REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

RURAL INFRASTRUCTURE FUND PROJECT

(AID PROJECT NO. 492-0420)

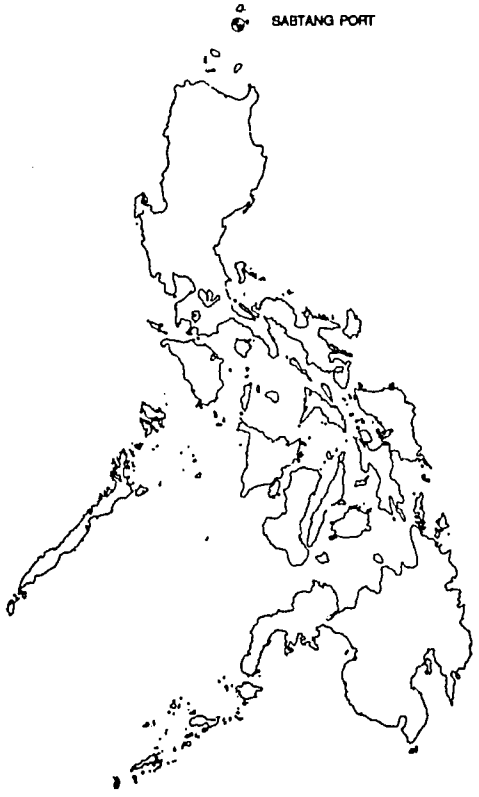
FEASIBILITY REPORT

THE PORT OF

SABTANG

BATANES PROVINCE

NOVEMBER 1990



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I.
SUMMARY

I. SUMMARY

A. INTRODUCTION

The subproject Port of Sabtang is located in Barangay Sanakan on the Island Province of Sabtang. Located approximately 230 kilometers north of the Luzon mainland, Sabtang Island is within the Province of Batanes in Region III. Figures 1-1 and 1-2 locate and detail the port site.

B. EXISTING PORT

The existing facility at the Port of Sabtang consists of an eighty-meter, rock-filled concrete causeway. The causeway lines one side of a beach-access channel between two littoral rock shelves which front the town of Sabtang. There is a seventy-five meter long concrete seawall across the channel on the adjacent rock shelf. These two parallel concrete structures define the channel access to the beach landing area. Plates 1-1 and 1-2 show sea level views of the subproject port site.

C. ECONOMIC OVERVIEW

The Port of Sabtang provides the sole access to this isolated island. Sabtang also serves as a secondary distribution node for passengers continuing en route to other local islands.

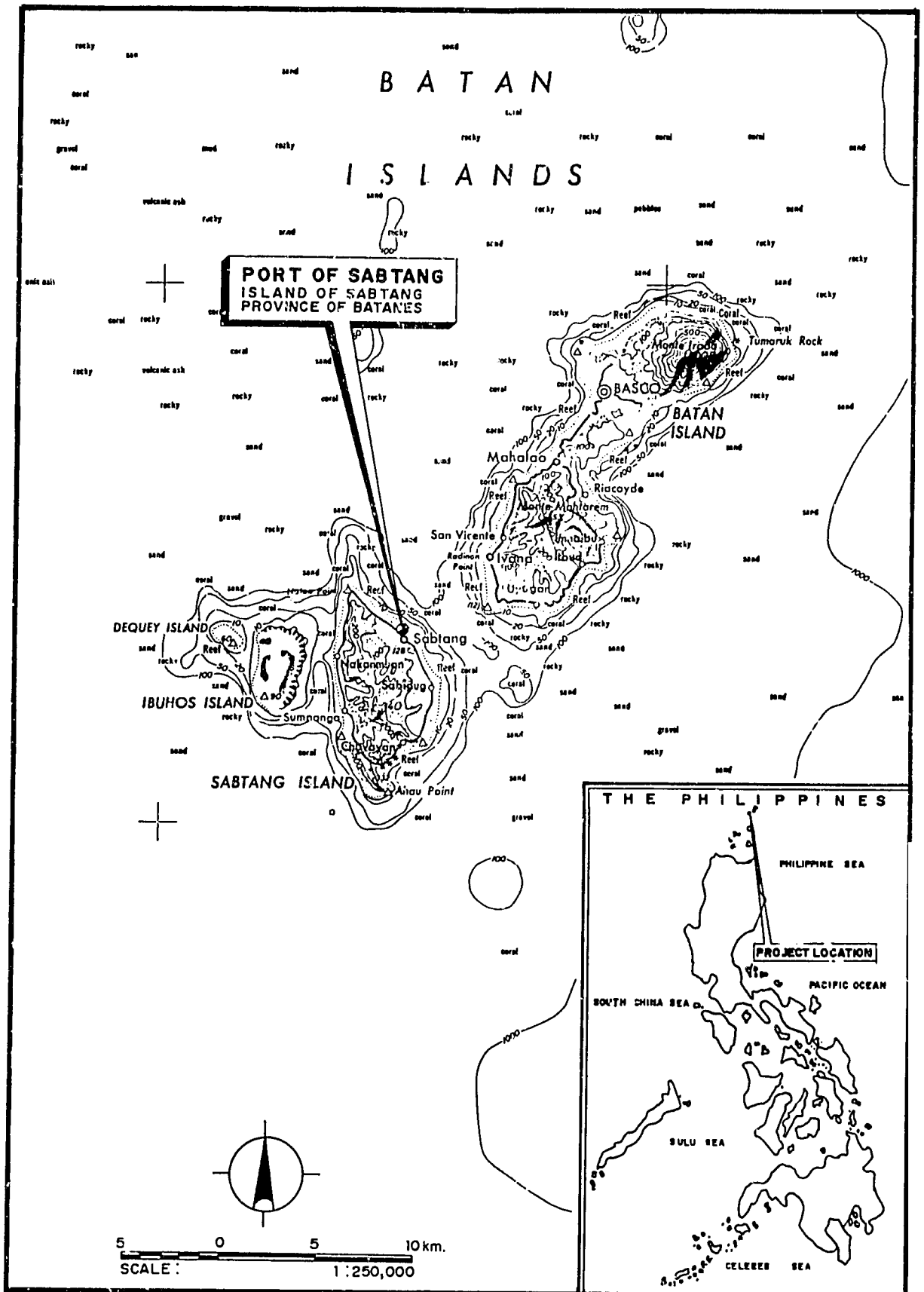
Sabtang is serviced by wooden plank boats coming from Ivana on Batan Island, approximately five kilometers distant. These boats are used to import necessities not produced on the island and to export crops and livestock to Basco the main distribution center for the province.

However, rough seas, typical for much of the year, can restrain or curtail the local inter-island traffic and isolate the island. Typhoons, also prevalent for the area, can isolate the entire province for weeks at a time by restricting transport to and from Aparri or Manila on the Luzon mainland.

D. PROPOSED PORT SUBPROJECT

The proposed improvements to the Port of Sabtang provide for a more-protected beaching area, thus allowing slightly larger vessels to ply the water route between Ivana and Sabtang.

The improvements include a thirty-meter extension of the existing concrete causeway. A rock breakwater would then be constructed out at an angle from the causeway end, thus protecting the existing channel from the larger waves and swells predominate in the area, while keeping the channel open to larger vessels.



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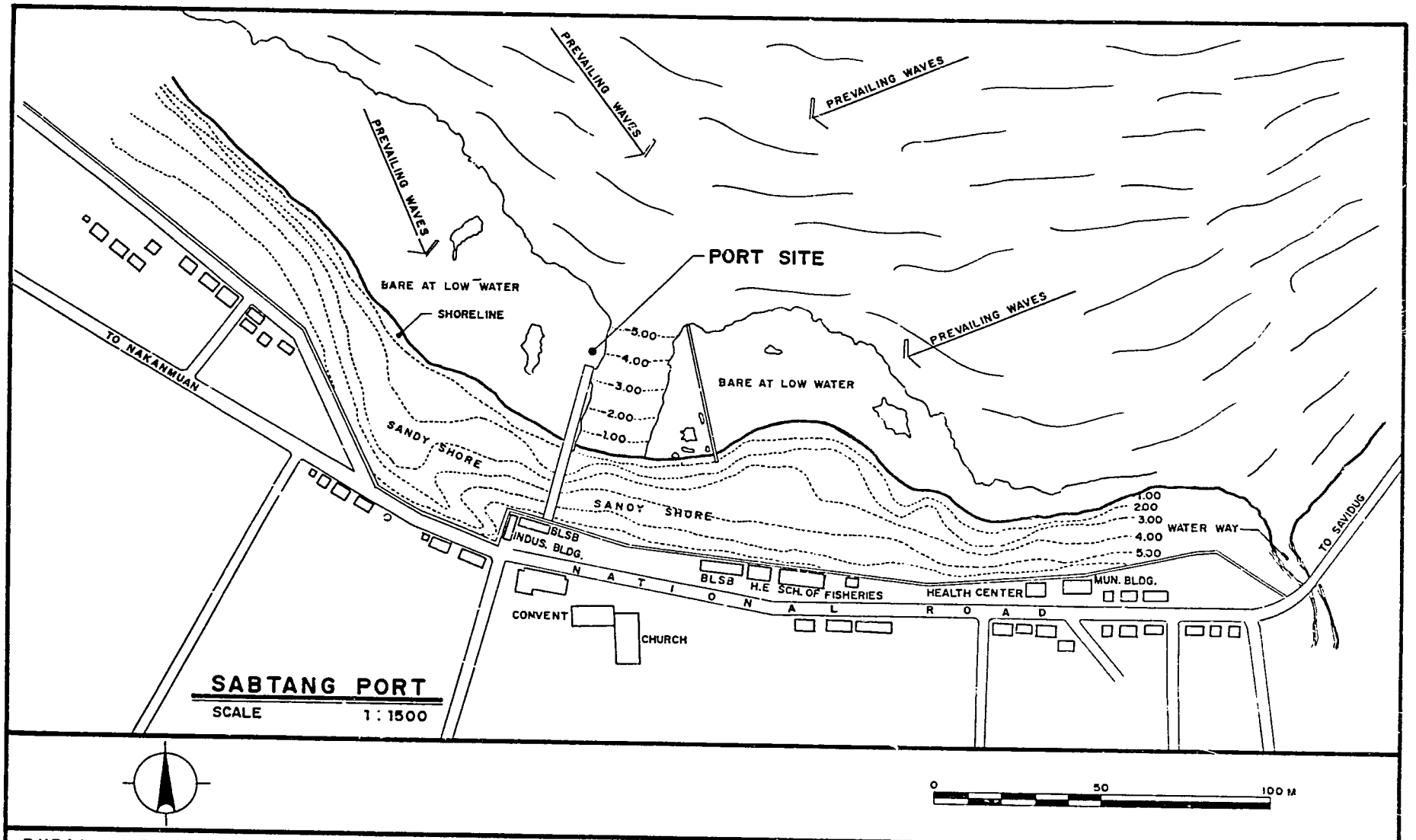
LOCATION MAP — FIGURE 1-1



RURAL INFRASTRUCTURE FUND PROJECT

PROJECT NO. 492 - 0420

PORT AREA MAP

FIGURE 1-2

E. COST CONSIDERATIONS

The cost of constructing the proposed upgrades is estimated at ₱12,419,000.

The cost of maintenance for the first year is assumed to be 2% of the initial investment and is projected to increase at 3.5% annually. Although this site is exposed to extreme waves and weather, the proposed structures would be designed to resist these forces and are typically low-maintenance types of structures. Therefore, a 2% initial maintenance investment is appropriate.

F. SOCIAL SOUNDNESS

Although the proposed construction at Sabtang Port upgrades an existing facility, social benefits would be pronounced for the area. Improvements to Sabtang Port would extend the effective sailing period by allowing the use of larger vessels. Communication and transportation linkages would become more reliable. Imported goods would become more readily available at lower cost. This would also relax some of the constraints on development of the now relatively isolated island.

Improvement of Sabtang Port is unlikely to result in any significant in-migration due to the hostile weather and climate. Out-migration would also be minimal due to the strong family ties and regional loyalty typical of the area.

In conclusion, the proposed port subproject would result in significant social benefits for a relatively neglected cultural minority. No negative social aspects are foreseen. Thus, the proposed subproject is socially sound.

G. ECONOMIC EVALUATION

The proposed subproject is recognized as a basic requirement of the isolated Island of Sabtang. With only 1,680 inhabitants on the island, the subproject cannot be feasible against economic criteria. Rather, in this type of environment, the criteria to support this improvement investment should be based on social considerations as noted above.

H. ENVIRONMENTAL ASSESSMENT

Sabtang is a remote, underpopulated island municipality for which the subproject port serves as the sole means of access.

Construction activities proposed for the Sabtang Port subproject will not result in significant disruption of the physical or natural environment. The substantial quantity of armour rock called for in the subproject could induce significant shore erosion if such rocks are sourced from

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shoreline areas. For aesthetic reasons, the adjoining headlands and cliffs bordering the Sabtang Port site should also not be considered as potential quarry sites.

The immediate vicinity where the port improvements are proposed has been subjected to human disturbances in the past, including construction of the existing port structures, and is not known to specifically include archaeological sites, historical monuments or culturally significant features.

I. RECOMMENDATION

The proposed port improvements, at an economic cost of ₱10,089,000 and a financial cost of ₱12,419,000, are unfeasible when judged against economic criteria. However, the subproject is necessary and worthwhile to the area and its residents when considered from a social standpoint.

Improving the port would reduced the periods of isolation by safely allowing slightly larger vessels to ply the route from Basco during marginal weather conditions. The plank boats used now do not normally travel to Sabtang during inclement weather or sea conditions, as any attempt to do so is unsafe. The isolation of neighboring islands which depend upon Sabtang Port would also be reduced. Further, Sabtang Port could provide temporary shelter to passing vessels endangered by the unpredictable weather typical for the area. Therefore, the Consultant recommends that the proposed subproject be undertaken.

PHOTO 1: SEA LEVEL VIEW OF SABTANG PORT, TO THE SOUTHEAST

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420	PLATE 1-1
REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA	

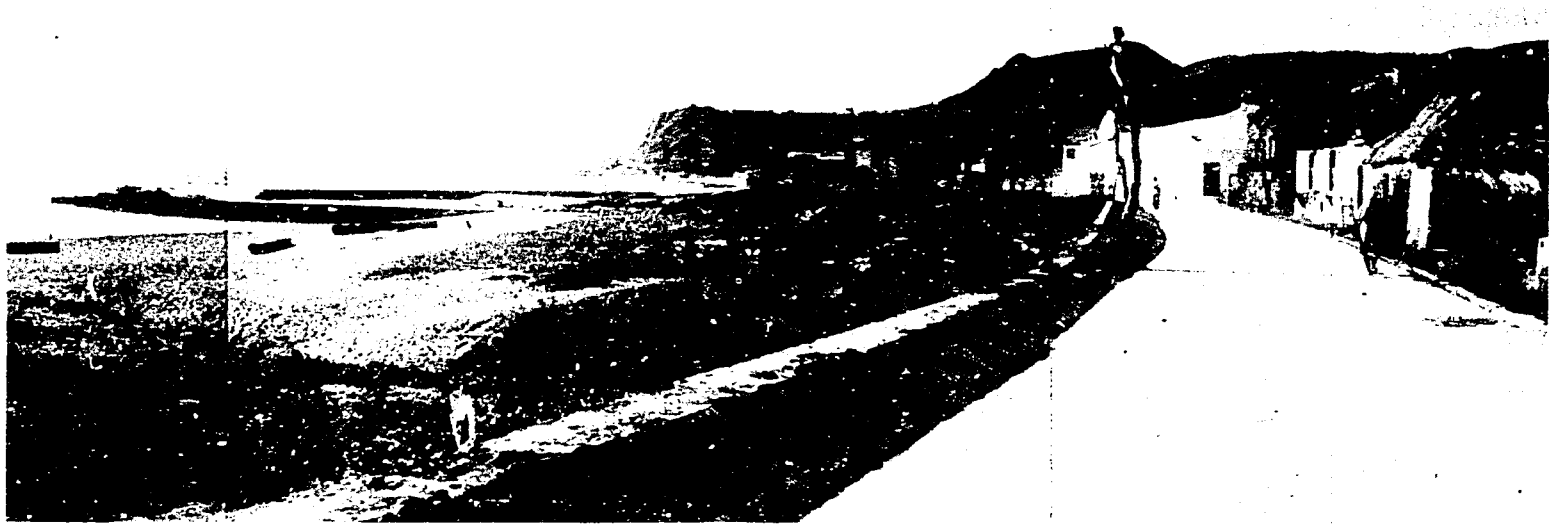


PHOTO 2: SABTANG PORT AND COASTAL ROAD

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA

PLATE 1 - 2

II.
ECONOMIC OVERVIEW

II. ECONOMIC OVERVIEW

A. PROFILE OF PROVINCE AND HINTERLAND

The proposed feeder port project is located in Barangay Sanakan within the Island Municipality of Sabtang. Sabtang is one of twelve island municipalities that comprise Batanes Province. Batanes is the northernmost province in the Philippines, composed solely of islands north of Luzon. Administratively, Batanes is part of Region II.

Batanes is also the smallest province in terms of area and population. The total land area of the province is estimated at only 23,390 hectares distributed among twelve named islands: Batan, Itbayat, Sabtang, Vivi, Ibuhos, Mavudis, Siayan, Ditarem, Misanga, Mabalbal, Dinem and Dequey. The three major islands, Batan, Itbayat and Sabtang, total 20,930 hectares.

The province has six municipalities and twenty-nine barangays. The Municipalities of Basco, Mahatao, Ivana, and Uyugan are on Batan Island, while Itbayat and Sabtang are separate island municipalities.

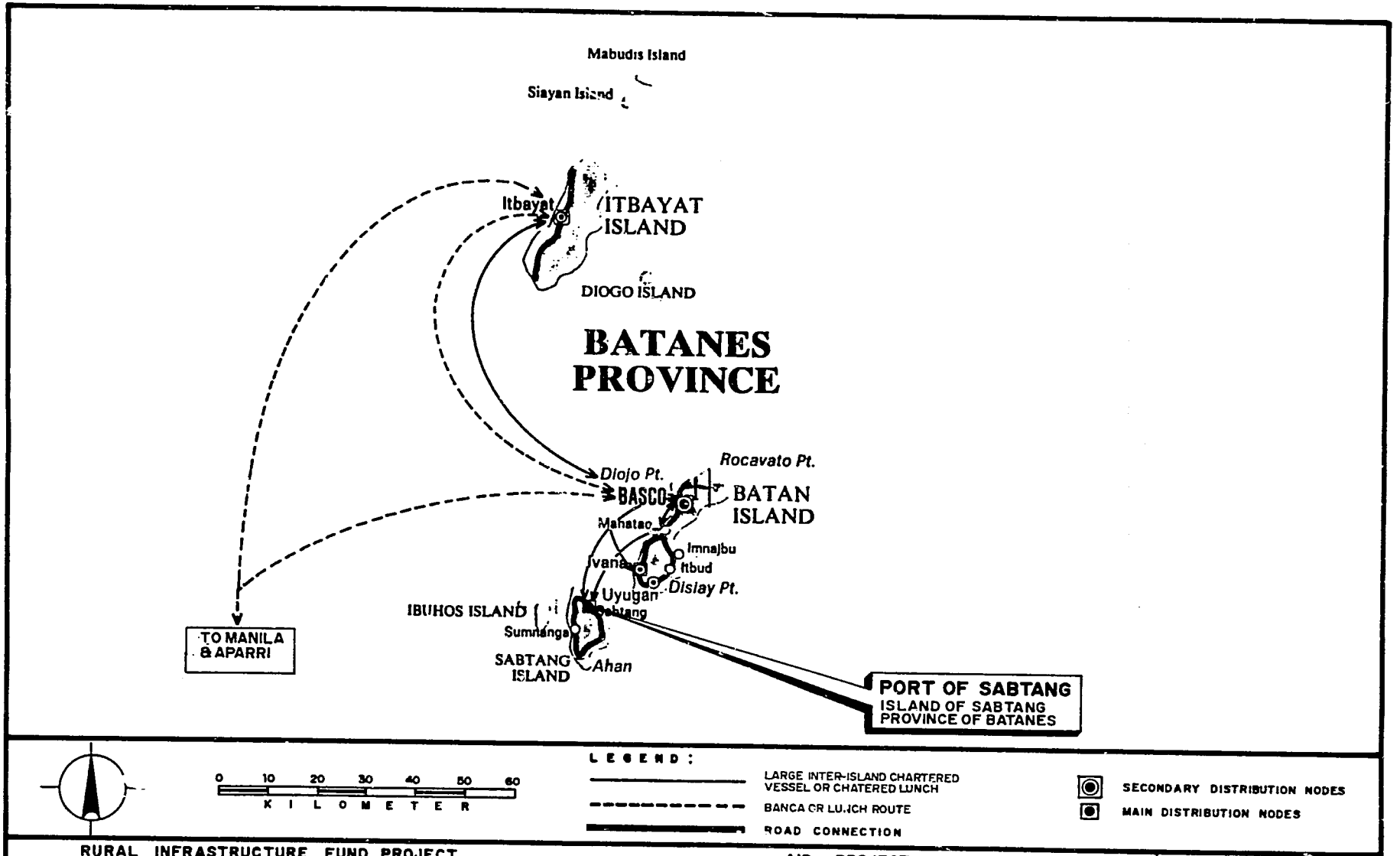
In 1988, the **population** of Batanes was 20,305 inhabitants, of which 8,887 live in Basco, 6,151 lived in Itbayat and 1,680 lived in Sabtang. The immediate **zone of influence** is the island municipality itself. The total hinterland is the province as a whole.

Basco, on Batan Island, is the capital of the province and the only important distribution center, being the sole port of access for the greater mainland. Basco is the only port able to receive and dispatch inter-island vessels throughout much of the year. Even at this port, the prolonged typhoon season from early June to late September often isolates that port from the Luzon mainland for weeks at a time.

Sabtang is a small secondary distribution node for the province but, like the rest of the province, is totally dependent upon the suppliers in Basco for goods and services not otherwise available from local production.

Sabtang Port in Barangay Sanakan is situated about five kilometers from Batan Island. Sabtang is bounded by the Pacific Ocean to the east, the South China Sea to the west and the Balintang Channel to the south. The geographical coordinates of the port are Latitude 20°09' N and Longitude 121°24' E.

The Municipality of Sabtang is composed of six barangays including the islets of Dequey and Ibuhos to the west. Sabtang has a total land area of about 4,632 hectares including the two small islets. The municipality comprises 19.45% of the total land area of the province.



RURAL INFRASTRUCTURE FUND PROJECT

AID PROJECT NO. 492 - 0420

SABTANG PORT BATANES PROVINCE LOGISTIC NETWORK

FIGURE 2 - 1

Predominately, Sabtang is an agricultural municipality with 18% of the total land area devoted to agriculture, namely rice and rootcrops.

The **existing facility** consists of a rock-filled concrete causeway about eighty meters long and five meters wide. Southwest of the causeway, there is a seawall about 1.5 meters wide by seventy-five meters long. There are no other facilities at present although a ten meter extension to the causeway was recently completed.

During navigable weather, the provincial interactive logistical network includes Basco, Sabtang, Itbayat, Ivana and Mahatao. This network is linked to the greater mainland at Aparri and Manila. However, service disruptions during bad weather are even more frequent between Basco and the nearby feeder ports than between Basco and the Luzon mainland. Further, all of the feeder ports, except Basco, are affected to one degree or another from the heavy swelling seas characteristic of the area throughout much of the year.

Regardless, the **present role** of Sabtang Port is to act a the sole port of access to Sabtang Island Municipality and as an important secondary passenger distribution node where passengers can transfer between vessels destined for alternative destinations. Small exports of root crops, garlic, cattle and goats currently go to Basco in three to ten DWT plank boats which are generally constructed short, wide and deep to weather the rough seas. The vessels return with those necessities not produced on the island such as rice, clothing, canned and bottled goods.

Basco consolidates or disaggregates exports and imports which in total often move in generally uneconomic volumes or conditions. Consequently, the government of the Philippines has found it necessary to assist the province with it's transportation requirements in a number of ways. Philippine Airlines (PAL), for example, is said to be able to maintain a daily service between Basco, Laoag and Manila only through substantial subsidies. The Philippine Navy provides an unscheduled service between Basco and Manila with a naval, beach landing type, vessel for essential imports of rice and other foodstuffs in bulk and for such exports of cattle, root crops and garlic in an effort to offer more economical transport links with the Luzon Mainland. Nevertheless, the province remains isolated and generally depressed.

In view of the foregoing, it is not surprising to find that direct economic benefits are able to support only minor additions. Yet, the port is essential and the need for improvements recognizable.

The **future role** of Sabtang Port will be the same as it is today albeit in step with the development of the province and the municipality.

The main problem facing the island province is the general isolation caused by the fact that communications, are regularly suspended between the province and the greater mainland for long periods during the typhoon season from early June until late September. In addition to this general isolation, communications are severed between Sabtang and Basco before, during and after typhoons. Since Sabtang is totally dependent upon Basco for many of its prime requirements, as is Basco on the greater mainland, a long storm or a frequent series of storms is a major cause of distress to the residents of the municipality.

The immediate requirement is for improvements that will extend the effective sailing period. This can mainly be accomplished by larger vessels able to sustain rougher seas and by port improvements that will ease berthing activities during bad weather.

B. TRANSPORT SYSTEM PROFILE

There are no motorized vehicles on Sabtang although all of the municipalities are connected to Sabtang Port by carabao trails.

Sabtang is accessible only by inter-island bancas and launches, or in emergency, by chartered sea plane. Basco is accessible only by sea and by air.

Basco is the only port of access to the province from the greater mainland and the only major distribution center in the province. The only civil airport is at Basco and the deep-sea industry in the province is focused at that port.

Basco is not readily accessible by sea during much of the typhoon season from June until September. Sabtang is not accessible during the periods before, during and after incoming typhoons which are vicious and frequent in that latitude. Consequently, Basco is at times totally dependent upon the often-cancelled flights of Philippine Airlines from Manila through Laoag or Tuguegarao. The remainder of the province depends upon inter-island bancas and launches throughout the year.

The Port of Basco is located within Basco Poblacion on the west coast of Batan Island. It is considered a national port, under the supervision of the Philippine Port Authority (PPA). The port was damaged by a navy LST hitting the pier during a typhoon in 1987 and is not serviceable in all weather. The port has access roads linking it to every barangay and municipality on the island. About four jeepneys per day ply the circuit from Basco.

All prime commodities bound for Batanes come from Luzon via Basco. Of these, 10% are shipped to Itbayat and 5% to Sabtang.

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There are passenger and cargo vessels scheduled regularly from Basco to Itbayat and Sabtang.

Basco is about fifteen kilometers and two hours from Sabtang. Sabtang is about one hour from Ivana, the nearest port on Batan Island. There are about five passenger cargo vessels per day plying the routes between the principal ports.

Basco is accessible by air transportation only through the services of Philippine Airlines (PAL). Presently, there are two airports: the main airport at Basco and a feeder airport at Itbayat. PAL has regularly schedule flights to Batanes Island. However, flights are often cancelled due to unfavorable weather conditions or lack of passengers.

Basco has seventy-eight motorized and non-motorized boats and five chartered ships. Vessels loaded with freight and passengers from the neighboring Islands of Sabtang and Itbayat make regular port calls at Basco. Similarly, four charter ships service Basco from Aparri as does another from Manila.

Fishermen from nearby municipalities utilized this port as their principal landing due to the larger markets and availability to external shipping services.

C. SOCIO-ECONOMIC CHARACTERISTICS OF THE ZONE OF INFLUENCE

Over half (55%) of the land area in the Province of Batanes is timber land. One-fourth (23%) is agricultural and one-fifth (20%) pasture land. Thirty-five percent of the total land area is alienable (available for public use). Major food crops are sweet potato, tugui and ube (all root crops). Garlic is the only commercial crop. Poor marketing linkages are a constraint for farmers.

