Chapter 1 Socio-economic Profile of Western Visayas

A. Geographical Features

Land Area

1. The Western Visayas region, where the Iloilo-Bacolod Link is located, is bounded on the north by the Sibuyan Sea, on the south by the Sulu Sea, on the east by Visayan Sea, and on the west by the islands of Palawan over the Palawan Sea. This region includes the major islands such as Panay, Negros and Panubulon, of which Negros is shared with the Central Visayas region. Panay Gulf lies between these islands.

2. Western Visayas region has a total land area of 2,022,311ha (6.7% of the Philippines total land area) and is composed of five (5) provinces viz., Aklan, Antique, Capiz, Iloilo, and Negros Occidental. The region has one sub-province (Guimaras) off the coast of Iloilo. There also are of 8 cities, 123 municipalities and more than 4,000 baranguays. Iloilo City is designated as the regional center.

Land Form

3. The topographical forms consist of lowland areas with mountain ranges separating provinces. Parts of these mountainous ranges divide the Negros Island into Negros Occidental in this region and Negros Oriental in the Central Visayas region. Around 40% of the land of the region is devoted to agriculture, 30% to open (unused) land, 20% to forests, 5% to settlements, the rest to inland ponds, pastures and mining.

4. The lands comprising the region exhibit similar physical features characterized by relatively wide stretches of rivers and coastal lowlands spread inland and series of rugged hills and mountain lands in the interior areas. The biggest rivers are: Aklan, Sibalom, Jaro, Binalbayan, Bago and Ilog river.

Climate

5. The climate is generally characterized by having distinct dry season from November to April, and wet season for the rest of the year. Although the region is outside the typhoon belt, freak ones sometimes hit the region.

Mountains

6. Mt. Canlaon, the highest mountain in the region, is located in the Negros Occidental. At 2,435 meters above sea level, it is also considered as the highest mountain in the central part of the Philippines. In Panay Islands, Mt. Madia-as, the second highest mountain in the region, rises to 2,117 meters above sea level and is located between the municipalities Clasi (Antique) and Madalag (Aklan). The third highest is Mt. Nangtud in Barbaza, Antique with a height of 2,060 meters above sea level. The other mountains of the region include Mt. Baloy (1,728 m, Capiz and Antique), Mt. Maman (1,350m, Iloilo) and Igalig (1,288m, Iloilo).

B. Political Subdivision

Local Government

7. In the Philippines, there are four(4) types of local government units: the baranguay, the municipality, the city, and the province. The local government units have the following functions and powers ; to promote health and safety, secure property, to improve morals, to maintain peace and order in the units, to preserve the comfort and convenience of the habitants, and to acquire and transfer real or personal property.

1) Baranguay

8. The baranguay is the basic unit of not less than one thousand (1,000) inhabitants within the territory. It is also administrated by a set of elective officials headed by a baranguay chairman. It performs both political and devel-

opmental functions such as the primary planning and implementing unit of government programs, projects, activities and conducting a forum in which the collective views of the people in the community may be heard and considered. In the other aspects, it is said that the baranguay is an administrative arms of the other local and national governments, assisting them in the maintenance of peace and order, facilitating urban traffic and implementing the baranguay road program. The baranguay is a terminal point in the reporting and collecting system for census and other intelligence purpose.

2) Municipality

9. The municipality is a political corporate body and subsidiary of the province, consisting of the many baranguays within its territory. The elective officials are the Mayor, Vice Mayor and the Sangguniang Bayan (legislative body of the town) members. The Sangguniang Bayan consists of the Mayor, Vice Mayor, elective members, and members appointed by the President of the Philippines.

3) City

10. Cities in the Philippines are of two (2) types: One is for highly urbanized cities independent of the province with a population of at least 150 thousand and an average annual income of 30 million pesos. The other is the component cities which are part of the provinces and subject to their provincial administrative supervision. A component city should have a population of 100 thousand and an average annual income of 10 million pesos. The legislative body is composed of the Mayor as presiding officer, the Vice Mayor, the elective members, and other members from the baranguays under the city. The Western Visayas has 8 cities, and of 2, Iloilo and Bacolod, are designated as highly urbanized cities.

4) Province

11. The province is the largest unit in the political structure of the Philippines. It consists of municipalities, component cities and barangnays. Its functions and duties are generally coordinative and supervisory in relation to the municipalities and component cities. Requirements for creation of new province are: a territory of at least 3,500km^2, either contiguous or comprising two(2) or more islands; a population of at least 500 thousand persons; and an estimated annual income of at least 10 million pesos (Philippine Yearbook 1989,NSO). The sub-province is a unit of this kind but does not satisfy the requirements. The Governor, Vice governor and the members of the legislature board are elected. The legislature board is comprised of members from the component cities, municipalities and baranguays appointed by the President of the Philippines other than those officials. As mentioned previously in the Western Visayas Region there are five (5) provinces; Aklan, Antique, Capiz, Iloilo, and Negros Occidental.

Number of Local Governments in Western Visayas

12. The number of cities, municipalities, and baranguays in Region VI as of December 31,1988 is shown in Table 1-1. Among them Guimaras is a sub-province. According to the table, there are eight (8) cities, one hundred twenty three (123) municipalities, and 4,042 baranguays in this region.

Table 1-1 Numbers of Cities, Municipalities, and Baranguay in Region VI as of December, 1988

Province	Cities	Municipalities	Baranguays
Aklan	-	17	327
Antique	-	18	590
Capiz	1	16	473
*Guimaras	-	3	96
Iloilo	1	43	1,900
Negros Occidental	6	26	656
Total	8	123	4,042

Source: Philippine Yearbook 1989, NSO.

* Sub-province

C. Demographic Features

13. As of the 1990 Census, the Region has a total population of 5,393 thousand, with an average ratio of 267 persons per square kilometer (Table 1-2). Out of the total population, 1,647 and 2,257 thousand people reside in Iloilo and Negros Occidental Province respectively, and 310 and 364 thousand reside in Iloilo City and Bacolod City respectively. These two cities are designated as highly urbanized cities independent of the provinces.

14. Table 1-2 shows the movement of population of the Western Visayas compared with that of the Philippines and the Metro Manila area. It shows that the population of both the Philippines and the Western Visayas gradually increases from the 1970s' to the 1980s'. However the increase rate of the Region comes under the national average, and in some provinces the population has decreased (Negros Occidental, Capiz).

Table 1-2 Movement of Population and Density

[Unit: Thousand Persons]

Region \ Year	Population 1970	1980	1987	1990	AREA(Km2)	Density person/km2
Philippines	32,718	48,098	57,356	60,155	300,000	201
	3.00%	3.93%	2.55%	1.60%		
National Capital Region	3,967	5,926	7,354	7,929	636	12,467
		4.10%	3.13%	2.54%		
Western Visayas	3,618	4,526	5,323	5,393	20,223	267
	1.60%	2.26%	2.34%	0.44%		
Iliilo	1,095	1,341	1,661	1,647	4,719	349
Iloilo City	210	245	278	310	56	5,536
*		2.05%	3.10%	-0.28%		
Negross Occidental	1,504	1,930	2,291	2,257	7,926	285
Bacolod City	187	262	314	364	156	2,332
Cadiz City	124	130	142	120	517	232
Bago City	72	100	124	123	402	306
La Carlata City	38	46	56	56	137	411
San Carlo City	90	92	99	106	451	234
Silay City	69	111	130	101	215	470
*		2.53%	2.48%	-0.50%		
Capiz	394	492	586	584	2,633	222
Roxas City	68	81	97	103	102	1,011
*		2.25%	2.52%	-0.11%		
Alkan	263	325	379	380	1,818	209
*		2.11%	2.24%	0.13%		
Antique	289	345	406	406	2,522	161
*		1.78%	2.36%	0.03%		
Guimaras	73	92	N.A.	118	605	195

Source: Data from IATCTP.
Note: *Each % indicates the average annual growth rate of province.

15. Table 1-3 shows the population distribution by age group in the Western Visayas. The population age structure has a trend indicates that the portion of young dependent age group (0-14 years) is decreasing in a percentage and both the working group (15-64 years) and the old dependent group (65 years and older) are increasing. The percentage of the working age group has been keeping more than 50% of the total population, and has not significantly changed through the 1970 - 1985 period.

Table 1-3 Population Distribution by Age Group of Western Visayas

Province	Year / Age Group	1970 %	1970 1000 persons		1980 %	1980 1000 persons	1980 Gth. Rate	1985 %	1985 1000 persons	1985 Gth. Rate
Aklan		100.00%	263	N.A.	100.00%	325	2.14%	100.00%	363	1.11%
	0-14 yrs	45.25%	119	N.A.	41.23%	134	1.19%	41.32%	150	1.13%
	15-64 yrs	50.19%	132	N.A.	52.92%	172	2.68%	53.17%	193	1.16%
	65 & Over	4.56%	12	N.A.	5.85%	19	4.70%	5.51%	20	0.51%
Antique		100.00%	289	N.A.	100.00%	346	1.82%	100.00%	388	1.15%
	0-14 yrs	43.94%	127	N.A.	41.91%	145	1.33%	42.27%	164	1.24%
	15-64 yrs	51.56%	149	N.A.	52.31%	181	1.96%	52.32%	203	1.15%
	65 & Over	4.50%	13	N.A.	5.78%	20	4.40%	5.41%	21	0.49%
Capiz		100.00%	394	N.A.	100.00%	492	2.25%	100.00%	559	1.28%
	0-14 yrs	47.46%	187	N.A.	43.90%	216	1.45%	44.01%	246	1.31%
	15-64 yrs	49.24%	194	N.A.	52.03%	256	2.81%	52.06%	291	1.26%
	65 & Over	3.30%	13	N.A.	4.07%	20	4.40%	3.94%	22	0.96%
Iloilo		100.00%	1,168	N.A.	100.00%	1,434	2.07%	100.00%	1,595	1.07%
	0-14 yrs	43.66%	510	N.A.	40.52%	581	1.31%	40.50%	646	1.07%
	15-64 yrs	52.40%	612	N.A.	54.53%	782	2.48%	54.55%	870	1.07%
	65 & Over	3.94%	46	N.A.	4.95%	71	4.44%	4.95%	79	1.07%
Negros Occ.		100.00%	1,504	N.A.	100.00%	1,930	2.53%	100.00%	2,187	1.26%
	0-14 yrs	46.68%	702	N.A.	43.21%	834	1.74%	43.21%	945	1.26%
	15-64 yrs	50.86%	765	N.A.	53.78%	1,038	3.10%	53.77%	1,176	1.26%
	65 & Over	2.46%	37	N.A.	3.01%	58	4.60%	3.02%	66	1.30%
Regional VI		100.00%	3,618	N.A.	100.00%	4,527	2.27%	100.00%	5,092	1.18%
	0-14 yrs	45.47%	1,645	N.A.	42.19%	1,910	1.50%	42.24%	2,151	1.20%
	15-64 yrs	51.19%	1,852	N.A.	53.66%	2,429	2.75%	53.67%	2,733	1.19%
	65 & Over	3.34%	121	N.A.	4.15%	188	4.51%	4.08%	208	1.02%

Source:Regional Handbook on the Land and Other Physical Resources - Region VI,Regional Development Council, Region VI, 1990.

D. Economic and Industrial Features

General

16. The principal products are rice, fish, poultry, cattle and other livestock, sugarcane, corn, capiz, shells, timber, fruits and vegetables, coconut, coffee, and cotton. Mineral resources include copper, gold, silver, limestone, iron, cement, marble, clay, and asbestos. The main sources of the population's livelihood are fishing, farming, livestock and poultry production, mining, fish processing, and logging.

