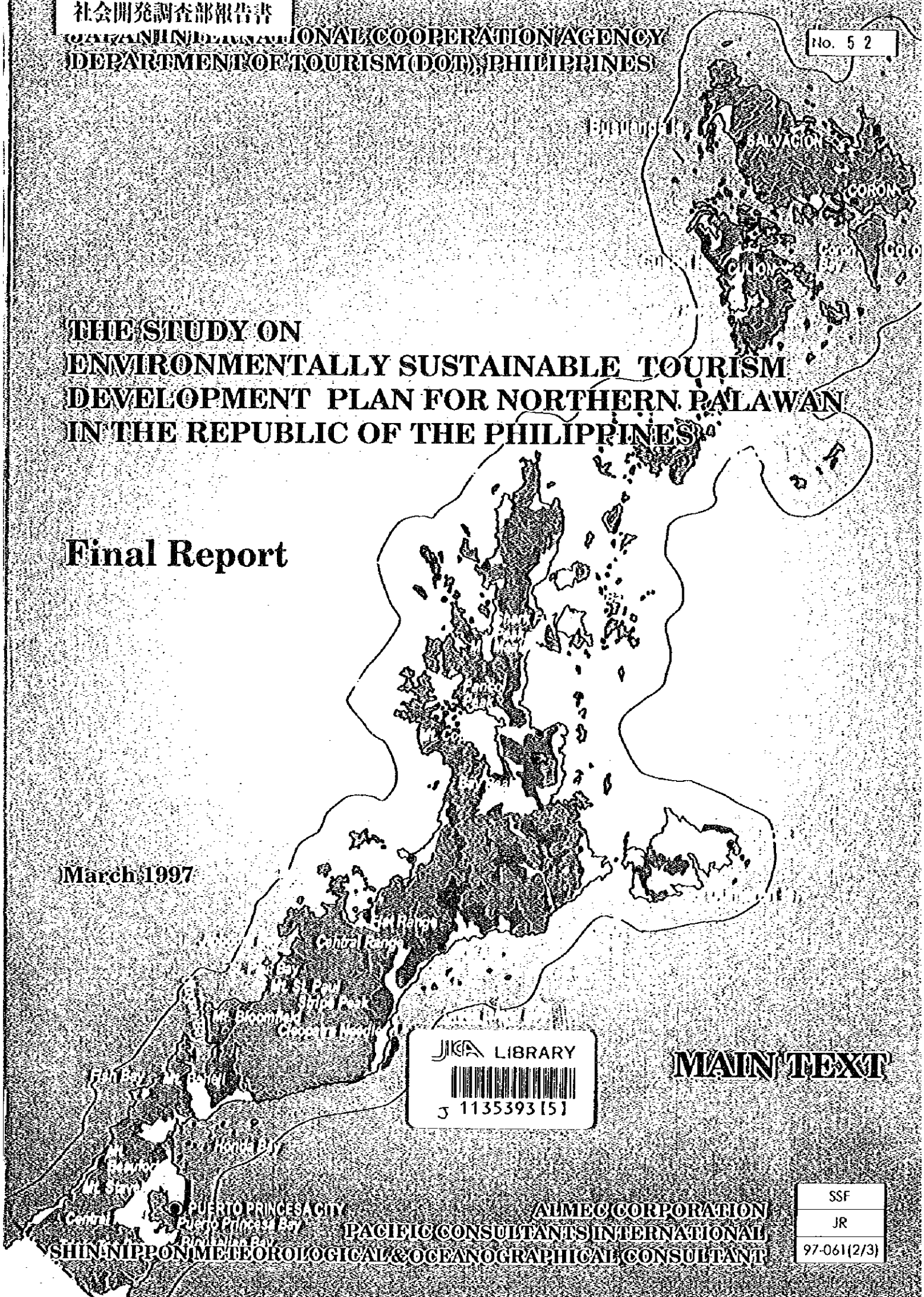



THE STUDY ON ENVIRONMENTALLY SUSTAINABLE TOURISM DEVELOPMENT PLAN FOR NORTHERN PALAWAN IN THE REPUBLIC OF THE PHILIPPINES

Final Report

March 1997



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**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
DEPARTMENT OF TOURISM (DOT), PHILIPPINES**

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ENVIRONMENTALLY SUSTAINABLE TOURISM
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PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a Study on Environmentally Sustainable Tourism Development Plan for Northern Palawan and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent a Study Team to the Philippines between December 1995 to December 1996. The Study Team was headed by Dr. Shizuo IWATA and composed of members of ALMEC Corporation, Pacific Consultants International, and Shin-Nippon Meteorological and Oceanographical Consultant Co., Ltd.

The team held discussions with the officials concerned of the Government of the Philippines, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

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

March 1997



Kimio FUJITA

President

Japan International Cooperation Agency

March 1997

Mr. Kimio FUJITA
President
Japan International Cooperation Agency

Dear Mr. Fujita:

Letter of Transmittal

We are pleased to submit herewith the report on the Study on Environmentally Sustainable Tourism Development Plan for Northern Palawan in the Republic of the Philippines. The report is composed of three volumes, namely, Summary, Main Text and Appendix.

This report embodies all major findings, study results and recommendations on the Master Plan for Northern Palawan and detailed studies for the two case study areas of Busuanga West and El Nido North. The Master Plan has proven that tourism development, if properly done, can greatly contribute to conservation and rehabilitation of natural and social environments and, at the same time, enhancement of socio-economy in Northern Palawan. Case studies have also confirmed the feasibility of undertaking tourism development in a sustainable manner in specific areas in Northern Palawan.

It is recommended that proposed projects would be implemented, wherein environmental management should be firmly integrated with the proposed tourism development and local communities be fully involved in this mechanism.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, Ministry of Transportation as well as the Department of Tourism and other authorities concerned of the Republic of the Philippines for the close cooperation and assistance extended to us during the study.

Very truly yours,



Shizuo IWATA

Team Leader

The Study on Environmentally Sustainable
Tourism Development Plan for Northern
Palawan in the Republic of the Philippines

**THE STUDY ON ENVIRONMENTALLY SUSTAINABLE
TOURISM DEVELOPMENT PLAN FOR NORTHERN PALAWAN
IN THE REPUBLIC OF THE PHILIPPINES**

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1. Introduction

1. Introduction

1.1 Study Background

Rich with precious marine, terrestrial and social environments, Northern Palawan is considered as one of the last frontiers of the Philippines. In the past, underdevelopment and under-population have been the major reasons for the generally intact environment of Palawan. However, conditions started to change in the late 1970s when in-migration pressure and logging activities became so significant that forest cover was reduced from 90% to 50% in subsequent decades.

The first attempt to integrate the environment with regional development was the Strategic Environmental Plan (SEP) which was completed in 1985 and enacted as Republic Act No. 7611 only in 1992. The governance, implementation and policy direction of SEP is carried out by the Palawan Council for Sustainable Development (PCSD), which was organized under the Office of the President. PCSD is composed of representatives from the relevant local governments, national agencies, Non-Governmental Organizations (NGOs) and politicians. Including the total ban on logging, development activities are presently under the control and monitoring of the SEP framework. It is only recently that an environmental management institution has been built and Government started to support the movement, although an environmental management system to cover conservation, enhancement, operation, education and financing is yet to be strengthened to become more effective.

Under these circumstances, tourism has become a focal point for development both by the public and private sectors. Inasmuch as a number of studies and plans have been made, the integration of tourism development framework/guidelines with environment and local socioeconomic development has not yet been clearly set forth. It is feared that tourism developments which might adversely affect the environment might take place on a large scale.

In view of the importance of formulating an effective physical and management framework for sustainable tourism development in Northern Palawan, the Japan International Cooperation Agency (JICA), upon the request of the Government of the Philippines, dispatched the first preparatory Study Mission (Contact Mission, 23 November to 2 December 1994) to discuss the scope of work for the study. A second mission was dispatched (28 February to 9 March 1995) to conduct further surveys and the Implementing Arrangement was agreed upon and signed at this time for the implementation of this study.

1.2 Objectives of the Study

The objective of the study is to provide a framework for tourism development which is both environmentally sustainable and economically feasible, assuring the betterment of local welfare. The study includes the following two specific tasks:

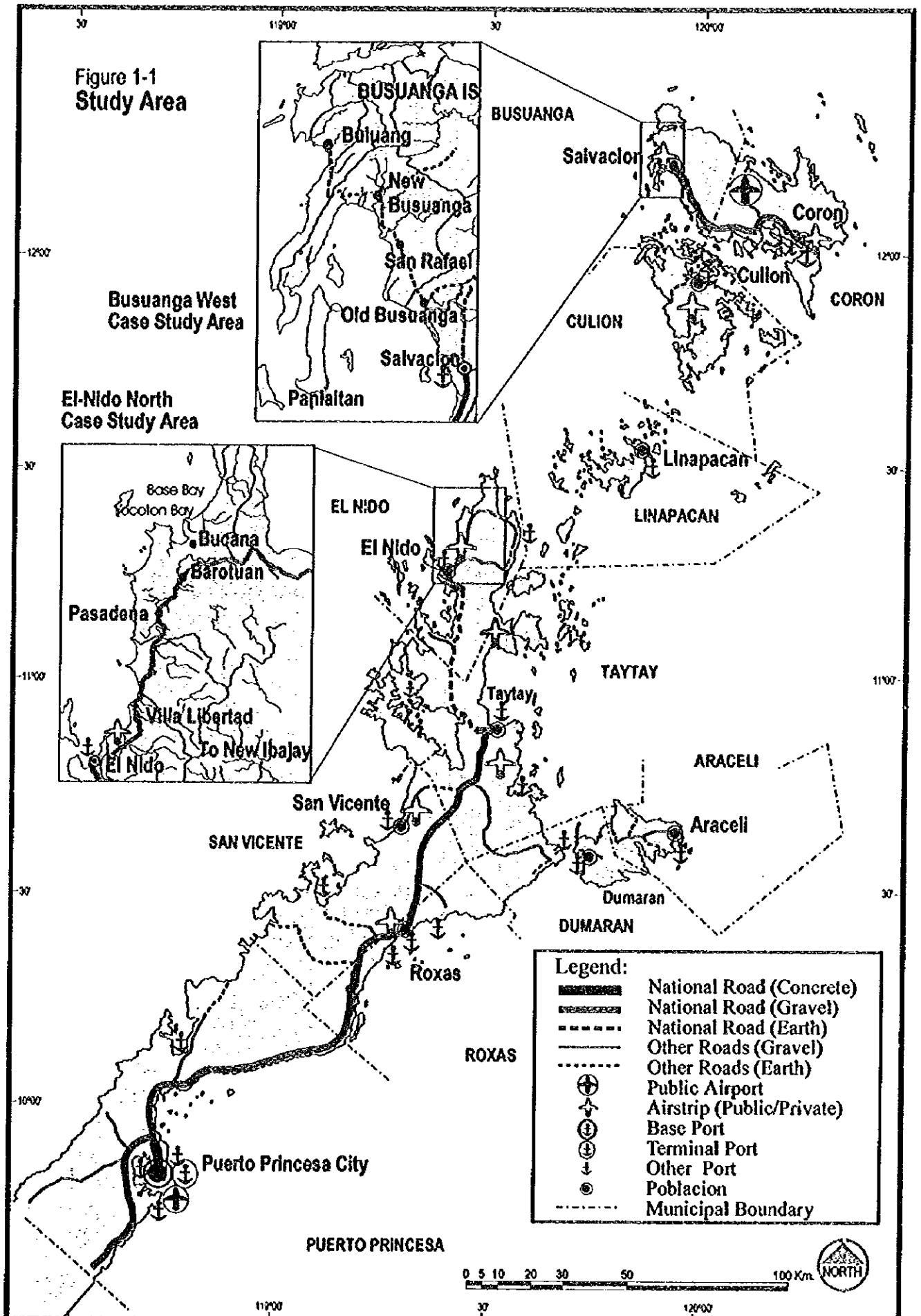
- 1) to formulate a master plan for Northern Palawan to direct on-going and future tourism and other related development activities with the end in view of ensuring the environmental quality of the area; and
- 2) to conduct a detailed study in the selected case study areas for environmentally-sustainable tourism development.