As of 1988, there were 20,305 inhabitants of Batanes, of which 8,887 lived in Basco and 6,151 in Itbayat. The population growth rate, reportedly, could be as high as 9.21%. Population density is also high at ninety-seven persons per square kilometer for the province and 250 for Basco. Most residents were Ivatan.

The province has ten elementary schools, seven secondary schools and three higher educational institutions. Education is widespread. In 1988, almost half the population over sixteen years old (48%) had received at least some high school education.

There are hospitals in Basco and Itbayat. In 1988, rural areas were underserved in health care. There were 121 government health personnel and 121 barangay health workers were being recruited and trained.

Five out of eight residents (62%) were in the labor force, but only 31% of these were employed. Of those employed, four

out of five (79%) were employed in agriculture and half were in unskilled occupations. Out of every ten employed persons, three were in government service and three were self-employed.

With a median family income of ₱29,312, Batanes is above average for the Philippines. As shown in Table 2-1, over three out of four families (77%) were agricultural. Only the richest families, earning over ₱40,000 per year, were non-agricultural.

TABLE 2-1

FAMILIES BY MAIN SOURCE OF INCOME AND TOTAL FAMILY INCOME FOR BATANES

		--------- Family Income (Pesos) ---------						
Main Source Of Income	Total	Under 10K	10K-14K	15K-19K	20K-29K	30K-39K	40K-59K	60K & Over
		Percent of Families						
Agricultural Wages/Salaries	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Non-Agricultural Wages/Salaries	11.1	0.0	0.0	0.0	3.0	11.8	80.1	40.1
Agricultural Entrepreneurial	76.6	0.0	100.0	92.9	97.0	70.6	0.0	0.0
Non-Agricultural Entrepreneurial	4.9	0.0	0.0	0.0	0.0	5.8	0.0	59.9
Other	7.4	100.0	0.0	7.1	0.0	11.8	19.9	0.0
	100%	100%	100%	100%	100%	100%	100%	100%
Total Families (Thousands)	2,697	67	167	466	1,099	566	167	167

SOURCE: National Census & Statistics Office. 1987. 1985 Family Income and Expenditures Survey, Vol. II. Manila: NCSO.

The provincial fishing grounds are estimated at 4,500 square kilometers. Basco and Sabtang have over twenty-five motorized fishing boats and fifty non-motorized craft. The motorized boats range from seven to seventeen horsepower and have a maximum tonnage of one-half ton. Since the Batanes Islands are lashed by gale force winds six months of the year, infrequently calm seas permit fishing only during short periods. Thus, Basco produces only 400 metric tons of fish per year.

III.
PORT THROUGHPUT

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III. PORT THROUGHPUT

A. INTRODUCTION

The Sabtang feeder port site was surveyed on three levels between May and September of 1990. There was an initial engineering reconnaissance survey, in May, a socio-economic survey, also in May and environmental site visit in September (Appendix B, Exhibits 1 through 3).

Appendix B displays the data base used to forecast port throughput. This data was developed during an early reconnaissance survey from secondary sources and subsequently finalized after a more specific economic survey (Exhibits 4 through 9).

The aforementioned surveys, data and projections form the basis for the economic evaluations of all proposed feeder port projects.

Sabtang Port is absolutely essential to the Island Municipality of Sabtang and important to the inter-island network of Batanes Province.

B. THROUGHPUT FORECAST

Existing throughput data was developed from a comprehensive survey and network analysis of the interactive network that encompasses Basco, Sabtang, Itbayat, Ivana, Mahatao, Aparri and Manila (Figure 2-1 and Exhibit 9).

1. FISH TRAFFIC

Fishermen were surveyed to determine the fish landed from marginal (inner-coastal) activities and imported for local consumption.

Marginal fish landings are not projected to increase but fish landings imported from Basco markets are projected to increase with population at 1.73% per year (Table 3-1).

2. CARGO TRAFFIC

a. Rice, Bagged Cargos and Bottled Cargos

Rice, bagged cargos and bottled cargos are derived from the Consultant's survey and subsequent network analysis.

Rice consumption is relatively income inelastic. This condition of general income inelasticity has been applied to other **bagged cargos** and to **bottled cargos** as well since present per capita bottled consumptions are already quite high.

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In any case, rice, bagged cargos and bottled cargos have been collectively projected to increase with the population increase of Batanes of 1.73% per year (Exhibit 4).

b. Fuel, Consumables and Others

Fuel movements are derived from the Consultant's survey and subsequent network analysis.

Consumables, representing all manner of consumer goods, vegetables and fruits were derived from the Consultant's survey and subsequent network analysis. This category is not entirely consistent when comparing one port with another due to substantial differences in the manner in which cargos are recalled or recorded.

Others is a residual category reserved for cargos that do not easily fit into the other aforementioned categories. Typical examples are ice and abaca.

Throughput has been projected by the following formula:

$$F = P + I*E_1$$

Where:

- F: Annual growth rate for identified cargos
- P: Annual growth rate of population for the province
- I: Annual growth rate of per capita income for the province
- E_1: Elasticity of demand for identified cargos to change in per capita income for the province

The growth rates described above (P and I) for each province are shown in Exhibits 4 and 5.

E_1, the elasticity of demand for fuel and consumables is assumed to be 0.5. Therefore, the estimated annual growth rate for fuel, consumables and others at Sabtang Port is 4.31%.

c. Cargo Allocations

Where definite origin/destination data was deficient, cargos were allocated to the network in proportion to the surveyed passenger distribution (Exhibit 9).

3. PASSENGER TRAFFIC

Growth in passenger traffic is based on the macro-economic analysis of household expenditures on transportation.

The formula used is:

$$T = P + I*E_2$$

Where:

T: Annual growth rate for passenger travel

P: Annual growth rate of population for the province

I: Annual growth rate of per capita income for the province

E_2: Elasticity of passenger travel demand to change in per capita income for the region

The growth rates and demand elasticity described above (T, P and I), for each province and for different transport modes are shown in Exhibits 4, 5 and 6.

The elasticity of passenger travel demand to change in per capita income for local inter-island travel is assumed to be the same as that for jeepney travel as determined by previous DPWH studies (Exhibit 6).

The estimated annual growth rate for passenger travel through Sabtang Port is 4.31%.

4. VESSEL THROUGHPUT

Daily commercial vessel throughput was determined by survey and represents effective vessel throughput except during periods of inclement weather.

Commercial vessels are defined as those registered vessels in excess of three DWT. Local commercial vessels are projected to increase with at 4.31% per year (Exhibit 6).

Small fishing vessels are estimated to enter and leave the port no more than 250 days per year and are projected to increase with population at 1.73% per year (Exhibit 4).

Table 3-1 displays the throughput projections described above for passengers and cargos.

TABLE 3-1

SABTANG PORT THROUGHPUT PROJECTIONS

COMMODITY	1989/90 SURVEY	1992 PROJECTED	2001 PROJECTED	2011 PROJECTGF
FISH (i) (tons per year)				
1 Imported from other islands (i)	40	41	49	58
2 Marginal (i)	6	6	6	6
3 Ipon	0	0	0	0
4 Bangus	0	0	0	0
5 Transhipped (out)	0	0	0	0
Total:	46	47	55	64
% of 1992:	97%	100%	116%	136%
CARGO""(tons per year)				
1 Rice (ii)	750	776	921	1,094
2 Consumables (iii)	154	168	256	390
3 Bagged Cargos (ii)	388	402	477	566
4 Bottled Cargos (ii)	1,125	1,164	1,382	1,641
5 Fuels & Oils (iii)	1,200	1,306	1,991	3,036
6 Others (iii)	714	777	[illegible],185	1,807
Total:	4,331	4,592	6,212	8,533
% of 1992:	94%	100%	135%	186%
PASSENGERS (per year)				
1 Local (iv)	28,800	31,336	47,786	72,872
2 Regional	0	0	0	0
3 Inter-island	0	0	0	0
Total:	28,800	31,336	47,786	72,872
% of 1992:	92%	100%	152%	233%
VESSELS (per day)				
1 Scheduled Commercial	5.0	5.4	8.3	12.7
2 And/Or Unscheduled Commercial	0.0	0.0	0.0	0.0
3 Small motorized fishing (25)*	17.1	17.7	21.0	25.0
4 Small unmotorized fishing (30)*	20.5	21.3	25.2	30.0
(v)" Total:	42.7	44.4	54.6	67.6
% of 1992:	96%	100%	123%	152%

SOURCE: Consultant's surveys

* Based on 250 sailing days per year for each vessel

BASIS: (1992 Projections)

(i) 47 tons fish increasing including 41 tons imported increasing with with population and 6 tons marginal not increasing (Exhibit 4)

(ii) 2,342 tons rice, bagged and bottled cargos projected to increase with population at 1.73% per year (Exhibit 4)

(iii) 2,250 tons projected to increase at 4.31% per year (Exhibit 6)

(iv) 31,336 passengers increasing at 4.31% per year (Exhibit 6)

(v) 5.4 commercial vessels per day projected to increase at 4.31% per year and 39.0 small fishing bancas per day increasing with population at 1.73% per year (Exhibit 6)

IV.
ENGINEERING DESIGN

IV. ENGINEERING DESIGN

A. DATA COLLECTION

1. RECONNAISSANCE SURVEY

The reconnaissance survey for the Port of Sabtang was conducted on April 30 through May 6, 1990. A second site visit, in construction with an environmental survey, was conducted on October 4 through 6, 1990 (Appendix C, Plates C-1 through C-8).

The survey team met with the following DPWH officials in Basco prior to going to Sabtang:

Engr. Estanislao C. Canlas	-	District Engineer, Batanes
Engr. Delfino Ufma	-	Chief, Planning and Design
Engr. Bernardo Urnido	-	Provincial Planning and Development Coordinator

The District Engineer proposed to extend the existing concrete causeway by another seven meters.

In Sabtang, the team met with the following municipal officers:

Mr. Migdonio Foberes	-	Municipal Mayor
Mr. Romeo Cielo	-	Municipal Planning and Development Coordinator

2. EXISTING FACILITY

The Port of Sabtang comprises an eighty meter long rock-filled concrete causeway with a five meter wide concrete-paved deck. A recent ten-meter extension to the causeway is included in the length. The concrete causeway lines one side of a channel formed between two littoral rock shelves.

There is a seventy-five meter long by 1.5 meter wide concrete seawall across the channel on the adjacent rock shelf. The causeway and seawall extend out perpendicular from shore, one on each side of the approach channel to the beach landing. Both structures are in good condition.

Originally intended to protect the beach landing area, these concrete barriers are ineffective against the predominate wave action. At Sabtang, the large waves generally approach parallel to shore. Neither concrete structure can protect the landing area from these waves.

Onshore from the landing area, there is a wooden and nipa vessel shed used to house some of the local plank boats. A caribao- or manually-operated turnstile is used to winch the plank boats onshore across the beach and into the shed.

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3. METEOROLOGICAL AND HYDROLOGICAL CONDITIONS

Weather data is not recorded at the Port of Sabtang. The nearest weather station to Sabtang is Basco. Climatological data from this station is being used as reference due to its proximity to the port site (Exhibits 13 and 14).

a. Climate

The climate at Sabtang can be categorized as tropical with heavy rains and high winds. Sabtang has no dry season but has a pronounced rainy period from October to December.

b. Rainfall

Rainy days are distributed throughout the year and range from an average monthly minimum of ten days in April to a maximum of twenty-one days in August, November and December. There are an average of 203 rainy days per year.

The average monthly rainfall ranges from a minimum of forty-three millimeters in August to a maximum of 370 millimeters in September. The total average annual rainfall is 2,492 millimeters.

The greatest daily rainfall recorded for Basco was 410.7 millimeters, which occurred on October 2, 1962.

c. Temperature

The annual mean temperature is 25.8°C. The warmest month is July with maximum temperature averaging 31.6°C. January is the coolest month with minimum temperatures averaging 19.2°C.

The maximum temperature ever recorded at Basco is 37.6°C. The minimum temperature recorded is 11.4°C.

d. Winds

Winds velocities throughout the year are typically four to six meters per second except during the passage of a typhoon. The prevailing winds are out of the northeast from September to March. Winds are from the southwest or southeast during the remainder of the year.

The maximum wind speed ever recorded in Basco was eighty-nine meters per second during the passage of Typhoon Nening in 1987. Winds from Typhoon Ising, in 1979, were recorded in Basco to be as high as sixty meters per second.

e. Waves

The significant wave height calculated for Sabtang is high at approximately 11.3 meters. The design wave height is also high at 9.4 meters.

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f. Tides

Tides at Sabtang are diurnal. The mean tidal range is 1.22 meters. Maximum tidal range is 1.62 meters.

4. SITE HYDROGRAPHY AND TOPOGRAPHY

The Port of Sabtang is located on the northeast coast of Sabtang Island, approximately five kilometers across the water from Batan Island.

Coralline rock shelfs, which are exposed at low tides, line the beaches fronting the town of Sabtang with the exception of the channel between the causeway and seawall. Water depth at the offshore edge of the rock shelves is approximately eight meters. Figure A-3 in Appendix A details the regional hydrographic conditions at the site.

Sabtang Island, volcanic in origin, is of generally rugged terrain. Deep canyons and plateaus adjoin basaltic peaks and headlands. Steep, rocky cliffs line much of the coastline. Figure A-4 details the topographic conditions at the site.

No subcontractor topographic or hydrographic survey has yet been conducted at the site.

5. AVAILABILITY OF CONSTRUCTION MATERIALS

Materials required from the immediate area for the construction of the port facilities include sand, gravel and armour rocks.

There is no available source of sand and gravel in the Batanes except for beach sand and gravel, which was approved by the DPWH for use in the recently completed causeway extension.

Armour rock can be sourced from the coastline beginning about 500 meters east of the port site. Loose boulders are scattered for about two kilometers further along the shore. These boulders are mostly volcanic rocks, but there are also some detached boulders of conglomeratic coralline limestone. This limestone, although vesicular, has a higher specific gravity than normal limestone because of cemented granular materials such as sand, gravel and rocks.

Armour rock can also be sourced from an outcrop of conglomeratic coralline limestone about 500 meters west of the port site. However, the removal of rock from either of these two sources could cause significant soil erosion along the shore. Therefore, neither of these two source locations are recommended.

As the island is predominantly volcanic in origin, alternative sites inland should be quarried instead to obtain the necessary armour rock of likely similar composition.

Figure A-5 shows source locations for these materials. All other construction materials (cement, timber, reinforcing bars and marine hardware) must be brought in from Aparri or Manila.

6. SOIL AND SUBSURFACE CONDITIONS

Sabtang Port is located on a narrow coastal plain. The vicinity is generally capped with hard corals. Previous soil investigations at nearby islands have determined these hard corals to be underlain with coralline and sandy gravel materials. These materials are then underlain with stiff, moderately plastic sandy silt.

The extent, thickness and engineering properties of the soil formation at Sabtang are still to be determined since no geotechnical investigation has yet been conducted at the port site.

7. SEISMIC CONDITIONS

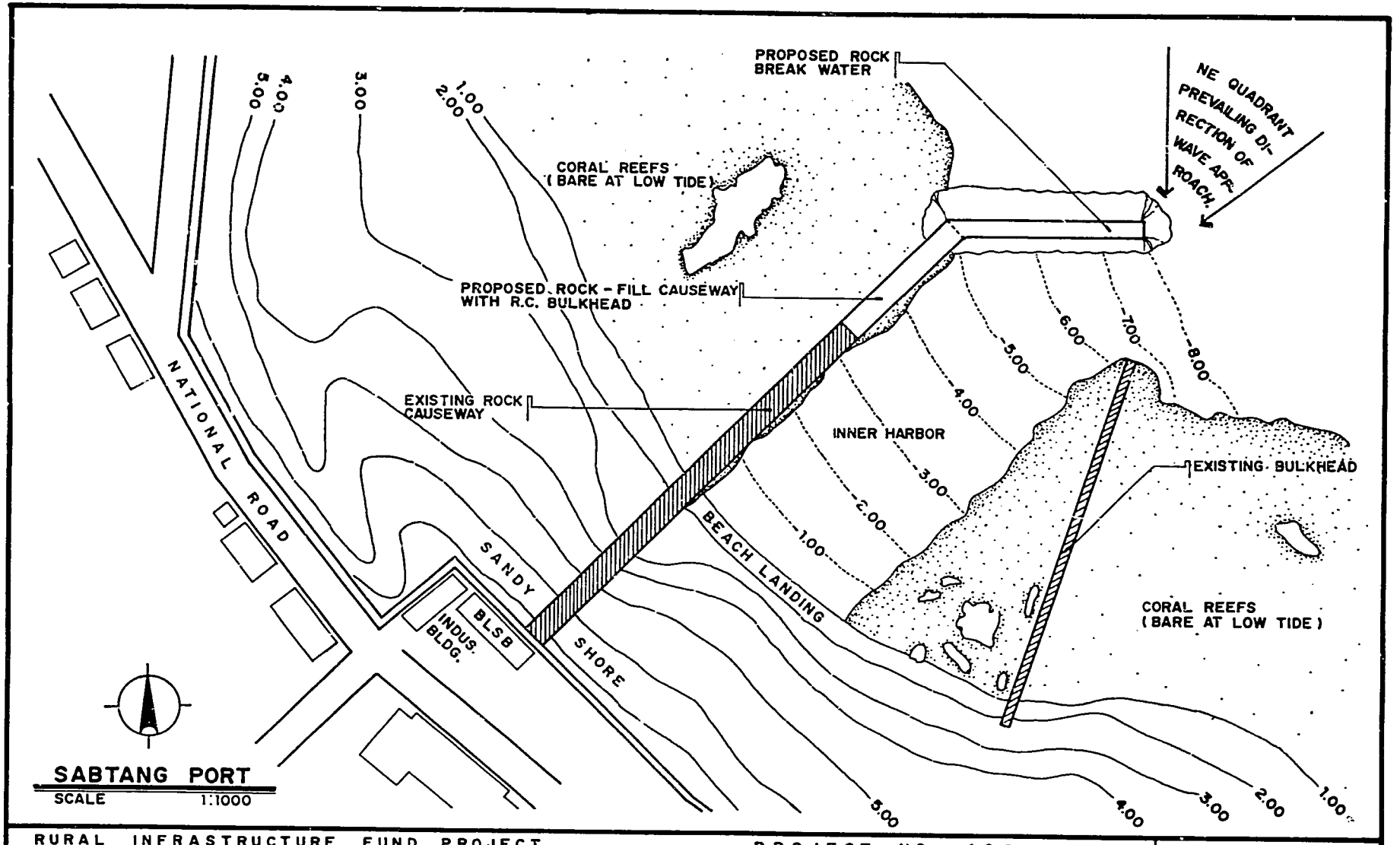
The Philippines is located along the peripheral boundary of the Pacific earthquake belt. The Batanes is one of the few regions in the Philippines, together with the major Islands of Palawan, Cebu and Bohol, that experiences an average of only one perceptible seismic shock each year.

Earthquake intensities of over 5.0 on the Richter Scale are not uncommon in the Philippines (Figure A-6). On July 16, 1990, an earthquake of intensity 7.7 on the Richter Scale hit central Luzon and caused severe damage. Design of any structure at Sabtang will take into account earthquake forces.

B. PRELIMINARY DESIGN

The proposed improvements for the Port of Sabtang (Figures 4-1 and A-7 through A-9) include the following:

- A thirty-meter extension to the existing rock-filled concrete causeway
- A forty-meter rock breakwater extending out at an angle from the end of the causeway



RURAL INFRASTRUCTURE FUND PROJECT PROJECT NO. 492 - 0420

PROPOSED PORT FACILITY

FIGURE 4-1

V.
COST ESTIMATES

V. COST ESTIMATES

A. COST OF PROPOSED PORT FACILITIES

The proposed port facilities are shown in Figures A-7 through A-9 (Appendix A). The construction cost of the proposed upgrades is estimated at ₱12,419,000.

B. UNIT RATES

The construction costs were determined by applying unit rates to the quantities. Unit rates are presented in Exhibit 10. These unit rates were developed from available data of current contracts for construction of ports at various locations in the country. In general, unit rates for port construction vary from port to port depending on the remoteness of the port. Applied unit rates are based on 1990 costs.

C. REMOTENESS FACTOR

An evaluation was made by comparing awarded contract unit prices for port subprojects at various locations throughout the Philippines. Subprojects on smaller, remote islands far from urban centers (Manila, Cebu, or Davao) or at sites accessible only by water were typically more expensive to construct than similar subprojects readily accessible by road. Therefore, a remoteness factor has been included in the cost estimate to help quantify the additional, above-normal mobilization and procurement costs required when constructing a port improvement at a remote location. This factor has been derived for each port subproject using the appropriate cost data available from other, similar port construction contracts.

Except by air, Sabtang Port is not readily accessible from Manila or any other urban center. Most materials and all equipment must be transported by water across the Babuyan Channel and the Luzon Strait to the port site on Sabtang Island, approximately 230 kilometers north of the Luzon mainland. These channels cannot be navigated during periods of bad weather, which is quite often during typhoon season. After due consideration regarding this condition, the remoteness factor for Sabtang has been assumed at 1.30.

D. CONTINGENCIES AND OTHER COSTS

A contingency factor of 10% has been taken into account for all port improvement construction. However, adverse construction conditions or unforseen obstacles are more likely for in-water construction than land-based construction. Typically, this extra uncertainly or contingency is reflected in higher unit rates for in-water construction instead of a

separate, higher contingency factor. The unit rates presented in Exhibit 10 are derived in keeping with this method.

The following additional costs are tabulated in the manner shown in the Cost Estimate Summary (Table 5-1):

o Contractor's site-related costs:

- Mobilization and demobilization		2%
- Surveying		1%
- Engineer's building at site		1%
- Office supplies, watchman, janitor		1%
- Site supervision		4%
	Total	9%

o Contractor's overhead and profit:
(based on DPWH standards)

- Contractor's overhead		10%
- Contractor's profit		9%
	Total	19%

E. ECONOMIC AND FINANCIAL COST ESTIMATE

The economic and financial analyses of this subproject have been made based on the data shown in Table 5-1. The economic cost of construction components typically varies between 70% and 90% of the financial cost. The economic and financial costs of the proposed facilities of Sabtang are tabulated in the estimate.

F. CONSTRUCTION PERIOD

The estimated construction time required for the proposed port improvement is between fourteen and sixteen months, provided that the required equipment can be readily mobilized from Manila or other urban centers.

TABLE 5-1 - COST ESTIMATE SUMMARY
THE PORT OF SABTANG
(Sheet 1 of 1)

ITEM	DESCRIPTION	UNIT	UNIT COST (Pesos)	QUANTITY	COST COMPONENTS [1000 Pesos (% of Financial Cost.)] FOREIGN	LOCAL	TAXES	ECONOMIC COST (1000 P)	FINANCIAL COST (1000 P)
	I. BREAKWATER								
68	Core Rock for Causeway or Breakwater	CU.M.	260	4,760	619 (50%)	371 (30%)	248 (20%)	990	1,238
69	Underlayer Rock	CU.M.	450	2,560	576 (50%)	346 (30%)	230 (20%)	922	1,152
71	Armor Rock, Large (larger than 1 ton)	CU.M.	690	4,140	1,428 (50%)	857 (30%)	571 (20%)	2,285	2,856
	TOTAL				2,623 (50%)	1,574 (30%)	1,049 (20%)	4,197	5,246
	II. CAUSEWAY								
50	Reinforcing Steel	KG	21	27,000	255 (45%)	249 (44%)	62 (11%)	504	566
64	Structural Concrete, Class A (over water)	CU.M.	3,300	33	38 (35%)	54 (50%)	16 (15%)	92	108
66	Structural Concrete, Class A (under water)	CU.M.	5,300	100	186 (35%)	265 (50%)	80 (15%)	451	531
69	Underlayer Rock	CU.M.	450	540	122 (50%)	73 (30%)	49 (20%)	195	244
	TOTAL				601 (41%)	641 (44%)	207 (14%)	1,242	1,449

SUBTOTAL		5,439	6,695
Remoteness Factor :	1.30	1,632	2,009
SUBTOTAL		7,071	8,704
Contingencies (10%)		707	870
SUBTOTAL		7,778	9,574
Site Costs (9%)		700	862
SUBTOTAL		8,478	10,436
Overhead & Profit (19%)		1,611	1,983
TOTAL COST		10,089	12,419

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VI.
ECONOMIC EVALUATION

VI. ECONOMIC EVALUATION

A. INTRODUCTION

Feeder port subprojects have to meet certain economic criteria to prove that the necessary investments will be beneficial to the community. All RIF port subprojects are subject to the following evaluation:

- an economic evaluation with a cut-off of 15% economic internal rate of return (EIRR)

The **economic evaluation** of feeder port subprojects is performed by using a Port Evaluation Model (Table 6-1). This spreadsheet model permits the easy economic evaluation of improvement proposals and alternatives for the proposed port subprojects. These alternatives can include the additional provision or extension of breakwaters, causeways, piers, seawalls and port buildings.

The main inputs to the model, drawing on the data discussed earlier, are:

- Traffic forecasts (Chapter III)
- Static port vessel capacities (Exhibit 11)
- Optimum vessel capacities (Exhibit 11)
- Representative vessel standby and operating costs (Exhibit 11)
- Value of passenger time (Exhibit 6)
- Construction costs for each alternative (Chapter V)

The benefits quantified can include vessel operating cost savings, time cost savings and maintenance cost savings as well as reduced handling, spoilage and development benefits. The economic evaluation of this subproject has been carried out with the following assumptions:

- The subproject life is assumed to be twenty years.
- For discounting purposes, annual values are assumed to be incurred at the end of each year.
- The opportunity cost of capital is set at 15%.

The benefits not usually quantified are:

- The expected new revenue opportunity for vessel, passenger, cargo and fish landing fees presented by the proposed new facilities (Chapter VII)

- Social benefits and some indirect development benefits

B. SUBPROJECT BENEFITS

The proposed subproject at Sabtang recognizes this port as the principal basic requirement of the isolated Island Municipality of Sabtang. However, the proposed extension to the causeway with a protective breakwater cannot be justified on the basis of economic return. The sparse population of only 1,680 is not able to generate, in themselves, the necessary economic benefits.

Yet, there is currently no viable alternative to small vessel marine services between Sabtang and Basco or between Sabtang and the other small feeder ports in Batanes. The ground swells typical of an exposed sea with a long fetch frequently affect small ports such as Sabtang that do not have natural or man-made breakwaters by limiting their use and threatening their moorage. The islands of the province are small and exposed to typhoons which can effectively isolate them from one another and from Luzon Island for weeks at a time.

On the other hand, population growth rates are relatively high at 1.73% per year. The residents, as members of the Ivatan cultural minority, are resistant to outward migration. Their local markets are currently accessible only by small vessels between the nearby island feeder ports and Basco. Access between Basco and Manila or Aparri is by infrequent inter-island vessels.

The problem is recognized by the national government which currently subsidizes air services between Manila and Basco. The national government also provides a navy operated lighter service between Basco and Manila at less than commercial rates.

The proposed subproject at Sabtang recommends an extended causeway, which can support slightly larger vessels, and a protective breakwater. However, in this kind of an environment, the base criteria to support the proposed additions should be social rather than economic. A purely economic justification is clearly inadequate.

In any event, the underlying basic criteria for economic evaluation would include the following:

1. VESSELS

There are currently twenty-five motorized fishing vessels with an average capacity of about one-half ton.

There are about thirty non-motorized fishing vessels of about the same capacity.

There are five commercial vessels larger than three tons capacity (Table 3-1).

Effective port days are estimated at less than 250 days per year.