17. The sugar industry has been the main source of livelihood in the Western Visayas. Since the crop is highly vulnerable to fluctuating world market prices, the industry collapsed when the price plummeted from the mid-1970s until the mid-1980s. Nowadays the regional economy is breaking free from the grip of this depression, however it also depends on the more stable sugar prices and booming prawn industry in ponds converted from the sugar industry.

18. Some of the region's tourist attractions include Mount Canlaon Volcano, Anti-atihan Festival, Boracay Island, Jawili Falls, caves, old churches, resorts and beaches.

Gross Domestic Product

19. Table 1-4 shows the increase in GDP (Gross Domestic Product) as well as the changes of value per capita in Western Visayas in the last half of 1980', compared with that of the Philippines and Metro Manila area. The table shows how all aspect of GDP slumped in 1986. Since then the pace of recovery up to 1989 seems to be steady. Figures of the Western Visayas, however, are below the national average. This situation is clear when one examines GDP and the growth rates of GDP.

Table 1-4 Growth of Gross Domestic Product

[Unit: Million Pesos, Pesos, %]

	Region	1981	1985	1986	1987	1988	1989
①GDP at Current Price	Philippines	305,260	612,665	624,430	708,369	825,707	963,171
	Metro Manila	94,004	173,686	186,008	216,670	263,587	309,137
(in millions of pesos)	Western Visayas	23,037	42,676	40,719	46,418	53,109	60,977
Annual Growth Rate (%)	Philippines	15.34%	19.03%	1.92%	13.44%	16.56%	16.65%
	Metro Manila	17.76%	16.59%	7.09%	16.48%	21.65%	17.28%
	Western Visayas	15.98%	16.66%	-4.59%	14.00%	14.41%	14.81%
②GDP at 1972 Price	Philippines	96,208	89,885	91,166	95,434	101,759	106,476
	Metro Manila	30,579	26,670	26,619	29,503	31,324	33,286
(in millions of pesos)	Western Visayas	7,821	6,581	6,346	6,546	6,902	7,586
Annual Growth Rate (%)	Philippines	3.93%	-1.69%	1.43%	4.68%	6.63%	4.64%
	Metro Manila	4.29%	-3.36%	-0.19%	10.83%	6.17%	6.26%
	Western Visayas	3.40%	-4.22%	-3.57%	3.15%	5.44%	9.91%
③Per Capita GDP at Current Price (in pesos)	Philippines	5,477	11,207	11,150	12,350	14,064	16,040
	Metro Manila	13,371	25,109	26,024	29,451	34,836	39,914
	Western Visayas	4,377	8,380	7,820	8,720	9,769	10,888
Annual Growth Rate (%) at Current Price	Philippines	-0.46%	19.60%	-0.51%	10.76%	13.88%	14.05%
	Metro Manila	-0.74%	17.06%	3.64%	13.17%	18.28%	14.58%
	Western Visayas	-0.26%	17.63%	-6.68%	11.51%	12.03%	11.45%
④Per Capita GDP at 1972 Price (in pesos)	Philippines	1,942	1,644	1,628	1,663	1,728	1,783
	Metro Manila	4,968	3,842	3,724	3,865	4,108	4,281
	Western Visayas	1,684	1,292	1,219	1,241	1,271	1,288
Annual Growth Rate (%) at 1972 Price	Philippines	0.94%	-4.08%	-0.97%	2.15%	3.91%	3.18%
	Metro Manila	0.40%	-6.22%	-3.07%	3.79%	6.29%	4.21%
	Western Visayas	0.78%	-6.41%	-5.65%	1.80%	2.42%	1.34%

Souece: Philippines Yearbook 1990, NSCB. Data offered by IATCTP.

20. The composition of GRDP(Gross Regional Domestic Product) is shown in Table 1-5 that represents the portion of each industry and its subdivision. The figures in this table are calculated out based on the both data at the 1973 and the 1985 price in order to look into the portion transit of the subdivided

industries. Given that the slump exists during 1984-1986 in the Philippines, the similar tendency, that the second and tertiary industries increase in the portion of GDP while the primary industry decreases in the recent developing countries' economies, is seen in the Western Visayas economy.

Table 1-5 Portion of Western Visayas GRDP

[Unit: Millions of Pesos]

Year / Industry	1975	1980	1981	1986	1987	1988	1989	1990
Agriculture, Fishery, Forestry	44.50%	38.31%	42.16%	43.74%	42.26%	42.30%	34.33%	34.01%
Agricultural Crops	N.A.	N.A.	24.27%	24.81%	23.28%	23.03%	34.33%	34.01%
Livestock & Paultry	N.A.	N.A.	7.74%	7.87%	8.01%	8.46%	N.A.	N.A.
Fishery	N.A.	N.A.	10.15%	11.05%	10.97%	10.82%	N.A.	N.A.
Forestry	N.A.	N.A.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Industry	25.72%	28.82%	21.24%	18.26%	17.87%	17.19%	22.98%	23.32%
Mining & Quarrying	2.10%	2.24%	2.52%	4.36%	3.85%	3.96%	1.20%	1.35%
Manufacturing	21.00%	21.54%	15.55%	11.05%	10.91%	10.20%	17.26%	17.15%
Construction	2.29%	4.58%	2.31%	1.91%	2.18%	2.16%	2.70%	3.04%
Electricity, Gas, Water	0.34%	0.46%	0.86%	0.95%	0.93%	0.86%	1.82%	1.78%
Service Sector	29.79%	32.87%	36.60%	38.01%	39.87%	40.51%	42.68%	42.67%
Transportation	2.29%	2.36%	2.74%	2.95%	2.96%	3.04%	3.98%	3.91%
Trade	14.54%	16.56%	19.49%	19.84%	20.87%	21.39%	19.84%	19.74%
Finance & Housing	5.27%	4.95%	4.44%	4.69%	5.18%	5.15%	8.76%	8.84%
Other services	7.68%	9.01%	9.93%	10.53%	10.86%	10.93%	10.11%	10.18%
G R D P	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note:Figures are calculated with the data obtained from CRC and the data offered by IATCTP.

Agriculture

21. Table 1-6 shows the portion of the Western Visayas in agricultural production. The Region's agriculture is characterized by sugarcane, as both the plant area and production are more than 50% of those throughout the country. Palay(rice), banana, and mango also share more than 10% of whole country's production. On the other hand corn, pineapple, abaca, and tobacco are produced less and have a lower productivity than the national average.

Table 1-6 Quantity and Value of Agricultural Products in the Philippines and Western Visayas (1986, 1987)

(Unit; Million Pesos, Thousand MT, MT per ha, peso per ha)

		1987			1986			Average Productivity (per ha)		
		Plant Area (1,000 ha)	Quantity	Value	Plant Area (1,000 ha)	Quantity	Value	Quantity	Value	Unit Value
Palay	Philippines	3,403	8,958	25,504	3,403	9,097	27,983	2.65	7,859	2,962
	Western Visayas	460	1,144	3,134	445	1,122	3,273	2.50	7,079	2,828
	(Share/Ratio %)	13.51%	12.77%	12.29%	13.09%	12.33%	11.70%	94.36%	90.08%	95.46%
Corns	Philippines	3,564	4,015	10,923	3,545	3,922	9,842	1.12	2,921	2,618
	Western Visayas	106	53	154	92	44	128	0.49	1,428	2,924
	(Share/Ratio %)	2.96%	1.31%	1.41%	2.59%	1.12%	1.30%	43.75%	48.90%	111.78%
Banana	Philippines	331	3,755	4,667	330	3,820	4,855	11.47	14,415	1,257
	Western Visayas	36	331	464	37	353	573	9.40	14,255	1,516
	(Share/Ratio %)	10.80%	8.82%	9.93%	11.21%	9.23%	11.80%	81.98%	98.90%	120.63%
Pineapple	Philippines	59	2,232	3,960	60	1,602	3,424	32.29	62,188	1,926
	Western Visayas	0.5	7	16	0.51	7	19	13.59	34,513	2,540
	(Share/Ratio %)	0.84%	0.30%	0.41%	0.86%	0.44%	0.55%	42.08%	55.50%	131.89%
Mango	Philippines	63	352	3,572	45	384	3,109	6.81	61,816	9,074
	Western Visayas	7	18	206	5	67	550	7.05	63,066	8,945
	(Share/Ratio %)	11.58%	5.07%	5.78%	10.44%	17.37%	17.70%	103.49%	102.02%	98.58%
Sugarcane	Philippines	274	1,861	8,563	356	2,135	7,663	6.34	25,747	4,060
	Western Visayas	141	978	4,515	183	1,149	4,105	6.56	26,590	4,052
	(Share/Ratio %)	51.42%	52.55%	52.72%	51.45%	53.82%	53.57%	103.48%	103.28%	99.80%
Abaca	Philippines	157	90	451	162	83	441	0.54	2,786	5,148
	Western Visayas	1.7	0.912	6	1.81	1.185	8	0.60	3,763	6,299
	(Share/Ratio %)	1.08%	1.01%	1.25%	1.12%	1.43%	1.72%	110.00%	134.60%	122.37%
Tobacco	Philippines	56	58	1,006	57	56	763	1.02	15,727	15,470
	Western Visayas	0.4	0.35	9.088	0.44	0.412	10.468	0.91	23,281	25,664
	(Share/Ratio %)	0.72%	0.60%	0.90%	0.78%	0.74%	1.37%	89.23%	148.03%	165.90%

Source;Phippine Year Book 1989,NSO.

22. Crops comprise more than half of Western Visayas agriculture product. After peaking in 1979 its production declined every year due to dwindling sugar production. Sugar continued to be the major regional crop although its share of the total crop product shrank. Palay is the second most important crop as much as that the Western Visayas' is one of the most country's leading producers. The provincial distribution of the regional agricultural crops production is shown in Table 1-7.

Table 1-7 Distribution of Agricultural Production by Province in 1988

(Unit: Metric Tons)

Commodity \ Province	Aklan		Antique		Capiz		Iloilo		Negros Occ.		Region VI	
	MT	%	MT	%	MT	%	MT	%	MT	%	MT	%
Food Crops												
Palay	79,229	7.06%	86,927	7.75%	213,486	19.03%	504,763	44.99%	237,540	21.17%	1,121,945	100.00%
Corn	761	1.28%	1,715	2.88%	8,459	14.21%	20,376	34.22%	28,235	47.42%	59,546	100.00%
Pineapple	987	17.98%	26	0.47%	111	2.02%	1,934	35.23%	2,431	44.29%	5,489	100.00%
Calamansi	484	8.41%	47	0.80%	55	0.94%	5,102	86.81%	179	3.05%	5,877	100.00%
Camote	1,142	2.39%	2,445	5.11%	5,563	11.63%	23,928	50.03%	14,750	30.84%	47,828	100.00%
Peanut	30	2.07%	101	6.96%	16	1.10%	604	41.60%	701	48.28%	1,452	100.00%
Mango	12	0.02%	876	1.30%	28	0.04%	65,430	97.36%	860	1.28%	67,208	100.00%
Commercial Corps												
Sugarcane		0.00%		0.00%	18,596	2.89%	49,875	7.74%	575,635	89.37%	644,106	100.00%
Abaca	485	49.90%	6	0.60%	3	0.30%	21	2.12%	467	47.08%	992	100.00%
Tobacco	1	0.56%	4	2.23%		0.00%	4	2.23%	170	94.97%	179	100.00%
Coffee	14	0.23%	37	0.61%	3,232	53.08%	732	12.02%	2,074	34.06%	6,089	100.00%

Source : Regional Handbook on Land and Other Physical Resources - Region VI, Regional Development Committee, 1990

Fishing

23. Fishing is the second biggest sub-sector in agriculture, owning with around a quarter share of the total. It has three major components; municipal fishing accounted for 40% of the whole fishery output in 1988, commercial fishing accounted for 36%, and inland fishpond aquiculture for 25% as shown in Table 1-8.

