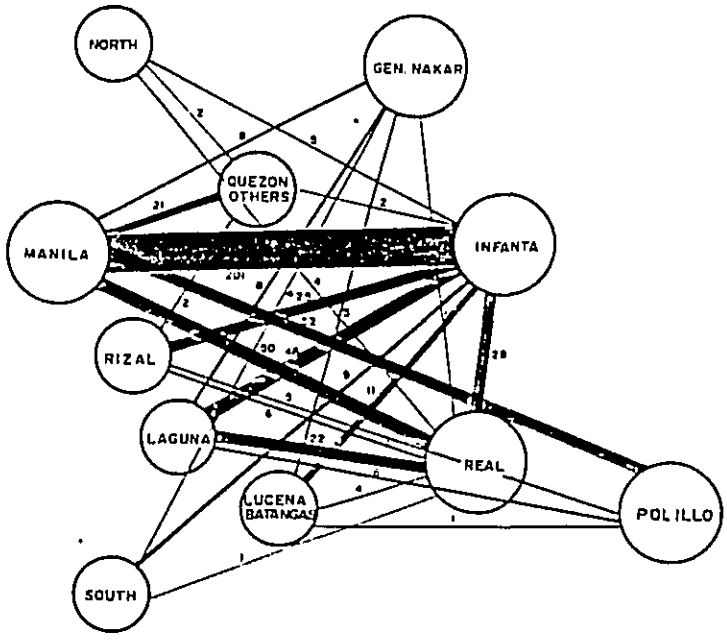


FIG. 2.3.8 BUS O.D. TRIPS (FROM I.R.M, PERSON/DAY)

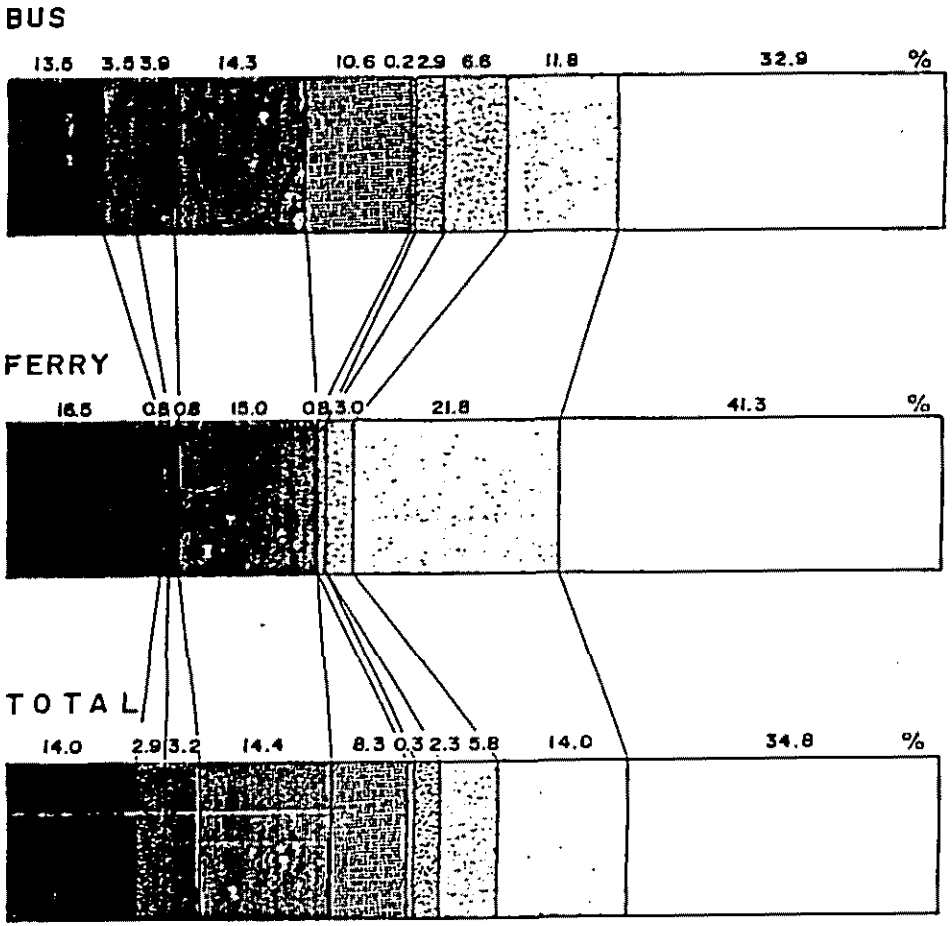
SOURCE : JICA STUDY TEAM

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

As for the occupation of passengers of buses and ferry boats, unemployed persons (including works not classifiable by occupation), followed by technical workers, service workers (consisting mostly of housekeepers) and students with practically even percentage, totalling approximately 40% of all users. Agricultural workers and sales workers are common among users of bus, but people engaged in these occupations are rare among users of ferry boats (Figs. 2.3.9 and 2.3.10).

As for trip purpose "others" (including visit) and "go home" account for approximately 80% of the total passengers. With the use of ferry boats, 70% of the trips account for trips to/from Manila. As for the passengers to/from Manila by bus, approximately 23% of the total number of trips to/from Manila accounts for shoppers, showing that Manila is located within the shopping sphere for living commodities. As for the trips within IRM, "go home" accounts for the absolute majority with 63.5% of the total, including short trips from Infanta to Real indicating that Real and Polillo are located within the living sphere of Infanta.

With regard to the frequency of trips on the whole, buses account for 1 trip per month, while ferry boats is much lower. Bus trips are used more frequently for business totalling 2-3 trips/month. As for the destination of the trips, the local trips within the project area are the most frequent ones, with approximately twice as much as the ones to Manila (Tables 2.3.2 and 2.3.3).



LEGEND:

- PROFESSIONAL, TECHNICAL & RELATED WORKERS
- ADMINISTRATIVE, EXECUTIVE & MANUAL WORKERS
- SALES WORKERS
- SERVICE WORKERS
- AGRICULTURAL WORKERS
- ANIMAL HUSBANDRY & FORESTRY WORKERS
- FISHERMEN
- PRODUCTION & RELATED WORKERS, TRANSPORTATION OPERATORS & LABORERS
- STUDENT
- WORKERS NOT CLASSIFIABLE BY OCCUPATION

SOURCE: JICA STUDY TEAM

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

FIG.2.3.9 OCCUPATION OF PASSENGERS

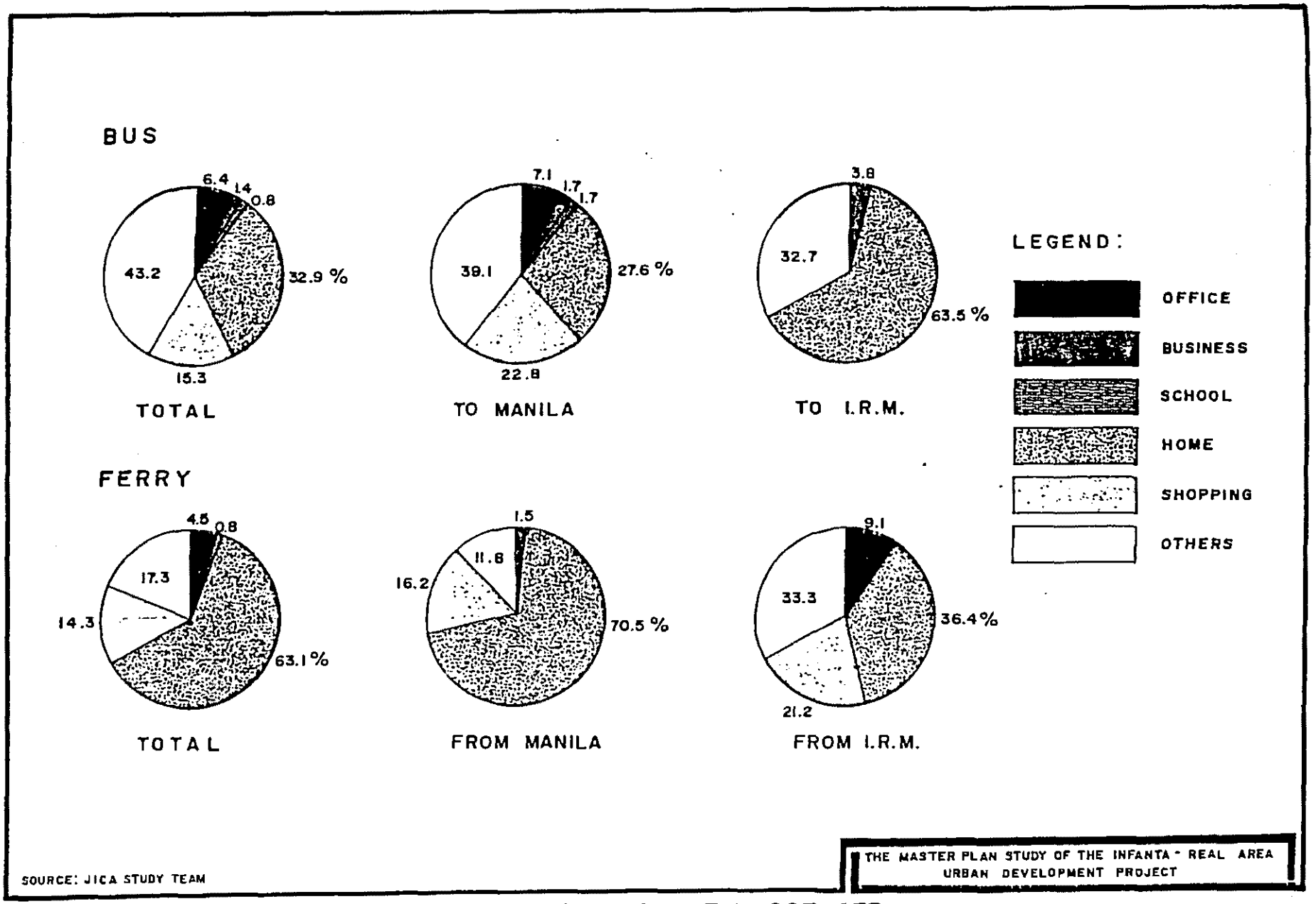


FIG.2.3.10 PURPOSE OF PASSENGER

Table 2.3.2 Bus Passenger Trips by Purpose (1983)

		Number of Trips					
	Purpose	Everyday	2-3 days/week	Once a Week	2-3 days/month	Once a Month	Less Than
Total	Office		2 (6.5)	4 (12.9)	9 (29.0)	9 (29.0)	7 (22.6)
	Business			2 (28.6)	3 (42.8)	2 (28.6)	
	School					4(100.0)	
	Home	4 (2.5)	10 (6.3)	9 (5.7)	45 (28.3)	53 (33.3)	38 (23.9)
	Shopping	1 (1.4)	5 (6.8)	3 (4.1)	22 (29.7)	28 (37.7)	15 (20.3)
	Others	3 (1.4)	6 (6.8)	32 (15.4)	29 (13.9)	66 (31.8)	72 (34.6)
	Total	8 (1.7)	23 (4.8)	50 (10.4)	108 (22.4)	162 (33.4)	132 (27.3)
To Manila	Office		2 (9.5)	4 (19.1)	6 (28.5)	4 (19.1)	5 (23.8)
	Business			1 (20.0)	2 (40.0)	2 (40.0)	
	School					5(100.0)	
	Home	2 (2.5)	4 (4.9)	4 (4.9)	21 (25.9)	29 (35.9)	21 (25.9)
	Shopping	1 (1.5)	5 (7.5)	3 (4.5)	22 (32.8)	22 (32.8)	14 (10.9)
	Others		1 (0.9)	19 (16.5)	10 (8.7)	36 (31.3)	49 (42.6)
	Total	3 (1.0)	12 (4.1)	31 (10.5)	61 (20.8)	98 (33.3)	89 (30.3)
To IRM	Office						
	Business			1 (50.0)	1 (50.0)		
	School						
	Home	2 (6.1)	6 (18.2)	5 (15.2)	8 (24.2)	8 (24.2)	4 (12.1)
	Shopping						
	Others	3 (17.7)	3 (17.7)	2 (11.8)	5 (29.3)	4 (23.5)	
	Total	5 (9.6)	9 (17.3)	8 (15.4)	14 (26.9)	12 (23.1)	4 (7.7)

Note: Figures in parenthesis are share to the particular purpose.

Source: JICA Study Team

Table 2.3.3 Ferry Passenger Trips by Purpose (1983)

		Number of Trips					
	Purpose	Everyday	2-3 dayss/week	Once a Week	2-3 days/month	Once a Month	Less Than
Total	Office		1 (16.7)	2 (33.3)		3 (50.0)	
	Business						
	School						1 (100.0)
	Home	2 (2.4)		1 (1.2)	10 (11.9)	19 (22.6)	52 (61.9)
	Shopping			2 (10.5)	4 (21.1)	10 (52.0)	3 (15.8)
	Others	5 (21.7)		5 (21.7)	3 (13.2)	5 (21.7)	5 (21.7)
	Total	7 (5.3)	1 (0.8)	10 (7.5)	17 (12.8)	37 (27.8)	61 (45.8)
From Manila	Office						
	Business						
	School						
	Home			1 (2.1)	2 (4.2)	5 (10.4)	40 (83.3)
	Shopping			2 (18.2)		7 (63.6)	2 (18.2)
	others			2 (25.0)		2 (25.0)	4 (50.0)
	Total			5 (7.4)	2 (2.9)	14 (20.6)	47 (69.1)
From I.R.M.	Office		1 (33.3)	1 (33.3)		1 (33.3)	
	Business						
	School						1 (100.0)
	Home	2 (16.7)			3 (25.0)	5 (41.6)	40 (83.3)
	Shopping				4 (57.1)	3 (42.9)	
	Others	5 (45.4)		2 (18.2)	2 (18.2)	1 (9.1)	1 (9.1)
	Total	7 (21.2)	1 (3.0)	3 (9.1)	9 (27.3)	10 (30.3)	3 (9.1)

Note: Figures in Parenthesis are share to the particular purpose

Source: JICA Study Team

3. PRESENT STATUS OF THE IRM AREA

3.1 Administrative Division of the IRM Area

The minimum administrative unit of the Philippines is the Barangay, and the social activities of the country are based on this unit.

In the three municipalities involved in this project, General Nakar consists of 19 barangays, Infanta 36 and Real 13 totalling 68. However, the number of Barangays directly involved in this project is 51 (10 in General Nakar, 36 in Infanta and 5 in Real).

The distribution and location of these Barangays is shown in Fig. 3.1.1. It is presumed that these Barangays reflect the settlement pattern described in the following (the zoning of the IRM area in accordance with the settlement pattern is shown in Fig. 3.1.2).

A) Settlements formed on the flatlands of General Nakar: Settlement of predominantly agricultural character formed in the area bordered by the Agos River, shoreline and hilly districts.

B) Mountainous settlement formed along the Agos River: Settlement mostly consisting of farmlands formed in the narrow strip of lowland located along the Agos River.

C) Agricultural settlement formed in the plateau: Settlement consisting of agricultural land along Infanta Road and surroundingss of built-up area of Infanta.

D) Settlement arranged along the shoreline (beach): Shoreline extending from Dinahican to General Nakar. Settlements consisting mostly of fishermen villages.

E) Settlements formed in the swamp areas: Point of intersection of creeks and roads Silangan, Langas, etc., are major settlement in the swamp area.

F) Settlement arranged along the Real beach: Settlements consisting mostly of fishermen villages with comparatively high population densities.

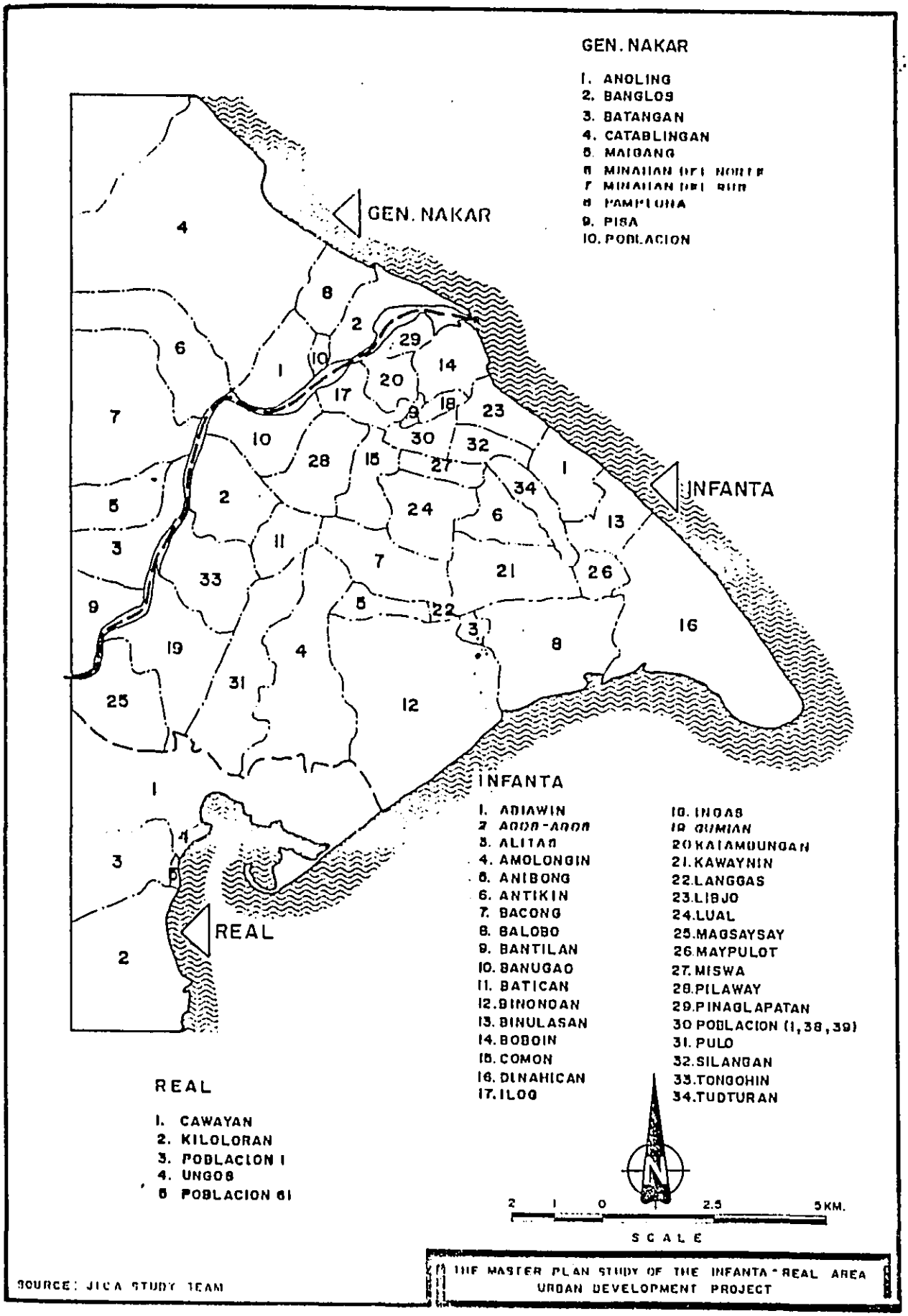


FIG. 3.1.1 BARANGAY MAP

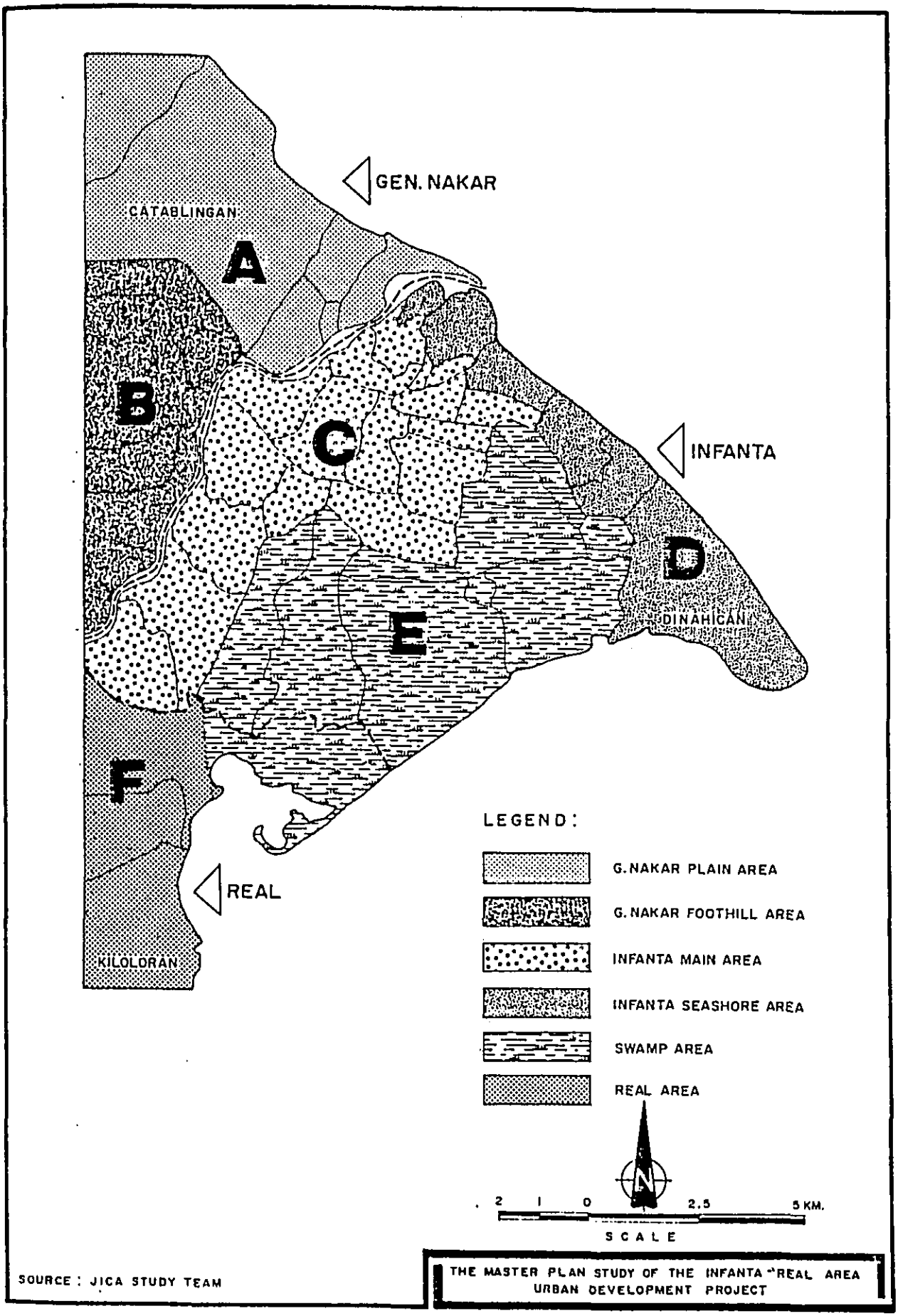


FIG. 3.1.2 MAJOR GROUP OF BARANGAY

3.2 Social Characteristics

1) Distribution of Population and Households (1980)

(1) Demographic Distribution by Zone.

The population and number of households of the IRM area are 41780 and 7500, respectively (as of 1980). In connection with their distribution in the three municipalities, Infanta accounts for 2/3 as can be seen from Table 3.2.1.

The demographic distribution (as of 1980) by zone (zoning of Fig. 3.1.2) in the IRM area is as follows:

(i) The plateau district of Infanta has the largest demographic concentration (41.6% of the total) followed by Real (20.4%).

(ii) The seashore district and swamp district of Infanta accounts for the same percentage (approximately 10%) while the mountainous district of General Nakar has the smallest percentage (4.1%).

The comparison of the aforesaid data with the demographic trends occurred in 1970-1980 (Table 3.2.2) lead to the following conclusions:

(i) Real beach and the seashore district of Infanta have high demographic growth rates. The highest annual average growth rate (3.8% per year) occurred in Real.

(ii) The growth rate of the Infanta plateau coincides with the average of the IRM area, and 41% of the population of Infanta is settled.

(iii) The population of the Infanta Swamp and General Nakar flatland are gradually growing but in the mountainous district of General Nakar it is gradually declining.

Table 3.2.1 Number of Households and Population by Municipality in the Study Area (1980)

	Population	Households
Study Area	41,780 (100%)	7,500 (100%)
General Nakar	5,460 (13.1%)	990 (13.2%)
Infanta	27,814 (66.6%)	5,015 (66.9%)
Real	8,506 (20.4%)	1,495 (19.9%)

Note: Figures in parentheses are share to the whole Study Area.

Source: JICA Study Team

Table 3.2.2 Population (IRM)

	1970		1975		1980		Yearly Increased Rate 1975/1980
Study Area	32,359	100.0%	37,763	100.0%	41,780	100.0%	2.6
G. Nakar							
A	3,001	9.3%	3,330	8.8%	3,767	9.0%	2.3
B	1,861	5.8%	1,927	5.1%	1,693	4.1%	Δ 0.9
Infanta							
C	13,471	41.6%	15,656	41.5%	17,368	41.6%	2.6
D	3,639	11.2%	4,309	11.4%	4,852	11.6%	2.9
E	4,543	14.0%	5,406	14.3%	5,594	13.4%	2.1
Real							
F	5,844	18.2%	7,235	19.2%	8,506	20.4%	3.8

Source: NCSO

(2) Demographic Distribution by Barangay

The barangay is the minimum unit of the social structure and consists of a minimum of 100 households and a maximum of 500 according to the pertinent regulations in force.

The classification of Barangay by number of households (Table 3.2.3) shows that 41.2% (21 Barangays) of the total do not satisfy the said requirement. Of the Barangays with less than 300 households, there are 46 (90%) and the number of households of these Barangays is 5596 (75%). As can be seen, the population of the IRM area is distributed in relatively small settlements (Barangays).

On the other hand, there are only 5 settlements with relatively large size (300 or more households/Barangay). They are Infanta Barangay No.3 Gumian, Real Barangay No. 1, Ungos, Real Barangay No. 61.

It is presumed that the existence of relatively large Barangays in Real is attributed to the existence of relatively few flatlands in this municipality which results into the concentration of population in these narrow flatlands.

Table 3.2.3 Number of Households and of Barangays by Size (1983)

Households/ Barangays	99 and Less	100 to 199	200 to 299	300 to 399	400 and Over	Total
No. of Barangay	21	18	7	3	2	51
No. of Households	1,476	2,519	1,601	993	911	7,500

Source: JICA Study Team

The demographic distribution by Barangay in three distinct epoch, i.e., 1970, 1975, and 1980 is shown in Figs. 3.2.1 to 3.2.3 and Table 3.2.4.

This demographic distributionn pattern has the following peculiarities:

(i) Barangays with population totalling 1000 are distributed semi-circularly in Real, right bank of the Agos River (along the Infanta Highway), streets of Infanta City and Dinahican.

(ii) Barangays with less than 500 population are distributed in the swamps.

(iii) All Barangays of the flatland of General Nakar have 500 or more population.

On the other hand, the following conclusions are drawn from the comparison of the aforesaid facts with the demographic trend of the 1975-1980 period (Figs. 3.2.4 and 3.2.5):

(i) Barangays with demographic decline were exceptionally rare in the 1970-1975 period, but in the 1975-1980 period the declining tendency spread in the flatland and swamps of Infanta.

(ii) In addition, the actual demographic growth in most of the Barangays is outnumbered by the natural growth rate.

(iii) Conversely, sporadic demographic growth is observed in Magusaisai located in the hilly district along the Infanta Road, Dinahican, Built-up area of Real and on the south of it.

These facts are presumed to be symptoms of expansion of urban area of Infanta and this tendency is particularly pronounced in the northeast direction (see shore direction).

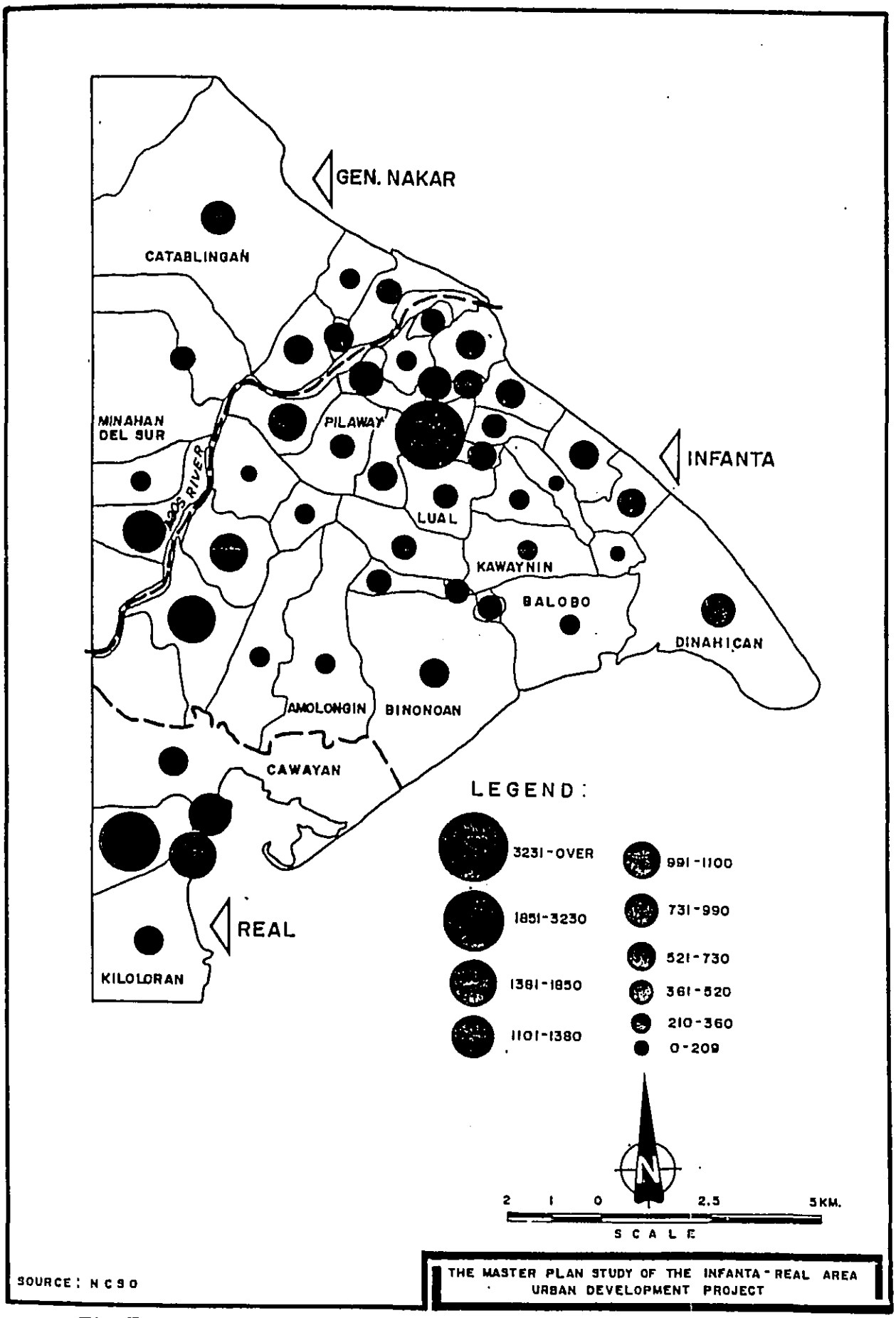


FIG.3.2.1 TOTAL POPULATION BY BARANGAY AS OF 1970

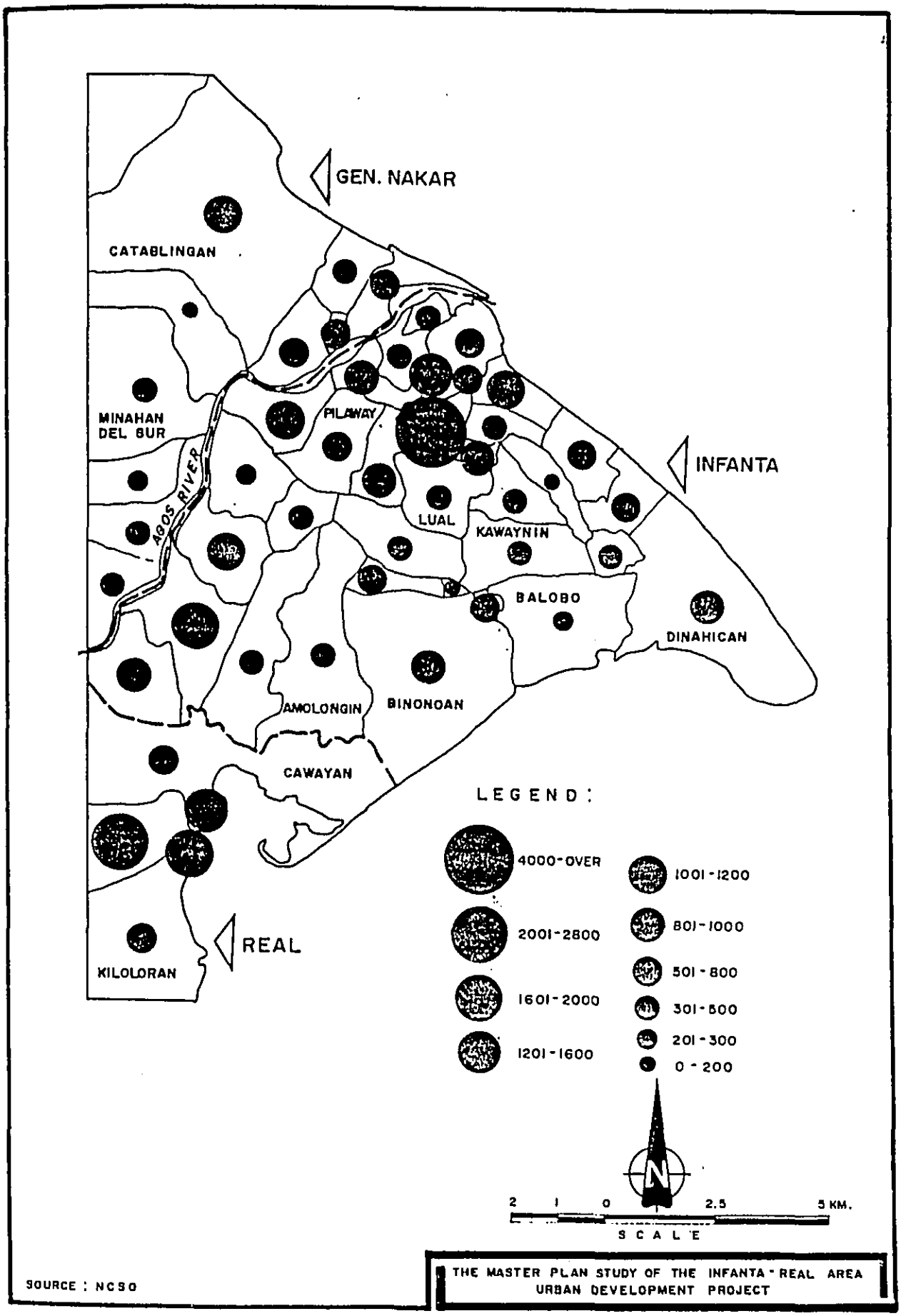


FIG. 3.2.2 TOTAL POPULATION BY BARANGAY AS OF 1975

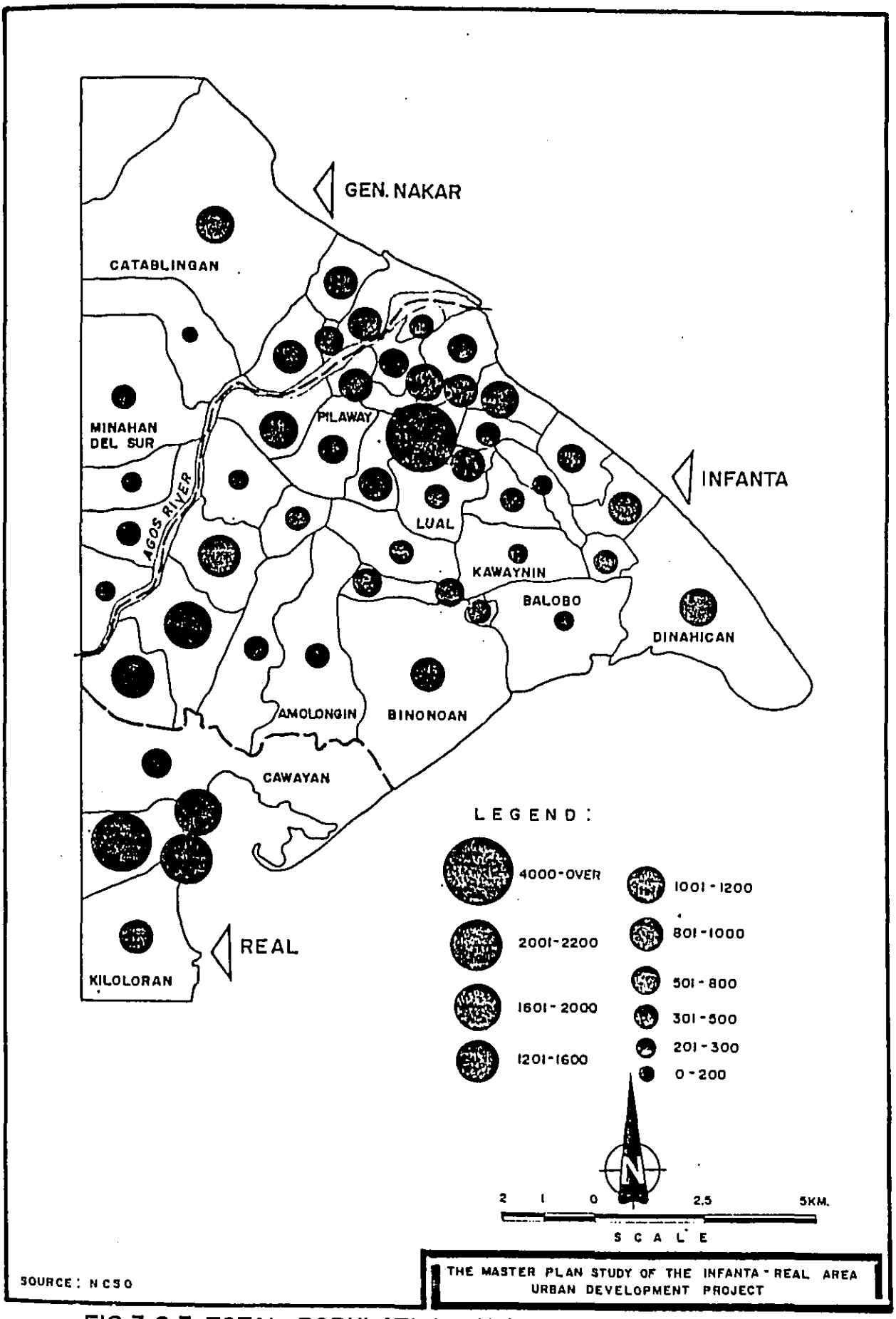


FIG.3.2.3 TOTAL POPULATION BY BARANGAY AS OF 1980

Table 3.2.4 Population and Household

	1970	1975	1980	1970 1975	1975 1980	Household 1980	Pop/Household	
GENERAL NAKAR	8,569	11,751	12,127	6.5	0.6	2,195	5.52	
1. Anoling	617	677	802	1.9	3.4	157	5.11	887
2. Banglos	518 *1	535	612	0.6	2.7	114	5.37	663
3. Batangan	1,376	490	444	-	Δ2.0	75	5.92	418
4. Catablingan	985	1,059	1,226	1.5	3.0	225	5.45	1,340
5. Maigang	-	303	297		Δ0.4	34	5.14	263
6. Minahan del Norte	485 *2	197	171	7.9	Δ2.8	34	5.03	157
7. Minahan del sur		577	467		Δ1.8	73	6.40	442
8. Pamplona	306	445	563	7.8	4.8	102	5.52	648
9. Pisa		426	314		Δ5.9	53	5.92	262
10. Poblacion	575	614	564	1.3	Δ1.7	107	5.27	536
INFANTA	21,653	25,271	27,814	3.1	1.9	5,015	5.55	
1. Abiawin	606	610	659	0.1	1.6	131	5.03	691
2. Agos-Agos	204	270	279	5.8	0.7	50	5.58	285
3. Alitas	447	534	487	3.6	Δ1.8	93	5.24	461
4. Amolongin	314	358	394	2.7	1.9	69	5.71	417
5. Anibong	470	559	591	3.5	1.1	99	5.97	611
6. Antikin	273	369	428	6.2	3.0	85	5.04	468
7. Bacong	366	396	390	1.6	Δ0.3	79	4.94	387
8. Balobo	246	274	303	2.2	2.0	54	5.61	322
9. Bantilan	724	1,040	1,309	7.5	4.7	229	5.72	1,502
10. Banugao	1,098	1,231	1,112	2.3	Δ2.0	179	6.21	1,047
11. Barangay 1 (Pobalcion01)		1,041	1,171		2.4	214	5.47	1,257
12. Barangay 2 (Pobalcion38)	3,911	1,124	1,021	0.8	Δ1.9	197	5.18	964
13. Barangay 3 (Poblacion39)		1,930	1,862		Δ0.5	352	5.29	1,834
14. Batican	312	363	368	3.1	0.3	64	5.75	371
15. Binonoan	683	900	915	5.7	0.3	155	5.90	923
16. Binulusan	625	677	835	2.6	4.3	151	5.53	947
17. Buboin	569	678	678	3.6	0.7	119	5.70	678
18. Comon	710	836	913	3.3	1.8	164	5.57	963
19. Dinahican	820	948	1,111	2.9	3.2	220	5.05	1,221
20. Ilog	867	971	945	2.3	Δ0.5	166	5.69	931
21. Ingas	509	524	675	0.6	5.2	117	5.72	795
22. Gumian	1,840	1,677	1,913	Δ1.8	2.7	318	6.02	2,072
23. Katambungan	355	382	481	1.5	4.7	86	5.59	552
24. Kawayan	348	387	307	2.1	Δ4.5	57	5.39	267
25. Langgas	488	542	599	2.1	2.0	111	5.40	636
26 Libjo	648	908	1,080	7.0	3.5	200	5.40	1,097
27. Lual	317	465	495	8.0	1.3	84	5.89	515
28. Magsaysay		802	1,447		12.5	262	5.52	2,060
29. Maypulot	369	431	464	3.2	1.5	77	6.03	485
30. Miswa	532	742	961	6.9	5.3	170	1.65	1,122
31 Pilaway	621	672	674	1.6	0.1	117	5.76	676
32. Pinaglapatan	371	489	489	5.6	0.0	95	5.15	489
33. Pulo	266	403	410	8.7	0.3	74	5.54	414
34. Silangan	451	438	473	Δ0.6	1.5	85	5.56	495
35. Tongohin	1,106	1,207	1,352	1.8	2.3	251	5.39	1,447
36. Tudturan	188	211	223	2.3	1.1	40	5.58	230
	21,653	25,271	27,814	3.1	1.9	5,015	5.55	29,723
REAL (Total Pop)	10,079	13,231	14,463	5.6	1.8	2,539	5.70	
1. Barangay 1 (Pobalcion)	3,222	2,708	2,931	6.6	1.6	511	5.74	3,074
2. Cawayan	636	637	705	0.0	2.0	123	5.73	748
3. Kiloloron	683	734	886	1.5	3.8	138	6.42	991
4. Ungos	1,303	1,428	1,771	1.8	4.4	323	5.48	2,015
5. Barangay (Poblacion 61)		1,728	2,213		5.1	400	5.53	1,569
	5,844	7,235	8,506	4.4	3.3	1,495	5.69	9,397
(%)	32,359 (80.3)	37,763 (75.1)	41,780 (76.8)	3.1	2.0	7,500 (76.9)		

*1 Lumutan, Mahabang, maigang, Pagsangahan, Pesa
*2 Minahan del Sur

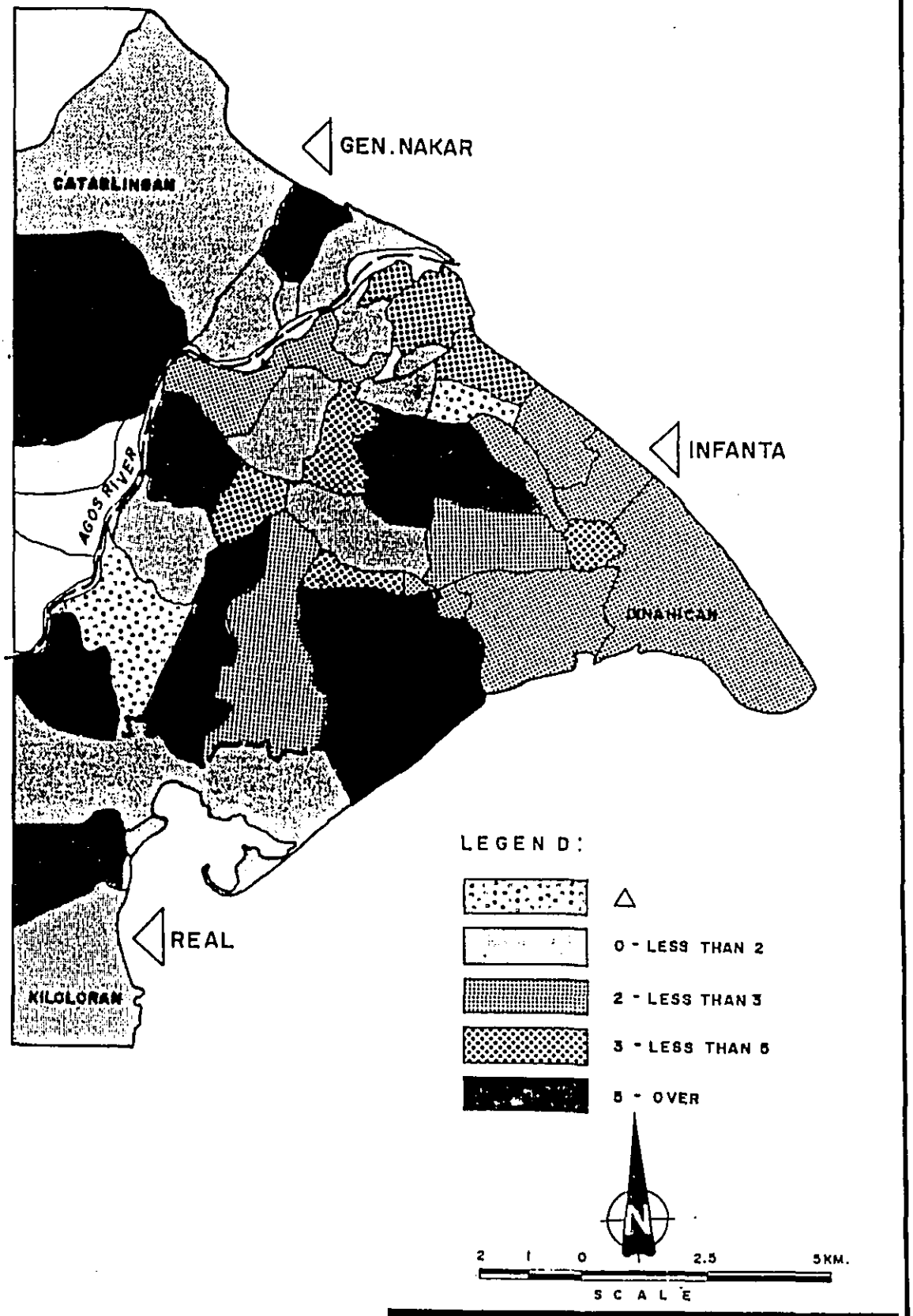


FIG.3.2.4 ANNUAL GROWTH RATE OF POPULATION FROM 1970-1975

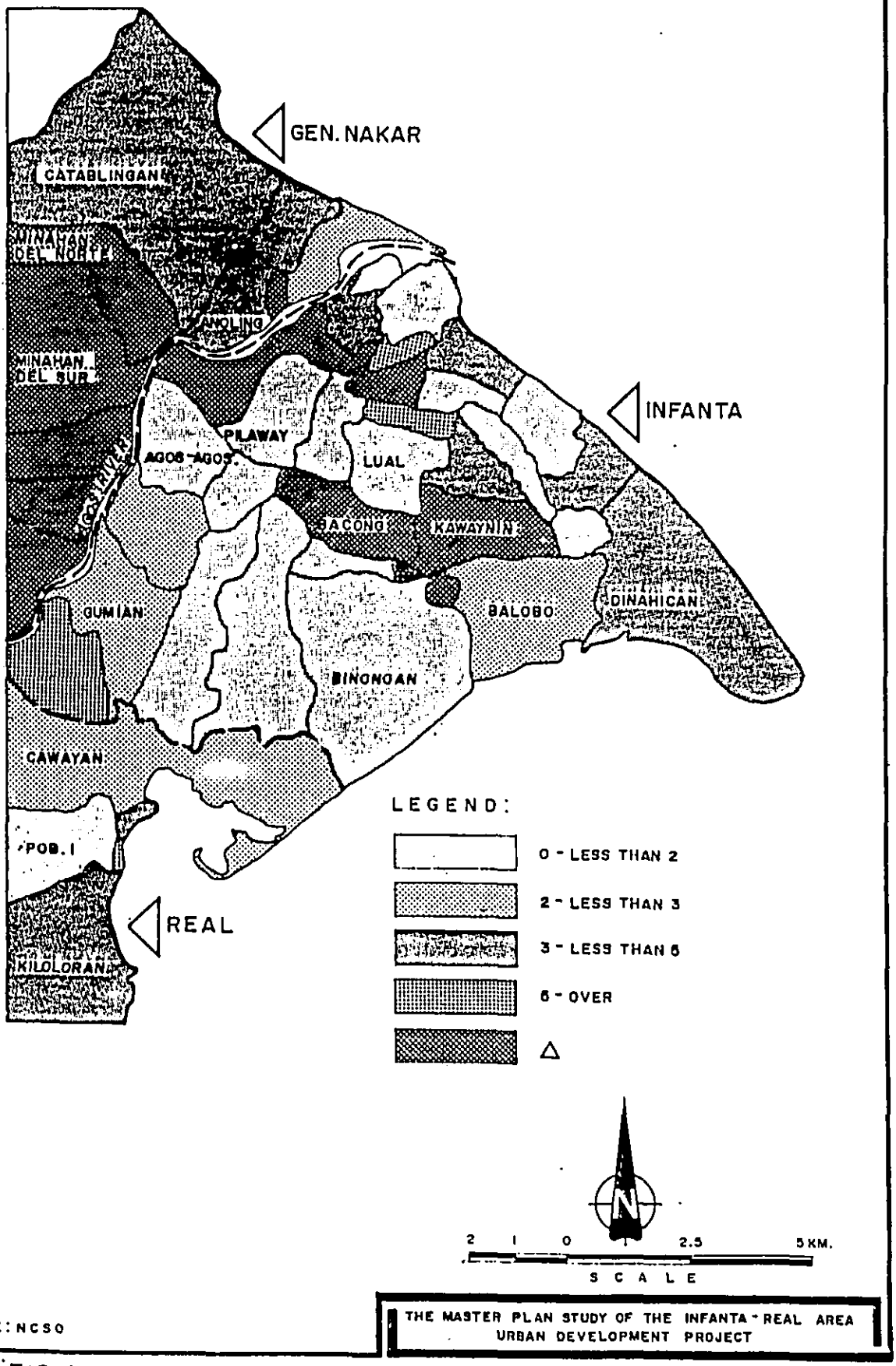


FIG. 3.2.5 ANNUAL GROWTH RATE OF POPULATION FROM 1975-1980

(3) Demographic Density

The distribution of demographic density is shown in Figs. 3.2.6 to 3.2.8 and in Table 3.2.5. The demographic density gradually increased in the IRM area as a whole, i.e., 2.1 persons/ha. (1970), 2.5 persons/ha (1975) and 2.7 persons/ha (1980).

In terms of demographic growth by municipality, Real has the most pronounced evolution. It must be borne in mind that the flatland of Real is a high demographic density area because it comprises mountainous districts.

Furthermore, in terms of demographic density by Barangay, the administrative units of Real have high density, particularly in Poblacion 61 which has the maximum density of the project area 100 persons/ha and above.

Other places with high demographic density are Poblacions of Infanta and the Barangays and its environs, the Poblacion of General Nakar, etc.

Aside from these urban areas and the adjacent Barangays, relatively high demographic density is also observed in Langas, which functions as settlement center in the swamp districts.