2. PASSENGERS

There were 28,800 passengers surveyed who embarked or disembarked at Sabtang in 1990. This is projected to increase to 31,336 passengers by 1992 (Table 3-1).

3. CARGO

There were 28,800 tons of cargo, six tons of locally caught marginal fish and forty tons of fish imported from other islands surveyed through Sabtang Port in 1990. This is projected to increase to 31,336 tons of cargo, six tons of local fish and forty-six tons of imported fish in 1992 (Table 3-1).

4. SPOILAGE

Surplus root crops and garlic are reported to be frequently discarded at Sabtang due to the absence of markets in the province and due to the cost and distance from markets on Luzon. Present production is understandably small.

Forty tons of fish were imported from other islands in 1990. This should increase with Sabtang population growth over the forecast period. Fish spoilage, in the absence of market sheds or other protective spaces, is generally estimated at 2% of the total landing.

5. DEVELOPMENT BENEFITS

Development benefits are considered as those derived from economic development generated by the proposed port improvement or construction. Generated activities are related to the type of investment and may occur in the port's direct or indirect zone of influence. The additional development may originate in extending agricultural areas that were not cultivated before, by improving agricultural technology, by attracting new tourists, by increasing fish catch, by increasing mineral exploitation, etc.

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In order to attribute development benefits to a specific port investment, one must be sure that the existing port condition and the facilities are the principal constraints for that development. The following four threshold criteria are considered essential to determine if further analysis of possible development benefits is required:

o Investment type

The proposed investment is classified as:

- Construction of a new port
- Increasing the number of months of service or upgrading the port to an all-weather port
- Significantly increasing the port's capacity in terms of space or vessel type

o Complimentary investment

In order to generate the new activities, an additional substantial complimentary investment is not required.

o Transport system

The transport system will fall into one of the following categories:

- The port is the only outlet for passenger or cargo movements from and to its hinterland
- There is no alternative all-weather transport system, cheaper than the proposed port, which serves its hinterland
- There is an effective port capacity constraint

o Development potential

An unexploited potential is identified in the port's hinterland (sea or land).

The Port of Sabtang serves the major mode of transport in the island. The port improvement will not significantly increase the port capacity and will not release the main constraint, which is the unpredictable weather condition in the zone. Hence, development benefits will not be quantified for this port subproject.

C. [illegible] COSTS

1. [illegible]TION COSTS

Sub[illegible] are developed and described in detail in Chapter [illegible]

2. MAINTENANCE COSTS

Maintenance costs are projected to commence at 2% of original investment costs and to increase thereafter at 8.5% per year until the asset is replaced. A 2% original maintenance investment typically reflects a structure not exposed to harsh weather or sea conditions. However, the subproject site at Sabtang is exposed to both waves and weather. But, since the proposed improvements are typically low-maintenance type structures, projecting a 2% original maintenance costs is appropriate in this case.

D. ECONOMIC EVALUATION

Since economic benefits were clearly unable to support the proposed additions, no economic evaluation was undertaken.

E. RECOMMENDATION

The proposed subproject is clearly not economically viable. However, the Consultant recommends that the subproject be undertaken based on social considerations.

TABLE 6-1

ECONOMIC ANALYSIS
(1000 Pesos)

PORT: Sabtang LOCATION: Batanes

YEAR	VESSEL SAVINGS (1)	PASSENGER SAVINGS (2)	HANDLING SAVINGS (3)	SPOILAGE SAVINGS (4)	MAINTENANCE NET COSTS (5)	PROJECT COSTS (6)	NET BENEFIT STREAM (7)
1991	0.0	0.0	0.0	0.0	0.0	10,089.0	(10,089.0)
1992	309.5	24.1	11.6	86.0	201.8	0.0	229.4
1993	316.4	26.8	11.9	89.2	218.9	0.0	225.5
1994	323.4	29.9	12.3	92.6	237.5	0.0	220.6
1995	330.6	33.2	12.7	96.1	257.7	0.0	214.8
1996	337.9	37.0	13.1	99.7	279.6	0.0	208.0
1997	345.4	41.2	13.5	103.5	303.4	0.0	200.1
1998	353.1	45.8	13.9	107.4	329.2	0.0	191.0
1999	360.9	51.0	14.3	111.5	357.2	0.0	180.5
2000	368.9	56.8	14.7	115.7	387.5	0.0	168.7
2001	377.1	63.2	15.2	120.2	420.5	0.0	155.2
2002	385.5	70.4	15.7	124.8	456.2	0.0	140.1
2003	394.0	78.3	16.2	129.6	495.0	0.0	123.1
2004	402.8	87.2	16.7	134.6	537.1	0.0	104.1
2005	411.7	97.0	17.2	139.8	582.7	0.0	83.0
2006	420.9	108.0	17.7	145.2	632.3	0.0	59.5
2007	430.2	120.2	18.3	150.9	686.0	0.0	33.6
2008	439.8	133.7	18.9	156.7	744.3	0.0	4.8
2009	449.5	148.9	19.5	162.9	807.6	0.0	(26.8)
2010	459.5	165.7	20.2	169.2	876.2	0.0	(61.7)
2011	469.7	184.4	20.8	175.9	950.7	0.0	(99.9)
TOTAL	7,686.8	1,602.8	314.3	2,511.4	9,761.5	10,089 0	(7,735.3)

TOTAL BENEFITS: 12,115.3 COSTS: 19,850.5

RESULTS:

Net Present Value (15%)	(8,963.5) (1000 Pesos)
Benefit Cost Ratio	0.11
EIRR (%)	NEGATIVE

SENSITIVITY ANALYSIS:

Costs:	+15%	+0%	+15%
Benefits:	+0%	-15%	-15%
Net Present Value (15%)	(10,797.1)	(9,452.6)	(11,286.1)
Benefit Cost Ratio	0.07	0.06	0.03
EIRR (%)	NEGATIVE	NEGATIVE	NEGATIVE

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VII.
FINANCIAL ANALYSIS

VII. FINANCIAL ANALYSIS

The terms of reference require a study to determine if the proposed project could be sustained by the responsible municipality from revenues generated by the port as a whole. This analysis assumes that the municipality is prepared to assess wharfage, layover, cargo, passenger and concession fees much as is currently undertaken at Caramoan (Guijalo) on the Lagonoy Gulf. Further, it has been assumed that the municipality is prepared to increase such fees proportionate to the projected growth in per capita income until the port becomes self sustaining.

It should noted, however, that the assessment and collection of port fees by municipalities is the exception rather than the rule throughout the Philippines.

The economic analysis performed for the Port of Sabtang clearly indicated that the proposed upgrades are not economically feasible. As a result, a Financial Analysis has not been undertaken.

VIII.
SOCIAL SOUNDNESS ANALYSIS

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VIII. SOCIAL SOUNDNESS ANALYSIS

Social soundness analyses evaluate the effect of construction projects from the perspective of the intended beneficiaries, local residents and institutions in the zone of influence. This analysis focuses on effects on income, population movements and cultural minorities.

Batanes Province is the smallest and one of the most neglected provinces in the Philippines. It is isolated by gale force winds for much of the year. The hardy Ivatan residents are able to withstand the harsh climate.

The Ivatan live in low, solidly built houses that are able to withstand the frequent typhoons. Many houses have meter-thick walls with thick thatched roofs. Even the boats of the Ivatan differ from the Luzon bancas. They are more like wooden European dories than Eastern craft. The neat little Ivatan houses are often painted white. Not a scrap of trash is in evidence in the clean villages. Ivatan women wear a "soot", a palm fiber headdress used to protect their head, shoulder and back from rain, wind and sun.

Sabtang is a sixth-class town. It has a population of 1,680 and is composed of six barangays. The scenery is spectacular and the island is peaceful. There are no cars on Sabtang; one walks from village to village. Householders arrange for their needs by negotiating directly with fishermen, farmers and butchers. No one charges or accepts money, even from the occasional tourist.

A. BASCO

Sabtang Municipality depends on Basco, the provincial capital, for much of its outside communications. Basco is a sixth-class municipality with six barangays and a population of 8,887 (1988). There is no industry, but electricity is available for a few hours in the evenings. Expanding electrical capacity is currently a priority government project. Basco Port is a national port under the supervision of the Philippine Port Authority (PPA). It was damaged during a typhoon in 1987 and is not serviceable in all weather. All prime commodities bound for Basco come from Luzon. Of these, 5% are then shipped to Sabtang. There are regularly scheduled passenger and cargo vessels from Basco to Itbayat and Sabtang.

The major constraint on provincial development is the isolation of the province. As of 1989, there had been no telephone service for over a year, after rebels bombed the Cagayan relay station at Lallo. The only regular transportation currently available is by airplane. There are two airports, one at Basco and the other at Itbayat, with daily flights scheduled from Manila. However, flight service is often irregular, with many flights cancelled by adverse wind conditions. Also, planes

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will not take off if there are not enough passengers. Sometimes, there are no available aircraft.

Provincial isolation is primarily due to the lack of regular sea transportation to Luzon. Batanes is the only province without commercial shipping service. This is because travel is risky. Batanes weather is unpredictable, changing every thirty minutes, because the islands are exposed to the Pacific Ocean and its typhoons. Also, there is no shelter for ships in case of bad weather.

The province has depended on the Philippine Navy for assistance. A navy LST had been assisting by transporting essential goods about four times per year, but it was stranded on shore during a 1987 typhoon. There are two charter boats which also call at Basco. Each comes about six times per year.

Currently, cargo is transported by air, driving the prices to about five times the original value of the goods. Thus, the government would like to divert air transportation to sea transportation. Provincial plans call for providing continuous, inexpensive transport to Manila through the Floating Market Project. This requires acquisition of vessels and the rehabilitation of the Basco pier to provide an all-weather port. The proposed improvement of Sabtang Port will be much more valuable if undertaken in conjunction with the improvement of the PPA Port of Basco.

B. SABTANG

Sabtang Port is located in Barangay Sanakan within the Municipality proper of Sabtang. The port recently underwent construction of an extension to the causeway, now about eighty meters long. Some vessels use the causeway during high tide, but passenger and cargo vessels usually beach at the adjacent shoreline.

The Island of Sabtang is considered the major fishing center of Batanes, but Sabtang still has a very small catch per year. Sabtang is importing fish from Batan Island, usually from the Municipality of Ivana. The peak fishing season is from April or May to August or September. The average catch during the peak season is thirty kilos per day. During the remaining months, the average catch is eight kilos per day.

The Municipality of Sabtang has twenty-five motorized fishing boats which use fifteen to forty-five horsepower engines and have an average capacity of one-half ton. There are also thirty non-motorized bancas. Two small motor boats carry passengers and cargo with an average capacity of ten passengers each. There is also one government boat. Their boats do not have outriggers.

Most of the cargo and passengers unloading at Sabtang come from the Municipalities of Ivana and Basco, but a little comes

from Mahatao. Ivana is closest to Sabtang. From Sabtang, it takes only fifty-five minutes to reach Ivana, which is about five kilometers away. Basco Port is about fifteen kilometers and requires almost two hours travel. Mahatao is ten kilometers and takes one hour and twenty minutes.

The Mayor of Sabtang seeks the improvement and expansion of the port to permit easier export of local products and to allow the docking of larger vessels which can easily supply their basic needs. Only corn, cattle and garlic are exported; food, fish, fuel, cement, sugar, lumber, salt and bottled cargo are all still imported.

The improvement of the Sabtang Port will be particularly more effective if undertaken in conjunction with the upgrading of Basco. An improvement will result in substantial socio-economic benefits for the people of Sabtang. The major benefit will be relaxation of constraints on development due to the unavailability and high cost of imported goods. In addition, it will facilitate exports and encourage more regular passenger service which will reduce the social isolation of the province.

Improvement of Sabtang Port is not expected to result in any significant population migration. Because of the hostile climate, in-migration from Luzon is unlikely to result. Some migration of Ivatan youth to Luzon might be encouraged, but this will be minimized by family ties and regional loyalties.

The residents of Sabtang belong to the Ivatan cultural minority who have been somewhat isolated from mainstream national development and deserve special consideration. The residents, through their mayor, are actively seeking the port improvement project to improve transportation and communication linkages.

In conclusion, the proposed port improvement project would result in significant social benefits for a relatively neglected cultural minority. No negative social impacts are foreseen. Thus, the subproject is socially sound.

For further analysis, refer to the Social Soundness Overview included in Appendix D.

IX.
ENERGY ANALYSIS

50

IX. ENERGY ANALYSIS

Energy savings derived from these proposed port improvements can be primarily attributed to the economies of consumption and the economies of scale. The economies of consumption result from a faster turn-around time at the improved port. Less time spent at the port allows more time for transit while maintaining the same transportation schedule. Transit at reduced speeds results in more efficient fuel consumption and realized energy savings.

The economies of scale evolve from the use of larger vessels made possible through port improvements. Approximately twice the amount of cargo or passengers can be shipped in a larger vessel at only a 50% increase in energy consumption.

A secondary but important source of energy savings results from the reduced wastage of other perishables, such as ice, when they can be protected in sheds and/or bodegas.

Other probable savings are not significant in the context of single municipal ports.

Representative vessel types were selected on the basis of general applicability to the current and future requirements of all municipal ports surveyed. Exhibit 9 displays vessel types, roles and costs and describes fuel consumption factors per unit of work undertaken. Vessel types are described in Table 9-1. Figure 9-1 shows the average fuel consumption in liters/hour for each vessel type.

TABLE 9-1

REPRESENTATIVE VESSELS

TYPE OF VESSELS	DESCRIPTION	PRINCIPAL ACTIVITY
Small Paddle Banca	without engines and not usually in excess of 3/4 DWT	subsistence fishing, some passenger and cargo handling as lighterage service
Small Motor Banca	16 HP Briggs and Stratton engines and not usually in excess of 1.5 DWT	fishing, (40 - 60%) transporting passengers (20 - 40%) and cargo (10 - 20%)
Medium Motor Banca	85 HP Fuso 4DR5 diesel engines and of an average displacement of 4 DWT	transporting fish, usually in support of much larger trawlers (40 - 60%) fishing (20 - 40%) and transporting cargo (10 - 20%)
Large Motor Banca	two 85 HP engines or single 165 HP Isuzu engine and of an average displacement of 9 DWT	transporting cargo (40 - 60%), fish (20 - 40%) and passenger (10 - 20%)
Medium Launch	two 85 HP engines or a single 165 HP Isuzu engine and of an average displacement of 10 DWT	transporting passengers (80 - 90%) and cargo (10 - 20%)
Large Launch	two engines totalling about 250 HP and of an average displacement of 20 DWT	transporting passengers (80 - 90%) and cargo (10 - 20%)
Small Trawler	two engines totalling about 250 HP and of an average displacement of 20 DWT	fishing (60 - 80%) and transporting fish (20 - 40%)
Large Trawler	two engines totalling about 300 HP and of an average displacement of 40 DWT	fishing (60 - 80%) and transporting fish (20 - 40%)

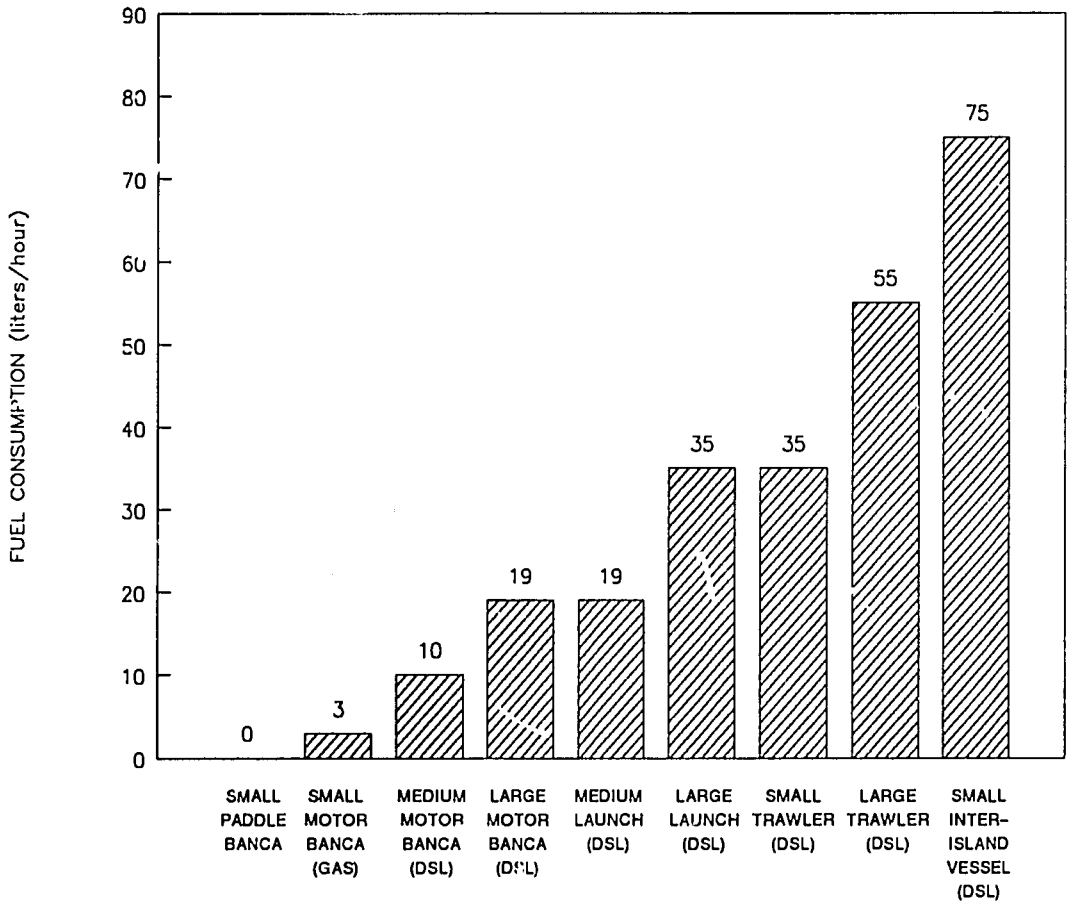
TABLE 9-1
(CONTINUED)

REPRESENTATIVE VESSELS

TYPE OF VESSELS	DESCRIPTION	PRINCIPAL ACTIVITY
Small Inter Island Vessel	two engines totalling about 400 HP and of an average displacement of 80 DWT	transporting passengers (40 - 60%), cargo (20 - 40%) and produce (10 - 20%)
Medium Inter Island Vessel	two engines totalling about 800 HP and of an average displacement of 1,000 DWT	transporting passengers (40% - 60%), cargo (20% - 40%) and produce (10% - 20%)
Large Inter Island Vessel	two engines totalling about 2,400 HP and of an average displacement of 2,000 DWT	transporting passengers (40% - 60%), cargo (20% - 40%) and produce (10% - 20%)

FIGURE 9-1

ASSUMED FUEL CONSUMPTION



(GAS) = Gasoline engine

(DSL) = Diesel engine

FS/SABTANG

X.
ENVIRONMENTAL ASSESSMENT

55

X. ENVIRONMENTAL ASSESSMENT

A. SUBPROJECT DESCRIPTION

Improvements proposed for the Port of Sabtang are described in detail in Chapter IV of this report. Construction involves an extension to the existing causeway and an attached breakwater structure (Figure 4-1). No other construction or dredging activities are proposed for the coastal or offshore environment.

B. EXISTING ENVIRONMENT

1. PHYSICAL ENVIRONMENT

The subproject site is in Barangay Sanakan of the Municipality of Sabtang, in the Province of Batanes (Figure 1-1). The existing facility, which consists of a causeway and seawall (Figure 1-2), is basically a beach landing on the shores of Sabtang town (Plate 1-1). The concrete barriers are located along a three to four meter deep natural channel through the shallow rock shelf fringing the Sabtang coast (Figure 10-1).

Situated on the northeast coast of Sabtang Island, the port site is exposed to Pacific Ocean swells that accompany the northeast monsoon (amihan, nortada; September to March). The port site is also highly exposed to typhoon conditions that frequent the Batanes area, particularly from early June to late September. One out of three typhoons that strikes the Philippines each year passes through the Batanes Islands. In addition, the Batanes Islands are noted for high tidal currents that reach extreme velocities of five to eleven knots.

Sabtang Island is volcanic in origin and characterized by steep rugged slopes, deep canyons and bench-like plateaus adjoining basaltic peaks and headlands (Plate 1-1). The narrow coastal plain of the Sabtang Port site extends seaward as a shallow littoral shelf that is exposed at low tide. This intertidal shelf extends an average of one hundred meters offshore to reach a reef front which abruptly descends several meters to a coarse sandy foreslope.

2. NATURAL RESOURCES

Based on the municipal profile, approximately thirty percent of the 4,632 hectare land area of Sabtang is forested. These remaining forests are scattered as low growths along steeper slopes reflecting the high wind regime of area. The majority of the island is characterized as pastures and seasonal agricultural land.

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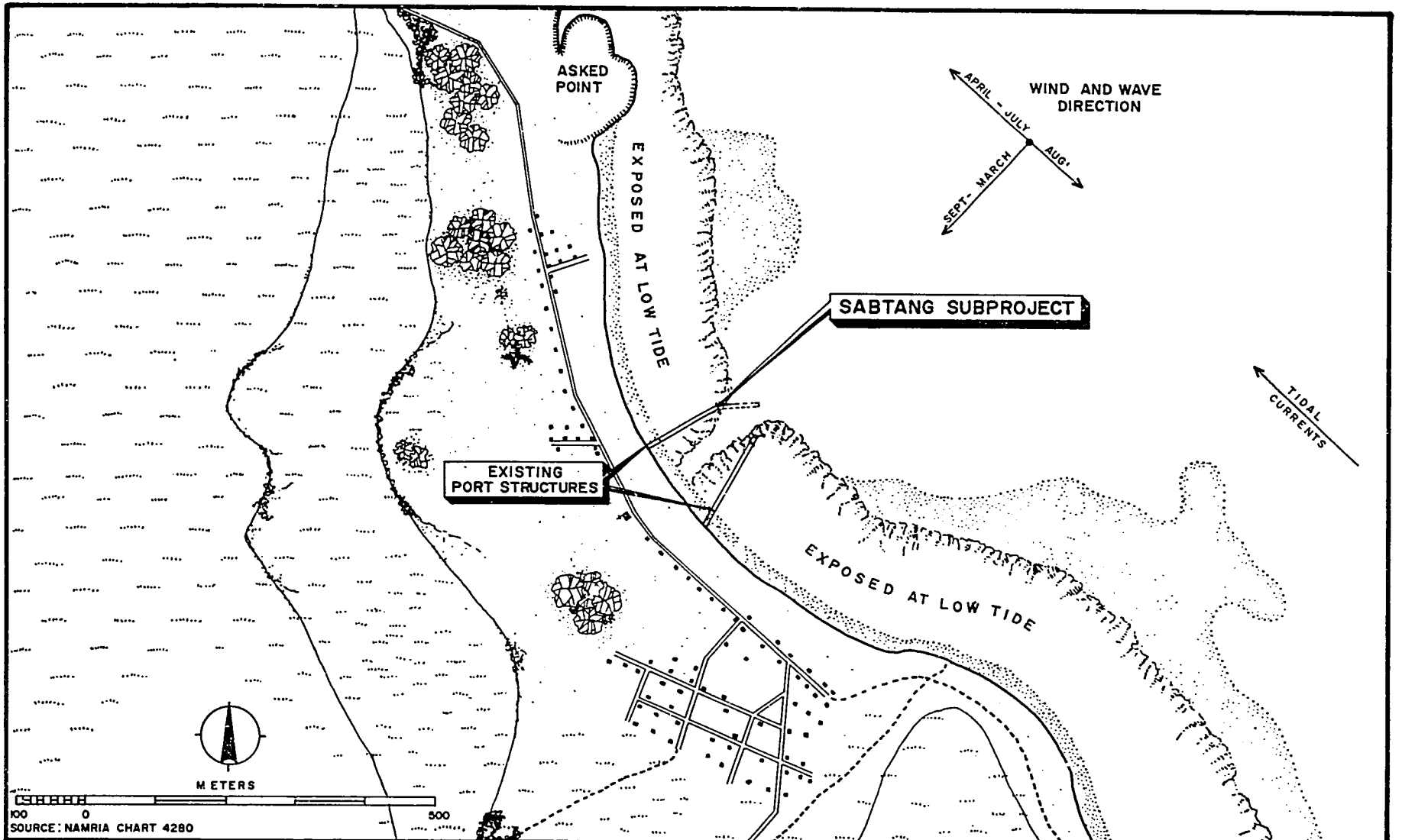


RURAL INFRASTRUCTURE FUND PROJECT — PROJECT NO. 492 - 0420

VICINITY MAP OF SABTANG PORT

FIGURE 10-1

Aquatic resources are limited by the harsh conditions (e.g., high wave impact) of the coastal zone. The benthic community of the adjacent reef flat includes the brown algae **Dictyota** and encrusting sponges. Stunted coral growth (**Montipora, Acropora, Millepora**) covers the reef front. The rugged coastline of Sabtang does not support any mangrove or estuarine areas.

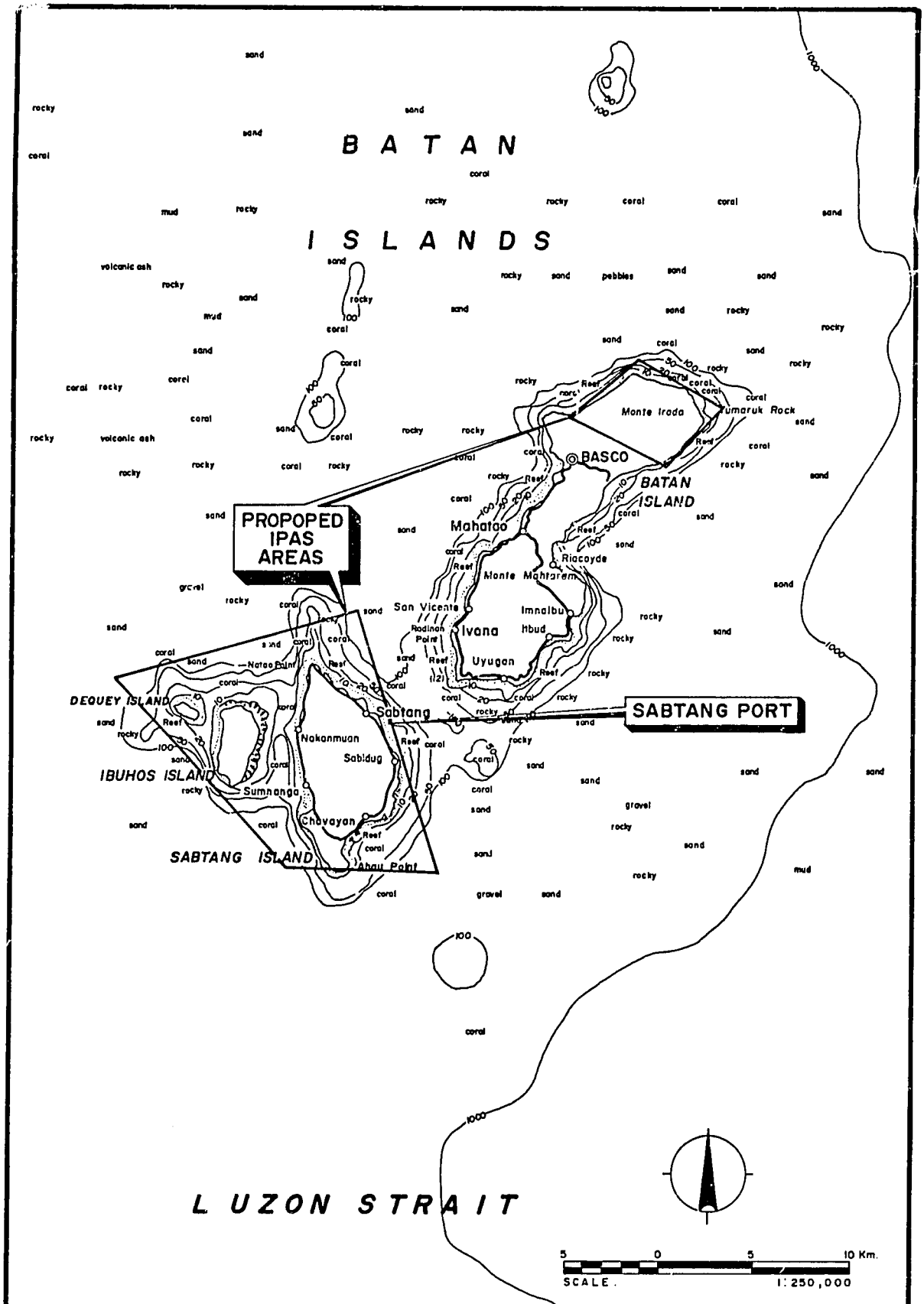
Sabtang, the adjoining islands of Ibuhos and Dequey, as well as the area surrounding Mount Iraya (Batan Island), are candidate sites for the Integrated Protected Area System (IPAS, Figure 10-2). The basis for proposed protected status is the reported presence of endemic plant species including a palm (**Phoenix hanceana var philippinensis**, voyavoi; Plate 10-1, Photo 3) and two orchids (**Vanda sandereana**, waling waling; **Asplenium sp**, pakpak-lawin). In addition, the designated islands are noted for beautiful coral reefs which serve as foraging areas for the endangered green sea turtle (**Chelonia mydas**) and hawksbill turtle (**Erethmocheles imbricata**). Illegal fishing by the Taiwanese is reportedly the primary threat to these endangered turtles.