1.3 Study Area

- 1) **Study Area for the Master Plan:** The area selected for the project encompasses the northern part of the mainland of Palawan including the islands located north of the city of Puerto Princesa. This area includes the municipalities of San Vicente, Roxas, Taytay, and El Nido in the mainland and the island municipalities of Busuanga, Coron, Culion, Calait, Dumaran, and other islands north of Puerto Princesa (refer to Figure 1-1). Inasmuch as the city of Puerto Princesa (excluding the Napsan area) is included in the study area, the islands which are isolated from the mainland of Palawan have been excluded, for example, the Cuyo Islands, Tubbataha Reef and Cagayancillo. Likewise, the Napsan area has been excluded as stipulated in the Minutes of the Meeting.
- 2) **Areas for Case Study:** Prior to the selection of the case study areas, the selection criteria had been drawn up for discussion. The case study areas were then decided by the Steering Committee based on the selection criteria and the results of the Master Plan. Two areas were selected: the west coast of Busuanga and the north-west coast of El Nido (refer to Figure 1-1).

1.4 Study Implementation

The study was jointly undertaken by the Study Team organized by JICA and the Counterpart Team organized by DOT. A Steering Committee and a Technical Working Group were formed composed of representatives of relevant government agencies, such as the Palawan Provincial Government, the Palawan Council for Sustainable Development (PCSD), Palawan NGO Network, Inc., the Department of Environment and Natural Resources (DENR), Department of Public Works and Highways (DPWH), Department of Agriculture (DA), Department of Agrarian Reform (DAR), Office of Southern Cultural Communities (OSCC), Department of Transportation and Communications (DOTC), and the National Economic and Development Authority (NEDA). They provided the direction of the study and made the necessary decisions for the smooth and effective undertaking of the study. The JICA Advisory Committee gave advice and provided clarification on the technical aspects of the study (refer to Figure 1-2 and Table 1-1).



Source: Study Team

Figure 1-2 Overall Study Organization

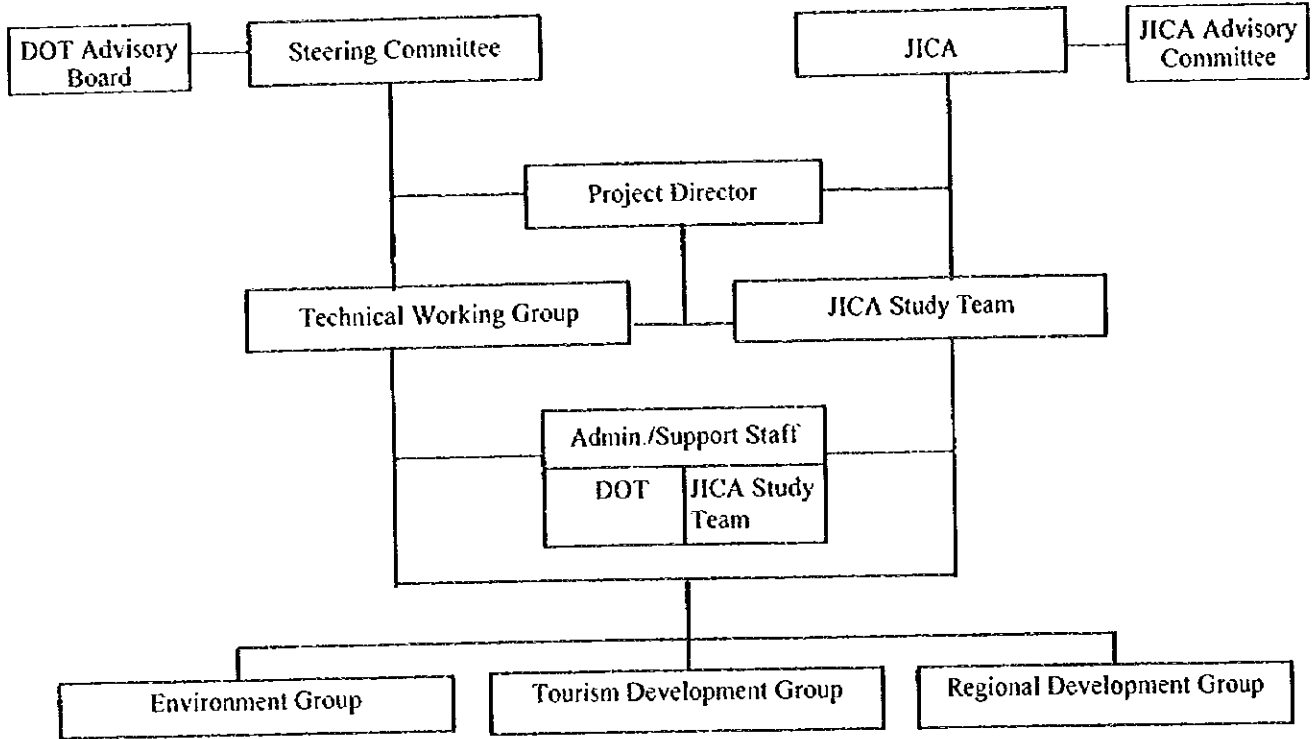


Table 1-1 Composition of the Study Team

Philippine Steering Committee		
Chairman	: Hon. Mina Gabor	Secretary, Department of Tourism
Vice-Chairman	: Hon. Salvador P. Socrates	Governor, Province of Palawan and Chairman, Palawan Council for Sustainable Dev't
Members	: Hon. William Russell L. Sobrepeña	Undersecretary for Planning, Product Dev't and Coordination, DOT
	Hon. Delfin Ganapin	Undersecretary for Environment and Special Projects, DENR
	Engr. George Esguerra	Director, Transport Planning Service, DOTC
	Mr. Juan D. Lualhati	Director III, DPWH
	Mr. Catalino S. Boquiren	Regional Director, Region IV, NEDA
	Mr. Eronio Muno	Acting Regional Director, Region IV, OSCC
	Ms. Carolina Geron	Director, DA
	Mr. Tomas Cabuenos	Assistant Secretary for Legal Affairs/ OIC Asst. Dir., BARBD-DAR
Mr. Redempto Anda	Executive Director, Palawan NGO Network, Inc.	

DOT Advisory Board

Hon. William Russell L. Sobrepeña	Undersecretary, PFDC
Hon. Evelyn B. Pantig	Undersecretary, TSRO
Hon. Makabangkit Lanto	Undersecretary, TP
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	Ms. Linda Templo	Officer-in-Charge, Planning Division, DPWH	
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	Ms. Ofie Bernardino	PANLIPI, Puerto Princesa	
	Mr. Homer Tobias	DAR, Palawan	
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C. Administrative

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	Ms. Agnes Marie Ocampo	Tourism Operation Officer II
	Mr. Jesse Glang	Tourism Operations Officer I

Cont. Table 1-1

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Ms. Anneli Vasco-Olin	Utility Worker I, Region IV
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Mr. Yoshiro Yamamoto	Member, Tourism Promotion Policy
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Ms. Rebecca Travis	
Ms. Jasmine Abrera	
Mr. Joseph Aranda	

Note:

OPRD	Office of Product Research and Development
OTC	Office of Tourism Coordination
OTDP	Office of Tourism Development and Planning
PCVC	Philippine Convention and Visitors Corporation
PPDC	Planning, Product Development Coordination
PTA	Philippine Tourism Authority
TP	Tourism Promotions
TSRO	Tourism Standards and Regional Offices

*2. Socioeconomic
Development, Environment
and Tourism in
Northern Palawan*

2. Socioeconomic Development, Environment and Tourism in Northern Palawan

2.1 Information Source and Supplemental Surveys

2.1.1 Available Information

Data and information were collected from different government agencies through the Department of Tourism (DOT). Spatial information was gathered mainly from the National Mapping Resource Information Authority (NAMRIA). Development data and information were collected mainly from the Department of Transportation and Communications (DOTC), National Economic and Development Authority (NEDA), and the Provincial Government of Palawan. Those on environment were from the Department of Environment and Natural Resources (DENR) and the Palawan Council for Sustainable Development (PCSD). They are more specifically outlined as follows:

1) Maps

Land Use Maps: Japan Forest Technical Association (JAFTA) worked closely with NAMRIA, and produced land use maps with a scale of 1:100,000 from the Landsat data (1992). NAMRIA provided color prints of the maps.

Topographic Maps: 46 sheets of 1:50,000 topographic maps were purchased at NAMRIA. The original maps were produced in the '40s and '50s. No updated topographic maps were available.

Cadastral Maps: Cadastral maps include information on land classification and land ownership. The maps were collected from DENR-Region IV to delineate alienable and disposable land, timberland, and others and to study land ownership. The available scale was 1:4,000 and 1:2,000. The scales of index maps vary, however.

Slope Maps: The slope maps were collected from the Bureau of Soils, Department of Agriculture.

2) Census

The 1980 and 1990 census data were provided by the National Statistics Office (NSO). Available 1995 census data is limited to population and housing statistics.

3) Environment

Various policy documents were provided on SEP, NIPAS (National Integrated Protected Areas System), EIA (Environmental Impact Assessment)

guidelines, and others. However, generally, scientific data on both marine and terrestrial environment was lacking. Meteorological data was available only at the Coron station. Hydrological study has not been conducted in the study area except on some rivers in Puerto Princesa City. EIA documents on resort development and offshore oil development, a botanical expedition, and an ecological study on limestone were available. However, the level of detailed studies varies, therefore, consolidating environmental information with available information in a comprehensive manner was not possible. The only updated and useful information which covered the entire Northern Palawan were the JAFTA land use maps.

Information on indigenous peoples and cultural communities were taken from the census data which was organized by dialect. Some unpublished documents on the distribution of indigenous populations were provided by the Office for Southern Cultural Communities (OSCC). The National Museum had some information on the distribution of indigenous peoples; however, the data was organized by municipality for the reason that indigenous peoples move periodically. No barangay level information was available.