Table 1-8 Fish Production by Subdivision and Province in 1988

[unit: MT]

Prov.	Municipal	Commercial	Inland	Total
Aklan	5,174	496	10,295	15,965
Antique	16,132	3,925	902	20,959
Capiz	11,847	10,318	23,594	45,759
Guimaras	2,111	-	2,411	4,522
Iloilo	50,044	47,891	22,326	120,261
Negros Occ.	54,726	62,546	26,504	143,776
Region VI	140,034	125,177	86,031	351,242

Source: Regional Handbook on Land and Other Physical Resources Region VI (Western Visayas), Sub - committee on Inter- Regional Development and Physical Planning (Regional Land use Committee), Regional Development Council, Region VI, 1990.

24. In the same year, municipal fishing contributed 140,034 MT (metric ton). Of it Negros Occidental was responsible for 54,726 MT (39% of this subdivision), Iloilo for 50,044 MT (36% of the same subdivision).

25. In terms of commercial fishing they landed 125,177 MT with Negros Occidental responsible for 62,546 MT followed by Iloilo's 47,891 MT (50% and 38% of the total commercial fishing for each province's). Table 1-9 shows the

volume of maritime fish landed by commercial fishing vessels in the Western Visayas. The share in terms of volume of this region in 1990 is below that of the beginning of the 1980s. Nevertheless, it can be said that the commercial fishing is recovering from the lows of 1985.

Table 1-9 Volume of Commercial Fishing Product in Visayas

[Unit; 1000 kg, %]

Region	1980	1985	1986	1987
Philippines	488,768	511,987	546,230	591,192
Western Visayas	133,723	104,342	111,672	119,249
Alkan	2,813	499	474	488
Antique	298	3,243	3,407	3,899
Capiz	7,978	7,745	6,541	8,871
Iloilo	53,735	43,918	41,965	45,864
Negros Occidental	68,899	48,937	59,285	60,127
Share(%)				
Western Visayas	27.36%	20.38%	20.44%	20.17%
Alkan	0.58%	0.10%	0.09%	0.08%
Antique	0.06%	0.63%	0.62%	0.66%
Capiz	1.63%	1.51%	1.20%	1.50%
Iloilo	10.99%	8.58%	7.68%	7.76%
Negros Occidental	14.10%	9.56%	10.85%	10.17%

Source:Philippine Yearbook 1989, NSO.

26. Inland fishpond produced 86,031 MT in this year, almost all coming from brackish water ponds utilized for prawn and milkfish culture. Out of this subdivided item, 26,504 MT is yielded in Negros Occidental, 23,594 MT in Capiz, and 22,326 MT in Iloilo. It is said that inland fishing increase its share of the total fishery sector's output. Specifically, they caught around 20% (62,300 MT) of the total (318,277 MT) in 1986 with having increased at the same rate of 17.5% per year up to 1988.

Mining

27. The principle mineral products in the Region are copper, gold, silver and limestone. These are produced mainly in Negros Occidental Province, and are shown in Table 1-10 below.

Table 1-10 Mineral Production in Negros Occidental in 1987

[Unit : Thousand Pesos]

Mineral Product	Unit	Quantity	Value
Gold	KG	292	84,912
Silver	KG	8,193	38,379
Copper(metal)	MT	40,604	1,188,836
Copper(concrete)	DMT	144,847	(1,188,836)
Limestone			
Agriculture use	MT	10,137	2,849
Industrial use	MT	9,316	3,693

Source:Philippine Yearbook 1989, NSO.

Manufacturing and Construction

28. Before the economic decline in 1986, the sum of the regional manufacturing and construction industry had kept occupying around 25% of the GRDP of Western Visayas. Table 1-11 shows the numbers of employees, output and value added manufacturing and construction in the Western Visayas. Neither the output nor value added per employee reaches the national average, particularly in construction where both the output and value added per employee only manages to total around 60 - 70% of the national average.

Table 1-11 Employees, Output and Value Added in Manufacturing

[Unit; Million Pesos, Thousand Persons, %]

		Manufacturing		Construction	
		1986	1987	1986	1987
NO. of Employees (thousand persons)	Philippines	636	675	58	70
	Metro Manila	349	371	42	53
	Western Visayas	24	24	0.69	0.58
	Share (%)	3.74%	3.56%	1.17%	0.83%
Value of Output (million pesos)	Philippines	247,461	297,940	7,709	8,350
	Metro Manila	105,802	132,331	6,533	6,991
	Western Visayas	7,729	8,305	51	43
	Share (%)	3.12%	2.79%	0.66%	0.51%
Output per Employee (thousand pesos)	Philippines	389	441	132	119
	Metro Manila	303	356	154	131
	Western Visayas	325	346	75	73
	Quota (%)	83.51%	78.40%	56.48%	61.72%
Value added (million pesos)	Philippines	97,747	105,382	2,911	3,154
	Metro Manila	40,872	52,709	2,459	2,607
	Western Visayas	3,924	2,887	19	19
	Share (%)	4.01%	2.74%	0.67%	0.60%
Value added per Employee (thousand pesos)	Philippines	154	156	50	45
	Metro Manila	117	142	58	49
	Western Visayas	165	120	28	33
	Quota (%)	107.33%	77.04%	56.74%	73.03%

Source:Philippines Year Book 1989
Note; Share and quata in the table are Western Visayas's as to Philippines total.

E. Infrastructure

Road

29. The Philippines road network system is composed of the national, the provincial, the city, the municipal and the baranguay roads. Table 1-12 shows the existing road length in the Western Visayas in 1990 by the different types of pavement used. Progress in the regional road length extends indifferently from 1986 to 1990. Of the total (14,256 km) as of 1990, earth or gravel paved baranguay roads account for 57% (8,136 km). Conversely, concrete or asphalt paved national, province and city roads accounts for only 11% (1,449km). The road transportation connects mostly the urban centers in the coastal areas. However the many communities in the inland hinterland still have inadequate basic transportation facilities.

Table 1-12(1) Progress in the Road Length in Western Visayas

[Unit: km, %]

	1972	1975	1982	1985	1986	1987	1988	1989	1990
Total	10,201	12,574	12,781	13,310	14,048	14,067	14,041	14,042	14,257
Av.Growth Rate/ann.	N.A.	7.22%	0.23%	1.36%	5.55%	0.13%	-0.19%	0.01%	1.52%
National Road	2,403	2,581	2,077	2,605	2,614	2,633	2,633	2,664	2,671
Av.Growth Rate/ann.	N.A.	2.41%	-3.06%	7.84%	0.35%	0.73%	0.00%	1.18%	0.26%
Provincial Road	4,053	3,997	2,559	2,229	2,229	2,453	2,459	2,434	2,459
Av.Growth Rate/ann.	N.A.	-0.46%	-6.17%	-4.49%	0.00%	10.04%	0.25%	-1.03%	1.04%
City Road	654	182	223	300	300	297	297	297	297
Av.Growth Rate/ann.	N.A.	-34.75%	3.01%	10.29%	0.00%	-0.84%	0.00%	0.00%	0.00%
Municipal Road	1,655	546	689	690	706	782	693	693	693
Av.Growth Rate/ann.	N.A.	-30.92%	3.40%	0.02%	2.44%	10.64%	-11.29%	0.02%	0.00%
Baranguay Road	1,436	5,268	7,233	7,487	8,199	7,902	7,958	7,954	8,136
Av.Growth Rate/ann.	N.A.	54.22%	4.63%	1.16%	9.51%	-3.62%	0.71%	-0.05%	2.29%
Concrete	436	579	633	654	696	617	715	736	742
Av.Growth Rate/ann.	N.A.	9.98%	1.27%	1.12%	6.34%	-11.32%	15.79%	2.95%	0.86%
Asphalt	6,799	6,529	830	935	945	1,328	1,282	1,143	1,132
Av.Growth Rate/ann.	N.A.	-1.34%	-25.53%	4.07%	1.02%	40.54%	-3.44%	-10.86%	-0.93%
Gravel	2,837	5,346	11,122	11,488	12,199	11,887	11,872	11,974	12,191
Av.Growth Rate/ann.	N.A.	23.52%	11.03%	1.08%	6.19%	-2.56%	-0.13%	0.86%	1.82%
Earth	130	119	197	233	209	235	172	190	191
Av.Growth Rate/ann.	N.A.	-2.85%	7.39%	5.79%	-10.44%	12.51%	-26.65%	10.61%	0.47%

Source: Data from IATCTP, DPWH
Note:* Gravel in baranguay also includes earth.

Table 1-12(2) Composition of Road in Western Visayas in 1990

[Unit: km, %]

Length (km)	Pavement				Total
	Concrete	Asphalt	Gravel	Earth	
National Road	326	711	1,613	21	2,671
Provincial Road	64	104	2,182	108	2,459
City Road	92	152	49	5	297
Municipal Road	211	65	360	58	693
Baranguay Road	49	100	7,987 *	N.A. *	8,136
Total	742	1,132	12,191	191	14,256

Portion (%)	Pavement				Total
	Concrete	Asphalt	Gravel	Earth	
National Road	2.29%	4.98%	11.31%	0.15%	18.73%
Provincial Road	0.45%	0.73%	15.31%	0.76%	17.25%
City Road	0.64%	1.07%	0.34%	0.03%	2.09%
Municipal Road	1.48%	0.46%	2.53%	0.40%	4.86%
Baranguay Road	0.35%	0.70%	56.02% *	N.A. *	57.07%
Total	5.20%	7.94%	85.51%	1.34%	100.00%

Source: Data from IATCTP, DPWH
Note:* Gravel in baranguay also includes earth.

30. The geographical concentration of vehicles throughout this region is another indicator for importance of the road transportation and infrastructure. Table 1-13 shows the number of motor vehicle registration in the Region. The average number of cars and trucks per 1000 persons is 13.24 cars as of 1989, and is far below the national average of 24.08.

Table 1-13 Number of Motervehicle Registration in Western Visayas

[unit: Cars,%]

Year / Cars	Western Visayas		Philippines		Portion	
	1987	1989	1987	1989	1987	1989
Cars	11,829	12,925	358,765	412,998	3.30%	3.13%
Utilized Vehicles	22,439	26,633	441,757	536,405	5.08%	4.97%
Trucks	9,360	11,421	97,752	118,382	9.58%	9.65%
Buses	500	563	15,173	16,950	3.30%	3.32%
Motercycles/Trycycles	16,499	19,600	249,568	330,975	6.61%	5.92%
Trailers	603	553	13,738	15,754	4.39%	3.51%
Total	61,230	71,695	1,176,753	1,431,464	5.20%	5.01%
Per Capita(1000 Persons)	11.50	13.24	20.52	24.08	56.07%	54.97%

Source:Philippine yearbook,1990, National Statistical Board

Railways

31. The Panay Railways is no longer operational for passenger and general cargo transportation, but is utilized by the sugar industry for hauling of sugar cane. Table 1-14 shows the length of the main railway line that stretches from Iloilo City to Roxas City (125 km by single track) with spur feeder line from Duenas to Calinog. Other feeder lines connect three sugar centers with the main lines. Of the 125 km above mentioned, only 73 km are operational in this transportation regard. An extensive network of narrow tracks owned and constructed by the sugar companies and planters are found

throughout the sugar areas in both Panay and Negros Islands. It continues an important infrastructure element of the sugar industry.