3. CULTURAL AND SOCIO-ECONOMIC RESOURCES

a. Human Settlement and Livelihood

The subproject involves the principal port facility of remote and underpopulated Sabtang Island. Sabtang Municipality consists of 1,680 residents, most of whom live in the port site community (Plate C-3, Photo 10).

The settlement and livelihood activities of Sabtang are distinguished by adaptation and self-sufficiency. Local structures are stoutly built to resist typhoon winds, with stone masonry walls over one-half meter thick. The unique plank-built boats (Plate 10-1, Photo 4) of Sabtang are designed for beach launching and landing to respond to constantly changing sea conditions. These open dory-like boats are used as the sole means of inter-island transportation and coastal fishing. Fishing is limited to a marginal, subsistence level, conducted during the calmer months. An estimated ten percent of the local boats are motorized and capable of offshore fishing. Agriculture, the primary source of local livelihood, is restricted to a single cropping cycle of wind tolerant, nonperishable root crops (garlic, yams, onions). Agricultural production is oriented towards home consumption with stored rootcrops, supplemented by dried fish, providing the basic source of nutrition during stormy months of isolation. The extensive grasslands of Sabtang, including the smaller islands of Ibuhos and Dequey, are utilized as communal pastures for cattle and goat raising. The population of Sabtang has remained relatively stable in recent years though outmigration has been a recurrent problem in the past.



RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

LOCATION MAP OF SABTANG PORT SITE AND PROPOSED INTEGRATED PROTECTED AREA SYSTEM (IPAS) AREAS

FIGURE 10-2

PHOTO 3: THE ENDEMIC "VOYAVOI" PALM, PHOENIX HANCEANA VAR PHILIPPINENSIS; PALM FIBERS ARE LOCALLY USED TO MAKE THE TRADITIONAL "SOOT" HEADDRESS

PHOTO 4: TRADITIONAL PLANK BUILT BOAT OF SABTANG ISLAND

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420	PLATE 10-1
REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA	

A detailed economic overview of the proposed subproject is presented in Chapter II of this report.

b. Transportation

A description of the transportation network serving the Sabtang area is also provided in Chapter II. As an island community, Sabtang is dependent on sea travel to reach the nearest source of basic necessities (fuel, rice) and public services in the provincial capital of Basco, over twenty kilometers to the north (Figure 2-1). Basco, via the Ivana beach landing, is also the primary market outlet and transportation center, with twice-yearly government transports supplying subsidized rice and fuel, while carrying island products (cattle, onions, garlic) to Luzon on the return trip. Philippine Airlines services Basco daily, from Tuguegarao or Laoag, as weather permits.

The smaller villages of Sabtang Island are linked to the port site community by a coastal dirt road and inland cart trails. With the exception of animal drawn carts, there is no land transportation available on the island. Rough sea conditions, particularly during the northeast monsoon, restrict all sea travel and isolate Sabtang for periods of one month or more.

c. Archaeological and Historical Sites

Based on available references and interviews with officials of the National Museum and local residents, significant archaeological and cultural resources are known to be present in the vicinity of the subproject. Archaeological discoveries in the Batanes Islands and Babuyan Islands to the south, have included numerous jar burial sites dating to the first quarter of the Christian Era (0-500 A.D.). A site on nearby Batan Island contained the earliest relics of burial jar culture reported in the Philippines. Similar jar burial sites, locally called "cunucun", were recently excavated near the existing cemetery of Sabtang Island, approximately eight kilometers from the port site. These cunucun resemble cairns, or mounds of coral rocks, two to three meters in diameter, which enclose the clay burial jars (ranga) and associated artifacts such as early Chinese porcelain. All cunucun burial sites discovered to date have been located in shoreline rather than interior or upland locations, reflecting the maritime heritage of the early island culture.

To the south of Sabtang, Balintang Channel served as the historic trade route of Chinese junks and Spanish galleons. These traders, and the English privateers who pursued them, regularly visited Sabtang Island during the sixteenth century. Diseases introduced and relocations forced during the Spanish era severely decimated the early burial jar culture of Sabtang Island.

The Sabtang Port area is rich in cultural resources that link the present to the past. The design and construction technique of the plank-built boat used exclusively in the Batanes (Plate 10-1, Photo 4) appears to be unchanged since pre-Spanish times. These boats are built only in Sabtang, by a group of five skilled craftsmen, using a locally cut hardwood called "palomaria". Women of Sabtang Island traditionally wear a unique wig-like headdress, called "soot", for weather protection (Plate 10-2, Photo 5). This headdress is reportedly only made on Sabtang from the fine fibers of the endemic "voyavoi" palm tree. The local dialect, Ivatan, is unique to the Batanes Island.

C. IMPACT ASSESSMENT

1. PHYSICAL ENVIRONMENT

Proposed construction activities involve the limited extension of an existing, seasonally active port facility. The subproject site is dominated by physical elements including:

- Oceanic swells, high winds and heavy surf conditions generated by the northeast monsoon (September to March). Wind and swell direction is perpendicular to the shore at the subproject site resulting in severe wave action within the existing Sabtang beach landing facility (Figure 10-1, Plate C-6)

- Storm swells, extreme winds and heavy surf conditions generated by frequent typhoon conditions (early June to late September). Wind and swell direction is highly variable, from parallel to perpendicular to port site shoreline

- Strong tidal currents which flow in a northwesterly direction during both flood and ebb tides

These severe parameters directly influence the coastal zone of the port site, particularly the dynamic shoreline processes of sand transport, beach accretion and erosion.

Slight headlands to the north (Asked Point, Plate C-1, Photo 7) and south, fringed by a shallow rock shelf provide a degree of natural protection to the beach landing of Sabtang Port. Past engineering efforts to enhance the sea protection of the site include the existing causeway, bulkhead and extensive shoreline seawalls (Plate C-7, Photo 17). These port structures have not resulted in any discernable negative alteration of the physical environment as reflected in shoreline alignment, sand build up or loss. Based on these observations,

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PHOTO 5: TRADITIONAL "SOOT" HEADDRESS WORN BY SABTANG ISLANDERS FOR WEATHER PROTECTION

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420	PLATE 10-2
REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA	

and the limited extension of the causeway and designed breakwater structure, the subproject structures are not predicted to further impact the physical environment. The need for the Sabtang subproject is described (Chapters II, III, VI) in social terms rather than port throughput potentials. Port use and associated environmental affects (e.g., degradation of water quality; solid waste pollution), are not anticipated to substantially increase as a result of the subproject.

Identified sources of construction materials are listed in Chapter IV and include beach sources of sand, gravel and armour rock. The quantities of sand and gravel required for the causeway extension are minimal and the port site beach is the regular source of such materials. The substantial quantity of armour rock called for in the subproject could induce significant shore erosion if such rocks are sourced from shoreline areas. The shoreline fields of armour rock identified as material sources (Figure A-5) serve as natural breakwaters of wave action and the littoral currents which strongly influence sand transport patterns and beach dynamics (Plate 10-3). Beach erosion could seriously threaten and undermine the coastal road and seawalls of Sabtang (Plate C-7, Photo 18). Based on these environmental considerations, an inland quarry should be the required source of armour rock. For aesthetic reasons, the adjoining headlands and cliffs bordering the Sabtang Port site should not be considered as potential quarry sites.

The construction contractor is required to restore, to natural grade and condition, all borrow pits, laydown areas, side slopes and other construction affected areas per DPWH Standard Specifications, Volume One, Requirements and Conditions of Contracts. Adherence to these specifications and formulation of special guidelines where warranted is under the auspices of the local DENR (Department of Environment and Natural Resources) and DPWH District Offices.

Construction related impacts on the physical environment could occur as a result of improper disposal of solid waste (both construction debris and refuse from construction crews) and accidental spills of environmentally harmful materials such as petroleum products. It would be mandatory for the construction contractor to develop and implement a waste management plan for the duration of the subproject construction that assures safe and appropriate handling of all waste materials.

2. NATURAL RESOURCES

Improvement of the Sabtang Port by extension of the existing causeway and construction of a breakwater structure is predicted to have insignificant impact on the local marine environment. Past port construction activities at the Sabtang site has not resulted in the discernable alteration of the dominant reef communities (**Dictyota** algae and hard corals). The relatively small, stunted corals observed in the surveyed reef

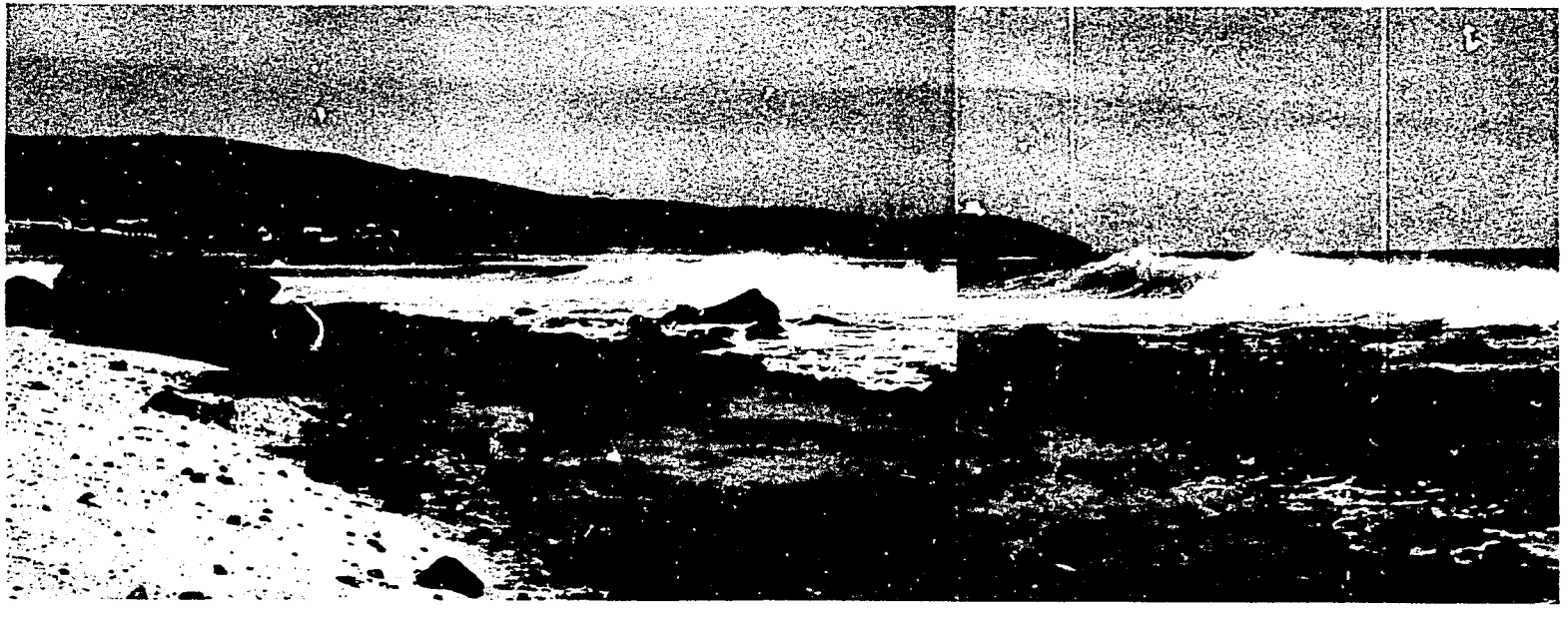


PHOTO 6: IDENTIFIED MATERIALS SOURCE IMMED:ATELY SOUTH OF SUBPROJECT SITE; NOTE SURF CONDITIONS AND PROTECTIVE ROLE THAT SHORELINE BOULDERS AND ARMOUR ROCK SERVE IN DISSIPATING WAVE ENERGY AND MITIGATING BEACH EROSION

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA

PLATE 10 - 3

area are typical of wave-stressed, typhoon affected shallow reef environments. The impact of the subproject on the rich biodiversity of Sabtang and adjacent Batanes Islands as identified and delineated under the proposed IPAS program (Figure 10-2) is expected to be minimal as this is a minor upgrade which will result in little projected increase in port use and no exploitation of natural resources.

3. CULTURAL AND SOCIO-ECONOMIC RESOURCES

a. Human Settlement and Livelihood

The described port subproject will not displace, or relocate, any existing structures, inhabitants or livelihood activities. The proposed improvements will compliment the settlement patterns and livelihood pursuits of Sabtang without disrupting cultural practices of the Ivatan cultural community. The subproject may indirectly contribute to reducing the recurrent pattern of out-migration of Sabtang islanders to Luzon by enhancing livelihood opportunities dependent on sea travel.

Socio-economic benefits attributed to the completed Sabtang Port are described in detail in Chapter VIII.

b. Transportation

Sabtang Island is dependent on sea transportation for market and public service access. The safety and shelter of the primary port facility of Sabtang will be enhanced as a result of the completed subproject. The addition of a breakwater structure, combined with the extended causeway will reduce the influence of wave action at the Sabtang beach landing (Plate C-6), particularly during the extreme conditions of the northeast monsoon (September to March). This may facilitate the launching and landing of local boats which may otherwise not be possible due to strong shorebreak (waves). The proposed port structures are not designed for docking of larger vessels though the more secure anchorage will encourage and accommodate such vessels.

c. Archaeological and Historical Sites

The immediate vicinity where the port improvements are proposed has been subjected to human disturbances in the past, including the construction of the existing port structures, and is not known to specifically include archaeological sites, historical monuments or culturally significant features. The lack of reported archaeological resources near the remote site may reflect limited survey and exploration efforts rather than an absence of such resources. The early history of the Sabtang area and numerous archaeological finds elsewhere in the Batanes and Babuyan Islands increase the possibility that archaeological resources may be located in the general subproject area.

Based on Philippine Law, the contractor would be required to halt construction if any archaeological properties are encountered in order to allow the National Museum to investigate discoveries and put into effect chance find procedures. DPWH should coordinate with the archaeological authorities to implement national standards of rescue and recovery of finds as appropriate.

D. ALTERNATIVE CONSTRUCTION ACTION

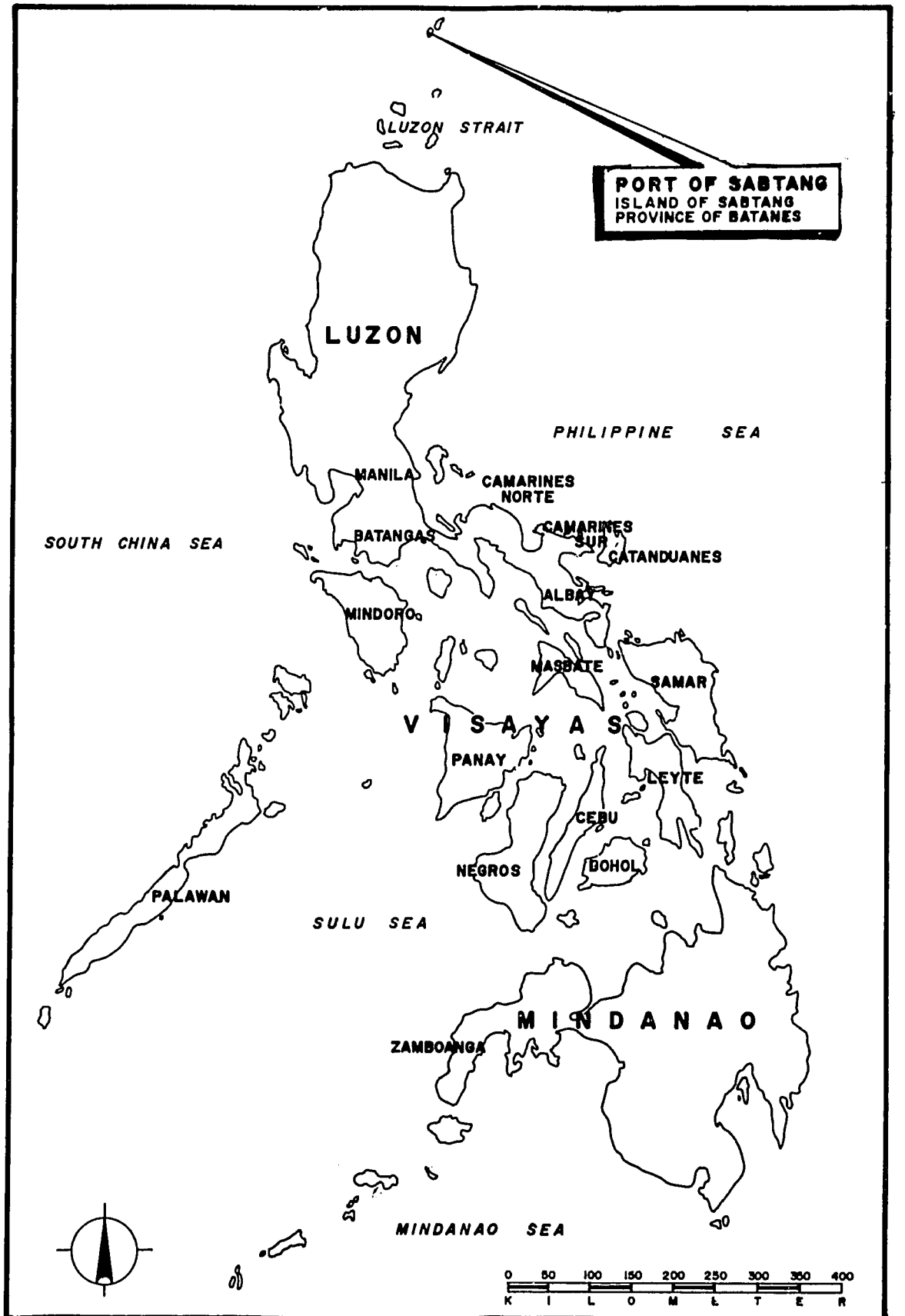
1. NO ACTION ALTERNATIVE

The no action alternative would not improve the quality and utility of the existing Sabtang Port facilities or correct the prevailing port deficiencies of sea protection. Based on the acknowledged socio-economic importance of this subproject, the no action alternative is considered unacceptable.

2. ALTERNATIVE CONSTRUCTION ACTION

In addition to the proposed subproject, local residents reported the need to repair the island's road system which currently is in a deteriorated condition. Due to rough sea conditions and rugged coastline, these roads and cart trails are the primary means of travel on the island.

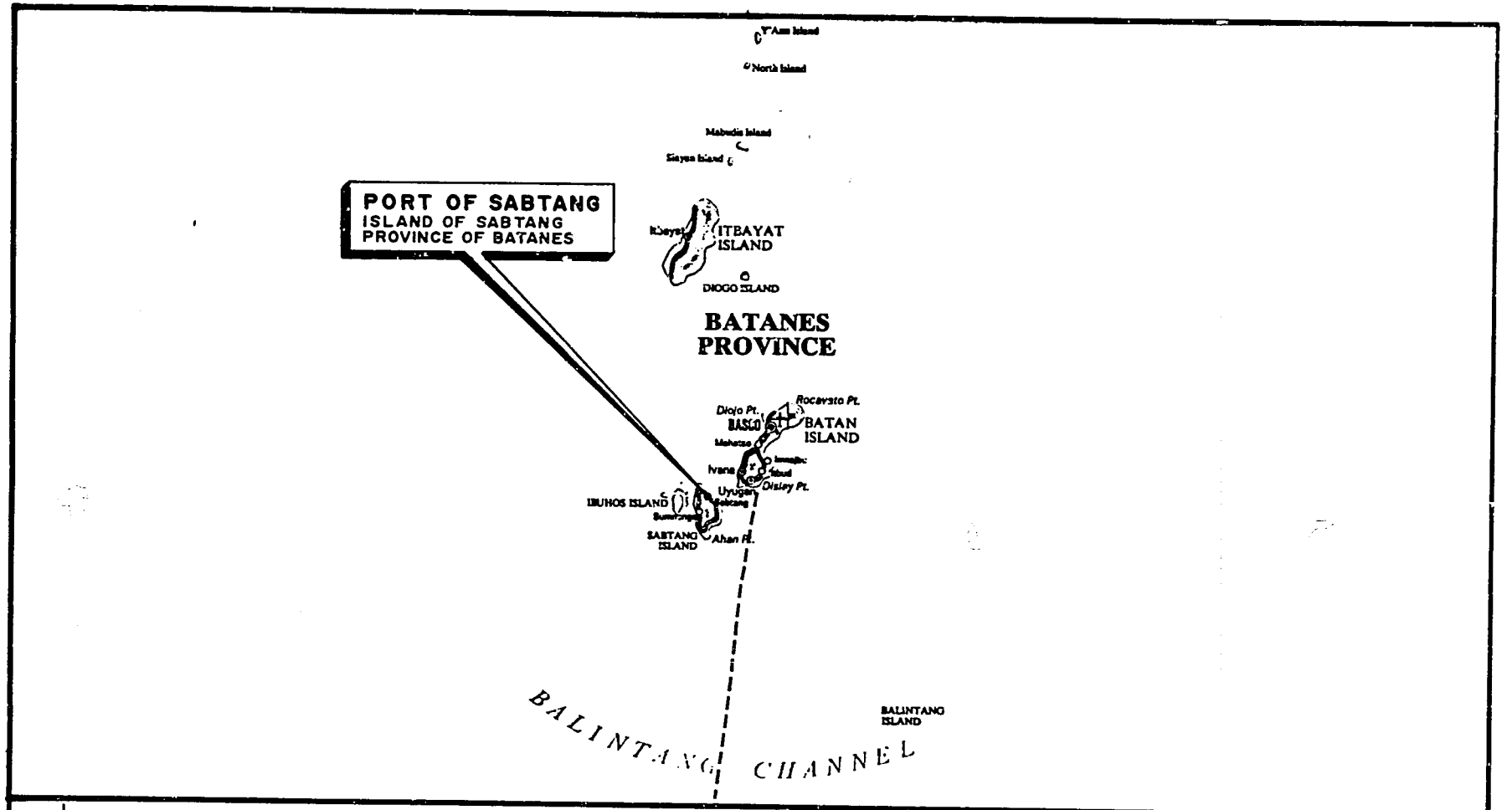
APPENDIX A
FIGURES



RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

K E Y M A P

FIGURE A-1



0 20 40 60 80
SCALE 1:1,000,000 km.