4) Socio-economy

Most of the basic data was taken from the National Statistics office (NSO). However, industry data by sector and by municipality was not available. Infrastructure development information, PLADP, SPIADP (Second Palawan Integrated Area Development Project), and provincial project information were provided by the Provincial Development and Planning Office of Palawan. However, most information on the existing road surface condition, port and airport condition were available mainly in text format. Cooperatives provided power and water supply information. Socioeconomic profiles by municipality were available; however, spatial information on existing land use was not available in any municipality. Puerto Princesa City was the only local government unit with existing land use information on maps. On public transportation, *How to Go to Palawan* was the major source of information. Information on informally-operated public transportation was not available in written form. Local government budgets provided by the Provincial Budget Office became the basis of the financial analysis on the public sector.

5) Tourism

Tourism Master Plan (WTO, 1991) for the Philippines and the Study on Regional Travel in the Philippines (1993) provided the basic policy directions and quantitative bases of analyses. List of Accommodations/ Travel Agencies and Tour Guides (Philippine Tourism Office, 1996) provided information on existing accommodation facilities. Other useful documents are the Tourism Manpower Survey (DOT, 1990) and Tourism Situation Report, Palawan (DOT, 1991) were available.

2.1.2 Supplemental Surveys Conducted

In order to fill the critical data gap, a number of supplemental surveys had been conducted by subcontracting them with selected local consulting firms. These surveys are listed in Table 2-1 and outlined as follows

1) Marine Environmental Survey

Aerial surveys and field surveys were conducted to determine current marine conditions in Northern Palawan. For the Master Plan preparation phase, a four-day aerial survey was conducted to cover the entire Northern Palawan. All the shorelines were recorded in video cassettes to analyze coral conditions, seagrass and seabed, and shoreline types. A diving spot survey was conducted in four locations. An inventory of marine species was also drawn up. During the spot diving survey, underwater videos were taken. For the case study areas, the same procedure was taken, but more detailed study was conducted.

2) Terrestrial Environmental Survey

As in the marine environmental survey, two levels of terrestrial environmental surveys were conducted. One is for the Master Plan and the other is for case study areas. The method of collecting necessary information was similar to the marine environmental survey. The aerial survey was conducted and the field survey followed both for the Master Plan and for the case study areas.

3) Cultural Environment

In cooperation with PANLIPI Palawan (an NGO providing legal assistance to indigenous peoples), the cultural environment questionnaire survey was conducted on indigenous peoples and barangay officials in the main island to identify their perceptions on tourism development.

4) Socioeconomic Survey

In cooperation with DOT, the Philippine Statistical Association (PSA) and the Provincial Planning and Development Office (PPDO), a survey on the social and economic conditions as perceived by the population of Northern Palawan was conducted over a two-week period. Enumerators, selected by PPDO, visited 1,647 sample households in 87 barangays, and interviewed household members to establish demographic and socioeconomic trends and to determine the following: a) availability of community services, including economic and social infrastructure; b) level of involvement of both government and non-government agencies in the drive for increased social and economic vitality; c) the state of the natural environment and the on-going activities which endanger it; d) the state of the tourism industry and the respondents' perceptions on future tourism development; and e) the socioeconomic conditions of the indigenous communities within their areas.

The information gathered was then tabulated and expanded per the 1995 Population Census.

5) Tourism Market Survey

The tourism market survey was conducted at major accommodations in Northern Palawan and in Manila.

Table 2-1 Supplemental Surveys Conducted

Type of Survey	Survey Method/Coverage	Form of Processed Data
1. Marine Environment		
1) Aerial Survey	- Ocular survey by experts ^{1/} - Video shooting from the air and its analysis ^{1/}	- Coral distribution/evaluation map ^{1/} - Coastal land form map - Seaweed/seagrass community distribution maps ^{1/}
2) Field/Diving Survey	- Underwater video shooting - Belt-transect ^{2/}	- Dugong & turtle distribution ^{1/} - Visual evidence of siltation and dynamite fishing - Sea bottom geomorphology - List of Magaro-benthic animals - List of reef-associated fish (case study areas)
3) Ocean Current Survey	- Case study areas	- Digital data ^{2/}
4) Water Quality Survey	- Samples in selected sites	- Testing results
2. Terrestrial Environment		
1) Aerial Survey	- Ocular survey by experts - Video shooting	- Vegetation/land use map
2) Field Survey	- Ground verification	- List and distribution of valuable/endangered species
3. Socio-cultural Environment		
1) Field Interview Survey	- Barangay captains and IP leaders of selected areas in the main island	- Distribution map of indigenous peoples - Report with photographs
4. Socioeconomic Survey		
1) Household Interview Survey	- Initial testing survey in El Nido and Taytay - 1,647 HHs in the study area	- Report with tabulated data - Report with tabulated data
2) Focused Group Discussion	- 10 municipalities and one city	- Reports by municipality
5. Tourism Market Survey	- Northern Palawan and Manila	- Report with tabulated data

1/ including El Nido North and Busuanga West case study areas

2/ El Nido North and Busuanga West case study areas only

2.2 Existing Socioeconomic Conditions and Current Development Directions

2.2.1 Profile of Northern Palawan

Palawan lies in the west of the Philippines, and is an elongated island. Mainland Palawan has a length of approximately 430 km and a width of 10-40 km. It is bounded by the South China Sea on the west and the Sulu Sea on the east.

North-easterly winds blow from January to April, and the south-westerly winds, from June to August. Rainy season is from May to December. The heaviest rainfall is recorded usually in July. Although the average annual rainfall in Puerto Princesa is 1,530mm (1961 - 1990), a different rainfall pattern exists in the other areas. It rains more in the western coast of Palawan rather than in the eastern coast and the mean monthly temperature is approximately 27°C in Puerto Princesa (1961 - 1990).

The fauna and flora in Northern Palawan are very similar to that of the Bornean Archipelago. Its coastline is predominantly sand beaches; other types found are rocky shore, mangrove forest and coral reef.

Palawan is known as the "last frontier" of the Philippines. However, its virgin forests exist only in patches. Virgin forests and regenerating forests (secondary forests) account for only 24% (cover ratio of close canopy) of Northern Palawan. Furthermore, most areas of coral reef are damaged by sedimentation and illegal fishing, especially destructive fishing. In light of this, it can be said that the environment of Palawan has deteriorated.

2.2.2 Socioeconomic Conditions

The socio-economy of Northern Palawan is characterized by high population growth rates, a high rate of in-migration and unemployment (most of the self-employed are farmers and fishermen) as well as underemployment, low level of infrastructure development and low level of public service.

With the exception of the central business district in Puerto Princesa, the means of livelihood of majority of the people is small-crop farming and fishing. The socioeconomic conditions are generally worse in island municipalities such as the island portion of Dumarán, Linapacan and Busuanga. Even in the main island of Northern Palawan, the living conditions are harsh in areas where accessibility is poor.

In remote barangays, the residents depend on sustenance fishing with small-crop farming (usually kaingin) and live-stock raising (animals are usually raised in back yards) as source of livelihood. The conditions are worse in island barangays where there is no land access to poblacions. In such barangays, especially during the rainy season, life becomes very hard because fishing activities become limited. For high-school students, commuting becomes impossible, as treacherous monsoon winds threaten small-boat transportation. Availability of boarding

houses is also limited in localities with already crowded schools and poor facilities. During the dry season, water shortage impacts on daily lifestyles. Gradually, water supply development is improving water access; however, these efforts are far from adequate especially in Linapacan and Dumarán. People still need to fetch water from well sites which for some are quite distant; and for those unable to afford twenty pesos for a jeepney or tricycle ride, simply getting water for basic daily use becomes an ordeal.

People in remote areas cannot afford to become sick, since medical services are limited. Where there is neither sewer system nor proper waste disposal, water-related diseases spread easily. Malaria is still one of the leading causes of death. Transporting patients becomes an ordeal where roads are not developed and emergency vehicles are unavailable. Even when a patient is lucky to be transported to a hospital, the lack of medication on-hand is not far-fetched.

The following section provides quantitative evidence to support socioeconomic development needs in Northern Palawan.

1) Population

The population of the study area grew at an annual average growth rate of 4.1% from 1980 to 1990. The growth rate was higher than that of the entire Palawan province with 3.6% during the same period. San Vicente has the highest growth rate of 5.8%, followed by Taytay and El Nido with 5.3% and 4.9%, respectively, between 1980 to 1990. Busuanga registered the lowest growth rate of 0.6% during the same period. Population by municipality is shown in Table 2-2.

Palawan is the least dense province in the country with 36 persons per sq. km. and the study area has 35 persons per sq. km. The most dense municipalities are Araceli, Puerto Princesa, and El Nido with 49, 44 and 40 persons per sq. km., respectively.

Urbanization: Urbanization exists in 31% of the study area and 37% in the entire province. The average growth rate of the area reached 5.5% per annum during 1980-1990 and higher growth rates are observed in San Vicente with 22.3% and Taytay with 17.9% during the same period. The largest concentration of urban population is observed in Puerto Princesa City with 47,300 (or a 47% share of total urban population in the area), followed by Coron with 19,460 (or a 19% share of the total).

In-migration: In-migration between 1980 and 1988 reached approximately 29,700 persons in Palawan. The peak period registered 16%, in 1986. In-migrants from Negros accounted for 15%, followed by NCR with 12%, Masbate with 11%, Panay with 9%, Samar with 6% and Cebu and Tawi-Tawi with 4%. Puerto Princesa City absorbed the largest portion of in-migrants at 22%, followed by Taytay, Brooke's Point and Narra with 15%, 12% and 11%, respectively. Most in-migrants in the area relocated in search of higher incomes, and are now engaged in agricultural and fishery activities. Both

their relocation and absorption in these industries impact on the social and natural environments in many ways: squatter areas in towns are created and kaingin activities in the forest areas increase.

Table 2-2 Population Trend in Northern Palawan

Municipality	Land Area: sq.km.	Population		Population Growth: %/yr.		Urban Population	
		1990	1995	1980-1990	1990-1995	1990: % to Total	1980-90 Growth :%/yr.
Busuanga	393	11,007	15,843	0.6	7.6	10.6	-
Coron	1,214	33,228	27,040	2.8	-	58.6	5.1
Culion	-	-	14,100	-	-	-	-
Linapacan	155	5,835	7,269	2.8	4.5	28.2	3.8
El Nido	465	18,832	21,948	4.7	3.1	13.2	5.1
Taytay	1,391	38,435	47,095	5.3	4.1	23.2	17.9
Araceli	179	8,708	10,556	3.7	3.9	26.8	2.1
Dumaran	435	12,624	13,980	4.2	2.1	7.9	-
Roxas	1,220	36,604	44,370	3.9	3.9	22.0	3.6
San Vicente	843	17,795	19,449	5.8	1.8	48.3	22.3
Puerto Princesa	2,107	92,147	129,557	4.3	7.1	51.3	3.4
Study Area Total	8,401	275,215	351,207	4.1	5.0	66.7	5.5

Source: Provincial Socioeconomic Profile
National Statistics Office

2) Employment

The provincial labor force of 298,400 persons accounts for 56% of its total population, 61% of which are engaged in agriculture, fishery and forestry while only 3% are engaged in manufacturing.