Table 1-14 Length of Railway by Province in 1988

Location	Total Length(km)	Remarks
Aklan	-	-
Antique	-	-
Capiz	52	-
Iloilo	73	operational
Negros Occ.	-	-
Region VI	125	

Source: Regional Handbook on Land and Other Physical Resources Region VI (Western Visayas), Sub-committee on Inter-Regional Development and Physical Planning (Regional Land use Committee), Regional Development Council, Region VI, 1990.

Port

32. According to PPA and DPWH, the Western Visayas is reported to have 63 ports in total, the majority of which are the private and the municipal ports. Based on the PPA statistics, there is one(1) national base port (Iloilo), three(3) terminal ports (Culasi, Pulupandan, San Jose (Antique)), eight(8) other government ports (Batan, Concepcion, Dumguit, E.B.Magalona, Guimaras (RC-8), New Washington, Punta Tabuc, Victorias Baranguay).

33. Of these, the port of Iloilo is the only one which serves the region's export and import needs. The newly constructed Iloilo Commercial Port Complex (ICPC) - east of the existing port area - will considerably boost port handling and berthing services for the ocean-going and large domestic vessels. The port has a 400m wharf and a backup area of about 20ha.

Airport

34. Air transportation expands the limited transport capacity in the regions through promoting the mobility of goods, services, and people. It has greater involvement in the socioeconomic activities between the provinces and the regions of the country. The Region has 6 airports viz., Antique (San Jose de B.), Bacolod, Caticlan, Kalibo, Iloilo and Roxas. Out of them, three (Bacolod, Iloilo, and Roxas) are designated as trunk line, two (San Jose = Antique, Kalibo) as secondary, and one (Caticlan) as a feeder airport. Trunk line airports mainly serve the principal commercial centers of the region. On the other hand, secondary airports serve towns and cities with less regular air traffic density, while feeder airports serve towns and rural communities with limited air traffic potential. The airports in this region serve domestic traffic only. The airports in San Jose, Antique, Caticlan and Aklan are not served by the regular flights because of the limited demands for scheduled flights. The aircraft operation and passenger traffic is shown in Table 1-15.

Table 1-15 Aircraft Operation and Passenger Traffic in Western Visayas in 1988

[Unit: Aircraft,Persons]

Airport	Aircraft	Passenger
Antique(San Jose de B.)	161	615
Bacolod	14,787	328,554
Caticlan	3,696	27,051
Kalibo	3,202	76,757
Iloilo	10,726	536,367
Roxas	4,625	84,536
Total	37,197	1,053,880

Source:Philippine Yearbook 1989,NSO.

[References]

1. Philippine Yearbook 1989,NSO.

2. Philippine Yearbook 1990,NSB.

3. Regional Perspective, Vol.1, No.2, 1988, Center for Research and communication.

4. Source: Regional Handbook on Land and Other Physical Resources-Region VI(Western Visayas), Sub-committee on Inter Regional Development and Physical Planning (Regional Land use Committee), Regional Development Council, Region VI, 1990.

Chapter 2 General Description of the Study Ports

A. Present Situation of Iloilo-Bacolod Ferry Service

1. The Iloilo-Bacolod ferry service is the only regular connection by sea between the island of Panay and Negros and most of the traffic is between the two provincial capitals, Iloilo and Bacolod. With the opening of the Bacolod-Cebu Ro/Ro route via the port of Danao (Escalante, Negros Occidental) and Tuburan (Cebu), there are growing expectations to open a similar Ro/Ro route between Iloilo and Negros. There are indications that the sizeable market potential for a Ro/Ro route exists, such as increased demand for the expansion of the bus transport services route between Iloilo and Negros as an extension of the present Negros-Cebu route supports such a claim.

2. There is no other way for most commuters cross from Panay to Negros except by sea and through this route. Any air link between the two islands is not to be considered because the crossing from Iloilo to Bacolod takes only two hours by sea. It is said that any study for a proposed Ro/Ro service link at any point between the two islands therefore would not be possible without referring to the potentiality of this route.

3. The Iloilo-Bacolod ferry route is serviced by three vessels. Two are owned by Negros Navigation Company Inc, namely, M/V Don Vicente, with a passenger capacity of 1,202 and M/V Princess of Negros, with a 1,187 capacity, and the third, the M/V Bacolod Express, with 356 capacity, belongs to Cardinal Carriers Corporation.

4. The first two boats leave the ports of Iloilo and Bacolod simultaneously, each making about three trips a day according to the following sailing schedule:

	Iloilo Departure	Bacolod Departure
Monday	7:00 am	7:00 am
Thursday	10:00 am	10:00 am
	3:00 pm	3:00 pm
	7:00 am	7:00 am
Friday	10:00 am	10:00 am
	4:00 pm	4:00 pm
	7:00 am	7:00 am
Saturday	10:00 am	10:00 am
	3:00 pm	3:00 pm
	8:00 am	8:00 am
Sunday	11:00 am	11:00 am
	5:00 pm	5:00 pm

5. The trips takes about two hours. The M/V Bacolod Express, on the other hand, makes two round trips a day according to the following sailing schedule:

Iloilo Departure		Bacolod Departure
Monday ~	7:00 am	8:45 am
Thursday	2:00 pm	3:45 pm
Friday	7:00 am	8:45 am
	3:00 pm	4:30 pm
Saturday	7:00 am	8:45 am
	2:00 pm	3:45 pm
Sunday	7:30 am	9:00 am
	3:00 pm	4:30 pm

The charge per person is P100.00 and the trip takes about one hour.

6. Negros Navigation Co. is one of the leading members of CISO and operates 11 passenger and cargo vessels as shown in the following Table 2-1, engaging in Manila-Cagayan, Manila-Iloilo, Manila-Bacolod, Manila-Roxas, Manila-Romblon, Iloilo-Cagayan, Bacolod-Romblon and Bacolod-Iloilo routes. The passenger rates of each route are also indicated in Table 2-2.

Table 2-1 Fleet List of Negros Navigation Co.

NENACO VESSELS	GROSS TONNAGE	DEAD WEIGHT	LENGTH	DEPTH
M/S Santa Ana	7,909.65	3,088.11 LT.	118.00m	8.00 M
M/S Don Julio	2,381.25	1,424.50 LT	96.43m	22.60FT
M/S Sta.Florentina	4,343.30	1,518.70 LT	108.40m	4.75m
M/V San Sebastian	2,749.70	4,431,70 LT	87.20m	6.15m
M/V Connie II	1,428.05	2,050.01 LT	65.90m	5.00m
M/V Santa Maria	1,109.97	758.04 LT	68.80m	3.55m
M/S Don Claudio	2,863.60	1,982.30 LT	86.44m	5.72m
M/V Don Vicente	1,064.99	576.94 LT	77.00m	4.53m
M/V Princess of Negro	543.36	188.00 LT	61.81m	3.87m
M/V Aphlodite J	641.93	1,000.00 LT	53.76m	4.19m
M/V Athena-J	641.93	1,000.00 LT	63.76m	4.19m

Source: Negros Navigation Co., Inc.

Table 2-2 New Passage Rates of Negros Navigation Co.
(Effective April 28, 1991 voyages)

CLASS	ONE-WAY			
	FULL	HALF	STUDENT-F	STUDENT-HF
ECONOMY CLASS				
Manila-Cagayan	485.00	242.50	412.23	242.50
Manila-Iloilo	327.00	163.50	278.00	163.50
Manila-Bacolod	323.00	161.50	274.30	161.50
Manila-Roxas	264.00	132.00	224.50	132.00
Manila-Romblon	193.00	96.50	164.00	96.50
Iloilo-Cagayan	243.00	121.50	206.40	121.50
Bacolod-Romblon	157.00	78.50	133.50	78.50
Bacolod-Iloilo	50.00	25.00		25.00
FIRST CLASS				
Manila-Cagayan	889.00	444.50	755.75	444.50
Manila-Cagayan	603.00	301.50	512.50	301.50
Manila-Bacolod	595.00	297.50	503.75	297.50
Iloilo-Cagayan	455.00	227.50	386.75	227.50
Bacolod-Iloilo	82.00	41.00		41.00

Source: Negros Navigation Co., Inc.

B. General Description of Port of Iloilo

Present Function of Terminal

7. Iloilo city is situated on the southeastern part of Panay island and is scattered around the mouth of the Iloilo river. According to the regional development plan of NEDA Region 6, the city is the trade center of the region (see Figure 2-1).

8. The port of Iloilo consists of three terminals; viz. International Commercial Port Complex (ICPC), River Port (RC#3), Old Foreign Pier (RC#2). The International Commercial Port Complex is situated 1.5 km of the north of Iloilo city center. This terminal was constructed using the 3rd IBRD loan to serve foreign trade. The ICPC is principally used by ocean-going vessels from abroad and inter-island vessels carrying cargoes, especially containerized cargoes.

9. The River Port is situated along the right side of the Iloilo river. The length of the port is about 3 km including private wharves. However, the water depth is shallow, with only 3 m, while the apron a 20 m width. This port is used for small bulk vessels, fishing boats, passenger bancas going to the Guimaras island; and as a ferry terminal for the Bacolod Express plying between Iloilo and Bacolod.

10. The Old Foreign Pier is situated on the south side of the mouth of the Iloilo river. The port is about 345 m length and about 6 m average depth. The port consists of a large passenger terminal and some warehouses. This port is mainly used as the ferry terminal for Bacolod and Cagayan de Oro and also functions as a general cargo terminal. It is located near the Iloilo city center and is very convenient for passengers. The water depth is 6 m to 7 m.
The locations of the three ports are shown in Figure 2-2.

11. Aside from the three terminals, a fishing port exists in the area. The location of the port is a bout 2 km west of the city center. The fishing port was constructed and is managed by PFDA under the aim of the regional export center of fishing production.