LEGEND:
- MAHARLIKA HIGHWAY
- FIRST CLASS CONCRETE OR ASPHALTED
- SECOND CLASS ASPHALTED
- THIRD CLASS FAIR
- PROVINCIAL CAPITAL
- PROVINCIAL CITY
- MUNICIPALITY
- BARRIO SITIO
- DOMESTIC AIRPORT

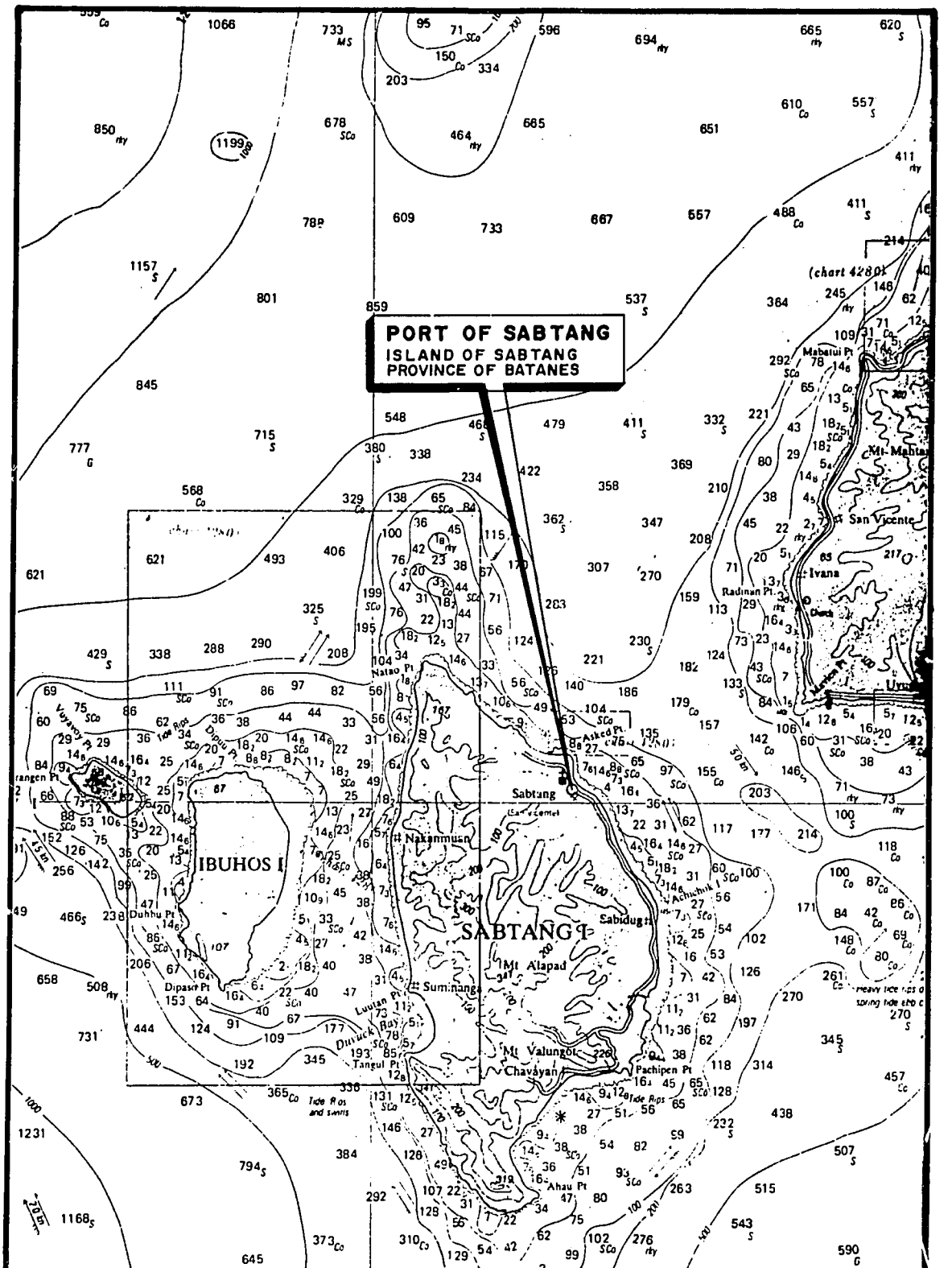
RURAL INFRASTRUCTURE FUND PROJECT

AID PROJECT NO. 492 - 0420

ROAD INFRASTRUCTURE MAP

FIGURE A-2

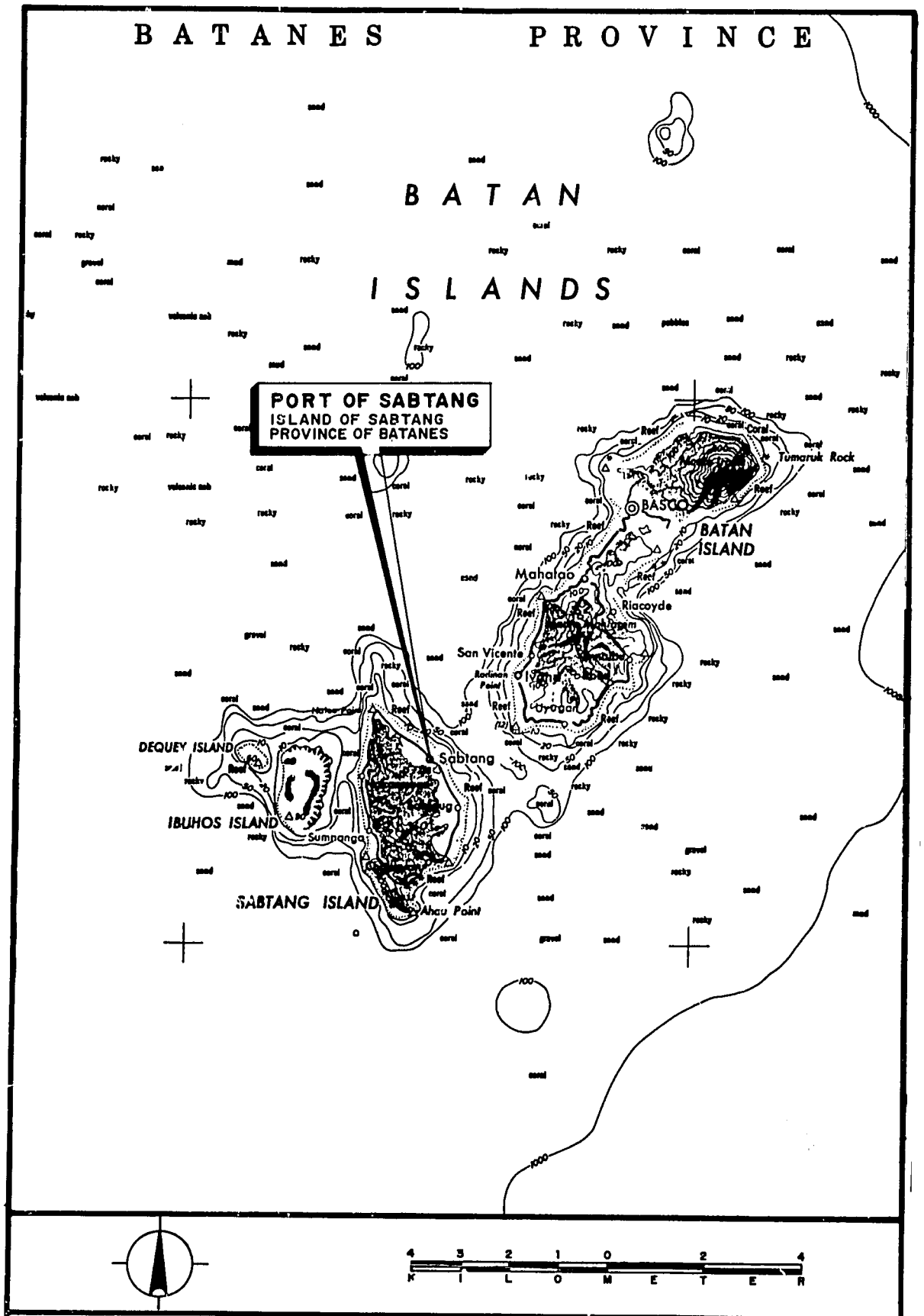
70



RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

REGIONAL HYDRO MAP

FIGURE A-3

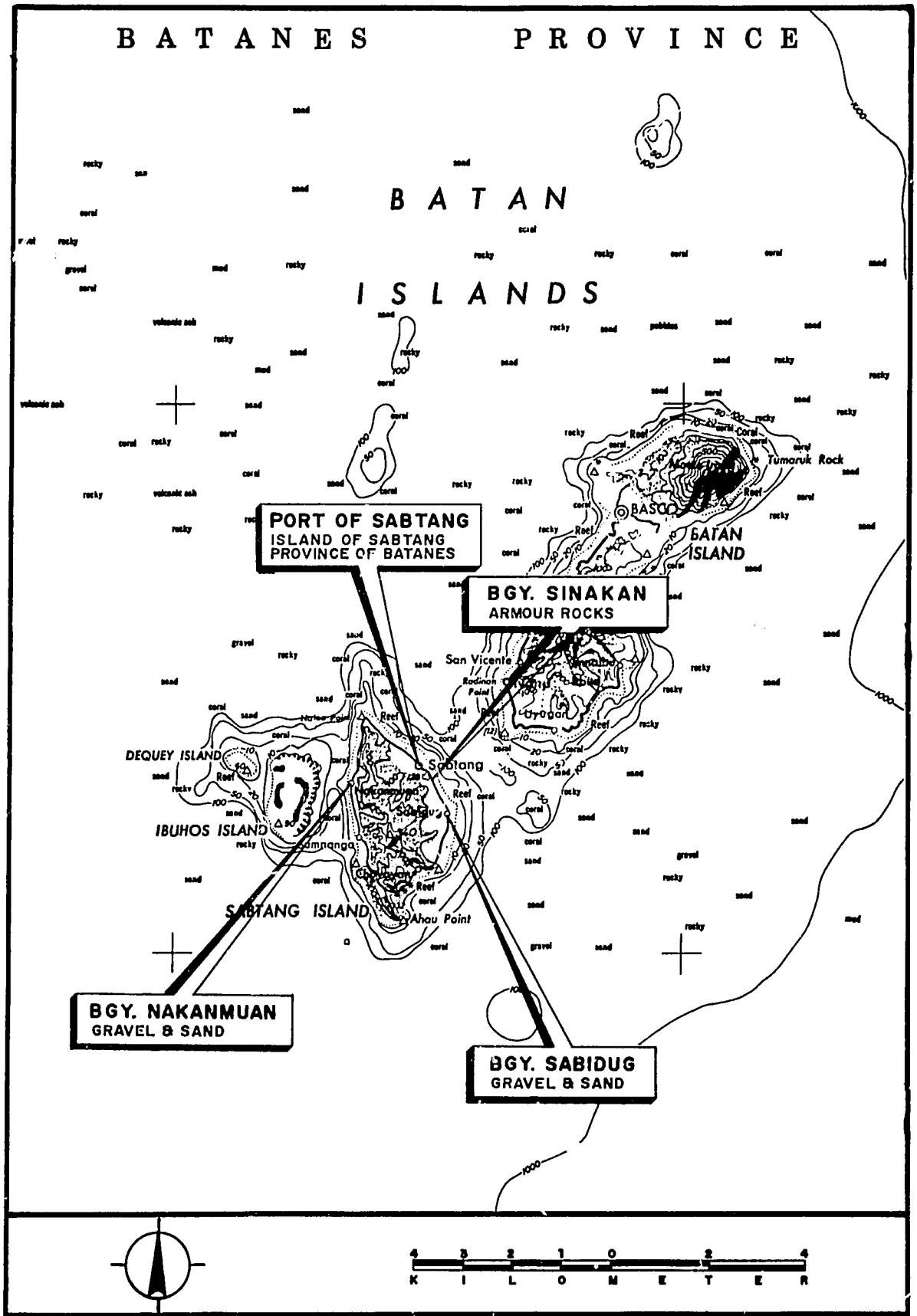


RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

REGIONAL TOPO MAP

FIGURE A-4

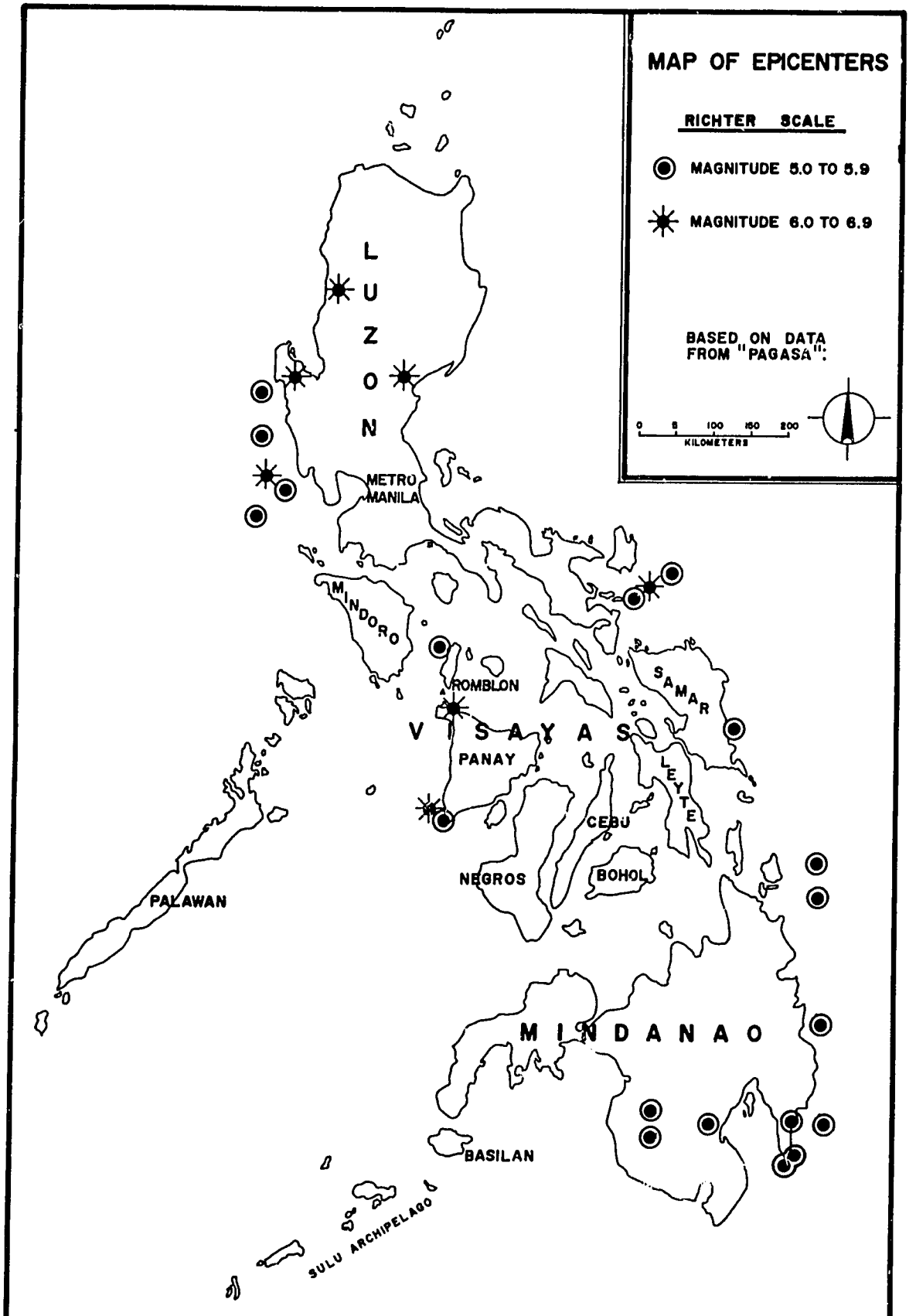
72



RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT NO. 492 - 0420

LOCATION OF CONSTRUCTION MATERIALS

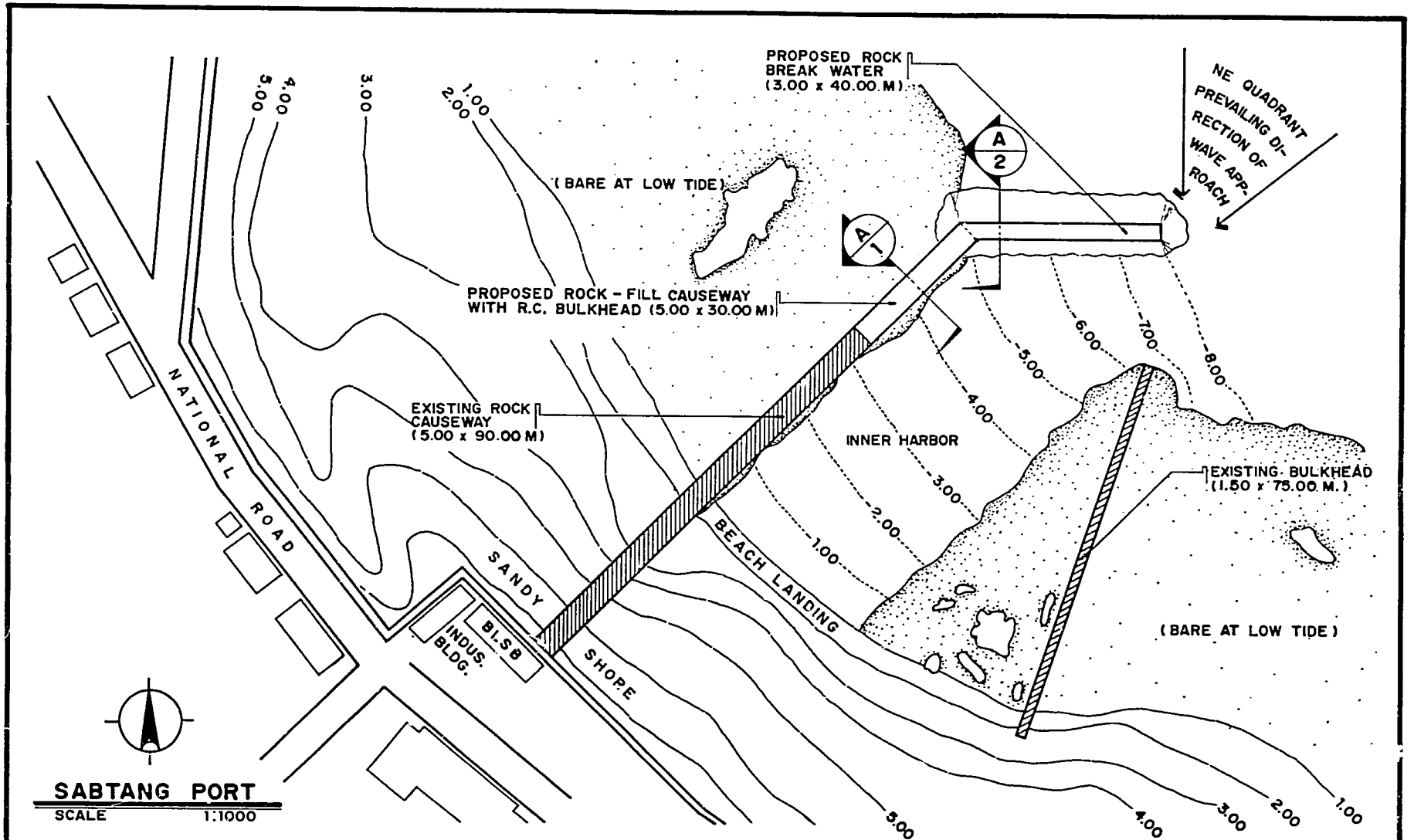
FIGURE A - 5



RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT 492 - 0420

SIGNIFICANT PHILIPPINE EARTHQUAKES : 1960 - 1965

FIGURE A - 6

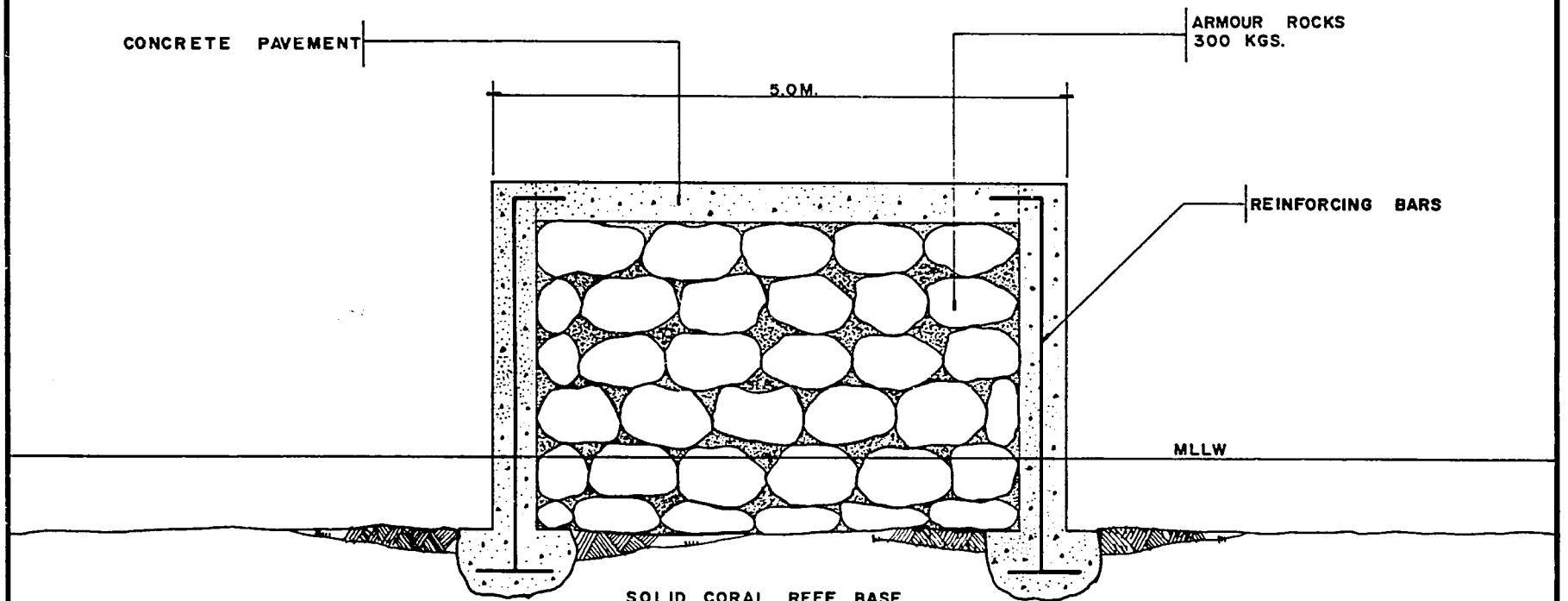


RURAL INFRASTRUCTURE FUND PROJECT PROJECT NO. 492 - 0420

DEVELOPMENT PLAN

FIGURE A-7

75

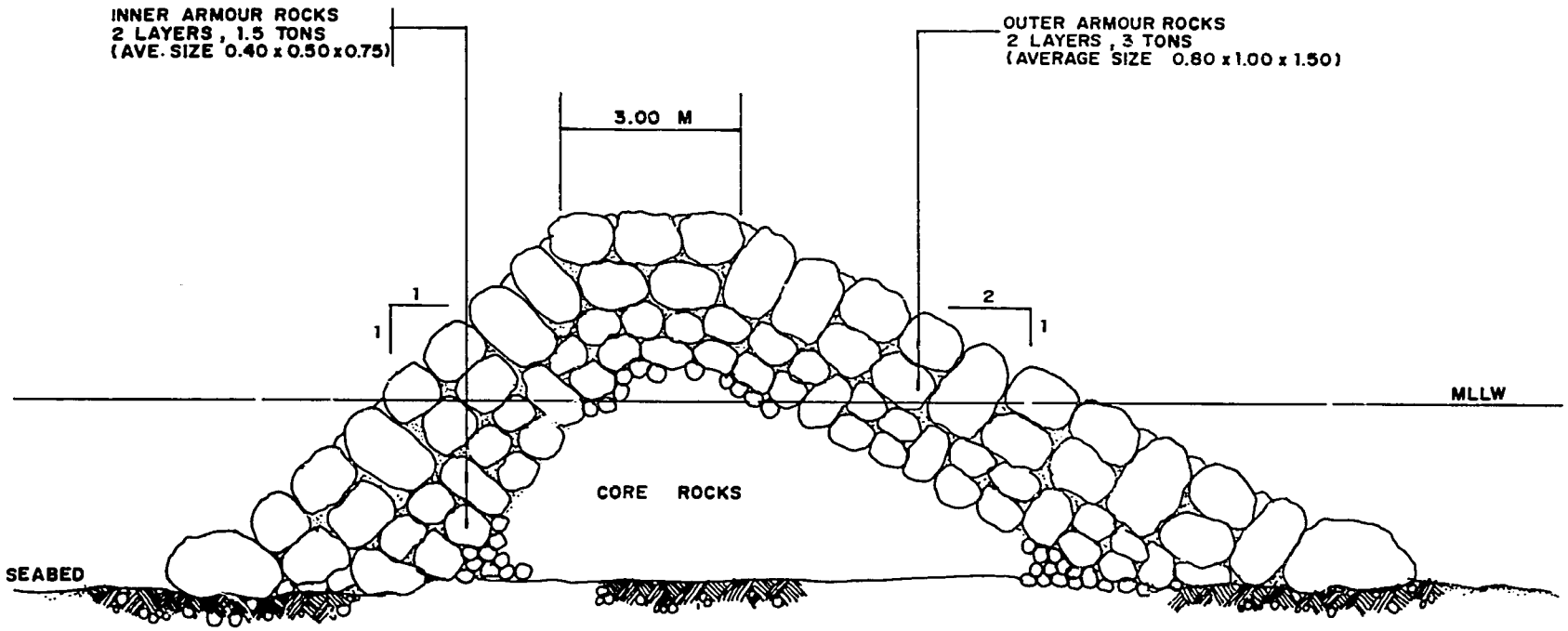


A/1 SECTION
SECTION 1:100

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

PROPOSED ROCK CAUSEWAY EXTENSION

FIGURE A-8



A/2 SECTION
SCALE 1:100

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

PROPOSED BREAKWATER

FIGURE A - 9

APPENDIX B
EXHIBITS

EXHIBIT I
PORT SHIPPING STATISTICS

PORT : SABTANG
PROVINCE : BATANES
ISLAND : SABTANG
REGION : II

DATE : APRIL 30, 1990
REPORTED BY: EPG/AA

CARGO: (If one sheet is insufficient, use second sheet attached)

COMMODITY	INBOUND/ OUTBOUND (Check one) In	Out	TONS PER YEAR	TYPE OF VESSEL	TONS PER VESSEL	PESOS VALUES per/kg	ORIGIN or DESTINATION	TARIFF or FARE
FISH/MARINE PRODUCTS	✓		6			₱ 25/kg		
VEGETABLES	✓		150			₱ 20/kg	66.7% BASCO 33.3% IVANA	₱ 0.25/kg
RICE	✓		750			₱ 9/kg	66.7% BASCO 33.3% IVANA	FOR BASCO
FUEL	✓		1,200			₱ 16/Lit	66.7% BASCO 33.3% IVANA	₱ 0.20/kg
CEMENT	✓		450			₱ 220/bag	66.7% BASCO 33.3% IVANA	FOR IVANA & MAHATAO
COPRA								
BOTTLED CARGO	✓	✓	IN- 750 OUT- 375			₱ 7- COKE ₱ 9- Beer	66.7% BASCO 33.3% IVANA	
CORN			18			₱ 15/kg	66.7% BASCO 33.3% IVANA	
ICE								
SUGAR	✓		240			₱ 20/kg	66.7% BASCO 33.3% IVANA	
ANIMAL FEED								
LUMBER	✓		240			₱ 280- PLYWOOD ₱ 30/Bd.Ft.	66.7% BASCO 33.3% IVANA	
MEAT								
SALT	✓		120			₱ 12/kg	66.7% BASCO 33.3% IVANA	
CATTLE		✓	24				15 - BASCO 9 - IVANA	
GARLIC		✓	4			₱ 30/kg	3 - BASCO 1 - IVANA	

PASSENGERS		VESSELS/ WEEK	DAY	PASSENGERS PER YEAR	TYPE OF YEAR	PASSENGERS PER VESSEL	FARE	DEST.
48	IN			14,400	300 DAYS	10 8	₱30-40	IVANA MAHATAO
48	OUT			14,400	A YEAR	10	PER HEAD	BASCO

VESSELS:

TYPE OF VESSEL	NO. OF VESSELS BOATS PER WEEK or DAY	MAX. TONNAGE	AVE. LENGTH (m)	MAX. DRAFT (m)	ORIGIN OF VESSEL	TRAVEL TIME	DISTANCE (km)	FUEL CONSP PER HOUR
PSGR/CARGO VESSEL	3- DAILY	5-10	8.0	0.50	IVANA	35 MINS	5 km	20 Lit/HR
PSGR/CARGO VESSEL	1- DAILY	5-10	7.0	0.40	MAHATAO	1 HR & 15 MINS	10 km	20 Lit/HR
PSGR/CARGO VESSEL	1- DAILY	5-10	8.0	0.50	BASCO	1½ HR	15 km	20 Lit/HR

EXHIBIT 2

SOCIO - ECONOMIC DATA

MUNICIPALITY OF : SABTANG DATE : APRIL 30, 1990

REPORTED BY: EPC/AA

ANNUAL PRODUCTION

NAME OF PRODUCTS	YEAR 1980		YEAR 1990	
Agriculture				
rice	280 cavans 14 M.T.	cavans/year		cavans/year
copras		sacks/year		sacks/year
corn	880	cavans/year		cavans/year
	44,000	kilos/year		kilos/year
Fishing				
fish marine catch	6 M.T.	M.T./year		M.T./year
fish cultures		M.T./year		M.T./year
shell fish		M.T./year		M.T./year
Cattle & Poultry Raising				
cow	1,301	heads/year	1,910	heads/year
carabao	141	heads/year		heads/year
hogs	593	heads/year	604	heads/year
goat	217	heads/year		heads/year
chickens	962	heads/year	1,560	heads/year
Local Products				
Root crops				
Garlic 5.5 M.T./yr.				

LAND TRAFFIC DATA (1990)

FROM: _____ TO: _____

VEHICLE			PASSENGER/DAY		CARGO (KILOS/DAY)	
TYPE	NO.	NO. OF TRIPS	INCOMING	OUTGOING	INCOMING	OUTGOING
			NONE			

EXHIBIT 2
(CONTINUED)

SOCIO - ECONOMIC DATA

MUNICIPALITY OF :- SABTANG DATE : APRIL 30,1990

REPORTED BY: EPC/AA

LOCATION OF PORT SITE	DISTANCE TO NEAREST ROAD/TOWN/ BARRIO	AREA OF INFLUENCE	HINTERLAND TOPOGRAPHY
a. it is located in barangay Sanakan. b. c.	it is within the municipality of Sabtang in front of Catholic church around 5 kms. away from Ivana - nearby island of Sabtang.	it includes the Sabtang island farther extended up to neighboring island of Baton.	it has rugged steep slopes with deep canyons · plateaus and steep mountain ranges midland. The terrain is poor hilly and high toward the cent

DEMOGRAPHY: PRESENT POPULATION BARRIO: Sanakan POPULATION: 1,680

PROVINCE: Batanes 20,305

COMMUNICATION	RADIO	TELEPHONE	TELEX	FAX	TELEGRAM	OTHERS
Available? (Yes or No)					Yes	

List other development projects in agriculture, fishing, health, etc. within 20 km of Port.

upgrading of municipal/barangay roads
construction of water supply/hospital/public market/farm facilities

What is the purpose of the port projects? What will be the role of the port?

to facilitate easy access and commendable port facilities
to play as a major linking/principal port in relative to Baton and Itbayat islands (thereby) and serve as an eye opening factor for economic development

If the port is built or improved, from where will traffic be diverted?