Unemployment rate in the area is 10.6% which is slightly lower than the provincial average of 10.2% in 1990. The municipality with the highest unemployment rate is Busuanga with 24.3%, followed by El Nido with 17.6% and San Vicente with 17.4%. Linapacan, on the other hand, shows the lowest rate of only 1.8%, followed by Puerto Princesa with 6.7%.

3) Household Income

Average annual income in Palawan was ₱33,700 in 1992. Annual family income in Northern Palawan was slightly lower at ₱32,200, excluding Culion and Linapacan. The annual family income of the province and the study area are lower than the regional average of ₱38,000 and the national average of ₱40,400 in 1992.

4) Socioeconomic Issues

The existing socioeconomic problems and issues are briefly as follows:

(1) Agriculture

Market: There is no incentive for farmers and fishermen to produce more in order to earn cash income because of the shortage of farm-to-market roads and access roads to the commercial centers (poblacion etc.) and the lack of consumption markets in Palawan. Under these conditions, agriculture and fishery cooperative organizations are discouraged in increasing production and marketing activities.

Low Productivity: Suitable areas for farming are limited due to its mountainous to hilly plains. Low productivity is compounded by inadequate irrigation and drainage facilities, low soil fertility, non-use of modern agricultural practices and lack of extension workers as well as post-harvest facilities and other market constraints.

The fishery sector is also in the same situation. It suffers from shortage of fish landings, lack of ice plant and cold storage facilities, deteriorating fishing grounds caused by illegal commercial fishing and dynamite and cyanide fishing, and lack of cooperatives.

(2) Manufacturing

Lack of Requisite Conditions for Investment: Requisite conditions for attracting industry investments are quantitative and qualitative human resource, basic infrastructure of road and sea transport, power supply, telecommunication facilities, educational facilities and other amenities. Palawan lacks basic infrastructures and other utilities and has a shortage of human resources for medium to large scale manufacturing.

Poor Marketing System: Problems of the local market include small population size and inefficient delivery and distribution of local manufacturing materials and products due to poor transportation and communication. Palawan is also located far from large consumption centers like Manila and Cebu.

High Initial Investment Cost and Production Cost: High initial investment costs are expected because almost all construction materials are transported from Manila, such as sewerage and exhaust equipment required for pollution control. High transport costs of raw materials and finished products and high power rates in Palawan are expected to deter the healthy performance of businesses.

(3) Health

Inadequate Health Services: Social services, in terms of quality and quantity, are insufficient in Northern Palawan. There is inadequate and inequitable distribution of health personnel. For instance, Araceli and Busuanga have no doctors.

Inadequate Social Infrastructure Facilities: Social infrastructures such as Rural Health Units (RHU), Barangay Health Stations (BHS) and sanitary toilets are still deficient in the study area. Many barangays have no BHS. There are no hospitals in the municipalities of Araceli, Busuanga, Dumarán, El Nido, Linapacan and San Vicente.

High Mortality and Morbidity Rate: The four leading causes of mortality in Palawan are influenza, diarrhea, malaria and tuberculosis. In 1989 and 1993, the four leading causes of mortality were cardiovascular diseases, pneumonia, malaria and pulmonary tuberculosis. Palawan has the highest rate of malaria-caused morbidity in the nation.

(4) Education

Ineffective Curriculum: Curriculum lacks emphasis on relevant vocational and technical courses, adequate coordination with companies or firms to provide on-the-job training, and unified planning and action to ensure quality.

Poor Management of Educational Resource: Oversized classes, lack of teachers and inadequate classrooms cause the decline in the quality of education. Incompetence among teachers, lack of textbooks and references, unequipped laboratories and lack of workshops/home economics facilities compound difficulties in ensuring quality.

Shortage of School Buildings: Some barangays still do not have elementary schools and some school buildings are dilapidated to the point of being unusable.

(5) Land Management

Land management systems have a solid legal status. However, because of informal or illegal settlements and administrative deficiencies, the system of land management is in a state of chaos. Specific reasons are as follows:

- cadastral surveys, base maps, are incomplete;
- control points may be erroneous;
- land classification is incomplete (no titles are granted if land is unclassified);
- land classification is not updated to reflect current land use;

- multiple-claims to a single lot have been reported;
- a tax declaration proof is exchanged in the real estate market
- informal settlement is not controlled, and
- land is assessed by land use, but zoning ordinances based on land use plans are not available in most areas.

These problems will become obstacles for development, and may discourage potential investors.

(6) Public Finance

Revenue-raising capabilities of municipalities are weak. Most municipalities rely on their resources from the Internal Revenue Allotment (IRA). As municipalities become increasingly responsible for managing their localities in accordance with the Local Government Code of 1991, their independently-generated revenues will become necessary.

2.2.3 Transportation and Infrastructure

1) Transportation

The transportation system in Northern Palawan is composed of air, water, and road transport (refer to Figure 2-1).

(1) Airport and Air Transportation

Airport and Airstrips: There are two public airports in Northern Palawan: Puerto Princesa Airport and Busuanga Airport. Others are classified as airstrips. The Busuanga Airport is being improved. The surface of the runway is being paved with concrete, and the terminal expanded. Sandoval Airstrip was recently expanded from 750x20m to 1200x30m. The runway is completed, and new ditches are being dug for better drainage. (The environmental condition is discussed in the environmental section of this report.). An airstrip was proposed for Linapacan Island but that plan has been put on hold for the meantime (refer to Table 2-3).

Table 2-3 Existing Airports and Airstrips

Location	Classi- fication	Runway			Terminal (m ²)	Guide System	Lighting	Ownership
		Length	Width	Surface				
Busuanga ^{3/}		800	30	n.a.	n.a.	n.a.	none	Private (SUMAPI)
Busuanga Airport ^{1/}	Feeder ^{1/}	1,200	30	Macadam	80	Wind cone	none	Government
Coron ^{1/}		1,000	25	Compacted sandy loam	none	Wind cone	none	Private (Vicente Be Lim)
Culion ^{3,5/}		900	30	Gravel			none	(Government)
El Nido ^{1/}		1,000	30	Macadam	Passenger terminal	Wind cone	none	Private
Sandoval, Taytay ^{1/}		1,200	30	Macadam	none	Wind cone	none	Government ^{1/}

Location	Classification	Runway			Terminal (m ²)	Guide System	Lighting	Ownership
		Length	Width	Surface				
Roxas ^{3/5/}		900	30	Gravel ^{4/}	n a.	n a.	none	Private (San Miguel)
Roxas ^{1/2/}		1,840	30	Concrete	225	Wind cone	PAPI	Government
San Vicente ^{4/}		960 ^{4/}	40 ^{4/}	Gravel ^{4/}	n a.	n a.	none	Private
Puerto Princesa ^{1/}	Alt International	2,960	45	Concrete	864	Central Tower VOR DME NDB ESS	PAPI SALS RWY edge light	Government

Sources: various agencies

1/ Air Transportation Office,

2/ Municipal Planning and Development Coordinator

3/ *Municipality Study on Development Opportunities, 1996*, Cullion Foundation

4/ *Socioeconomic Profile, 1993*, Municipality of San Vicente

5/ Provincial Planning and Development Office

n.a = Information not available

Air Services: The Manila-Puerto Princesa route is served by Philippine Airlines. Air Philippines recently added a new daily route between Manila and Puerto Princesa. Both carriers use B737s which have 141 passenger capacities. Other air access is available on demand basis by individual resorts. Air transportation service is summarized in the following table.

Table 2-4 Current Air Transportation Services

To/From	Manila		
Busuanga, Coron ^{1/}	Carrier	Air Ads	Pacific Air
	Aircraft	Islander	Islander
	Hour	1.5 hours	1.5 hours
	Schedule	Daily	Daily
	Fare ^{3/}	₱3,100	₱3,100
El Nido (Ten Knots)	Carrier	A. Soriano	
	Aircraft	Dornier (19-seater)	
	Hour	2 hours	
	Schedule	Unscheduled ^{2/}	
	Fare ^{3/}	\$230=₱6,100	
Taytay (Club Noah)	Carrier	Chartered/Star Asia	
	Aircraft	Unspecified	
	Hour	2 hours	
	Schedule	Unscheduled ^{2/}	
	Fare ^{3/}	\$200=₱5,300	
Roxas (Coco Loco)	Carrier	Air Ads	
	Aircraft	8 Seater Islander	
	Hour	5 hours	
	Schedule	Unscheduled ^{2/}	
	Fare ^{3/}	approx. ₱77,950	
Puerto Princesa	Carrier	PAL	Air Philippines
	Aircraft	B737 (141 seats)	B737 (141 seats)
	Hour	1 hour	1 hour
	Schedule	Daily	Daily
	Fare ^{3/}	₱3,267.50	₱2,457.50

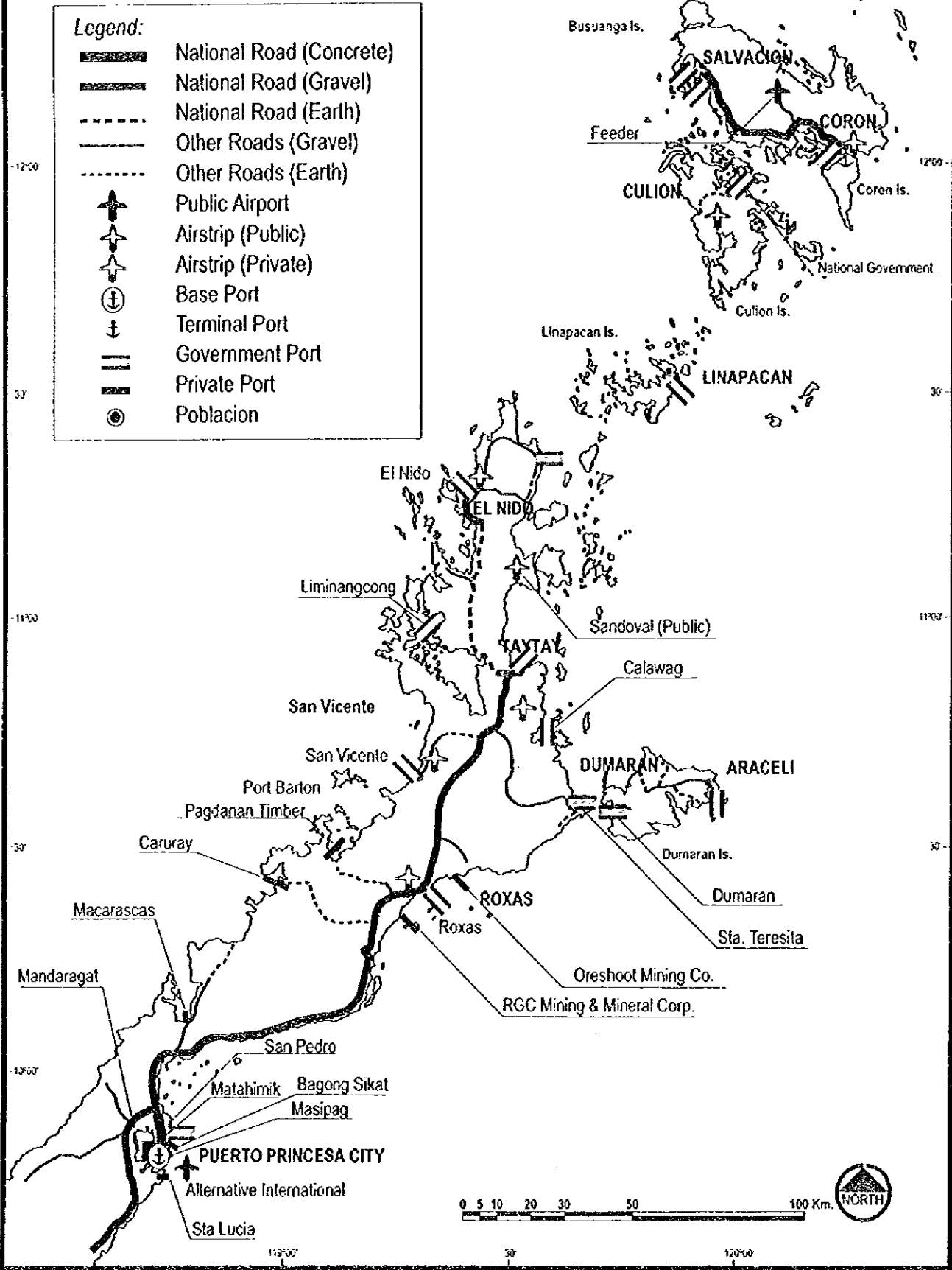
Source: How to Go to Palawan, Ten Knots, Club Noah Isabelle, Coco Loco Island Resort