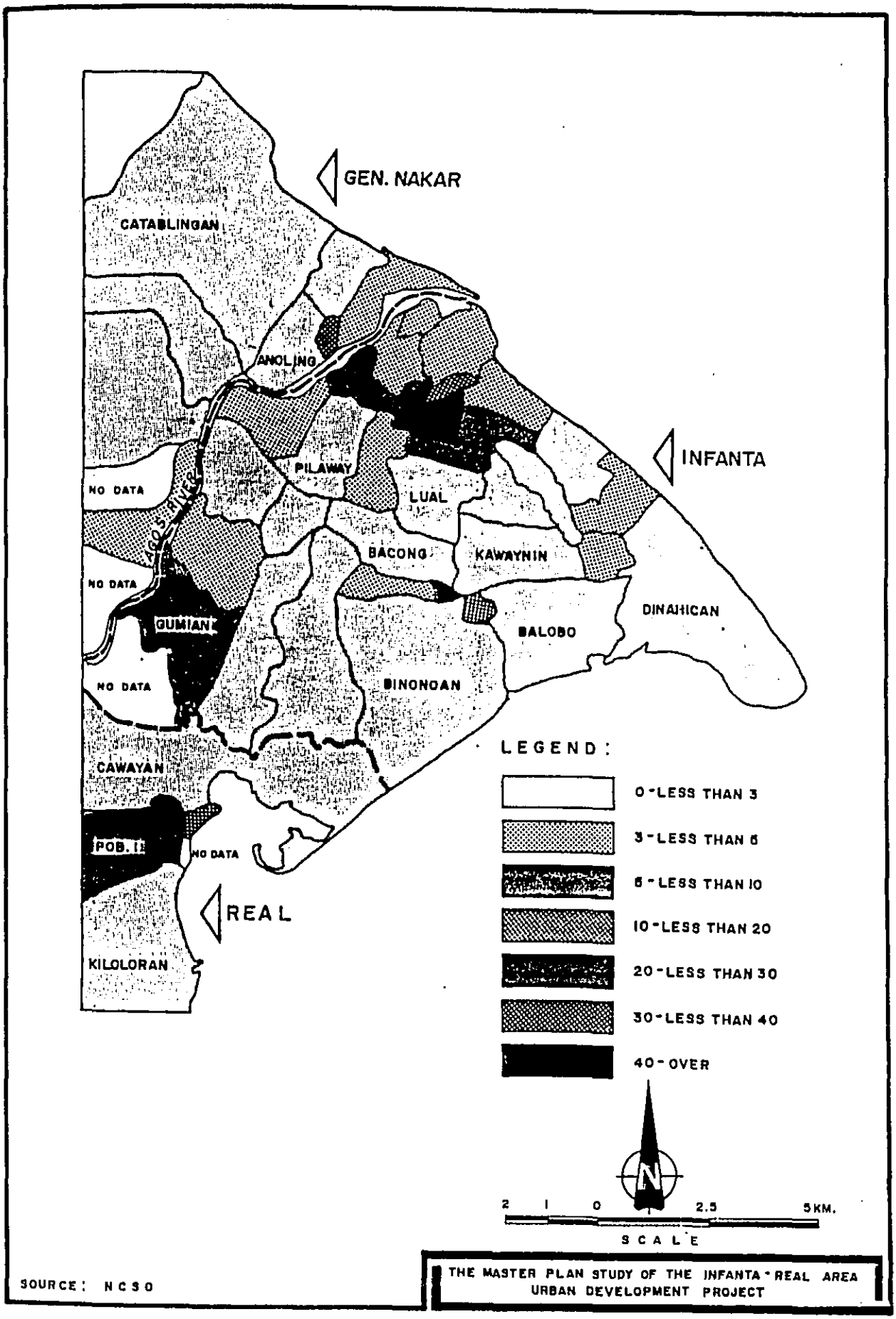


FIG. 3.2.6 POPULATION DENSITY 1970

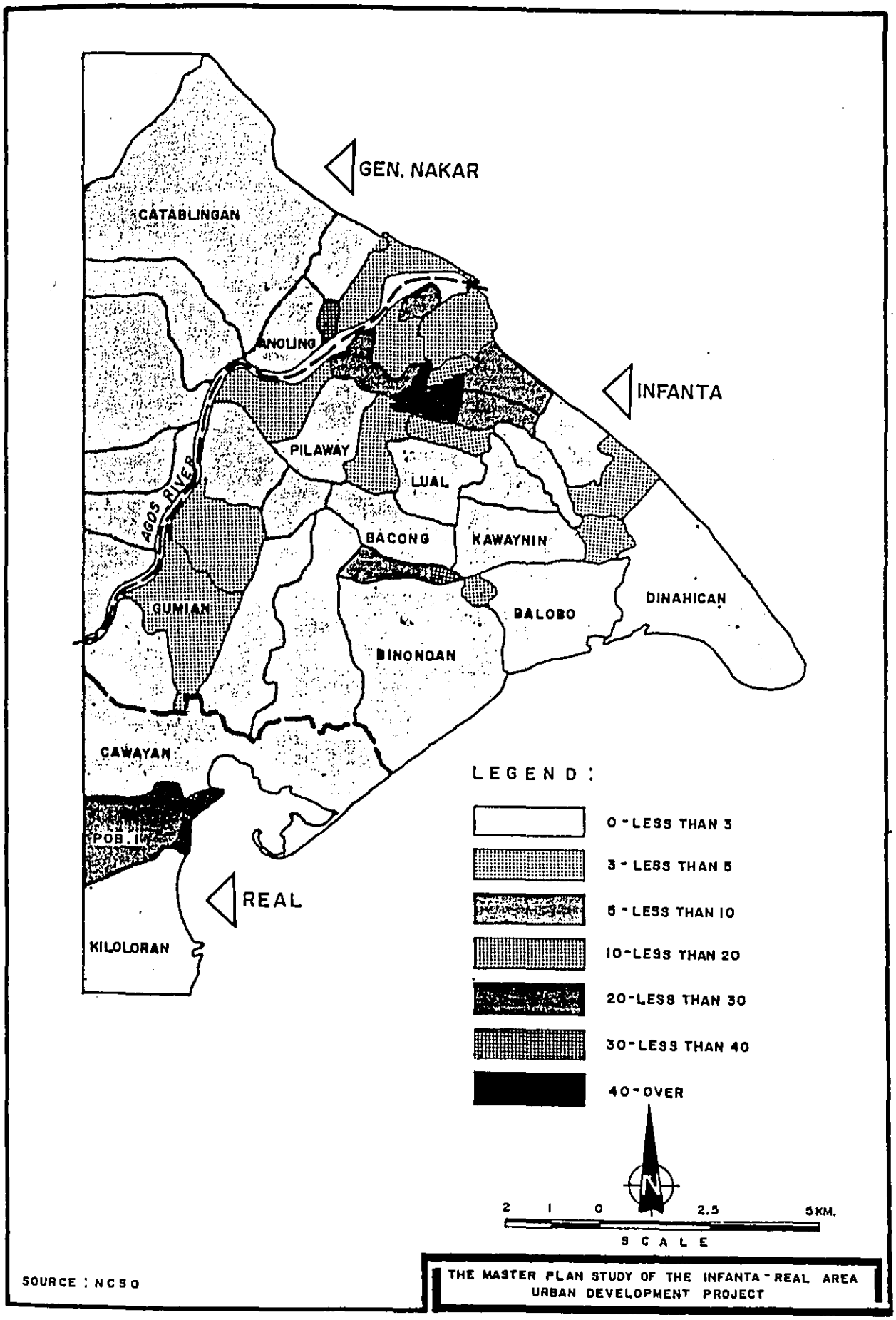


FIG. 3.2.7 POPULATION DENSITY 1975

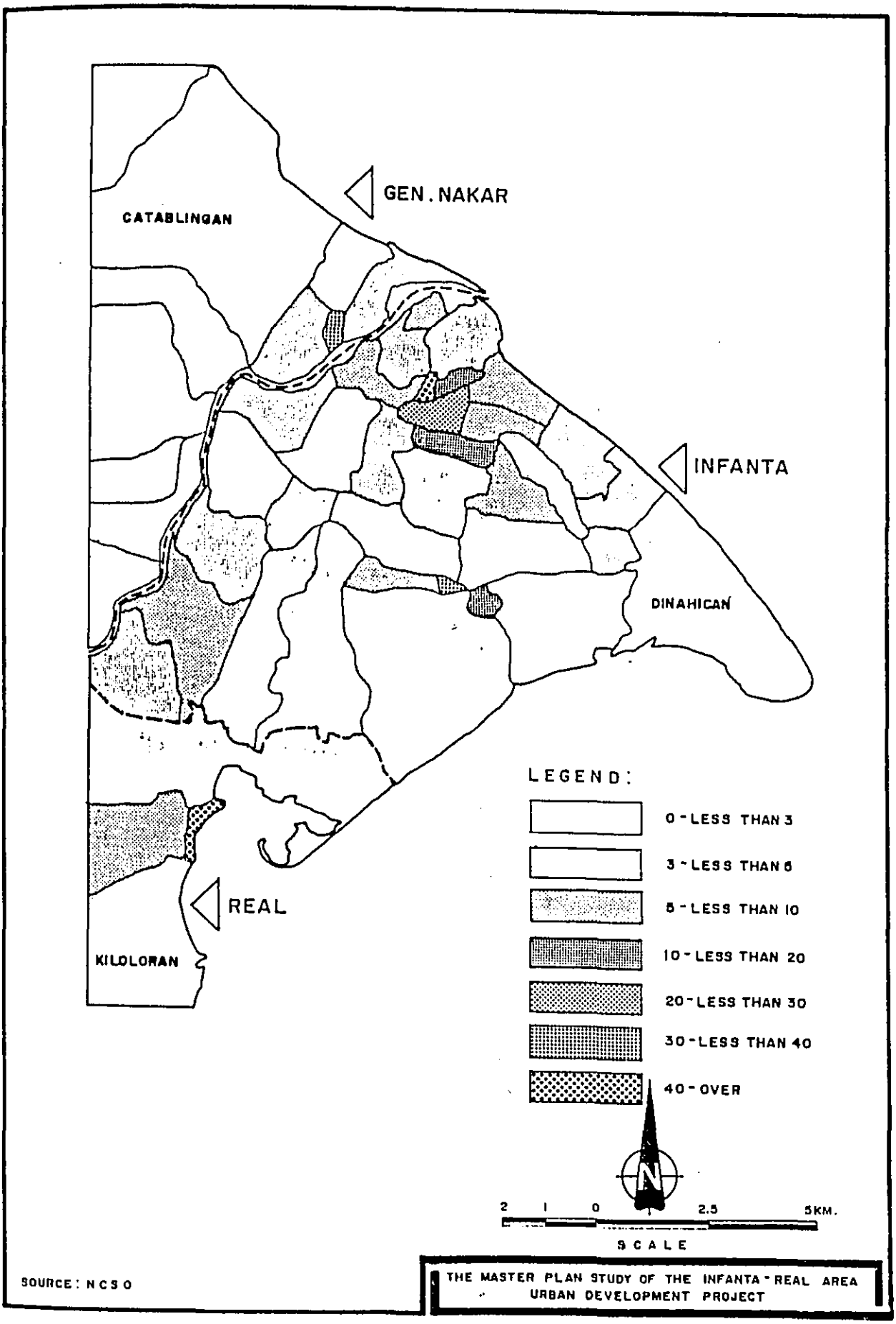


FIG. 3.2.8 POPULATION DENSITY 1980

Table 3.2.5 Population Density

(person/hectare)

MUNICIPALITY/ BARANGAY	LAND AREA IN HECTARES	POPULATION DENSITY 1970	1975	1980
GENERAL NAKAR				
1. Anoling	249.7	2.5	2.7	3.2
2. Banglos	165.1	3.1	3.2	3.7
3. Batangan	300	4.3	1.5	1.4
4. Catablingan	1,828.7	0.5	0.5	0.7
5. Maigang	244.4		1.2	1.2
6. Minahan del Norte	519.5	0.4	0.4	0.3
7. Minaha del Sur	635.2		0.8	0.7
8. Pamplona	198.5	1.5	2.2	2.8
9. Pisa	160.2		2.7	2.8
10. Poblacion	18.6	30.2	33.0	30.3
SUB-TOTAL	4,339.8	1.1	1.2	1.3
INFANTA				
1. Abiawin	211.2	2.9	2.9	3.1
2. Agos-Agos	293.4	0.7	0.9	1.0
3. Alitas	33.0	13.5	16.2	14.8
4. Amolongin	697.3	0.5	0.5	0.6
5. Anibong	107.5	4.4	5.2	5.5
6. Antikin	109.8	2.5	2.8	3.9
7. Bacong	319.7	1.1	1.2	1.2
8. Balobo	521.7	0.5	0.5	0.6
9. Bantilan	17.9	40.4	58.1	73.1
10. Banugao	248.9	4.4	4.9	4.5
11. Barangay 1 (poblacion 01)				
12. Barangay 2 (Poblacion 38)	157.6	24.8	25.9	25.7
13. Barangay 3 (Poblacion 39)				
14. Batican	129.1	2.4	2.8	2.9
15. Binonoan	1,012.3	0.7	0.9	0.9
16. Binulasan	196.9	3.2	3.4	4.2
17. Boboin	1,176.6	3.2	3.8	3.8
18. Comon	211.6	3.4	4.0	4.3
19. Dinahican	999.1	0.8	0.9	1.1
20. Ilog	162.1	5.3	6.0	5.8
21. Ingas	43.1	11.8	12.2	15.7
22. Cumian	1,371.6	5.0	4.5	5.1
23. Katambungan	99.6	3.6	3.8	4.8
24. Kawaynin	420.2	0.8	0.9	0.7
25. Langgas	16.9	28.9	32.1	35.4
26. Libjo	155.4	4.2	5.8	6.9
27. Lual	248.9	1.3	1.9	2.0
28. Magsaysay	314.0	-	2.6	4.6
29. Maypulot	94.3	3.9	4.6	4.9
30. Miswa	68.4	7.8	10.8	14.0
31. Pilaway	280.3	2.2	2.4	2.4
32. Pinaglapatan	80.3	4.6	6.1	6.1
33. Pulo	459.0	0.6	0.9	0.9
34. Silangan	64.3	7.0	6.8	7.4
35. Tongonin	334.0	3.3	3.6	4.0
36. Tudturan	141.7	1.3	1.5	1.6
SUB-TOTAL	8,797.7	2.5	2.9	3.2
REAL				
1. Barangay 1 (Poblacion)	329.7	9.8	8.2	8.9
2. Cawayan	1,149.0	0.6	0.6	0.6
3. Kiloloron	602.1	1.1	1.2	1.5
4. Ungos	35.9	36.3	39.8	49.3
5. Barangay (Polbacion) 61	12.9	-	134.0	171.6
SUB-TOTAL	2,129.6	2.7	3.4	4.0
GRAND TOTAL	15,267.2	2.1	2.5	2.7

(4) Urban Population

Urban areas are included in the administrative units called poblacion for the most part.

In this study, the urbanization process is analyzed by regarding the poblacions as urbanized areas.

According to the census, if the population of the poblacion is regarded as urban population, the rate of urbanization of the three municipalities as a whole shall decline as can be seen from Table 3.2.6 (1975-1980).

The rates of urbanization and urban population by municipality is declining in General Nakar and Infanta, while in Real both rates of urbanization and urban population are increasing.

From the viewpoint of household size, the average of the three municipalities is 5.58 persons/household, and therefore it is presumed that as a consequence of the urbanization process, no change is occurring in the size of the households.

Furthermore, as can be seen from the distribution by economic sector of the working population settled in the urban areas (Table 3.2.7), the population working in non-urban economic sectors (agriculture, fishery and forestry) is 17.7% in Infanta, while in Real the percentage is 52.8% and 41.5% in General Nakar.

The urban areas of Real and General Nakar have the following characteristics instead of settlement of urbanized industry workers:

Real : Settlement of fishermen (384 persons) and farmers (207 persons).

General Nakar : Settlement of farmers.

Table 3.2.6 Poblacion Population and Households (IRM, 1983)

	Population		Households	
	1975	1980	1980	Size
G. Nakar	614 (5.2)	564 (4.7)	107	5.27
Infanta	4,078 (16.1)	4,054 (14.5)	763	5.31
Real	4,436 (33.5)	5,144 (35.6)	911	5.65
Study Area	9,128 (18.2)	9,762 (17.9)	2,782	5.48

Note: Figures in parenthesis are share to the Study Area Poblacion Total.

Source: JICA Study Team

Table 3.2.7 Number of Poblacion Resident Workers by Industry (IRM, 1983)

	General Nakar		Infanta		Real		Total	
	Workers	%	Workers	%	Workers	%	Workers	%
Agriculture, Fishery, Forestry	80	(41.5)	236	(17.7)	591	(52.8)	907	(31.2)
Manufacturing	0	0	78	(5.9)	21	(1.5)	99	(3.4)
Electricity, Gas/Water	0	0	10	(0.8)	0	0	10	(0.3)
Construction	0	0	32	(2.4)	171	(8.0)	143	(4.9)
Wholesale/Retail Trade	6	(3.1)	182	(13.7)	161	(11.7)	349	(12.0)
Transportation, Storage, Communication	0	0	110	(8.3)	184	(13.3)	294	(10.1)
Financing, Insurance, Real Estate, Business Service	0	0	36	(2.7)	0	0	36	(1.2)
Community, Social/Persqnal Services	107	(55.5)	649	(48.7)	312	(22.6)	1,068	(36.8)
Not adequately defined	0	0	0	0	0	0	0	0
Total	193	(100.0)	1,333	(100.0)	1,380	(100.0)	2,906	(100.)

Note: Figures in parenthesis are share to the total poblacion resident workers of each municipality.

Source: JICA Study Team

(5) Population and Number of Households as of 1983

The population and number of households of the IRM area as of 1983 are estimated on the basis of the demographic trend of the NCSO Census population in the 1975-1980 period (Table 3.2.8).

The number of households is estimated by using the average household size by Barangay obtained as a result of the household survey carried out this time.

According to these calculations, the population of the IRM area as a whole is 44423 and the number of households is 7859 with an average of 5.65 persons/household.

Since the population of the project area is 41780 and the number of household totals 7500 as of 1980, their growth rates are 2.07% and 1.4% respectively.

Table 3.2.8 Population and Households (IRM, 1983)

		Population	Household	Size of Household (psn per hh)
	Infanta			
101	Abiawin	678	127	5.34
102	Agos-Agos	282	44	6.38
103	Alitas	453	84	5.39
104	Amolongin	409	73	5.63
105	Anibong	608	107	5.70
106	Antikin	463	99	4.68
107	Dacong	380	77	4.92
108	Dalobo	317	52	6.14
109	Dantilan	1,489	273	5.46
110	Danugao	1,032	181	5.69
111	Poblacion 01	1,237	262	4.73
112	Poblacion 38	953	182	5.25
113	Poblacion 39	1,804	318	5.67
114	Batican	364	73	5.00
115	Binonoan	899	160	5.61
116	Binulasan	936	162	5.78
117	Boboin	669	121	5.53
118	Comon	944	155	6.11
119	Dinahican	1,210	219	5.52
120	Gumian	2,046	339	6.03
121	Ilog	918	156	5.97
122	Ingas	784	143	5.47
123	Katambungan	549	94	5.81
124	Kawaynin	262	59	4.46
125	Langgas	627	115	5.44
126	Libjo	1,188	211	5.62
127	Lual	508	85	6.00
128	Magsaysay	2,111	390	5.41
129	Maypulot	480	90	5.33
130	Miswa	1,120	176	6.35
131	Pilaway	665	119	5.60
132	Pinaglapatan	482	112	4.32
133	Pulo	414	71	5.86
134	Silangan	487	78	6.25
135	Tonguhin	1,421	254	5.60
136	Tudturan	229	41	5.53
	Sub-total	29,418	5,302	5.55
	Real			
201	Poblacion 1	5,648	977	5.78
202	Poblacion 61			
203	Cawayan	745	119	6.27
204	Kiloloron	996	143	6.95
205	Ungos	2,023	337	6.00
	Sub-total	9,412	1,576	5.97
	General Nakar			
301	Anoling	876	186	4.71
302	Batangan	411	53	7.75
303	Catablingan	1,325	225	5.89
304	Maigang	289	51	5.67
305	Minahan del Norte	158	25	6.44
306	Minahan del Sur	435	79	5.52
307	Pamplona	647	104	6.21
308	Poblacion	532	90	5.90
309	Banglos	658	115	5.71
310	Pisa	262	53	4.94
	Sub-total	5,593	981	5.70
	Total	44,423	7,859	5.65

Source: JICA Study Team

2) Demographic Composition By Age Group

The composition of the population by age group in the IRM area as of 1983 consists of 39.1% for juvenile population (ages 0-14), 57.9% for productive population (Ages 15-64) and 3.1% for advanced age population (ages of more than 64 years old) (Table 3.2.9)..

The comparison of the aforesaid composition with the distribution of the Philippines as a whole indicates that the IRM area has a small percentage of juvenile population and a high percentage of productive population.

The same conclusion is drawn from the 1980 comparison of the composition of the 3 municipalities as a whole as of i.e., the population of the IRM area as of 1983 has low percentage of juvenile age population and high percentage of productive age population.

Comparing the three (3) municipalities of the IRM area, Infanta and Real have practically the same composition (Table 3.2.10) with the percentage of aged population of Real being slightly high. On the other hand, General Nakar has higher percentage of juvenile population and lower percentage of productive age population compared with the other two cities.

The demographic composition by age groups classified in units of 5 years is shown in Figs. 3.2.9 to 3.2.12.

The following conclusions are drawn in connection with the demographic composition by age group.

Table 3.2.9 Age Group of the Study Area (IRM, 1983)

(%)

	General Nakar			Infanta			Real			Average		
	M	F	Both Sexes	M	F	Both Sexes	M	F	Both Sexes	M	F	Both Sexes
0 - 14 (A)	45.0	50.2	47.5	37.3	38.9	38.1	38.8	38.0	38.4	38.4	39.8	39.1
15 - 64 (B)	51.5	48.4	50.0	59.3	57.8	58.6	58.3	59.9	59.1	58.3	57.4	57.9
65 & Over (C)	3.5	1.4	2.5	3.4	3.3	3.3	2.9	2.1	2.5	3.3	2.8	3.1
$\frac{(A) + (C)}{(B)}$		100.0			70.6			69.2			72.9	

Source: JICA Study Team

Table 3.2.10 Age Group of Three Municipalities

1980 (%)

	General Nakar			Infanta			Real			Average		
	M	F	Both Sexes	M	F	Both Sexes	M	F	Both Sexes	M	F	Both Sexes
0 -14 (A)	46.4	46.9	46.6	41.8	41.2	41.5	46.8	47.2	47.0	44.2	44.0	44.1
15 -64 (B)	50.9	50.8	50.9	54.4	54.0	54.2	50.5	50.5	50.5	52.6	52.3	52.5
65 & Over (C)	2.7	2.3	2.5	3.8	4.9	4.3	2.6	2.3	2.5	3.2	3.6	3.4
$\frac{(A) + (C)}{(B)}$			96.4			84.5			98.0			90.5

Source: NCSO

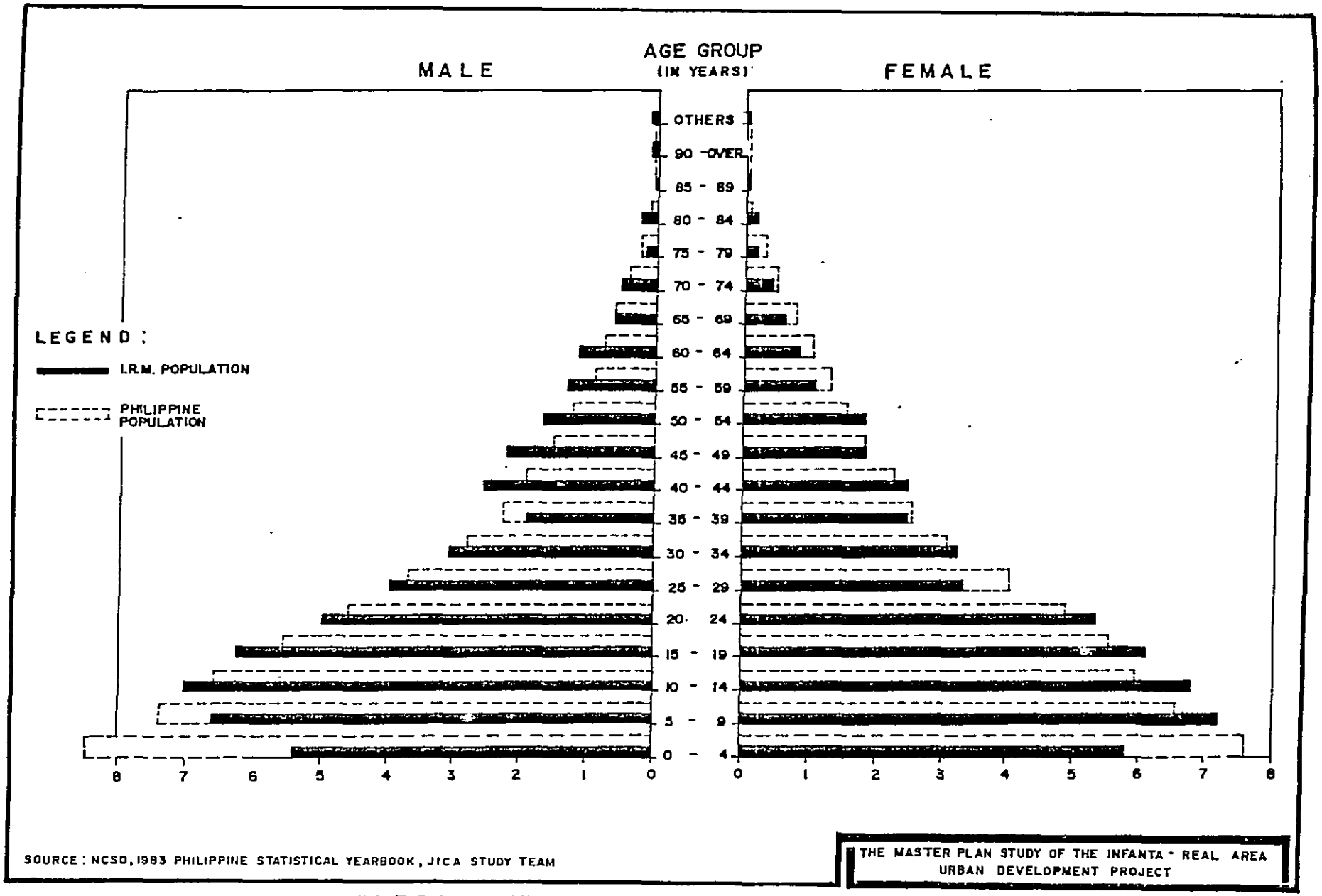


FIG. 3.2.9 POPULATION BY AGE AND SEX
PHILIPPINES' POPULATION (1980) AGAINST I.R.M POPULATION

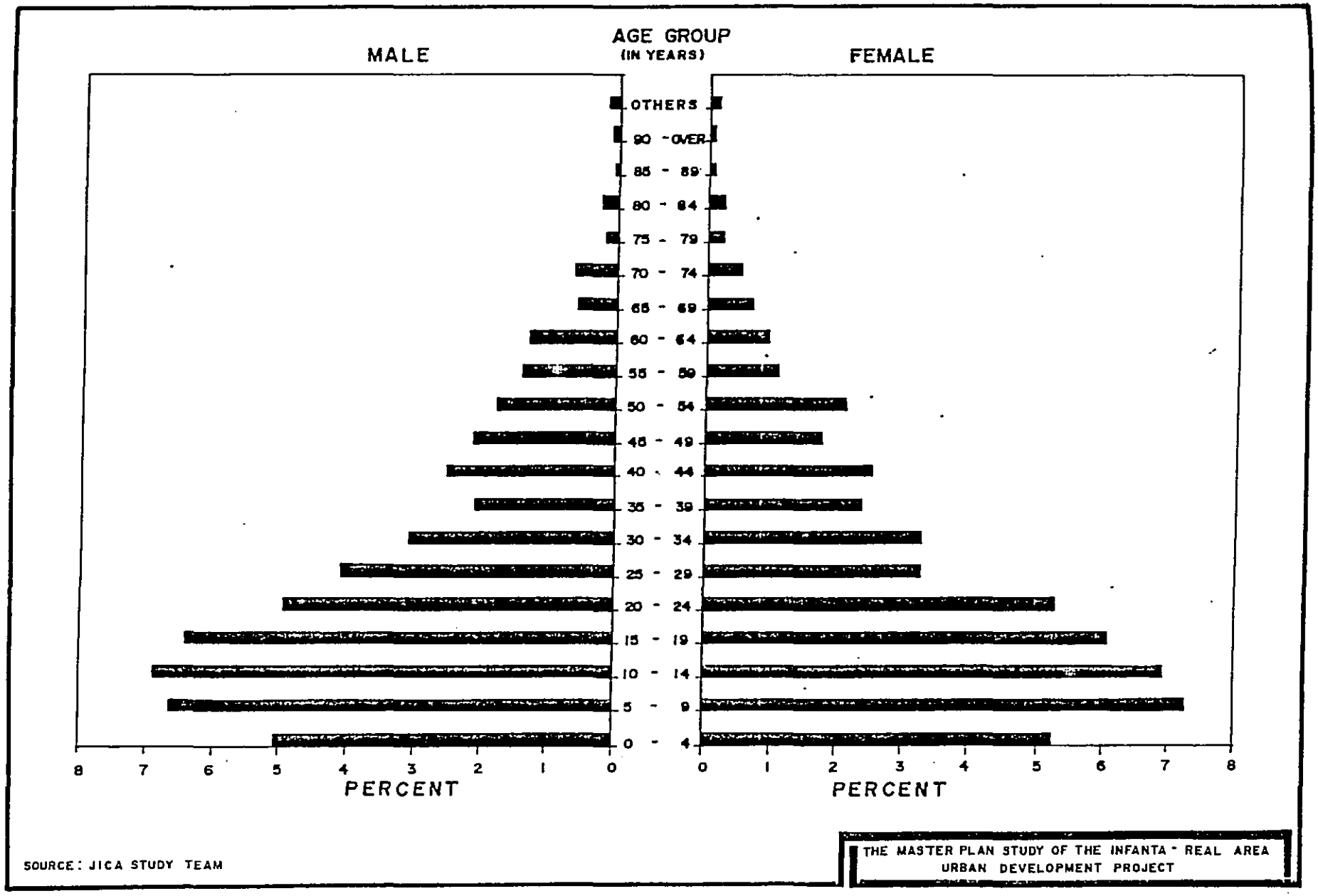


FIG. 3.2.10 POPULATION BY AGE AND SEX
MUNICIPALITY OF INFANTA

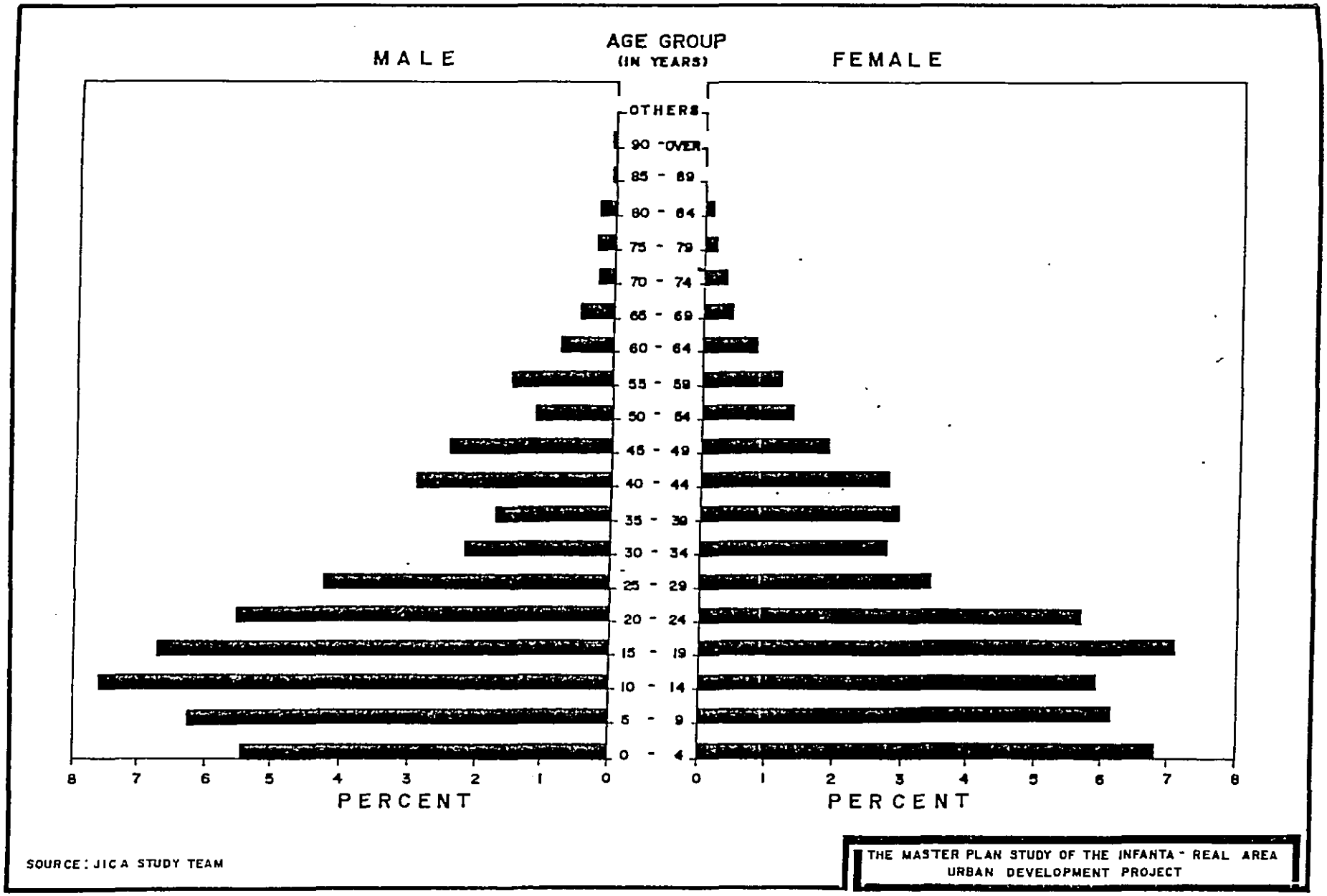


FIG. 3.2.11 POPULATION BY AGE AND SEX
MUNICIPALITY OF REAL

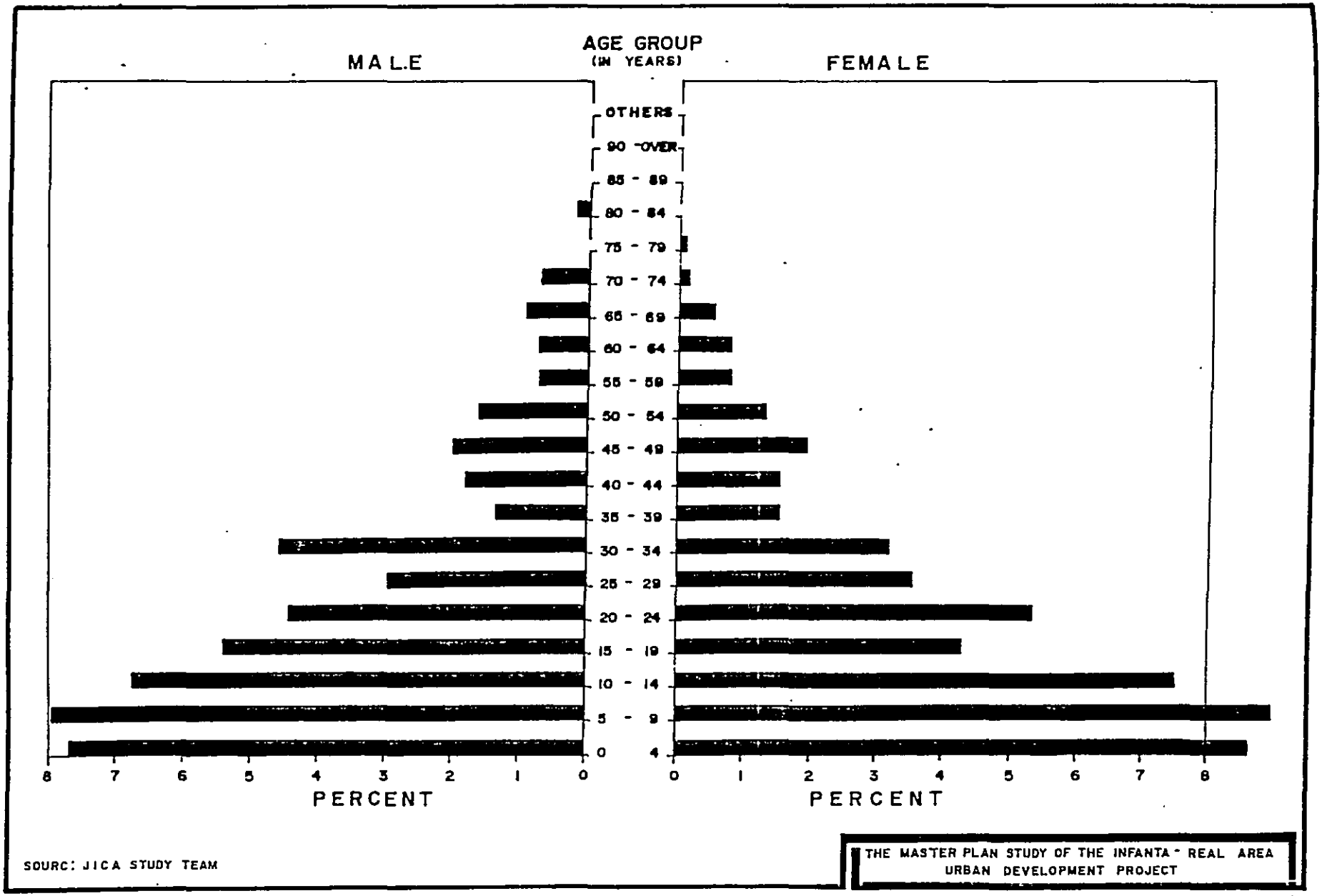


FIG.3.2.12 POPULATION BY AGE AND SEX
MUNICIPALITY OF GENERAL NAKAR

(i) The comparative peculiarities of the IRM and the totality of the Philippines (as of 1980) are described in the following (Fig. 3.2.9).

① In the Philippines, the general tendency is "the younger the age the larger the percentage of emigration", but in the IRM area this tendency does not apply.

Particularly in the case of the 0-4 years old age group, the percentage of this area is pronoucedly below the average of the country as a whole.

Furthermore, another depressison is observed also in the 35-39 years old age group of the IRM population.

② On the other hand, the 5-24 years old age group population (particularly the female population) of this area surpasses the national average. As for the male population, it generally surpasses the national average with the exception of 2 to 3 age groups.

(ii) The following conclusions are drawn from the comparison of the demographc composition by municipality.

① The demographic composition of the 0-4 years old age group is low in Infanta but on the other hand it is high in General Nakar and Real (It is presumed that the demographic maturation process of Infanta is different from that of General Nakar and Real).

② In Infanta, the demographic composition by age group is regular to some extent, but in General Nakar and Real it is completely irregular.

③ It is presumed that the said difference takes place because the demographic data of Infanta expresses the population of the municipality as a whole, while data of General Nakar and Real expresses part of the demographic composition by age group of these municipalities.

The dependency index (total of juvenile population and old age population corresponding to productive age population) as of 1983 is 72.9 (per 100 head) for the study area as a whole, and is far below the national average of 86.6 as of 1980 and the average of 3 municipalities (90.5) as of 1980.

The said discrepancy is attributed to the reduction of the 0-4 years age group population. The distribution of the dependency index by Barangay is shown in Fig. 3.2.13. As shown, the hilly districts and swamp districts of General Nakar and Infanta have high indeces.

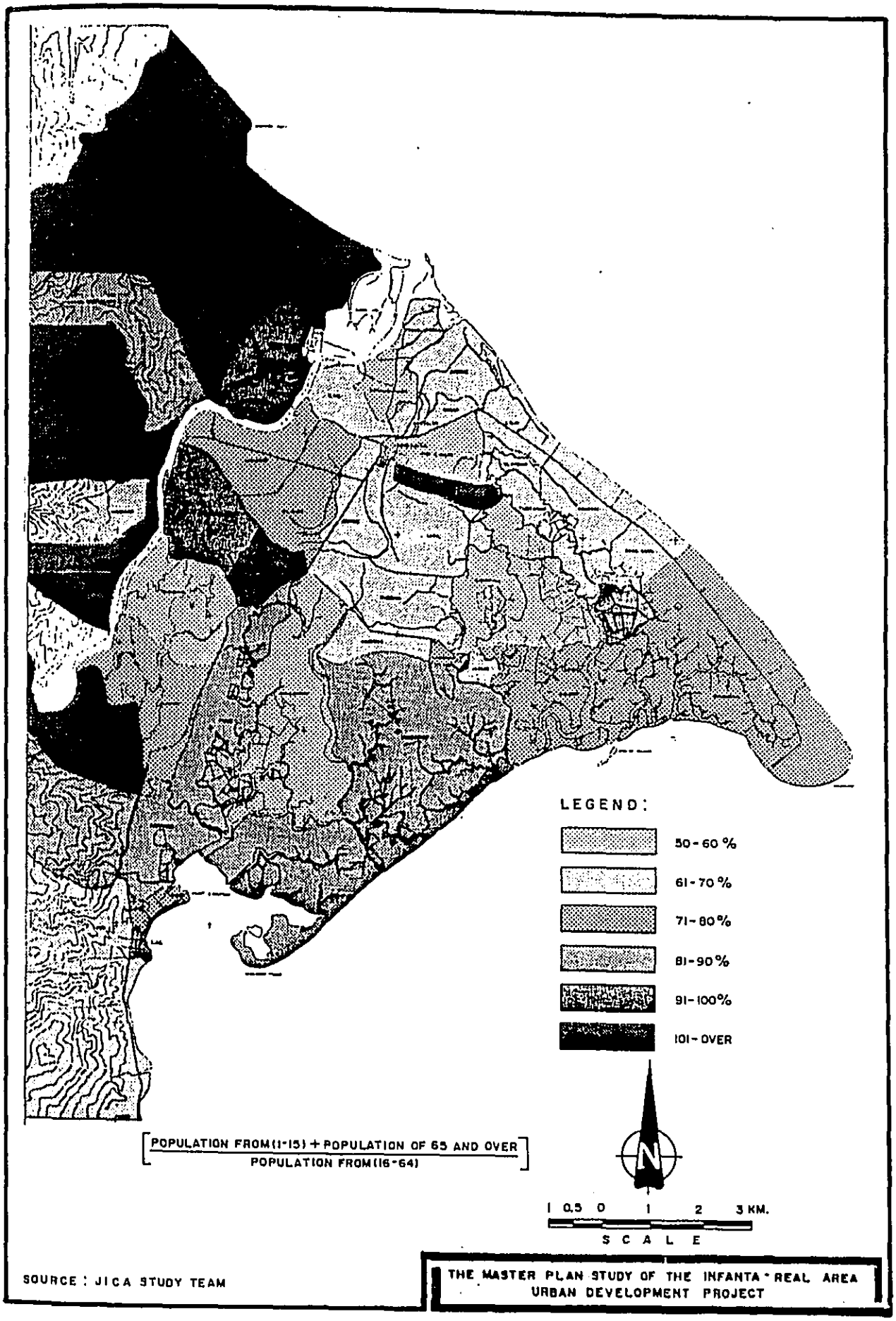


FIG. 3.2.13 DEPENDENCY INDICATOR

3) Demographic Composition by Vocation Groups

The total population of 44.423 inhabitants of the project area consists of 26.1% workers, 27.8% (12,366 inhabitants), students and 46.1% (20461 inhabitants), non-workers (Table 3.2.11). The non workers consist mostly of children, aged, housewives, etc.

By municipality, General Nakar and Real have higher percentage of non workers and lower percentage of workers and students compared with Infanta.

In terms of composition of workers population by vocational group, farmers has the largest percentage totalling 32.6% followed by the production workers, operators of transportation equipment and laborers totalling 21.5% (Table 3.2.12).

Compared with the national average, the percentage of administrative and managerial workers, clerical and related workers, sales workers, etc., is low indicating the predominantly rural characteristics of IRM.

The percentage of service workers and laborers is high due to the same reason.

The vocational group composition by zone of each Barangay is shown in Fig. 3.2.14. The following conclusions are drawn from this figure:

(i) The hilly districts of General Nakar (Group 2) and the swamp district of Infanta (Group 5) shows a pattern with relative predominance on agriculture.

(ii) There is diversification in terms of occupational groups in the flatland district of Infanta and Real.

(iii) The most important occupational groups in the shoreline district of Infanta are agriculture and fishery.

Table 3.2.11 Share of Workers, Students and Non-Workers

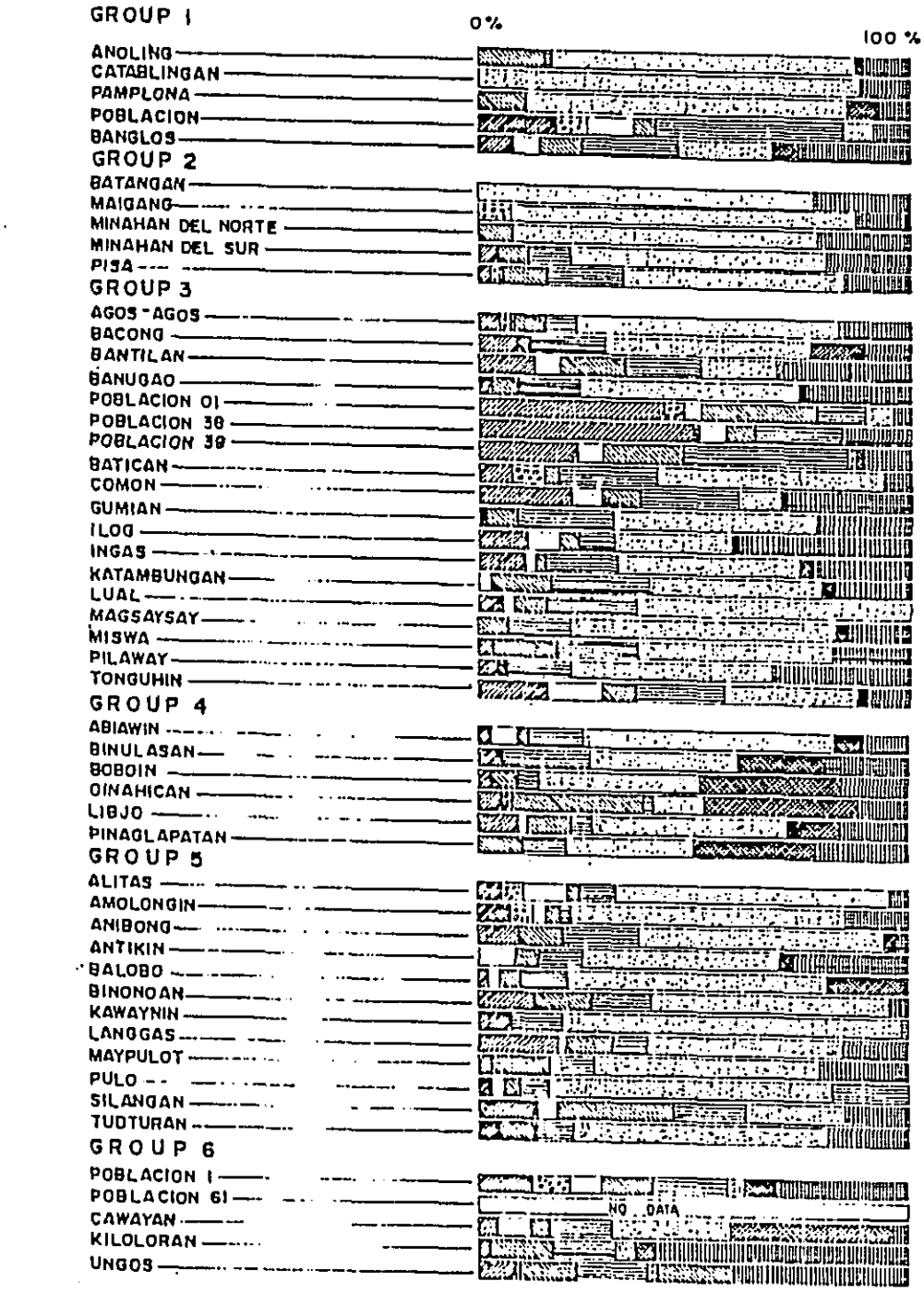
	Percentage Over Total Population			
	Gen. Nakar	Infanta	Real	Average
Workers	22.7	27.4	24.0	26.1
Students	24.2	29.0	26.4	27.3
Non-workers	53.1	43.6	49.6	46.1

Source: JICA Study Team

Table 3.2.12 Share by Occupation

	PERCENTAGE OVER TOTAL WORKERS			
	Gen. Nakar	Infanta	Real	Average
1. Professional, Technical Related Workers	4.3	12.0	9.7	10.7
2. Administrative, Managerial Workers	1.3	0.6	0.6	0.7
3. Clerical and Related Workers	1.8	3.2	5.3	3.4
4. Sales Worker	5.2	10.5	12.0	10.2
5. Service Workers	9.4	15.6	16.5	15.1
6. Agricultural, Animal Husbandry	59.6	35.8	5.8	32.6
7. Forestry	0	0.2	0	0.1
8. Fishermen	1.8	4.9	10.8	5.7
9. Production Workers, Transport Equipment And Laborers	16.7	17.2	39.3	21.5

Source: JICA Study Team



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

FIG.3.2.14 PERCENTAGE OF MAJOR OCCUPATION GROUP

4) Social Movement

On the basis of the results of the field survey, the migration trend in the project area is identified as follows:

(i) Immigration trend is estimated in the form of the average immigration in the 1975-1983 period shown in Fig.3.2.15 based on the survey carried out in the settlement in 1975 (20% sampling).

According to this estimation, there is an annual average immigration of 479 persons in the project area, consisting of 46.3% (222 persons) of local immigration within the IRM and 30% (144 persons of immigration from areas of the 3 municipalities located outside the study area. Furthermore, the immigration from other municipalities to IRM accounts for 23.4% (113 persons from Manila accounts for 25 inhabitants which corresponds to 22.1% of the immigration from outside the 3 municipalities).

Another conspicuous tendency is the immigration from mountainous districts (outside IRM Study) to flatlands (IRM) and 77% (111 persons/year) of this flow converges to the Infanta district inside IRM.

(ii) Emigration

The emigration of members of households settled in the IRM as of December 1983 is examined here.

The status of the emigration of members of households settled in the IRM in the last 10 years is shown in Fig. 3.2.16.

The annual average outflow is 202 persons, and 90% of which outflows to the areas outside the three municipalities. A half of this outflow (86 persons, 47.3%) goes to Manila.

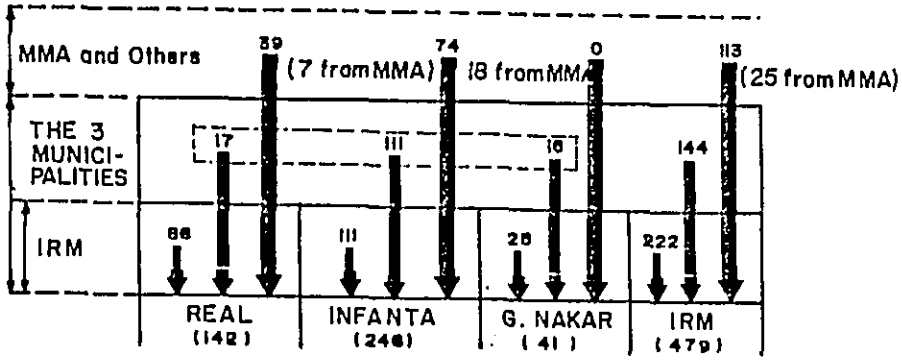
The outflow from the planning area into other areas of the three municipalities is very minimal.

The majority of the outflux to outside the three municipalities is that of Infanta, which constitutes 57.4% of the total outflux.

Due to the fact that there are some households which move out completely, the actual total of the outflux is not certain. However, even when this figure of outflux is compared with the abovementioned figure of outflux, there still shows an excess of 182 persons outflux.

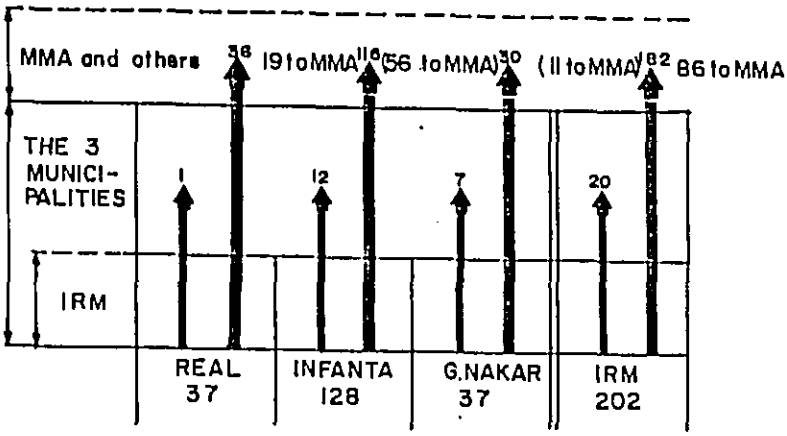
On the other hand, when the planning area and other areas of the three municipalities are compared, the concentration of population is indicated (inflow 144, outflow 20).

Marriage is one of the reasons that led to majority of emigration cases (Table 3.2.13). This fact is presumed to have close relationship on the reduction of juvenile population previously mentioned. Employment (25.5%) and school (3.6%) are other important reasons for emigration.



RESULT OF I.R.M. HOUSEHOLD SURVEY
AS OF DECEMBER 1983

FIG. 3.2.15 AVERAGE IN-MIGRATION (1975-1983)



RESULT OF I.R.M. HOUSEHOLD SURVEY
AS OF DECEMBER 1983

FIG. 3.2.16 AVERAGE ANNUAL OUT-MIGRATION OF HOUSEHOLD MEMBERS IN LAST 10 YEARS

SOURCE : JICA STUDY TEAM

Table 3.2.13 Reason of Out Migration
(IRM, 1983)

%

	Gen. Nakar	Infanta	Real	Average
Separated	-	1.0	-	0.8
Work	17.4	23.3	37.7	25.5
Marry	78.3	68.7	46.4	65.3
School	-	2.7	8.7	3.6
Others	4.3	4.3	7.2	4.8
Total	100	100	100	100

Source: JICA Study Team

5) Income by Household

The average income per household of the project area is 8400 pesos per year. By municipality, Real has the highest level (10800 Pesos/year), followed by Infanta.

As for the composition by economic sector which the breadwinner of the household belongs to (Table 3.2.14) total income by agriculture accounts for 35.0% of the households settled in IRM, while the social service sector accounts for 33.4% of the income. The percentage shared by the fishery sector is barely 5.2%.

On the other hand, the distribution by economic sector in municipality is as follows:

(i) The agricultural sector accounts for a total of 44.2% of Infanta, surpassing the average;

(ii) The percentage shared by the agricultural sector is extremely low in Real accounting for barely 5.5%;

(iii) The percentage share of the fishery sector in Real surpasses that of Infanta;

(iv) The percentage share by the manufacturing sector is extremely high (23.8%) in Real.

As shown, the agricultural and social service sectors are the principal sources of income in Infanta. In Real, there is considerable diversification of the economic activities among fishery, manufacturing, wholesale and retail commerce, etc., instead of absolute predominance of agriculture.

The average income per household in the various economic sectors are inclined as follows (Table 3.2.15):

(i) The income of households engaged in primary industries such as agriculture, fishery, etc., is out-numbered by the income of households engaged in secondary industries;

(ii) With the exception of some economic sectors, the income per household of Real outnumbers that of Infanta.

Next, the distribution by Barangay of the income per household is shown in Fig. 3.2.17. Furthermore, the distribution of income by source is shown in Fig. 3.3.18. Generally, strong reliance on the agriculture is observed in the Poblacion of Real and Ungos, etc., the agriculture is outnumbered by other sectors.