Being the current linking port in the island in relative to Baton island Sabtang has already establish its traffic thereby leaving uncertain diverted traffic even with the improvement of Sabtang port.

NAMES OF LOCAL OFFICIALS:

Mayor - Migdonio Fabores
vice mayor - Jose Belgado
MPDC - Romulo Ciela
SB member - Alfredo Alabado
- Alipio Hontomin
- Mariano Cultura

EXHIBIT 3

NAME OF PORT: SABTANG					PORT OPERATION INVENTORY									ISLAND: SABTANG	PROVINCE: BATANES	
TYPE OF VESSELS	NO. OF VESSELS	VESSEL STATISTICS			CONSUMPTION				ENGINE TYPE	ORIGIN	DESTINATION	CARGOES / TON			AVERAGE NO OF PASS. / YEAR	
		MAX. TONNAGE	LENGHT	DRAFT	LITERS / HR.	HRS. / TRIP	NO. OF TRIP/BOAT	DIST. / TRIP				COMMODITY	INCOMING	OUTGOING	IN	OUT
PSGR/CARGO VESSEL	3	5 - 10	L = 8.0 W = 3.0	0.50	20 Lit/HR	35 mins.	DAILY	5 km	FUSO 4DR5 65 HP	IVANA	SABTANG	(SEE PORT	SHIPPING	STATISTICS)	9,000	x 2
PSGR/CARGO VESSEL	1	5 - 10	L = 8.0 W = 3.0	0.40	20 Lit/HR	1½ HR	DAILY	15 km		BASCO	SABTANG				3,000	x 2
PSGR/CARGO VESSEL	1	5 - 10	L = 7.0 W = 3.0	0.50	20 Lit/HR	1 HR & 15 mins.	DAILY	10 km		MAHATAO	SABTANG				2,400	x 2

Municipal Fishing boats:

25 - motorized fishing boat

30 - non-motorized bancas

EXHIBIT 4

POPULATION BY PROVINCE

Socio-Economic Data by Province for Use in Forecasting Travel Demand.

This file contains, for each province, the base year (1990) and forecasted (for years 2000 and 2010) population and income per capita.

This spreadsheet uses these variables to calculate average annual traffic growth rates by province for the normal growth of passenger traffic.

Population by Province, Base Year (1990) and Forecasts for Years 2000 and 2010.

		POPULATION			AVERAGE ANNUAL GROWTH RATE	
REGION	PROVINCE	1990	2000	2010	1990 to 2000	2000 to 2012
I	Abra	190,634	223,919	252,506	1.62%	1.62%
I	Benguet	477,706	617,374	696,193	2.60%	2.60%
I	Ilocos Norte	455,395	517,582	583,661	1.29%	1.29%
I	Ilocos Sur	526,273	614,474	692,923	1.56%	1.56%
I	La Union	562,603	677,880	764,424	1.88%	1.88%
I	Mountain Province	126,455	151,647	171,007	1.83%	1.83%
I	Pangasinan	1,952,865	2,270,109	2,559,930	1.52%	1.52%
II	Ba nes	14,748	17,510	19,746	1.73%	1.73%
II	Cagayan	891,370	1,077,806	1,215,408	1.92%	1.92%
II	Ifugao	138,827	167,787	189,208	1.91%	1.91%
II	Isabela	1,117,[illegible]	1,380,361	1,556,589	2.14%	2.14%
II	Kalinga Apayao	242,970	305,946	345,005	2.33%	2.33%
II	Nueva Vizcaya	322,034	410,811	463,259	2.46%	2.46%
II	Quirino	117,629	157,745	177,884	2.98%	2.98%
III	Bataan	479,034	659,363	743,543	3.25%	3.25%
III	Bulacan	1,395,274	1,695,899	1,912,411	1.97%	1.97%
III	Nueva Ecija	1,354,853	1,641,089	1,850,604	1.94%	1.94%
III	Pampanga	1,483,572	1,808,985	2,039,935	2.00%	2.00%
III	Tarlac	860,292	1,031,338	1,163,007	1.83%	1.83%
III	Zambales	568,593	692,201	780,573	1.99%	1.99%
IV-A	Aurora	138,273	172,004	193,963	2.21%	2.21%
IV-A	Batangas	1,466,451	1,767,352	1,992,987	1.88%	1.88%
IV-A	Cavite	1,076,137	1,399,737	1,578,439	2.66%	2.66%
IV-A	Laguna	1,260,610	1,551,619	1,749,711	2.10%	2.10%
IV-A	Marinduque	218,707	264,552	298,327	1.92%	1.92%
IV-A	Rizal	782,340	1,020,032	1,150,258	2.69%	2.69%
IV-B	Occidental Mindoro	315,536	419,919	473,529	2.90%	2.90%
IV-B	Oriental Mindoro	606,444	782,611	882,526	2.58%	2.58%
IV-B	Palawan	511,706	664,917	749,806	2.65%	2.65%
IV-B	Quezon	1,491,434	1,864,838	2,102,919	2.26%	2.26%
IV-B	Romblon	236,994	280,440	316,243	1.70%	1.70%
V	Albay	1,017,294	1,236,032	1,393,835	1.97%	1.97%
V	Camarines Norte	397,583	496,280	559,639	2.24%	2.24%
V	Camarines Sur	1,360,206	1,620,670	1,827,578	1.77%	1.77%
V	Catanduanes	225,575	282,818	318,925	2.29%	2.29%
V	Masbate	745,100	917,634	1,035,012	2.11%	2.11%
V	Sorsogon	642,377	801,182	903,467	2.23%	2.23%

EXHIBIT 4

(CONTINUED)

REGION	PROVINCE	POPULATION 1990	POPULATION 2000	POPULATION 2010	AVERAGE ANNUAL GROWTH RATE 1990 to 2000	AVERAGE ANNUAL GROWTH RATE 2000 to 2012
VI	Aklan	402,849	481,163	542,593	1.79%	1.79%
VI	Antique	434,893	525,447	592,530	1.91%	1.91%
VI	Capiz	627,494	766,587	864,455	2.02%	2.02%
VI	Iloilo	1,787,316	2,129,918	2,401,841	1.77%	1.77%
VI	Negros Occidental	2,419,758	2,896,811	3,266,642	1.82%	1.82%
VII	Bohol	893,359	967,868	1,091,434	0.80%	0.80%
VII	Cebu	2,655,417	3,229,110	3,641,365	1.98%	1.98%
VII	Negros Oriental	986,764	1,152,772	1,299,945	1.57%	1.57%
VII	Siguijor	80,498	90,847	102,445	1.22%	1.22%
VIII	Leyte	1,542,354	1,783,671	2,011,390	1.46%	1.46%
VIII	Southern Leyte	356,458	419,255	472,781	1.64%	1.64%
VIII	Eastern Samar	405,427	505,846	570,426	2.24%	2.24%
VIII	Northern Samar	465,235	567,231	639,648	2.00%	2.00%
VIII	Samar	590,960	696,994	785,978	1.66%	1.66%
IX-A	Basilan	252,894	304,018	342,832	1.86%	1.86%
IX-A	Sulu	437,994	504,300	568,683	1.42%	1.42%
IX-A	Tawi-Tawi	250,984	304,187	343,022	1.94%	1.94%
IX-B	Zamboanga del Norte	741,645	902,260	1,017,450	1.98%	1.98%
IX-B	Zamboanga del Sur	1,511,286	1,859,045	2,096,386	2.09%	2.09%
X	Agusan del Norte	452,794	542,951	612,269	1.83%	1.83%
X	Agusan del Sur	369,390	487,739	550,008	2.82%	2.82%
X	Bukidnon	826,513	1,033,392	1,165,324	2.26%	2.26%
X	Camiguin	67,356	78,157	88,135	1.50%	1.50%
X	Misamis Occidental	469,098	548,476	618,499	1.58%	1.58%
X	Misamis Oriental	947,529	1,238,810	1,396,966	2.72%	2.72%
X	Sorigao del Norte	482,934	610,398	688,326	2.37%	2.37%
XI	Davao	959,373	1,209,064	1,363,423	2.34%	2.34%
XI	Davao del Sur	1,465,011	1,808,583	2,039,481	2.13%	2.13%
XI	Davao Oriental	422,778	507,920	572,766	1.85%	1.85%
XI	South Cotabato	989,440	1,217,472	1,372,904	2.10%	2.10%
XI	Surigao del Sur	497,094	620,771	700,024	2.25%	2.25%
XII	Lanao del Norte	570,714	692,697	781,132	1.96%	1.96%
XII	Lanao del Sur	525,437	655,021	738,646	2.23%	2.23%
XII	Maguindanao	684,360	842,815	950,415	2.10%	2.10%
XII	North Cotabato	738,625	925,411	1,043,557	2.28%	2.28%
XII	Sultan Kudarat	423,122	559,363	630,776	2.83%	2.83%
Total		53,508,155	65,329,031	73,671,484	2.02%	2.02%

Source: NEDA

EXHIBIT 5

PER CAPITA INCOME GROWTH RATES

REGION	PROVINCE	AVERAGE ANNUAL GROWTH RATE 1990 to 2000	AVERAGE ANNUAL GROWTH RATE 2000 to 2012
I	Abra	5.25%	5.75%
I	Benguet	5.25%	5.75%
I	Ilocos Norte	5.25%	5.75%
I	Ilocos Sur	5.25%	5.75%
I	La Union	5.25%	5.75%
I	Mountain Province	5.25%	5.75%
I	Pangasinan	5.25%	5.75%
II	Batanes	5.15%	5.65%
II	Cagayan	5.15%	5.65%
II	Ifugao	5.15%	5.65%
II	Isabela	5.15%	5.65%
II	Kalinga Apayao	5.15%	5.65%
II	Nueva Vizcaya	5.15%	5.65%
II	Quirino	5.15%	5.65%
III	Bataan	4.90%	5.35%
III	Bulacan	4.90%	5.35%
III	Nueva Ecija	4.90%	5.35%
III	Pampanga	4.90%	5.35%
III	Tarlac	4.90%	5.35%
III	Zambales	4.90%	5.35%
IV-A	Aurora	4.50%	5.05%
IV-A	Batangas	4.50%	5.05%
IV-A	Cavite	4.50%	5.05%
IV-A	Laguna	4.50%	5.05%
IV-A	Marinduque	4.50%	5.05%
IV-A	Rizal	4.50%	5.05%
IV-B	Occidental Mindoro	4.50%	5.05%
IV-B	Oriental Mindoro	4.50%	5.05%
IV-B	Palawan	4.50%	5.05%
IV-B	Quezon	4.50%	5.05%
IV-B	Romblon	4.50%	5.05%
V	Albay	5.00%	5.00%
V	Camarines Norte	5.00%	5.00%
V	Camarines Sur	5.00%	5.00%
V	Catanduanes	5.00%	5.00%
V	Masbate	5.00%	5.00%
V	Sorsogon	5.00%	5.00%
VI	Aklan	5.05%	5.35%
VI	Antique	5.05%	5.35%
VI	Capiz	5.05%	5.35%
VI	Iloilo	5.05%	5.35%
VI	Negros Occidental	5.05%	5.35%
VII	Bohol	5.00%	5.35%
VII	Cebu	5.00%	5.35%
VII	Negros Oriental	5.00%	5.35%
VII	Siguijor	5.00%	5.35%
VIII	Leyte	5.65%	5.95%
VIII	Southern Leyte	5.65%	5.95%
VIII	Eastern Samar	5.65%	5.95%
VIII	Northern Samar	5.65%	5.95%
VIII	Samar	5.65%	5.95%
IX-A	Basilan	5.25%	5.65%
IX-A	Sulu	5.25%	5.65%
IX-A	Tawi-Tawi	5.25%	5.65%
IX-B	Zamboanga del Norte	5.25%	5.65%
IX-B	Zamboanga del Sur	5.25%	5.65%
X	Agusan del Norte	4.90%	5.35%
X	Agusan del Sur	4.90%	5.35%
X	Bukidnon	4.90%	5.35%
X	Camiguin	4.90%	5.35%
X	Misamis Occidental	4.90%	5.35%
X	Misamis Oriental	4.90%	5.35%
X	Sorigao del Norte	4.90%	5.35%
XI	Davao	4.60%	5.20%
XI	Davao del Sur	4.60%	5.20%
XI	Davao Oriental	4.60%	5.20%
XI	South Cotabato	4.60%	5.20%
XI	Surigao del Sur	4.60%	5.20%
XII	Lanao del Norte	4.70%	5.15%
XII	Lanao del sur	4.70%	5.15%
XII	Maguindanao	4.70%	5.15%
XII	North Cotabato	4.70%	5.15%
XII	Sultan Kudarat	4.70%	5.15%

Source: Family Income & Expenditures Survey 1985 (FBS), NEDA

EXHIBIT 6

GROWTH RATE FOR PASSENGER TRAVEL DEMAND, BY PROVINCE

T = P + I * E where:

T is annual growth rate for passenger travel demand
P is annual growth rate of population in province
I is annual growth rate of income per capita in province
E is elasticity of passenger travel demand to change in income per capita:

private vehicle	1.40
jeepney (banca)	0.50
bus	0.80

		AVERAGE ANNUAL GROWTH RATE					
		1990 to 2000			2000 to 2012		
REGION	PROVINCE	CAR	JEEPNEY	BUS	CAR	JEEPNEY	BUS
I	Abra	8.97%	4.25%	5.82%	9.67%	4.50%	6.22%
I	Benguet	9.95%	5.22%	6.80%	10.65%	5.47%	7.20%
I	Ilocos Norte	8.64%	3.91%	5.49%	9.34%	4.16%	5.89%
I	Ilocos Sur	8.91%	4.19%	5.76%	9.61%	4.44%	6.16%
I	La Union	9.23%	4.51%	6.08%	9.93%	4.76%	6.48%
I	Mountain Province	9.18%	4.46%	6.03%	9.88%	4.71%	6.43%
I	Pangasinan	8.87%	4.14%	5.72%	9.57%	4.39%	6.12%
II	Batanes	8.94%	4.31%	5.85%	9.64%	4.56%	6.25%
II	Cagayan	9.13%	4.49%	6.04%	9.83%	4.74%	6.44%
II	Ifugao	9.12%	4.49%	6.03%	9.82%	4.74%	6.43%
II	Isabela	9.35%	4.71%	6.26%	10.05%	4.96%	6.66%
II	Kalinga Apayao	9.54%	4.91%	6.45%	10.24%	5.16%	6.85%
II	Nueva Vizcaya	9.67%	5.04%	6.58%	10.37%	5.29%	6.98%
II	Quirino	10.19%	5.55%	7.10%	10.89%	5.80%	7.50%
III	Bataan	10.11%	5.70%	7.17%	10.74%	5.92%	7.53%
III	Bulacan	8.83%	4.42%	5.89%	9.46%	4.65%	6.25%
III	Nueva Ecija	8.80%	4.39%	5.86%	9.43%	4.61%	6.22%
III	Pampanga	8.86%	4.45%	5.92%	9.49%	4.68%	6.28%
III	Tarlac	8.69%	4.28%	5.75%	9.32%	4.50%	6.11%
III	Zambales	8.85%	4.44%	5.91%	9.48%	4.66%	6.27%
IV-A	Aurora	8.51%	4.46%	5.81%	9.28%	4.73%	6.25%
IV-A	Batangas	8.18%	4.13%	5.48%	8.95%	4.41%	5.92%
IV-A	Cavite	8.96%	4.91%	6.26%	9.73%	5.19%	6.70%
IV-A	Laguna	8.40%	4.35%	5.70%	9.17%	4.62%	6.14%
IV-A	Marinduque	8.22%	4.17%	5.52%	8.99%	4.45%	5.96%
IV-A	Rizal	8.99%	4.94%	6.29%	9.76%	5.21%	6.73%
IV-B	Occidental Mindoro	9.20%	5.15%	6.50%	9.97%	5.42%	6.94%
IV-B	Oriental Mindoro	8.88%	4.83%	6.18%	9.65%	5.11%	6.62%
IV-B	Palawan	8.95%	4.90%	6.25%	9.72%	5.18%	6.69%
IV-B	Quezon	8.56%	4.51%	5.86%	9.33%	4.78%	6.30%
IV-B	Romblon	8.00%	3.95%	5.30%	8.77%	4.22%	5.74%
V	Albay	8.97%	4.47%	5.97%	8.97%	4.47%	5.97%
V	Camarines Norte	9.24%	4.74%	6.24%	9.24%	4.74%	6.24%
V	Camarines Sur	8.77%	4.27%	5.77%	8.77%	4.27%	5.77%
V	Catanduanes	9.29%	4.79%	6.29%	9.29%	4.79%	6.29%
V	Masbate	9.11%	4.61%	6.11%	9.11%	4.61%	6.11%
V	Sorsogon	9.23%	4.73%	6.23%	9.23%	4.73%	6.23%

EXHIBIT 6

(CONTINUED)

		AVERAGE ANNUAL GROWTH RATE					
		1990 to 2000			2000 to 2012		
REGION	PROVINCE	CAR	JEEPNEY	BUS	CAR	JEEPNEY	BUS
VI	Aklan	8.86%	4.32%	5.83%	9.28%	4.47%	6.07%
VI	Antique	8.98%	4.43%	5.95%	9.40%	4.58%	6.19%
VI	Capiz	9.09%	4.55%	6.06%	9.51%	4.70%	6.30%
VI	Iloilo	8.84%	4.29%	5.81%	9.26%	4.44%	6.05%
VI	Negros Occidental	8.89%	4.34%	5.86%	9.31%	4.49%	6.10%
VII	Bohol	7.80%	3.30%	4.80%	8.29%	3.48%	5.08%
VII	Cebu	8.98%	4.48%	5.98%	9.47%	4.65%	6.26%
VII	Negros Oriental	8.57%	4.07%	5.57%	9.06%	4.24%	5.85%
VII	Siguijor	8.22%	3.72%	5.22%	8.71%	3.89%	5.50%
VIII	Leyte	9.37%	4.29%	5.98%	9.79%	4.44%	6.22%
VIII	Southern Leyte	9.55%	4.46%	6.16%	9.97%	4.61%	6.40%
VIII	Eastern Samar	10.15%	5.06%	6.76%	10.57%	5.21%	7.00%
VIII	Northern Samar	9.91%	4.83%	6.52%	10.33%	4.98%	6.76%
VIII	Samar	9.57%	4.49%	6.18%	9.99%	4.64%	6.42%
IX-A	Basilan	9.21%	4.48%	6.06%	9.77%	4.68%	6.38%
IX-A	Sulu	8.77%	4.04%	5.62%	9.33%	4.24%	5.94%
IX-A	Tawi-Tawi	9.29%	4.57%	6.14%	9.85%	4.77%	6.46%
IX-B	Zamboanga del Norte	9.33%	4.60%	6.18%	9.89%	4.80%	6.50%
IX-B	Zamboanga del Sur	9.44%	4.72%	6.29%	10.00%	4.92%	6.61%
X	Agusan del Norte	8.69%	4.28%	5.75%	9.32%	4.51%	6.11%
X	Agusan del Sur	9.68%	5.27%	6.74%	10.31%	5.49%	7.10%
X	Bukidnon	9.12%	4.71%	6.18%	9.75%	4.93%	6.54%
X	Camiguin	8.36%	3.95%	5.42%	8.99%	4.17%	5.78%
X	Misamis Occidental	8.44%	4.03%	5.50%	9.07%	4.25%	5.86%
X	Misamis Oriental	9.58%	5.17%	6.64%	10.21%	5.39%	7.00%
X	Sorigao del Norte	9.23%	4.82%	6.29%	9.86%	5.04%	6.65%
XI	Davao	8.78%	4.64%	6.02%	9.62%	4.94%	6.50%
XI	Davao del Sur	8.57%	4.43%	5.81%	9.41%	4.73%	6.29%
XI	Davao Oriental	8.29%	4.15%	5.53%	9.13%	4.45%	6.01%
XI	South Cotabato	8.54%	4.40%	5.78%	9.38%	4.70%	6.26%
XI	Surigao del Sur	8.69%	4.55%	5.93%	9.53%	4.85%	6.41%
XII	Lanao del Norte	8.54%	4.31%	5.72%	9.17%	4.53%	6.08%
XII	Lanao del Sur	8.81%	4.58%	5.99%	9.44%	4.80%	6.35%
XII	Maguindanao	8.68%	4.45%	5.86%	9.31%	4.68%	6.22%
XII	North Cotabato	8.86%	4.63%	6.04%	9.49%	4.86%	6.40%
XII	Sultan Kudarat	9.41%	5.18%	6.59%	10.04%	5.41%	6.95%

Source: Consultant's calculations from (5 & 8)

EXHIBIT 7

GROSS REGIONAL DOMESTIC PRODUCT (GRDP)

REGION	PROVINCE	AVERAGE ANNUAL GROWTH RATE 1990 to 2000	AVERAGE ANNUAL GROWTH RATE 2000 to 2012
I	Abra	6.80%	6.80%
I	Benguet	6.80%	6.80%
I	Ilocos Norte	6.80%	6.80%
I	Ilocos Sur	6.80%	6.80%
I	La Union	6.80%	6.80%
I	Mountain Province	6.80%	6.80%
I	Pangasinan	6.80%	6.80%
II	Batanes	7.25%	7.05%
II	Cagayan	7.25%	7.05%
II	Ifugao	7.25%	7.05%
II	Isabela	7.25%	7.05%
II	Kalinga Apayao	7.25%	7.05%
II	Nueva Vizcaya	7.25%	7.05%
II	Quirino	7.25%	7.05%
III	Bataan	6.80%	6.80%
III	Bulacan	6.80%	6.80%
III	Nueva Ecija	6.80%	6.80%
III	Pampanga	6.80%	6.80%
III	Tarlac	6.80%	6.80%
III	Zambales	6.80%	6.80%
IV-A	Aurora	6.80%	6.80%
IV-A	Batangas	6.80%	6.80%
IV-A	Cavite	6.80%	6.80%
IV-A	Laguna	6.80%	6.80%
IV-A	Marinduque	6.80%	6.80%
IV-A	Rizal	6.80%	6.80%
IV-B	Occidental Mindoro	6.80%	6.80%
IV-B	Oriental Mindoro	6.80%	6.80%
IV-B	Palawan	6.80%	6.80%
IV-B	Quezon	6.80%	6.80%
IV-B	Romblon	6.80%	6.80%
V	Albay	6.80%	6.80%
V	Camarines Norte	6.80%	6.80%
V	Camarines Sur	6.80%	6.80%
V	Catanduanes	6.80%	6.80%
V	Masbate	6.80%	6.80%
V	Sorsogon	6.80%	6.80%
VI	Aklan	6.40%	6.20%
VI	Antique	6.40%	6.20%
VI	Capiz	6.40%	6.20%
VI	Iloilo	6.40%	6.20%
VI	Negros Occidental	6.40%	6.20%
VII	Bohol	6.85%	6.60%
VII	Cebu	6.85%	6.60%
VII	Negros Oriental	6.85%	6.60%
VII	Siguijor	6.85%	6.60%
VIII	Leyte	6.80%	6.80%
VIII	Southern Leyte	6.80%	6.80%
VIII	Eastern Samar	6.80%	6.80%
VIII	Northern Samar	6.80%	6.80%
VIII	Samar	6.80%	6.80%
IX-A	Basilan	6.80%	6.80%
IX-A	Sulu	6.80%	6.80%
IX-A	Tawi-Tawi	6.80%	6.80%
IX-B	Zamboanga del Norte	6.80%	6.80%
IX-B	Zamboanga del Sur	6.80%	6.80%
X	Agusan del Norte	6.80%	6.80%
X	Agusan del Sur	6.80%	6.80%
X	Bukidnon	6.80%	6.80%
X	Camiguin	6.80%	6.80%
X	Misamis Occidental	6.80%	6.80%
X	Misamis Oriental	6.80%	6.80%
X	Sorigao del Norte	6.80%	6.80%
XI	Davao	6.85%	7.00%
XI	Davao del Sur	6.85%	7.00%
XI	Davao Oriental	6.85%	7.00%
XI	South Cotabato	6.85%	7.00%
XI	Surigao del Sur	6.85%	7.00%
XII	Lanao del Norte	6.80%	6.70%
XII	Lanao del Sur	6.80%	6.70%
XII	Maguindanao	6.80%	6.70%
XII	North Cotabato	6.80%	6.70%
XII	Sultan Kudarat	6.80%	6.70%

Source: NEDA

EXHIBIT 8

VALUE OF PASSENGER TIME BY REGION

REGION	INCOME		POPULATION (IN THOUSANDS)		PROPORTION OF ADULTS (A)	UNADJUSTED PASSENGER TIME (V*)	ADJUSTED PASSENGER TIME (V)
	1988 INCOME	FEBRUARY 1988 INCOME (Y)	1988	FEBRUARY 1990			
I	2.086 x 10^10	2.656 x 10^10	4,099	4,236	0.593	2.843	2.001
II	1.435 x 10^10	1.847 x 10^10	2,689	2,806	0.570	3.954	2.784
III	4.776 x 10^10	6.144 x 10^10	5,816	6,065	0.580	6.014	4.234
IV	5.454 x 10^10	7.052 x 10^10	7,623	7,992	0.579	5.219	3.674
V	1.969 x 10^10	2.524 x 10^10	4,158	4,323	0.542	3.670	2.584
VI	2.909 x 10^10	3.721 x 10^10	5,387	5,588	0.578	3.945	2.777
VII	2.270 x 10^10	2.917 x 10^10	4,411	4,599	0.594	3.657	2.574
VIII	1.499 x 10^10	1.907 x 10^10	3,216	3,317	0.557	3.534	2.488
IX	1.727 x 10^10	2.211 x 10^10	3,033	3,150	0.546	4.402	3.100
X	2.089 x 10^10	2.695 x 10^10	3,408	3,567	0.560	4.620	3.252
XI	2.707 x 10^10	3.489 x 10^10	4,096	4,275	0.557	5.012	3.528
XII	1.706 x 10^10	2.197 x 10^10	2,778	2,902	0.534	4.856	3.420

Source:

NSCB, "1989 Philippine Statistical Yearbook", Manila, October 1989
1988 Income - Table 2.4, pp. 2-12 - pp. 2-13
February 1990 Population - Table 1.7, pp. 1-48 - pp. 1-59
1988 Population - Table 1.7, pp. 1-48 - pp. 1-59
Proportion of Adults in Population - Table 1.4, pp. 1-20 - pp. 1-42

EXHIBIT 9

BATANES PROVINCE LOGISTICS NETWORK

SABTANG PORT

FROM/ TO	DIRECT DATA BASCO	SABTANG	INDIRECT DATA ITBAYAT	IVANA	MAHATO	APARRI	MANILA	TOTAL
BASCO (52%)								
%/passengers	100.0	22.2	66.7	7.4	3.7	0.0	0.0	27.1
passengers	13,500	3,000	9,000	1,000	500	0	0	27,000
fish, etc.	4,000				0	0	0	4,000
rice	2,500					250	2,250	5,000
fuel	4,000					400	3,600	8,000
consumables	503	3				50	450	1,006
bag cargo	1,260					126	1,134	2,520
bottle cargo	2,100	250	125	200	25	250	1,250	4,200
others	2,315	15				230	2,070	4,630
SABTANG (20%)								
%/passengers	20.8	100.0	0.0	62.5	16.7	0.0	0.0	28.9
passengers	3,000	14,400	0	9,000	2,400	0	0	28,800
fish, etc.	0	46		46				92
rice	500	750		250				1,500
fuel	800	1,200		400				2,400
consumables	100	150		50				300
bag cargo	252	378		126				756
bottle cargo	500	750		250				1,500
others	460	690		230				1,380
ITBAYAT (10%)								
%/passengers	100.0	0.0	100.0	0.0	0.0	0.0	0.0	18.1
passengers	9,000	0	9,000	0	0	0	0	18,000
fish, etc.	0		0					0
rice	250		250					500
fuel	400		400					800
consumables	50		50					100
bag cargo	126		126					252
bottle cargo	250		250					500
others	230		230					460
IVANA (16%)								
%/passengers	10.0	90.0	0.0	100.0	0.0	0.0	0.0	20.1
passengers	1,000	9,000	0	10,000	0	0	0	20,000
fish, etc.	0			0				0
rice	400			400				800
fuel	640			640				1,280
consumables	80	1		81				162
bag cargo	201	10		211				422
bottle cargo	400	125		525				1,050
others	368	9		377				754