1/ Busuanga Airport, Coron Municipality

2/ Schedule depends on booking demand to resorts.

3/ There may be seasonal changes of airfares.

Figure 2-1
Existing Transportation Infrastructure



Source: Study Team

Philippine Airlines and Air Philippines offer reasonable fares. However, other services are relatively high and only serve resort guests. For residents in Northern Palawan, other than those areas close to the Puerto Princesa Airport, accessibility to Manila is very limited and especially problematic in areas where medical services are not available.

Intra-regional public air transportation is not available, unless chartered. The absence of regular service makes it hard to travel from Puerto Princesa to other areas in Northern Palawan except Busuanga where two flights per week are available (refer to Table 2-4).

(2) Ports

Port conditions are substandard with the exception of the base port in Puerto Princesa. In Taytay and El Nido, the tips of piers are damaged and make it difficult for passengers to transfer from boats to land. The Coron Terminal Port is severely damaged and is in need of repair. The Roxas Municipal port is under construction and thus, not functional. Lack of fuel transport facilities in most ports makes fuel transport difficult (refer to Table 2-5).

The role of inter-regional public sea transportation is not as significant as that of air transportation, as far as passenger transportation is concerned. The travel time is significantly longer which may not be tolerable to most international travelers. The only advantage to sea transportation is its low cost which is the reason why this mode of transportation is mainly used by local people (refer to Table 2-6).

Table 2-5 Current Sea Transportation Services

Route	Manila - Puerto Princesa			Manila - Coron		Iloilo-Cuyo-Puerto Princesa
Carrier	William Lines	Sulpicio Shipping Company	Negros Navigation ¹⁷	M/V Asuncion	Cathalyn A	M/V Milagrosa
Fare	₱1,350 - ₱430	₱1,050 - ₱430		₱300 One way	₱300 One way	Iloilo-P.P.C.: ₱330 Cuyo-P.P.C.: ₱210
Schedule	2 trips a week	2 trips a week	1 trip a week	1 trip a week	1 trip a week	6 trips / month
Travel time	24 hrs.					P.P.C.-Cuyo: 2 hrs. Cuyo-Iloilo: 14 hrs. P.P.C.-Iloilo: 26 hrs.

Source: How to Go to Palawan,

¹⁷ Palawan Sun, June 25-July 1, 1996, p.2

Table 2-6 Existing Ports

Location	Name	Management	Major Cargo	Facilities		Remarks
				Major Facility (Causeway and pier: m)	Supplemental Facility	
Busuanga	Yulo King Ranch	Bureau of Animal Industry, Dept of Agriculture	Breeding cattle and sheep	n a.	n a.	
Salvacion, Busuanga	Busuanga Port	Municipality	Fish/general cargo	n a.	n a.	Very shallow
Concepcion, Busuanga	Busuanga	Municipality	Fish/general cargo	n a.	n a.	
Coron	Coron Port	PPA, Terminal	Fish/general cargo	44x8	Warehouse 64 sq m	
Coron	Coron Port	Municipality	General Cargo	n a.	n a.	
Culion	Culion Port	National Government	Fish/general cargo	n a.	n a.	
San Miguel, Linapacan	Linapacan	Municipality	General Cargo	n a.	n a.	
Calawag, Taytay	Taytay Port	Municipality	Fish/general cargo	n a.	n a.	Tip of the pier damaged, shallow; no fuel transport facilities
Liminangcong, Taytay	Liminang-cong Port	Municipality	Fish Port	64x4 (9x17.8m RC pier) 1/	n a.	
Casian, Taytay	Casian Port	Municipality	Fish Port		n a.	
El Nido	Port of El Nido	Municipality	Fish/general cargo	130x6 1 m deep	n a.	Causeway is not paved. The tip of the causeway is damaged. Expansion on-going.
Santa Teresita, Dumaran	Santa Teresita Port	Private	General Cargo	n a.	n a.	
Dumaran	Dumaran Port	Municipality	General Cargo	n a.	n a.	Very shallow
Araceli	Araceli Port	Municipality	General Cargo	240 m long	Lighthouse	Fish port deterioration
Roxas	Municipal Port of Roxas	Municipality	General Cargo	n a.	n a.	One pier under construction
Roxas 2/	Nin Bay Mining Co	Private	Silica Sand	10x10 RC wharf	n a.	
Roxas	Oreshoot Mining Co.	Private	Silica Sand	16 22 x 4 1 wooden wharf	n a.	
Roxas	RGC Mining & Mineral Corporation	Private	Silica Sand	221.31 x 2.44 timber pier	Belt conveyor	
Roxas	Republic Glass Corp.	Private	Silica Sand	n a.	n a.	
Roxas	Vulcan Industrial & Mining Corp.	Private	Silica Sand	200 x 3m wooden pier	n a.	No longer operational
San Vicente	Nationwide Princess Timber Co.	Private	Dried Veneer	n a.	n a.	
Port Barton, San Vicente	Pagdanan Timber Production	Private	Logs, Lumber	n a.	n.a.	Pagdanan Timber no longer operating 4/
San Vicente	San Vicente port	Municipality	Fish Port	n a.	n a.	
Puerto Princesa	Port of Puerto Princesa	PPA, Base	Agricultural products, general cargo	287.5 x 15 5.4-11.76 m deep 2/	Open Storage, Parking, Passenger Terminal	
Puerto Princesa	Liberty Fish Port	Private	Fish Port	n a.	n a.	
Puerto Princesa	Macarascas Port	Private	General cargo	n a.	n a.	
Puerto Princesa	Petron Berthing	Private	Fuel	n a.	n a.	
Puerto Princesa	Slaughter-house F. Port	n a.	Fish Port	n a.	n a.	
Puerto Princesa	Palawan Lumber Mfg. Corp.	Private	Lumber	n a.	n a.	No longer operational
Sta. Lucia, Puerto Princesa	Palawan Apitong Corp	Private	n a.	n a.	n a.	No longer operational
Puerto Princesa	Caltex	Private	Fuel	n a.	Bulk receiving pipeline	No longer operational
Puerto Princesa	San Miguel Corp.	Private	Beer	3 x 51 22 (10 x 28)	30x21m concrete warehouse	

Sources: Nationwide Role-on / Roll-off Transport System Development Study in the Phils., 1992
 Philippine Ports Authority Port Profile, PMO Puerto Princesa
 National Statistical Coordination Board
 PPDO & MPDC Staff

Note. n a = Information not available

Intra-regional water transportation is provided by the private sector and is still limited. They are unscheduled. The fares are normally on negotiation basis and services being affected by weather and number of passengers. In less populated remote barangays, such as Linapacan, small fishing boats act as the only public transportation (refer to Table 2-7).

Table 2-7 Current Intra-Regional Water Transportation Services

To From		Busuanga	Coron	Culion	Linapacan	El Nido	Taytay	Dumaran	Araceli	Roxas	San Vicente	Puerto Princesa
Busuanga	Hours	-										
	Fare	-										
	Frequency	-										
Coron	Hours	-	-									
	Fare	-	-									
	Frequency	-	-									
Culion	Hours	-	1 hr.	-								
	Fare	-	P30	-								
	Frequency	-	Tues.	-								
	Carrier	-	Viva Ma Socorro	-								
Linapacan	Hours	-	4 hrs.	-	-							
	Fare	-	P175	-	-							
	Frequency	-	2/week	-	-							
El Nido	Hours	-	-	-	-	-						
	Fare	-	P650	-	-	-						
	Frequency	-	Wed/Sat	-	-	-						
	Carrier	-	SEA FUN	-	-	-						
Taytay	Hours	-	-	-	6 hrs.	3 hrs.	-					
	Fare	-	P400	-	P200	P150	-					
	Frequency	-	Tues/Sat	-	Sat	n d s	-					
	Carrier	-	Dionemer	-	-	-	-					
Dumaran	Hours	-	-	-	-	-	-	-				
	Fare	-	-	-	-	-	-	-				
	Frequency	-	-	-	-	-	-	-				
Araceli	Hours	-	-	-	-	-	-	3 hrs	-			
	Fare	-	-	-	-	-	-	P300	-			
	Frequency	-	-	-	-	-	-	hire	-			
Roxas	Hours	-	-	-	-	-	-	-	4 hrs.	-		
	Fare	-	-	-	-	-	-	P65	P2,000	-		
	Frequency	-	-	-	-	-	-	Fri.	hire	-		
San Vicente	Hours	-	-	-	-	-	-	-	-	-	-	-
	Fare	-	-	-	-	-	-	-	-	-	-	-
	Frequency	-	-	-	-	-	-	-	-	-	-	-
P.P.C.	Hours	-	-	-	-	-	-	n a	12 hrs	-	-	-
	Fare	-	P600	-	-	-	-	P150	P125	-	-	-
	Frequency	-	n d s.	-	-	-	-	n d s.	3/week	-	-	-
	Carrier	-	M/V Ruby Ruth	-	-	-	-	M/V Ruby Ruth	-	-	-	-

Source: How to Go to Palawan

Note: All the fares are one-way.

n d s: no definite schedule

(3) Roads

The existing road network is poorly configured. The major arterial (primary) road passing through the poblacion of Puerto Princesa to Taytay and from Coron to Busuanga support major inter-municipal trips. Secondary roads connect poblacions from the major arterial roads. Other tertiary roads connect from poblacions to barangays.