Table 3.2.14 Mean of Household Income and Contribution of Income by Industry to Total Income

	G. Nakar	Infanta	Real	Total
Mean Household Income (₱) Average	5,900	8,300	10,800	8,400
Agriculture	(60.7%)	44.2%	5.5%	35.0%
Fishery	(1.0)	4.6	7.8	5.2
Forestry	(3.6)	0.5	0.9	0.8
Mining, Quarrying	(0)	0	0	0
Manufacturing	(0)	3.4	23.8	2.9
Electricity, Gas, Water	(0.3)	0.9	0	0.6
Construction	(21.5)	5.5	6.1	6.7
Wholesale, Retail Trade	(1.3)	3.9	17.0	7.2
Transportation, Communication	(1.7)	7.0	10.3	7.5
Financing, Insurance	(0)	0.4	1.1	0.5
Community, Social, Personal Service	(10.2)	29.5	48.9	33.4

Source: JICA Study Team

Table 3.2.15 Mean Household Income by Industry

	Gen. Nakar	Infanta	Real	Total
AVERAGE	5,900	8,300	10,800	8,400
Agriculture	4,800	7,400	10,900	7,100
Fishery	3,000	6,200	7,700	6,500
Forestry	5,000	12,000	12,000	8,100
Mining, Quarrying	-	-	-	-
Manufacturing	-	8,000	11,000	8,400
Electricity, Gas, Water	2,000	12,000	-	12,000
Construction	13,000	8,600	6,800	8,800
Wholesale, Retail Trade	6,000	9,900	19,600	13,300
Transportation, Communication	5,000	11,800	9,800	10,800
Financing, Insurance	-	13,000	15,000	13,800
Community, Social, Personal Service	10,300	9,400	10,700	9,800

Source: JICA Study Team

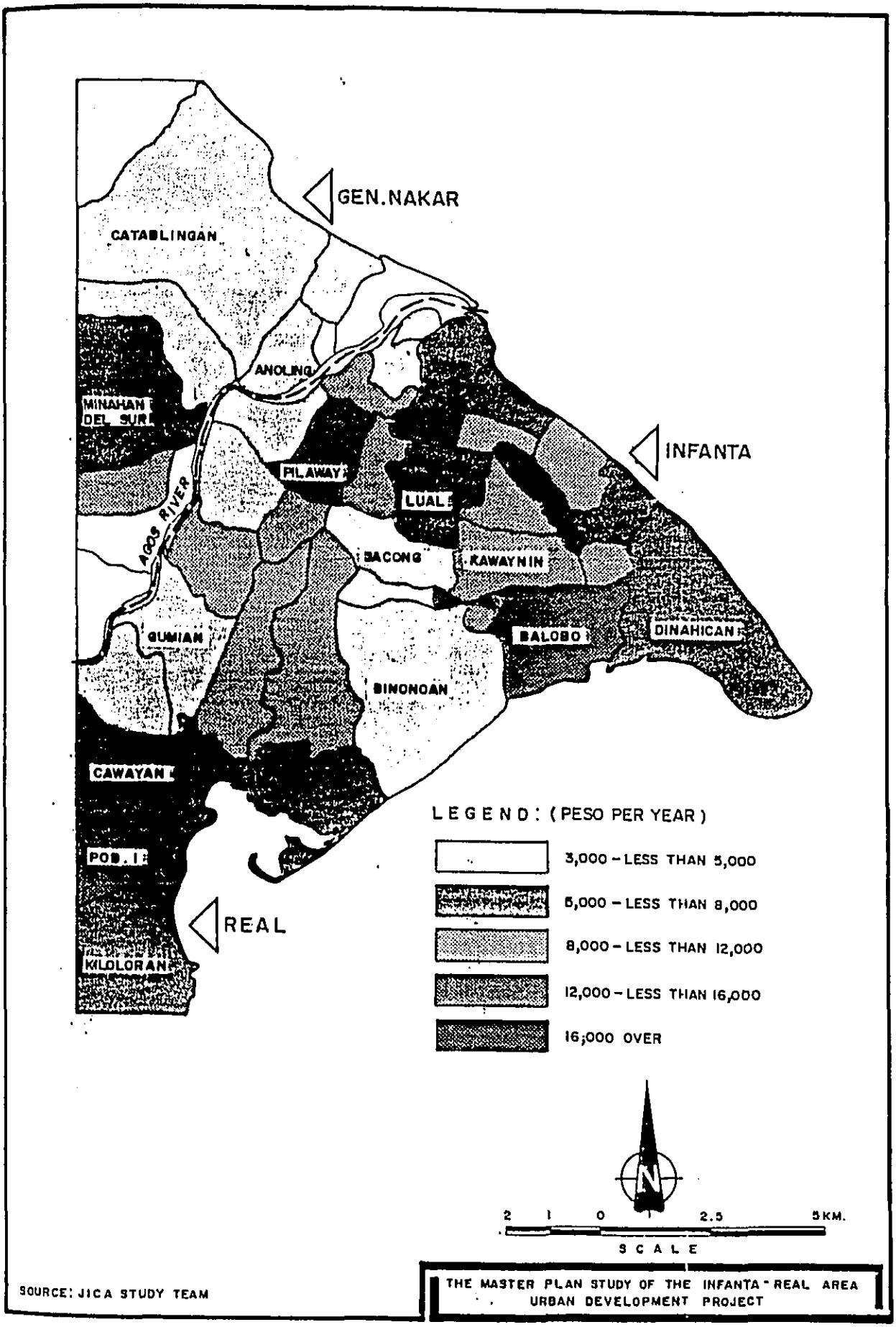


FIG.3.2.17 AVERAGE HOUSEHOLD INCOME 1983

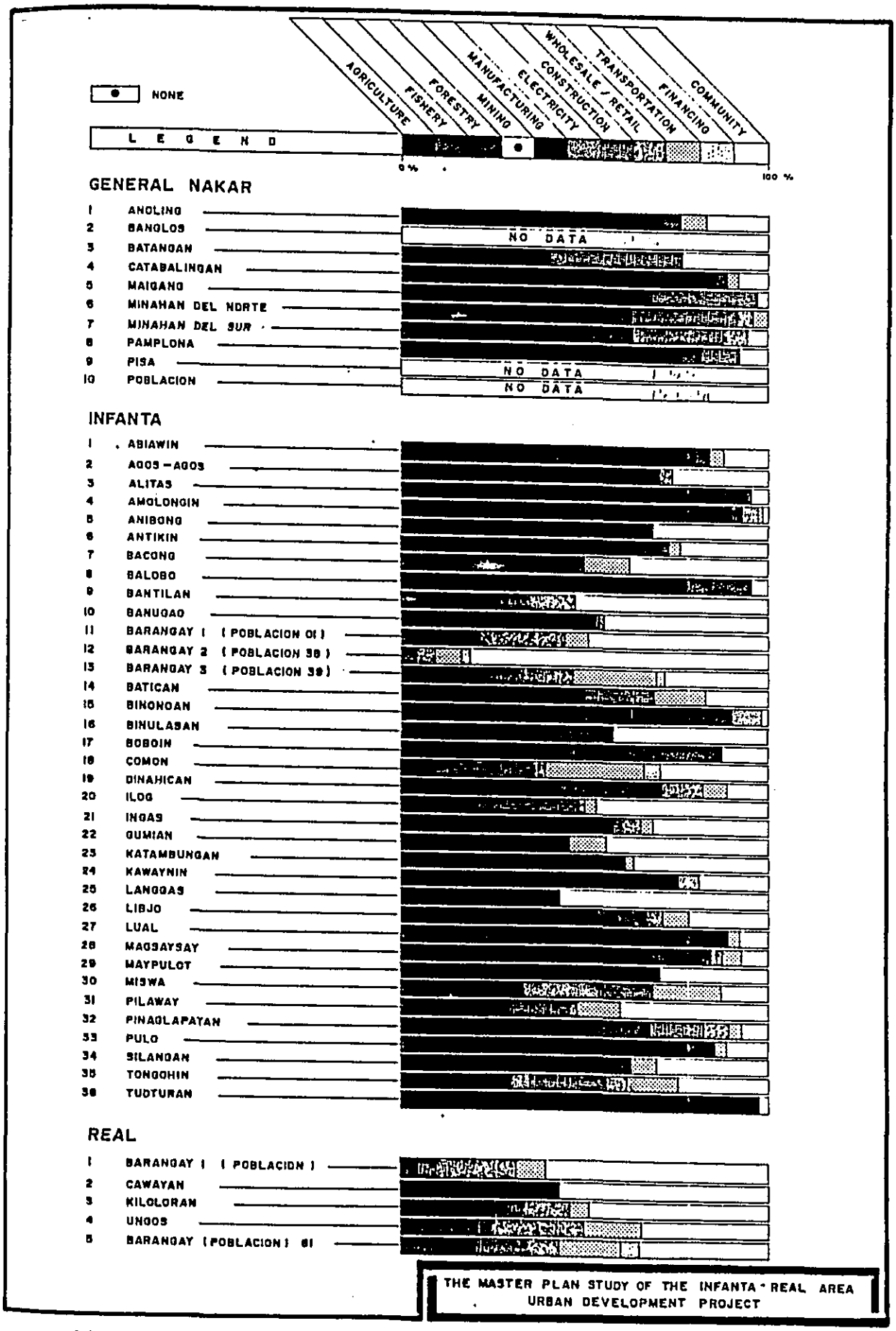


FIG.3.2.18 COMPOSITION OF INCOME SOURCE BY BARANGAY

3.3 Characteristics of the Economy

3.3.1 Establishments (non-public sector)

1) Outline

As shown in Table 3.3.1, the total number of establishments based on the registration list submitted from each municipality registered in IRM is 589 as of December 1983.

- o Non registered persons not included.
- o No establishment form such as banca owner not included
- o The secondary and tertiary industry only, no primary industry included.
- o No public facilities included.

(i) As for the composition by sector, the wholesale and retail trade leads the list with more than a half of the total (56.4%), followed by the transportation and communication sector with a 29.2%. These two sectors account for approximately 86% of the total. The percentage shared by the manufacturing sector is barely 8.7%.

(ii) As for the location of the establishments, the total number of establishments located in the project area are distributed in Infanta, Real and General Nakar in conformity with 7:2:1 rate.

(iii) The wholesale and retail trade and the transportation and communication sectors account for approximately 3/4 of the workers of these establishments, while the secondary industry (mining and industry) shares 16%.

(iv) In terms of the size of establishments (average number of workers per establishment), the transportation and communication sector has the smallest scale, while the mining, quarrying and the financing/insurance sector have the largest scale.

(v) As for the size of establishment by municipality, Infanta leads the list with 2.3 workers in average, followed by Real with 2.1 and General Nakar with 2.0. As a result, the concentration of establishments in Infanta is 69.9%.

As can be seen, Infanta has the largest concentration of economic activities in IRM surpassing by far the other two municipalities both in terms of the number of establishments and workers. Therefore, Infanta seems to have already acquired the form of a city in view of the concentration of establishments, while the other two municipalities are at a stage of economic development that can not be regarded as a city yet (Tables 3.3.2 and 3.3.3).

Overall, 99.4% of the number of establishments and 77.3% of the number of workers have small-scale establishment with less than five workers. More than 80% of these small-scale establishments (both in terms of number of establishments and number of workers) consist of wholesale/retail commerce (principally Sari-Sari Stores) and transportation/storage/communication (principally tricycles) establishments.

There are 34 so-called major establishments with 5 or more workers, consisting mostly of wholesale/retail commerce and manufacturing industry that are concentrated principally in Infanta.

Table 3.3.1 Number of Establishments and Workers

ITEM	NO. OF ESTABLISHMENTS				NO. OF WORKERS				Average no. of workers per establishment
Municipality/Industrial Group	Gen.Nakar	Infanta	Real	Total	Gen. Nakar	Infanta	Real	Total	
Mining, Quarry	1(1.7)	2(0.5)	0(0)	3(0.5)	1(0.9)	12(1.3)	0(0)	13(1.0)	4.3
Manufacturing	5(8.6)	37(9.2)	9(6.9)	51 (8.7)	6(5.7)	153(6.9)	54 (19.5)	213(16.4)	4.2
Electricity, Gas	0(0)	0(0)	1(0.8)	1(0.2)	0(0)	0(0)	2(0.7)	2(0.2)	2.0
Construction	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	-
Wholesale, Retail Trade	36(62.1)	230(57.4)	66(50.8)	332(56.4)	87(76.3)	501(55.3)	131(47.3)	719(55.4)	2.2
Transportation, Storage, Comm.	15(25.9)	114 (28.4)	43 (33.1)	172(29.2)	19(16.7)	147(16.2)	64(23.1)	230(17.7)	1.3
Financing / Insurance	0(0)	2(0.5)	7(0.8)	3(0.5)	0(0)	44(4.9)	6(2.2)	50(3.9)	16.7
Community, Social, Personal Serv.	1(1.7)	16(4.0)	10(7.7)	27(4.6)	1(0.9)	49(5.4)	20(7.2)	70(5.4)	2.6
Total	58(100.0)	401(100.0)	130(100.0)	589(100.0)	114(100.)	906(100)	277(100)	1,297(100.0)	2.2

Note: Figures in parenthesis are (%) share to the total.

Source: JICA Study Team

	G. N.					INFANTA					REAL					TOTAL				
	TOTAL	1-2	3-4	5-9	10 OVER	TOTAL	1-2	3-4	5-9	10 OVER	TOTAL	1-2	3-4	5-9	10 OVER	TOTAL	1-2	3-4	5-9	10 OVER
MINING/QUARRYING	1	1	0	0	0	2	0	1	1	0	0	0	0	0	0	3	1	1	1	0
MANUFACTURING	5	5	0	0	0	37	19	8	8	2	9	5	2	1	1	51	29	10	9	3
ELECTRICITY, GAS	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0
CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHOLESALE, RETAIL	36	22	13	1	0	230	172	48	10	0	66	56	5	5	0	332	250	66	16	0
TRANSPORTATION, STORAGE, COMMUN.	15	15	0	0	0	114	109	4	1	0	43	42	1	0	0	172	166	5	1	0
FINANCING INSURANCE	0	0	0	0	0	2	0	0	1	1	1	0	0	1	0	3	0	0	2	1
COMMUN., SOCIAL PERSONAL SERVICES	1	1	0	0	0	18	8	7	1	0	10	8	2	0	0	27	17	9	1	0
T O T A L	58	44	13	1	0	401	308	68	22	3	130	112	10	7	1	589	464	91	30	4

Table 3.3.2 NO. OF ESTABLISHMENT BY SIZE OF ESTABLISHMENT

	G. N.					INFANTA					REAL					TOTAL				
	TOTAL	1-2	3-4	5-9	10 OVER	TOTAL	1-2	3-4	5-9	10 OVER	TOTAL	1-2	3-4	5-9	10 OVER	TOTAL	1-2	3-4	5-9	10 OVER
MINING/QUARRYING	1	1	0	0	0	12	0	4	8	0	0	0	0	0	0	13	1	4	8	0
MANUFACTURING	6	6	0	0	0	153	27	31	60	35	54	8	7	9	30	213	41	38	69	65
ELECTRICITY, GAS	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	2	2	0	0	0
CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHOLESALE, RETAIL	87	36	45	6	0	501	258	172	71	0	131	82	15	34	0	719	376	232	111	0
TRANSPORTATION, STORAGE, COMMUN.	19	19	0	0	0	147	127	13	7	0	64	60	4	0	0	230	206	17	7	0
FINANCING INSURANCE	0	0	0	0	0	44	0	0	10	34	6	0	0	6	0	50	0	0	16	34
COMMUN., SOCIAL PERSONAL SERVICES	1	1	0	0	0	49	15	27	7	0	20	11	9	0	0	70	27	36	7	0
T O T A L	114	83	45	6	0	906	427	247	163	69	277	163	35	49	30	1297	653	327	218	99

Table 3.3.3 NO. OF WORKERS BY SIZE OF ESTABLISHMENT

2) Activity of the Establishments by Sector

(1) *Mining/Quarrying Sector*

All establishments of the mining sector of IRM are gravel pits, with 2 located in Infanta and 1 located in General Nakar. The output of these three (3) establishments amounts to 537,000 Pesos (as of 1983).

In the manufacturing sector there are 51 establishments totalling 213 workers and an output of 7,863.00 Pesos. The sewing establishments play the leading part in terms of the number of establishments, the forestry establishments in terms of number of establishments and the saw mill in terms of output (Table 3.3.4).

(i) The manufacturing establishments located in the study area consists mostly of service industry supplying the daily necessities, with the exception of a very small number of other establishments (saw mills of Real).

(ii) The proportion of the output of manufacturing industries by size of establishment (Table 3.3.5) has the following characteristics:

① Most of the output of the manufacturing industry of General Nakar consists of small businesses with 1 or 2 workers.

② In Infanta, there is a predominance of medium sized establishments with 5 to 9 workers.

③ Establishments with 10 or more workers account for majority of the output of manufacturing industries located in Real.

(iii) The following conclusions are drawn from the distribution of municipality of the output of manufacturing industries of the study area (Table 3.3.6).

① Infanta accounts practically the most of the output of industries related to daily necessities such as tailoring, bakery, rice mill and others (welding, distillery), because it has the most number of population of the study area. In terms of rice mill, most of the cultivation of rice is carried out in Infanta, and this municipality functions as a base or supply of foodstuff to the IRM.

② Wood industry with products like wood furniture comprises wood carving, rattan, tanning, charcoal, etc., and Real plays a leading part in the sector due to the advantage of its port.

③ All saw mills are located in Real Port, which accounts for 100% of the output.

Table 3.3.4 Number of Establishments, Workers and Amount of Shipment of Manufacture

	No. of Establishments	No. of workers	Amount of Shipment
Tailoring	16(31.4)	25(11.7)	191(2.4)
Bakery	6(11.8)	34(16.0)	1,115(14.2)
Rice Mill	14(27.5)	33(15.5)	319(4.1)
Wood, Furniture	12(23.5)	80(37.6)	877(11.2)
Others	2(3.9)	11(5.2)	362(4.6)
Sawmill	1(2.0)	30(14.1)	5,000(63.6)
Total	51 (100.0)	213(100.0)	7,863 (100.0)

Note: Figures in parentheses are share (%) to the total.

Source: JICA Study Team

Table 3.3.5 Share of Amount of Shipment of Manufacture by Size (IRM, 1983)

	Size By Number of Workers			
	1 - 2	3 - 4	5 - 9	10 - over
Gen. Nakar	100 %	0 %	0 %	0 %
Infanta	9.1	13.5	73.5	3.9
Real	5.9	1.1	5.1	87.9
Total	7.0	4.5	23.9	64.6

Source: JICA Study Team

Table 3.3.6 Share of Amount of Shipment of Manufacture by Municipality (IRM, 1983)

	Gen. Nakar	Infanta	Real
Tailoring	0.0 %	100 %	0.0 %
Bakery	0.0	94.5	5.5
Rice Mill	5.0	93.8	1.1
Wood, Furniture	0.0	29.0	71.0
Others	0.0	100.0	0.0
Sawmill	0.0	100.0	0.0
Total	0.2	27.5	72.3

Source: JICA Study Team

(2) Wholesale/Retail Commerce

In the wholesale/retail commerce sector, there are 332 establishments that account for 719 workers and a turnover of 14,107,000 Pesos (Table 3.3.7).

Of this total, wholesale commerce accounts for barely 4.4%, and the location of wholesale establishments in IRM is very rare.

(Wholesale Commerce)

The turnover of the wholesale commerce is barely 590,000 Pesos.

There are 2 establishments in Infanta and 1 establishment in General Nakar, consisting of 2 copra dealers and 1 fish dealer.

Both copra dealers have 1 worker each, with a turnover of 100,000 to 200,000 Pesos/year, and are therefore, considered private establishments.

On the other hand, fish dealer is located in the urban area of Infanta. It has 4 workers and an annual turnover of 500,000 Pesos.

The wholesale establishments of the study area have the following functions:

(i) Producing center and wholesaler that gathers products such as copra, lumber, charcoal, fishes, etc., from Infanta and delivering there to market places of Manila and other consumer centers.

(ii) Consumer center wholesaler that brings in daily necessities from Manila and other place in order to distribute them in market places (retail commerce) of Infanta and environs.

The dealers described above account for function (i), but the local wholesale commerce is not so developed because dealers and manufacturers of Manila and other major economic center of the country carry out direct gathering of local produces.

As for the function (ii), local retail establishments purchase their commodities directly from wholesalers of Manila and other centers.

Table 3.3.7 Number of Establishments, Workers and Amount of Sales of Wholesale and Retail Trade (IRM, 1983)

		Wholesale	Retail Trade	T O T A L
Number of Establishments	Gen. Nakar	1(33.0)	35(10.6)	36(10.8)
	Infanta	2(67.0)	228(69.3)	230(69.3)
	Real	0(0)	66(20.0)	66(19.9)
		3(100.0)	329(100.0)	332(100.0)
Number of Workers	Gen. Nakar	1(16.7)	86(12.1)	87(12.1)
	Infanta	5(83.3)	496(69.6)	501(69.7)
	Real	0(0.0)	131 (18.4)	131 (18.2)
		6(100.0)	713(100.0)	719 (100.0)
Amount of Sales (1000 pesos)	Gen. Nakar	130(22.0)	405.0(3.0)	535.0(3.8)
	Infanta	460(78.0)	10,696.0(79.1)	11,156.0(79.1)
	Real	0(0.0)	2,416.0(17.9)	2,416.0(17.1)
		590(100.0)	13,517.0(100.0)	14,107.0(100.0)

Source: JICA Study Team
Note: Figures in parentheses are (%) share to the total.

(Retail Commerce)

The turnover of the retail commerce establishments of IRM totalling 13,517,000 Pesos (as of 1983) (Table 3.3.8). This turnover divided by the population of IRM is approximately 324 Pesos/person-year (population as of 1980).

The principal characteristics of the retail commerce of the IRM are as follows:

(i) As mentioned in the case of the wholesale commerce, the commodities procured in the local market places are mostly rice, bread and some wood products. Most of the commodities handled by the retail commerce of IRM came from Manila and other centers of the country.

(ii) As for the imports from outside the study area, they are handled through the following routes, as mentioned in the case of the wholesale commerce:

① Direct wholesale purchase of the local retail establishments in Manila and other major centers of the country.

② Bulky and heavy commodities that can gather in the form of relatively large transportation batches, such as drinks, beer, etc., are delivered from Manila manufacturers and wholesalers.

(iii) Sari-Sari (variety) stores play a predominant part retail commerce not only in IRM but also the Philippines. They are grocery stores or generally stores stocked with various kinds of daily necessities. Most of them are small-scale shops in some case they have both the scale and the functions of a supermarket.

(iv) These stores are scattered throughout the settlements of IRM, and sell basic daily necessities to the population.

These stores obtain the commodities they sell from the large scale Sari-Sari stores located in principal urban centers of other retail establishments.

Therefore, the retail sellers of IRM also function as wholesalers to supply the Sari-Sari stores with the required commodities.

(v) The column "others" of Table 3.3.8 shows the retail seller specializing in certain products.

There are 62 shops of this kind and their products are shown in Table 3.3.9.

In terms of the share of turnover by municipality, Infanta accounts for approximately 80%, while General Nakar accounts of an extremely low percentage of approximately 3% (Table 3.3.10). In terms of turnover per capital, Infanta outnumbers Real by 100 Pesos, indicating that it is the center of commercial activities IRM.

However, it must be borne in mind that the turnover per capital of Real is relatively high presumably because Real is the center of the administrative district. A substantial shopping is done by transit passengers from Polillo Islands and other related places in Real.

Table 3.3.8 Number of Establishments, Workers and Amount of Sales and Trade

		General Nakar				Infanta				Real				Total			
	Size by Number of Workers	1 - 2	3 - 4	5 - 9	10 -	1 - 2	3 - 4	5 - 9	10 -	1 - 2	3 - 4	5 - 9	10 -	1 - 2	3 - 4	5 - 9	10 -
Establishments	Sari-Sari Store	35	21	13	1	0	172	142	23	7	0	60	53	4	3	0	267	216	40	11	0
	Others	0	0	0	0	0	56	29	24	3	0	6	3	1	2	0	62	32	25	5	0
	Total	35	21	13	1	0	228	171	47	10	0	66	56	5	5	0	329	248	65	16	0
Workers	Sari-Sari Store	86	35	45	6	0	349	213	85	51	0	111	77	12	22	0	546	325	142	79	0
	Others	0	0	0	0	0	147	144	83	20	0	20	5	3	12	0	167	49	86	32	0
	Total	86	35	45	6	0	496	257	168	71	0	131	82	15	34	0	713	374	228	177	0
Amount of Sales (1000 Pesos)	Sari-Sari Store	405	237	157	11	0	6650	4867	1700	82	0	1963	942	777	244	0	9018	6047	2634	377	0
	Others	0	0	0	0	0	4046	1331	2584	131	0	453	320	27	106	0	4499	1351	2611	237	0
	Total	405	237	157	11	0	10695	6199	4284	213	0	2416	1262	804	350	0	13517	6893	5244	575	0

Table 3.3.9 Establishments of Retail Trade Excluding Sari-Sari Store (IRM, 1983)

	INFANTA	REAL
Rice	5	0
Foods	9	0
Dry Goods	20	2
Drugs	4	1
Transport Parts	2	0
Fertilizers	2	0
Gasoline	2	0
Ice	1	2
Magazines	4	0
Others	0	1

Source: JICA Study Team

Table 3.3.10 Share of Amount of Sales by Municipality (IRM, 1983)

	G. Nakar	Infanta	Real	Total
Share of Amount of Sales (%)	3.0%	79.1%	17.9%	100.0%
Amount of Sales per head (pesos/psn)	74	385	284	324

Source: JICA Study Team

(3) Service Sector

According to the standard industrial classification of the Philippines, the service sector is included in Group 9 comprising the community, social and personal services. The service sector taken into consideration in this study does not include all kinds of service mentioned in this classification, and refers only to the service industry of the private sector.

As shown in Table 3.3.11, there are 26 establishments in IRM that belong to one of the following classifications:

- Restaurant/Hotel
- Repair
- Amusement
- Others

These establishments of the service sector accounts for 69 workers and a turnover of 1,088,000 Pesos.

Restaurants/hotels account for the largest number of establishments, workers, and turnover, followed by amusement establishments (cinema).

Barber shops, beauty parlors and photo service shops are included in the classification "others".

As shown, the social demand requiring this kind of service of the private sector is still negligible both socially and individually, with exception of some specific functions (restaurants and movie houses which are the only kind of amusement). As shown in Table 3.3.12, IRM is considerably below the average of Region IV in terms of number of workers and turnover of the service sector per 1,000 persons.

Table 3.3.11 Number of Establishments, Workers and Amount of Sales Service Industry

Size by No. of Workers		General	Nakar				Infanta					Real					Total				
		Total	Total	1-2	3-4	5-9	10 over	Total	1-2	3-4	5-9	10 over	Total	1-2	3-4	5-9	10 over	Total	1-2	3-4	5-9	10 over
Number of Establishments	Restaurant, Hotel	0	0	0	0	0	0	7	3	3	1	0	8	6	2	0	0	15	9	5	1	0
	Repair	0	0	0	0	0	0	3	1	2	0	0	0	0	0	0	0	3	1	2	0	0
	Amusement	0	0	0	0	0	0	3	1	2	0	0	0	0	0	0	0	3	1	2	0	0
	Others	0	0	0	0	0	0	3	3	0	0	0	2	2	0	0	0	5	5	0	0	0
	Total	0	0	0	0	0	0	16	8	7	1	0	10	8	2	0	0	26	16	9	1	0
Number of Workers	Restaurant, Hotel	0	0	0	0	0	0	25	6	12	7	0	17	8	9	0	0	42	14	21	7	0
	Repair	0	0	0	0	0	0	9	2	7	0	0	0	0	0	0	0	9	2	7	0	0
	Amusement	0	0	0	0	0	0	10	2	8	0	0	0	0	0	0	0	10	2	8	0	0
	Others	0	0	0	0	0	0	5	5	0	0	0	3	3	0	0	0	8	8	0	0	0
	Total	0	0	0	0	0	0	49	15	27	7	0	20	11	9	0	0	69	26	36	7	0
Amount of Sales (1000 pesos)	Restaurant, Hotel	0	0	0	0	0	0	135	52	60	23	0	292	247	45	0	0	426	298	105	23	0
	Repair	0	0	0	0	0	0	26	7	18	0	0	0	0	0	0	0	26	7	18	0	0
	Amusement	0	0	0	0	0	0	532	18	514	0	0	0	0	0	0	0	532	18	514	0	0
	Others	2	2	0	0	0	0	84	84	0	0	0	18	18	0	0	0	104	104	0	0	0
	Total	2	2	0	0	0	0	776	161	593	23	0	310	265	45	0	0	1,088	427	638	23	0

Source: JICA Study Team

Table 3.3.12 Private Service in Region IV and IRM

	Region IV	I R M
No. of Private Service Workers per 1,000 persons	4.1	1.6
Amount of Sales per 1,000 persons	66.0	24.5

Source: JICA Study Team

(4) Transportation Sector

The transportation businesses operating regularly in IRM consists of bus, jeepney, and tricycle services, (Table 3.3.13). The tricycle transportation service plays a predominant part in the transportation of both passengers and commodities in the study area as described in this section.

The tricycle transportation business of the study area consists of extremely small establishments, most of them private ones, consisting of 1.2 workers/establishment in average.

As shown on Table 3.3.14, there is relatively large number of tricycles Infanta but are relatively small in Real. This difference is attributed to the following:

(i) In Real Port, a relatively large number of passengers and bulky commodities are for transit to and from Polillo Islands. Therefore, it is necessary to use jeepneys which could accommodate a relatively large transportation load.

(ii) In Real, the areas of flatland are few and most of its parts are accessible by walking. Therefore, the demand for tricycles is limited.

(iii) Real has little influence on transportation due their way of life.

(iv) In Infanta, however, both passengers and cargo load/unload at various parts of its long shoreline, swamps and creeks. These passengers and commodities are loaded/unloaded directly to/from beaches and/or creeks by banca or other means of transportation. As a result, the quantities to be transported by tricycles are small.

(v) The settlements (rural and fishery villages) scattered at the urban center are at a distances not accessible by walking but the demand for transportation is not sufficiently large to require the use of jeepneys. (Therefore, jeepneys are used principally in the Infanta-Real route where transportation demand is relative high

The annual turnover of each tricycle ride is an average of 58,400 Pesos for Infanta and Real and 10,600 Pesos for General Nakar.

In view of these figures, it is estimated that the total turnover of the tricycle transportation business as a whole is 7,867,000 Pesos in 1983, representing, therefore, a business of considerable importance within IRM.

(5) Other Establishments

The other kinds of establishment operating in IRM are the financing business and the warehouse business.

(Financing/Insurance Business (3 Cases))

The financing establishment are the Rural Bank of Infanta, and Real, accounting 34 and 6 workers respectively. The annual turnover of these establishments sum up to 1.37 million Pesos. The insurance sector operating in Infanta is the United System Life Plan (10 workers).

(Warehousing 1 Case)

There is one establishment in Real of the warehousing sector. This warehouse is used to store copra shipped from Real and Polillo with a warehouse charge of approximately 1,000 Pesos per day.

Table 3.3.13 Number of Establishments of Transportation Service

	Gen. Nakar	Infanta	Real	Total
Bus	0	1 (7)	0	1 (7)
Jeepney	0	11 (23)	12 (26)	23 (49)
Tricycle	15 (19)	102 (117)	30 (34)	147 (170)
Total	15 (19)	114 (147)	42 (60)	171 (226)

Note : No. of Workers are shown in parenthesis

Source: JICA Study Team

Table 3.3.14 Number of Workers in the Study Area (IRM, 1983)

Municipality / District			No. of Establishment		No. of Workers incldg. family workers		No. of workers per 1,000 heads	Workers per Establishment
G. NAKAR	A	Total	51	8.9%	93	7.3%	2.5	1.8
		Poblacion	20	3.5	28	2.2	5.0	1.4
		Others	31	5.4	65	5.1	2.0	2.1
	B	Total	6	1.0	15	1.2	0.9	2.5
		A + B	57	9.9	108	8.4	2.0	1.9
INFANTA	C	Total	330	57.3	807	62.9	4.6	2.4
		Poblacion	212	36.8	556	43.4	13.7	2.6
		Others	118	20.5	251	19.6	1.9	2.1
	D	Total	48	8.3	85	6.6	1.3	1.8
	E	Total	22	3.8	66	5.1	1.2	3.0
		C + D + E	400	69.4	958	74.7	3.4	2.4
REAL	F	Total	119	20.7	216	16.8	2.5	1.8
		Poblacion	62	10.8	104	8.1	2.0	1.7
		Others	57	9.9	112	8.7	3.3	2.0
Grand Total			576	100.0	1,282	100.0	3.1	2.2
		Poblacion	294	51.0	688	53.7	7.0	2.3
		Others	282	49.0	594	46.3	1.9	2.1

Source: JICA Study Team

3) Distribution of Establishments

The distribution by zone of establishments and workers is shown in Table 3.3.14 (the zoning criteria are shown in Fig. 3.1.2). As shown, the distribution has the following characteristics:

(i) Both establishments and workers are distributed in Infanta, Real and General Nakar in accordance with 7:2:1 ratio. On the other hand, the number of workers per 100 heads in the three municipalities is 2.4, 2.1 and 1.9, indicating therefore, that Infanta is the economic center of the study area.

(ii) Number of establishments and workers, rural and fishery villages in the Poblacion practically have the same. Nevertheless, the urban area of Infanta accounts for 36.8% of the total in terms of number of establishments, 43.4% in terms of number of workers and 13.7 workers per 100 persons, outnumbering the other two municipalities.

(iii) In Real, the Poblacion accounts for barely 8.1% of the total, and the number of workers per 100 persons totalling 2.0 is below the average totalling outside the Poblacion 3.3 workers/100 persons. Part of the said difference is attributed to the fact that Ungos, the district adjacent to the port, is located outside of the Poblacion. Nevertheless, it is unquestionable that the degree of maturity of the urbanization process is behind compared with that of Infanta.

(iv) Comparing the 6 zones that constitute IRM, the Infanta flatland including the urban area of Infanta accounts for the largest number of workers (62.9%), followed by Real (16.8%). The sea shore district of Infanta, swamp district and flatland district of General Nakar are practically even with approximately 5% to 7%, while the mountainous district of General Nakar accounts for the smallest number of workers (1.2%).

The distribution of establishments and workers (including family workers) by sectoral classification is shown in Figs. 3.3.1 to 3.3.7 (distribution by Barangay).

Generally, the establishments and workers are distributed in semi-circular pattern around the swamp areas, particularly in the urban districts of Infanta and Real as in the case of the demographic distribution pattern (this distribution pattern coincides with the direction of the principal traffic lines of the transportation netwrok of IRM i.e., Infanta and Infanta-Dinahican Roads, and from the physical standpoint it has the most advantageous route location for a transportation network along elevations from 3 to 4 meters).

The following conclusions are drawn from the distribution pattern of establishments:

(i) Establishments belonging to the wholesale/retail and transportation/communication sectors (these establishments) more evenly are distributed in the Barangays of the study area, compared with other businesses. Other businesses are concentrated in some specific Barangays.

(ii) The location of establishment engaged in the transportation business (tricycles) suggests the local structure of the study area (Fig. 3.3.8).

In Infanta, there is an inclination to concentrate on this kind of establishments in the surrounding Barangays, instead of the urban area.

The distribution pattern of Barangays with 5 or more tricycles shows that they are located mostly at the fringe of the administrative border of Infanta with the exception of the Poblacion of the urban area. These Barangays constitute the point of interconnection between the sea and land transportation. Tricycles are used to transfer passengers and commodities transported by sea to the urban area of Infanta. It is presumed that the regional center function of Infanta, (commerce, services, etc.) relies on the said transportation system. The following Barangays constitute these points of interconnection.

Dinahican, Libjo, Binulasan: these Barangays are located along the shoreline of the Dinahican Peninsula, and are the points of transit of fish landed by the Banca, commodities and passengers coming from the Polillo Islands, etc., which area transported to Infanta, the most important marketplace of IRM.

Points of interconnections along the swamp districts Silangan, Langgas: Passengers and commodities are transported by Bancas from the Polillo Islands, and other places, using the creeks of the swamps. These passengers and commodities are handed over to the means of land transportation in these Barangays.

Furthermore, these Barangays are also the strategic points for access to the nurseries located in the swamps. Points of interconnection along the Agos River, Banugao, Katambungan: these Barangays are the strategic points to cross the Agos River, and the passengers and cargo using the Bancas are transported to the urban area of Infanta.

In Infanta, the tricycle establishments are scattered throughout the various Barangays, but on the other hand, in Real they are concentrated mostly in the Poblacion and in the adjacent Pamplona.

(iii) The wholesale and retail commerce consists principally of the Sari-Sari Stores and are concentrated mostly in the urban center of each municipality, at rates of 68.7% (Infanta), 34.3% (General Nakar) and 25% (Real). In addition, there are 2 or 3 cases of establishments of this kind in each Barangay as well.

A conspicuous characteristics in connection with the concentration of the wholesale/retail commerce establishments is Bantilan and Comon in Infanta, Ungos in Real and Anoling in General Nakar, and the said tendency corresponds to the low demographic density outside the major concentrations (Refer to Figure 3.1.1) for the distribution of the Barangays).

(iv) The number of manufacturing establishments is small, and they are located outisde the urban areas, principally in the Barangays along the Infanta Road.

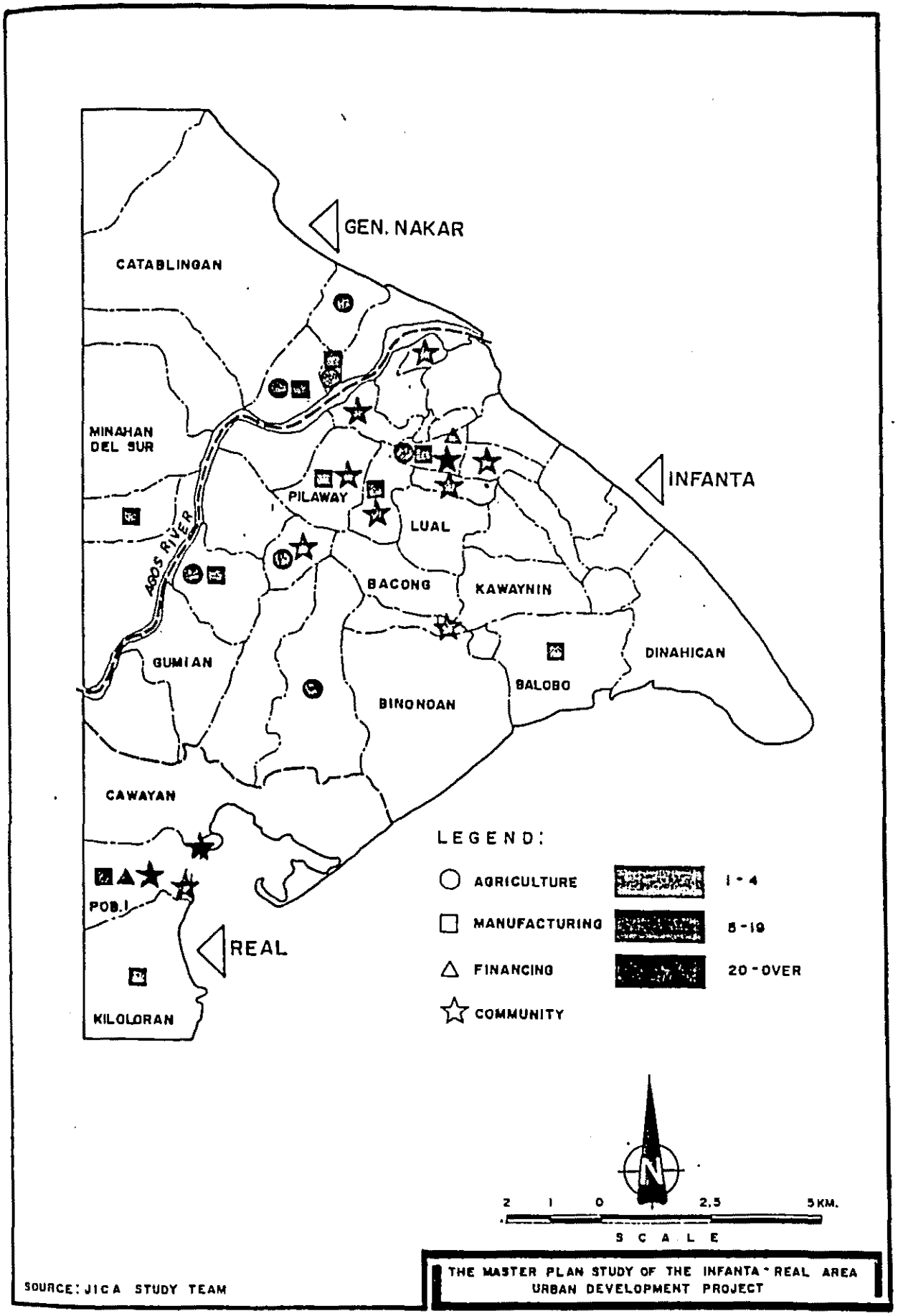


FIG.3.3.1 ESTABLISHMENT (AGRICULTURE, MANUFACTURING, FINANCING & COMMUNITY SERVICES)

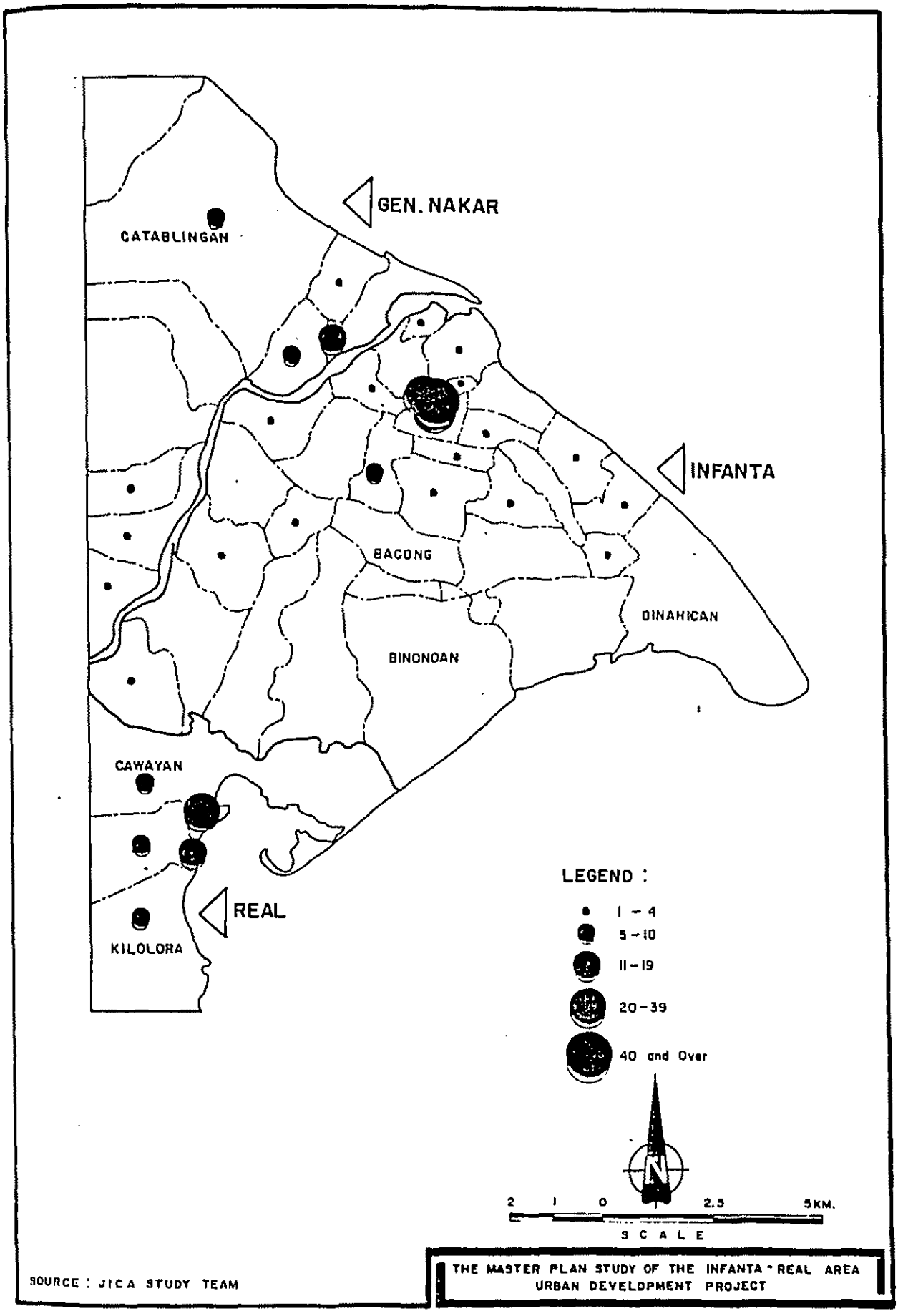


FIG. 3.3.2 ESTABLISHMENT (WHOLESALE & RETAIL TRADE)

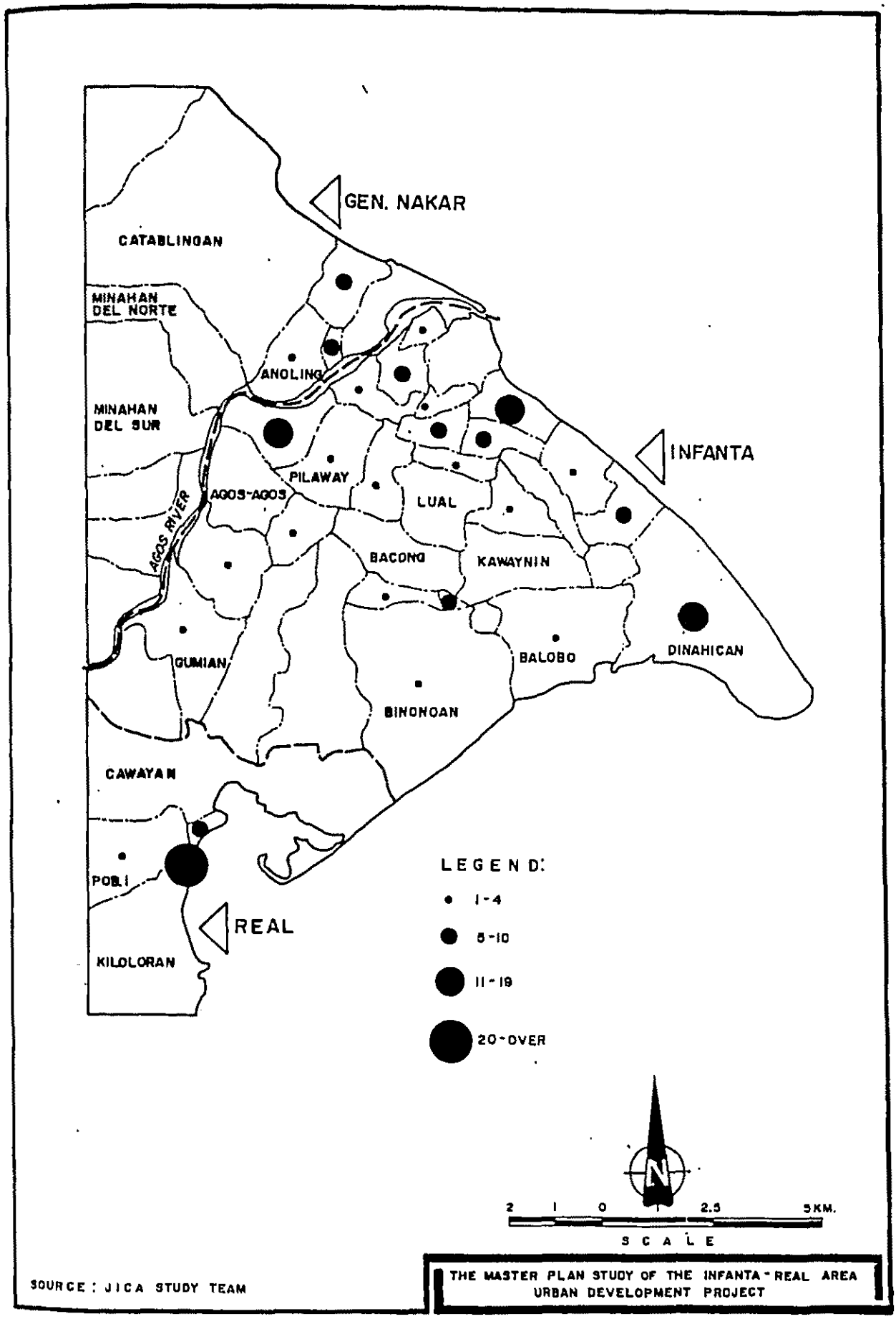


FIG.3.3.3 ESTABLISHMENT (TRANSPORTATION & COMMUNICATION)

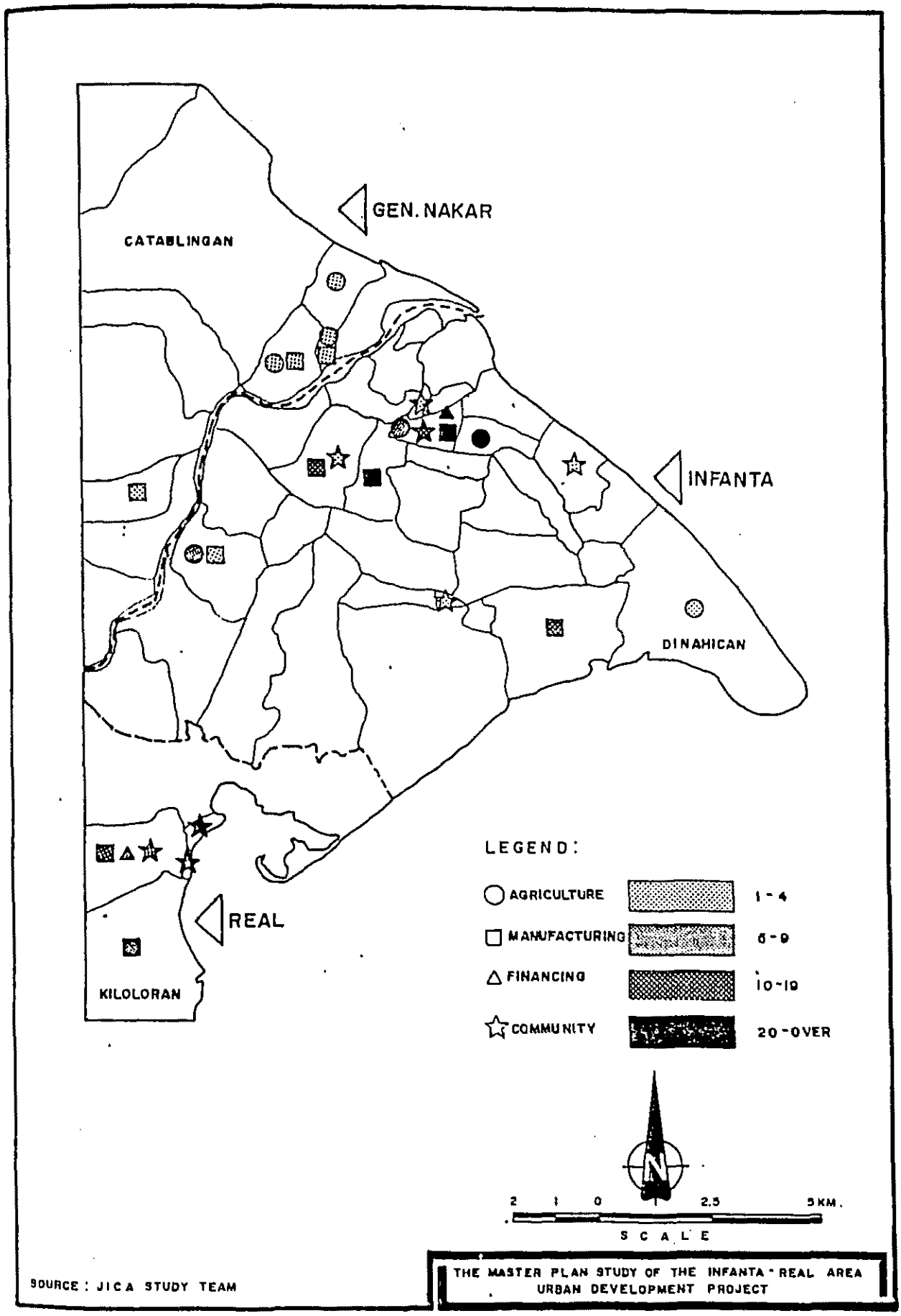


FIG. 3.3.4 WORKERS (AGRICULTURE, MANUFACTURING, FINANCING, COMMUNITY)

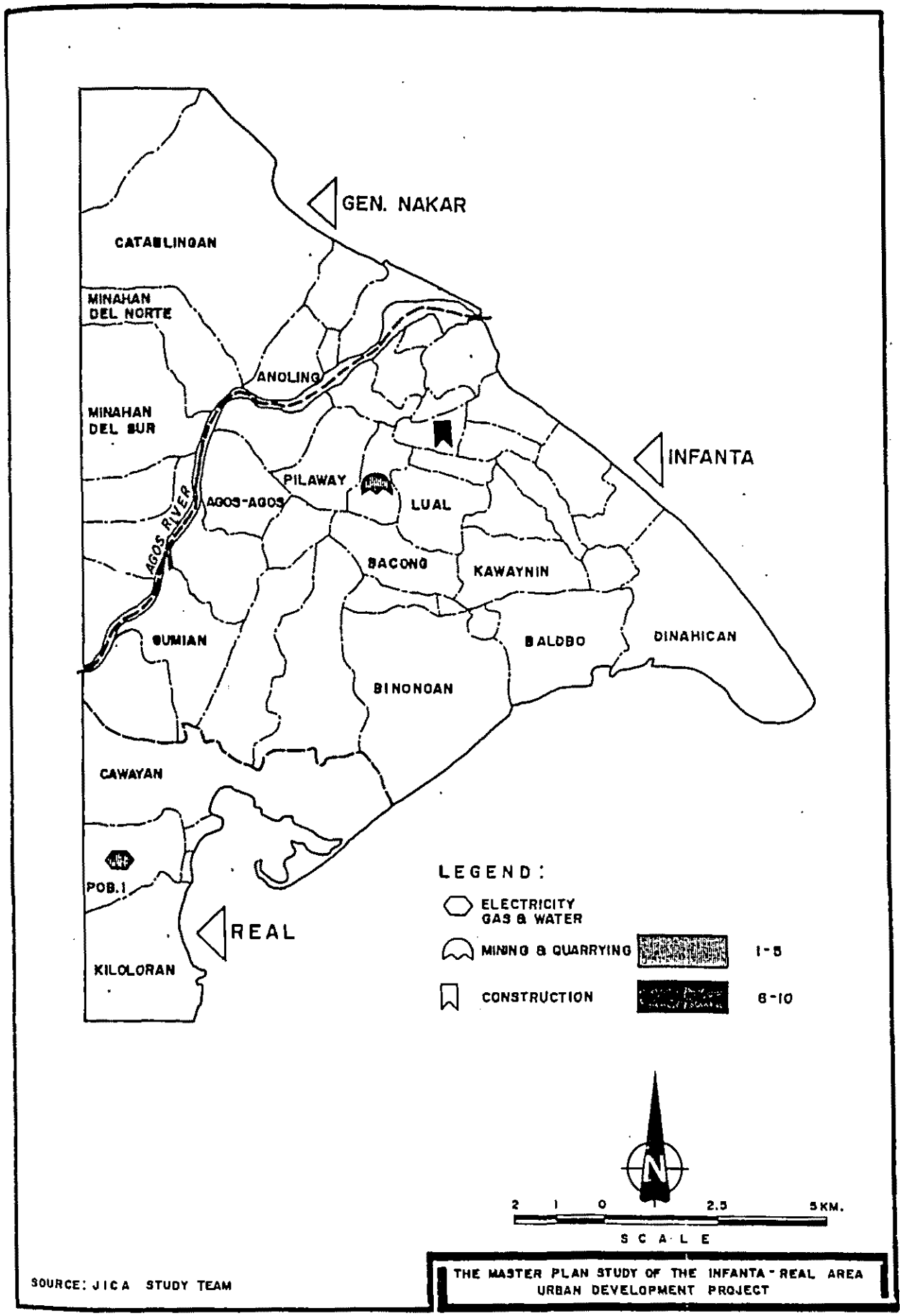


FIG.3.3.5 WORKERS (ELECTRICITY,GAS,WATER,MINING,QUARRYING & CONSTRUCTION)