EXHIBIT 9
(CONTINUED)

FROM/	DIRECT DATA		INDIRECT DATA					
TO	BASCO	SAPTANG	ITBAYAT	IVANA	MAHATO	APARRI	MANILA	TOTAL
MAHATO (2%)								
%/passengers	17.2	82.8	0.0	0.0	100.0	0.0	0.0	5.82
passengers	500	2,400	0	0	2,900	0	0	5,800
fish, etc.					0			0
rice	50				50			100
fuel	80				80			160
consumables	10				10			20
bag cargo	25				25			50
bottle cargo	50				50			100
others	46				46			92
APARRI (20%)								
%/passengers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
passengers	0	0	0	0	0	0	0	0
fish, etc.						0		0
rice						0		0
fuel						0		0
consumables	2,200					2,200		4,400
bag cargo	0					0		0
bottle cargo	250					250		500
others	30					30		60
MANILA (80%)								
%/passengers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
passengers	0	0	0	0	0	0	0	0
fish, etc.							0	0
rice							0	0
fuel							0	0
consumables	8,800						8,800	17,600
bag cargo							0	0
bottle cargo	1,000						1,000	2,000
others	120						120	240
TOTAL								
passengers	27,000	28,800	18,000	20,000	5,800	0	0	99,600
%	27.1	28.9	18.1	20.1	5.8	0.00	0.0	100.0
fish	4,000	46	0	46	0	0	0	4,092
%	98	1	0	1	0	0	0	100
rice	3,700	750	250	650	50	250	2,250	7,900
fuel	5,920	1,200	400	1,040	80	400	3,600	12,640
consumables	11,743	154	50	131	10	2,250	9,250	23,588
bagged casgo	1,864	388	126	337	25	126	1,134	4,000
bottled	4,550	1,125	375	975	75	500	2,250	9,850
others	3,569	714	230	607	46	260	2,190	7,616
TOTAL CARGO	31,346	4,331	1,431	3,740	286	3,786	20,674	65,594
Percent	48%	6.6%	2%	6%	0.44%	6%	32%	100%

EXHIBIT 10 - SUMMARY OF UNIT RATES

(Sheet 1 of 3)

SUMMARY OF UNIT RATES RURAL INFRASTRUCTURE FUND PROJECT			FINANCIAL COST		FOREIGN COMPONENT DIRECT		FOREIGN COMPONENT INDIRECT		FOREIGN COMPONENT TOTAL		LOCAL COMPONENT		TAXES		ECONOMIC COST	
PAY ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Pesos)	%	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)
(0 - 19)	I. EARTHWORK															
1	Clearing & Grubbing	SQ.M.	1.76	100	49	0.9			49	0.9	19	0.3	32	0.6	68	1.2
2	Tree Removal, Small	EA.	250	100	46	115.0			46	115.0	29	72.5	25	62.5	75	187.5
3	Demolition of Structures & Obstructions	L.S.	1	100	49	0.5			49	0.5	19	0.2	32	0.3	68	0.7
4	Unsuitable Excavation	CU.M.	40	100	46	18.4			46	18.4	23	9.2	31	12.4	69	27.6
5	Surplus Rock Excavation	CU.M.	150	100	28	42.0			28	42.0	54	81.0	18	27.0	82	123.0
6	Structure Excavation	CU.M.	50	100	47	23.5			47	23.5	22	11.0	31	15.5	69	34.5
7	Foundation Fill	CU.M.	56	100	47	26.3			47	26.3	28	15.7	25	14.0	75	42.0
8	Excavation Below Water Elevation	CU.M.	190	100	16	30.4	18	34.2	34	64.6	52	98.8	14	26.6	86	163.4
9	Compacted Fill, Select Material, Borrow	CU.M.	70	100	47	32.9			47	32.9	28	19.6	25	17.5	75	52.5
10	Common Excavation	CU.M.	65	100	47	30.6			47	30.6	28	18.2	25	16.3	75	48.8
(20 - 39)	II. PAVEMENT															
20	Aggregate Subbase Course	CU.M.	140	100	48	67.2			48	67.2	27	37.8	25	35.0	75	105.0
21	Aggregate Base Course	CU.M.														
22	Crushed Aggregate Base Course	CU.M.	240	100	52	124.8			52	124.8	22	52.8	26	62.4	74	177.6
23	Soil Aggregate Shoulder	CU.M.	150	100	48	72.0			48	72.0	27	40.5	25	37.5	75	112.5
24	Gravel Surface Course	CU.M.														
25	Bituminous Prime Coat, MC-70	SQ.M.	11	100	5	0.6	50	5.5	55	6.1	25	2.8	20	2.2	80	8.8
26	Bituminous Tack Coat, CRS-2	SQ.M.	8	100	8	0.6	47	3.8	55	4.4	24	1.9	21	1.7	79	6.3
27	Single Bituminous Surface Treatment	SQ.M.	25	100	5	1.3	49	12.3	54	13.5	24	6.0	22	5.5	78	19.5
28	Double Bituminous Surface Treatment	SQ.M.	49	100	5	2.5	48	23.5	53	26.0	25	12.3	22	10.8	78	38.2
29	Bituminous Concrete Wearing Course	CU.M.	2740	100	31	849.4	21	575.4	52	1424.8	22	602.8	26	712.4	74	2027.6
30	Bituminous Concrete Binder Course	CU.M.	2600	100	31	806.0	21	546.0	52	1352.0	22	572.0	26	676.0	74	1924.0
32	Bituminous Concrete Leveling Course	MT	1130	100	31	350.3	21	237.3	52	587.6	22	248.6	26	293.3	74	836.2
33	Portland Cement Concrete Pavement	SQ.M.	400	100	18	72.0	32	128.0	50	200.0	31	124.0	19	76.0	81	324.0

EXHIBIT 10 · SUMMARY OF UNIT RATES

(Sheet 2 of 3)

SUMMARY OF UNIT RATES RURAL INFRASTRUCTURE FUND PROJECT			FINANCIAL COST		FOREIGN COMPONENT DIRECT		FOREIGN COMPONENT INDIRECT		FOREIGN COMPONENT TOTAL		LOCAL COMPONENT		TAXES		ECONOMIC COST	
PAY ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Pesos)	%	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)
(40 - 59)	III. CONCRETE STRUCTURES - ON LAND															
40	Precast Concrete Piles, Furnished (40 x 40cm)	L.M.	820	100	15	123.0	26	213.2	41	336.2	44	360.8	15	123.0	85	697.0
41	Precast Concrete Piles, Driven (40 x 40cm)	L.M.	626	100	14	87.6	32	200.3	46	288.0	38	237.9	16	100.2	84	525.8
42	Precast Concrete Piles, Furnished (45 x 45cm)	L.M.	1290	100	15	193.5	26	335.4	41	528.9	44	567.6	15	193.5	85	1096.5
43	Precast Concrete Piles, Driven (45 x 45cm)	L.M.	790	100	14	110.6	32	252.8	46	363.4	38	300.2	16	126.4	84	663.6
44	Prestressed Conc. Sheet Piles, Furn. (25 x 60cm)	L.M.	1180	100	15	177.0	26	306.8	41	483.8	44	519.2	15	177.0	85	1003.0
45	Prestressed Conc. Sheet Piles, Driven (25 x 60cm)	L.M.	590	100	14	82.6	32	188.8	46	271.4	38	224.2	16	94.4	84	495.6
46	Pile Transportation per 100 Kilometers, On Land	L.M.	250	100	30	75.0	20	50.0	50	125.0	30	75.0	20	50.0	80	200.0
47	Pile Transportation per 100 Kilometers, By Sea	L.M.	300	100	30	90.0	20	60.0	50	150.0	30	90.0	20	60.0	80	240.0
48	Test Pile, Concrete (40 x 40cm)	L.M.		100									100			
49	Test Pile, Concrete (45 x 45cm)	L.M.		100									100			
50	Reinforcing Steel	KG	21	100			45	9.5	45	9.5	44	9.2	11	2.3	89	18.7
51	Structural Concrete, Class A	CU.M.	2100	100	15	315.0	26	546.0	41	861.0	44	924.0	15	315.0	85	1785.0
52	Structural Concrete, Class B	CU.M.	2090	100	15	313.5	26	543.4	41	856.9	44	919.6	15	313.5	85	1776.5
(60 - 79)	IV. MARINE STRUCTURES OVER/IN WATER															
60	Precast Concrete Piles, Furnished (40 x 40cm)	L.M.	820	100	15	123.0	26	213.2	41	336.2	44	360.8	15	123.0	85	697.0
61	Precast Concrete Piles, Driven (40 x 40cm)	L.M.	660	100	25	165.0	20	132.0	45	297.0	40	264.0	15	99.0	85	561.0
62	Precast Concrete Piles, Furnished (45 x 45cm)	L.M.	1290	100	15	193.5	26	335.4	41	528.9	44	567.6	15	193.5	85	1096.5
63	Precast Concrete Piles, Driven (45 x 45cm)	L.M.	835	100	25	208.8	20	167.0	45	375.8	40	334.0	15	125.3	85	709.8
64	Structural Concrete, Class A (over water)	CU.M.	3300	100	15	495.0	20	660.0	35	1155.0	50	1650.0	15	495.0	85	2805.0
65	Structural Concrete, Class B (over water)	CU.M.	3280	100	15	492.0	20	656.0	35	1148.0	50	1640.0	15	492.0	85	2788.0
66	Structural Concrete, Class A (under water)	CU.M.	5300	100	15	795.0	20	1060.0	35	1855.0	50	2650.0	15	795.0	85	4505.0
67	Structural Concrete, Class B (under water)	CU.M.	5200	100	15	780.0	20	1040.0	35	1820.0	50	2600.0	15	780.0	85	4420.0
68	Core Rock for Causeway or Breakwater	CU.M.	260	100	50	130.0			50	130.0	30	78.0	20	52.0	80	208.0
69	Underlayer Rock	CU.M.	450	100	50	225.0			50	225.0	30	135.0	20	90.0	80	360.0
70	Armor Rock, Small (up to 1 ton)	CU.M.	575	100	50	287.5			50	287.5	30	172.5	20	115.0	80	460.0
71	Armor Rock, Large (larger than 1 ton)	CU.M.	690	100	50	345.0			50	345.0	30	207.0	20	138.0	80	552.0
72	Berthing Dolphins (5 Timber Piles)	EA.	30000	100	30	9000.0	20	6000.0	50	15000.0	35	10500.0	15	4500.0	85	25500.0
73	Berthing Dolphins (7 Timber Piles)	EA.	40000	100	30	12000.0	20	8000.0	50	20000.0	35	14000.0	15	6000.0	85	34000.0
74	Mooring Bollard	EA.	13000	100	40	5200.0			40	5200.0	45	5850.0	15	1950.0	85	11050.0
75	Mooring Cleat	EA.	8000	100	40	3200.0			40	3200.0	45	3600.0	15	1200.0	85	6800.0
76	Mooring Ring	EA.	450	100	40	180.0			40	180.0	45	202.5	15	67.5	85	382.5

Note: Items 40,42,44,60 and 62 are ex plant.

EXHIBIT 10 - SUMMARY OF UNIT RATES

(Sheet 3 of 3)

SUMMARY OF UNIT RATES RURAL INFRASTRUCTURE FUND PROJECT			FINANCIAL COST		FOREIGN COMPONENT DIRECT		FOREIGN COMPONENT INDIRECT		FOREIGN COMPONENT TOTAL		LOCAL COMPONENT		TAXES		ECONOMIC COST	
PAY ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Pesos)	%	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)
(80 - 99)	V. STANDARD PORT BUILDINGS															
80	Building w/ Comfort Room, Office	S.M.	4000	100	15	600.0	26	1040.0	41	1640.0	44	1760.0	15	600.0	85	3400.0
81	Open Building	S.M.	3070	100	15	460.5	26	798.2	41	1258.7	44	1350.8	15	460.5	85	2609.5
82	Comfort Rooms, incl. Walls (no foundation, no roof)	S.M.	1500	100	15	225.0	26	390.0	41	615.0	44	660.0	15	225.0	85	1275.0
(100 - 119)	VI. DRAINAGE/EROSION WORKS															
100	Backfill Material, Pipe Culvert	CU.M	136	100	47	63.9			47	63.9	27	36.7	26	35.4	74	100.6
101	RCPC, 61cm Diameter	L.M.	886	100	18	159.5	22	194.9	40	354.4	42	372.1	18	159.5	82	726.5
102	RCPC, 91cm Diameter	L.M.	1500	100	16	240.0	26	390.0	42	630.0	42	630.0	16	240.0	84	1260.0
103	RCPC, 107cm Diameter	L.M.	2000	100	14	280.0	28	560.0	42	840.0	42	840.0	16	320.0	84	1680.0
104	RCPC, 122cm Diameter	L.M.	3000	100	14	420.0	28	840.0	42	1260.0	42	1260.0	16	480.0	84	2520.0
105	Structural Concrete for Pipe Headwalls	CU.M.	2090	100	15	313.5	26	543.4	41	856.9	44	919.6	15	313.5	85	1776.5
106	Reinforcing Steel for Pipe Headwalls	KG	23	100			45	10.4	45	10.4	44	10.1	11	2.5	89	20.5
107	Removal, Cleaning, Replacement, Salvaged Pipe Culverts	L.M.														
108	Grouted Riprap	CU.M.	1000	100	8	80.0	13	130.0	21	210.0	67	670.0	12	120.0	88	880.0
109	Concrete Slope Protection	SQ.M.	400	100	18	72.0	32	128.0	50	200.0	31	124.0	19	76.0	81	324.0
110	Gabions	CU.M.														
(120 - 129)	VII. INCIDENTAL WORKS															
120	Metal Beam Guardrail	L.M.	786	100	40	314.4			40	314.4	25	196.5	35	275.1	65	510.9
121	Warning Signs	EA.	2825	100	42	1186.5			42	1186.5	23	649.8	35	988.8	65	1836.3
122	Regulatory Signs	EA.	2825	100	42	1186.5			42	1186.5	23	649.8	35	988.8	65	1836.3
123	Informatory Signs	EA.	10800	100	44	4752.0			44	4752.0	21	2268.0	35	3780.0	65	7020.0
124	Sodding	SQ.M.	5	100	51	2.6			51	2.6	16	0.8	33	1.7	67	3.4
(130-135)	VIII. LAND ACQUISITION, DEMOLITION, AND REPLACEMENT															
130	Land Acquisition	KM	300000	100							90	270000	10	30000	90	270000
131	Demolition of Nipa House	EA.	10000	100	15	1500.0	25	2500.0	40	4000.0	40	4000.0	20	2000.0	80	8000.0
132	Nipa House Replacement	EA.	15000	100	20	3000.0	15	2250.0	35	5250.0	45	6750.0	20	3000.0	80	12000.0
133	Demolition of Concrete House	SQ.M.	1000	100	15	150.0	25	250.0	40	400.0	40	400.0	20	200.0	80	800.0
134	Replacement of Concrete House	SQ.M.	2000	100	20	400.0	15	300.0	35	700.0	45	900.0	20	400.0	80	1600.0
140	IX. CONCRETE PIER (w/ Prestressed Conc. Piles)	SQ.M.	9500	100	15	1425	26	2470	41	3895	44	4180	15	1425	85	8075
150	X. ENGINEERING INSPECTION OF PRIER	SQ.M.	500	100	20	100	10	50	30	150	40	200	30	150	70	350

EXHIBIT 11

REPRESENTATIVE VESSEL COST MODEL

CLASS OF BOAT	(1) Paddle Banca	(2) Small Banca	(3) Medium Banca	(4) Large Banca	(5) Medium Launch	(6) Large Launch	(7) Small Trawler	(8) Large Trawler	(9) Small Inter-Island	(10) Medium Inter-Island	(11) Large Inter-Island
ROLE I (40-60%)	Catch Fish	Catch Fish	Trnspt Fish	Trnspt Cargo	Trnspt Psngrs	Trnspt Psngrs	Catch Fish	Catch Fish	Trnspt Psngrs	Trnspt Psngrs	Trnspt Psngrs
ROLE II (20-40%)	Catch Fish	Trnspt Psngrs	Catch Fish	Trnspt Fish	Trnspt Psngrs	Trnspt Psngrs	Trnspt Fish	Trnspt Fish	Trnspt Cargo	Trnspt Cargo	Trnspt Cargo
ROLE III (10-20%)	Catch Fish	Trnspt Cargo	Trnspt Cargo	Trnspt Psngrs	Trnspt Cargo	Trnspt Cargo	Catch Fish	Catch Fish	Trnspt Produce	Trnspt Produce	Trnspt Produce
FIXED COSTS											
DWT	0.75	1.5	4	9	10	20	20	40	80	1,000	2,000
HP	n/a	16	85	165	165	250	250	300	450	1,800	2,400
New building	10,000	25,000	100,000	200,000	220,000	440,000	1,600,000	2,800,000	1,600,000	16,000,000	30,000,000
10% Deprec.	1,000	2,500	10,000	20,000	22,000	44,000	160,000	280,000	160,000	1,600,000	3,000,000
15% Maint.	1,500	3,750	15,000	30,000	33,000	66,000	240,000	420,000	240,000	2,400,000	4,500,000
30% Other	3,000	7,500	30,000	60,000	66,000	132,000	480,000	840,000	480,000	4,800,000	9,000,000
Tot/yr;Fin	5,500	13,750	55,000	110,000	121,000	242,000	880,000	1,540,000	880,000	8,800,000	16,500,000
Tot/yr;Econ	4,675	11,688	46,750	93,500	102,850	205,700	748,000	1,309,000	748,000	7,480,000	14,025,000
CREW COSTS											
# Crewmen	2	2	4	6	10	20	20	40	80	160	200
Crew costs	20,000	40,000	120,000	180,000	310,000	615,000	625,000	1,240,000	2,450,000	4,850,000	6,050,000
FUEL COSTS											
Liters/hour	n/a	3	10	19	19	35	35	55	75	300	400
Km/hour	3	15	20	20	20	20	15	15	20	20	20
Liters/km	n/a	0	1	1	1	2	2.33	3.67	3.75	15.00	20.00
Km/day	5	15	30	45	60	60	30	40	80	80	80
%/days/year	1	1	1	1	1	1	0.6	0.7	0.9	0.9	0.9
Km/year	913	2,738	6,570	11,498	13,140	15,330	6,570	10,220	26,280	26,280	26,280
Fuel;Fin	n/a	7	5	5	5	5	4.96	4.96	4.96	4.96	4.96
Fuel;Econ	n/a	4	4	4	4	4	4.18	4.18	4.18	4.18	4.18
Fuel/yr;Fin	n/a	3,663	16,294	54,176	61,916	133,064	76,037	185,868	488,808	1,955,232	2,606,976
Fuel/yr;Econ	n/a	1,933	13,731	45,657	52,179	112,139	64,079	156,639	411,939	1,647,756	2,197,008
TOTAL COSTS											
Tot/yr;Fin	25,500	57,413	191,294	344,176	492,916	990,064	1,581,037	2,965,868	3,818,808	15,605,232	25,156,976
Tot/yr;Econ	24,675	53,620	180,481	319,157	465,029	932,839	1,437,079	2,705,639	3,609,939	13,977,756	22,272,008
Hours/yr	2,190	2,190	2,628	3,066	2,628	3,066	2,628	3,066	3,942	3,942	3,942
Cost/hr;Fin	12	26	73	112	188	323	601.61	967.34	968.75	3,958.71	6,381.78
Cost/hr;Econ	11	24	69	104	177	304	546.83	882.47	915.76	3,545.85	5,649.93

EXHIBIT 11
(CONTINUED)

CLASS OF BOAT	(1) Paddle Banca	(2) Small Banca	(3) Medium Banca	(4) Large Banca	(5) Medium Launch	(6) Large Launch	(7) Small Trawler	(8) Large Trawler	(9) Small Inter-Island	(10) Medium Inter-Island	(11) Large Inter-Island
FISHING COSTS											
% Avail/day	1	1	0	0			0.7	0.7			
Avg/catch	0	0	0	0			2	3.5			
Avg/day/yr	183	128	44	26			153	179			
Tons/year	3	5	7	8			306.60	625.97			
Cost/kgm;Fin	9	8	6	4			3.61	3.32			
Cost/kgm;Eco	9	7	5	4			3.28	3.03			
FISH TRANSPORT COSTS											
% Avail/day	0	0	0	0			0.3	0.3			
Tons/trip	0	0	2	5			15	30			
Trips/year	0	0	88	77			66	77			
Tons/year	0	0	175	345			986	2,300			
Cost/kgm;Fin	0	0	0	0			0.48	0.39			
Cost/kgm;Eco	0	0	0	0			0.44	0.35			
Cost/tkm;Fin	0	0	29	13			32.09	19.35			
Cost/tkm;Eco	0	0	27	12			29.16	17.65			
PASSENGER TRANSPORT COSTS											
% Avail/day	0	0	0	0	1	1			0.6	0.6	0.6
#/Roundtrip	0	30	60	120	150	300			800	3500	6000
Trips/year	0	37	44	51	153	179			197	197	197
Psgrs/year	0	1,095	2,628	6,132	22,995	53,655			157680	689850	1182600
Cost/psgr;Fi	0	10	15	11	15	13			14.53	13.57	12.76
Cost/psgr;Ec	0	10	14	10	14	12			13.74	12.16	11.30
Cost/pkm;Fin	0	1	0	0	1	[illegible]			0.36	0.34	0.32
Cost/pkm;Eco	0	1	0	0	0	0			0.34	0.30	0.28
CARGO TRANSPORT COSTS				CARGO TRANSPORT							
% Avail/day	0	0	0	0	0	0			0.4	0.4	0.4
Tons/day	0	1	2	5	5	10			40	400	800
Days/year	0	18	44	102	44	51			131	131	131
Tons/year	0	18	88	460	219	511			5256	52400	104800
Cost/ton;Fin	0	315	437	299	450	388			291	119	96
Cost/ton;Eco	0	294	412	278	425	365			275	107	85
Cost/tkm;Fin	0	42	29	13	15	13			7.27	2.98	2.40
Cost/tkm;Eco	0	39	27	12	14	12			6.87	2.67	2.13

SOURCE: Consultant's survey.

BASIS:
1. New building costs from field surveys.
2. Depreciation over 10 years at straight line.
3. Ordinary maintenance at 15% per year in lieu of 10% first year increasing at 8% per year.
4. Other and extrordinary costs at 15% per year for tri-annual hull rehabilotions, lost and damaged nets and gear as well as excessive wear and tear due cargo and passenger overloads.

EXHIBIT 12

PORT TARIFFS AND CHARGES

Municipal ports do not, for the most part, collect dues, rates or charges for the use of ports located in their municipalities.

The following basis for determining probable revenues levels at municipal ports which might elect to assess charges is derived from current Philippine Port Authority (PPA) tariffs or from particular municipal ports who do currently assess rates or charges.

Most current PPA and municipal port charges are by vessel, crate, sack, bag, can, piece or commodity and have been converted herein to approximate per ton or kilogram equivalents for purposes of comparative evaluation.