Under the direction of current provincial road development plans, all poblacions within the study area will be linked by roads except in island

municipalities. Within the municipalities and city, the development direction is to connect all the barangays to the poblacions. Development is not being realized as fast as public officials would hope, due to limited funding.

The service level of public land transportation heavily depends on road conditions. Where there are all-weather roads, service is reliable. Of the three types of road-plying public transportation, buses are the most reliable because they are available on trunk roads, and are equipped with water tanks for keeping radiators cool. Although tire puncture is common and some buses are not suitable for human transportation, they remain the main mode of transportation for residents along the trunk roads between Puerto Princesa and El Nido.

Jeepneys and tricycles make up the other modes of road transportation. Jeepneys are commonly over-crowded with both passengers (many atop) and various forms of cargo. Indeed, it is not uncommon to see them packed with farm commodities, pigs and chickens, construction materials, fuel and sometimes even motorcycles. Tricycles for hire are available in municipal centers except in Busuanga and Linapacan. The fare is about ₱2 - ₱5, depending on the distance. Table 2-8 summarizes the intra-regional public land transportation:

Table 2-8 Current Intra-Regional Land Public Transportation

To From		Busuanga	Coron	Culion	Linapacan	El Nido	Taytay	Dumaran	Araceli	Roxas	San Vicente	Puerto Princesa
Busuanga	Hours	-										
	Fare	-										
	Frequency	-										
Coron	Hours	2 hrs	-									
	Fare	₱20 w.	-									
	Frequency	1 / day	(J)(T)									
Culion	Hours	-	-	-								
	Fare	-	-	-								
	Frequency	-	-	(T)(J)								
Linapacan	Hours	-	-	-	-							
	Fare	-	-	-	-							
	Frequency	-	-	-	-							
El Nido	Hours	-	-	-	-	-						
	Fare	-	-	-	-	-						
	Frequency	-	-	-	-	(T)						
Taytay	Hours	-	-	-	-	3 hrs	-					
	Fare	-	-	-	-	₱100	-					
	Frequency	-	-	-	-	4 (J)3/ 2 (B)3/	(J)(T)					
Dumaran	Hours	-	-	-	-	-	1.5 hrs	-				
	Fare	-	-	-	-	-	₱25	-				
	Frequency	-	-	-	-	-	2 1/2	(J)2/				
Araceli	Hours	-	-	-	-	-	-	-	-			
	Fare	-	-	-	-	-	-	-	-			
	Frequency	-	-	-	-	-	-	-	(J)(T)			
Roxas	Hours	-	-	-	-	-	3 hrs	-				
	Fare	-	-	-	-	-	₱50 (J), ₱40 (B)	-				
	Frequency	-	-	-	-	-	2-3 (J&B)	-		(B)(J)(T)		
San Vicente	Hours	-	-	-	-	-	-	-	-	1 hr.	-	5-6 hrs
	Fare	-	-	-	-	-	-	-	-	₱30	(T)	₱90 (J)
	Frequency	-	-	-	-	-	-	-	-	2-3 (J&B)	-	n d s
P P C	Hours	-	-	-	-	10-12hrs	7-8 hrs	-	-	4 hrs	5-6 hrs	-
	Fare	-	-	-	-	₱200 (J), ₱150 (B)	₱100	-	-	₱50 (J), ₱55 (B)	₱90 (J)	(B)(J)(T)
	Frequency	-	-	-	-	-	6 (J)3/ 3 (B)3/	-	-	2-3 (J&B)	n d s	-

Source: *How to Go to Palawan*

1/ From Santa Teresita

2/ Mainland Dumaran only

3/ Municipal Socioeconomic Profile and Physical Profile, Municipality of Taytay (1994), p 44

Note: Origin-Destination is to/from Poblacions. Frequency is the number of trips per day. (B) Bus, (J) Jeepney, (T) Tricycle

2) Power

Power Supply System: National Power Corporation (NAPOCOR), a government-owned entity, was vested with the overall development of power generating facilities in the Philippines by virtue of Presidential Decree No. 40 dated November 7, 1982. It is, however, tasked only with establishing system grids without regard to the direct distribution of electricity to consumers.

The setting up of a transmission and distribution network from NAPOCOR's main sub-station to the consumer is the responsibility of the National Electrification Administration (NEA). Thus, NEA technically administers the franchise of electric cooperatives. It is also mandated to develop power generating stations with sizes of less than 5,000 kw which include the mini-hydro power projects.

In areas where the government cannot initially supply a locale's power requirements, it is usually the private sector which takes the lead in the effort to develop a power system, which is the case in Palawan.

Palawan province is served by two electric cooperatives: Palawan Electric Cooperative (PALECO) which operates in the mainland and other island grids and the Busuanga Island Electric Cooperative (BISELCO) which operates solely in the island of Busuanga. PALECO was established and registered with NEA sometime in January 1974 and initially operated in Puerto Princesa with the 900 KW diesel generating units it acquired.

The system has since expanded and is now available to cover about 32% of the total households in the province. Aside from PALECO, several facilities were operated by both the private companies, for their own requirements, and the local government, for household needs of their constituents. The latter have capacities of less than 150 kw and operate only for very short periods. They also service only a limited number of households due to problems with financing the distribution facilities.

The existing total capacity in mainland Palawan, excluding those owned by the municipalities and private companies, is 29,410 kw. This is an increase of 173.23% from the 1988 capacity of 10,864 kw. Most existing power generating plants are diesel-fired.

The service charge for PALECO is ₱3.65/kwh and BISELCO charges ₱5.4/kwh. The hours of service varies by municipality as shown in Table 2-9.

In 1987, NAPOCOR took over the operation of the PALECO and BISELCO generating units. Consequently, the cost of electricity to the consumer was reduced from an average of ₱3.90/kwh to ₱2.50/kwh. Effectively, NAPOCOR's other profitable grids subsidized the cost of operating the facilities to be able to supply electricity demand at a rate similar to those of other island grids served. Costs then rose to ₱3.85/kwh due to high fuel and operation costs nationwide. NAPOCOR's takeover of these facilities makes it responsible for the development of all generating and transmitting facilities for the island.

Table 2-9 Present Situation of Power Supply

Municipality	Hours	Number of Barangays Served	Cooperative
Busuanga	6 p.m.-midnight	4	BISELCO
Coron	6 p.m.-midnight	2	BISELCO
Culion	6 p.m.-midnight	2	BISELCO
Linapacan	6 p.m.-midnight	1	BISELCO
El Nido	6 p.m.-midnight	4	PALECO
Taytay	6 p.m.-midnight	1	PALECO
Dumaran	(not served)		PALECO
Araceli	6 p.m.-midnight	2	PALECO
Roxas	24 hours	5	PALECO
San Vicente	6 p.m.-midnight	2	PALECO
Puerto Princesa	24 hours	39	PALECO

Source: PALECO, BISELCO

In the municipality of El Nido, there are few existing electric systems. One is being run by the municipal government and is located in the poblacion, while the rest are scattered in different barangays and are privately-owned. While it is true that there is an existing electrification project in the poblacion, 6.4% of the households do not avail of its services due to financial reasons and distance from the source. Such is the case of barangay Corong-corong which is one kilometer away from the town proper. Electric services start at 6:00 p.m. and end at 10:00 p.m. This system was implemented to extend the lifespan of the engine and the generator.

The rate of payment for electric service is ₱30.00 for a 20 watt fluorescent lamp and ₱35.00 for 40 watts. A common problem experienced by residents are brownouts caused by engine breakdowns and/or additional installation being done.

Load centers are those areas which exhibit economic activity and whose potential need for power is considered significant in comparison with those of other areas in the province. The first group of load centers, as shown in Table 2-10, consists of the city of Puerto Princesa and its neighboring municipalities.

Although San Vicente is geographically part of the municipality of Taytay, it is one of the areas, along with Roxas, to be considered under Group III load centers. This is probably because of their proximity to each other. Its population represents a 10.7% share of the province.

The fourth group is represented by the municipalities of Taytay and El Nido. The population in these areas is only about 5.6% of the total.

Cuyo and Busuanga are two island municipalities which are grouped together under Group V. Originally, both have existing power systems. The population of Group V areas is only about 12.5% of the provincial total.

Group VI of the major load centers is composed of the different smaller island municipalities such as Linapacan, Dumaran and Culion. This load center represents 17% of the total population.

In 1993, around 10% of total households in San Vicente had access to electricity from privately-owned generator units. Majority of the households (85%) use kerosene-wick lamps for lighting.

Supply and Demand: The 1995 demand for each municipality within the load center, shown in Table 2-10, indicates that the present demand for the whole province is only 9.19 MW. Most of this load could be attributed to the demand caused by the existing power system, with Puerto Princesa, accounting for the largest demand for power supply. Supply and demand for the generation plant is also shown in the table. Most of the load centers have individual distribution which is limited only to their areas.

Virtually, all of the existing generating facilities are diesel units. Looking at this present supply and demand for power in the whole province, there is a total surplus of 20.2 MW.

Table 2-10 Existing Electricity Supply and Demand in Northern Palawan, 1995

Group No. Load Center	1994 Peak Demand (kw)	Average Load (kw)	Existing Power Supply (no. kw)
I, Puerto Princesa	6,500	4,590	1x3,500
			1x5,500
			1x14,400
III, Roxas-San Vicente	288	122	1x150
			3x250
			1x448
IV, Taytay-El Nido	192	143.31	3x500
			2x250
			3x250
VI, Other small islands	Not available		3x250
			7x150

The table below shows the status of electrification by municipality. Out of the 11 municipalities, only 6 are presently served with electric power.

Table 2-11 Status of Electrification by Municipality

Municipality/City	Barangay				House Connections			Membership	
	Date Energized	Potential	Actual	%	Potential	Actual	%	Actual	%
Puerto Princesa	11-Jan-75	66	39	59.1	21,429	20,330	94.9	18,278	85.3
Roxas	6-Feb-92	31	5	16.1	1,934	915	47.3	1,043	53.9
Taytay	22-May-92	31	1	3.2	750	386	51.5	341	45.5
El Nido	3-Jun-93	18	4	22.2	586	253	43.2	230	39.2
Araceli	18-Jul-93	13	2	15.4	626	218	34.8	213	34.0
San Vicente	22-Jul-95	10	2	20.0	1,175	149	12.7	157	13.4
Total		169	53	31.4	26,500	22,251	84.0	20,262	76.5

Source : Palawan Electric Cooperative, Inc. / As of February 1996

3) Water

Water Supply: The Puerto Princesa Water District is the only registered water district in Palawan. It is the largest water supply authority of the province with 6,271 individual connections in 26 barangays as of May 1996. Its main source of water is an infiltration gallery in Irawan River, 12 kilometers from the city's center. This is supplemented by 13 deep wells and serves a total population of about 47,000.