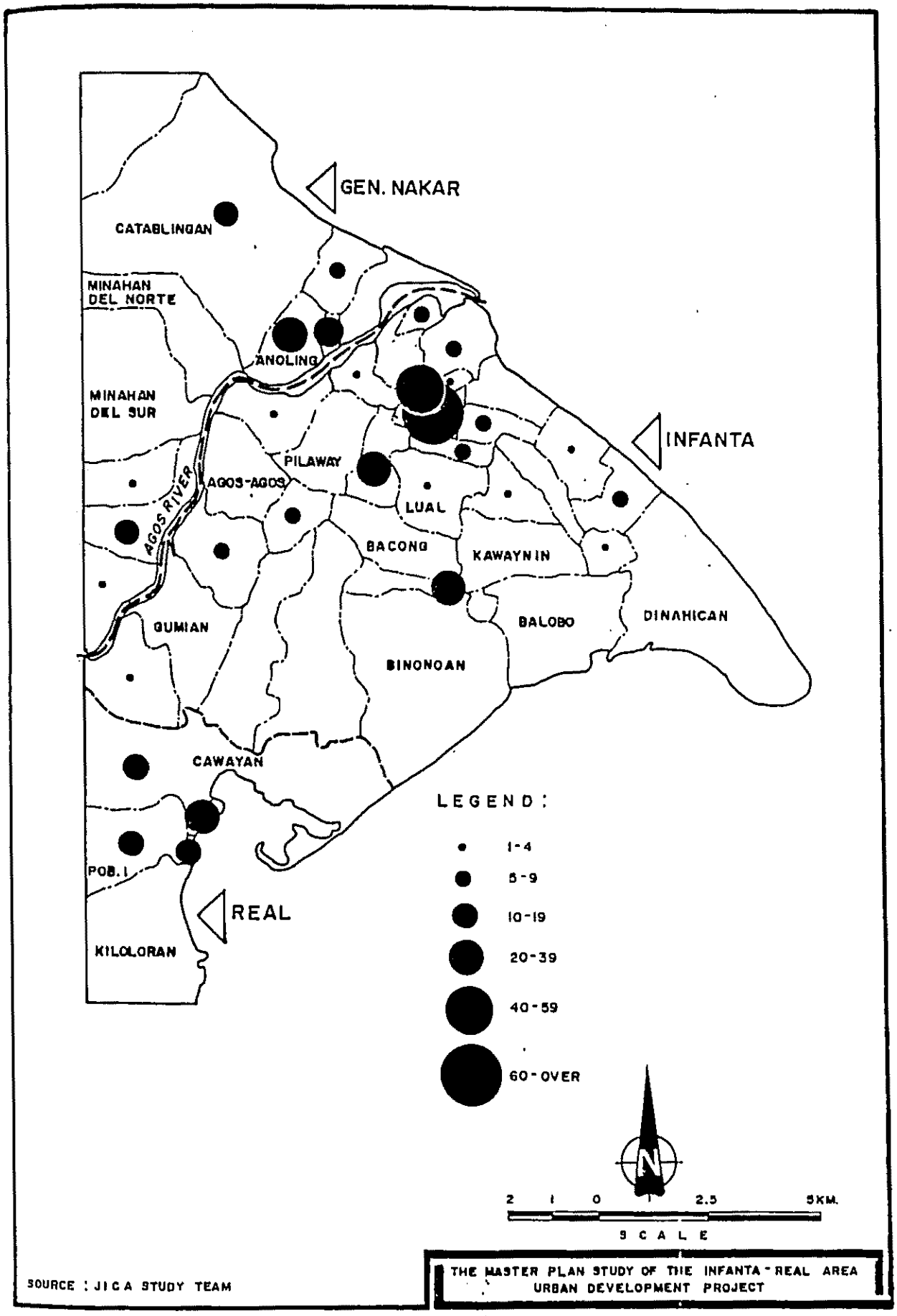


FIG. 3.3.6 WORKERS (WHOLESALE & RETAIL TRADE)

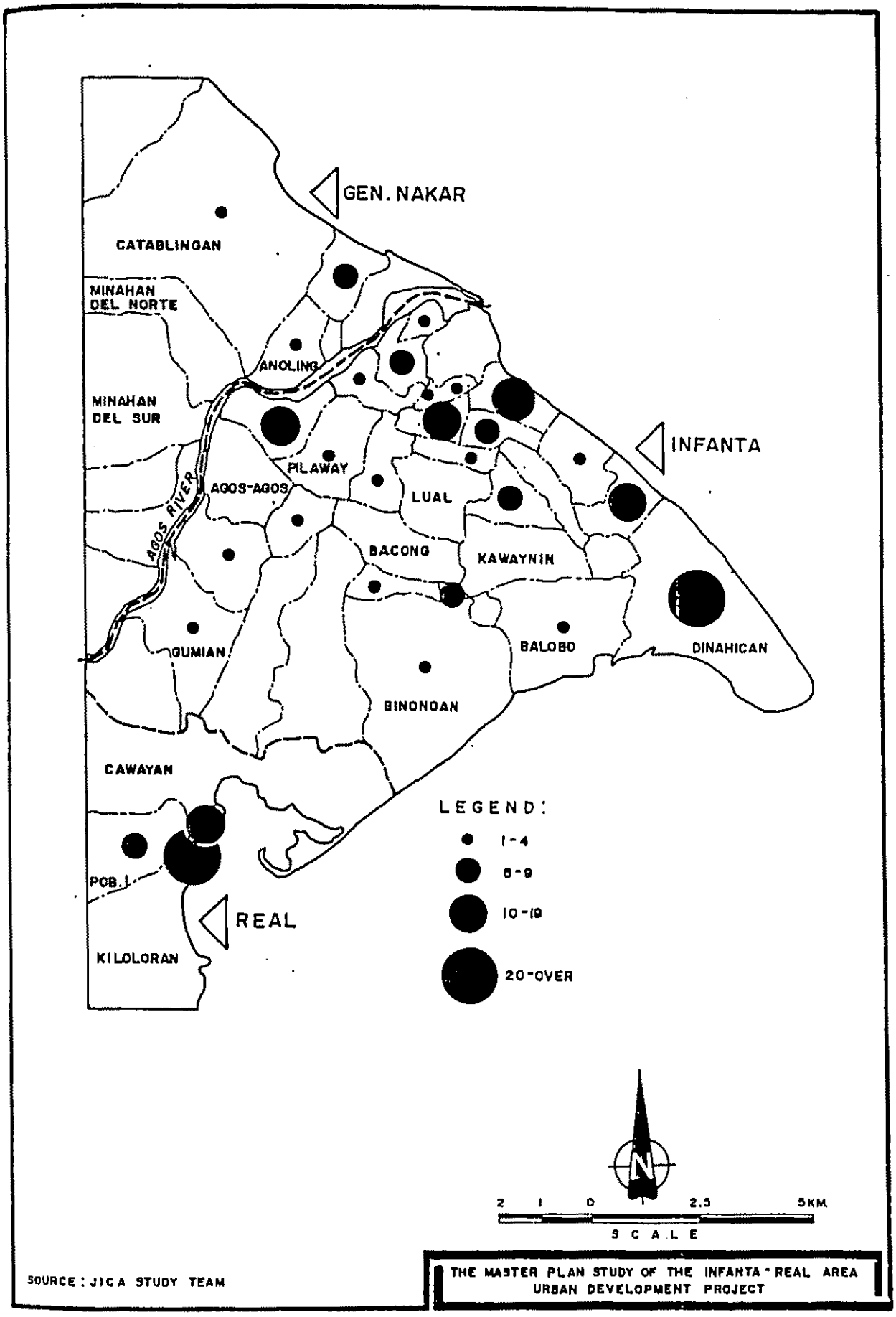


FIG.3.3.7 WORKERS (TRANSPORTATION & COMMUNICATION)

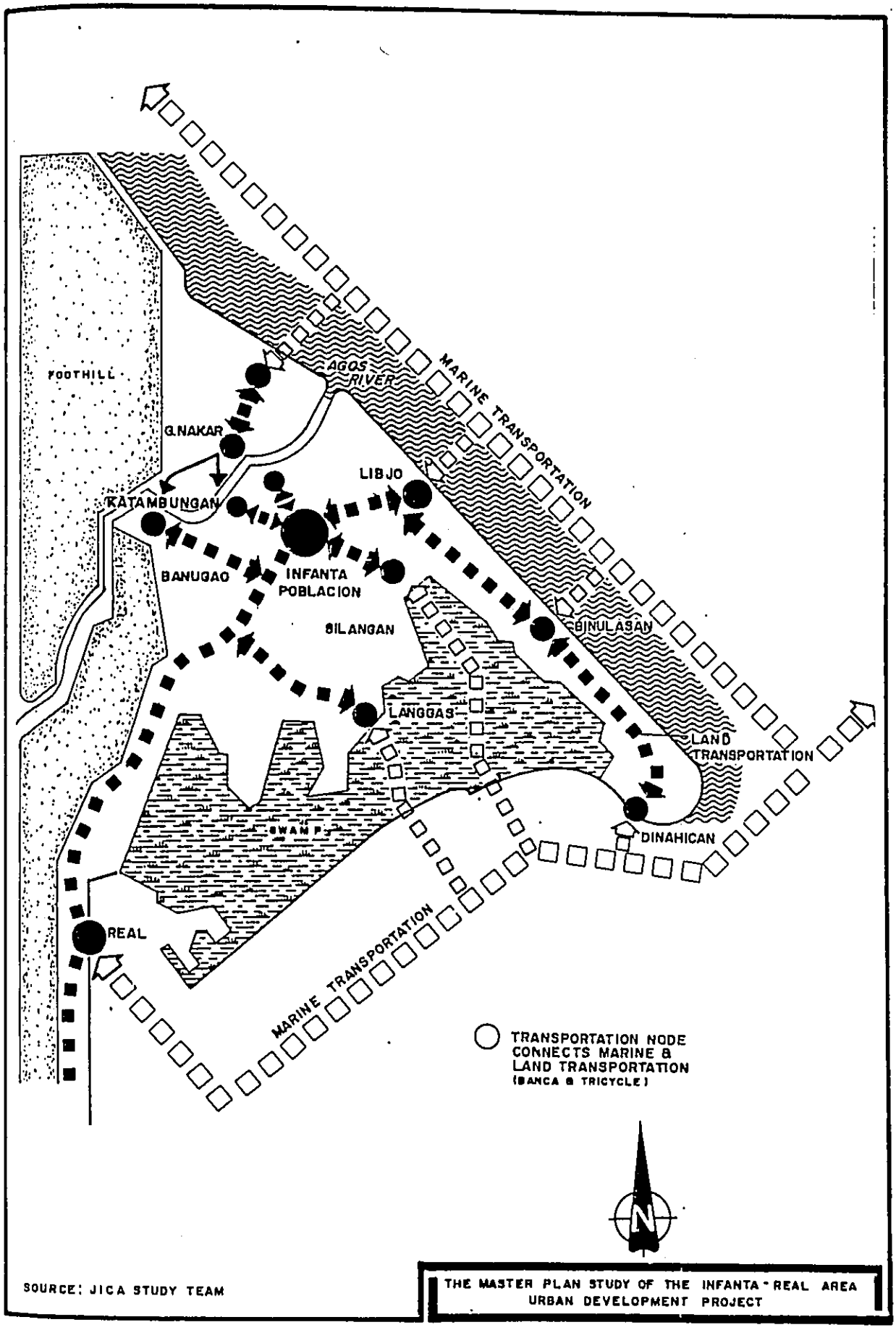


FIG. 3.3.8 LOCATION OF TRANSPORTATION NODE

3.3.2 Workers

1) Composition of the Workers

The total number of workers of IRM is estimated to be approximately 11,600 on the basis of the results of the field survey.

The distribution of workers by industry and by municipality is shown in Table 3.3.15. From the standpoint of the workers population, the study area has the following industrial characteristics:

(i) The primary industry accounts for approximately 60% of the workers population and the secondary industry accounts for approximately 10%, while the tertiary industry accounts for the remaining 30%, evidencing therefore, the reliance of the economy on the agriculture.

(ii) Likewise the distribution of workers of establishment (Section 3.3), Infanta accounts for 70% of the workers, Real accounts for 20% and General Nakar accounts for 10% indicating therefore, the concentration of job opportunities in Infanta.

(iii) In terms of ratio of workers, Infanta has the smallest rate with 3.65 persons/workers, followed by Real and General Nakar and Real. From the standpoint of dependency rate, Infanta has the smallest rate 3.65 persons/workers, followed by Real and General Nakar.

(iv) From the standpoint of primary industry, General Nakar has the strongest reliance on agriculture (70.5% of the total), while in Real the percentage of fishermen surpasses farmers, indicating the fishing village characteristic of the municipality.

It is unquestionable that Infanta is a predominantly agricultural municipality because the majority of its workers are engaged in farming, but in terms of percentage of farming population it is ranked at an intermediate position between General Nakar and Real.

(v) From the standpoint of the secondary industry and tertiary industry, Infanta has the largest number of workers, but in terms of percentage Real has a larger proportion. This difference is attributable to the fact that part of Real included in the study area consists of its central area, with concentration of secondary and tertiary industries.

It is not possible to make an unconditional comparison in view of distinctions in the methods and accuracies of the surveys, but data of 1980 (NCSO Census) and 1983 (JICA Field Survey) indicate approximately the following tendency in connection of Infanta (Table 3.3.16):

(1) The dependency rate remained practically unchanged from 1980 to 1983, but the rate of workers to the 15 years old and over population has declined.

(2) In terms of composition of workers population by industry, there is a decline of the agricultural sector and rise of the secondary and tertiary industry.

Table 3.3.15 Workers in the Study Area (1983)

	G. NAKAR	INFANTA	REAL	TOTAL
Primary Industry	932 (73.4)	4,758 (59.0)	1,098 (48.5)	6,788 (58.5)
Agriculture	895 (70.5)	4,245 (52.6)	401 (17.7)	5,541 (47.8)
Forestry	0 (0)	17 (0.2)	0 (0)	17 (0.1)
Fishery	37 (2.9)	496 (6.2)	697 (30.8)	1,230 (10.9)
Secondary Industry	72 (5.7)	668 (8.2)	218 (9.6)	958 (8.3)
Mining	0 (0)	6 (0)	0 (0)	6 (0)
Manufacturing	16 (0.7)	291 (3.6)	43 (1.9)	350 (3.0)
Construction and Others	56 (4.9)	371 (4.0)	175 (7.7)	602 (5.2)
Tertiary Industry	265 (20.9)	2,639 (32.7)	946 (41.8)	3,850 (33.2)
Utilities	3 (0.2)	61 (0.8)	0 (0)	64 (0.6)
Wholesale and Retail Trade	54 (4.3)	547 (6.8)	240 (10.6)	84 (7.3)
Transportation and Communication	29 (2.3)	454 (5.6)	266 (11.8)	749 (6.5)
Social & Personal Services	179 (14.1)	1,516 (18.8)	440 (19.5)	2,135 (18.4)
Finance and Insurance	50 (0)	611 (0.8)	0 (0)	61 (0.5)
Total	1,269	8,065 (100.0)	2,262 (100.0)	11,594 (100.0)
Ratio of Workers to Total Population 15 and Over	43.2	44.3	39.0	43.0
Ratio of no. of dependent family to a worker	4.41	3.65	4.16	3.83

Note: Figures in parentheses are share to total.

Source; JICA Study Team

Table 3.3.16 Industrial Mixture in Infanta

(%)

	1980 1)	1983 2)
Primary Industry	67.1	59.0
Agriculture	58.9	52.6
Forestry	0.8	0.2
Fishery	7.2	6.2
Secondary Industry	6.3	8.3
Mining	0	0.1
Manufacturing	3.3	3.6
Construction and Others	3.0	4.6
Tertiaty Industry	25.8	32.7
Utilities	0.6	0.8
Wholesale & Retail Trade	4.8	6.8
Transportation & Communication	5.5	5.6
Finance and Insurance	1.1	0.8
Social and Personal Services	13.8	18.8
Ratio of Workers to total Population (15 and over)	46.8	44.3
Ratio of no. of dependent to a worker	3.656	3.647

Source: 1) NCSO
2) JICA Study Team

(1) Workers Distribution by Zone

The number of workers and their composition by zones of the study area are shown in Tables 3.3.17 and 3.3.18.

The zone D which consists of the flatland of Infanta accounts for the largest percentage of 42.9% because it is the economic and industrial activity of the study area, followed by Real.

The agricultural sector accounts for 44.4% in the flatland of Infanta, 19.9% in the swamp and 12.3% in the sea shore. The fishery accounts for 56.7% in Real and 32.0% in the sea shore of Infanta. These two industries account for approximately 90% of the total population in these two zones.

(2) Composition of the Workers

The composition of the wokrers by Barangay is shown in Fig. 3.3.9. Generally speaking, the percentage of the primary industry is high. Therefore, there is pronounced concentration of the workers in the lower left corner of the triangular diagram.

The following conclusions are drawn in connection with the distribution of workers in each Barangay:

(i) Barangay with high concentration of tertiary industries

It is unquestionable that the Poblacions of each municipality are typical cases of Barangays with high concentration of tertiary industry. However, the Barangay of Comon adjacent to the Poblacion of Infanta has also this characteristics. The Poblacion of Real does not belong yet to this classification. On the other hand, included in this classification in exceptional character.

Table 3.3.17 Number of Workers by Industry and by Zone (IRM, 1983)

Industry/ Zone	Gen. Nakar		Infanta		Real		
	A	B	C	D	E	F	Total
Agricluture	666 (70.1)	229 (71.8)	2,461 (49.5)	681 (45.6)	1,103 (69.0)	401 (17.7)	5,541 (47.8)
Forestry	0 (0)	0 (0)	8 (0.2)	5 (0.3)	4 (0.3)	0 (0)	17 (0.1)
Fishery	37 (3.9)	0 (0)	83 (1.7)	393 (26.3)	20 (1.3)	697 (30.8)	1,230 (10.6)
Mining and Quarrying	0 (0)	0 (0)	6 (0.1)	0 (0)	0 (0)	0 (0)	6 (0.1)
Manufacturing	6 (0.6)	10 (3.1)	150 (3.0)	28 (1.9)	113 (7.1)	43 (1.9)	350 (3.0)
Electricity	0 (0)	3 (0.9)	46 (0.9)	5 (0.3)	10 (0.6)	0 (0)	64 (0.6)
Construction	9 (0.9)	47 (14.7)	312 (6.3)	27 (1.8)	32 (2.0)	175 (7.7)	602 (5.2)
Wholesale & Retail	43 (4.5)	11 (3.4)	373 (7.5)	120 (8.0)	54 (3.4)	240 (10.6)	841 (7.3)
Transportation	27 (2.8)	2 (0.6)	345 (6.9)	51 (3.4)	58 (3.6)	266 (11.8)	749 (6.5)
Financing	0 (0)	0 (0)	54 (1.1)	5 (0.3)	2 (0.1)	0 (0)	61 (0.5)
Community, Social Personal Services	162 (17.1)	17 (5.3)	1,135 (22.8)	178 (11.9)	203 (12.7)	440 (19.5)	2,135 (18.4)
Total	950	319	4,973	1,493	1,599	2,262	11,596

Note: Figures in parentheses are share to column total.

Source: JICA Study Team

Table 3.3.18 Shares of Workers of Each Industry Zone (IRM, 1983)

Industry/Zone	Gen. Nakar		Infanta			Real	
	A	B	C	D	E	F	Total
Agriculture	12.0	4.1	44.4	12.3	19.9	7.2	100.0%
Forestry	0	0	47.1	29.4	23.5	0	100.0
Fishery	3.0	0	6.7	32.0	1.6	56.7	100.0
Mining & Quarrying	0	0	100.0	0	0	0	100.0
Manufacturing	1.7	2.9	42.9	8.0	32.3	12.3	100.0
Electricity	0	4.7	71.9	7.8	15.6	0	100.0
Construction	1.5	7.8	51.8	4.5	5.3	29.1	100.0
Wholesale & Retail	5.1	1.3	44.4	14.3	6.4	28.5	100.0
Transportation	3.6	0.3	46.1	6.8	7.7	35.5	100.0
Financing	0	0	88.5	8.2	3.3	0	100.0
Community, Social Personal	7.6	0.8	53.2	8.3	9.5	20.6	100.0
Total	8.2	2.8	42.9	12.9	13.8	19.5	100.0

Source; JICA Study Team

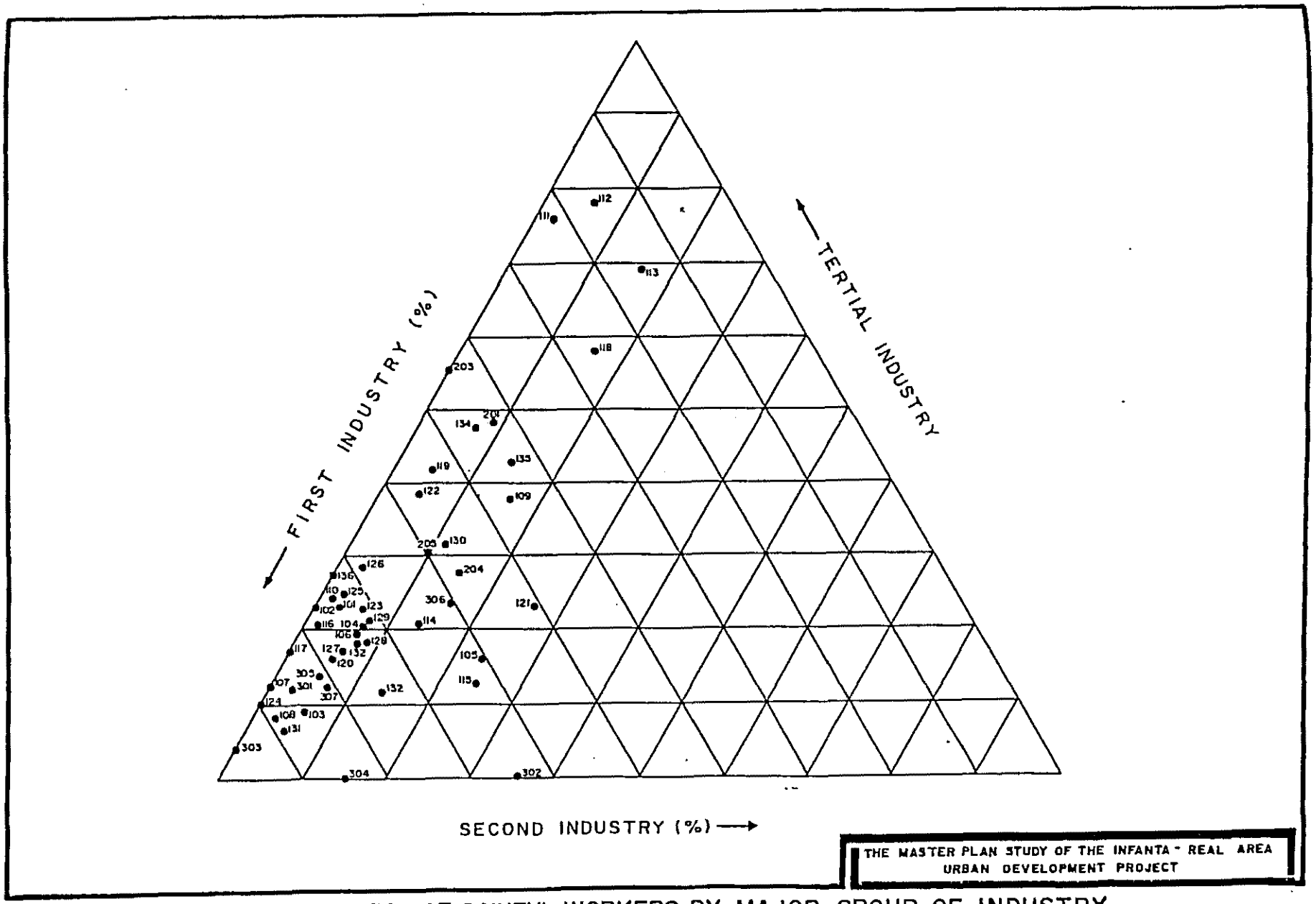


FIG.3.3.9 COMPOSITION OF GAINFUL WORKERS BY MAJOR GROUP OF INDUSTRY

(ii) Barangays with concentration of both primary and tertiary industry.

In the first place, the Poblacion of Real belongs to this group. This fact indicates that the urban area of Real is characterized as settlement of workers engaged in the primary industry (fishery in this case, as desccribed later).

Furthermore, the Barangay of Bantilan adjacent to the Poblacion of Infanta, Silangan which is local center in the swamp, Tongohin located along the Infanta Road, etc., are cases of Barangays belonging to this classification.

(iii) Barangay with high percentage of primary industry

All of the 37 remaining Barangays belong to this classification. These are Barangays relying on agriculture and fishery.

The proportion of workers compared with the total population of each Barangay is shown in Fig. 3.3.10. As shown, there is considerable variation compared with the average of 26.1% of the study area as a whole.

These data indicate that hilly districts along the Infanta Road, the totality of General Nakar (excluding the Poblacion), etc., have low percentage of workers while the Barangays with high percentage of workers are the Poblacion of Infanta and the adjacent Barangays, Dinahican and Libjo that are local centers of the transportation network of the swamp, etc.

2) Number of Workers by Sector

(1) Workers of the Primary Industry

There are 6,788 workers engaged in the primary industry of IRM, with the agriculture accounting for 5,541 workers (81.6%, forestry for 17 (0.3%) and fishery for 1,230 (18.1.%). by municipality, Infanta accounts for 4,758 workers of the primary industry (70.1%), Real 1,098 (16.2%) and General Nakar for 932 (13.7%).

The distribution of primary industry workers in IRM is shown in Fig. 3.3.11. As shown, the distribution of primary industry workers in IRM corresponds approximately to the demographic distribution patterns (Section 3.3.2), with exception of the Poblacions.

In connection with the distribution of farmers and fishermen, most of the Barangays located at the sea shore are mixed agricultural/fishery workers are the Poblacion of Real, Barangay of Ungos and Dinahican of Infanta. These settlements are Barangays relying principally on fishery.

The distribution of fishery workers is the conspicuous also in the swamps. On the other hand, agricultural workers are widely scattered throughout the study area principally in the flatland of Infanta, but there are also agricultural settlements in the swamps. In the latter case they are engaged in the plantation of nipa palm trees in the swamps.

Furthermore, agricultural setllements are also present in the hilly districts of Infanta (right bank of the Agos River), principally in Magsaysay.

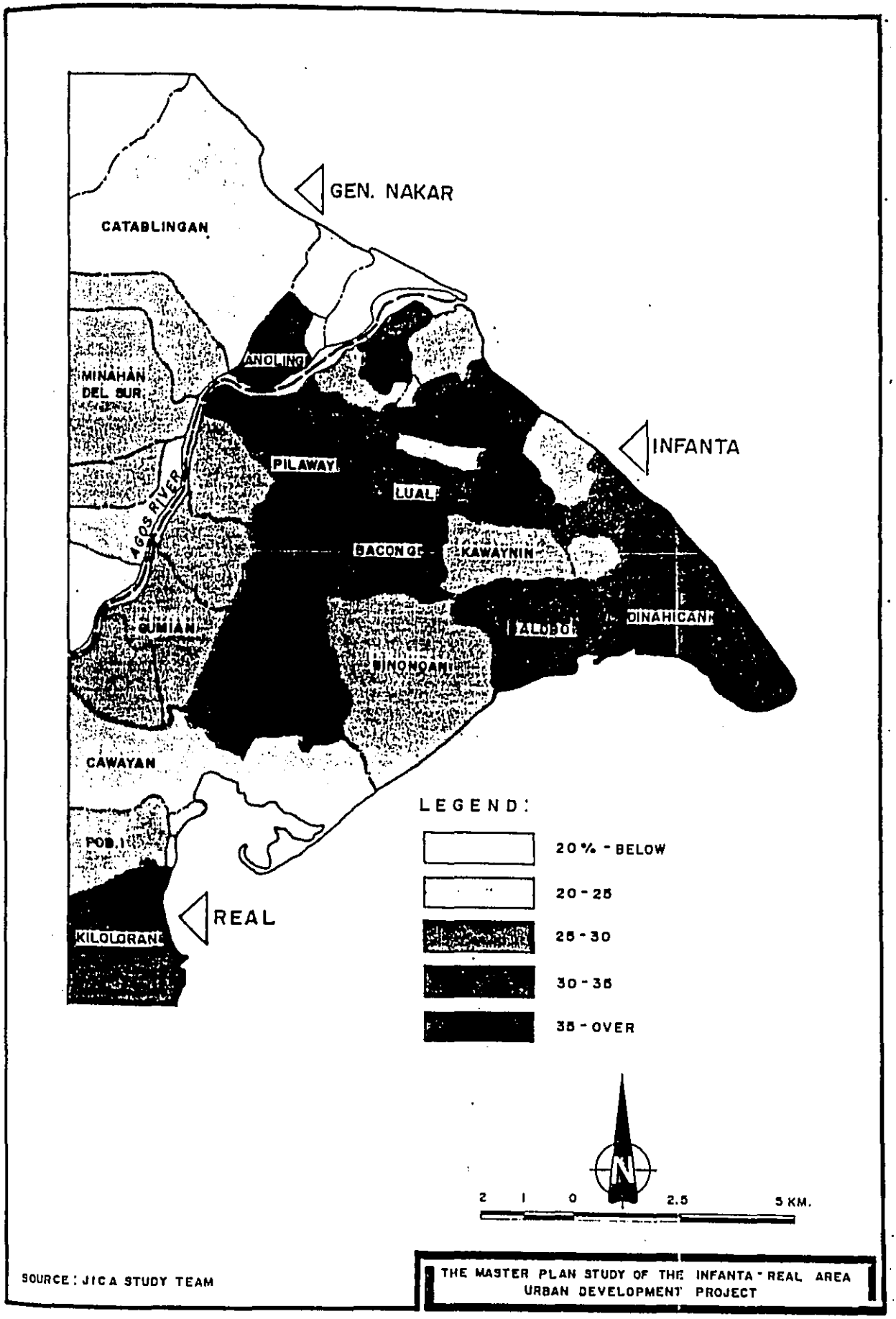


FIG.3.3.10 RATIO OF GAINFUL WORKERS / BARANGAY POP.

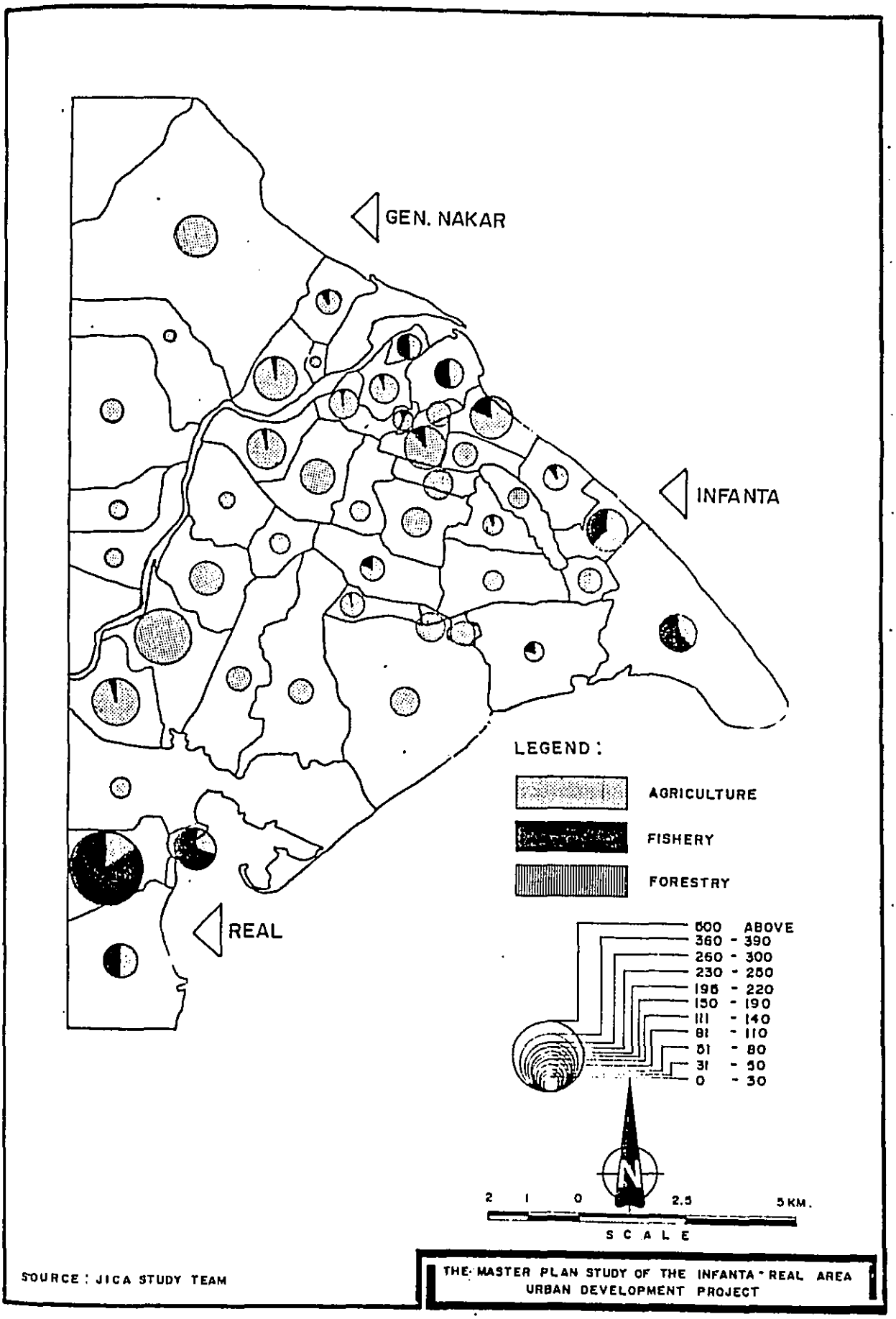


FIG.3.3.11 COMPOSITION OF GAINFUL WORKERS IN PRIMARY INDUSTRY (AGRICULTURE, FORESTRY, FISHERY)

(2) Secondary Industry Workers

The secondary industry consists principally of the construction sector (602 workers corresponding to 62.8% of the secondary industry). In reality however, there is no private establishment in IRM engaged in the construction industry, and therefore, these workers are presumably engaged in public works such as repair of roads, etc.

The manufacturing industry accounts for 350 workers (36.5% of the workers of the secondary industry of IRM), and its composition was described in Section 3.3.

The distribution of the secondary industry workers by Barangay is shown in Fig. 3.3.12. The principal concentrations are the Poblacion of Infanta, the adjacent Barangay of Pantilan, Ilog and Magsaysay, the Poblacion of Real and the adjacent Barangay of Ungos, etc.

Of these concentrations, Bantilan, Ilog and the Poblacion also widely scattered throughout the flatland of Infanta, swamps, etc., although negligible in number.

(3) Tertiary Industry Workers

There are 3,786 tertiary industry workers in the study area that are distributed as follows:

(i) The social and personal services account for the majority, i.e., 56.4% of the total.

The sector constitutes the largest tertiary industry of IRM because it comprises not only workers of public services (administrative services, schools, etc.) as well as nonsteady and temporary labor service workers, irrespective of the kind of industry and/or business.

(ii) As mentioned in Section (1) of Chapter 3.3 referring to the business establishments, the wholesale/retail trade consisting principally of small scale Sari-Sari stores and the transportation/communication sector consisting principally of tricycles account for 42.0% of the tertiary industry as a whole. The distribution of the tertiary industry expresses in terms of their compositions is shown in Fig. 3.3.13.

As shown, the Poblacion of Infanta and Real are the most important centers of concentration of tertiary industry workers. Furthermore, the concentration of tertiary industry in other parts of IRM are seen at:

(i) Barangays adjacent at the Poblacions (Bantilan, Silangan and Ungos);

(ii) Major settlements along the sea shore (Dinahican, Libjo, etc.);

(iii) Hilly district along the Infanta Road (Tongohin).

These concentrations are local center in terms of transportation, fishery, etc., within IRM. Therefore, they are presumed to be centers of absorption of labor of seasonal and temporary character, as well as centers of general of services related to the aforesaid businesses.

Furthermore, there is also small-scale distribution of tertiary industry in each Barangay, and most of them consists of social and individual services represented by teachers of schools, workers of local administrative organization, etc., that provided basic public and social service required by the local community.

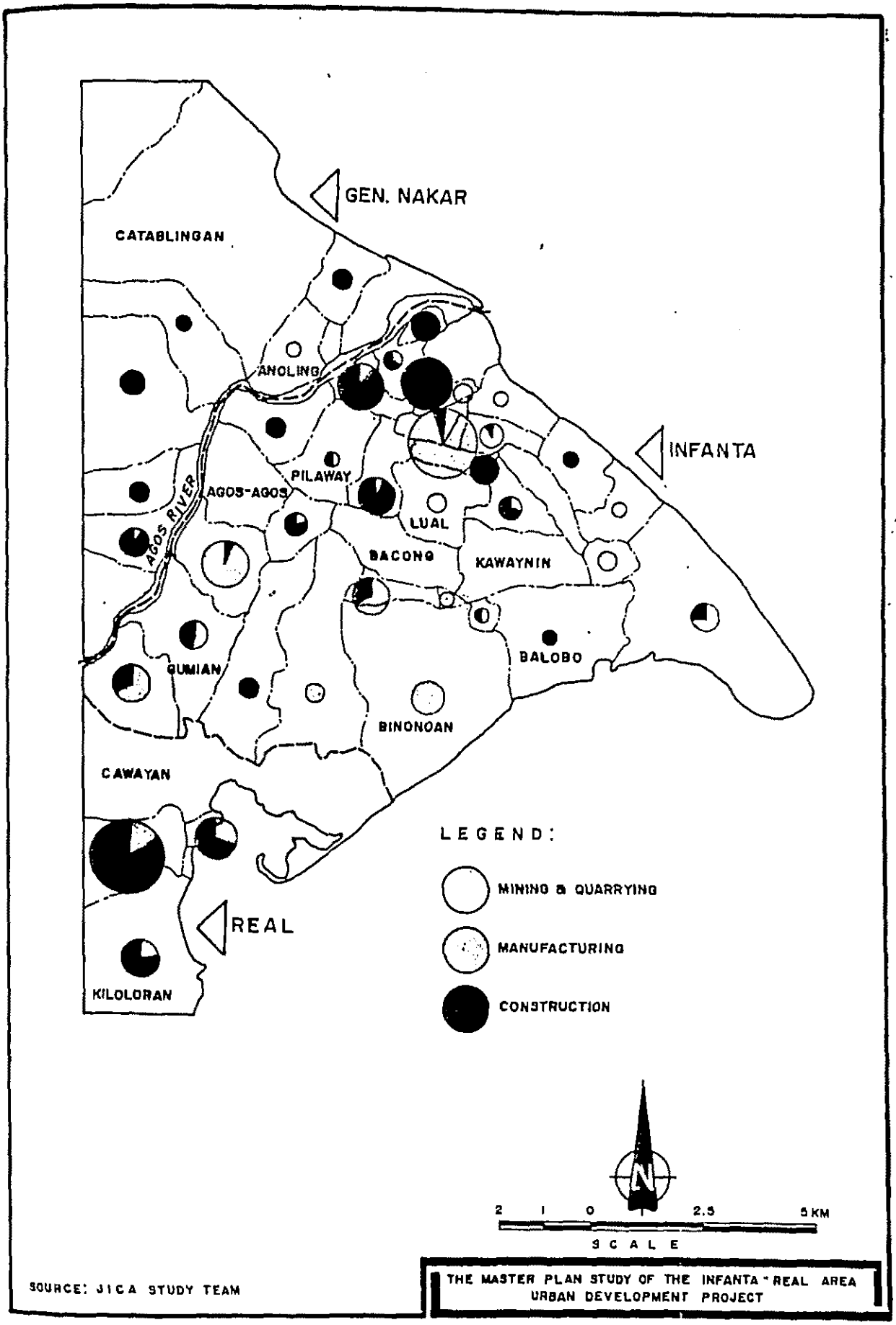


FIG. 3.3.12 COMPOSITION OF GAINFUL WORKERS IN SECONDARY INDUSTRY

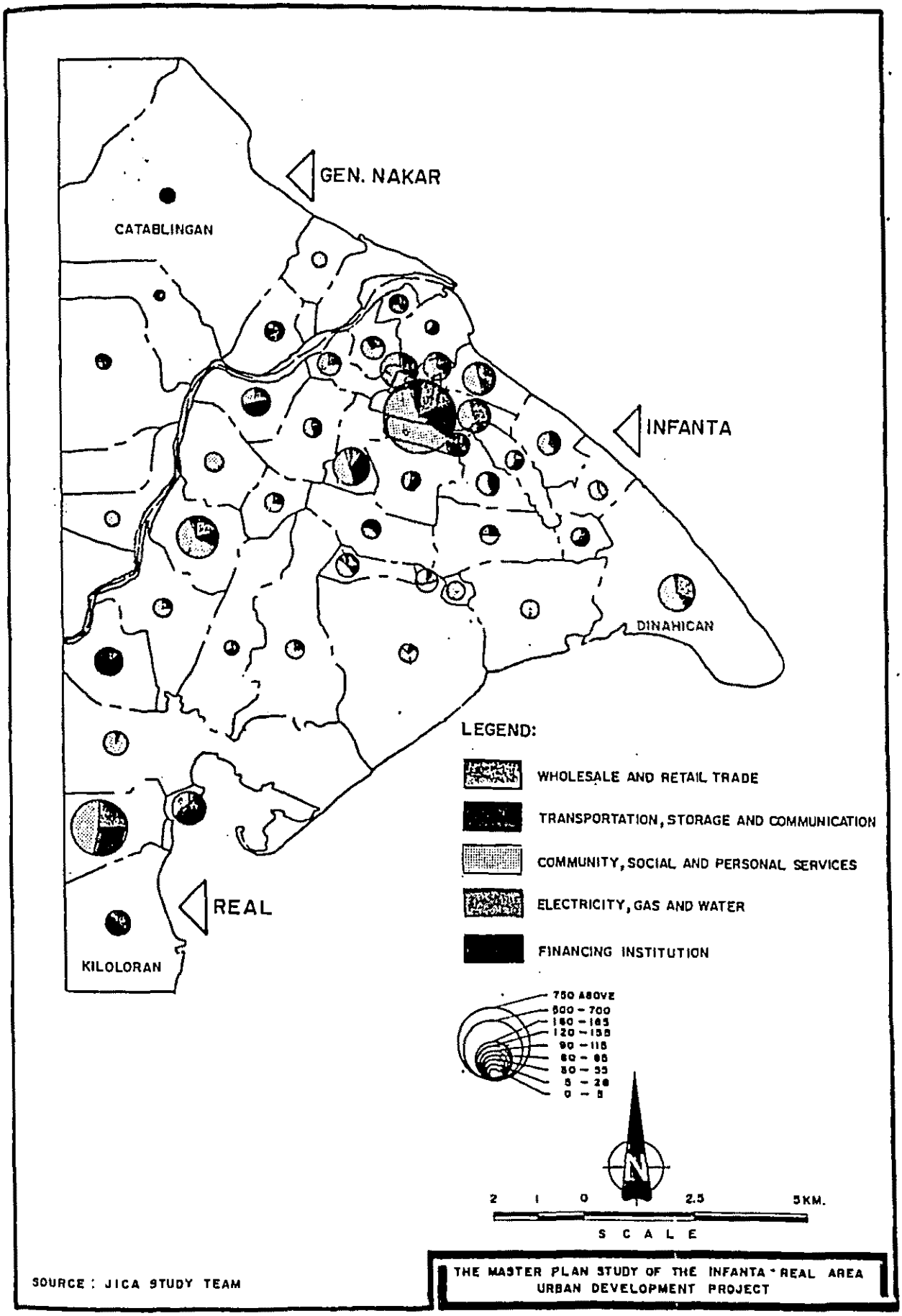


FIG. 3.3.13 COMPOSITION OF GAINFUL WORKERS IN TERTIARY INDUSTRY

3.3.3 Industrial Features of Agriculture

The following industrial features of agricultural activities in IRM have been identified from the result of a household survey.

1) Farming Families

The estimated number of farming families in IRM totalled 3529 as of December 1983 (20% sampling). They were characterized by crop and location (Tables 3.3.19 and 3.3.20):

(i) The majority of farming families were mainly engaged in paddy rice cultivation. By municipality, however, they represented varying proportions of all farming households: 75.0% in Infanta, 50.0% in Real and 37.3% in General Nakar. In Real and General Nakar, the potential for farming is physicakly limited (land, irrigation, drainage, etc.) as discussed in Chapter 3.4 (Land Use).

(ii) The crop with a comparable importance with rice is coconut, although families mainly engaged in coconut accounted for only 3.8% of total farming households. Coconut was mostly grown as a side business of rice growers, as it was evident from the fact that the number of families growing both paddy rice and coconut was the second largest (after exclusive rice growers) in each of the three municipalities of the IRM and reached as high as 54.7% in General Nakar.

(iii) Infanta has the best agricultural area of the three with the largest share of all farming families in IRM or 78.7% as well as or respective area totals of families engaged in different crops. It was characterized that General Nakar had large (not the largest) shares of families exclusively engaged in paddy rice and those engaged in both paddy rice and coconut.

Table 3.3.19 Farmhouses by Production (IRM, 1983)

	G. Nakar	Infanta	Real	Total
Paddy	242 (37.38%)	2.082 (75.0%)	51 (50.0%)	2,3756 (67.3%)
Coconut	48 (7.3)	75 (2.7)	11 (11.1)	134 (38)
Coconut & Paddy	356 (54.7)	489 (17.6)	23 (22.2)	868 (24.6)
Livestock	-	36 (1.3)	17 (16.7)	53 (1.5)
Farming & Fishing	5 (0.7)	94 (3.4)	0 (0.0)	99 (2.8)
Total	651 (100.0)	2.776 (100.0)	102 (000.0)	3.529 (100.0)

Source: JICA Study Team

Table 3.3.20 Farmhouses by Municipality (IRM)

	G. Nakar	Infanta	Real	% Total
Palay & Paddy	10.2	87.7	2.1	100
Coconut	35.8	56.0	8.2	100
Paddy & Coconut	41.0	56.3	2.6	100
Livestock	-	67.9	32.1	100
Farming & Fishing	5.1	94.9	0	100
Total	18.4	78.7	2.9	100

Source: JICA Study Team

Using the above classification of farming families, the average value of production per family has been estimated as shown in Table 3.3.21 with the following identified characteristics:

(i) In Infanta and General Nakar, families growing both paddy rice and coconut produced the highest average values per family. In Real those only engaged in coconut produced more--about twice the values produced by exclusive coconut growers in Infanta and General Nakar.

(ii) Infanta has the highest and Real the lowest average production value per exclusive paddy rice growing family.

Table 3.3.21 **Average Amount of Receipts**

(Pesos/Month)

	Palay	Coconut	Palay + Coconut	Livestock	*Agricultural & Fishery
Infanta	5320	1690	8880	4610	680
Real	3170	5300	4600	1000	-
G. Nakar	4400	2810	7270	-	-
Total	5180	2300	7970	3630	680

Note: *Total Receipts

The composition of farming households by crop is shown for each barangay in Fig. 3.3.14. It is noted that:

(i) In the flat area of General Nakar, rice is the major activity but many rice growers also grow coconuts (Group A). Up the hills along Agos River, majority are exclusively and non-exclusively coconut growers except in Pisa where many grow rice on paddies opened in narrow land along the Agos River.

(ii) In Infanta (Groups C, D, and E), majority are exclusively paddy rice growers but in barangays of Group C where sporadic "islands" or sprouts of coconut groves are seen in the flat land, 20% to 30% of farming families also grow coconut. The characteristics of the coastal/peninsular part extending to Dinahican (Group D), where rice growing is also the major activity are that farmers are also engaged in fishery activities. Group E, the chiefly swamp area shows a high ratio of paddy rice growers and a low ratio of coconut growers.

(iii) Real (Group F) shows a mixed compositions and in Kilolowan, all farming families grow coconut exclusively or otherwise.

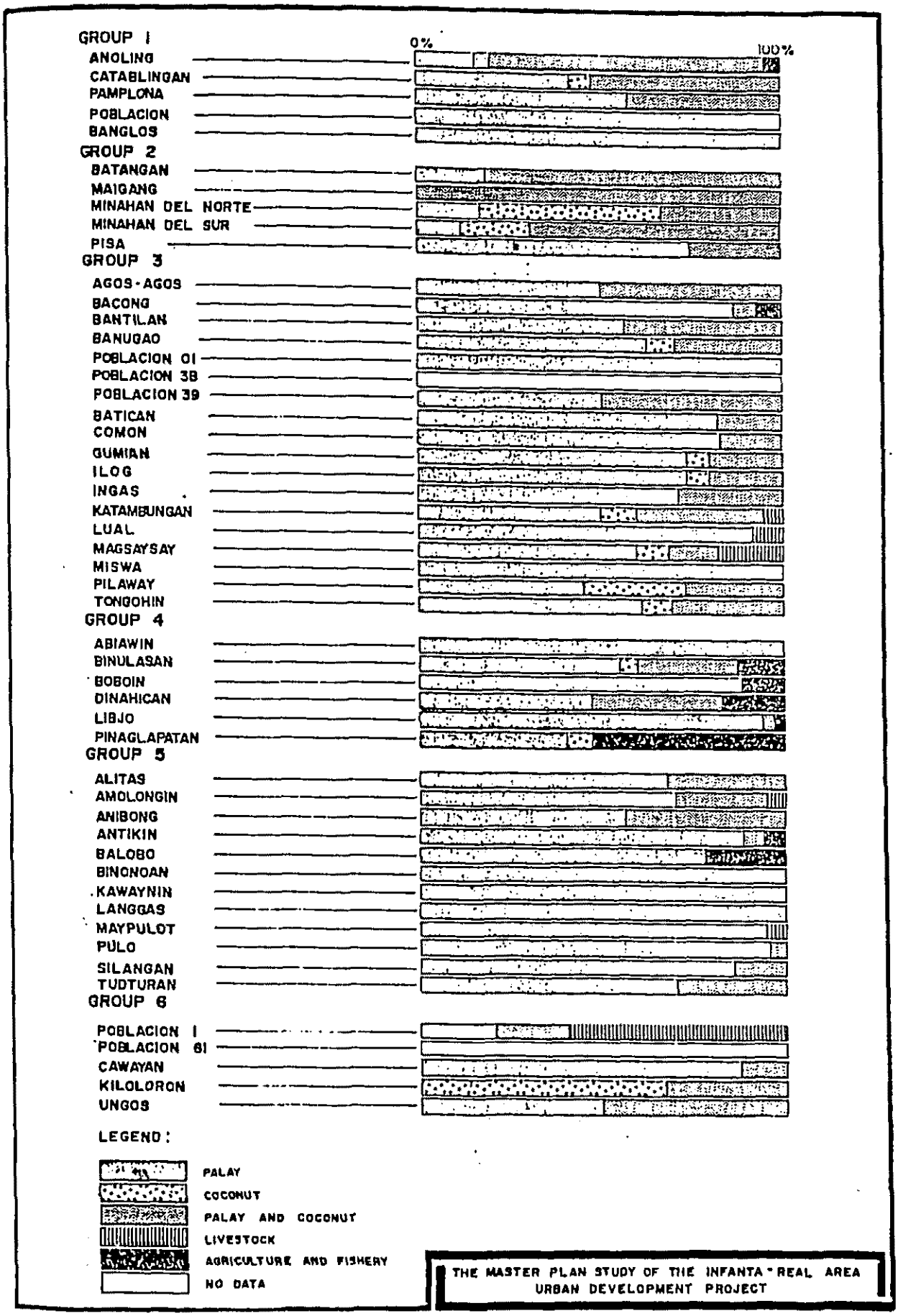


FIG. 3.3.14 COMPOSITION OF AGRICULTURAL HOUSEHOLD BY CROP

2) Cultivation Area and Yield

The major crops of IRM are rice and coconuts. Of the total 3,214 hectares paddy rice growing farms (exclusive or otherwise) in the IRM, the majority are in Infanta. The average farm area is 0.71 hectares in area, but such average is the smallest in General Nakar. From these, total rice farm area is estimated at 2,279 hectares of which 81.6% is concentrated in Infanta (Table 3.3.22).

Average rice yield in IRM is estimated from the household survey findings at 2,375 kilograms per hectare. (Information from other source --- 2,500 to 3,500 kilograms per hectare --- appears to pertain to relatively well-maintained paddies.) This means a 48.0% achievement of the Masagana 99 target with the highest achievement of 60.6% in Infanta.

Average rice production and income there from per family is 1,690 kilograms and 5,300 pesos per year. Yield and income per unit of land is relatively low in Infanta flat land (Group C), the central rice area.

The total number of farms in coconut production is 1,031 which is about one-third the number of rice growing farms while average size of coconut farm is 1.46 hectares which is about twice as large as average area of paddy farm.

Average coconut production per hectare is from 4,000 to 5,000 shells and is particularly large in the peninsula area extending to Dinahican (Group D) where well maintained (like plantations) orchards are found but family income from coconut is extremely low.

Average family income from coconut is 7,400 Pesos which is higher than the income from rice of 5,300 Pesos but average income from coconut per hectare of land is 5,070 pesos which is lower than the income from rice of 7,500 pesos (Table 3.3.23).