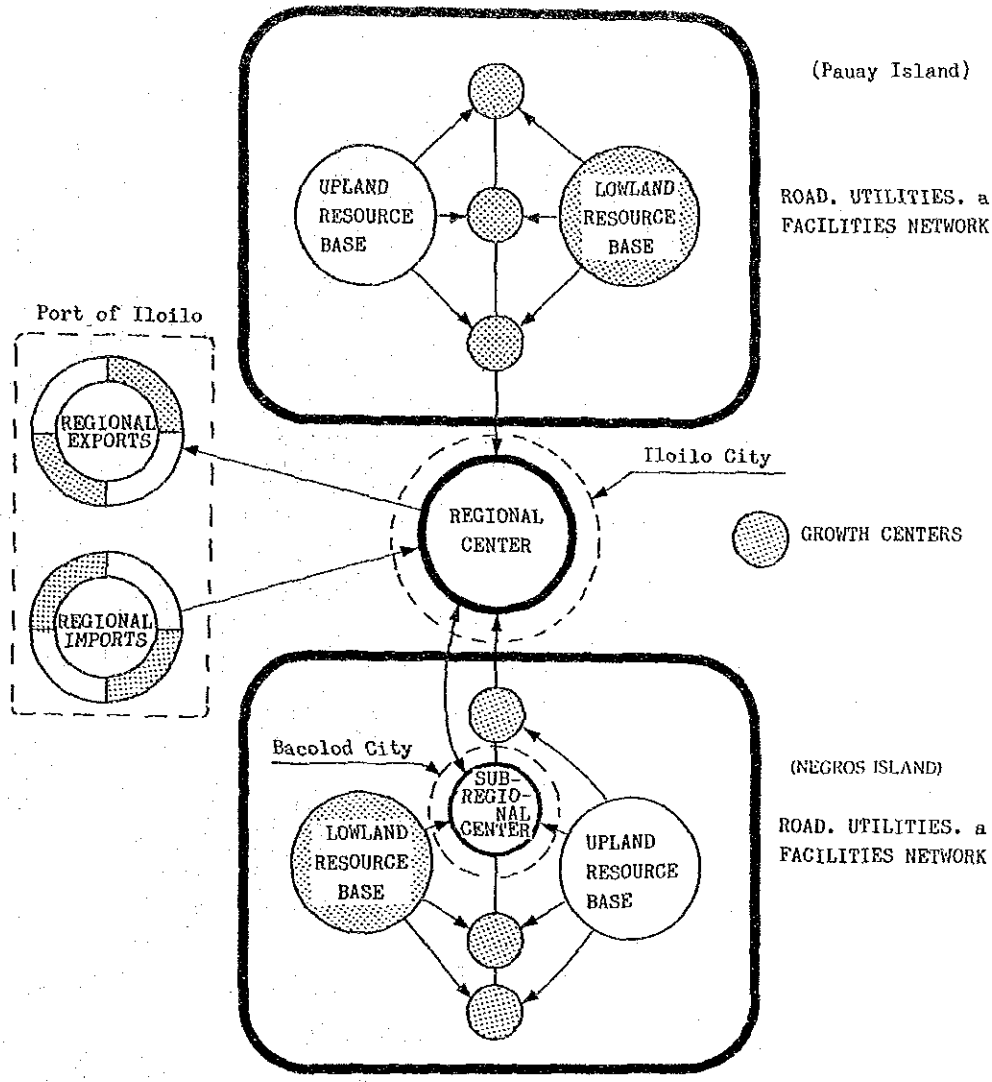


Figure 2-1 Economical Structure of Region 6

Source: Regional Development Plan of NEDA Region 6, 1991, NEDA

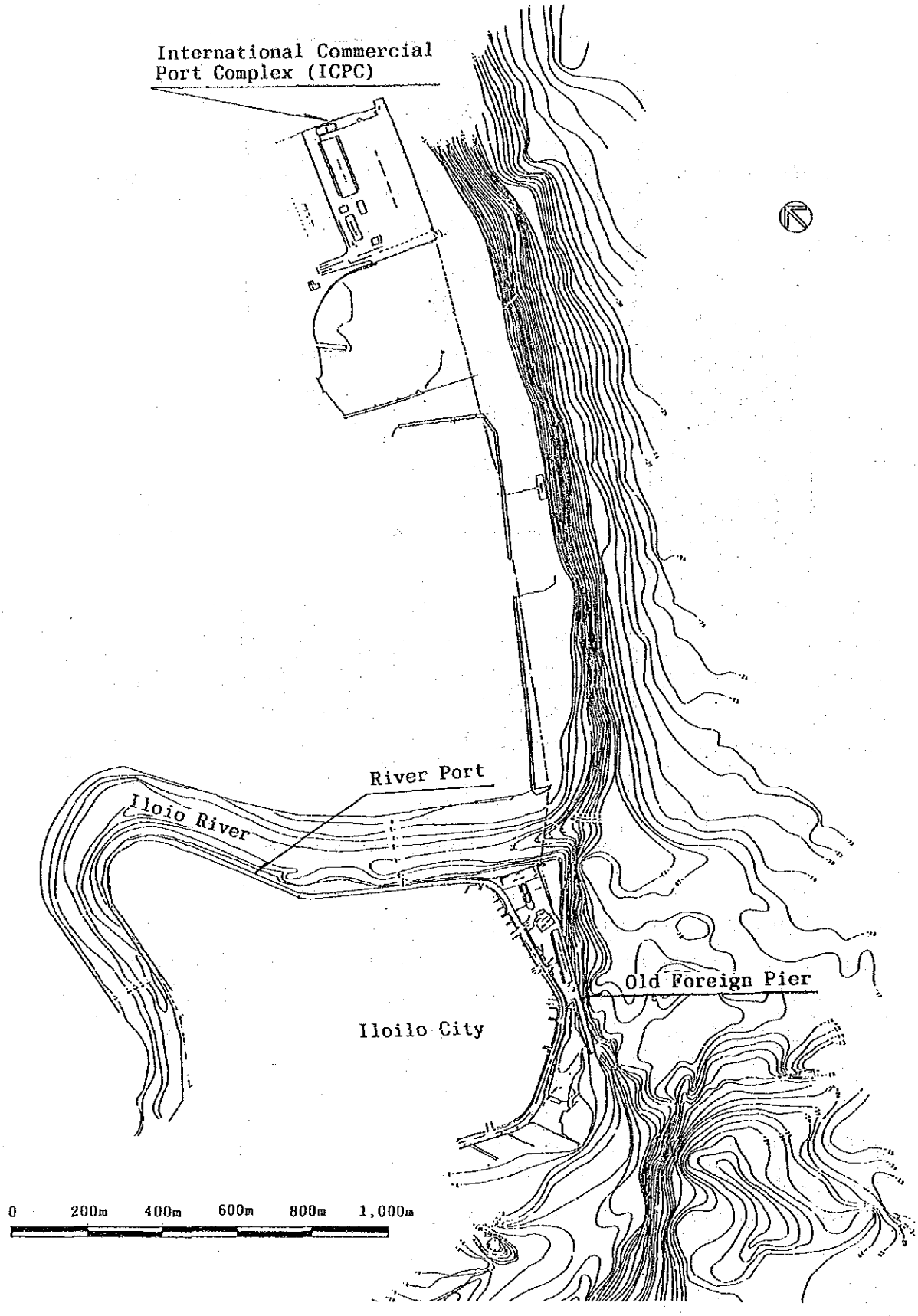


Figure 2-2 Location of the Three Ports of Port of Iloilo
Source: JICA Study Team

Port Hinterland

12. The port of Iloilo is one of the base ports of the PPA. It is managed by PMO Iloilo, which also manages the PPA secondary ports of Western Visayas. The port of Iloilo is with an area of 110,877 km² the largest port in Panay island.

13. Rice, fruits and sugarcane are the main products of Panay island. They are brought mainly to Iloilo city and transported to the other islands. The hinterland of the port of Iloilo with several smaller ports scattered along the shoreline of the island (see Figure 2-2) includes the whole of the island with the provinces of Aklan, Antique, Capiz and Iloilo. The population of Panay island is 3,018 thousand in 1990, including 1,647 thousand of in Iloilo province. Annual growth rate since 1980 is 1.58 %, less than the nation's average, and in the last 3 years, population of the province has slightly diminished.

Port Traffic

14. Passenger/cargo traffic at the port of Iloilo during the 1980s is shown in Table 2-3 and Figure 2-4. The cargo traffic by commodity at the port in 1990 is also shown in Table 2-4 and Figure 2-5.

15. The main cargo commodity handled in the port of Iloilo is shown in Table 2-5.

Existing Port Development Project

16. The IBRD aid project started in 1990 for the port of Cebu and the port of Iloilo. This project focuses on the rehabilitation and improvement of poor facilities and equipment of the ports. The content of the project about Iloilo port is a feasibility study of rehabilitation of the pavement in the River Port.

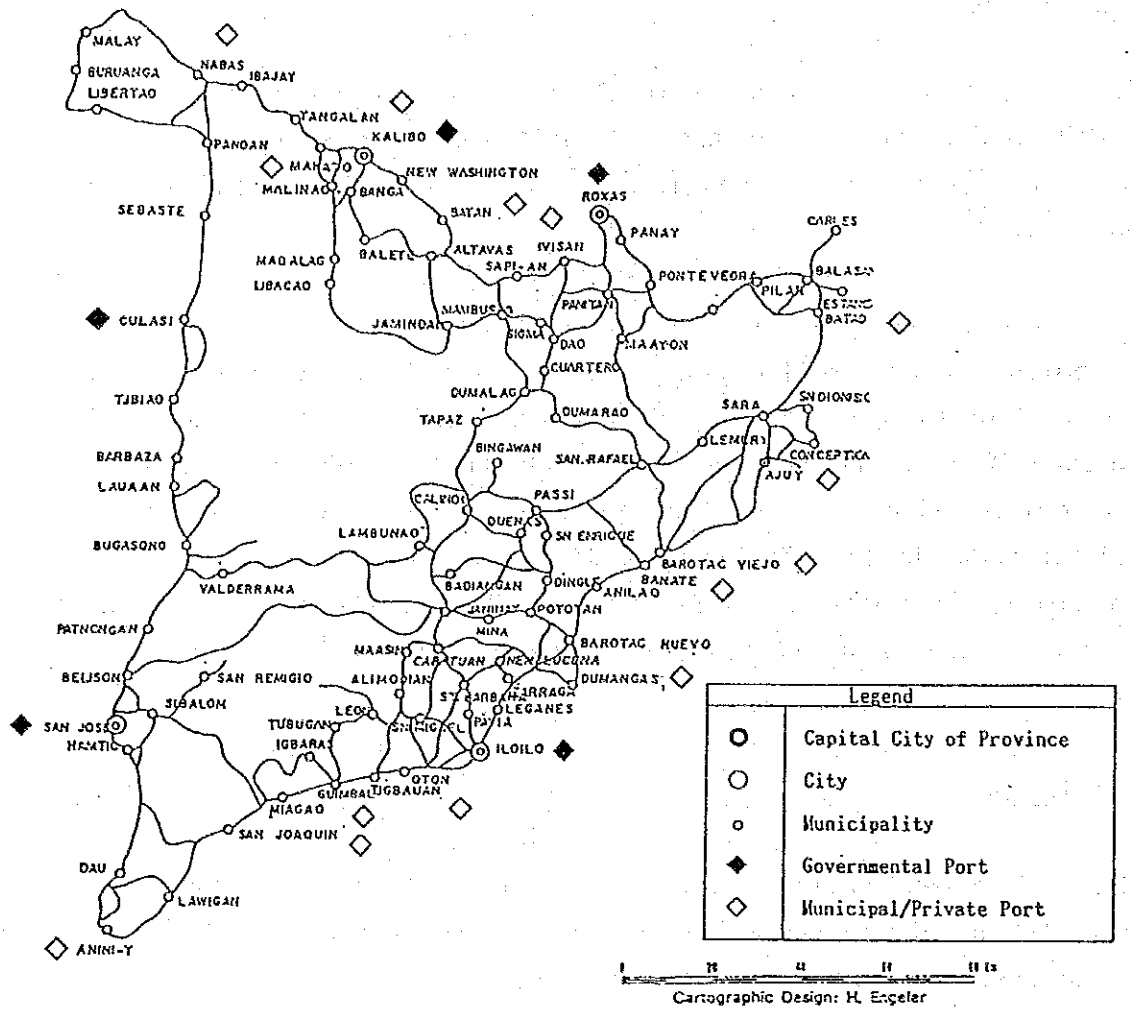


Figure 2-3 Location of Iloilo City

Table 2-3 Passenger & Cargo Movement of Port of Iloilo
1980 - 1990

Unit: Cargo; M ton Passenger; Person

Year	Cargo.T	Cargo.D	Cargo.F	Passenger.T
1980	982,409	796,593	185,816	1,105,535
1981	1,124,810	987,704	137,160	1,324,798
1982	1,042,768	874,962	167,806	1,273,538
1983	1,085,631	943,146	142,485	1,414,453
1984	1,058,420	968,812	89,608	1,287,506
1985	806,593	703,510	103,083	1,291,518
1986	918,503	810,020	108,483	1,266,947
1987	1,231,117	1,055,539	175,578	1,521,994
1988	1,421,745	1,186,521	226,224	1,701,472
1989	1,572,280	1,378,589	193,701	2,027,642
1990				