There are 17 additional Level III schemes which are fed by springs and by deep wells. They are managed by a group of municipalities, serving about 22,295 persons or 34.2% of the urban population. A total of 9,642 persons or 4.3% of the rural population is served by Level III system. On the other hand, there are 72 Level II schemes which are operated by the Rural Water and Sanitation Associations (RWSAs) and fed mainly by springs. A total of 347 persons or 0.5% of the urban population and 12,844 persons or 5.7% of the rural population are served by Level II systems.

There are 52,516 persons who are served with safe water sources in Northern Palawan, and 238,438 who are not. Only 23,999 persons or 36.8% of the urban population and 28,517 persons or 12.6% of the rural population are served by safe water sources.

In the case of the municipality of El Nido, the main sources of water are open wells serving almost 65% of the population. 15% are served by developed springs and 20% by pumps and deep wells. At present, there are five springs that are already developed: one is located in barangay Corong-corong, two in barangay Maligaya and one each in barangays Masagana and Bagong Bayan.

There are 13 artesian wells and 32 jetmatic pumps in the whole municipality. People in the poblacion avail of water from a developed spring with improvised direct house-to-house connection. However, during the dry season, this spring cannot support the water needs of the poblacion.

Drought also occurs in the municipality during the long dry season, which dries up deep-wells and springs, and often leaves artesian wells as the only water source. El Nido has many springs that can be developed as water sources.

In 1993, around 42% of the households in the municipality of San Vicente depended on open deep wells for water supply. Another 41% depended on deep wells and pumps. The remaining 17% were dependent on lakes, rivers, creeks, springs and rainwater for water.

Water Resources: Water resources are unevenly distributed around Palawan. Ground water is essentially limited to recent alluvium and young sedimentation rocks found mainly along the east coast of Puerto Princesa.

Surface run-off in the north is low although there are many perennial rivers draining orographic rainfall from high mountain ranges. From the limited available data, run-off appears greatest on the west coast.

- (a) **Ground Water Resources:** Significant ground water resources in Palawan are confined mainly to geologically young sediments along the east coast of Puerto Princesa. These comprise alluvial coastal fringes, plains and valleys, among other types. The shallow unconfined and slightly deeper confined aquiferous formations represent the major drinking water supply for the rural and urban population in the lowlands.

In the north, alluvial deposits are small and fragmented although their ground water reserves are crucial to small communities in elongated valleys such as the valleys of Buayan, Barbacan and Abongan.

NWRB estimated the ground water storage of Palawan to be approximately 3,900 million cubic meters with a yearly inflow of 1,230 million cubic meters.

- (i) **Wells:** The assessment on well sources is based on the National Water Resources Council's "Rapid Assessment of Water Supply Sources," May 1982. In this assessment, the provincial ground water potential was classified into three levels. This classification is useful in the general planning of Level I and to some extent Level II facilities, especially in the rural areas.
- (ii) **Shallow Well:** In general, these areas are recent formations with slopes ranging from 0 to 3 percent. Most of them are located not more than 50 meters above sea level, like alluvial and coastal plains and river valleys. Recent alluvial deposits in Palawan which characterize shallow well areas cover about 2,230 kilometers or 15% of the provincial area. These occur along the coastal areas throughout the province.

Other occurrences are distributed in the northern part of Palawan covering portions of Roxas, Dumaran, San Vicente, Araceli and El Nido and the northern end of Palawan covering portions of Coron and Busuanga.

In the shallow well areas, wells measuring less than 20 meters below ground surface (mbgs) may be generally developed for rural water supply, particularly Level I and Level II services. The static level in these areas are generally within 6 meters below ground surface. Shallow wells are less susceptible to salt water intrusion compared to deep wells with the same discharge and location. Although shallow wells can easily be made safe from bacteria, they may not be resistant to the effects of fertilizer and pesticides, particularly those that are constructed near rice fields.

- (iii) **Deep Well:** These are areas which are generally sedimentary formations, 90% of which are water carriers. They are usually located in slopes reaching up to 10%, usually at elevations of more than 50 meters above mean sea level. About 17% or 2,566 square kilometers of the whole province is occupied by deep well areas. Aquiferous formations occur in pyroclastic rock tuffs, tuffites, tuffaceous sedimentary rocks, and reef limestone chiefly of arkose and arenites. In Northern Palawan these are found in Coron Island which is underlain wholly by limestone. Construction of wells with depths greater than 20 meters is recommended in these areas.

The water from deep wells is, in general, of good quality. Care must be exercised, however, in limestone formations where calcium carbonates are the major constituents. The aquiferous formations are generally susceptible to pollution caused by the activities of man, animals, birds and other creatures. This is so because said geologic formation normally has solution channels/caves where water flows as underground creeks/rivers and therefore it has no considerable filtration and/or purifying properties.

- (b) **Ground Water Quality:** Ground water quality in mainland Palawan has been studied by the DPWH as part of the feasibility study of PIADP Rural Drinking Water Supply Component. The study came to the conclusion that despite impurities, ground water is considered to be the most acceptable source of water supply.

It is recommended that ground water should be drawn from shallow aquiferous formations because of its lower mineral and salt content, otherwise, water treatment and protection may be required to make it suitable for human consumption.

- (c) **Surface Water Resources:** Systematic monitoring of river flows in Palawan is non-existent although attempts were made by the National Irrigation Administration in 1978 and by the Palawan Integrated Area Development Project Office (PIADPO) through its Hydrometric Network Program in 1991. Nevertheless, in 1993, the National Water Resources Council (NWRC) estimated the mean annual run-off volumes recorded at the NWRC station in Region IV at 1,576 millimeters or approximately 23,479 million cubic meters. Based on weighted average annual runoff, the NWRC identified thirty-one contributing river basins. Dependable flow over the basins was calculated by the reciprocal distance methods of interpolation on the available stream flow records of the nearby basins. Eighty percent dependable flow over the basin is estimated at approximately 11.63 ps/sq.km or 14.96 million cubic meters/day.
- (d) **Surface Water Quality:** Surface water in Palawan is suitable for irrigation, and to some extent, for domestic water supply. The pH levels range from of 6.5 to 7.4, which poses no salinity problem. The total alkalinity is within the permissible level; dissolved cations and anions are below the toxicity level.

4) Communication Facilities

(1) Telecommunications

There are two telephone companies operating in Palawan with a total of 5,000 lines. With 5,000 fully operational lines, the telephone density per 100 population would be 0.794, which is 50% below the national standard density of 1.465.

The Pilipino Telephone Company (PILTEL) installed 9 public calling offices in the municipalities of Araceli, Busuanga, Coron, Dumaran, El Nido, Linapacan, Roxas, San Vicente and Taytay.

In the case of San Vicente, BUTEL operates a telegraph system as well as a telephone system which links San Vicente to Puerto Princesa. These, together with the Palawan Radio Communication Systems (PRCS), are currently housed in the municipal hall. The municipal government likewise operates a radio communications system for the municipal offices and the barangay government units. Despite these, telecommunications services are still inadequate.

Puerto Princesa City has a local exchange service with 3,000 lines provided by PILTEL and one cellular mobile service operated by EXTELCOM. Meanwhile, GLOBE TELECOM has plans for new investments in Palawan. But, it will concentrate its investments in the southern part of Palawan due to the road conditions, economic activities and income levels of inhabitants.

All municipalities in Northern Palawan, except Puerto Princesa, have serious telephone service shortages.

(2) Telegraph system

There are two public and eleven private telegraph systems in the province with province-wide coverage.

(3) Radio Broadcasting

There are two radio stations operating in the province. Its AM stations broadcast province-wide. Its lone FM station reaches only Puerto Princesa City and the municipality of Roxas.

The Palawan Broadcasting Corporation (PBC), a radio station with 5,000-watt capacity and with both FM and AM frequency operations based in Puerto Princesa, can be heard in a few municipalities aside from three (3) other stations in Metro Manila.

(4) Postal Communication

Postal services in the province are provided by 21 postal offices in the different municipalities, most of which are manned by only one person. Frequency of mail delivery is once a week but this sometimes extends to once a month. Twenty-four (24) hour mail delivery service is available in Puerto Princesa.

The municipality of San Vicente has one post office located in the poblacion. Delivery of ordinary mail takes two to three weeks, while special delivery and air mail takes one week. The slow-paced mail service is due mainly to the town's inaccessibility and is further compounded by the lack of utility vehicles.

In El Nido town, for example, incoming letters, along with letters going to the barangays, are put in pigeon holes found at the post office. Mail to or from Manila is sent via water vessels.

(5) TV Network

The television programs in Manila are telecast live in Puerto Princesa City on three channels through the relay station of PTV-4, and the facilities of ABS-CBN and GMA-7 affiliates. Puerto Princesa City and Roxas has one cable television station each. In the other municipalities, there is no television transmission reception whatsoever, thus, TV sets are used only for videotaped movies.

(6) Other Media

The isolation of the municipalities likewise affects the print media, as newspapers, etc. are received and read by the residents only a week after publication. Normally, however, newspapers and magazines are available only at certain resorts which bring them in by private plane.

5) Waste Disposal

As in most rural areas, there are no existing public waste disposal facilities. In rural areas and smaller municipalities, wastewater is discharged into open drains or directly into the ground. Toilets are mostly pits from where effluent penetrates into the ground. Septic tanks are often the leaching type, whereby soil conditions allow direct percolation. Solid waste disposal and garbage collection is only available in de luxe class accommodation facilities.

In Puerto Princesa City, there is one dumping site proposed and made possible by loans secured from the Asian Development Bank. The proposed site is a former mercury mining site. Serious concerns have been raised on this proposal because no studies have been conducted on how the former mercury mining site and new solid wastes will impact on the quality of ground water.

Based on 1988 data, out of 3,030 households, 0.016% in El Nido used flush toilets; 1,320 households or 43.56% used water-sealed toilets; 1,600 or 52.80% used antipolo types; and 3.26% had no toilet facilities. More than half or 54.10% of the residents dispose of their garbage by burning them while 41.56% dump their wastes in open pits in their backyards.

6) Irrigation

The existing Communal Irrigation System in Northern Palawan, is approximately 3,800 ha, as of 1991. Puerto Princesa accounts for 37% of the total area, followed by Roxas with 23%, Dumarán with 15% and San Vicente with 14%. No irrigated areas exist in the island municipalities.

2.2.4 People's Perception and Assessment on Infrastructure and Services

The Focused Group Discussions and the Socioeconomic Household Survey were conducted to gain a more accurate perspective on the current condition of the social, economic, environmental, and tourism situations of Northern Palawan through the perceptions of the area's residents. The survey assessed infrastructure and other basic services based on availability and public satisfaction/dissatisfaction, while focused group discussions, in which community leaders from different sectors discussed community affairs rated the services as shown in Table 2-12.