Table 3.3.22 Rice Culture in IRM

		Paddy Fields (ha)	Average Area (ha/ farmhouse)	Total Paddy Field (ha)	Yield (kg/ha)	Total Production (mt/year)	Income from rice Culturing per Farmhouse	Income per ha (₱)	Income per kg (₱)	Production per farm- (kg/year)
G. Nakar	Area A	34	0.62	269	2,945	671	4,100	6,600	4.2	1,550
	Area B	177	0.54	96	3,280	315	4,000	7,400	2.3	1,770
	Total	611	0.58	365	2,700	1,038	4,100	7,100	2.5	1,650
Infanta	Area C	1,401	0.70	981	1,710	1,678	3,500	5,000	2.9	1,200
	Area D	416	0.83	345	2,605	899	5,000	6,000	2.3	2,162
	Area E	711	0.75	533	3,000	1,599	8,500	11,300	3.8	2,250
	Total	2,528	0.74	1,859	2,317	4,307	5,500	7,400	4.3	1,710
Real	Area F	75	0.73	55	1,395	77	2,300	3,200	2.3	1,020
	Total	75	0.73	55	1,395	77	2,300	3,200	2.3	1,020
Grand Total		3,214	0.71	2,279	2,375	5,413	5,300	7,500	3.1	1,690

Source: JICA Study Team

Table 3.3.23 Coconut Culture in IRM

		Coconut Plantations (farmhouse)	Average Area (ha)	Total Coconut Plantation Area	Yield (nut/ha)	Production Per Farmhouse (nut)	Total Production (nut/year)	Income Per Farmhouse (₱)	Income per ha (₱)
G. Nakar	Area A	271	1.49	404 ha	4,431	6,600	1,790,000	17,100	11,500
	Area B	151	1.54	233	4,714	7,260	1,098,400	7,800	5,060
	Total	422	1.51	637	4,535	6,850	2,888,400	12,600	8,340
Infanta	Area C	415	1.45	602	4,114	5,970	2,476,600	3,000	2,070
	Area D	67	1.57	105	5,060	7,940	531,300	700	450
	Area E	97	1.07	104	4,249	4,550	441,900	3,600	3,360
	Total	579	1.40	811	4,254	5,960	3,450,000	2,900	2,070
Real	Area E	30	1.97	59	4,619	9,100	272,500	8,600	4,370
	Total	30	1.97	59	4,619	9,100	272,500	8,600	4,370
Grand Total		1,031	1.46	1,507	4,387	6,410	6,610,900	7,400	5,070

Source: JICA Study Team

3.4 Characteristics of the Land Use

3.4.1 Outline

The status of the land use in IRM is shown in Fig. 3.4.1 and in Table 3.4.1.

Land in IRM is generally used for coconut plantations, rice paddies and swamps.

The topography, soil and water system are the predominant factors that contribute to determine the form of land use. At present, the status of these factors still play a predominant part in its land use.

The topography of IRM (elevation map) is shown in Fig. 3.4.2. As shown, the study area is divided in 3 distinct zones in terms of altitude, i.e., less 1 m to 10 m and more than 10 m.

The distribution of soil type is shown in Fig. 3.4.3. The type of soil corresponds to the topographic zoning.

The land use has clear peculiarities in accordance with this topographic and soil zoning (Table 3.4.2, Fig. 3.4.4 and zoning maps from the standpoint of land use).

In this paper, the pertinent analysis is carried out in terms of two distinct types of land use: agricultural-type land use, and urban-type land use.

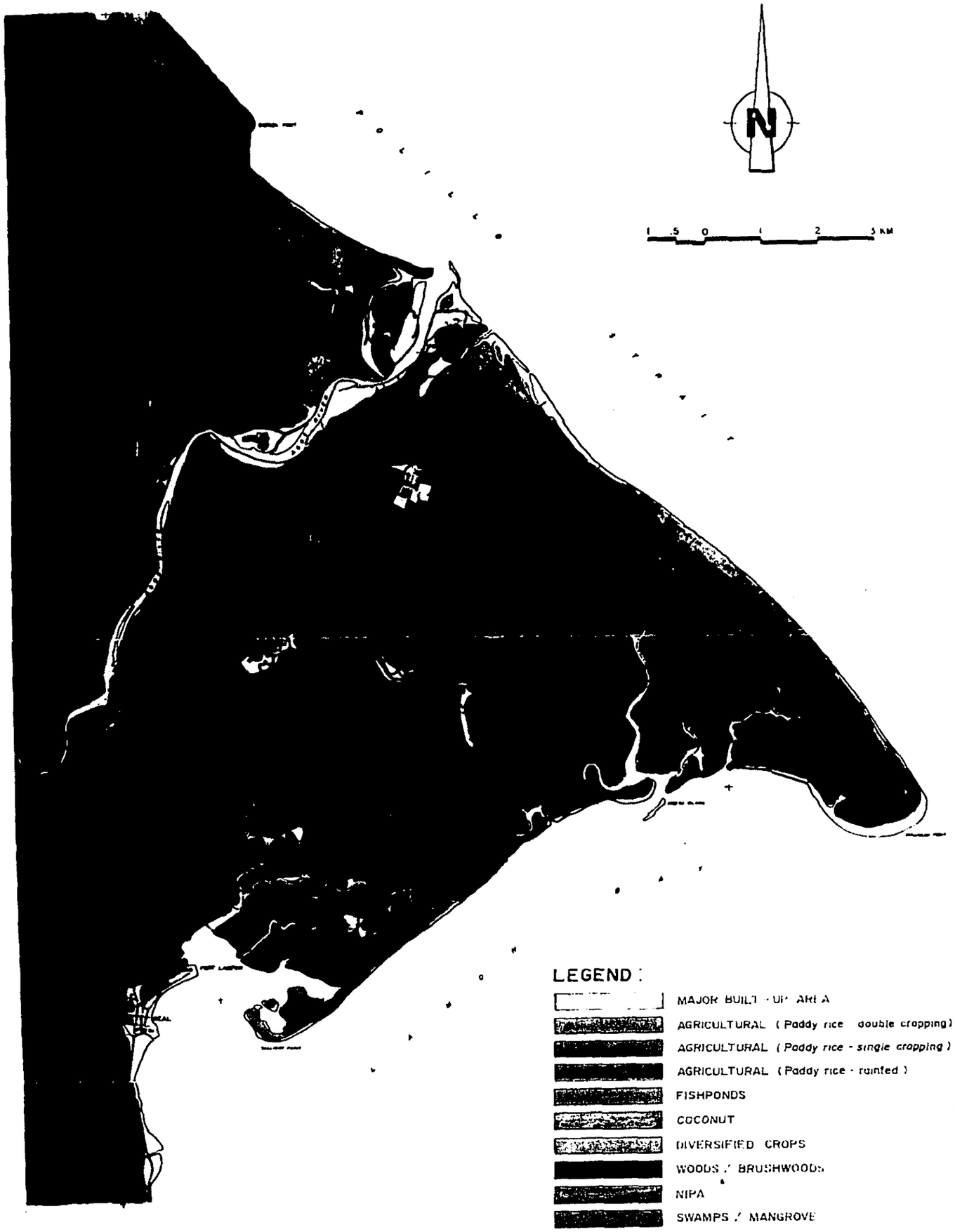


Fig. 3.4.1 EXISTING LAND USE - YEAR 1983

Table 3.4.1 Land Use Areas (IRM, 1983)

Classification	Gen. Nakar	Infanta	Real	G. Total
Coconut Groves	1,349.7 (31.1)%	1,865.1 (21.1)%	34.1 (1.6)%	3,248.9 (21.3)%
Mangroves	-	1,627.6 (18.5)	368.4 (17.3)	1,996.0 (13.1)
Nipa	-	439.9 (5.0)	149.1 (7.0)	589.0 (3.9)
Woods & Brushwoods	2,109.2 (48.6)	818.2 (9.3)	1,352.3 (63.5)	4,279.7 (28.0)
Paddy Rice Single Cropping	-	651.0 (7.4)	-	651.0 (4.3)
Paddy Rice Double Cropping	451.3 (10.4)	1,548.4 (17.6)	49.0 (2.3)	2,048.7 (13.4)
Paddy Rice Rainfed	-	123.2 (1.4)	-	123.2 (0.8)
Built-Up Areas	17.4 (0.4)	96.8 (1.1)	27.7 (1.3)	141.9 (0.9)
Swamps	-	395.9 (4.5)	-	395.9 (2.6)
Fish Ponds	-	712.6 (8.1)	29.8 (1.4)	742.4 (4.9)
Diversified Crops	325.5 (7.5)	8.8 (0.1)	40.5 (1.9)	374.8 (2.5)
Others	86.8 (2.0)	510.2 (5.8)	78.7 (3.7)	675.7 (4.4)
Area of Municipality	4,339.9ha	8,797.7ha	2,129.6ha	15,267.2ha

Source: JICA Study Team

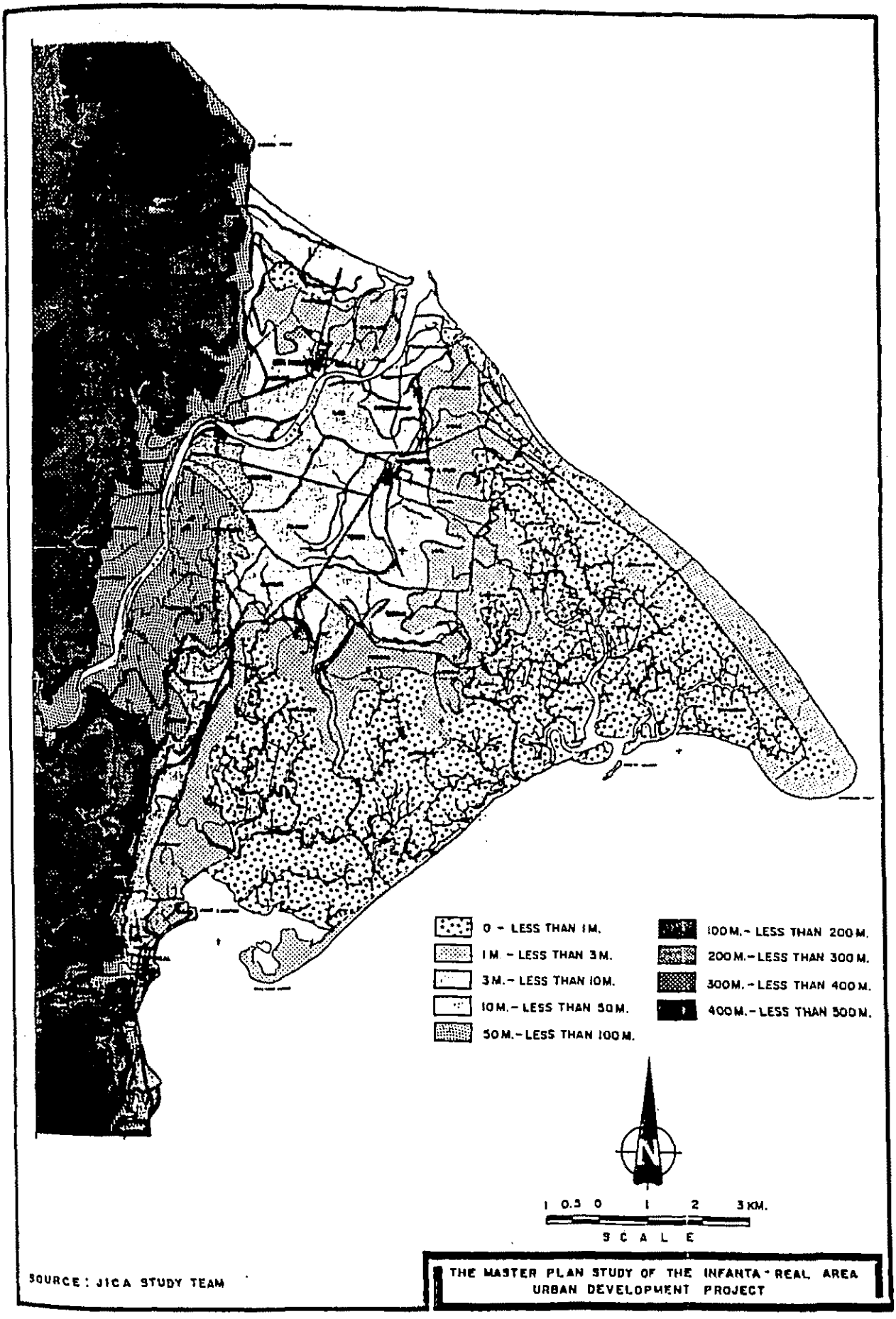


FIG. 3.4.2 TOPOGRAPHY OF I R.M.(CONTOUR MAP)

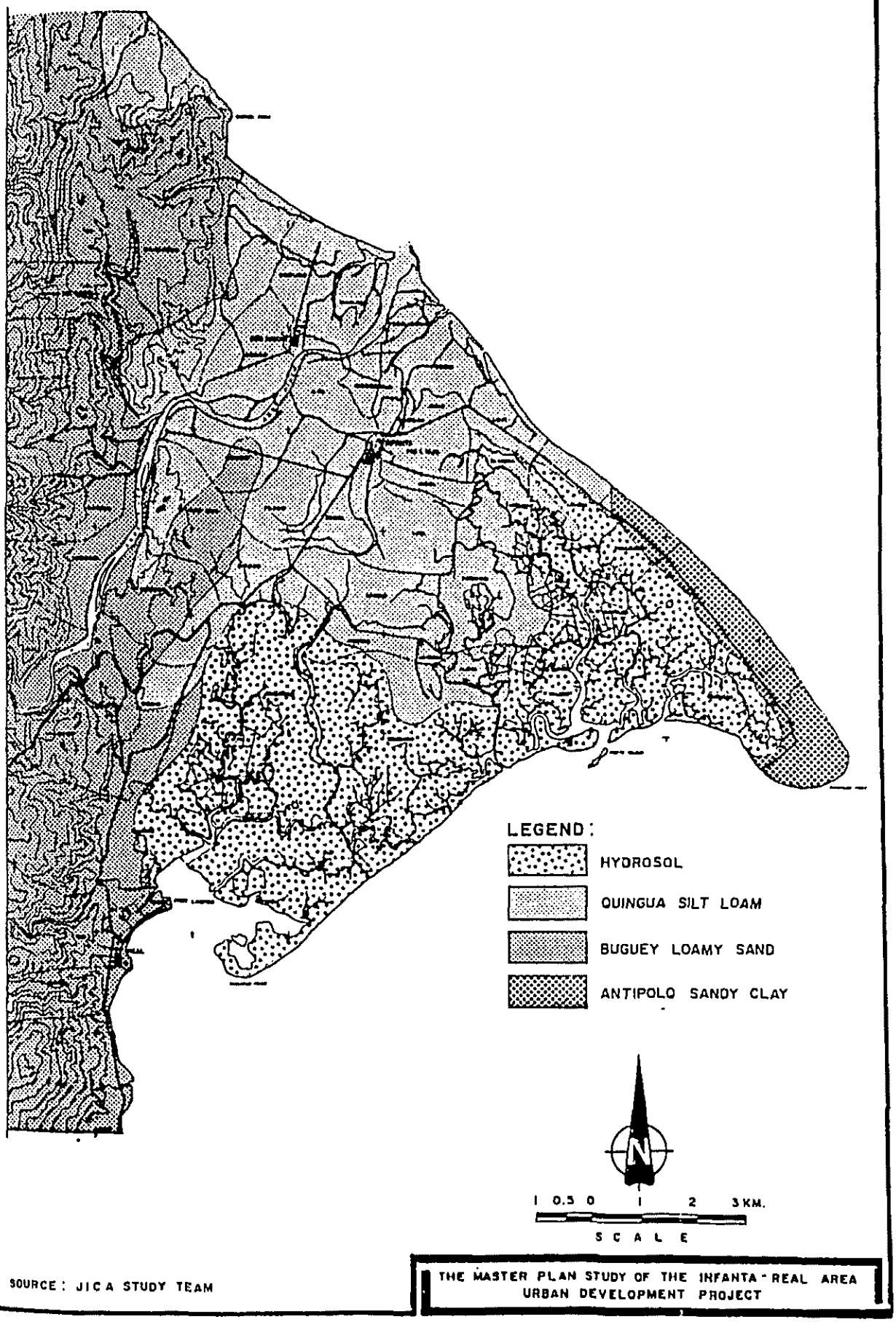


FIG. 3.4.3 SOIL MAP

Table 3.4.2 Characteristics of Land Use (IRM)

A R E A	ABOVE SEA LEVEL	S O I L	CHARACTERISTICS
A. Swamp	Below 1m	Hydrosol	Mangrove, Nipa, etc.
B. Sandbar extending towards Dinahican point	1m - 3m	Buguey, loamy sand	Extensive agricultural area, mainly coconuts
C. Infanta, Gen. Nakar heights area	1m - 10m mainly, 4m-5m	Quingasilt-loam	Intensively cultivated land, mainly paddy
D. Stretch of hills, foot of Sierra Madre mountains	10m - over	Antipolo sandy clay	Forest, coconuts

Source: JICA Study Team

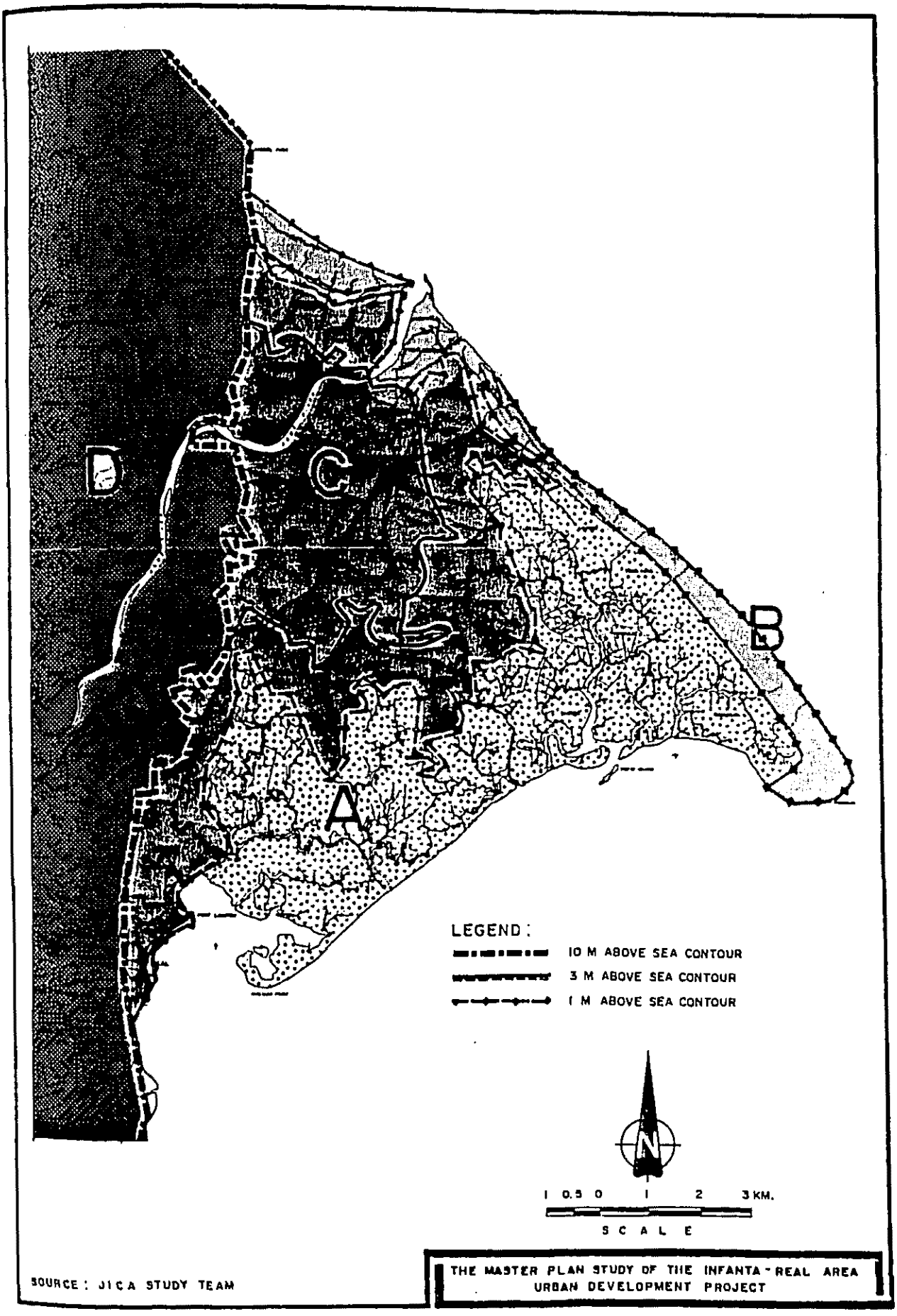


FIG. 3.4.4 MAJOR ZONING OF EXISTING LAND USE

3.4.2 Agricultural-type land use

The agricultural-type land use is influenced by the soil, which is the factor determining the agricultural productivity of the land.

There are 4 types of soil in IRM, and the characteristics as well as the vegetation of these soils are shown in Table 3.4.3, in conformity with the soil classification system of the Philippines.

The topographic outline and vegetation of the soil zone mentioned before correspond exactly to this classification system, indicating therefore, that the land use is determined by the soil.

(i) The large area south of Infanta is the swamp zone (A). It corresponds approximately to the zone with less than 1.0 m elevation, because it has a high-tide level of 1.9 m and low tide level of -1.14 m (maximum)*. The soil consists of hydrosoil as shown in Table 3.4.3, and it is covered with water. Fish ponds suited for fish nursing are located in this swamp.

(ii) Most of the farming activities of the study area are carried out within altitudes of 1 m to 10 m. One of the zones belonging to this classification is the peninsula (Zone B) extending to the sandbank of Dinahican. This zone consists of relatively new alluvial soil conveyed by the Agos River, which belongs to the Buguey Loamy Sand.

This zone is not so much suited for agriculture in view of the damages caused by sand, poor irrigation water, etc., but its farmers mainly cultivate coconut palms that are resistant to sea water, in addition to small-scale plantations of banana and rootcrops. The agriculture carried out in this zone has negligible importance.

(The harvest of coconut is said to be of the order of 3,400 nut/ha-year).

Note: * Mean tide level = 0m

Table 3.4.3 Characteristics of Soil (IRM)

SOIL	PARENT MATERIAL	RELIEF	DRAINAGE		VEGETATION
			EXTERNAL	INTERNAL	
Hydrosol		Flat	Very poor	Very poor	Mangrove, Nipa, Fish pond
Quinguasilt loam	Recent alluvial deposits	Nearly level to slightly undulating	Good	Good	Rice, coconut, banana, rootcrops, (ricefield = 40 - 50 cavans/ha.)
Bugney, loamy sand	Recent alluvial deposits	Nearly level to slightly undulating	Good	Excessive	Coconut, rootcrops, banana, vegetables (coconut yield = 3,400 nuts/four ha.)
Antipolo, sandy clay	Igneous rocks	Strongly rolling to hilly mountain	Good to excessive	Good	Coconut, rice, corn, banana, forests

*Mean tide level = 0m

Source: Bureau of Soil

(iii) On the other hand, there are narrow strips of flatlands adjacent to swamps located at one side and hilly zones with more than 10 m elevation at the other in the plateaus of Infanta and General Nakar.

The most important part of the agriculture of the IRM is located in this zone. The soil of this flatland belongs to the class of quigua silt loam as shown in Table 3.4.3, which consists of metamorphosed alluvial soil and is suited for agriculture. Intensive agriculture consisting principally of rice is carried out in this zone, in addition to the cultivation of coconut and corn. (The harvest of rice is said to be generally from 2,000 to 2,500 kg/ha).

Particularly in the Infanta flatland, this zone has altitudes of 4 to 5 m, and it has good drainage tanks at the slope rising toward the Agos River. But on the other hand, the supply of irrigation water is difficult.

Such being the case, the Agos River Irrigation Project relying on the Agos River for supply of water was implemented in this zone. As a result, the majority of the flatland of the Infanta plateau is comprised within the coverage area of this system.

Other zones of arable lands of altitudes of this order consist of very narrow strips scattered throughout the hills along the Infanta Road making the Infanta Real interconnection.

The flat arable lands of General Nakar are frequently flooded by the overflow of the Agos River.

(iv) The western extremity of IRM consists of hilly and mountainous districts (Zone D). The approximate of 10 m contour line is the borderline of the Antipolo Sandy Clay zone. These hills are covered by forests, but coconut is the best suited crop. At present, there are several coconut plantations.

3.4.3 Urban Structure and Urban-type land use

1) Urban Structure

The narrow flatlands that are bordered by hills at the western side are almost completely developed for agricultural use. There are few idle land and wasteland.

The socio-economic activities of the local population are developed principally in this flatland. The urban center of Infanta and the Infanta Road accessing the urban center of Real compose the axis of the formation of the urban structure within IRM.

The urban structure consisting of the urban areas of Infanta and Real, and the Infanta Road interconnecting them is shown in Fig. 3.4.5.

(i) The Infanta flatland is an agricultural land specializing in the cultivation of rice and coconut while the adjacent urban area of Infanta provides the service functions required by this rural area.

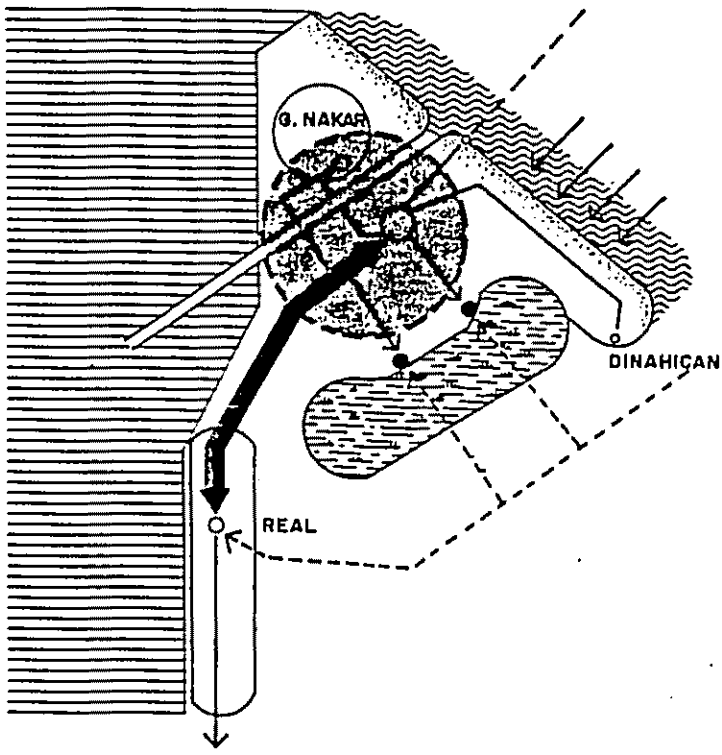
(ii) On the other hand, there are branch roads diverging from the urban areas of Infanta and Infanta Road, and there are small settlements at the points of intersection of these roads with creeks at the swamps and the shoreline (section located between Santa Monica and Dinahican). These settlements are local center points for landing of fishes (coastal fishery and nursing fishery), transist of passengers (shopping at Infanta, etc.) from Polillo Islands, etc. (Both commodities and passengers converge to Infanta via these transit points).

(iii) The urban area of Infanta as well as General Nakar are included within its service sphere.

(iv) The urban area of Real has the function of settlement center along the shoreline and also functions as a port, but it has yet the predominant character of fishermen settlement.

(v) The Infanta Road supports the aforementioned activities and concentrates all traffic of exports from sand imports IRM, as well as the mutual interconnection between the various zones of IRM. Therefore, it is the artery that unifies both the daily life and the economy.

Furthermore, population, regional facilities and urban facilities spreading out of the Infanta-Real urban area are accumulating along this road due to traffic convenience. Therefore, it plays an important part within IRM.



LEGEND:

HIGHLAND

SWAMP

PLAIN AREA OF INFANTA

TRANSPORTATION NODE

N

SOURCE: JICA STUDY TEAM

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

FIG.3.4.5 EXISTING URBAN STRUCTURE

2) Urban Land Use

(1) Location of the Urban Centers.

Urban centers are formed in the three municipalities of the study area, and these urban centers have extremely rational and advantageous locations, as shown from the following (Fig. 3.4.6):

(Urban Center of General Nakar)

The urban center of General Nakar is adjacent to the Agos River, approximately 2 km from the shoreline. This urban center covers the flatland located between the seashore and the hills within a radius of 2 km, and is near the urban area of Infanta, which is the center of the IRM.

There is no risk of influence of flood tide because the urban center of General Nakar is located at a place with elevations from 4 to 5 m, but it is directly exposed to the flood of the Agos River (at present, most of the flatland of General Nakar is exposed to flood).

(Urban Center of Infanta)

The urban area of Infanta is located at the center of the Infanta flatland. At present, it is the center of the traffic system of IRM because it is located in the point of interconnection with the sea transportation network (shoreline--- Santa Monica, Swamp. creek---Silangan) and at approximately even distances from the river crossing points accessing General Nakar (2.0-2.5 km).

This urban center is located at the fringe of the plateau with elevations from 4 to 5 m, and is free from exposure to floods from the Agos River and high tide of the sea.

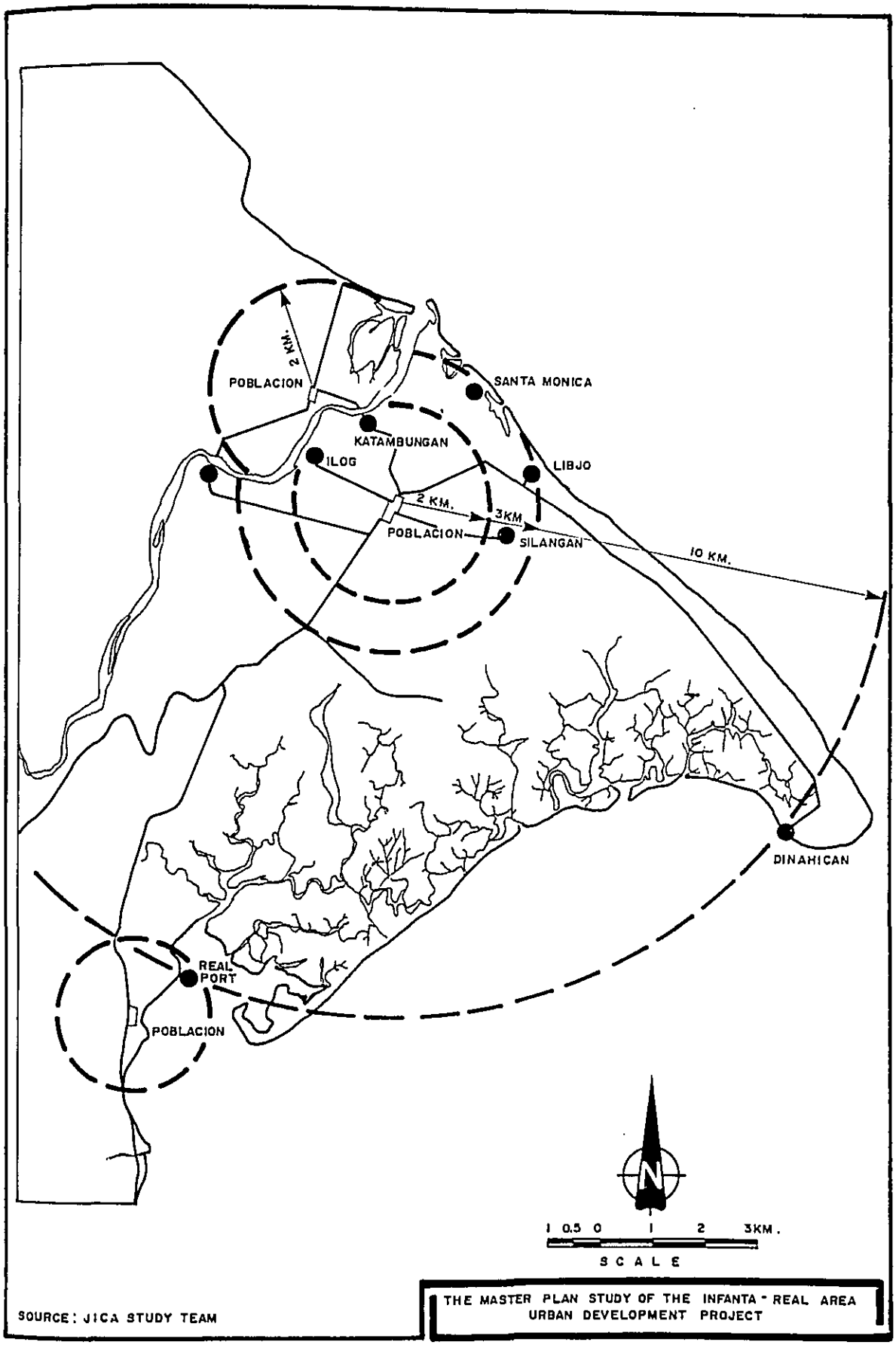


FIG. 3.4.6 LOCATION OF POBLACION

(Urban Center of Real)

The urban center of Real is located along the Infanta Road which is the arterial road of IRM.

Therefore, access to IRM is not only through the front gate but also adjacent (1.5 km) to the local center of the sea traffic network.

The location adjacent to the shoreline can be used for landing of commodities transported by sea (fishes, coconut) with bancas and other means.

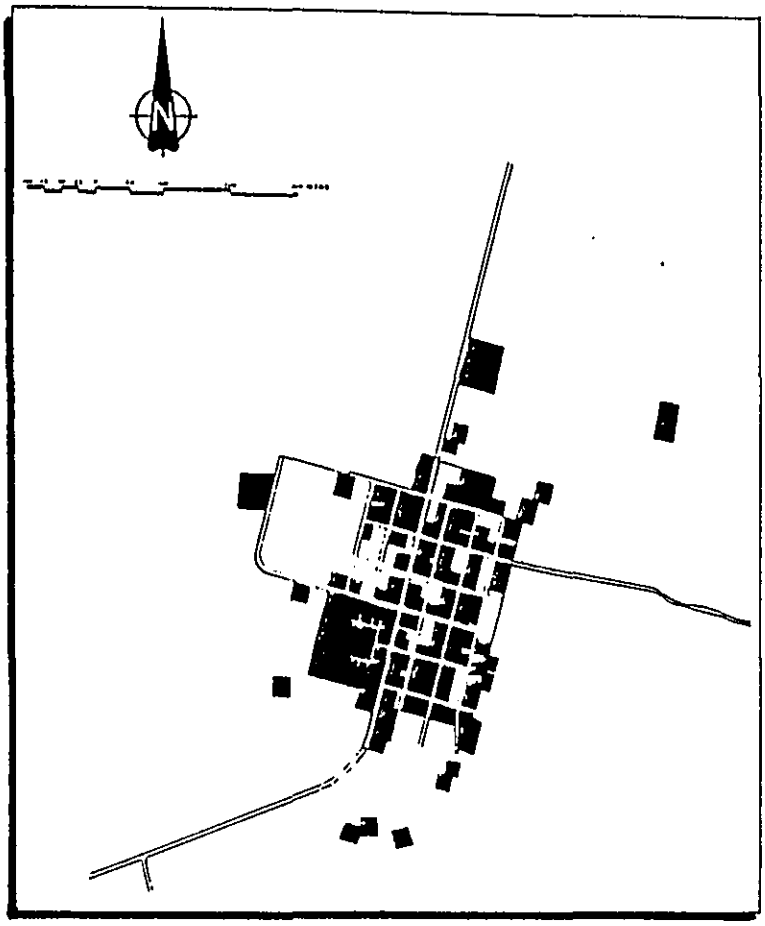
(2) State of Urbanization

In each municipality, the road network is developed in a lattice pattern at the urban center. This urban center, together with the streets sprawled at its environs, comprise the urban area of the municipality. These urban areas cover 46.8 hectares in Infanta, 56.6 hectares in Real and 11.8 hectares in General Nakar. They have the following characteristics as shown from the urbanization map on Fig. 3.4.7:

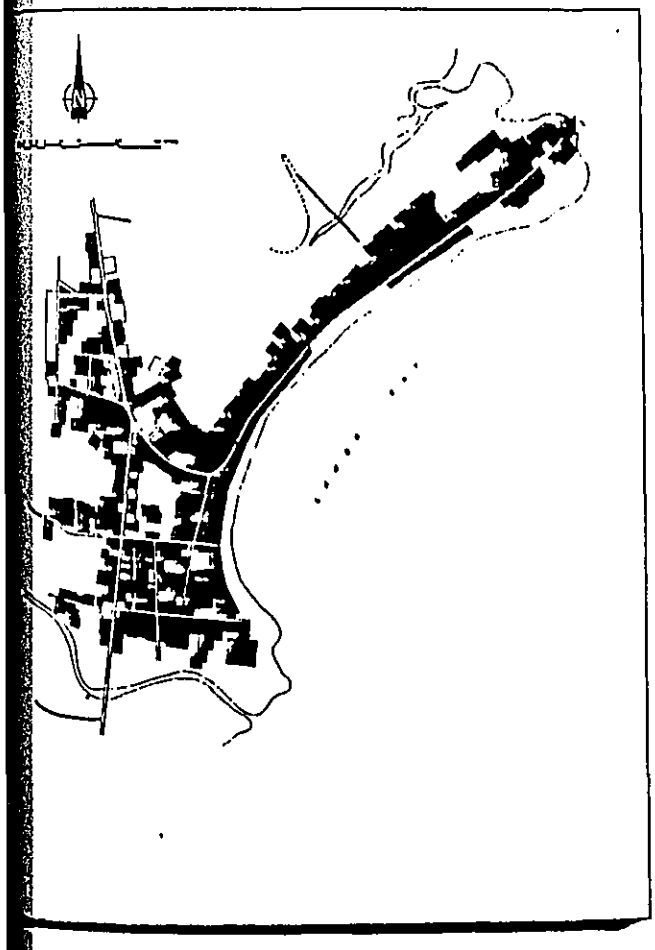
o In Infanta and Real, the urbanized area is spread throughout the urban center and along the principal roads.

o The urban center of Infanta is completely occupied by buildings and urban functions, but the urban centers of Real and General Nakar have many vacant lots.

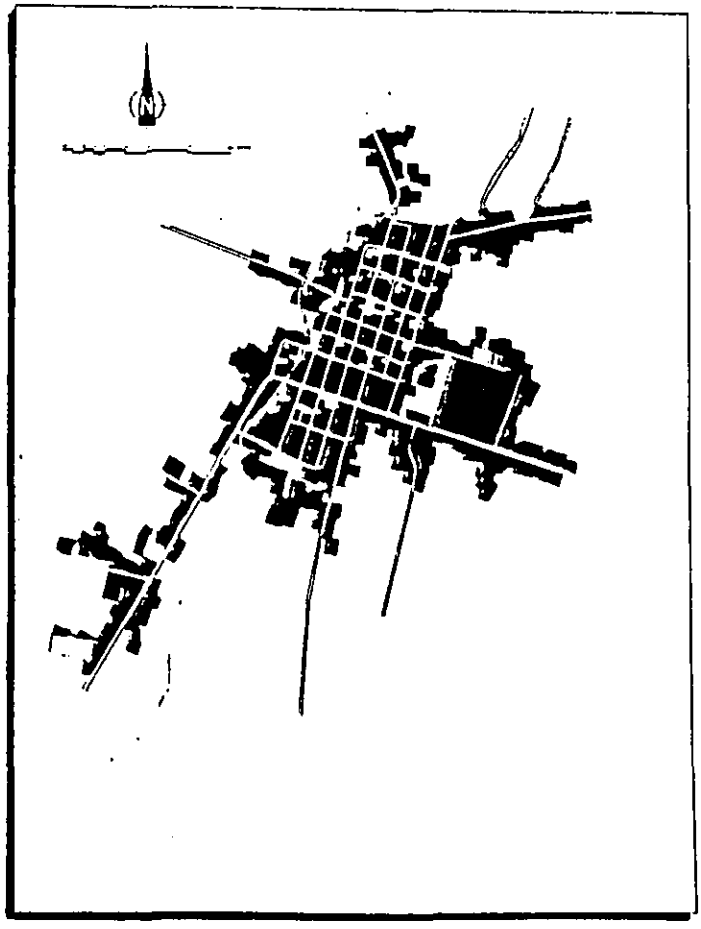
The number of buildings, density, building coverage and floor area ratio of the urban centers are shown in Table 3.4.4.



G. NAKAR



REAL



INFANTA

JICA STUDY TEAM

FIG. 3.4.7 EXISTING BUILT-UP AREAS

Table 3.4.4 Buildings inBuilt-up Area (IRM, 1983)

	G E N. N A K A R		I N F A N T A		R E A L	
	Central District	All Built-up area	Central District	All Built-up area	Central District	All Built-up area
Built-up area	'000m^2 118.25	'000m^2 118.25	'000m^2 307.68	'000m^2 467.59	'000m^2 236.16	'000m^2 356.00
No. of buildings	123	123	521	725	455	790
Building area	'000m^2 11.71	'000m^2 11.71	'000m^2 60.17	'000m^2 72.45	'000m^2 25.29	'000m^2 40.81
Floor area	'000m^2 12.41	'000m^2 12.41	'000m^2 80.00	'000m^2 96.47	'000m^2 26.05	'000m^2 42.59
Building density	/ha 10.4	/ha 10.4	/ha 16.9	/ha 15.5	/ha 19.3	/ha 22.2
Building ratio	9.9%	9.9%	19.6%	15.5%	10.7%	11.5%
Building volume ratio	10.5%	10.5%	26.0%	20.6%	11.0%	12.0%
Average stories of buildings	1.06^{Fl}	1.06^{Fl}	1.33^{Fl}	1.33^{Fl}	1.03^{Fl}	1.04^{Fl}

Source: JICA Study Team

The following conclusions are drawn from the structural characteristics of the buildings of the three urban centers shown in Figs. 3.4.8 to 3.4.10:

Infanta - The buildings are mostly made of wood, wood and mortar, and a few concrete buildings.

Real - Concrete structures are rare including the ones located along the Infanta Road. There are also houses constructed with nipa along the shoreline.

General Nakar - The buildings are made mostly of wood, and wood and mortar, and a few nipa houses.

(3) Present Status of Land Use

The status of land use in the central district and the built up area of each municipality is shown in Table 3.4.5 and Figs. 3.4.11 to 3.4.13.

The land use in the three municipalities has the following characteristics:

a) The size of the central district of Infanta is approximately 1.5 times as large as that one of Real. Furthermore, the commercial and institutional facilities of the central district of Infanta account for areas 2 to 3 times as large as the corresponding facilities of Real. The said difference is attributed to the fact that Infanta is the center of IRM in terms of commercial, administrative and educational activities. However, in terms of residential area the two municipalities are practically even. The size of residential lots is particularly large in Real due to the residences of fishermen.

b) Real has the largest area of unused land, both in terms of absolute area and composition of use. However, in terms of proportion between the urban area sprawled from the central district and the whole of the urban area, Infanta and Real seem to be practically even with 34.2% and 33.7% respectively.

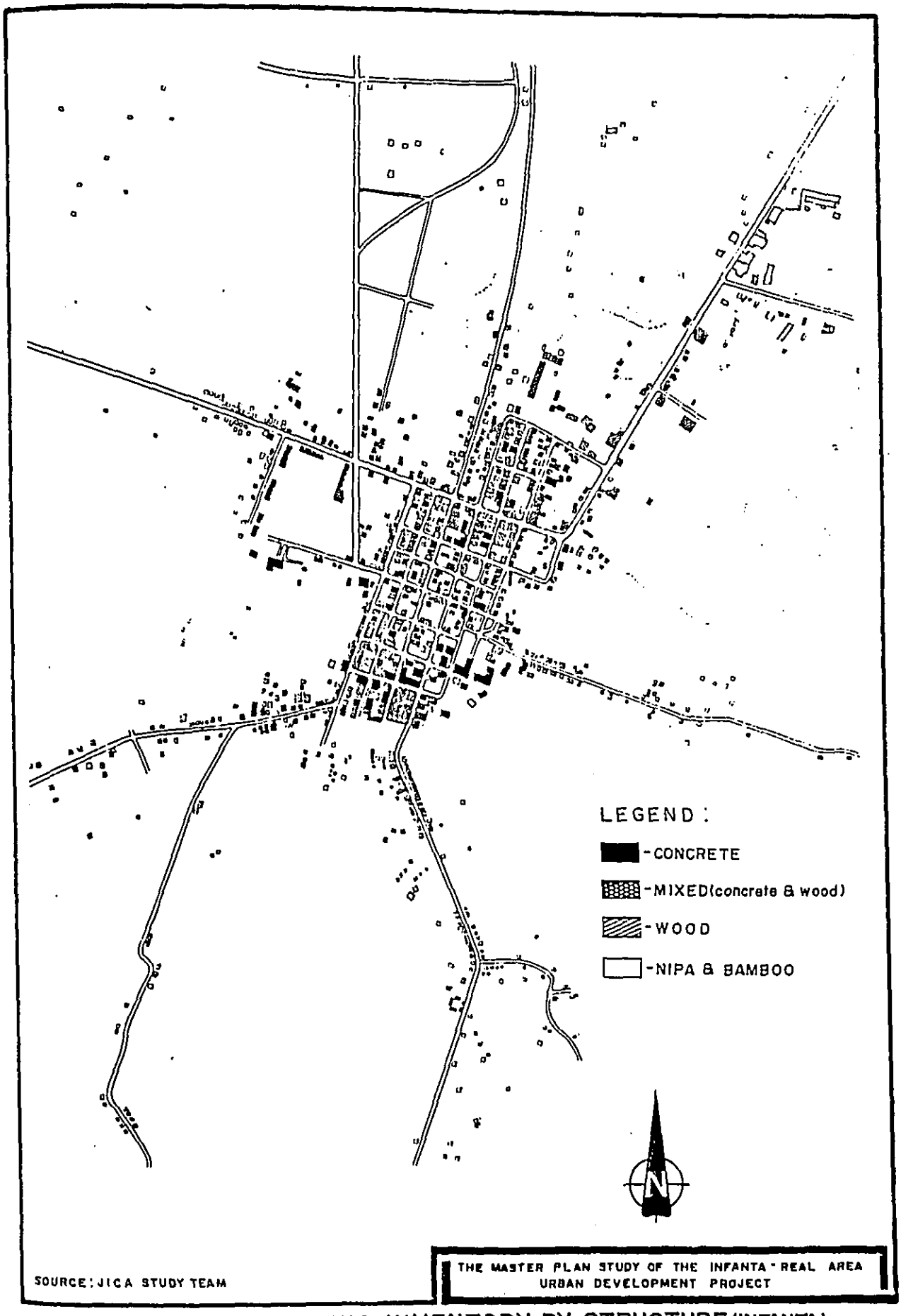


FIG.3.4.8 BUILDING INVENTORY BY STRUCTURE (INFANTA)

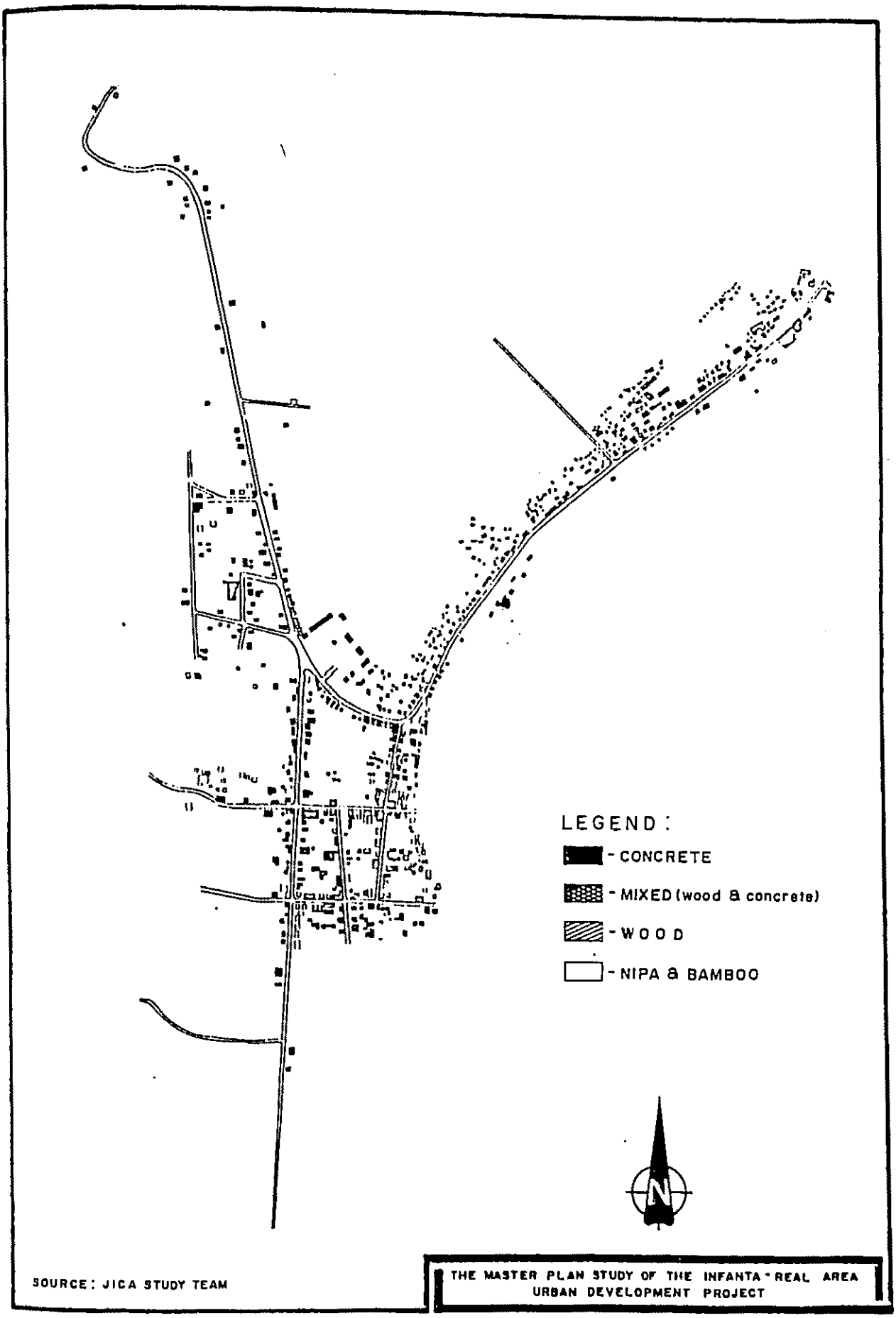


FIG. 3.4.9 BUILDING INVENTORY BY STRUCTURE (REAL)

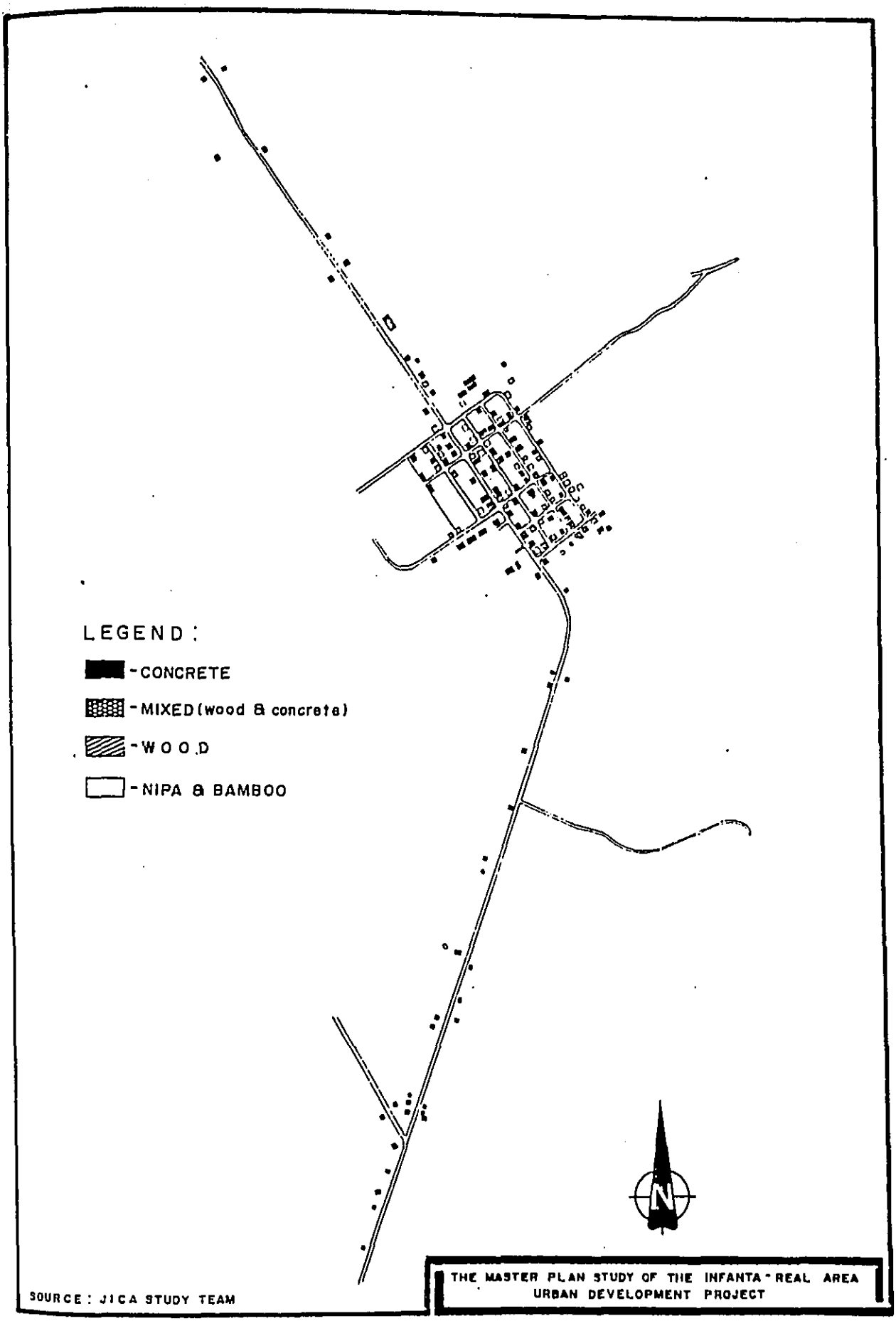


FIG.3.4.10 BUILDING INVENTORY BY STRUCTURE (GEN. NAKAR)

Table 3.4.5 Land Use Area in Built-Up Area
(IRM, 1983)

ha (%)

Land Use	General Nakar		Infanta		Real	
	Central District	All Built-Up Area	Central District	All Built-Up Area	Central Distric	All Built-Up Area
Residential	36.67 (31.0)	36.67 (31.0)	121.65 (39.5)	198.28 (42.4)	115.82 (49.0)	184.53 (53.2)
Single Family	36.67 (31.0)	36.67 (31.0)	113.28 (36.8)	186.63 (39.9)	113.60 (48.1)	184.52 (51.8)
Multi Family	0 (0)	0 (0)	8.37 (2.7)	11.65 (2.5)	2.22 (0.9)	5.01 (1.4)
Commerical	5.49 (4.6)	5.49 (4.6)	48.16 (15.7)	59.58 (12.7)	17.42 (7.4)	21.23 (6.0)
Institutional	23.67 (20.0)	23.67 (20.0)	63.88 (20.8)	74.04 (15.8)	17.83 (7.5)	29.76 (8.4)
Transport Utilities	0 (0)	0 (0)	3.27 (1.1)	3.27 (0.7)	2.29 (1.0)	18.96 (5.3)
Manufacturing	0 (0)	0 (0)	2.45 (0.8)	4.37 (0.9)	0 (0)	0 (0)
Open Space	12.39 (10.5)	12,39 (10.5)	19.80 (8.7)	32.57 (7.0)	54.00 (22.9)	54.76 (15.4)
Functional Open Space	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Vacant Lot	12.39 (10.5)	12.39 (10.5)	19.80 (8.7)	32.57 (7.0)	54.00 (22.9)	54.76 (15.4)
Forestry	19.71 (16.7)	19.71 (16.7)	0.31 (0.1)	0.31 (0.1)	0 (0)	0 (0)
Road	20.32 (17.2)	20.32 (17.2)	41.13 (12.4)	50.95 (10.9)	28.80 (0.2)	41.76 (11.7)
Total	118.25 (100.0)	118.25 (100.0)	307.68 (100.0)	467.59 (100.0)	236.16 (100.0)	356.00 (100.0)