Source: Annual Statistical Report. PPA. 1990

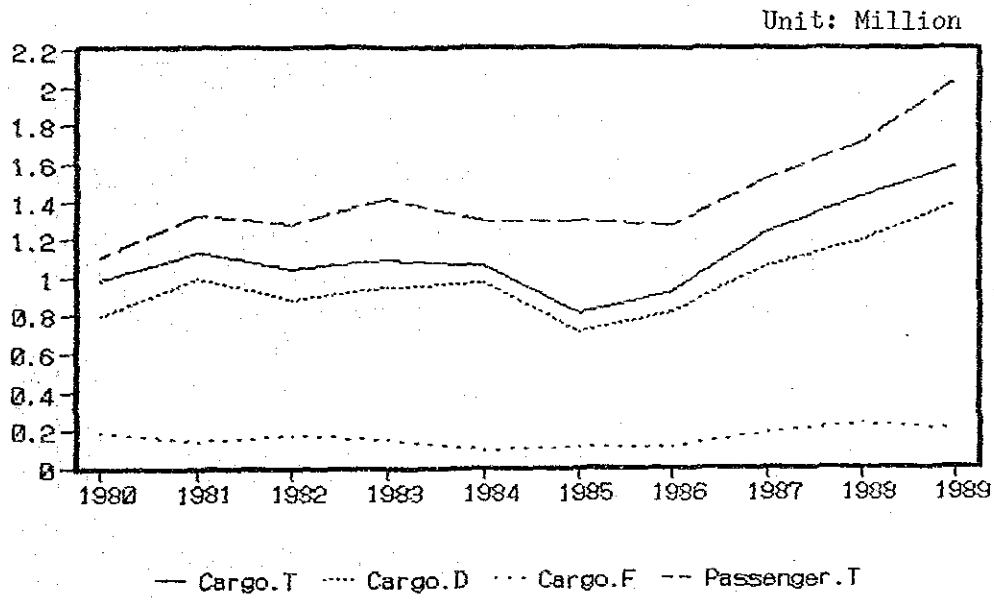


Figure 2-4 Passenger & Cargo Movement of Port of Iloilo
Source: JICA Study Team

Table 2-4 Cargo Traffic of Port of Iloilo by Commodity at 1990

Unit: metric Ton

Commodity	G.Total	Total		Old Foreign Port					River Port					International Commercial Complex					
					Breakbulk		Containerized			Breakbulk		Containerized			Breakbulk		Containerized		Bulk
		In	Out	Total	In	Out	In	Out	Total	In	Out	In	Out	Total	In	Out	In	Out	Out
Animal Feeds	32,938	24,980	7,958	4,851	638	124	2,247	1,842	26,483	17,927	4,697	2,758	1,101	1,604	18	72	1,392	122	
Bottled Cargo	145,873	119,185	26,688	10,989	270		7,317	3,402	125,918	96,525	21,724	6,928	741	8,966			8,145	821	
Cemment	133,080	125,822	7,258	844	531		310	3	132,236	124,950	7,255	31		0					
Chemicals	7,711	5,914	1,797	3,235	505	468	1,676	586	4,466	3,029	660	694	83	10			10		
Coconut Oil	1,351	1,245	106	1,161	615	106	440		146			146		44	44				
Copra	6,301	1,760	4,541	1,510	29	80	30	1,371	2,824	1,632	1,123	69		1,967		178		1,789	
Corn	14,123	4,593	9,530	3,777	1,910	101	500	1,266	8,642	2,074	4,679	40	1,849	1,704			89	1,635	
Crude Minerals	1,665	545	1,120	1,350	117	134	113	986	315	278		37		0					
C.Petroleum	228	228	0	228	18		210		0					0					
Dairy Products	2,042	2,031	11	1,742	41	1	1,697	3	272	51	7	214		28			28		
Fertilizer	154,547	38,488	116,059	745		590	18	137	127,549	38,454	88,980	16	99	28,253		16,775		30	9,448
Fish & F.Prep	41,453	11,790	29,663	25,325	1,017	23,487	38	783	13,679	10,339	3,181		159	2,449	162	11	234	2,042	
Fruits & Veg.	18,174	8,077	10,097	10,817	5,748	3,708	464	897	6,180	768	5,333	8	71	1,177	1,089	52		36	
Furniture	1,578	918	660	239	70	21	124	24	1,313	425	587	285	16	26			14	12	
Iron & Steel	21,200	17,213	3,987	497	207		290		18,231	12,366	3,820	1,882	163	2,472	1,456		1,012	4	
Live Animals	9,388	839	8,549	452		1	246	205	8,074	500	6,711	8	855	862		88	85	689	
Lumber	27,334	25,400	1,934	1,003	466	5	508	24	25,370	23,400	1,862	83	25	961	779	18	164		
Mach. & Elec.	7,727	5,738	1,989	2,832	710	765	1,267	90	4,603	2,081	1,060	1,388	74	292			292		
Ores/Scrap	11,282	8,695	2,587	5,679	2,292	89	2,935	363	5,584	2,662	1,453	787	682	19	19				
M.of Metal	2,326	206	2,120	367	2	3	157	205	0					1,959		1,750	47	162	
Mineral Fuels	3,556	2,901	655	294		247	47		3,184	2,828	216	26	114	78				78	
Other G.Cargo	357,010	235,920	121,090	67,214	11,758	2,461	45,765	7,230	111,155	34,332	36,074	33,137	7,612	178,641	11,619	2,566	99,309	65,147	
Palay & Rice	130,376	20,004	110,372	24,580	246	11,720	636	11,978	91,792	17,187	71,658	1,428	1,519	14,004		6,540	507	6,957	
Paper & Pulp	2,650	2,499	151	2,603	201	40	2,251	111	0					47			47		
Plywood	8,925	8,738	187	956	948	8			7,718	6,950	178	589	1	251	213		38		
R.Petroleum	1,202	1,050	152	432	6		402	24	373	124	82	121	46	397	216		181		
Suger	96,065	27,700	68,365	22,038	122	9,885	6	12,025	67,295	27,572	38,520		1,203	6,732				6,732	
Textile & Gar.	948	902	46	934	168	4	720	42	0					14	14				
Tobacco	2,824	2,737	87	2,453	128	10	2,315		5		5			366	59	72	235		
Transport Equ.	12,875	8,622	4,253	4,247	3,601	631	15		7,891	3,737	2,694	711	749	737	434	104	124	75	
Wheat	37,802	32,368	5,434	249	226		23		37,503	31,748	5,434	321		50			50		
Empty Bottles	76,496	16,512	59,984	0					76,496	16,450	55,651	62	4,333	0					
Salt	14,646	1,071	13,575	0					13,733	1,071	12,662			913		913			
Total	1,385,696	764,691	621,005	203,643	32,590	54,689	72,767	43,597	929,030	479,460	376,306	51,769	21,495	253,023	16,122	29,139	111,983	86,331	9,448

Source: Annual Statistical Report 1990, PPA

Table 2-5 Major Commodities Treated at Port of Iloilo

Unit: Metric Ton

Commodity	Whole Port	Old Foreign Por	River Port	I.C.C
Bottled .C	145,873	10,989	125,918	8,966
Cemment	133,080	844	132,236	0
Fertilizer	154,547	745	127,549	26,253
Palay & Rice	130,376	24,580	91,792	14,004
Sugar	96,065	22,038	67,295	6,732
Fish & F.Prep	41,453	25,325	13,679	2,449
Fruits & Veg.	18,174	10,817	6,180	1,177
Empty Bottles	76,496	0	76,496	0
O.G.C	357,010	67,214	111,155	178,641
Others	232,622	41,091	176,730	14,801
Total	1,385,696	203,643	929,030	253,023

Note: I.C.C; International Commercial Complex

Source: Annual Statistical Report 1990, PPA

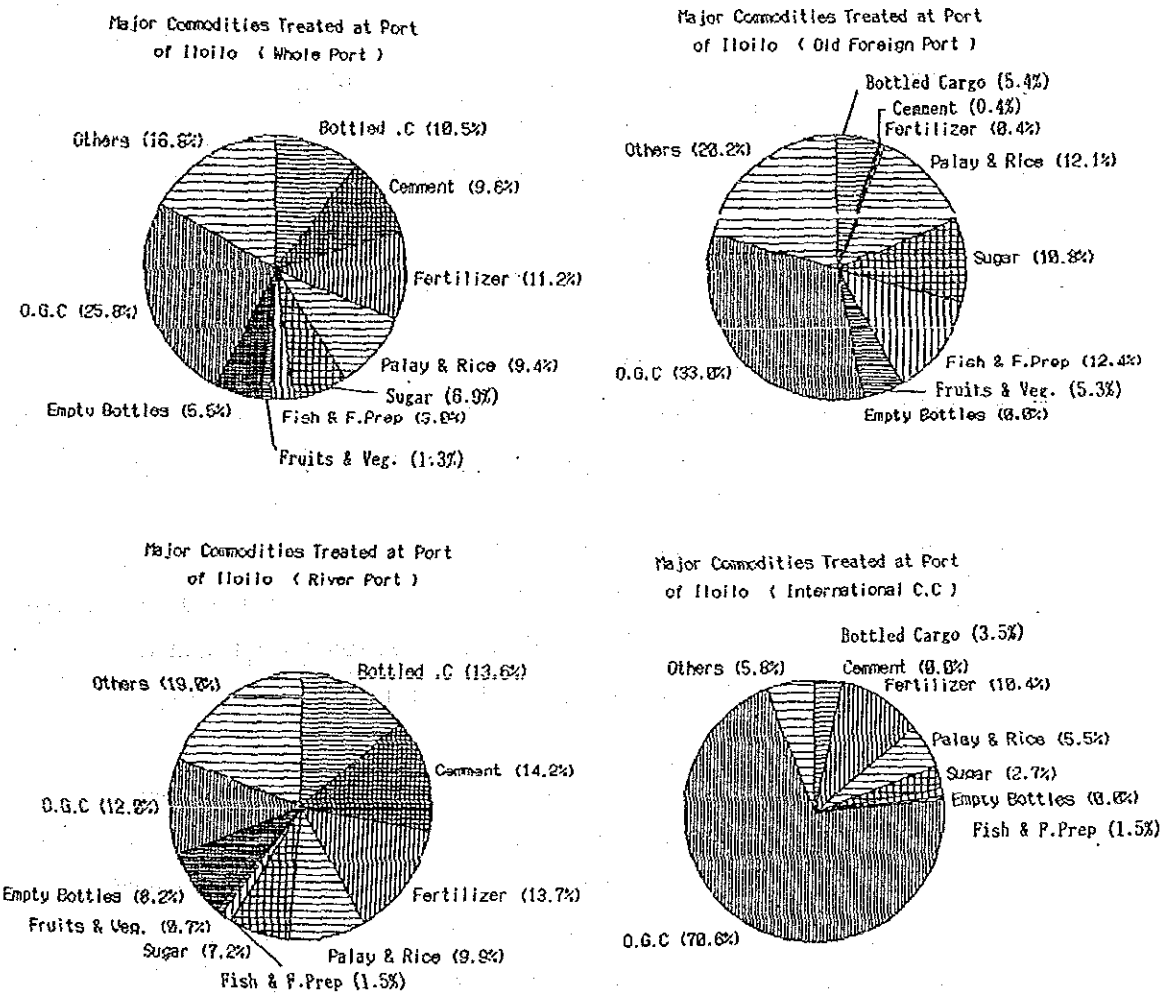


Figure 2-5 Major Cargo Commodities Treated at Port of Iloilo at 1990

Port Structure and Facilities

17. Based on the PPA inventory table and filed investigation, existing port facilities in Iloilo are as follows:

Old Foreign Pier

- Berthing Facility

Berth length/depth	345 m/6m
No. of berth	4 (R.C. pier)
Fendering system	Truck Tires
Mooring fixture	20 bitts (25T capacity)
5 bollars (70T cap.)	