Table 2-12 People's Perception on Infrastructure Services

	Land Transportation	Water Transportation	Road Condition	Water Supply	Power Supply	Telephone	Telegraph	Postal
Busuanga	Poor	Good	Poor	Poor	Fair	Poor	Poor	Poor
Coron	Fair	Very Poor	Poor	Fair	Good	Good	Good	Good
Culion	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Poor	Poor	Poor
Linapacan	Very Poor	Fair	Very Poor	Poor	Poor	Poor	Poor	Poor
Taytay	Fair	Poor	Very Poor	Poor	Poor	Poor	n r.	n r.
El Nido	Very Poor	Very Poor	Very Poor (South)/ Fair(North)	Very Poor	Poor	Poor	Good	Good
Dumarán	Poor/Good ^{1/}	Good	Fair	Poor	Poor	Good (Poblacion)	Fair	n r.
Araceli	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair
Roxas	Good	Good	Very Poor	Poor	Fair	Fair	Fair	Fair
San Vicente	Fair	Poor	Poor	Fair	Fair	Poor	Poor	Poor
Puerto Princesa	Fair	Fair	Poor	Fair	Very Poor	Fair	Fair	Fair

Source: Study Team

Note: n r. - no response

^{1/} Good in the mainland; poor in the island

Other services showed more consistent ratings. On the whole, elementary schools are available in almost all the areas; high schools are limited in poblacion areas; and other institutions of higher learning are available only in limited areas. Furthermore, high satisfaction ratings were consistently given for education services. Among services that have low availability, according to the survey respondents, were postal services, and hospitals.

As far as infrastructure-related services are concerned, except in Coron and Linapacan, the survey found that residents in Northern Palawan perceived availability as fair to poor. In fact, in the entire study area, less than half of the residents have access to basic community services; however, of those with access, almost 87% are satisfied with the services.

Availability of power, telecommunications, and water was also perceived as low, the latter of which worsens during the rainy season especially in Busuanga, Dumarán, Roxas and Taytay. Availability of roads varied from municipality to municipality. In fact, transportation, both land and water, received ratings from “very poor” to “good” from the focused group discussions. The disparity was cited as being due to poor roads, for land transportation, and lack of seaports and insufficient scheduling of trips for water transit facilities. Despite the availability of the national road, the positive responses were low in Taytay. This may indicate that access roads were not available to respondents.

Unlike the Survey findings, only the Araceli and Puerto Princesa groups rated their education systems “good.” Those that rated it “fair” decried the lack of facilities, supplies and teachers. Health and nutrition services also took a beating from the participants of the focused group discussions. Only Puerto Princesa rated them “good” even though the survey found that less than 1% of residents there had access to such services.

Lack of basic community services translates directly into serious community problems for most Northern Palawan residents. Aside from livelihood/lack of jobs, which was the number one problem in their eyes, lack of roads, medical services, power, and water constituted the top concerns facing the various communities. The overall consensus of the focused group discussions was that there simply was not enough funding available to remedy the various concerns of each municipality. Solutions ranked from building or repairing facilities, gaining local government support, and increased employment of staff (teachers, and medics, for instance.)

2.2.5 Regional Development Plans and Directions

1) Regional Development Direction

Palawan has one of the richest fishing grounds in the country. Approximately 65% of Metro Manila’s commercial fishing consumption is accounted for by the total commercial fishing production of Palawan. The basic industries in Palawan are fishery and agriculture. Suitable areas for agriculture are limited in Northern Palawan because of its mountainous and hilly terrain. The main production areas are Puerto Princesa, Taytay, Roxas, and San Vicente.

Under the regional medium-term development program, an agricultural modernization strategy will be adopted in Palawan. The development in Palawan will focus on the development potential of the agricultural sector, including fishery, and the judicious utilization of its natural resources. The strategy requires a shift from subsistence-oriented and agri-based industrialization. Utilizing the abundant natural resources such as coral reef,

scenic views and white sand beaches in the area, sustainable tourism shall be implemented to improve socioeconomic conditions and to create employment opportunities from a sustainable environmental viewpoint.

As a strategy to promote the development of Northern Palawan, the Provincial Government envisages that Taytay area will become the center of development in Northern Palawan.

2) Infrastructure Development Plans and Directions by Sector

The primary goal of the sector is to support the socioeconomic activities and primary needs of the population in an effort to promote regional development. The sector seeks to achieve the following objectives:

- rehabilitate, upgrade and expand the existing network of roads, railways, ports, and airports;
- upgrade and expand the postal, telephone and telegraph facilities to provide fast, efficient, and reliable service to the populace;
- provide enough water supply for domestic, industrial and agricultural uses;
- expand the coverage of rural electrification system to energize all barangays in the region; and
- provide cheap, adequate and dependable power services.

(1) **Roads:** The Regional Development Plan aims to intensify the construction, upgrading and maintenance of existing roads. Construction of new roads as well as permanent bridges on national roads and upgrading of the pavement of existing national roads with concrete and asphalt shall be undertaken. The Provincial Medium Term Development Plan emphasizes the necessity of improving transport infrastructure within the next decade. The target is to connect municipalities in the mainland to the provincial capital with all-weather roads as well as primary roads and to connect all barangays within municipalities with feeder roads (refer to Figure 2-2).

(2) **Ports:** Various islands are to be connected with barangays and municipalities, sea transport facilities shall be provided, and standard design of sea transport facilities shall be prepared (refer to Figure 2-2).

(3) **Airports:** Investment in airport development shall focus on the upgrading of runways, rehabilitation of airport facilities and navigational aids and the construction and improvement of the region's major airport terminals. Upgrading of Puerto Princesa Airport and Busuanga Airport is ongoing under DOTC, while Sandoval Airport is being constructed by the Provincial Government (refer to Figure 2-2).

(4) **Water Resources:** The policies and strategies on water resource development as stated in the regional plan are as follows:

- adopt an integrated area approach in developing water resource projects for domestic, industrial water supply, power, irrigation and flood control;
- provide three level water supply systems of potable water to urban and rural communities; and
- rationalize users' fees and penalties for the operation and maintenance of irrigation systems.

The main target of water supply development for urban areas is to service 79% of the population by 1998 and 96% of the urban population by 2010. The main target for the rural areas is 69% of the rural population by 1998 and 69% by 2010.

(5) Power Generation: The goals and objectives of the sector in the regional plan are, as follows:

- provide adequate power supply to support agro-industry development programs
- expand the coverage of the rural electrification program to all barangays, if possible, and
- accomplish the above goals and objectives in an environmentally sustainable manner.

The power plants to be constructed in the island provinces will be diesel- and small hydro-electric-fed. The level of electrification will be increased to 77.5% for household connections and 97% for barangays by 1997.

(6) Telecommunication: Telephone services, though extensive at present, are only limited to urban areas. The private sector, being the major supplier of telephone services, should also provide the rural population with access to telephone services under non-monopolistic terms. The goals and objectives of the development plan are as follows:

- improve the telecommunication system for better, faster and dependable service to the public, and
- modernize the telecommunication system.

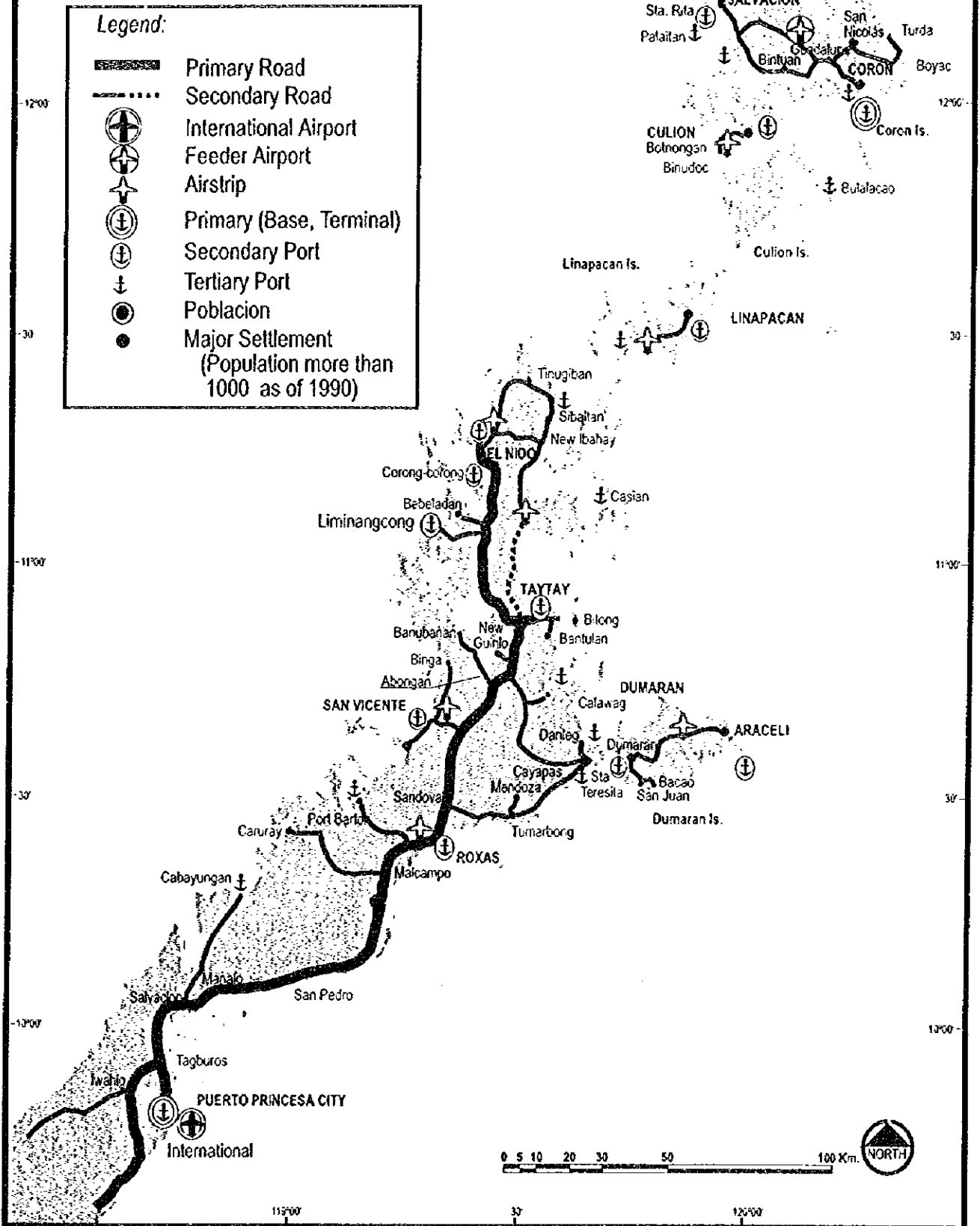
Under the regional plan, the provincial plan is formulated as follows:

- provide telephone facilities to remote barangays and island municipalities, and
- provide public facilities at strategic places in commercial areas.

(7) Current Infrastructure Development Projects

The related development projects by sector in the SPIADP, the central government sectoral plans, the Provincial Medium Term Development Plan, etc. are summarized in Appendix B.

Figure 2-2
Transportation Network Development
Expected to be Undertaken within the
Regional Development Framework



Source: Study Team