Source: JICA Study Team

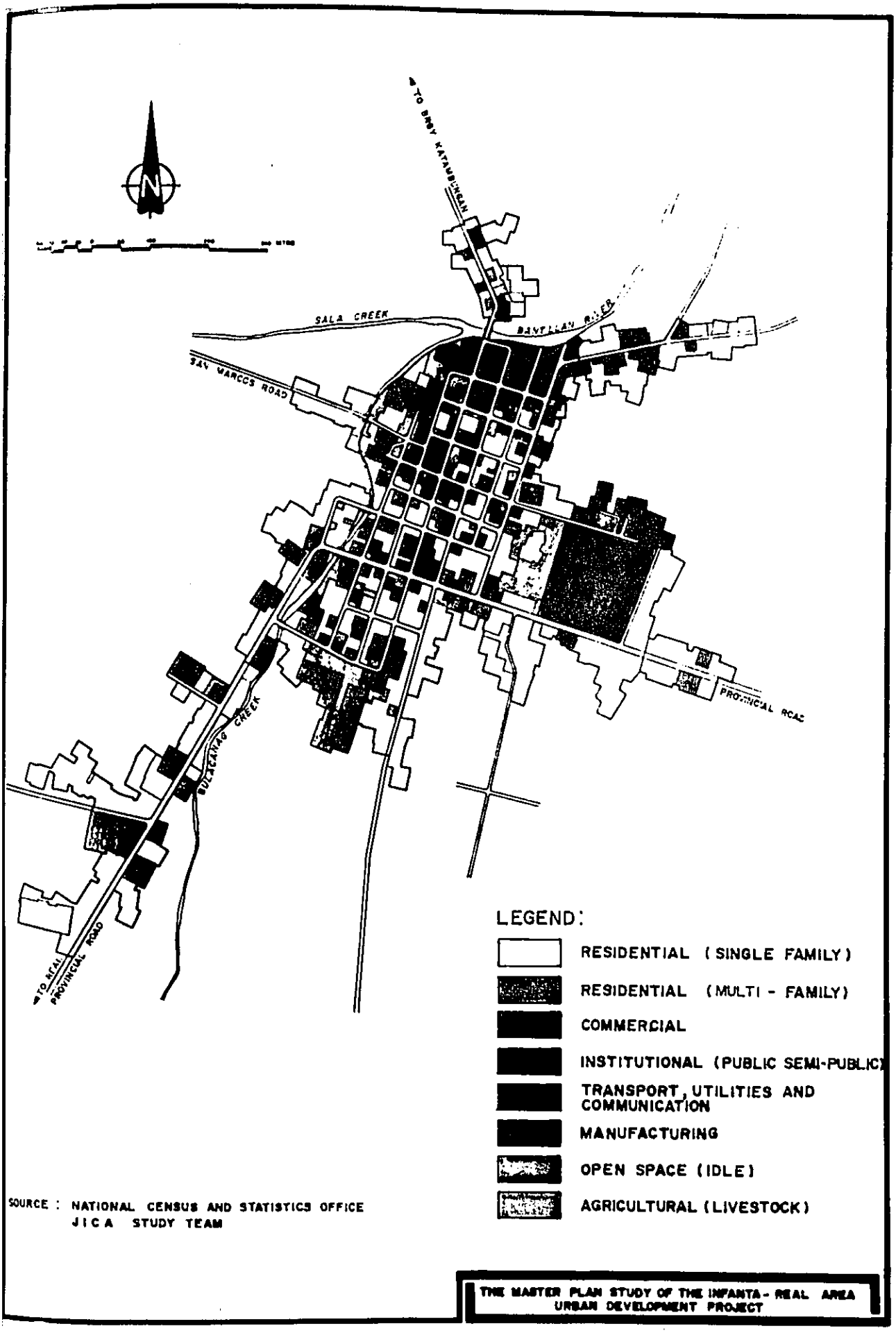


Fig.3.4.11EXISTING LAND USE OF BUILD-UP AREA (INFANTA)

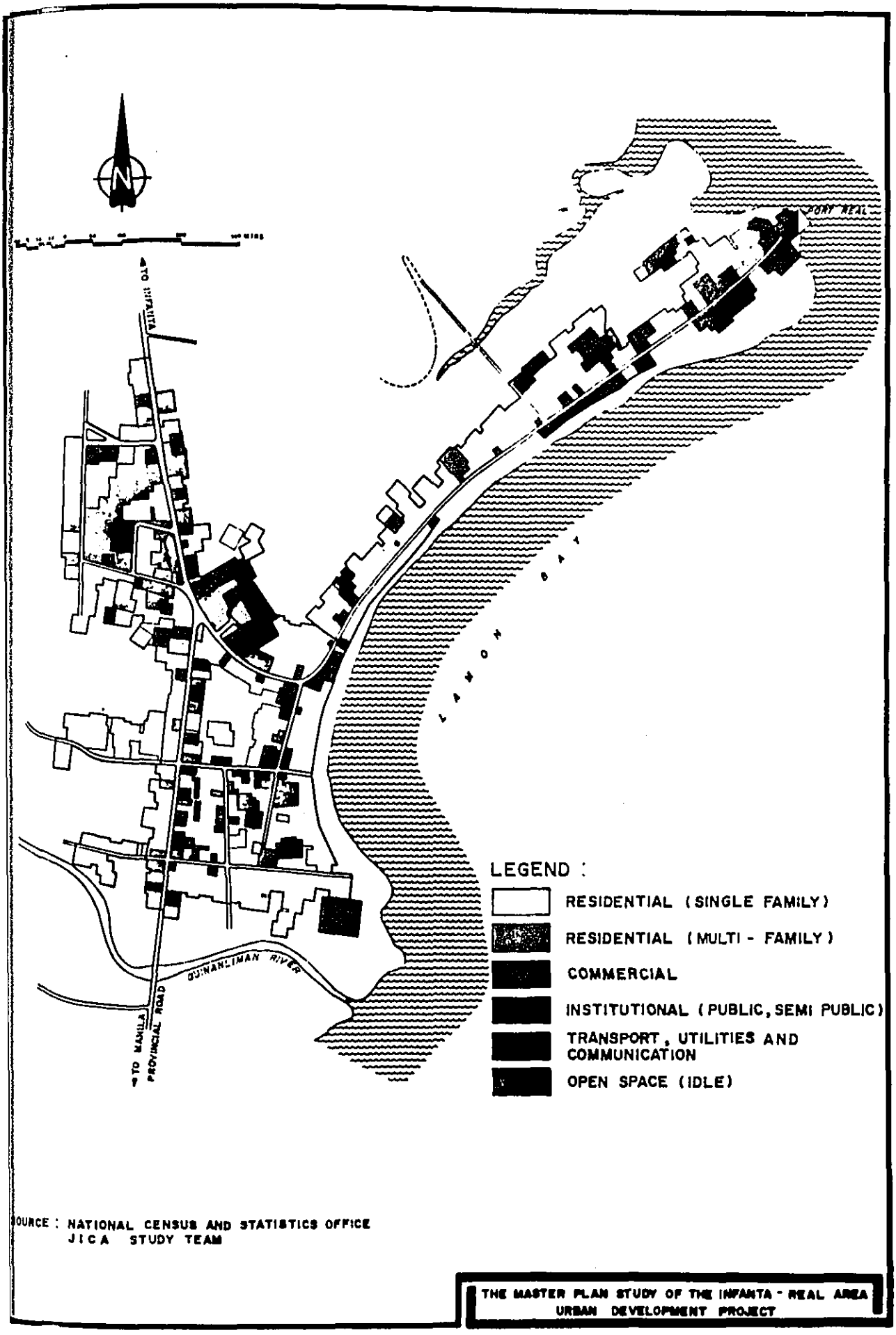


Fig.3.4.12 EXISTING LAND USE OF BUILD-UP AREA (REAL)

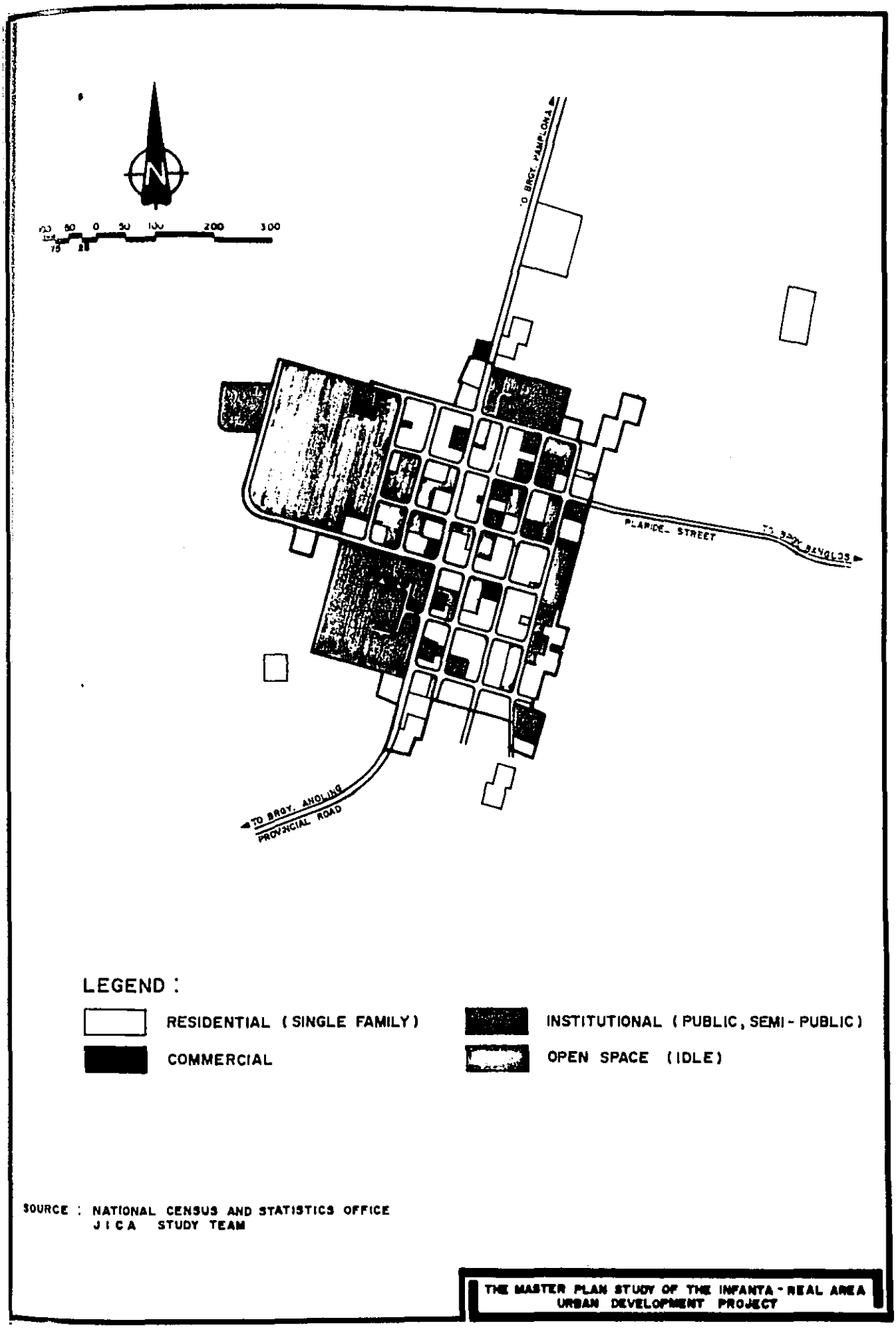


Fig3.4.13EXISTING LAND USE OF BUILD-UP AREA (GEN. NAKAR)

c) The road area rate is low in the central district of the three municipalities with 13.4% in Infanta, 12.2% in Real, and 17.2% in General Nakar.

The road network, including the local roads is arranged in a lattice pattern but at present, they are narrow (it is impossible to provide two lanes in the driveway) and complicatedly arranged. Therefore, problems are expected to occur in the future on the location of the central function and handling of the traffic of automotive vehicles.

d) The central district of General Nakar has a small scale. The principal forms of land use are residences, roads and public facilities. Many residential lots are concurrently used for agricultural purposes, and under the circumstances the configuration of the central district has not reached a developed stage yet.

The land use pattern in the all built up area of each municipality is described as follows:

(Infanta)

The urban area reflects its history as base of the fluvial trade of the Bantilan River flowing from west to north. The commercial land use mainly consisting of the market has developed along the river bank at the northern part of the municipality.

The urban area has developed radially along the roads diverging from the central district which is formed in two dimentional pattern. In particular, the Infanta Road which is the local artery road functions as axis of the urban activities of this municipality.

On the other hand, institutional facilities such as schools that require relatively large areas are located at the fringe of the central district.

(Real)

The urban area of Real does not develop in two dimensional pattern around the commercial district as in the case of Infanta. It is interpreted instead as the combination of linear urban areas developed along the Infanta Road, shoreline, etc.

In other words, commercial facilities, public facilities, etc., are developed along the Infanta Road, while residences of fishery workers extending from the central district to Real Port are located along the shoreline.

(General Nakar)

The land use is regularly arranged along the longitudinal and transversal local roads arranged around the central district sized 1000 m X 250 m. Nevertheless, this municipality does not have a clearly defined land use pattern of urban type.

3.5 Transportation Facilities

3.5.1 Land Transportation Facilities

The land transportation for public use of IRM are buses, jeepneys and tricycles. Tricycles take charge of short trips within the study area, jeepneys take charge of medium trips interconnecting with neighboring cities and buses take charge of long distances to Manila and other places. Therefore, the road facilities are formed in conformity with these means of transportation. The road network of the central district of the municipalities consists of a grid pattern of approximately 4.0 m width which is sufficient to cope with the traffic of tricycles (Fig. 3.5.1). The number of registered automotive vehicles in the IRM is 294 as of 1983, as shown in Table 3.5.1, with 71% consisting of tricycles. This percentage is particularly high in Infanta (82%) and the number of other kinds of automotive vehicle besides tricycles is barely 38 (21 trucks, 11 jeepneys and 6 jeeps). The number of automotive vehicles per 1000 population in the IRM is lower than the average of Quezon Province and Lucena City, indicating the backward automotive vehicle transportation system of IRM. One of the reasons of this underdevelopment is the presence of the Sierra Madre Range located at the Western side of IRM that cuts the land access to other parts of the country from that direction.

The number of registered automotive vehicles by the Barangay is shown in Fig. 3.5.2. As shown, trucks and jeepneys are concentrated in the Poblaciones, but tricycles are scattered throughout the Barangays. The Barangays that have a particularly large number of automotive vehicles are Dinahican, Libjo, Bamugao, Langgas, etc. It must be borne in mind that these Barangays contain points of interconnection with sea transportation, such as bancas, ferry of the Agos River, etc.

Table 3.5.1 Number of Registered Vehicles (IRM, 1983)

	Tricycle	Others	Total	No. of Vehicles per 1,000 pop.
Infanta	175 (82.2)	38 (17.8)	213 (100.0)	6.97
Real	24 (33.8)	47 (66.2)	71 (100.0)	4.47
Gen. Nakar	10 (100.0)	0	10 (100.0)	0.76
Total	209 (71.1)	85 (28.9)	294 (100.0)	4.94
*Lucena City	322 (10.8)	2,666 (89.2)	2,988 (100.0)	27.74
*Quezon	-	-	8,079	7.15

*Year of 1980

Source: MPWH

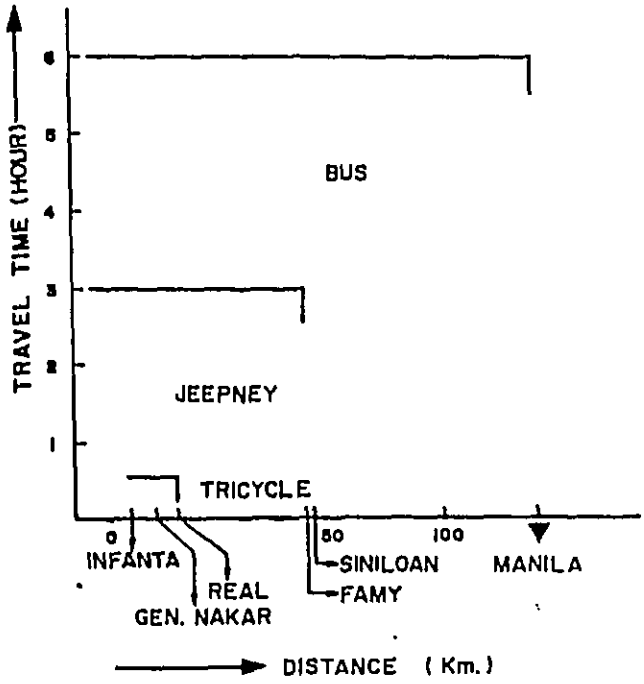


FIG. 3.5.1 MODAL SPLIT OF PUBLIC TRANSPORTATION

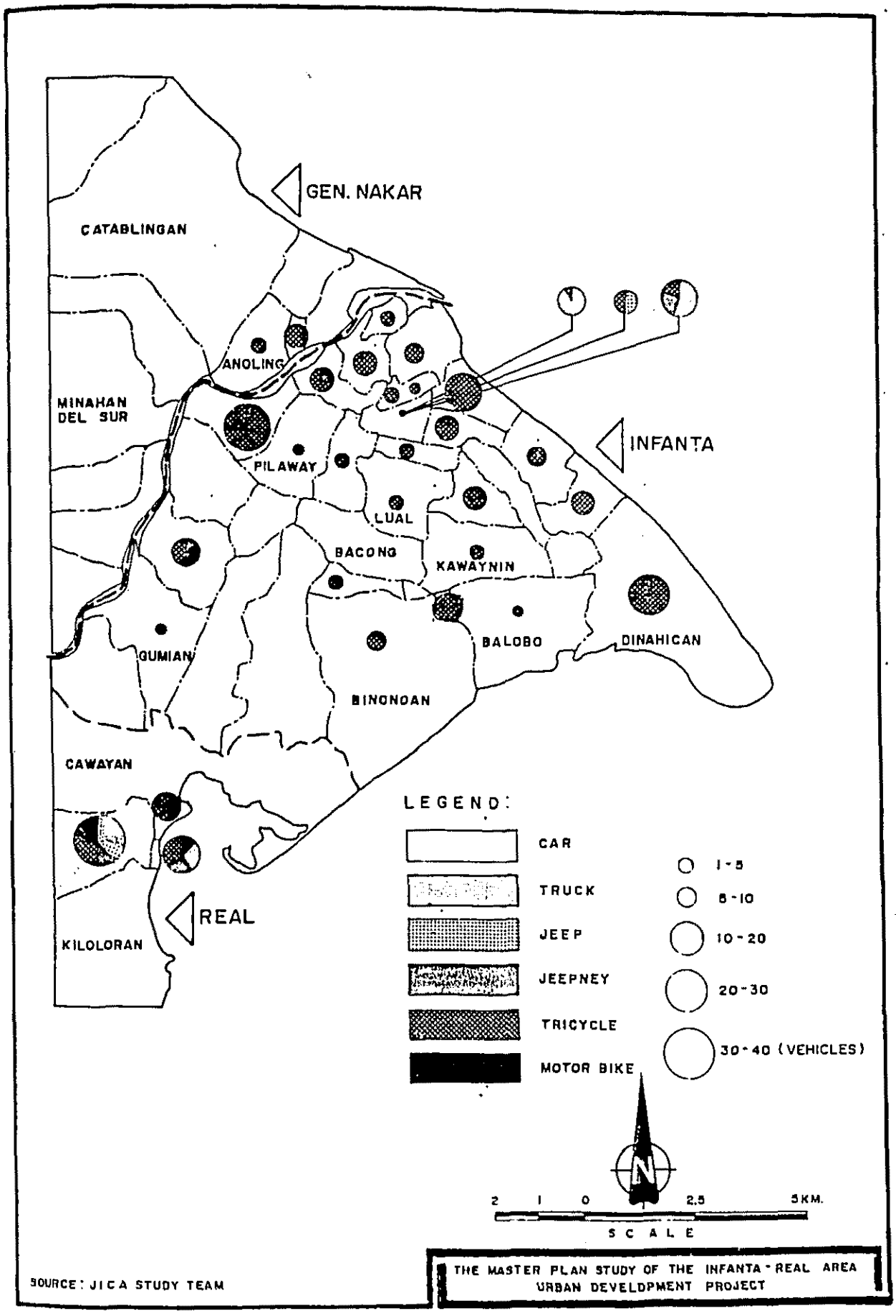


FIG.3.5.2 NUMBER OF VEHICLES (INFANTA, REAL & GEN. NAKAR)

The total length of roads of the 3 municipalities of IRM is 226 km, including 32 km (14%) of national roads, but the absolute majority (61%) consists of Barangay roads. The rate of paved roads of IRM is barely 6% and practically most of the roads are unpaved with the exception of the centers in the cities. As for the width, the major roads of IRM including the provincial have a relatively large size of 5.0 m or more. There are 25 bridges in IRM with Real having the largest concentration of 13 bridges. Only 8 of the 25 briges are able to withstand heavy load. All others are of wooden structures (Tables 3.5.2 and 3.5.3).

As shown on Fig. 3.5.3, the artery of the road network of IRM consists of the national roads interconnecting Real, Infanta, and Dinahican. Provincial roads branch from these national roads, and bases of the marine transportation network are located at the terminal points of these provincial roads. At the Poblacion centers of Real, Infanta and General Nakar, there are lattice pattern road networks spaced by 30 to 50 m in conformity with the scale of the urban population. The roads accessing General Nakar do not have bridges across the Agos River. Therefore, the three roads coming from Infanta are provided with Bancas that make possible the interconnection with the urban area of General Nakar. Thus, the road network of General Nakar is designed and constructed to cope with two wheeled vehicles.

As shown on Table 3.5.4, the traffic of automotive vehicles totals 560 vehicles/day in the Real-Infanta section and 250 vehicles/day in the Real-Famy section. Therefore, the existing road facilities are sufficient to cope with the volume of traffic. Under the circumstances, the problems related to the road facilities in this paper is analyzed from the standpoint of the relationship between the traffic functions and the network.

Table 3.5.2 Inventory of Roads (IRM, 1980)

	Type of Road	Total Length(kms)	Surface Type by Length (kms.) Concrete	Asphalt	Gravel	Unsurfaced	Rate of Pave (%)	Surface Width(m)
Infanta	National	18.20	0.27		17.93		1.48	6.0 - 7.0
	Provincial	39.54			35.31	4.23	0	5.0
	Municipal	3.27	2.06		1.21		63.00	-
	Barangay	21.95	0.12		21.83		0.55	-
	Total	82.96	2.45		76.28	4.23	2.95	-
Real	National	13.50	0.64	0.22	12.64		6.37	5.0 - 7.0
	Provincial							
	Municipal	2.80	0.33		2.36	0.11	11.79	-
	Barangay	61.00	0.26	1.00	48.74	11.00	2.07	-
	Total	77.30	1.23	1.22	63.74	11.11	3.17	-
Gen. Nakar	National							
	Provincial	7.72			1.00	6.72	0	5.0
	Municipal	2.54	1.25		1.20	0.09	49.21	-
	Barangay	55.70			41.60	14.10	0	-
	Total	65.96	1.25		43.80	20.91	1.90	-
I. R. M.	National	31.70	0.91	0.22	30.57		3.56	
	Provincial	47.26			36.31	10.95	0	-
	Municipal	8.61	3.64		4.77	0.20	42.28	-
	Barangay	138.65	0.38	1.00	112.17	25.10	1.00	-
	Total	226.22	4.93	1.22	183.82	36.25	2.72	-

Source: "Socio Economic Profile" Province of Quezon

Table 3.5.3 Inventory of Bridges (IRM, 1980)

	Type of Road	Concrete No.	Concrete Length	Steel No.	Steel Length	Bailey No.	Bailey Length	Timber No.	Timber Length	Others No.	Others Length	Total No.	Total Length
Infanta	National	1	20.0					2	28.8	1	15.0	4	63.0
	Provincial							5	78.0			5	78.0
	Municipal							1	14.0			1	14.0
	Barangay												
	Total	1	20.0					8	120.0	1	15.0	10	155.0
Real	National	7	188.0	1	59.0	3	51.0	2	17.7			13	315.7
Gen. Nakar	Barangay									2	57.8	2	57.8
I. R. M.	National	9	208.0	1	59.0	3	51.0	4	45.7	1	15.0	17	378.7
	Provincial							5	78.0			5	78.0
	Municipal							1	14.0			1	14.0
	Barangay									2	57.8	2	57.8
	Total	8	208.0	1	59.0	3	51.0	10	137.7	3	72.8	25	528.5

Concrete includes RCDG

Source: "SOCIO-ECONOMIC PROFILE" Province of Quezon

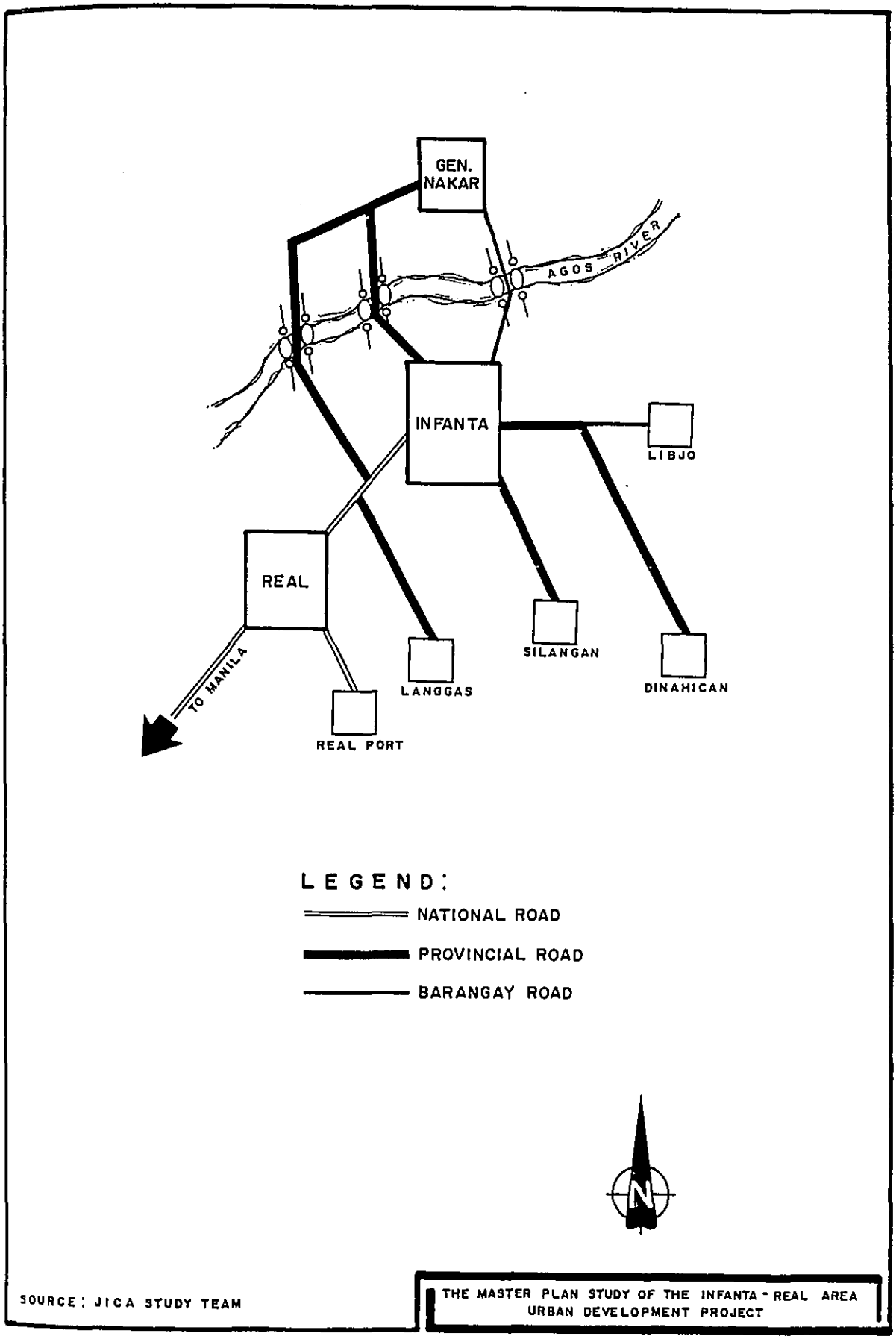


FIG. 3.5.3 ROAD NETWORK OF I.R.M.

The road density by Barangay and the distribution of the ratio of road area/demographic density are shown in Fig. 3.5.4. In terms of road density, General Nakar and Real have a concentration of roads in the Poblacion. In Infanta, there is higher road density in the adjacent areas such as Libjo and Calanbragan that surround the Poblacion. Furthermore, Barangays such as Langgas and Miswa tend to have higher road density.

In connection with the correlation between the road facilities (road area), population and number of registered automotive vehicles, the following conclusions are drawn from Fig. 3.5.5. There is a relatively clear correlation between the population and the number of automotive vehicles but the correlation between the road area and the number of vehicles is not necessarily clear. The obscurity of the latter kind of relationship is attributed to the following facts particularly in Baragao (Infanta) where the road area (approximately 60 m^2) is small inspite of its being a barangay with a large number of automotive vehicles (33 vehicles), and this is seldom seen in districts that contain local center of the transportation network. On the other hand, districts such as Lual (Infanta) that have small number of automotive vehicles and large road areas are regarded as transit districts that do not contain junction of traffic network.

Table 3.5.4 Daily Traffic Volumes (1981)

Station	Cars	Jeepney	Buses	Trucks		Total
				Truck	Trail	
Real - Infante	160	169	27	202	2	560
Famy - Real	102	64	26	55	3	250

Source : MPWH

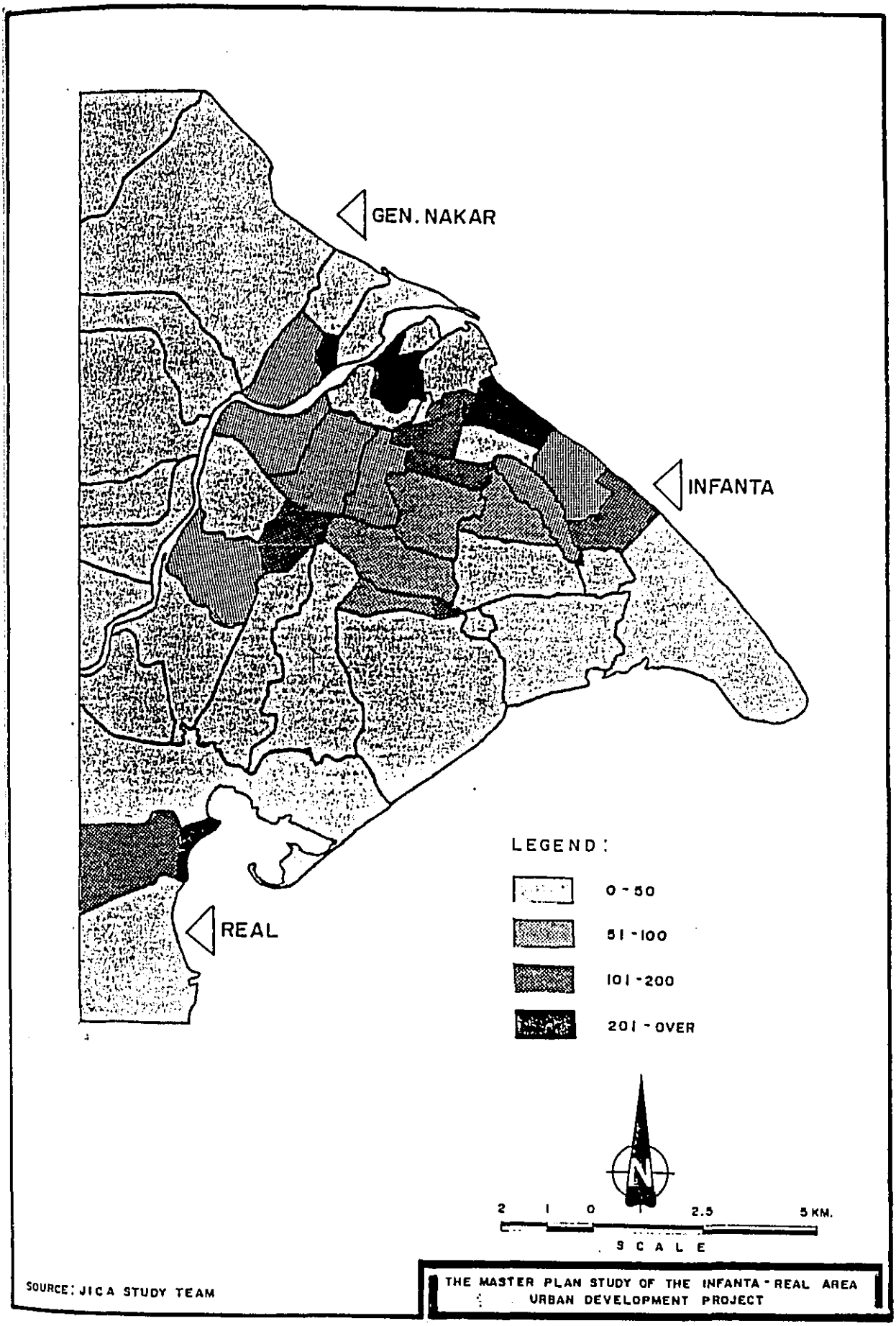
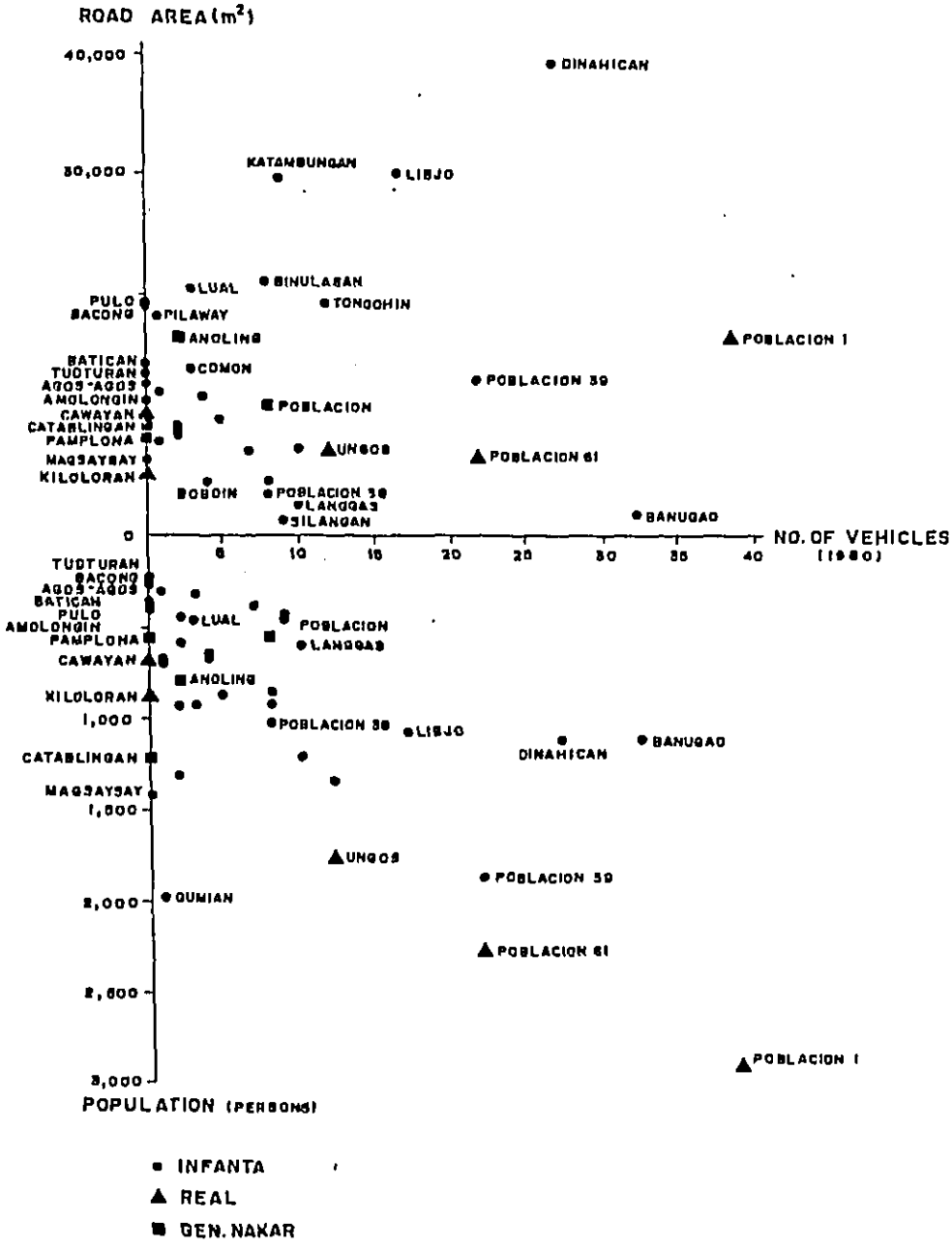


FIG. 3.5.4 DENSITY OF ROAD IN I.R.M.



SOURCE: JICA STUDY TEAM

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

FIG. 3.5.5 CORRELATION OF ROAD AREA, POPULATION & MOTOR VEHICLE

The correlation between the population and the number of automotive vehicles is expressed by the following formula:

$$Y = 54.211X + 523.164$$

$$(r = 0.7385)$$

Where:
Y - Population (inhabitants)

X - Number of registered automotive vehicles

According to this expression, there are 8.8 automotive vehicles per 1000 population.

There are presently 3 bus companies in Infanta that are operating regular services between Manila and Infanta. This bus service is the only means of transportation accessing the capital city area of Manila. There are 12 trips a day that transport an average of 570 passengers.

There are two bus terminals in the center of Infanta that have parking capacities for 10 and 2 vehicles respectively. These bus terminals have parking facilities only for their buses. On the other hand, Real has only bus stops instead of terminals. One must take a bus to reach the ferry at Port Real (Table 3.5.5 and Fig. 3.5.6).

The roads between General Nakar and Infanta are obstructed by the Agos River. Transportation of passengers and goods is carried out by means of Banca located at three points. This banca transportation has an irregular cargo/passenger but in general they provide 20 trips/place with a total capacity of 170-200 passengers/day (Fig. 3.5.7).

Table 3.5.5 Bus Companies Operating in IRM (1983)

	Kapalaran Bus Line	Vic Transit	D B Transit
Head Office	Sta. Cruz, Laguna	Marikina, Manila	Infanta, Quezon
No. of Buses owned	10	8	1
Routes	Infanta - Manila	Infanta - Manila	Infanta - Manila
No. of Trips per day	6	5	1
No. of passengers per day	360	150	60
Fare to Manila (pesos)	27.10	22.9	22.9

Source: JICA Study Team

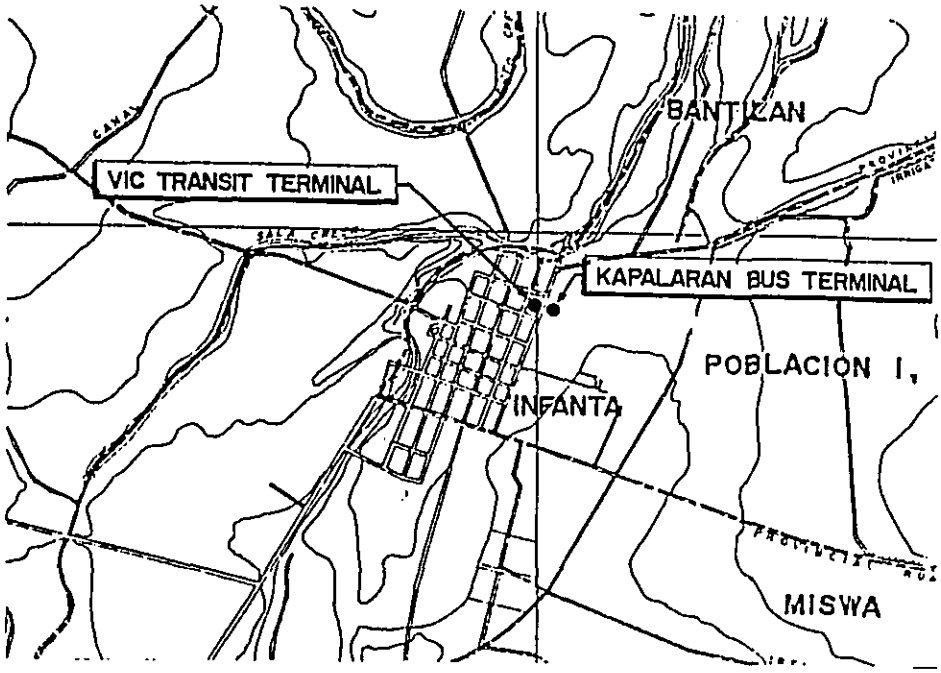


FIG. 3.5.6 BUS TERMINAL OF I.R.M.

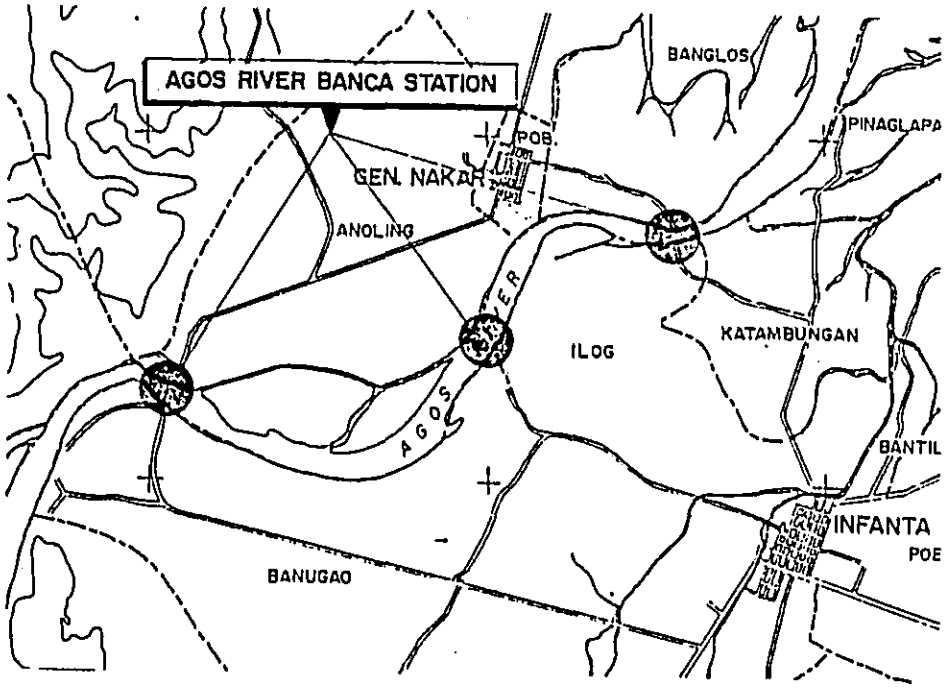


FIG. 3.5.7 FERRY BOAT OF AGOS RIVER

SOURCE: JICA STUDY TEAM

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

3.5.2 Maritime Transportation Facilities

The means of maritime transportation of the project area consist mostly of bancas. There are other means of transportation such as ferries at the Polillo-Real route and 100t-class ships for transportation of lumber but they belong to the Polillo Island. At present, there is no ship with a size of 50t or more in the project area.

There are two kinds of banca: namely, motor-banca and hand-rowing banca. It is presumed that there are approximately 590 fishing bancas in the project area. The number of owners of motor-banca as of 1983 is shown in Table 3.5.6 and Fig. 3.5.8. As shown, almost all (94%) of the approximately 50 motor bancas of the project area are engaged in fishing, while the remaining ones are owned by establishments engaged in forestry and manufacturing.

The maritime transportation consists of passenger transportation and cargo transportation, and in both cases the routes going to Polillo are the most important ones. Transportation by means of banca is irregular both in the case of passengers and cargo (with exception of ferries of the Real-Polillo route). Therefore, it is difficult to identify the real number of bancas in operation, but the approximate number of passengers and volume of cargo they transport are indicated in Table 3.5.7. There are two companies operating ferries (approximately 50 ton class) in the Real-Polillo route. There is one daily trip with a capacity of approximately 120 passengers.

Table 3.5.6 Number of Boat in the Study Area

	Without Motor	With Motor	Total
No. of Boats	124	467	591
*1 Owners' Boats	-	49	49
*2 Transportation Boats	-	67	67

Source:

*1 JICA Study Team (1983)

*2 Quoted from existing transportation study, including Polillo (1976)

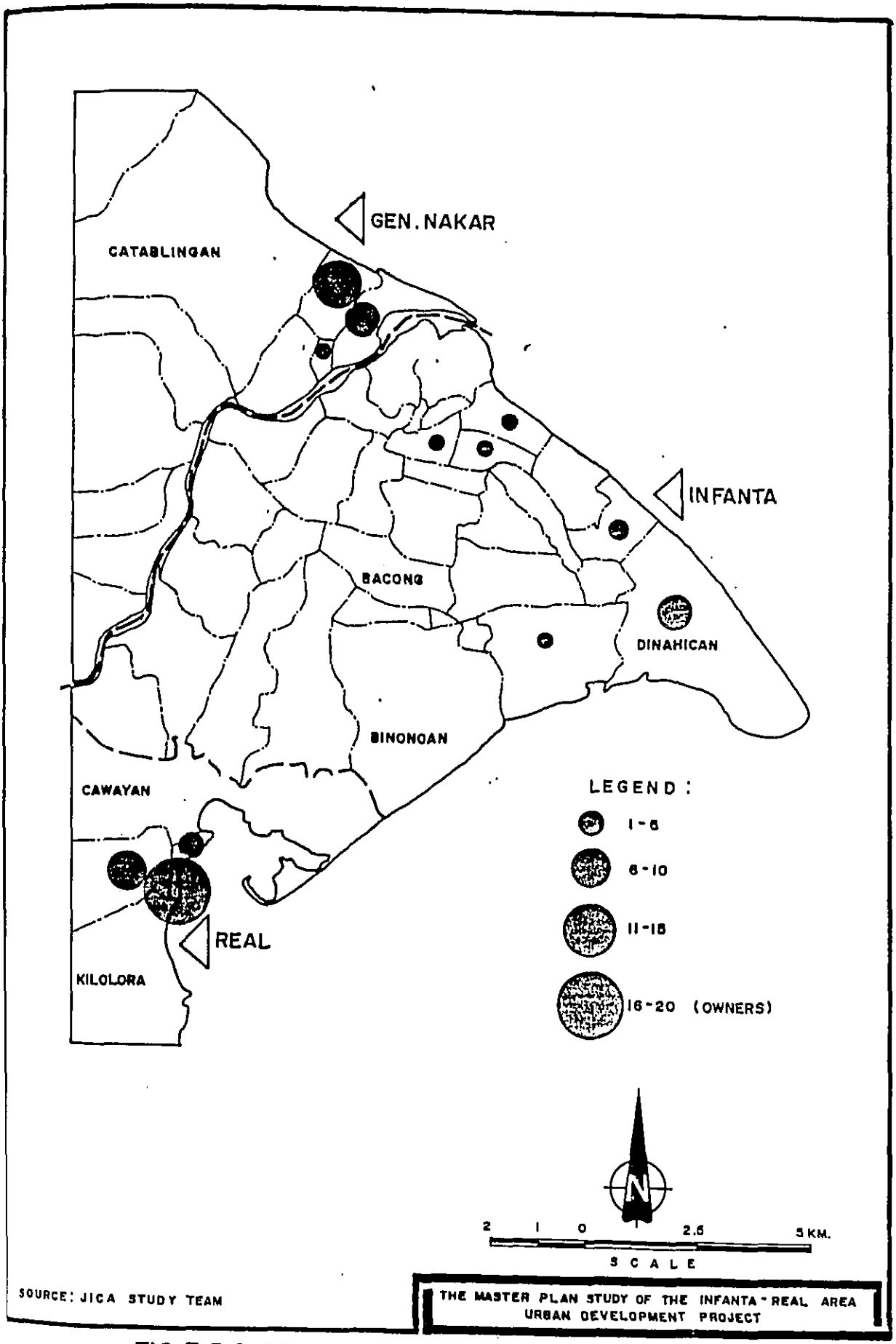


FIG. 3.5.8 NUMBER OF MOTOR BANCA OWNER

Table 3.5.7 The Volume of Traffic and Cargo Loadings Between IRM and Polillo

Items			Volume per Annum
Ferry	* Passenger		168,000 psn
	** Cargo	Copra, Fruits	3,600 tons
		Rice, Commodities	900 tons
Banca	* Passenger		182,000 psn
	** Cargo	Charcoal	2,000 tons
		Copra	1,200 tons
		* Fish	1,800 tons
		Others	-
Barge	** Cargo	Woods	1,000 tons

Source: *BFAR (1980)
**Jica Study Team (1983)

IRM has no harbor facilities of a large scale. In Infanta there are four ports with some harbor facilities, namely: Dinahican, Libjo, Silangan and Langgas, but there are also private landing facilities in the seashore and in the creeks (Fig. 3.5.9 and Table 3.5.8).

(Passenger Transportation Facilities)

o Real and Dinahican have a quay for anchoring ferry boats but they do not have any other passenger service facility (e.g. waiting room, etc.).

o The ferry of Real Port offers regular services. All other routes are irregular and therefore access by means of land transportation is poor.

o With the exception of Real, all ports of Infanta are far from the central district and land transportation are required to make the interconnection.

(Cargo Transportation Facilities)

o Both Silangan and Langgas are located in creeks and therefore the navigation becomes impossible during the low tide.

o There is no port equipped with cargo-handling yard and as a result the cargo handling efficiency is very low.

o There is no parking space for vehicles and other means of transportation.

o The roads for access to the port are in bad condition (unpaved and narrow width).

o The cargo yard space is narrow.

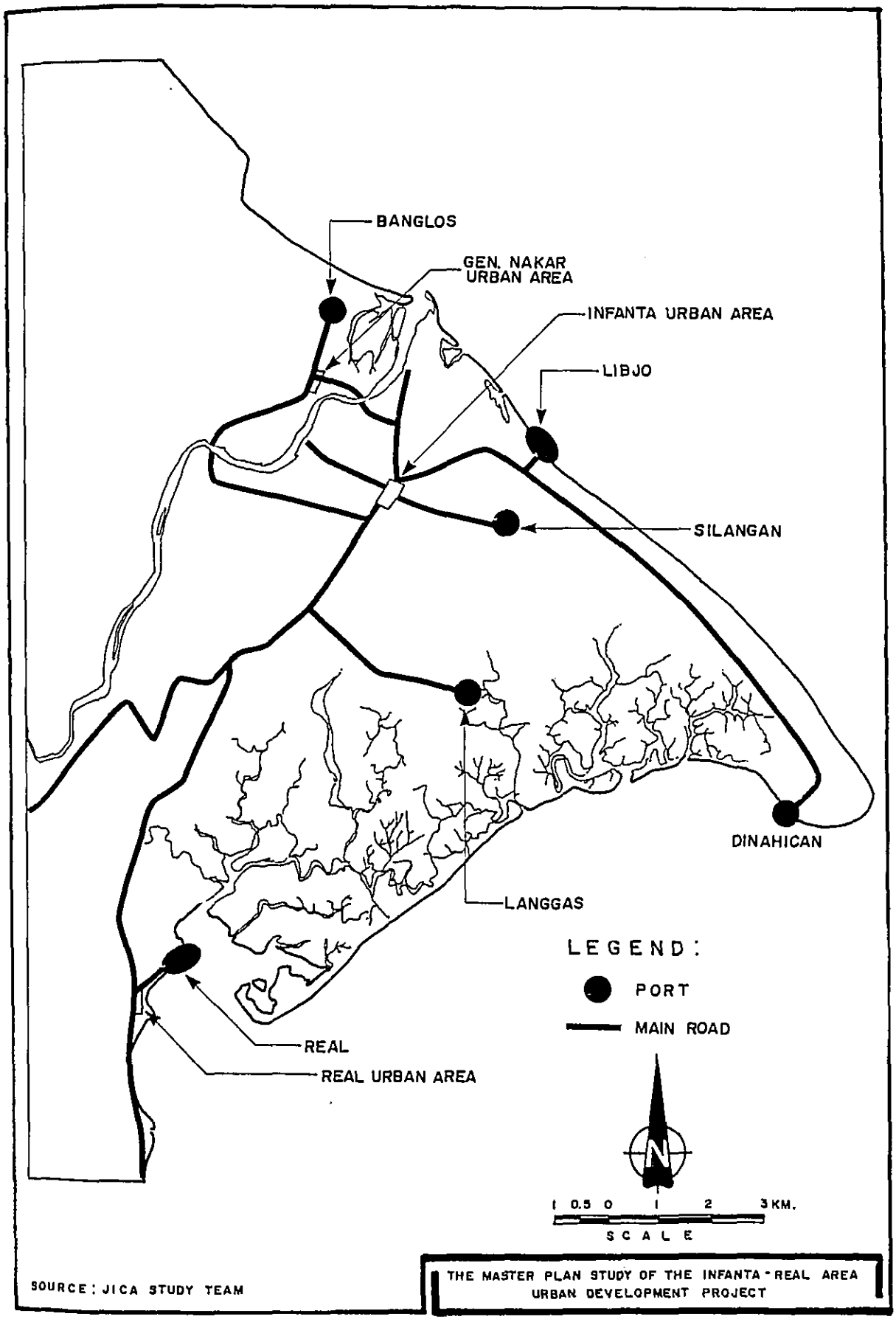


FIG. 3.5.9 LOCATION OF PORTS IN I.R.M.