A. Docking and Landing Fee (per trip)

Small-inter island vessels <100 DWT	₱100.00
Pump boats & larger bancas >3 DWT	₱ 20.00
Small motor bancas <3 DWT	n/c
Paddle and sail bancas <1 DWT	n/c

B. Port Charges (per day)

Small inter-sland vessels <100 DWT	₱100.00
Pump boats & larger bancas >3 DWT	₱ 20.00
Small motor bancas <3 DWT	n/c
Paddle and sail bancas <1 DWT	n/c

C. Cargos (per ton equivalent)

Storage (2 days free, average stay 5 days)	₱ 1.00
Dried fish @ ₱0.05 per box & ₱0.20 per sack	₱ 5.00
Cement @ ₱0.10 per bag	₱ 2.00
Other bagged cargo @ ₱0.20 sack	₱ 4.00
Hogs @ ₱1.0 per head	₱ 4.00
Cattle @ ₱2.0 per head	₱ 4.00
Bottled cargo @ ₱0.05 per case	₱ 5.00
Petroleum Products @ ₱0.05 per liter	₱ 50.00
Other items not otherwise itemized by name	₱ 4.00

D. Passengers

Passenger amenity fee (per passenger)	₱ 0.50
Baggage and parcels (per package)	₱ 2.00
Bagged cargos (per sack)	₱ 2.00
Other cargos (per ton)	₱ 50.00

SOURCES: Consultant's surveys and Philippine Port Authority

EXHIBIT 13

CLIMATOLOGICAL NORMALS - BASCO

STATION : BASCO
COORDINATES: 11°15'N 125°00'E

PERIOD OF RECORDS: 1951 - 1985

MONTH	RAIN FALL (mm)	RAINY DAYS	TEMPERATURE (deg C) MAX-IMUM	MIN-IMUM	MEAN	DRY BULB	WET BULB	DEW PT.	RH (%)	MEAN SEA LEVEL PRESSURE (mbs)	PREVAILING WIND DIREC-TION	SPEED (mps)	CLOUD (octa)	DAYS WITH TSTM	LGHT
JAN	183.9	19	24.7	19.2	22.0	22.0	19.8	19	82	1016.8	NE	5	6	0	0
FEB	126.1	15	25.7	19.8	22.7	22.7	20.5	20	82	1015.9	NE	5	6	0	1
MAR	102.6	13	27.5	21.2	24.3	24.2	21.9	21	82	1014.8	NE	5	5	0	0
APR	83.1	10	29.2	23.3	26.3	26.2	23.8	23	82	1012.6	SE	4	5	2	2
MAY	138.4	11	30.9	24.7	27.8	27.9	25.6	25	83	1008.7	SE	4	5	3	7
JUN	278.3	15	31.4	25.2	28.3	28.5	26.1	25	83	1007.9	SE	4	6	3	9
JUL	259.2	17	31.6	25.1	28.4	28.6	26.4	26	84	1007.1	SE	5	5	3	9
AUG	43.0	21	30.9	24.8	27.9	28.1	26.1	26	85	1006.4	SW	5	6	4	7
SEP	370.1	20	30.9	24.4	27.6	27.8	25.6	25	84	1008.2	NE	4	6	3	7
OCT	330.1	20	29.5	23.5	26.5	26.7	24.3	24	82	1010.1	NE	4	6	3	7
NOV	317.1	21	27.5	22.3	24.9	24.9	22.6	20	82	1013.9	NE	6	6	0	1
DEC	259.9	21	25.7	20.3	22.9	23.0	21.0	20	84	1014.1	NE	6	6	0	0
ANNUAL	2491.8	203	28.8	22.8	25.8	25.9	23.6	23	83	1011.4	NE	5	6	21	50

EXHIBIT 14

CLIMATOLOGICAL EXTREMES - BASCO
(AS OF 1986)

MONTH	TEMPERATURE (deg. C)				GREATEST DAILY RAINFALL (mm)		HIGHEST WIND (mps)		SEA LEVEL PRESSURE (mbs)			
	HIGH	DATE	LOW	DATE	AMOUNT	DATE	SPD/DIR	DATE	HIGH	DATE	LOW	DATE
JAN	30.9	14'78	11.4	18'80	108.0	26'58	36/N	2'81	1028.7	17'59	1004.2	1'50
FEB	32.6	24'83	12.0	26'74	109.2	27'69	25/NE	9'70	1027.6	1'62	1004.6	16'83
MAR	34.8	16'86	13.5	4'77	94.6	5'67	30/NE	22'70	1028.0	30'58	1002.7	18'86
APR	34.4	12'58	15.6	5'69	118.6	30'65	26/N	4'69	1023.5	10'63	999.9	26'60
MAY	36.4	30'84	17.2	26'61	224.0	25'61	44/SW	5'71	1016.3	3'83	951.7	25'61
JUN	36.5	21'86	19.0	12'81	403.4	24'57	46/SW	29'76	1016.9	14'53	935.7	24'57
JUL	36.5	4'86	18.0	3'84	231.6	25'71	62/NE	26'69	1015.2	7'53	932.1	24'83
AUG	36.9	22'57	19.5	27'80	253.9	13'75	59/NW	1'79	1015.8	8'58	949.8	1'79
SEP	35.6	3'83	17.6	28'68	380.1	26'74	54/ENE	20'81	1016.4	28'82	983.8	13'57
OCT	35.3	9'85	17.4	1'80	410.7	2'62	43/SW	1'69	1021.9	29'60	945.7	12'75
NOV	37.6	9'86	14.5	26'79	210.8	1'66	38/SE	25'81	1023.0	4'58	943.9	13'52
DEC	31.1	12'57	12.0	13'73	176.0	9'53	35/NE	1'81	1026.3	7'60	997.6	13'49
OVERALL	37.6	11/9/ 1986	11.4	1/18/ 1980	410.7	10/2/ 1962	62/NE	7/26/ 1969	1028.7	1/17/ 1959	932.1	7/24/ 1981
PERIOD OF RECORDS		1903-1939 1949-1986				1949-1986		1966-1986		1949-1986		

EXHIBIT 15

ENVIRONMENTAL CONTACT LIST

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Tomas Villanueva, District Drainage Officer
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APPENDIX C
PHOTOGRAPHS

PHOTO 7: CAUSEWAY AND COASTLINE TO THE NORTHWEST, INCLUDING ASKED POINT IN THE BACKGROUND

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA

PLATE C - 1

PHOTO 8: NORTHWEST SIDE OF CAUSEWAY ADJACENT TO CORAL REEF

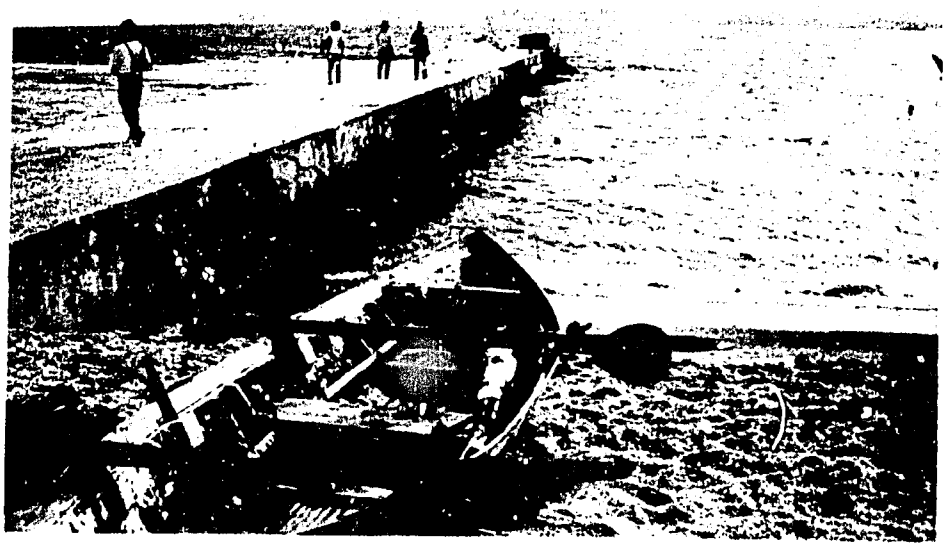

PHOTO 9: SOUTHEAST SIDE OF CAUSEWAY AND ACCESS CHANNEL

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420	PLATE C-2
REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA	

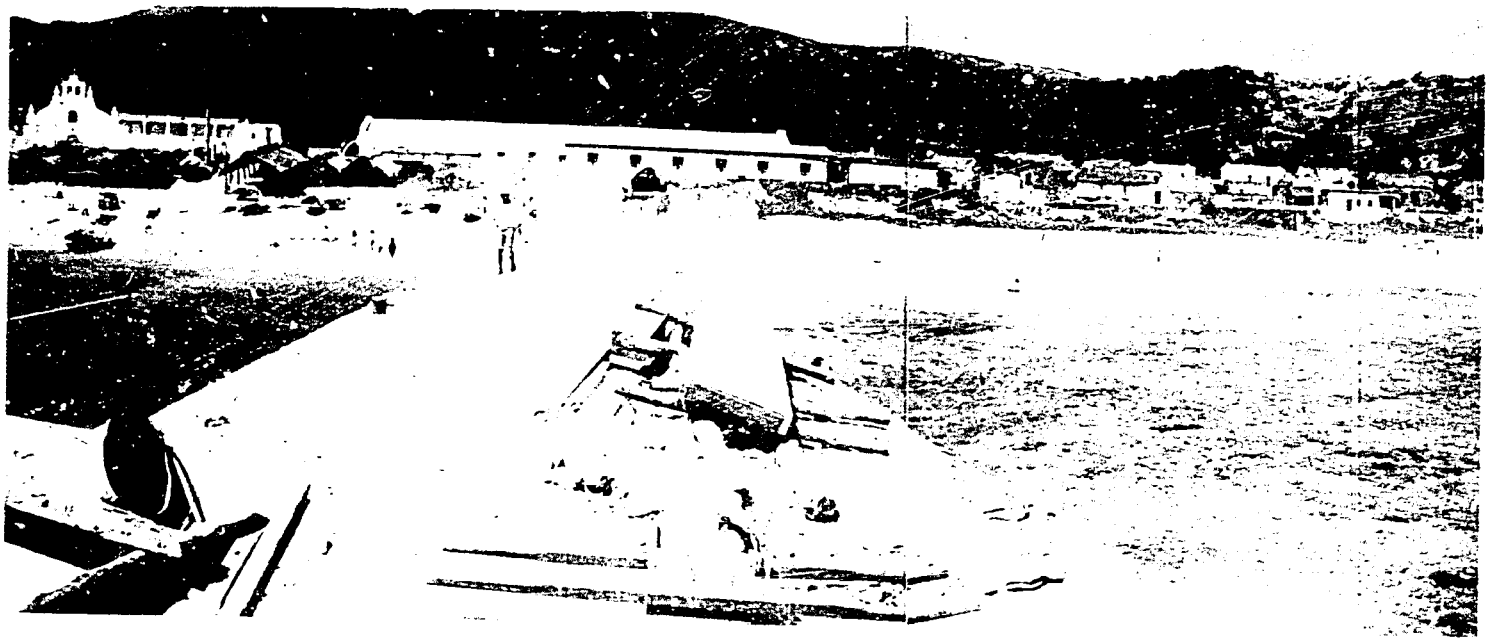

PHOTO 10: SABTANG FROM END OF CAUSEWAY DURING CONSTRUCTION; BEACH LANDING AREA AT LEFT

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

REPRESENTATIVE VIEWS OF THE SUBPROJECT AREA

PLATE C - 3

PHOTO 11: RECENT EXTENSION TO CAUSEWAY UNDER CONSTRUCTION

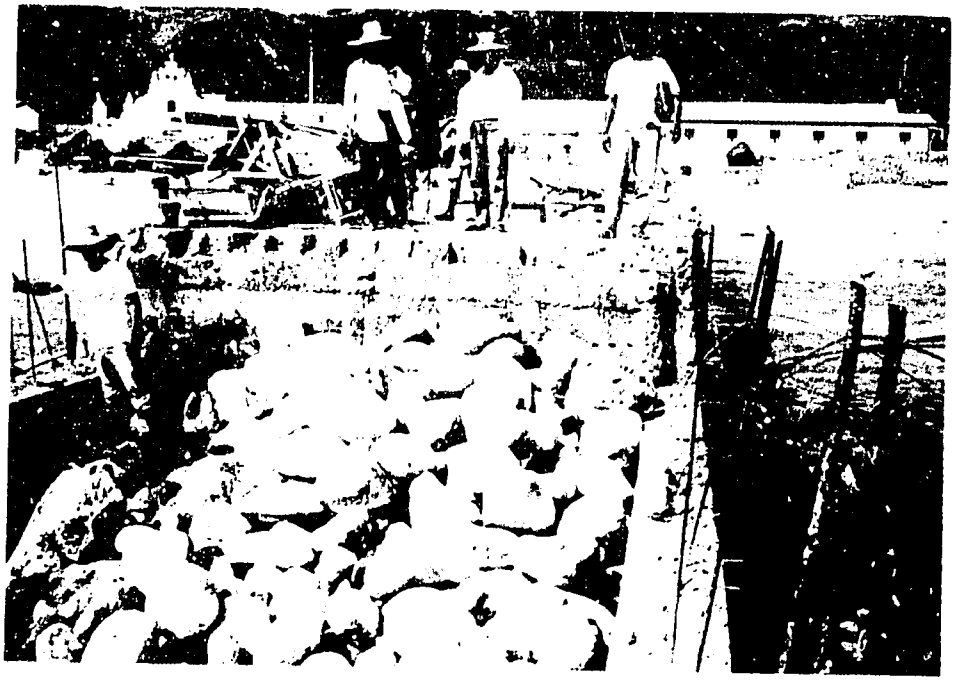

PHOTO 12: ROCK FILL FOR CAUSEWAY EXTENSION

PHOTO 13: CAUSEWAY WITH EXTENSION COMPLETED

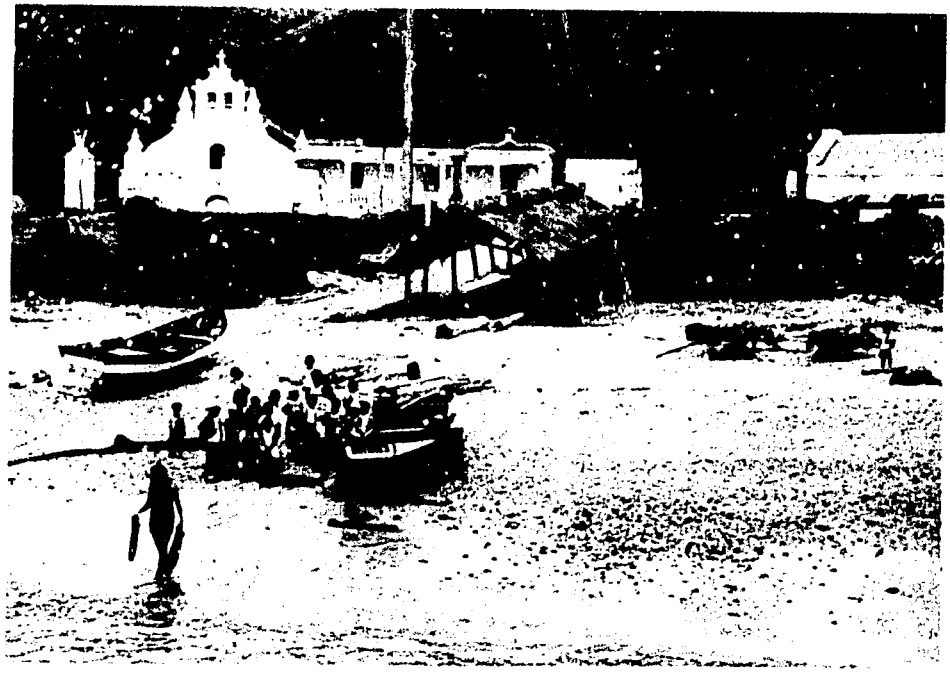

PHOTO 14: CLOSE-UP OF BEACH LANDING AREA

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PHOTO 15: ACCESS CHANNEL TO BEACH LANDING AREA BETWEEN CAUSEWAY AND SEAWALL

PHOTO 16: TYPICAL WAVES APPROACHING CHANNEL AND BEACH LANDING

PHOTO 17: APPROACH TO CAUSEWAY

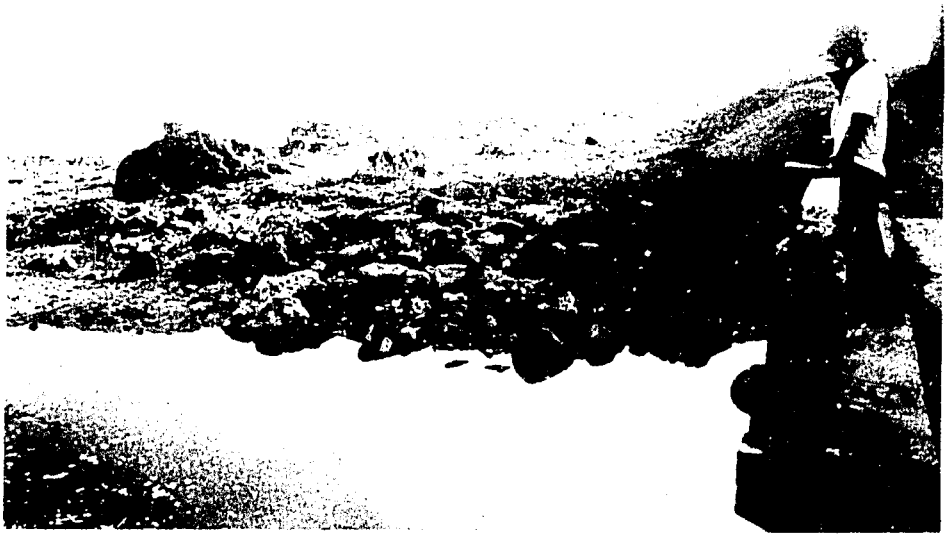

PHOTO 18: SOURCE OF ARMOUR ROCK TO THE SOUTHEAST OF PORT SITE

PHOTO 19: TYPICAL PLANK BOAT
PLYING ROUTE BETWEEN BASCO
AND SABTANG ISLANDS

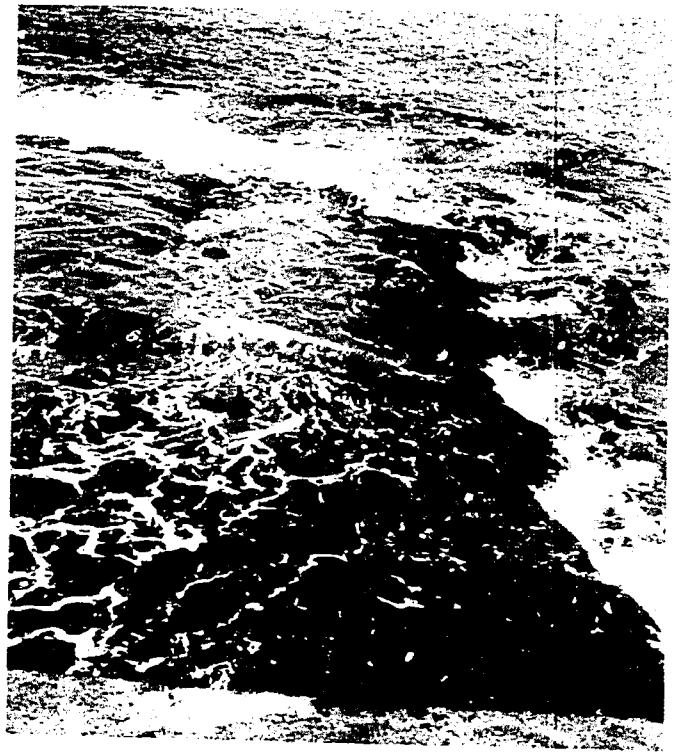

PHOTO 20: AREA OF PROPOSED
CAUSEWAY EXTENSION
ATOP ROCK SHELF

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APPENDIX D
SOCIAL SOUNDNESS OVERVIEW

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APPENDIX D

THE SOCIAL SOUNDNESS OF PORT IMPROVEMENTS: AN OVERVIEW

A. INTRODUCTION

Social soundness analysis evaluates the effect of rural port projects from the perspective of the intended beneficiaries: users, residents and local institutions. It considers project adaptability, social participation, spread of benefits, and equity of benefit distribution. Social sensitivity in feasibility analysis can improve understanding of real needs, projection of future usage, and anticipation of negative social impacts. Social consideration in project design can help in mitigating or compensating for negative impacts and developing community capabilities for self-directed and self-sustained growth.

Social soundness analysis involves five steps:

- Identifying and describing potential port users (individuals and organizations)
- Evaluating potential benefits and/or negative social impacts for these users
- Analyzing socio-economic institutions influencing port usage
- Assessing overall social soundness
- Identifying design and implementation considerations to improve social soundness.

This report provides general social soundness analysis for Philippine port projects, common to many of the proposals. It emphasizes five important aspects of social impact:

- Influences on family income for various social groups
- Implications for population movements
- Potential effects on vulnerable cultural minorities
- Institutional effects
- Design and implementation considerations.

B. THE PHILIPPINE CONTEXT

Many social analysts have recognized the importance of the family as the basic element underlying Filipino social structure. Jocano (1971;410) notes "It is through this structural unit of society that much local authority, rights and obligation and

modes of interactions are expressed, defined, ordered and systematized."

Andres (1981;21) concludes "Structurally speaking the social system in the Philippines is the kinship system. Philippine society is markedly segmented into subgroups with which the members identify themselves to exclusion of others....The most important and highly valued segment in the Philippine society is the family and the kinship system. Obligations to the family are of the highest order. For the Filipino, the concept 'blood is thicker than water' is highly regarded. Within the network of his alliance system which consists of relatives, friends, or followers, status age-grading, generation, authority and power differentials are ranked and observed."

In the family, the father rules, but the mother governs. She is the educator, financial officer, laundry woman and cook (Agoncillo and Alfonso 1961;7). Traditionally, Filipino parents exercise almost absolute powers over their children. It is unthinkable for a Filipino to undertake something important without consulting his parents. When the parents are absent, the eldest sibling takes on the parental role. Grandparents are also consulted and their recommendations carry considerable weight. There is a deeply ingrained respect for elders (Andres 1981;22).

Ritual kinship extension through inclusion of compadre and comadre (ninong and ninang) in baptism, confirmation and wedding services is the immediate linkage between family and community. Ninong are sought from upper income social and political elites to solidify social support networks which are expected to ultimately result in concrete benefits such as granting employment and promotion, providing money in times of need, lending a vehicle, or arranging medical care.

From the family and the local community, allegiances are eventually extended as far as the region sharing a common language and religion. Regionalism generally overshadows nationalism in the Filipino value system. As Agoncillo and Alfonso (1961;9) note: "Regionalism is an extension of the closeness of family ties. Invariably, the Filipino believes that the person known to him, no matter how bad, is better than the one unknown to him."

Inherent Filipino Regionalism has been reinforced historically by Spanish "divide and rule" policies and American "democratic" values. Andres (1981;24) says: "Filipinos have the natural tendency to band together segregating themselves according to regions and home towns. Social status, sex, age and other differences seem to break their barriers at the mention of magkababayan (compatriot) and a closer interpersonal relationship, carried almost to the degree of kinship, is expected mutually of both parties at this point of time."

It is within this social context that Philippine port projects are proposed. Political leaders, loyal to their kin, barangay, and kababayan followers, naturally seek construction projects for their home communities. It is the role of feasibility studies to ensure that approved proposals also meet

rational economic and engineering criteria.

C. PHILIPPINE PORT PROJECTS

The Philippines consists of over 7,000 islands (about 700 of which are inhabited), and is dominated economically by two major cities, Manila and Cebu. Thus, ports play an extremely important role in linking small communities into the economic life of the country. In addition to inter-island traffic, ports play an important role in coastal transportation where roads are either lacking or only seasonally passable. This section summarizes lessons from social soundness analyses of previous Philippine port projects.

For coastal communities, travel by banca often fulfills the same social functions as road transport serves inland. These include moving goods to market, going shopping, visiting relatives, attending high school, and emergency dashes to hospitals or clinics. Such trips are necessary even where bancas must simply land on the beach. Improved port facilities make these journeys easier, faster and safer, and can cause travel to become feasible under previously unnavigable weather conditions.

In general, socio-economic benefits are much more dramatic where new facilities are added than where an existing port is repaired or enlarged. Most proposed RIF sub-projects involve a simple combination of repairing typhoon damage and extending existing piers. For such sub-projects, social benefits are incremental rather than striking. When passenger or marketing sheds, ice plants and cold storage, marine gas stations, or comfort rooms are added, the advantages to the user are much more impressive. Projects which include breakwaters or dredging and land reclamation can have a dramatic impact, sometimes providing year-round access to larger vessels.

Most proposed port sub-projects concern small municipal landings, primarily in rural areas, where users tend to be relatively poor. There are four major types of port users: fishermen, passengers, merchants, and companies. Fishermen may represent family or commercial enterprises. Passengers are local or inter-island. Merchants may be wholesale or retail, and companies reflect various concerns such as trading, agribusiness, and mining. Most port users are individuals from lower and middle income categories. Deep-water ocean ports, which accommodate inter-island vessels, also service large companies.

Fishermen, usually the poorest coastal residents, use the ports regularly and will benefit most. Passengers and merchants, improved port facilities can considerably speed and facilitate travel and cargo shipments. At Morong, Bataan, for example, motorized bancas come from Olongapo in 40-60 minutes, but require an additional 40 minutes to ferry passengers and their goods ashore in the shallow cove where no docking facilities exist. The transport operators and merchants benefitted are usually small operators, but cannot be considered really poor.

Socio-economic benefits from port development projects are generally reflected in:

- o Better access through more regular and frequent departures
- o Time savings through more rapid loading and unloading
- o Added comfort through easier boarding/landing and new facilities
- o Increased safety through protection of passengers and boats during inclement weather
- o Reduced costs through the landing of larger craft, protection of cargo, reduced spoilage, and less ice consumption

In short, travel and transport become more convenient, faster, more comfortable, safer, and less expensive. This, in turn, can result in higher income and improved access to medical and educational facilities, especially where roads are lacking.

D. INCOME EFFECTS

Speedier travel, faster turnaround times and reduced spoilage translate into reduced transportation expenses. Given a fixed market price in Manila, this will result in lower prices for goods from the capital and higher prices for commodities exported by the port community. Both factors imply a higher effective disposable income available to community residents.

For the many small farmers in the rural port hinterlands, this can mean reduced costs for farm inputs and higher farm-gate prices for crop exports. In practice, capitalizing on this opportunity requires a road network linking the hinterland to the port and no alternative access to markets. However, most RIF sub-project ports have alternative port or road access to markets.

The most direct economic benefits accrue to fishermen, who usually represent the poorest social class. Port improvements can decrease costs, lessen spoilage, and improve marketing. A clear understanding of fishermen's needs can easily multiply such benefits. For example, an ice plant or cold storage facility will often be of greater utility than repairing a cracked market structure. Similarly, sensitivity to functional needs might be reflected in provision of a marine fueling facility where gas stations are far away.

E. POPULATION MOVEMENT

Voluntary migration effects are less likely for port development than for road projects where the value of the land

along the road increases dramatically. It would be unusual for a port to improve access to the point where it would influence a family's decision to move. Involuntary displacement, however, remains a significant concern, especially where squatters line the coast and may have to be moved for port construction.

One pair of ports has been designed with the objective of resettling squatters. A docking facility will provide access to a previously remote peninsula where small house plots have been laid out. Another will serve as a market landing, providing access to the area from which the squatters are being moved. One fisherman/ squatter noted that "resettling" usually means provision of farmland. Fishermen who wish to continue with their livelihood are provided only with a little hardware for rebuilding. In the RIF case, the new area is a peninsula and the operation should satisfy all, if properly implemented. Until now, however, the project has been planned without either consulting or informing the squatters.

F. CULTURAL MINORITIES

A special social soundness consideration is to protect tribal and cultural minorities from unfair exploitation resulting from construction projects. This is a significant consideration where roads are planned through or near ancestral tribal lands. Such considerations are less likely for port projects where less land is involved and non-existent for the large majority of the proposed projects which involve only extension of an existing port.

Historically, however, such events have occurred. In Panacan Port (Narra, Palawan), for example, the Tagbanwa formerly occupied the area where the port was constructed. They were relocated to a mountainside reservation to facilitate the development. Only about three of the original Tagbanwa residents held title to their lands. These three still hold their titles and can legally reap some of the development benefits through the increased value of their property.

Thus, the most significant step in protecting tribal minorities is ensuring them title to their lands. This is feasible in the coastal areas applicable to port projects. (Land titles are not permitted in forest reserves where many tribes live, but communal stewardship arrangements provide some protection.) Where vulnerable minorities are involved, the social soundness of development projects can be increased by including in the project provisions for assisting these people to obtain titles for their property. The Offices of Northern and Southern Communities in the President's Office are currently charged with the task of protecting tribal minorities. Outsiders wishing to purchase land from such minorities are required to obtain approval from these offices.

Appropriate consideration of minority communities's needs in port project planning could be facilitated by more pro-active consultation with them during early project planning. As with other local residents, they too often learn about development

projects when the bulldozers arrive.

G. DESIGN AND IMPLEMENTATION CONSIDERATIONS

Appropriate design considerations can be identified for individual ports by including the intended beneficiaries in the planning process. Most simply, this requires only a few interviews with representative port users. Local leaders could reap political recognition as well as economic gains by expanding the process to include public meetings. People almost always react more positively towards projects in which they are involved.

Consultation with port users can also avoid serious negative consequences. For example, the fishermen a port is intended to aid are often squatters living in huts built on stilts at the waters edge. If construction of a landing requires destruction of their houses and dislocation of their families, their net benefit will be strongly negative.

Land tenure considerations deserve special attention. Wherever private land is involved, port projects should provide assistance in obtaining titles to ensure equitable distribution of benefits.

Labor-intensive construction methods employing local labor should be considered wherever feasible. The Philippine context is characterized by extensive under-employment, and the temporary boost to the economy through provision of temporary employment opportunities can be significant.

In addition, port projects can make permanent contributions to the economy. Kiosks in newly constructed passenger sheds, for example, represent added entrepreneurial ventures. Port maintenance activities may require regular laborers. And, where municipal ports collect docking fees, local institutions will be strengthened through income generation.

Institution-strengthening efforts linked to port improvements can include support for fishermen's cooperatives. Ice plants and cold storage facilities, for example, are often a major concern of fishermen. These plants could be owned and managed through such cooperatives. Government projects could provide credit to local cooperatives, linked with appropriate management training, rather than paying for such facilities outright. DPWH could design small, inexpensive cold storage facilities appropriate for rural fishing ports, in place of the larger plants now available. Appropriate development of such interventions can be pursued effectively if fishermen are involved and consulted from the beginning.

Educational efforts can also be utilized to facilitate the development of local capacity. Municipal port personnel, for example, might benefit from management training including the collection and management of funds and port maintenance. In areas with coral reefs, workshops could be conducted for port users on appropriate practices for maintaining the integrity and

beauty of the reefs while fishing, diving or conducting normal port operations. Such seminars would be especially useful in tourist locations.

H. Conclusions

In general, the proposed port sub-projects will make transportation more convenient, faster, more comfortable, safer, and less expensive. Most port sub-projects will tend to improve real income slightly in the port communities and will not adversely affect cultural minorities or result in significant population movements.

This appendix has presented general analysis common to all port projects. Considerations specific to each case are analyzed in the main body of the report. Socio-economic characteristics of port users are summarized in Chapter II and social soundness analysis is presented in Chapter VIII.

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