- Supporting Facility

Port Area	11,564 ㎡ , Terminal building 240 ㎡
Warehouse	1,544 ㎡ , 978 ㎡ (Private)
Open storage	6,000 ㎡ , Others 4 office & 1 guest house

- Utility

Water supply	2 shallow well/Elevated water tank
Fuel supply	Tanker/truck (Private)
Electricity	PECO (Panay Electric Co.)
Lighting	19 lamp post
Communication	VHF (Security Office, Pilot Office)
	Marine VHF
Navigation Aids	1 bouy (PFDA)/2 light beacon (coast guard)
Cargo Handling	Managed by private company

River Port (PPA operated)

- Berthing Facility

Berth length/depth	2,160m/3.0m (average)
No. of berth	35
Fendering system	Timber fender
Mooring fixture	5 bollard 60T capacity
Bollard 5-60T cap.	19 bollard 25T capacity
Bitt 72-425T cap.	72 bitts 25T capacity
Creats 15T cap.	19 bitts 20T capacity
	20 creats 15T capacity

- Supporting Facility

Port area	14,255 ㎡	Passenger shed	105 ㎡
Terminal office		Open storage	10,000 ㎡

- Utilities

Water supply	Water burg/storage tank
Fuel supply	Tanker (Private)
Electricity	PECO
Lighting	28 lamp post
Communication	VHF (Security Agency)
Cargo handling	Managed by private company

International Commercial Port Complex (ICPC)

- Berthing Facility

Berth length/depth	400m/10.5m
No. of berth	4 (steel sheet piped pile)
Fendering system	Rubber fender
Mooring fixture	25 bollards (60T capacity)
	3 bitts (25T capacity)

- Supporting Facility

Port area	93,600 ㎡	
Administration building	720 ㎡	
CFS	7,500 ㎡	CY 60,000 ㎥
Open storage	110,000 ㎡	

- Utility

Water supply	Water burge (private company)
	Reservoir (750T capacity)
	Elevated water tank (100T capacity)
Fuel supply	Tanker (private company)
Electricity	PECO
	Gen. Set 500KVA (1 unit)
Lighting	47 flood light
Communication	SSB/2-VHF/Telephone/Intercom
Navigation aids	1 light beacon (coast guard)
Cargo handling	Managed by private company

- Ro/Ro Facility 15 m × 14.8 m 1 set

Source: PPA inventory table/JICA Study Team

C. General Description of Port of Bacolod

Present Function of Terminals

18. Bacolod City is the provincial capital of Negros Occidental. Negros Occidental province is one of the five provinces of the Western Visayas Region. It plays a role as the center of economic activity in the province. Bacolod City is located in the north-western part of the Negros Island. Within the city, two major port terminals exist, namely, Banago Pier and Reclamation Area Wharf. Both are privately owned and operated.

19. Banago Pier is owned and managed by Negros Navigation Co., Inc. which also operates vessels for Manila and Iloilo/Bacolod ferry. The pier is located 3 km north of the Bacolod city center. One jetty is jutting out from the shoreline of 1.2 km length. Half of the jetty is a rock causeway while the other half is made of concrete. Half of the floorboard of the pier is made of concrete and the other half wooden. The jetty seems to be superannuated. At the top of the jetty there is a passenger terminal, a ticket window and one wooden Ro/Ro ramp. The area is 3400 sq.m. which is not sufficient to handle the volume of passenger traffic. At the foot of the jetty there is a container yard owned by Negros Navigation Co., Inc..

20. The wharf of Reclamation Area is the port owned by Bacolod Port Development and Reclamation Project Co., Inc.. This area was gained through the reclamation of the shoreline in front of Bacolod city center. The area is about 125 ha and the road from the city center is almost completed. Two-thirds of the area has already been sold to the private company while not being built up. The existing wharf is about 600 m in length and used by bulk or general cargo vessels. The water depth of the wharf is shallow at 2.0 m. The location of the terminals are shown in Figure 2-6 and Figure 2-7.

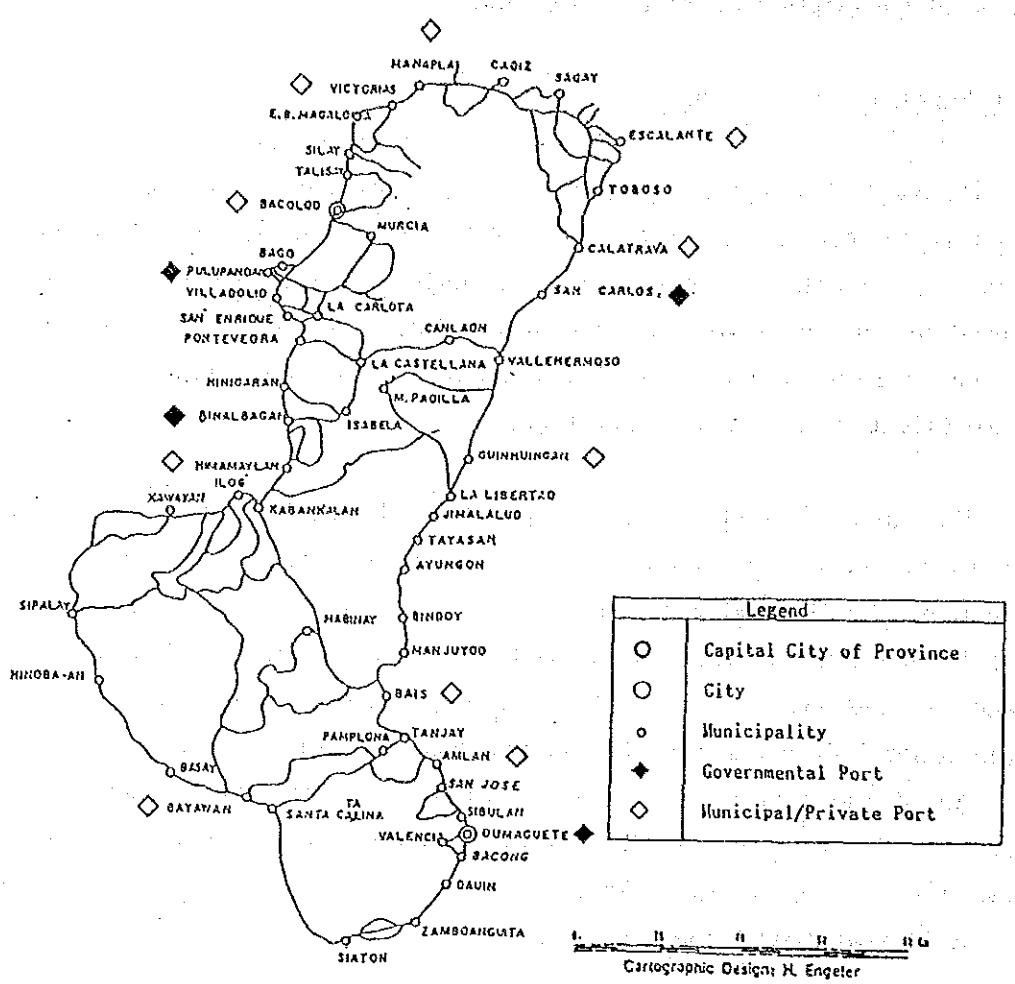


Figure 2-6 Location of Bacolod City

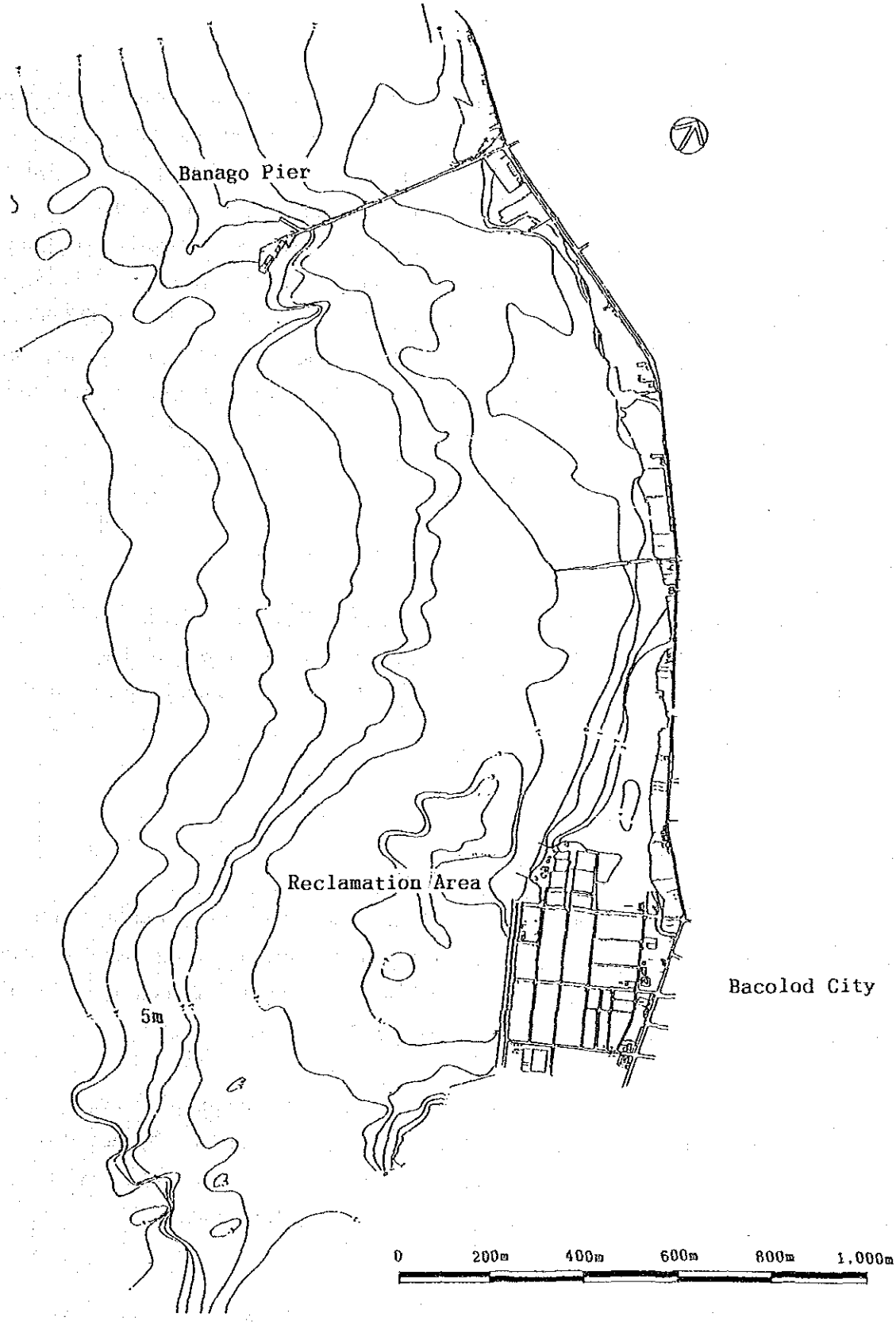


Figure 2-7 Location of Banago Jetty and Reclamation Area
Source: JICA Study Team

Port Hinterland

21. Bacolod City is the provincial capital of Negros Occidental with a population of over 360 thousand. Since the high mountain range named Canlaon runs along the east coast of negros island it separates the island into Occidental and Oriental provinces. The economical connection of the two provinces is not strong. Negros Occidental is the major producer of sugarcane in the Philippines. Almost all sugar is brought to Bacolod city and distributed to the other regions mainly to Manila. The hinterland of Bacolod is limited to Negros Occidental. Population of the province is 2,257 thousand in 1990 and full growth rate since 1980 is 1.58 % that is equal to the Iloilo hinterland growth rate. Population of the area has diminished in recent three years.