	INFANTA				REAL	GEN. NAKAR
	Denahican	Langgas	Silangan	Libjo	Real	Pinaglapatan
Mooring, Quay	Causeway 5m	non	Quay 10m	non	Quay 27m	non
Location	Exposed to the sea	Inner water	Inner water	Exposed to the sea	Exposed to the sea	Inner water
Natural Conditions	Front water depth 0m Troubles in storm					Unusable during ebbtide
Passengers (persons/day)	Regular 15-20 boats 80-100 persons	Irregular 8-10 boats 30-40 persons	Irregular 15-20 boats 60-80 persons		Regular 6-10 boats 250 persons	
Handling goods (per year)	15-20 boats fish, 2,300 tons copra, 500 tons	charcoal fish	30-40 boats charcoal, 500 tons fish, 3,000 tons copra, 350 tons wine		15-20 boats timber, 3,500 tons copra, 3,600 tons banana fish rice, others, 900 tons	fish
Handling place	Burdeos Infanta	Panukalan Polillo Infanta	Burdeos Polillo Infanta		Polillo Real	Gen. Nakar
Landing	Few houses Car park for 2 or 3 cars No open air store	Almost no car parking space No open air store space	Open air store space Car park for one car	No facility as a port	Little space for open air store Car park for 3 or 4 cars.	No facility as a port
Area behind port	Furthermost from Infanta built-up area	Paddy field Comparatively far from built-up area, narrow road	Paddy field Comparatively close to built-up area	Sand bar	Timber yard and shops. Close to Real built-up area Bus stop	Coconut field

Source: JICA Study Team

3.6 Urban and Social Services

3.6.1 Urban Facilities

1) Supply and Treatment Facilities

(1) Water Service

a) Present Status of Supply of Running Water

In IRM, there are running water facilities located at Infanta and Real as shown in Table 3.6.1. However, the operation of the running water facilities of Infanta was stopped in 1982 in view of the soaring costs of the pumping facilities. Therefore, the households of the study area that are being served with running water at present are those of the Poblacion of Real and some households of Gumias, Tongohing and Batican of the municipality of Infanta located near the water source of the old water system of Infanta which is partially operated (Fig. 3.6.1).

All other households of IRM rely on artesian well, open well, springs, rain water, lakes, rivers, streams, springs, etc., for supply of water. Table 3.6.2 shows the breakdown of the sources of water supply for the 3 municipalities of IRM on the basis of the results of the 1983 survey. As shown, approximately half of the households of Real are served by running water, General Nakar relies on springs and Infanta relies on open wells, pumped wells and artesian wells. Piped water of General Nakar is supplied by means of communal pump system.

Table 3.6.1 Waterworks in IRM (1983)

MUNICIPALITY	IMPLEMENTING AGENCY	YEAR CONSTRUCTED	CAPACITY	SOURCE KIND	SOURCE PLACE	COVERAGE	OPERATION
Infanta	1. MPWH	1941	-	Surface Water	Gumian	Pob. 1, 38, 39	Ceased operation in 1983
	2. NAWASA	1956, 1961	191ts/sec	Spring	Pilaway	-	
	3. M L G	1978-1980	-	-	Ilog	-	Repair and Replacement
Real	1. Municipal	1963	71ts./sec	Creek	Pinaglagarian Creek	Pob.I, 61	-

*Source: LWUA and municipal governments

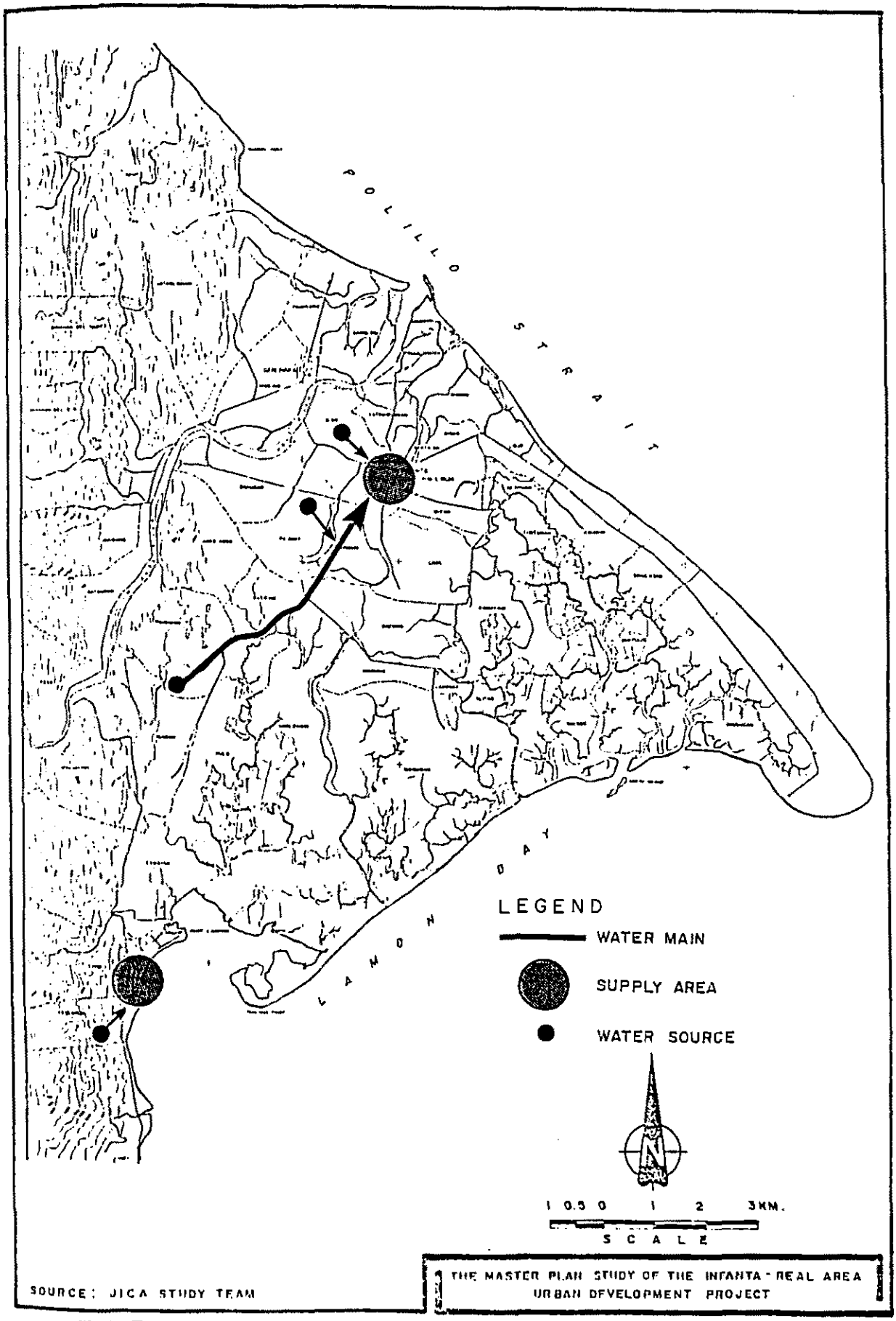


FIG. 3.6.1 WATER SOURCE OF EXISTING WATER SUPPLY SYSTEM

Table 3.6.2 Source of Water Supply (share, 1983)

Kind of Water	Gen. Nakar	Infanta	Real	Planning Area
Piped Water	5.0	7.0	50.9	15.8
Artesian Well	0.6	16.5	11.9	13.9
Pump	25.8	29.0	9.1	24.6
Open Well	20.3	37.7	14.9	31.2
Spring	40.4	5.8	4.8	9.3
Rain Water	0.0	1.0	0.0	0.7
Lake, River, Stream	7.9	3.0	8.4	4.5
All Source	100.0	100.0	100.0	100.0

Source: JICA Study Team

b) Subterranean Water

At present, there are shallow wells, deep wells and springs in IRM as shown in Table 3.6.3.

Data shown on Table 3.6.3 is not a complete inventory of IRM because the figures for General Nakar refer to the communal pump and other problems. It also indicates that there are no deep wells in Infanta and Real. The deep well of General Nakar is mainly used for irrigation purposes.

Table 3.6.4 shows the results of the survey carried out by the NWRC in the project area. As shown, the average static water level is 2.54 m and the average capacity is 0.44 liter/sec.

c) Existing Projects and Future Plans

Water districts (WD) in the municipalities of Infanta and General Nakar were set up in March 1980, and the pre-feasibility study for construction of the facilities was carried out in 1982. The study report proposes the construction of water facilities with a maximum capacity of 1047 m^3/day aimed at covering the municipalities of Infanta and General Nakar by repairing the existing water sources that consist of two springs. However, this project has not been included yet in the project list of the LWVA.

As for Real, the Municipal Government is proceeding with its own plan for the construction of water facilities. At present, it has drawn up a project with the water source located in the Kawayan and Baliba Gohin Rivers near the Poblacion, and is asking for the cooperation of the MLGCD (Provincial Office) for detailed design.

In connection with the well drilling projects in IRM, the MLGCD subsidises 20% of the construction costs, while the RWDC which is a subsidiary organization of the Ministry of Residential Environment provides the required equipment and materials such as pumps, etc. The number of communal water pumps (shallow wells covering approximately 30 households) drilled in 1983 totalled 34 in Infanta and 8 in General Nakar.

Table 3.6.3 Well and Spring Inventory

	Shallow Well	Deep Well	Artesian Well	Spring
GENERAL NAKAR				
1. Anoling	1	2		
2. Batangan				
3. Catablingan		1		
4. Maigang	1	1		
5. Minahan del Norte				
6. Minahan del Sur	1	1		
7. Pamplona	3	4		
8. Poblacion	2	3		
9. Banglos	1	2		
10. Pisa				
Sub-total	9*	14*		
INFANTA				
1. Abiawin	6	50		
2. Agos-Agos	2	15		
3. Alitas	2	20		
4. Amolongin	3	17		
5. Anibong	5	15		
6. Antiking	2	14		
7. Bacong	1	15		
8. Bálobo	2	15		
9. Bantilan	17	5		
10. Banugao	10	5		
11. Poblacion 01	85	-		
12. Poblacion 38	45	-		
13. Poblacion 39	58	2		
14. Batican	10	11		
15. Binonoan	2	20		
16. Binulasan	5	70		
17. Boboin	1	60		
18. Comon	10	5		
19. Dinahican	4	75		
20. Ilog	10	2		
21. Gumian	2	15		
22. Ingas	2	16		
23. Katambungan	2	15		
24. Kawaynin	3	21		
25. Langgas	2	17		
26. Libjo	2	30		
27. Lual	5	10		
28. Magsaysay**	-	-		
29. Maypulot	1	15		
30. Miswa	15	5		
31. Pilaway	6	5		
32. Pinaglapatan	3	10		
33. Pulo	3	15		
34. Silangan	3	10		
35. Tonguhin	10	15		
36. Tudturan	2	15		
Sub-total	345	620		
REAL				
1. Pobalion I	12		1	2
2. Poblacion 61			1	
3. Cawayan	5		5	3
4. Kiloloron			3	2
5. Ungos	7		4	
Sub-total				

Note:
* Communal wells only
** Unknown numbe of springs

Source: Municipal Governments

Table 3.6.4 Wells in IRM (Survey Results, 1983)

P L A C E	Drilling Depth (m)	Actual Cap. (lts/sec)	Static Water Level (m)
Real	3.96	0.63	0.91
Infanta			
Provincial High School	10.06	0.21	3.66
Silangan	9.76	-	1.22
Abiawin	7.32	0.32	1.22
Pinaglapatan	7.01	0.63	2.13
Binonoan Elem. School	7.62	0.63	1.22
Tudturan	7.62	-	1.22
Ilog	6.71	0.32	2.44
Bantilan	7.32	0.32	2.44
Dinahican Barrio School	7.01	0.32	1.83
Catambugan	6.10	0.63	1.52
Binulasan Elem. School	8.23	0.32	4.29
Libjo	7.93	0.32	5.79
Infanta Elem. School	16.46	0.32	3.05
Ingas	10.67	0.32	5.79
Langgas	15.24	0.63	2.74
Banugao	10.37	0.63	0.91
		Average cap, =0.44	Average W.L.2.54

Source: NWRC

(2) Electricity

a) Status of Electricification

According to the Settlement Profile 1978, a private organization (Infanta Lights & Power Cooperative - ILIPSCO) was supplying electricity only to the Poblacion of Infanta (620 households) before the connection of the 69KV transmission line from the NPC Luzon Grid in January 1983. (Real and General Nakar were not supplied electrity at that time) Thanks to the construction of the transmission line however, the electrified areas which was limited exclusively to the Poblacion expanded in such a way that nowadays it covers the totality of the municipality of Infanta (excluding Magsaysay), part of General Nakar extending up to Katablingan and part of Real extending to Kiloloron (this electrified area coincides with the project area). The electrification is progressing rapidly and the number of electrified households became approximately 5 times as large. (The target year for completion of QUEZELCO II is 1990 with 100% electrification of the project area). (Fig. 3.6.2)

The rate of electrification of IRM (as of January 1983) is 43.8% in totality. The electrification by town is 21.9% in General Nakar, 47.1% in Infanta and 46.3% in Real. (Table 3.6.5). The Poblaciones of Infanta and General Nakar are practically 100% electrified but the Poblacion of Real is barely 46% electrified indicating therefore that it is considerably behind in this aspect. As for the progress of electrification, the swamp areas (consisting mostly of households living on the water) such as Alitas, Antikin, Binonoan, etc., and the remote mountainous districts of General Nakar such as Minahan del Norte, Sur, Pisa, etc., are behind in terms of electrification but the construction of the power distribution network is complete practically in the totality of the flatlands. (Refer to the Fig. 3.6.3). (The results of the household survey indicates the same trend regarding the progress of electrification in various parts of IRM). The monthly consumption of electricity in the IRM as of 1983 totaled 157217 KWH/month, and a simple calculation of the consumption per household indicates 46.6 KWH/month/household as an average for the project area as a whole.

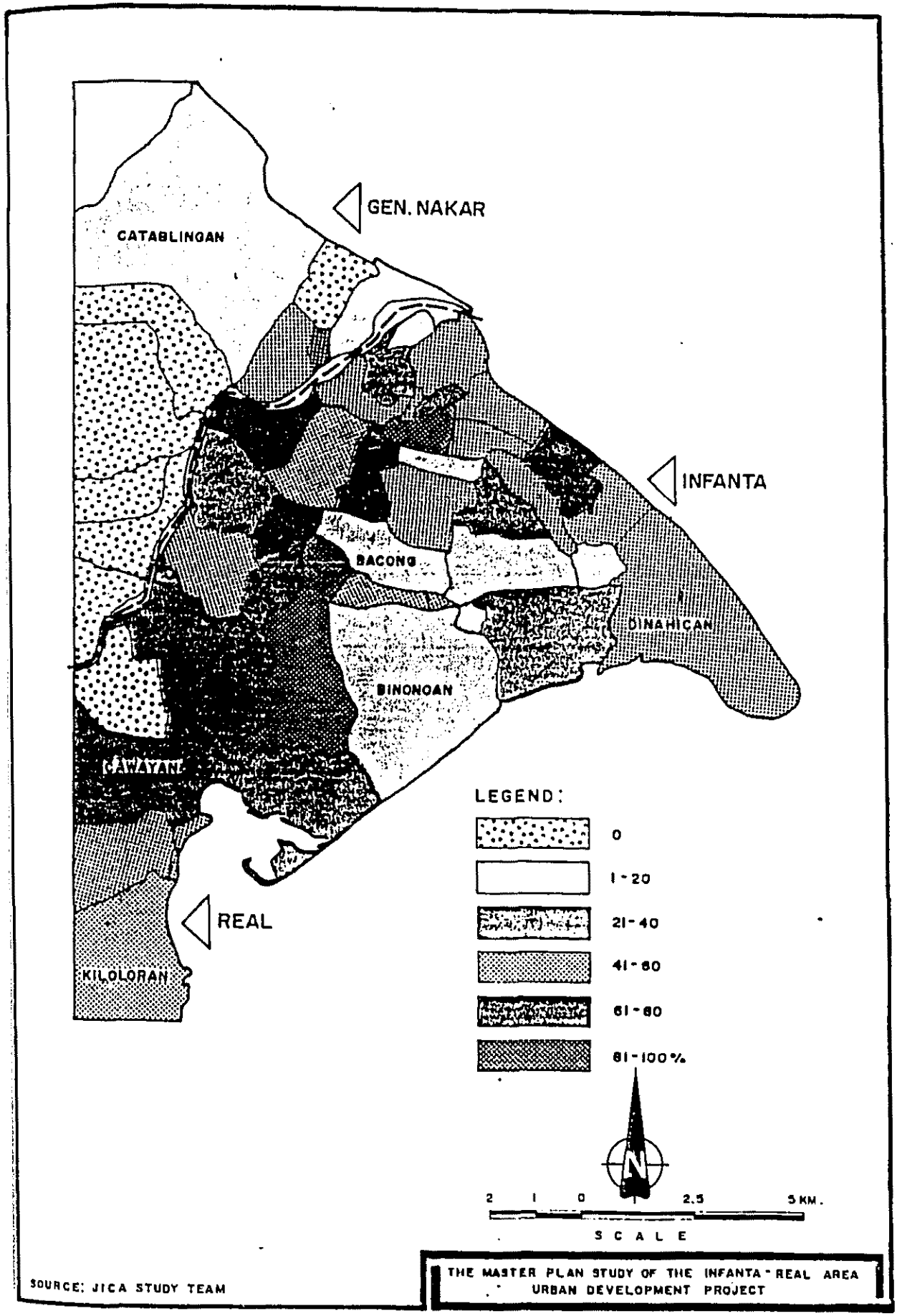


FIG.3.6.2 CONDITION OF ENERGIZED HOUSEHOLD

Table 3.6.5 Energized Household (1983)

Code No.		POWER		
		IRM No. of Energized HH	Total No. of HH	%Energized
	GENERAL NAKAR			
301	Anoling	78	186	41.9
302	Batangan	-	53	-
303	Catablingan	25	225	11.1
304	Maigang	-	51	-
305	Minahan del Norte	-	25	-
306	Minahan del Sur	-	79	-
307	Pamplona	-	104	-
308	Pobalicon	89	90	98.9
309	Banglos	23	115	20.0
310	Pisa	-	53	-
	PLANNING AREA TOTAL	215	981	21.9
	INFANTA			
101	Abiawin	49	127	62.2
102	Agos-Agos	9	44	20.5
103	Alitas	6	84	7.1
104	Amolongin	69	73	94.5
105	Anibong	50	107	46.7
106	Antiking	24	99	24.2
107	Bacong	11	77	14.3
108	Balobo	19	52	36.5
109	Bantilan	136	273	49.8
110	Banugao	123	181	67.9
111	Poblacion 01		262	
112	Poblacion 38	761	182	99.9
113	Poblacion 39		318	
114	Batican	46	73	63.0
115	Binonoan	13	160	8.1
116	Binulasan	88	162	54.3
117	Boboin	68	121	56.2
118	Comon	100	155	64.5
119	Dinahican	130	219	59.4
120	Gumian	155	339	33.9
121	Ilog	77	156	49.4
122	Ingas	44	143	30.8
123	Katambungan	30	94	31.9
124	Kawaynin	12	59	20.3
125	Langgas	52	115	45.2
126	Libjo	96	211	45.5
127	Lual	48	85	56.5
128	Magsaysay	-	390	-
129	Maypulot	14	90	3.6
130	Miswa	18	176	10.2
131	Pilaway	47	119	39.5
132	Pinaglapatan	17	112	15.2
133	Pulo	28	71	39.4
134	Silangan	42	78	53.8
135	Tonguhin	108	254	42.5
136	Tudturan	19	41	46.3
	PLANNING AREA TOTAL	2,499	5,302	47.1
	REAL			
201	Poblacion 1	454	997	46.5
202	Poblacion 61	30	119	25.2
203	Cawayan			
204	Kiloloron	61	143	42.7
205	Ungos	185	337	54.9
	PLANNING AREA TOTAL	730	1,576	46.3
GRAND TOTAL - P. A.		3,444	7,859	43.8

Source: QUEZELCO II

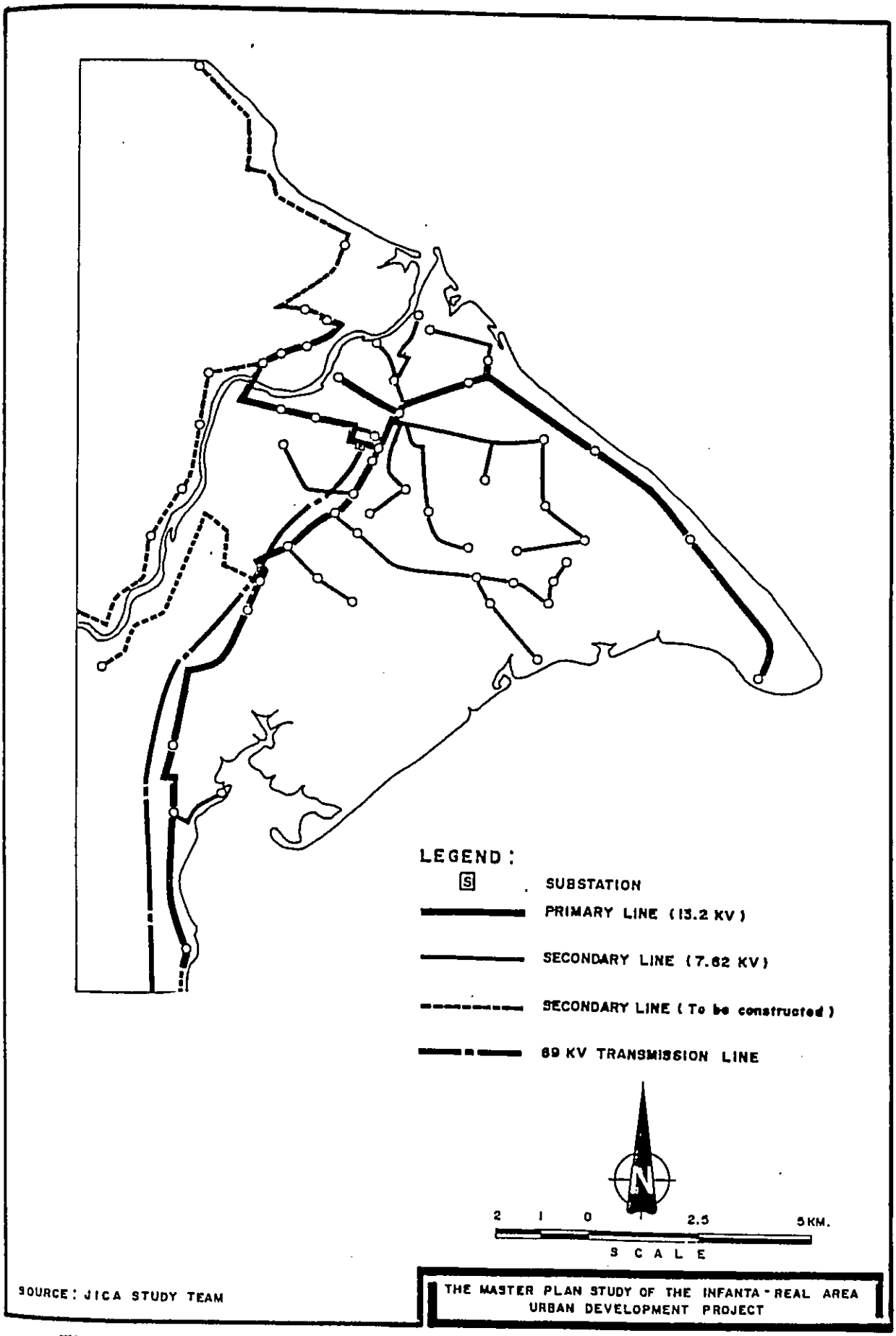


FIG.3.6.3 EXISTING POWER DISTRIBUTION NETWORK (I.R.M.)

The electric charges shown in Table 3.6.6. As shown, the redidential charge is cheap compared with the Manila area (Refer to MERALCO Manila of Table), but on the other hand, the charge of major consumers (commerce and industry - General Charge) is considerably expensive. In IRM, the saw mill of Real is the only major consumer (62.2KW, consumption of 10,000KWH/month) object of demand charge (the flat rate of P15/KW is applied in the case of this saw mill).

Table 3.6.6 Electricity Charge (1983)

	CONSUMPTION	I R M	MERALCO
Residential Charge	1st 10 KWH	4.853 (₱/kwh)	5.00
	Next 40 KWH	0.4853	0.50
	Next 50 KWH	0.4853	0.55
	Next 100 KWH	0.5073	0.365
General charge	1st 500 KWH	13.20 (₱/kwh)	12.60*
Demand charge	Next 19,500 KWH	17.60	12.60*
Energy Charge	1st 200 KWH	0.4853(₱/kwh)	0.27*
	Next 200 KWH	0.5073	0.26*
	Next 100 KWH	0.5073	0.25*
	Next 100 KWH	0.5073	0.24*
	Excess KWH	0.5073	0.23*

*For the demand of 40 kwh and over

SOURCE : MERALCO and QUEZELCO II

b) Transmission, Distribution and Transformation Facilities

The substation located in Barangay Camon of Infanta is interconnected with the Luzon Grid by means of a 69KV transmission line via Cawayan substation of Laguna (Table 3.6.7).

The power distribution network of the study area is shown in Fig. 3.6.3. As shown, this network consists of the 13.2KV trunk line extending along the national road (Infanta) from Kiloloron at north to the Poblacion of General Nakar at south and Dinahican Point at east, as well as the 7.62KV branch line that extends to the mountainous districts, rice paddy areas and swamp area.

c) Use of Energy in the Study Area

According to the Settlement Profile 1978, approximately 90% of the households of Infanta and practically the totality of the households of Real and General Nakar were using kerosene as energy source for home lighting at that time. According to the household survey of 1983 (covering only IRM), that proportion was changed to 47.1% of electricity and 39.0% of kerosene in Infanta (total of the municipality), 46.3% of electricity and 49.3% of kerosene in Real and 21.9% of electricity and 67.6% of kerosene in General Nakar, as a result of the introduction of electricity in these municipalities (Table 3.6.8).

Table 3.6.7 Outline Of Transmission Distribution and Transformation Facilities

	Capacity	Length	Others
Transmission Line	69 kv	49 km (Kalayaan) (Infanta)	wood pole singie circuit
Distribution Line	13.2 kv. 7.62 kv.	50 km(Planning Area) 28 km(Planning Area)	
Substation	3,750 kva		Protective Devices: 3 voltage regulators 9 reclosers

SOURCE : QUEZELCO II

On the other hand, as for the principal heat source, the results of the household survey carried out in 1983 indicates that electricity accounts for barely 0.3% of the total in IRM, as a whole, kerosene 1.1%. LPG 2.8%, charcoal and forewood 94.3% and others (rice hulls, etc.) 1.5%, evidencing therefore that charcoat and firewood play yet a predominant part as principal sources of heat for home use (Table 3.6.9).

d) Existing Projects and Future Plans

The project for electrification of IRM is being implemented presently by QUEZELCO II with the purpose of realizing 100% electrification in the project area by 1990, which is the target year for its completion. However, in view of the too expensive power selling price of the NPC, QUEZELCO II is planning the construction of hydo-electric power stations using the hydropower resources of the Kiloron River and Kinanliman Rivers of the municipality of Real. The pre-engineering report of a 4,200 KW output hydo-electric power plant with 55 million peso project cost was drawn up by NEA in August 1981.

The service area of this hydro-electric power station covers the totality of the 3 municipalities of the project area, i.e., Infanta, Real and General Nakar. At the initial stage of operation this power plant is expected to generate surplus power which is to be sold to NPC. The implementation of this project has already been approved by NEA, but in reality the prospect of construction is not clear in view of difficulties related to raising of the required funds with financing of the Asian Development Bank (Fig. 3.6.4).

Table 3.6.8 Type of Lighting (%, IRM, 1983)

	Electricity	Kerosene	L P G	OIL	Others
Gen. Nakar	21.9	67.6	9.3	-	1.2
Infanta	47.1	39.0	12.9	0.2	0.8
Real	46.3	49.3	3.9	0	0.5
Study Area Total	42.4	46.0	10.6	0.1	0.9

SOURCE : JICA Study Team

Table 3.6.9 Type of Fuel for Cooking (%, IRM, 1983)

: Electricity	Kerosene	LPG	Wood/charcoal	Others
Gen. Nakar -	1.7	1.5	94.9	1.9
Infanta 0.4	1.2	3.4	93.3	1.7
Real -	0.4	1.6	97.6	0.4
Planning Area Total 0.3	1.1	2.8	94.3	1.5

SOURCE : JICA Study Team

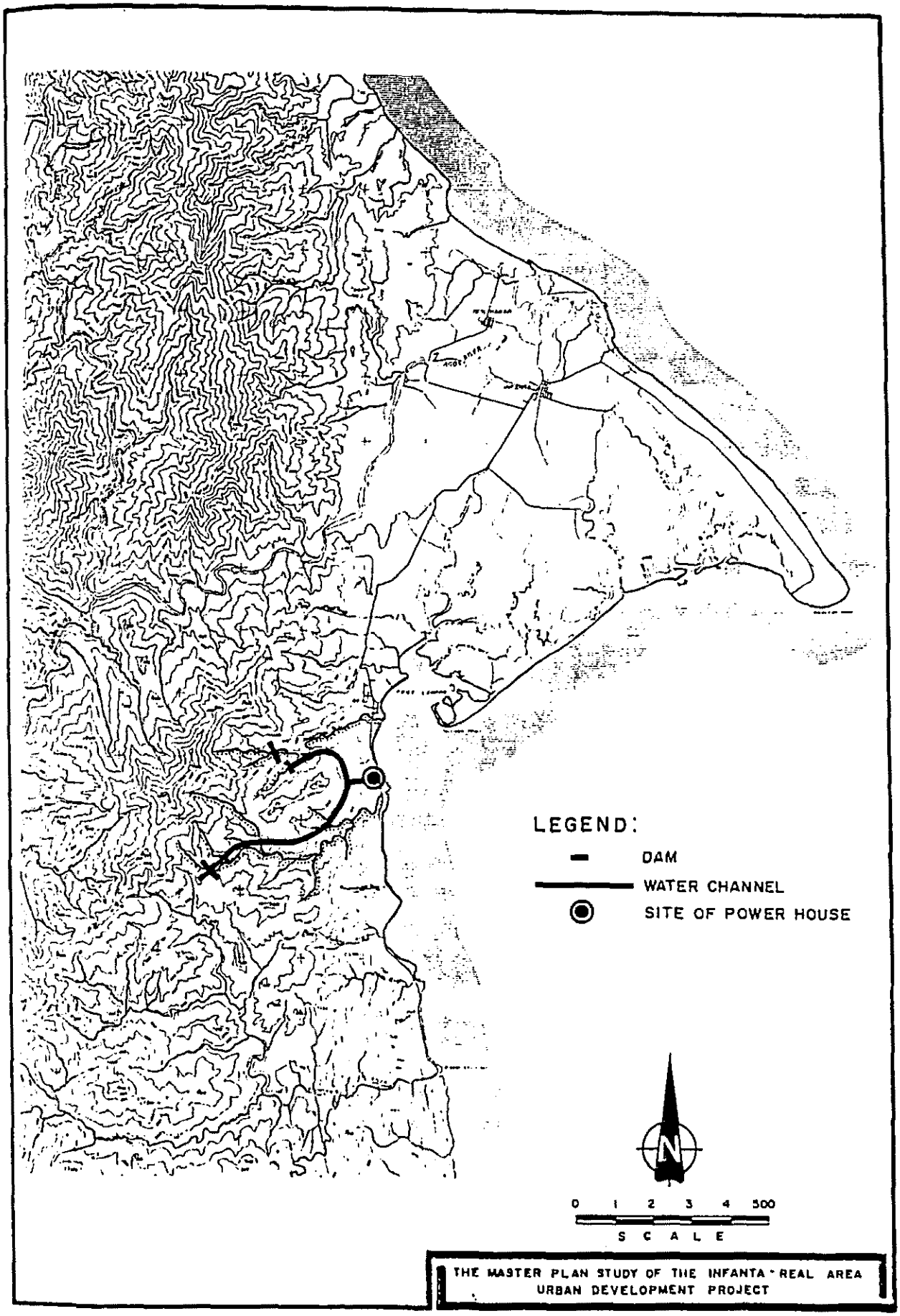


FIG. 3.6.4 LOCATION OF MINI-HYDRO POWER GENERATION PROJECT

(3) Communication

a) Telephone Facilities

There is only one SSB-type radio-telephone equipment being operated by A. Z. Communication in the Poblacion of Infanta. This equipment provides communication service with the exchange of the same company located in Quezon City (it is possible to communicate with the telephone network of the Manila Area). However, the quality of service provided by this equipment is very poor in terms of immediate communication and quality of communication. Approximately 2 minutes are required from the application to the start of the telephone call under normal circumstances, and depending on the conditions the communication with Manila becomes impossible and in reality the interruption of the communication is very frequent. Nevertheless, this equipment handles a traffic consisting of an average of 20 daily calls (outgoing 60%, incoming 40%). The charge is Six Pesos (P6.00) during the first two (2) minutes and Three Pesos (P3.00) for each successive minute (as of 1983).

b) Telegraph, Mail and Other Facilities

Besides telephone, the project area is served by the communication facilities shown in Table 3.6.10. As things stand there is no telegraph facility at all in the municipality of Real.

These facilities are distributed as shown in the Fig. 3.6.5, and as can be seen they are concentrated in the Poblacion. With exception of the RCPI of Infanta, both telegraph offices and post offices of IRM provide their services at the municipal office and its annex.

The annual quantity of mails and telegraphs handled by the telegraph offices and post offices of each municipality of the project area is shown in the Table 3.6.11.

Table 3.6.10 Number of Communication Facilities (IRM, 1983)

Facility		Gen. Nakar No.	Gen. Nakar Remarks	Infanta No.	Infanta Remarks	Real No.	Real Remarks
Telegraph office	Private	-		1	RCPI (7487.5 khz army type)	-	
	Government	1	BUTEL (morse type)	1	BUTEL (morse type)	-	
	Total	1		2		-	
Postal station	Private	-		-		-	
	Government	1		1		1	
	Total	1		1		1	
Mail Carrier	Private	-		-		-	
	Government	1		2		2	
	Total	1		2		2	
Radio Station	Private	-		1	720 khz (5w)	-	
	Government	-		-		-	
	Total	-		1		-	

SQURCE : Municipal gov'ts.

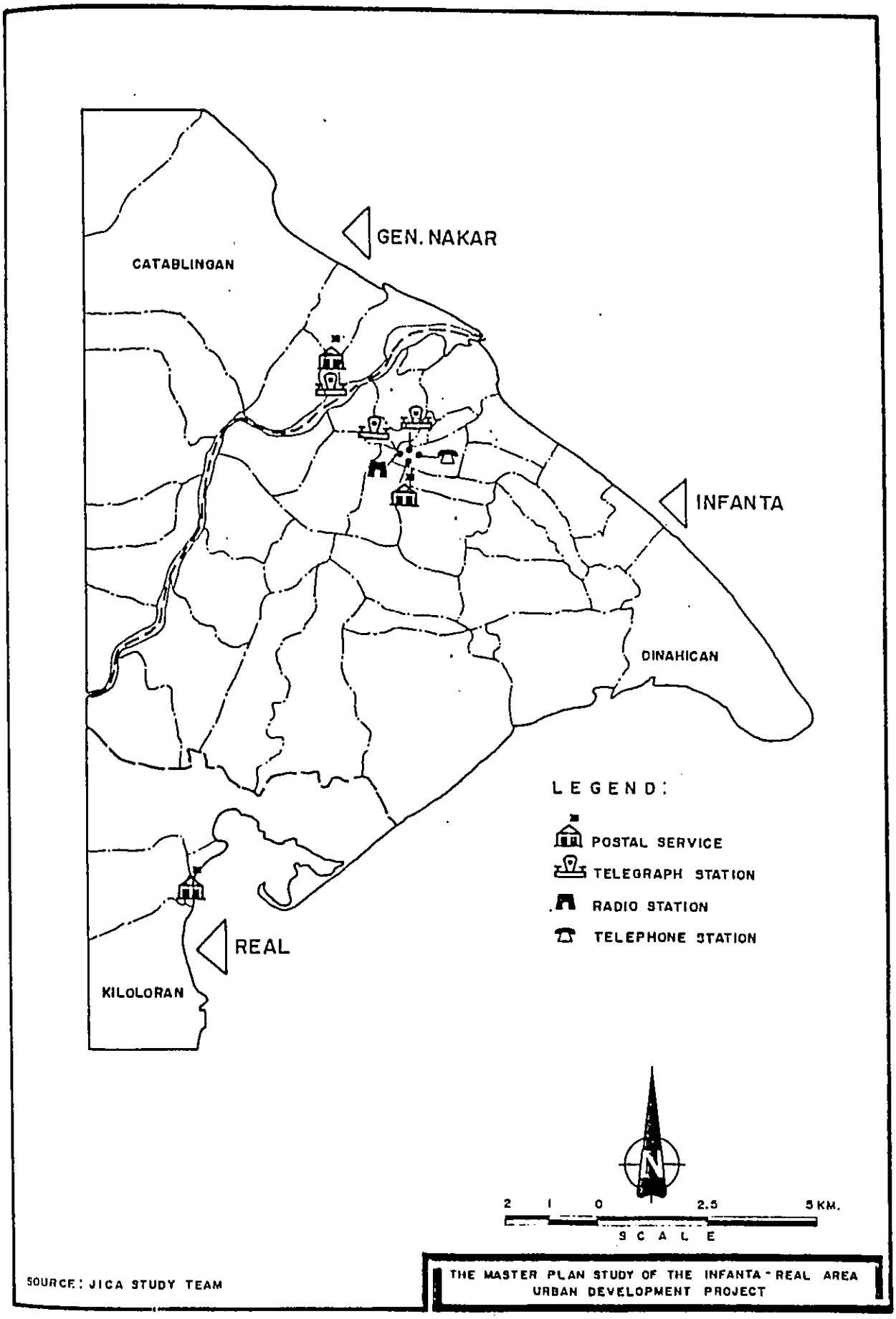


FIG.3.6.5 COMMUNICATION FACILITIES

Table 3.6.11 Daily Traffic of Telegrams and Mail (the three Municipalities 1983)

Municipality			Gen. Nakar	Infanta	Real
Kind					
Telegraph	(RCPI)	Out	-	17	-
		In	-	20	-
	(BUTEL)	Out	3	4	-
		In	4	-	-
Mail		Out	30	300	400
		In	50	800	1,000 (incldg. Polillo,600)

Source: Municipal Governments

The telegraph service of Infanta is carried out by BUTEL and RCPI. The total number of telegrams handled per year is 14400 and the average per capital (assuming 300 days/year) is 0.5 telegram/year (The national average is 1 telegraph/year/person).

The telegraphic service of General Nakar is carried out by BUTEL and the annual average of telegrams destines to the population is very low (0.16 telegram/year-inhabitant), evidencing the weak relationship between this municipality and other parts of the country outside the IRM area.

The telegraph service of BUTEL is transmitted by Morse via Lucena City and takes 3 days to communicate with Manila. Therefore, the service of RCPI is preferred by the local population because it takes only one day to deliver a telegram to Manila. As for the mail service, it uses the Kapalaran bus for transportation to outside (the mail matter is transshipped to the mail truck in Siniloan and is sent to Manila via San Pablo.

c) Radio and TV

It is presumed that the number of radio and TV sets in the households of IRM increased conspicuously as a consequence of the electrification of the parts outside the Poblacion since 1983. According to the results of the household survey carried out in 1983, there is an average of one radio each 1.4 households and one TV set each 8.7 households in the project area. According to the hearing, it is possible to receive radio programs of the local broadcasting station as well as all stations of Manila and to receive TV programs directly from the 3 stations of Manila.

d) Future Plans

MOTC is drawing up plans for improvement of communication facilities in the Regions III, IV and V but it has not been finalized yet as of February 1984. Therefore, the position of the IRM (particularly Infanta) within the said plan has not been defined yet.

(4) Garbage disposal and other treatment facilities.

Generally, garbage disposal is carried out by means of the three following methods in the project area:

(i) Incineration or burrying within the area of the housing lot;

(ii) Dumping in rivers nearby the house;

(iii) Collection by garbage trucks and dumping in the garbage yard.

Garbage collection service (iii) is being carried out by the Municipal Government in the Poblaciones of Infanta and Real. (This service covers the totality of the Poblaciones of Infanta by means of truck and exclusively the market area of Real by means of oxcart). The collected garbage is dumped in the dumping yards shown in the Fig. 3.6.6.

The direct dumping of garbage in the rivers is bringing about the contamination of rivers, and this problem is particularly serious in the Bantiran River of the Infanta Poblacion. Therefore, appropriate measures shall be indispensable in order to cope with the future increase in the volume of garbage as a consequence of the future urbanization (construction of dumping yards, introduction of rational means such as massive incineration, etc.)

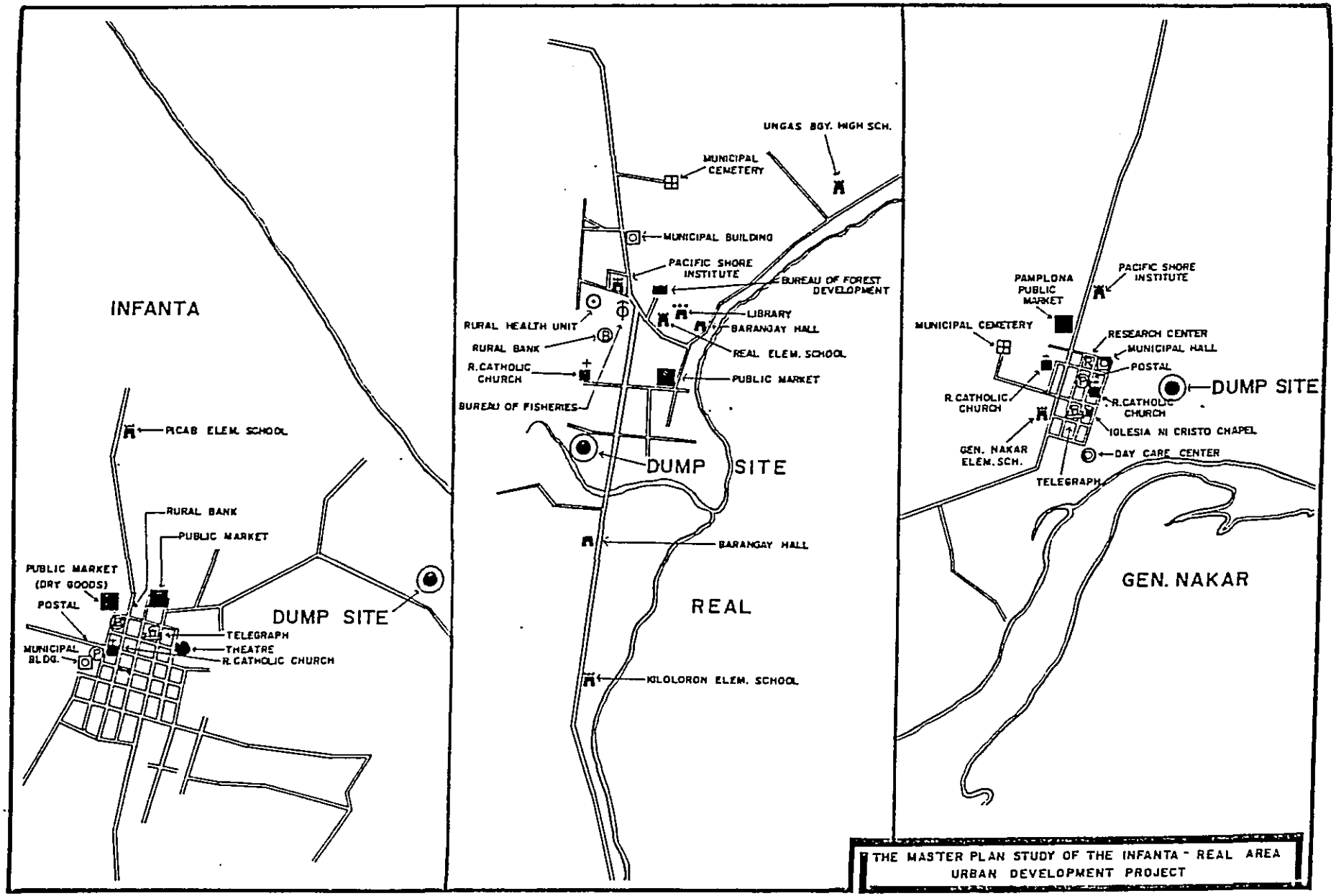


FIG.3.6.6 LOCATION OF DUMP SITES

Table 3.6.12 shows the results of the 1983 survey regarding night soil treatment. As can be seen, the main stream of toilets used in the municipalities of the project area consists of water sealed other depository toilet without septic tank and closed pits excavated at a corner of the residential lot. There is no night soil collecting service in IRM. Furthermore, 6.5% of the total number of households of IRM are not provided with toilet (particularly in Real and General Nakar).

Table 3.6.12 Inventory of Toilet Facilities (%, IRM, 1983)

Type	Water-Sealed Sewer/Septic T.	Water-Sealed Other Depository	Closed Pit	Open Pit	Others	No Toilet
Municipality						
Gen. Nakar	15.3	19.6	39.2	21.6	-	4.3
Infanta	18.8	41.8	21.4	12.2	2.7	3.1
Real	4.8	60.8	15.3	7.5	1.2	10.4
Planning Area Total	15.5	43.3	22.0	12.2	0.5	6.5

Source: JICA Study Team

3.6.2 Social Service Facilities

1) Educational Facilities

The educational facilities of the project area consist of 22 elementary schools (all public), 9 high schools (including 3 private schools), one public college and two kindergardens as shown in Table 3.6.13.

The distribution of these education facilities is shown in Fig. 3.6.7, and with regard to elementary schools they are evenly distributed throughout the totality of IRM (including the swamp districts). Normally, the school district of one elementary school covers 2 or 3 Barangays, but in some districts with demographic concentration (e.g., Libjo of Infanta and Ungos of Real), there is one elementary school per Barangay (refer to Fig. 3.6.8).

The high schools do not have school districts in particular but in reality the school attendance area of each high school is practically defined in view of their distribution with exception of the private high schools.

The total number of students of the project area as of 1983-1984 is 8068 in elementary schools, 4329 in high schools (with 1630 in private) and 146 in kindergardens. As for the number of teachers and professors there are 243 in elementary schools, 145 in high schools (including 39 of private schools), 18 of the college and 2 of kindergarden.

Table 3.6.13 Education Facilities (1983-1984)

*SECONDARY SCHOOL (Private)

Name of School	Enrollment	No. of Classrooms	No. of Teachers	Pupil / Teacher Ratio
General Nakar				
1. Pacific Share Inst.	330	-	6	55.0
Infanta				
1. Mt. Carmel H. S.	815	15	24	33.9
Real				
1. Pacific Share Inst.	485	9	9	53.9
Grand Planning Area Total	1,630	24	39	41.8

*COLLEGE

Name of School	Enrollment	No. of Classrooms	No. of Teachers	Pupil / Teacher Ratio
1. Infanta Comm. Coll.	125	3	18	6.9
Grand Planning Area Total	125	3	18	6.9

*NURSERY SCHOOL

Name of School	Enrollment	No. of Classrooms	No. of Teachers	Pupil / Teacher Ratio
Infanta				
1. Infanta Nursery S.	104	1	1	
Real				
1. Real Nursery School	42	1	1	
Grand Planning Area Total	146	2	2	

SOURCE : Municipal governments

Table 3.6.13 Education Facilities (1983-1984)

*ELEMENTARY SCHOOL

Name of School	Enrollment	No. of Classrooms	No. of Teachers	Pupil / Teacher Ratio
General Nakar				
1. Batangan Elem. S.	197	6	1	197.0
2. Catablingan " "	146	6	7	20.9
3. Minahan " "	177	4	5	35.4
4. G. Nakar " "	599	14	16	37.4
TOTAL	1,119	30	29	38.6
Infanta				
1. Abiawin Elem. S.	136	3	3	45.3
2. Banugao " "	398	12	15	26.5
3. Infanta Central "	1,825	43	57	32.0
4. Binonoan Elem. "	227	6	7	32.4
5. Binulasan " "	213	6	7	30.4
6. Dinahican " "	273	6	6	45.5
7. Gunian " "	288	7	8	36.0
8. Alitas " "	442	12	15	29.5
9. Libjo " "	225	6	7	32.1
10. Lual " "	164	4	4	41.0
11. Magsaysay " "	124	3	3	41.3
12. Pinaglapatan " "	249	6	7	35.6
13. Tongohin " "	492	12	15	32.8
14. Tudturan " "	253	7	8	36.1
TOTAL	5,309	133	162	32.8
Real				
1. Real Central Sch.	973	27	35	27.8
2. Cawayan Elem. "	133	3	3	44.3
3. Kiloloron " "	172	5	5	34.4
4. Ungos " "	362	8	9	40.2
TOTAL	1,640	43	52	31.5

*SECONDARY SCHOOL

Name of School	Enrollment	No. of Classrooms	No. of Teachers	Pupil / Teacher Ratio
General Nakar				
1. Batangan High Sch.	120	4	4	30.0
Infanta				
1. Binulasan High S.	161	4	5	32.2
2. Langgas " "	190	4	8	23.8
3. Tongohin " "	334	9	9	37.1
4. Infanta Prov. " "	1,444	24	68	21.2
TOTAL	2,129	41	90	23.7
Real				
1. Ungos Bgy. H. S.	450	11	12	37.5
Grand Planning Area Total	2,699	56	106	25.5

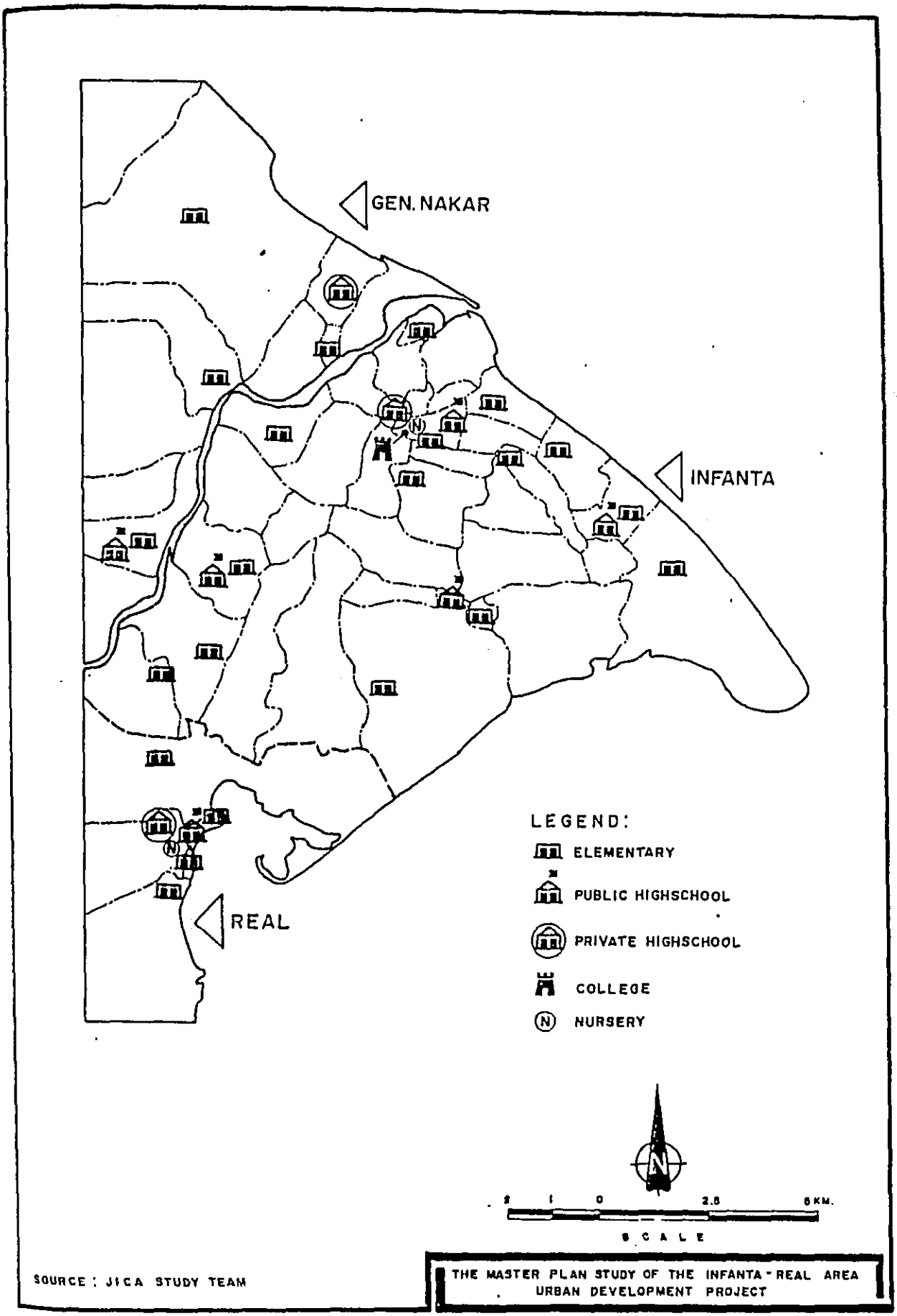


FIG. 3.6.7 EDUCATIONAL FACILITIES

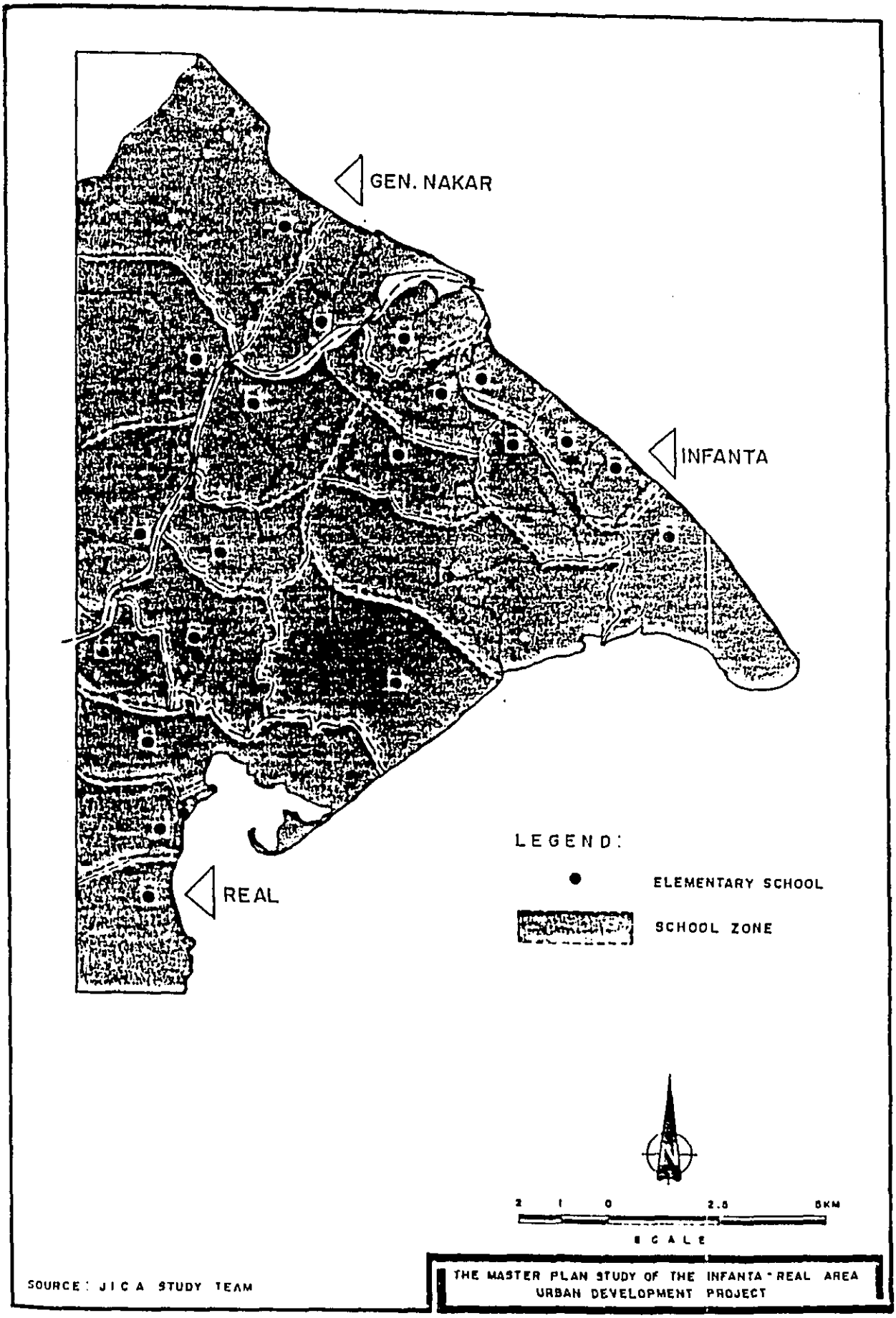


FIG. 3.6.8 ELEMENTARY SCHOOL ZONE

As for the level of the educational service of the elementary schools by school district and the number of pupils per teacher, the level is particularly low in the Barangays of Dinahican, Abiawin, Lual, Alitas and Magsaysay of Infanta and Kawayan and Ungos of Real and Batangan of General Nakar, where the number of pupils per teacher surpasses 40 (standard level of the Ministry of Education).

As for the high schools, there are more than 50 students per teacher in the Pacific Shore Institute of General Nakar and Real (the standard number of students per teacher proposed by the Ministry of Education is 25).

The only institution of higher learning of IRM is the Infanta Community College located in the Poblacion of Infanta. This college has 125 students and is a night school. kindergarden shools are functioning in the sites of high schools, and there are one each in the Poblaciones of Infanta and Real.

The relationship between the population of all cities and municipalities of the GCLA and the number of classes of elementary, secondary and tertiary schools is plotted in the Figs. 3.6.9, 3.6.10, 3.6.11, with the purpose of identifying the level of the educational facilities of IRM. As can be seen, at the elementary school level the 3 municipalities is even with the average level of the GCLA but in terms of secondary school level and General Nakar are practically even with the average level but Infanta falls far behind the average level. As for the tertiary education level, most of the municipalities of the country with the demographic scale of Infanta are not provided with institutions of higher education but the existence of the college in Infanta is attributed to the geographical peculiarities of IRM (insolation from other parts of the country). In this connection, IRM has a rate of literacy of approximately 95%, which surpasses by far the average rate of literacy of the nation as a whole which is 90%.

On the other hand, the number of youth that emigrate to Manila and other parts in search of opportunities of higher education (1 person each 4.5 households according to the results of the field survey) suggest that there is insatisfaction among the local population with regard to the educational opportunities offered within IRM. Figs. 3.6.9, 3.6.10, 3.6.11 suggests that generally speaking the improvememt of the educational facilities tends to reach a stable state when the population reaches the level of the order of 100000 persons.

The state of things and level of the educational facilities of IRM are generally satsifactory, but the following measures will be required in order to cope with the future development.

- Expansion Kindergarden
- Reorganization of the school districts concurrently with the settlement of the population.
- Construction of an integrated university (taking into consideration adult education service) aimed at keeping the centrality of the east coast zone and making possible the supply of labour of good quality.

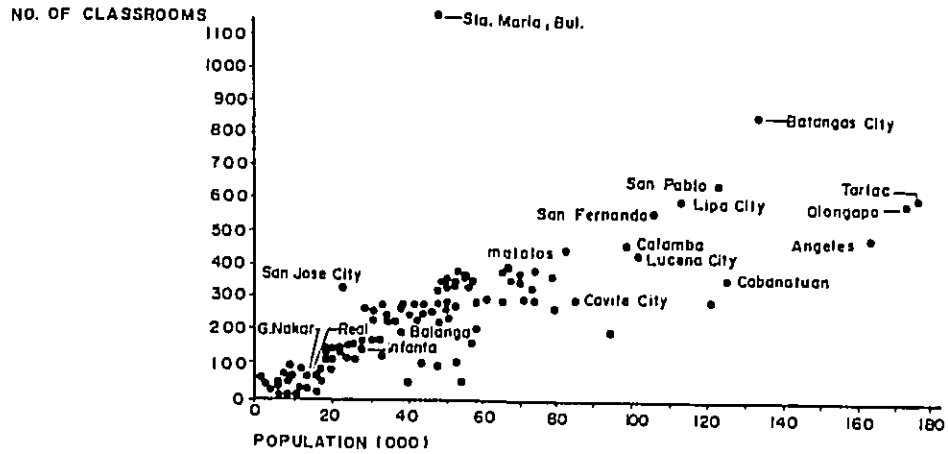


FIG. 3.6.9 NO. OF CLASSROOMS (ELEMENTARY LEVEL)

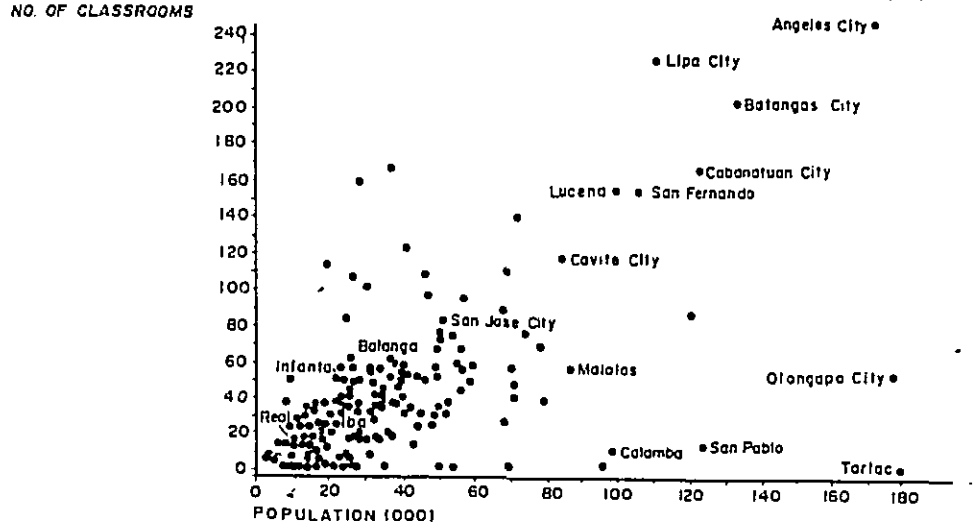


FIG. 3.6.10 NO. OF CLASSROOMS (SECONDARY LEVEL)

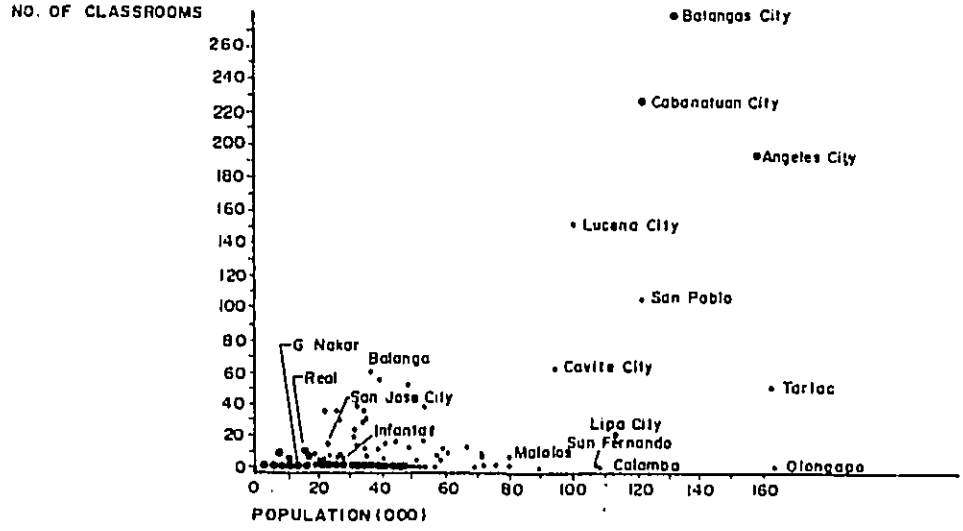


FIG. 3.6.11 NO. OF CLASSROOMS (TERTIARY LEVEL)

SOURCE : JICA STUDY TEAM

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

2) Medical and Health Facilities

The medical and health facilities of IRM are shown in Table 3.6.14. In terms of hospitals, there are shown in Table 3.6.14. In terms of hospitals, there is the Claro M. Recto Memorial Hospital (25 beds) in the Poblacion of Infanta that functions as a community hospital. (Tehere was also the private Saint Mark Hospital with 25 beds, but it was lost by fire in 1979). Summing up the beds offered by the private clinic opened in 1983 and by RHU (Rural Health Unit), the medical care facilities of IRM total 41 beds.

Besides the ordinary clinics and hospitals the installation of one RHU in each municipality is compulsory. The Barangay Health Station (BHS) are subsidiary facilities that supplement the medical and health care functions on the RHU. These BHS are distributed as shown in Fig. 3.6.12. In view of the service areas of these facilities, it is presumed that the medical and health care services are rather poor in the Barangays of Binulasan, Dinahican, Batican, Pulo and Amolongin of Infanta, as well as in the areas along the Agos River and in the Mountains districts of General Nakar.

Table 3.6.14 Medical Facilities (IRM, 1983)

Municipality		Gen. Nakar	Infanta	Real
Facility				
Hospital	Private / No. of Beds ( )	-	-	-
	Public / No. of Beds ( )	-	1 (25)	-
Rural Health Unit		1	1 (4)	1 (4)
Barangay Health Station		1	5	-
Medical Clinic	Private / No. of Beds ( )	-	1 (8)	-
	Public / No. of Beds ( )	-	-	-
Nutrition Centers		1	1	1

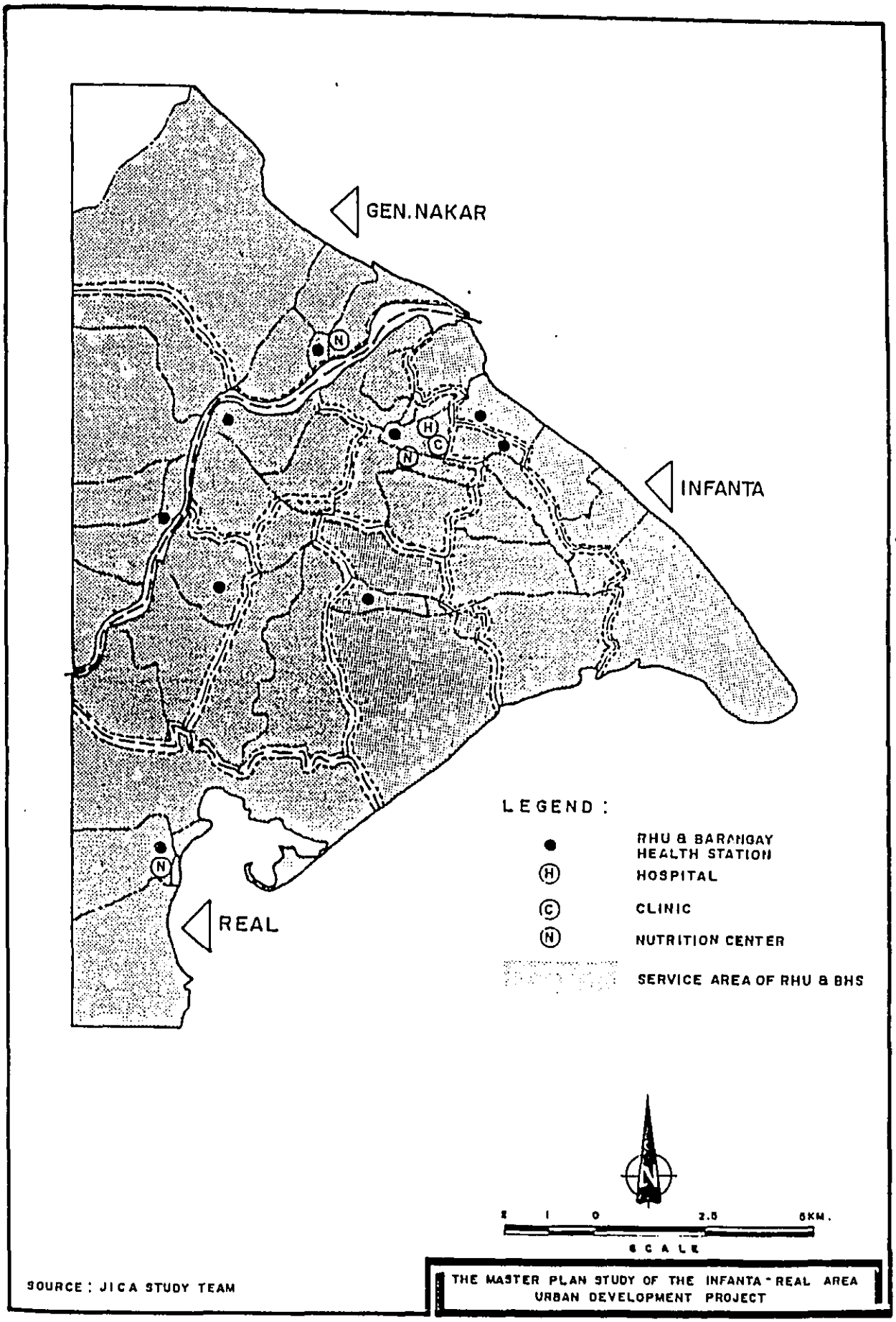


FIG. 3.6.12 DISTRIBUTION OF MEDICAL FACILITIES & ITS SERVICE AREA

The Claro M. Recto, which is the only hospital of the study area, covers General Nakar, Infanta and Real as a district hospital. According to the interview survey we carried out, there are approximately 5-10 hospitalized patients and 150 outpatients, and the existing 25 beds are insuficient to cope with the demand.

The number of doctors and nurses of IRM is shown in the Table 3.6.15.

There are presently 16 doctor in IRM, all living in Infanta. The municipalities of Real and General Nakar have no doctor at all at the present time, and in reality the doctor of the RHU of Infanta goes around the RHU of each municipality once a week.

3) Administrative and Community Facilities

The public and community facilities existing in IRM are shown in the Table 3.6.16.

As can be seen from the Fig. 3.6.13, most of the facilities listed in the table are concentrated in the Poblacion of each municipality. The exceptions are the locations of the NIA and NFA of Infanta in Comon, BAEX in Gumian and the Coast Guard of Real in Ungos where the port is. In IRM there are local offices of government institutions, but most of them are run by one or two persons at most. The municipal office has 18 employees in General Nakar, 27 in Infanta and 28 in Real.

As for parks, there is the Municipal Plaza in front of each municipal office which constitutes the only facility of the kind in the municipalities of IRM. As for the playgrounds, those ones of of the local elementary schools are used by the local population. As for the community facilities, the abscence of municipal libraries in IRM is an issue requiring urgent solution.

4) Social Welfare and Other Facilities

The social welfare facilities of IRM are shown in the Table 3.6.17.

The Family Planning Unit is located in the RHU of each municipality, and the Day Care Center is run by the staff of the RHU and by local volunteers.

The churches and facilities of religious organizations are shown in the Table 3.6.18 (Fig. 3.3.14).

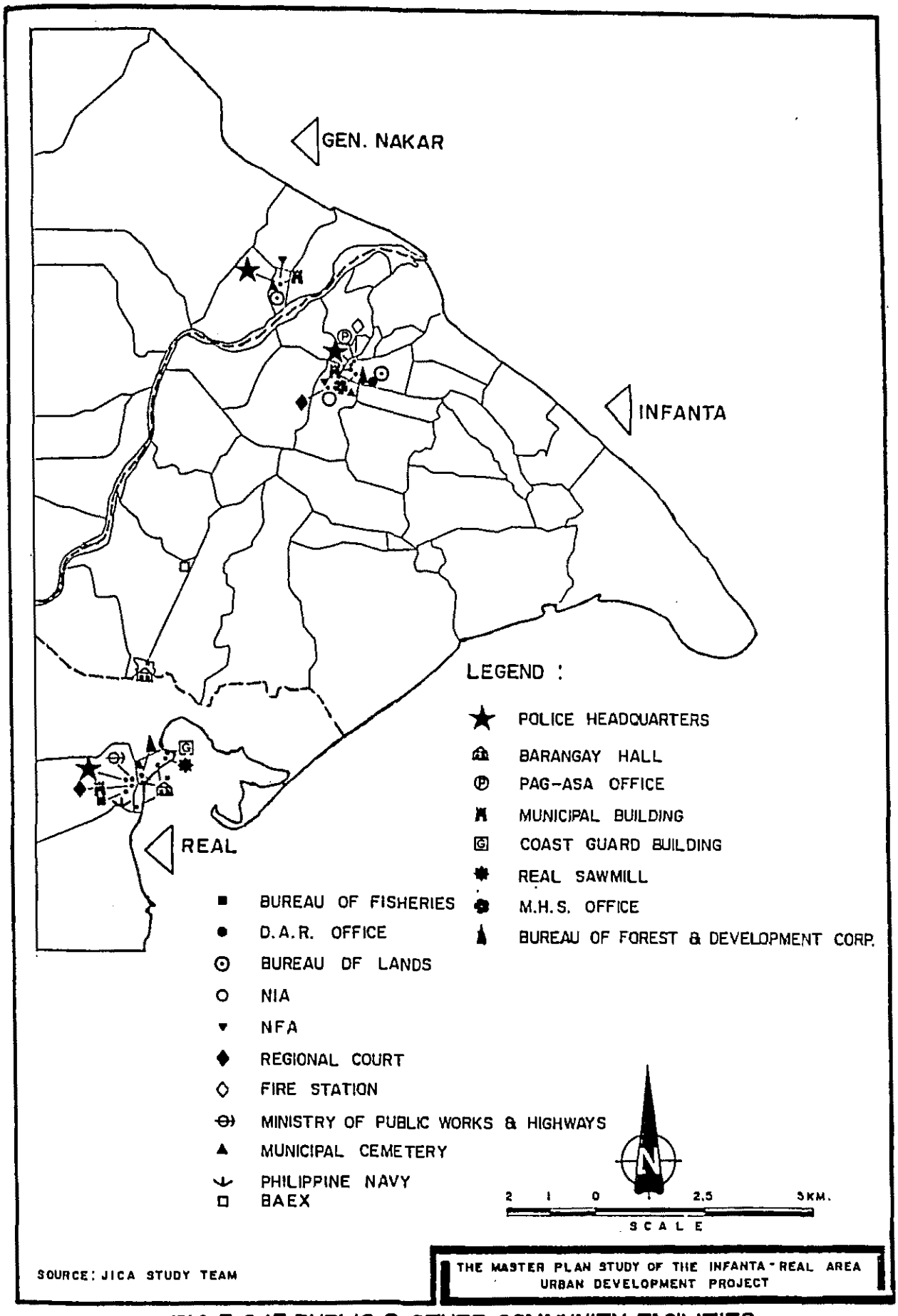


FIG.3.6.13 PUBLIC & OTHER COMMUNITY FACILITIES

4) Social Welfare and Other Facilities

The social welfare facilities of IRM are shown in the Table 3.6.17.

The Family Planning Unit is located in the RHU of each municipality, and the Day Care Center is run by the staff of the RHU and by local volunteers.

The churches and facilities of religious organizations are shown in the Table 3.6.18 (Fig. 3.3.14).

Table 3.6.17 Social Welfare Facilities (IRM, 1983)

Facility / Municipality	Gen. Nakar	Infanta	Real
Family planning unit	1 RHU	1 RHU	1 RHU
Day care center	4 Poblacion Anoling Maigang Batangan	2 Poblacion Gumian	1

SOURCE : Municipal government

Table 3.6.18 Churches (IRM, 1983)

Church / Municipality	Gen. Nakar	Infanta	Real
Catholic	2	3	3
Iglesia Ni Kristo	1	2	4
Protestant (Mistica)	-	1	1
Seventh-day Adventist	-	1	1
Jehovah's Witnesses	-	1	1
Baptist	-	2	-
TOTAL	3	10	10

SOURCE : Municipal governments

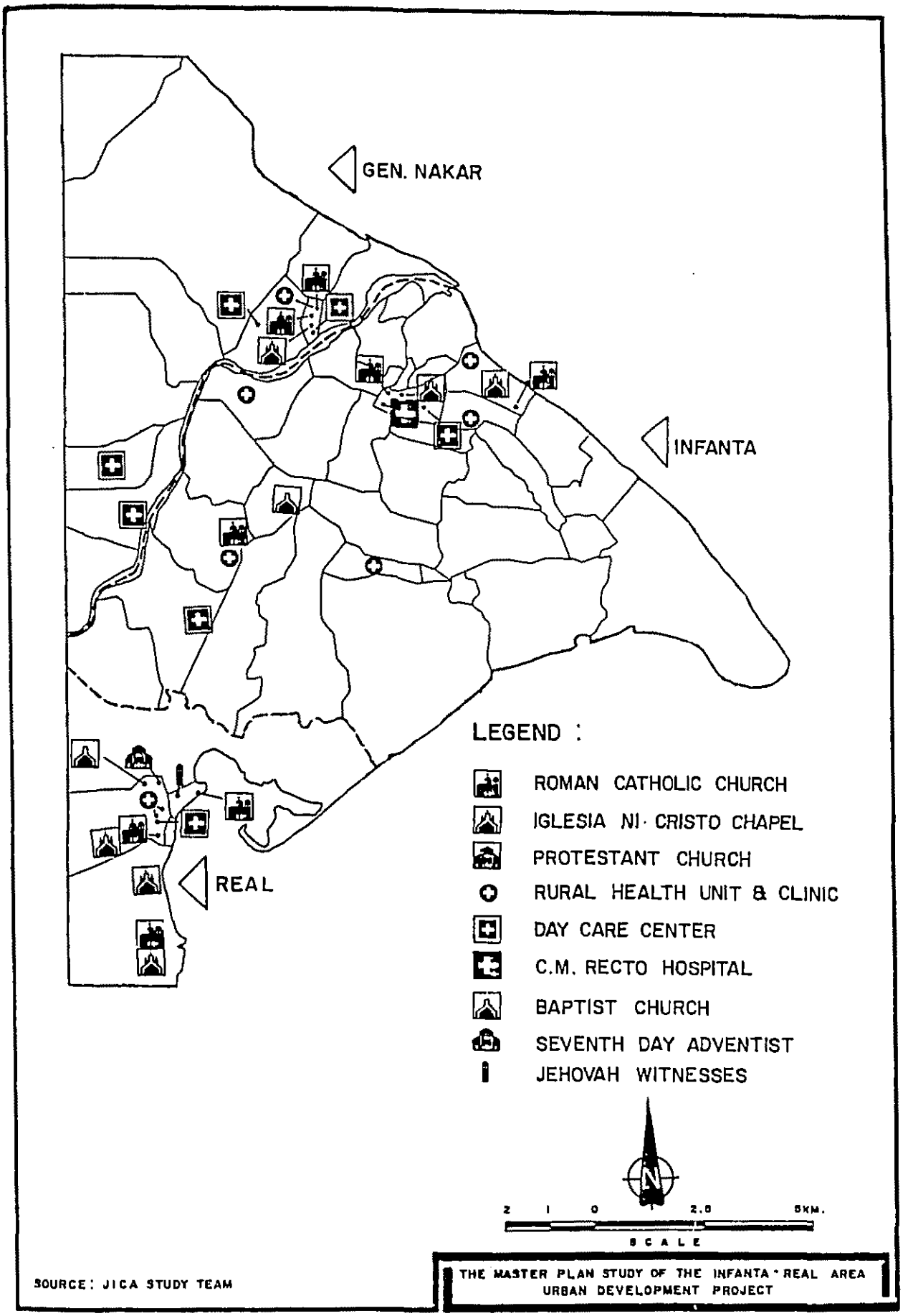


FIG.3.6.14 DISTRIBUTION OF CHURCHES

APPENDIX: OUTLINE OF THE FIELD SURVEY

1. Survey of Business Establishments

1) Purpose

This survey is aimed at providing data required to identify the trend of the business, the present number of workers, etc., in the study area, IRM.

2 Place of survey

The survey was carries in the totality of the municipality of Infanta (36 Barangays), as well as in part of the municipality of Real (5 Barangays) and General Nakar (10 Barangays), that the constitute the study area (Fig. A).

3) Epoch Survey

The survey was carried out during 3 days from December 20 to 23, 1983 in the business establishments of the study area.

4) Method of Survey

The survey staff visited the business establishments based on the 1983 registration list of the study area presented on the occasion of the survey, and carried out the questionaire survey through direct interview. As for the survey samples, 40% of the Sari-Sari Stores and tricycles owners of Infanta, and practically the totality of the other kinds of business establishments included in the registration list are picked up.

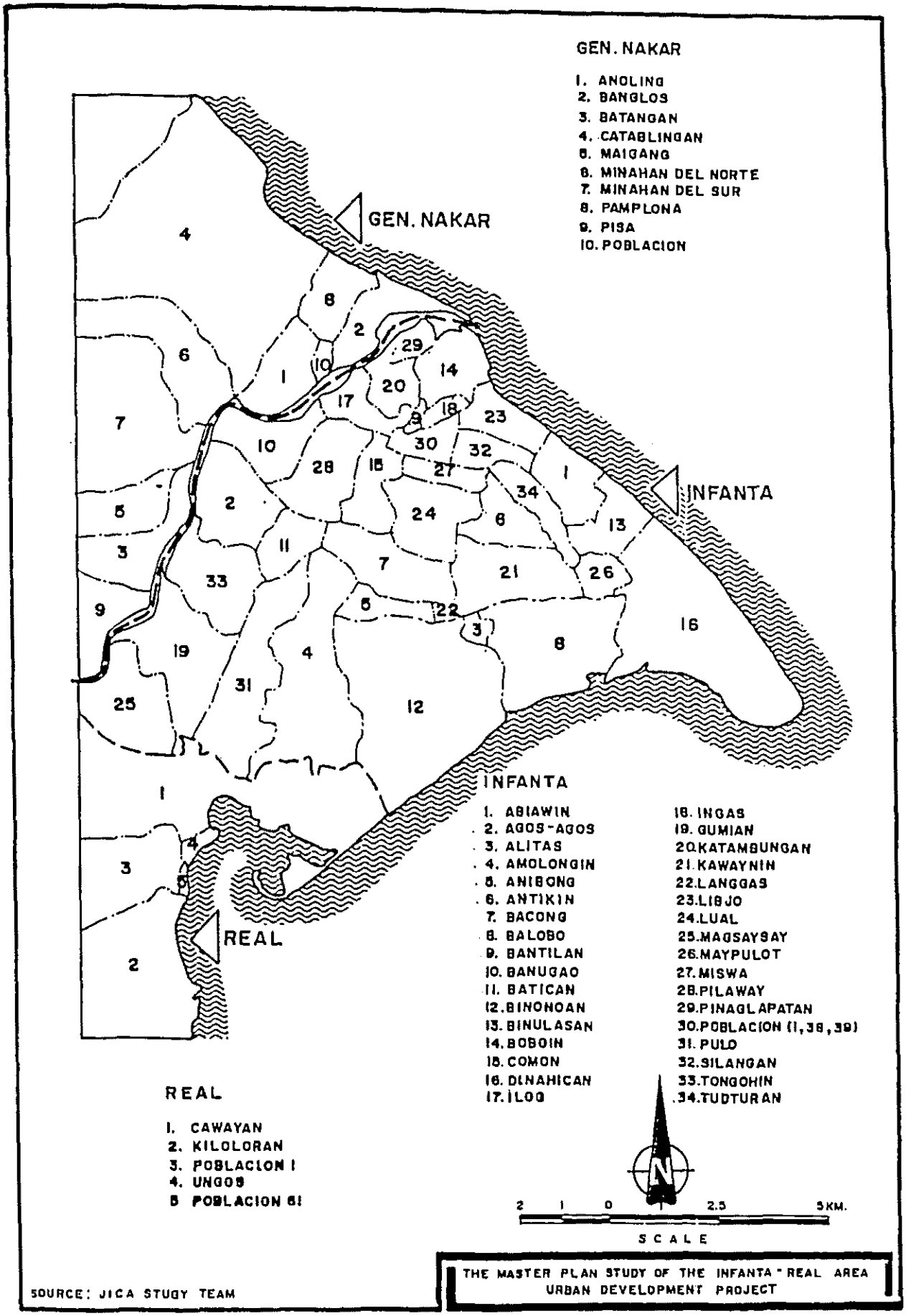


FIG. A. SURVEY AREA

5) Contents of the survey

The business establishment survey was carried by focusing principally on the type of business, number of workers and turnover. With regards to the industrial, wholesale, retail and transportation establishments, attention was paid to the transportation means, volume, frequency and cost of their raw materials, products and related items as well.

(Principal Survey Items)

- Name and address of the establishment
- Type of business
- Number of workers (employees and family workers)
- Turnover, cost, wage
- Land area, floor area
- Industry
  - Means of transportation
  - Transported volume, transportation cost
  - Number of trips
  - OD
- Wholesale and retail commerce
  - Means of transportation
  - Number of trips
  - OD
- Transportation, storage and communication industry
  - Transported commodity
  - Means of transportation
  - Transported volume, cost
  - Number of trips
  - OD

6) Items of Compilation and Analysis

The survey results are complied by municipality, Barangay and kind of business establishment list was used as universe to expand the sampling data. The present state of things of the business establishments of IRM was analyzed from the following standpoints, on the basis of compilation report.

- Distribution of business establishments
- Distribution of the number of workers
- Present state of things of the turnover, cost and salary
- Physical distribution of commodities of the industry, wholesale trade and retail trade
- Original unit of turnover and number of employees
- Original unit of floor area

7) Survey form

QUESTIONAIRE FOR ESTABLISHMENT

1. Name of establishment: _____

2. Address of the establishment: _____

3. Industry group : _____

   classification: _____

4. Total number of persons working:

   No. of employees: _____

   Total number of persons working including owners and family workers: _____

5. Total receipts: _____

   Total cost (including total salaries and wages): _____

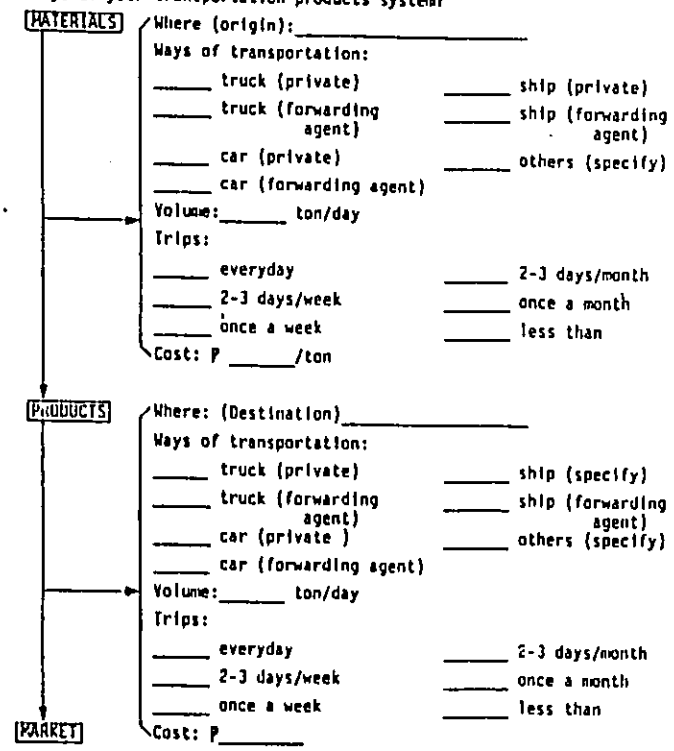
   _____

   Total salaries and wages in 1983: _____

6. Lot size (square meter) and floor (square meter) of the building: _____

MANUFACTURING

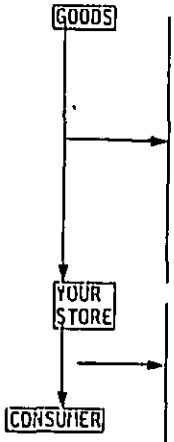
1. What are the products of your corporation? _____
2. Ways of your transportation products system?



WHOLESALE AND RETAIL TRADE

1. What do you sell in your store? _____

2. Ways of transportation goods system?



Where (Place of Purchase): _____

Ways of transportation:

_____ car
_____ truck
_____ ship
_____ others (specify)

Trip:

_____ everyday
_____ 2-3 days/week
_____ once aweek
_____ 2-3 days/month
_____ once a month
_____ less than

Delivery:

_____ do
_____ don't

Ways of transportation:

_____ car
_____ ship
_____ jeepney
_____ tricycle
_____ others (specify)

TRANSPORTATION, STORAGE AND COMMUNICATION INDUSTRY

1. What kind of transportation does your company have?

☐ Truck ☐ Tricycle
☐ Ship ☐ Others (Specify)
☐ Jeepney

2. How many transports you owned by yourself and other household members?

Number of units owned by yourself: _____

Number of units owned by other household members: _____

3. What cargo do you usually carry? _____

4. How often is your trip?

☐ 2 - 3 times a day ☐ once a week
☐ once a day ☐ 2 - 3 days a month
☐ 2 - 3 days a week ☐ less than

5. What is the volume of your cargo?

____ ton or ____ kg. or ____ piece or ____ person/day
____ ton or ____ kg. or ____ piece or ____ person /week

6. Where are you going to deliver its cargo?

____ survey area (Infanta, Real, G. Nakar)
____ Pollilo ____ Manila
____ Famy ____ Others (Specify)

7. How much is the fare for one trip?

₱ ____ / one person
₱ ____ / ton
₱ ____ / kg.
₱ ____ / Others (Specify)

2. Traffic Flow Survey

1) Purpose of the Survey

This survey is aimed at providing data required to identify the state of things of the flow of persons and objects (particularly the flow by ships) within IRM.

2) Survey Items.

The survey items are classified in three general types.

(i) Survey of passenger flow in means of public transportation

- o Survey of the state of use of bus
- o Survey of the state of use of ferry

(ii) Survey of the flow of goods by Banca

3) Date and Place of Survey

The survey was carried out during one whole day of 21 December, 1983 commencing at the time of the starting bus (4:00) in order to cover the totality of the daily activites in IRM. The bus transportation survey was carried out at 5 places and the interview with banca owners at 5 places (Fig. B).

4) Method and Contents of the Survey

(1) Method of Survey

The survey of the flow of passengers of means of public transportation was carried through direct interview with the passengers at the bus terminals, ferry terminals, etc., using questionaires containing the survey items. The survey of the flow of banca cargo was carried out through interview with banca owners, based on the banca owner registration list.

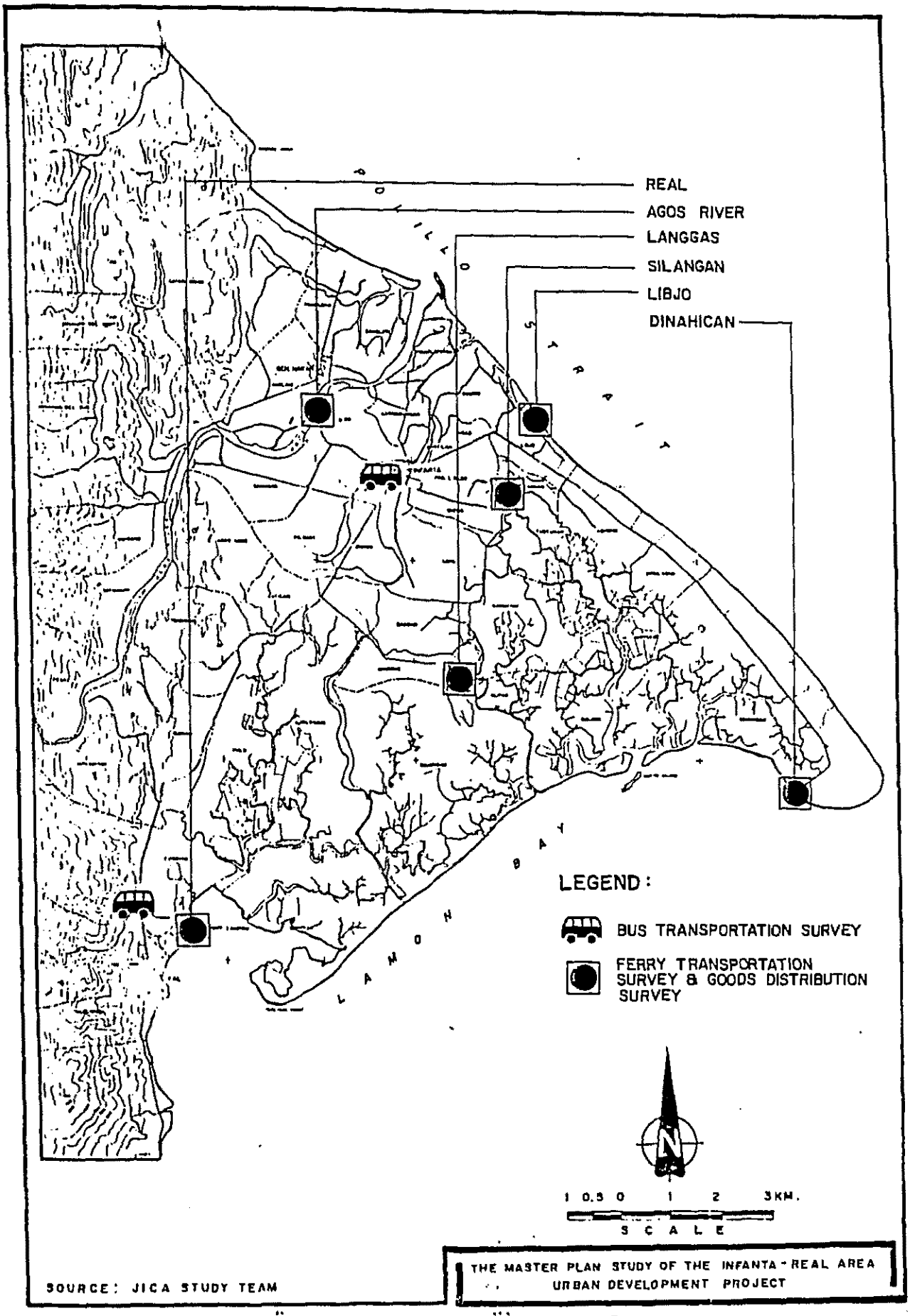


FIG. 8 . LOCATION OF SURVEY

(2) Contents of the survey

The contents of the survey consist principally of the OD, trip, purpose of use, transported goods, transported volume, etc., related to the flow of passengers and cargo. The contents of each survey item are shown in the Table A.

5) Number of the surveyed

The number of survey data of each survey is shown in Table B. The bus transportation survey and the ferry transportation survey (Real Port) was carried out for 100% of the cases. The sampling referring to the other ferry transportation survey was carried out for 50% of the cases, and the banca owner interview was carried out for 100% of the cases, based on the banca owner list.

6) Items of compilation and analysis

(Basic items for compilation)

- Public transportation survey.
  Bus passengers by bus terminal and by occupation (O-D, purpose of use, number of trips).

  . Ferry and banca users by port and by occupation (O-D, purpose of use, number of trips).

- Goods distribution survey

  . Banca cargo by Barangay and by occupation (O-D, transported good, transported volume, number of trips, cost).

Table A Traffic Survey Methods

H E A D			Location	Time	Contents
Public Transportation Survey	Bus Transportation Survey	Bus Passenger Interview	Infanta Bus Station Real Bus Stop	4:00-17:00	Interview to bus passenger Occupation, O.D., Reason for use, Frequency of use
		Bus Passenger Counting	same	same	Counting of bus passengers
	Ferry (Banca) Transportation Survey	Ferry Passenger Interview	Real Port, Dinahican, Libjo, Silangan, Langgas	4:00-17:00	Interview of ferry passengers, Occupation, O.D., Transport for use, reason for use
		Ferry Passenger Counting	same	same	Counting of ferry passengers
Goods Distribution Survey		Banca owner Interview	Survey Area	8:00-17:00	Kind of cargo, trip, volume, O.D., cost, occupation
		Banca Passenger Interview	Real Port, Dinahican, Libjo, Silangan, Langgas, Agos river	8:00-17:00	O.D., trip, kind of cargo, volume cost, occupation.

Source: JICA Study Team

Table B Number of Surveyed

K I N D			No. of Surveyed
Public Transportation Survey	Bus Transportation Survey	Bus Passengers Survey	483 persons
		Bus Passengers Counting	483 persons
Goods Distribution Survey	Ferry Transportation Survey	Ferry Passengers Survey	233 persons
		Ferry Passengers Counting	233 persons
	Banca Owners Interview		49 owners
	Banca Passengers Interview		36 persons
Bus Company Survey			2 companies
Ferry Company Survey			1 company

Source: JICA Study Team

(Items of Analysis)

- o Transportation of passengers
  - . Transportation of passengers by bus and ferry
    - * Distribution of the flow from the district in question
      - * O-D trip
      - * Originated quantity
  - . Transportation of passengers by banca
    - * O-D trip
    - * Purpose of use and frequency of trips
    - * Sphere of action of banca
- o Transportation of goods
  - . Transported items and sphere of transportation (O-D)
  - . Transported volume and transportation cost
  - . Relationship with other areas (Polillo and Manila)
  - . Frequency of transportation trips

7) Survey Form

BUS TRANSPORTATION SURVEY (Bus Company)

Date: _____

Name of Company: _____

1. How many buses do you have in your company? _____
2. How many routes do your buses have? _____
   from Infanta to _____ from Infanta to _____
   from Infanta to _____ from Infanta to _____
   from Infanta to _____
3. How many trips/day (by each route)?
   _____ /day _____ /day
   _____ /day _____ /day
   _____ /day _____ /day
4. Do you operate on different route sometimes within a month period?
   _____ different
   _____ non-different
   How many trips/month by each?
   Jan. _____ Feb. _____ Mar. _____ Apr. _____
   May _____ June _____ July _____ Aug. _____
   Sept. _____ Oct. _____ Nov. _____ Dec. _____
5. How many passengers/day (average)?
   _____ person/day _____ person/day
   _____ person/day _____ person/day
   _____ person/day _____ person/day
6. How much sales/year does your company earn?
   ₱ _____/year
7. How much is the fare to go to the following places listed below?
   Famy ₱ _____
   Tanay ₱ _____
   Angono ₱ _____
   Manila ₱ _____

BUS PASSENGER INTERVIEW SURVEY

Date : _____

Name of Station: _____

Bus Destination: _____

Bus Departure Time: _____

1. What is your occupation? _____
2. Where did you come from before going to this station?
   ☐ from office
   ☐ from school
   ☐ from home
   ☐ from shopping _____ specify the address
   ☐ others
3. What mode of transport did you use in going to this station?
   ☐ by walking
   ☐ by tricycle
   ☐ by jeepney
   ☐ by ferry
   ☐ others
4. Where are you going? _____ specify the address
5. Reason for using the bus?
   ☐ going to office
   ☐ going to school
   ☐ going for shopping
   ☐ going home
   ☐ others
6. How often do you commute by bus?
   ☐ everyday
   ☐ 1-3 days/week
   ☐ once a week
   ☐ 1-3 days/month
   ☐ once a month
   ☐ less than

FERRY TRANSPORTATION SURVEY (Ferry Company)

Date: _____

Name of Company: _____

1. How many ferries do you have in your company? _____
2. How many routes do your ferries have? _____
   from Infanta to _____ from Infanta to _____
   from Infanta to _____ from Infanta to _____
   from Infanta to _____
3. How many trips/day (by each route)?
   _____ /day _____ /day
   _____ /day _____ /day
   _____ /day _____ /day
4. Do you operate on different route sometime within a month period?
   _____ different
   _____ non-different
   How many trips/month by each route?
   Jan. _____ Feb. _____ Mar. _____ Apr. _____
   May _____ June _____ July _____ Aug. _____
   Sept. _____ Oct. _____ Nov. _____ Dec. _____
5. How many passenger/day (average)?
   _____ person/day _____ person/day
   _____ person/day _____ person/day
   _____ person/day _____ person/day
6. How much sales/year does your company earn?
   ₱ _____/year
7. How much is the fare to go to the following places listed below?
   Polillo ₱ _____
   Patnanongan ₱ _____
   Others _____ (specify) ₱ _____

FERRY (SHIP) PASSENGER INTERVIEW SURVEY

Date: _____

Name of Station: _____

Ferry's Destination: _____

Ferry's Departure Time: _____

1. What is your occupation? _____
2. Where did you come from before going to this port?
   ☐ from office
   ☐ from school
   ☐ from home _____ specify the address
   ☐ from shopping
   ☐ others
3. What mode of transport did in going to this port?
   ☐ by walking
   ☐ by tricycle
   ☐ by jeepney
   ☐ by bus
   ☐ others
4. Where are you going? _____ specify the address
5. Reasons for using the ferry?
   ☐ going to office
   ☐ going to school
   ☐ going for shopping
   ☐ going home
   ☐ others
6. How often do you commute by bus?
   ☐ everyday ☐ 2-3 days/month
   ☐ 2-3 days/week ☐ once a month
   ☐ once a week ☐ less than

TRAFFIC COUNTING SURVEY

DATE : _____ KIND OF TRAFFIC : [BUS] [FERRY]

NAME OF STATION : _____

NO.	TRAFFIC DESTINATION	TRAFFIC DEPARTURE TIME	NUMBER OF PASSENGER (PERSON)	
			ON BOARDING	ALIGHTING

BANCA TRANSPORTATION SURVEY

Date:_____

Name of Establishment:_____

Location:_____

Occupation:_____

1. How many bancas do you owened by yourself and other household members?

   Number of units owned by yourself?_____

   Number of units owned by other member of household?

   _____

2. What cargo do you usually carry?_____

3. How often is your trip?

   ☐ everyday ☐ 2-3 days6month

   ☐ 2-3 days/week ☐ once a month

   ☐ once a week ☐ less than

4. How many volume can your banca carry?

   _____person _____ton or _____kg. or _____piece/day

   _____person _____ton or _____kg. or _____piece/day

5. Where did you pick-up your cargo?

   Origin:_____

   Destination:_____

6. How much does it cost for one trip?

   ₱_____/one person ₱_____/kg.

   ₱_____/ton

   ₱_____/Kg.

   ₱_____ Others

3. Household survey

1) Purpose of survey

The household survey was carried out with the purpose of collecting basic data required to examine the socio-economic frame of the project by identifying the family composition, occupational trends and other social peculiarities within the area of survey.

2) Place of survey

The area of survey covers the totality of the municipality of Infanta (36 Barangays), as well as part of Real (5 Barangays) and General Nakar (10 Barangays) which constitute the object area.

3) Dates of survey

The survey was carried out with the sampled households, during the 5-day period from 22 to 27 December 1983.

4) Method of survey

The survey was carried out with the sampling in conformity with the expression (1)*, on the basis of the household survey list of each Barangay of the area of survey as of 1983. The number of samples was determined by random sampling for each Barangay with 20% average sampling rate, by assuming 30% sampling error and 95% reliability. The survey staff visited the households sampled in conformity with this sampling procedure and carried out the direct interview covering the items of the questionnaire.

$$*M = \frac{N}{(F/R)^2 (N-1)/\sigma^2 + 1} \quad \ldots\ldots(1)$$

Where: n = Sample Number
N = Mother Population
σ^2 = Variance of Mother Population
F = Sampling Error
R = Reliability

5) Contents of the survey

The household survey covers principally the family composition, number of workers, income and family. In the case of households engaged in agriculture, forestry and fishery, we investigated the farming area, harvest and transportation trend as well.

(Principal survey items)

- Number of family members and attribute
- Occupation
- Migration of the family and causes of the migration
- Annual income
- State of the facilities, electricity, electricity, water and fuel
- Possession of TV, radio, car, etc.

- o Agriculture
  - . Farming area
  - . Quantity and types of livestock
  - . Income
  - . Ownership of land
  - . Means of transportation of crop, trip
- o Fishery
  - . Possession of banca
  - . Processing of fish
  - . Means of transportation of fish and trip

6) Results of survey and number of data.

The number of data of the household survey carried out this time is shown in Table C. As can be shown, the total number of households is 7859 and the number of data corresponds to 1736 households (excluding void data), resulting therefore into 22% sampling rate.

The number of households by Barangay, the number of sampling households and the sampling rate are shown in the Table D.

7) Items of compilation and analysis

The compilation was carried with regard to the following attributes, on the basis of the survey results. In carrying out the compilation, the data were expanded by using the household list as mother population. The social characteristics of the area of survey are analyzed from the following standpoints, from the compilation results.

Table C Number of Households and Surveyed

	No. of Household	No. of Surveyed	Rate of Surveyed
Infanta	4,981	1,246	25.0%
Real	1,495	257	17.2
Gen. Nakar	666	153	23.0
Total	7,142	1,656	23.2

Source: JICA Study Team

Table D Rate of Surveyed Household by Barangay

	Number of Sampling HH	Population	Total No. Household	Ave Size
Infanta				
101 Abiawin	29	678	127	5.34
102 Agos-Agos	26	282	44	6.41
103 Alitas	28	453	84	5.39
104 Amolongin	24	409	73	5.60
105 Anibong	30	608	107	5.68
106 Antikin	31	463	99	4.68
107 Bacong	26	380	77	4.91
108 Balobo	22	317	52	6.10
109 Bantilan	46	1,489	273	5.45
110 Banugao	39	1,032	181	5.70
111 Poblacion 01	26	1,237	262	4.72
112 Poblacion 38	48	953	182	5.23
113 Poblacion 39	54	1,804	318	5.67
114 Batican	22	364	73	4.99
115 Binonoan	38	899	160	5.61
116 Binulasan	40	936	162	5.78
117 Boboin	34	669	121	5.53
118 Comon	46	944	155	6.09
119 Dinahican	44	1,210	219	5.52
120 Gumian	59	2,046	339	6.04
121 Ilog	55	918	156	5.88
122 Ingas	30	784	143	5.48
123 Katambungan	26	549	94	5.84
124 Kawaynin	28	262	59	4.44
125 Langgas	27	508	85	5.98
126 Libjo	45	1,188	211	5.63
127 Lual	27	508	85	5.98
128 Magsaysay	32	2,111	390	5.41
129 Maypulot	30	480	90	5.53
130 Miswa	31	1,120	176	6.36
131 Pilaway	35	665	119	5.59
132 Pinaglapatan	25	482	112	4.30
133 Pulo	28	414	71	5.83
134 Silangan	32	487	78	6.24
135 Tongohin	57	1,421	254	5.59
136 Tudturan	15	229	41	5.58
Total	1,235	29,418	5,302	5.55
Real				
201 Poblacion 01	79	5,648	977	5.78
202 Poblacion 61	65			
203 Cawayan	22	745	119	6.26
204 Kiloloron	38	996	143	6.96
205 Ungos	49	2,023	337	6.00
Total	253	9,412	1,576	5.97
General Nakar				
301 Anoling	31	876	186	4.71
302 Batangan	16	411	53	7.75
303 Catablingan	27	1,325	225	5.89
304 Maigang	12	289	51	5.67
305 Minahan del Norter	16	158	25	6.32
306 Minahan del Sur	25	435	79	5.51
307 Pamplona	24	647	104	6.22
308 Poblacion	31	532	90	5.91
309 Bunglos	35	658	115	5.72
310 Pisa	31	262	53	4.94
Total	248	5,593	981	5.70

Source: Field Survey

- Distribution of the number of households
- Age characteristics (age distribution)
- Distribution of workers
- Trend of employment of workers

8) Survey Form

Municipality _____

Zone No. _____

Barangay _____

SAMPLE PRIVATE HOUSEHOLD QUESTIONAIRE

1) Name: _____ 2) Address: _____

(last) (first) (m.i.)

	3) Number of household members	Relationship to Head	4) Age / Civil Status	5) Sex	6) Residence in 1975 1. Same 2. Another Barangay (Specify)	7) Usual Occupation	8) Kind of business/ industry	9) School/ Work Address	10) List of members who moved out in this household in the last ten (10) years			11) What is the total monthly household income? (Check one)
									Name	Purpose	Place	
1		HEAD										Below ₱500
2												501 to 1,000
3												1001 to 1500
4												1501 to 2000
5												2001 to 2500
6												2501 to 3000
7												3001 to 3500
8												3501 to 4000
9												4001 to 5000
10												5001 to 7000
11												Over ₱7000
12												
13												
14												

Name of Supervisor: _____ Name of Interviewer _____

	12. What is the Highest Grade Completed?	13. Can Read or Write Simple Message?
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

14. What kind of lighting do you use?

Electricity — Oil

Kerosene — Others (specify)

Liquified Petroleum Gas (LPG)

15. What is the main source of your water supply?

Piped Water — Spring

Artesian Well — Rain Water

Pump — Lake, Rivers, Streams

Open Well

16. What kind of fuel do you use most of the time for cooking?

Electricity — Wood, Charcoal

Kerosene — Others (specify)

Liquified Petroleum Gas (LPG)

17. What kind of Toilet Facilities do you use?

Water-sealed, sewer/septic tank — Open Pit

Water-sealed, other depository — Others

Closed Pit (Antipolo, etc.) — None

18. Do you have these appliances in working condition?

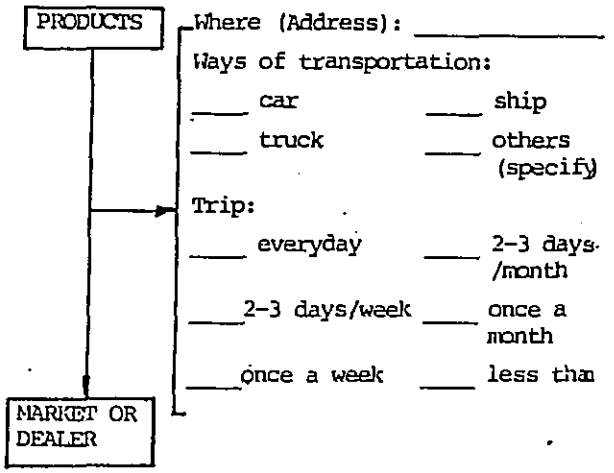
Radio

T.V.

Refrigerator/Freezer

19. If your occupation is Agriculture, .. Fishery, Forestry.

Ways of your transportation products system?



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