Traffic

22. Passenger/cargo traffic of Banago Pier in 1990 is shown in Table 2-6. The main cargo commodity treated at Banago is also shown in Table 2-7 and Figure 2-8. The main cargo commodity handled at Reclamation Area is also shown in the same Table.

Existing Port Development Project

23. As of this time (December 1991), there is an on-going deliberation as to whether or not to extend the permit granted to Negros Navigation to operate the Port of Banago. If this private port is subsequently turned over to PPA, this will allow more flexibility in planning Ro/Ro facilities in the area.

24. The future extension plan of the wharf in the Reclamation area had been studied by the Bacolod Port Development and Reclamation Project Co,. Inc.. The concept of the plan on Reclamation Area is to extend the wharf to the east. However, this plan is not authorized by any public bodies.

Table 2-6 Cargo/Passenger Traffic of Port of Bacolod by Commodity at 1990

Unit: Metric Ton

Commodity	G.Total	Total		Banago							Reclamation Area						
				Sub Total			Breakbulk		Containerized		Sub Total			Breakbulk		Containerized	
		In	Out	Total	In	Out	In	Out	In	Out	Total	In	Out	In	Out	In	Out
Animal Feeds	43,822	41,971	1,851	32,114	30,563	1,551	4,846	1,024	25,717	527	11,708	11,408	300	11,408	300		
Bottled Cargo	117,840	115,771	2,089	4,411	4,411	0	6		4,405		113,429	111,360	2,069	111,360	2,069		
Cemment	125,676	125,514	162	260	260	0	260				125,416	125,254	162	125,254	162		
Chemicals	422	313	109	336	287	49	252	26	35	23	86	26	60	26	60		
Coconut Oil	6,838	6,679	159	5,922	5,763	159	385		5,378	159	916	916	0	916			
Copra	1,349	0	1,349	1,349	0	1,349		192		1,157	0	0	0				
Corn	5,657	5,655	2	1,437	1,435	2	709	2	726		4,220	4,220	0	4,220			
Crude Minerals	489	235	254	473	219	254		55	219	199	16	16	0	16			
C.Petroleum	12	0	12	12	0	12				12	0	0	0				
Dairy Products	2,272	2,260	12	2,268	2,256	12	688	12	1,568		4	4	0	4			
Fertilizer	101,250	100,329	921	1,381	595	786	126	71	469	715	99,869	99,734	135	99,734	135		
Fish & F.Prep	52,614	5,271	47,343	52,554	5,253	47,301	4,963	39,955	290	7,346	60	18	42	18	42		
Fruite & Veg.	22,083	13,761	8,322	21,668	13,346	8,322	13,054	6,016	292	2,306	415	415	0	415			
Furniture	1,396	659	737	1,259	523	736	215	144	308	592	137	136	1	136	1		
Iron & Steel	28,182	25,853	2,329	15,634	15,204	430	11,276	164	3,928	266	12,548	10,649	1,899	10,649	1,899		
Live Animals	18,912	148	18,764	18,912	148	18,764	48	18,764	100		0	0	0				
Logs	1,482	1,482	0	290	290	0	0		290		1,192	1,192	0	1,192			
Lumber	11,346	11,228	118	5,135	5,093	42	5,093	42			6,211	6,135	76	6,135	76		
Mach. & Elec.	9,522	8,801	721	9,237	8,573	664	3,140	498	5,433	166	285	228	57	228	57		
Ores/Scrap	3,980	0	3,980	0	0	0	0				3,980	0	3,980		3,980		
M.of Metal	9,972	9,882	90	9,507	9,418	89	255	9	9,163	80	465	464	1	464	1		
Mineral Fuels	889	401	488	0	0	0					889	401	488	401	488		
Molasses	0	0	0	0	0	0					0	0	0				
Other G.Cargo	142,524	86,243	56,281	98,756	66,277	32,479	54,281	15,984	11,996	16,495	43,768	19,966	23,802	19,897	23,802	69	
Palay & Rice	66,895	66,380	515	20,198	19,683	515	8,275	88	11,408	427	46,697	46,697	0	46,697			
Paper & Pulp	102	96	6	101	95	6	95	6			1	1	0	1			
Plywood	13,065	12,852	213	10,164	9,954	210	9,931	192	23	18	2,901	2,898	3	2,898	3		
R.Petroleum	345	21	324	208	21	187	21	187			137	0	137		137		
Suger	348,029	4,519	343,510	113,952	1,038	112,914	964	37,184	74	75,730	234,077	3,481	230,596	3,481	230,596		
Textile & Gar.	5,534	5,354	180	5,534	5,354	180	1,331	118	4,023	61	0	0	0				
Textile Fiber	3,972	3,813	159	3,972	3,813	159		16	3813	143	0	0	0				
Tobacco	486	486	0	485	485	0	215		270		1	1	0	1			
Transport Equ.	41,696	34,032	7,664	41,008	33,640	7,368	33,566	7,276	74	92	688	392	296	392	296		
Wheat	28,464	28,168	296	6,841	6,570	271	5,046		1,524	271	21,623	21,598	25	21,598	25		
Empty Bottles	75,277	10,959	64,318	0	0	0					75,277	10,959	64,318	10,959	64,318		
Salt	438	438	0	0	0	0					438	438	0	438			
Total	1,292,832	729,574	563,258	485,378	250,567	234,811	159,041	128,026	91,526	106,785	807,454		328,447	478,938	328,447	69	0

Source: Annual Statistical Report 1990, PPA

Table 2-7 Major Commodities Treated at Port of Bacolod

Unit: Metric Ton

Commodity	Whole Port	Banago	Reclam
Bottled .C	117,840	4,411	113,429
Cemment	125,676	260	125,416
Fertilizer	101,250	1,381	99,869
Palay & Rice	113,077	66,380	46,697
Sugar	348,029	113,952	234,077
Fish & F.Prep	55,614	55,554	60
Fruits & Veg.	52,969	52,554	415
Transport Equ.	41,696	41,008	688
Empty Bottles	75,277	0	75,277
O.G.C	142,524	98,756	43,768
Others	118,880	51,122	67,758
Total	1,292,832	485,378	807,454

Source: Annual Statistical Report 1990, PPA

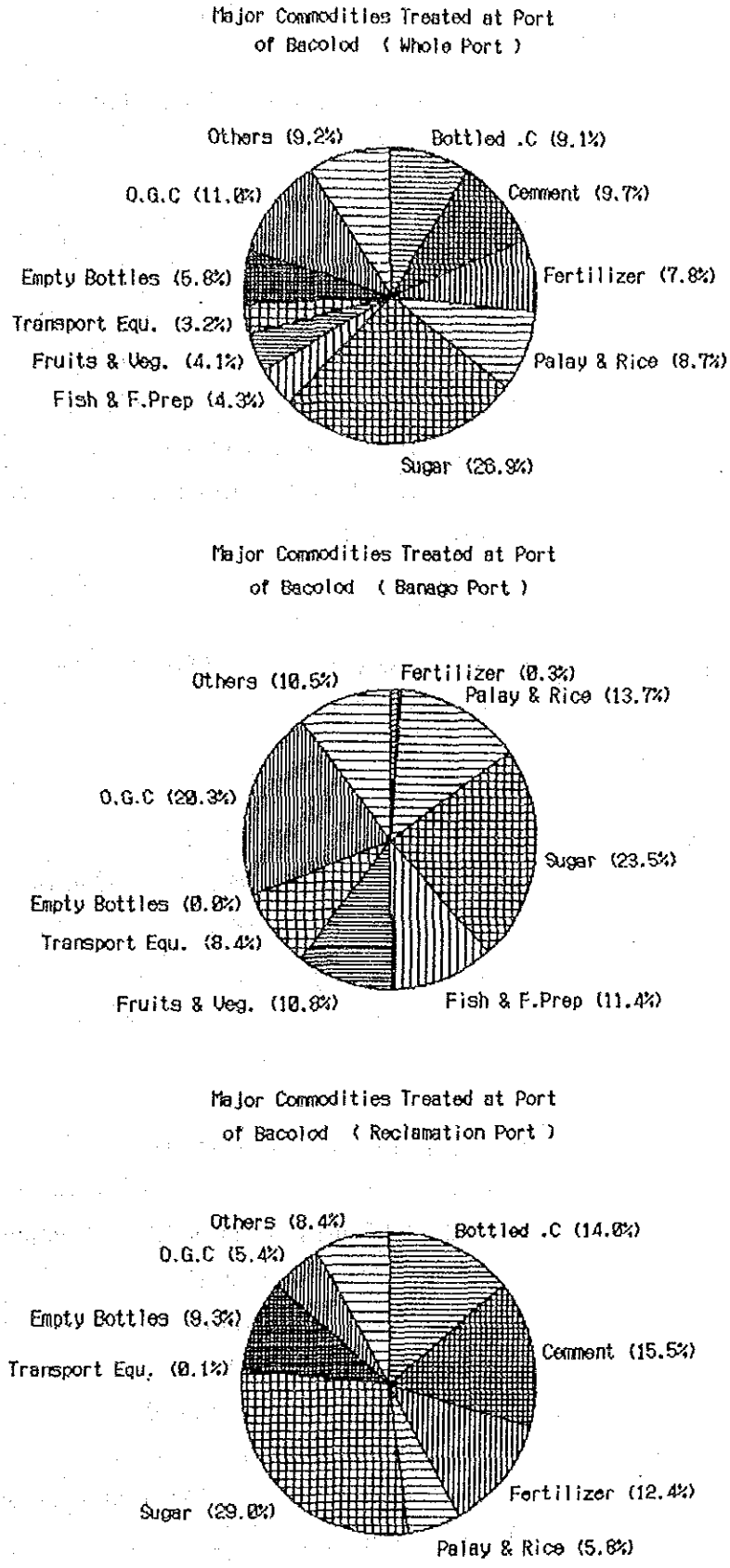


Figure 2-8 Major Cargo Commodities Treated at Port of Bacolod at 1990

Port Structure and Facilities

25. Existing port structure and facilities of Port of Bacolod are as follows;

Banago Pier

- Berthing Facility

Berth length/depth	93m/4.5m	Bacolod-Iloilo Ferry
	135m/6.7m	Inter Island Vessel
	104m/6.7m	Inter Island Vessel
	118m/6.7m	Small Cargo (Fishing Boat)
No. of berth	4 (R.C. pier)	
Fendering system	Timber fender	
Mooring fixture	4 bollards/7 cleats	

Water basin (berthing/maneuvering/channel) 40,000 ㎡

- Supporting Facility

Warehouse	311.5 ㎡ /384 ㎡ /462.8 ㎡	
Administration Bldg.	750 ㎡	Office (Fleight Asst. Center)
	80 ㎡	(2-stories)
Security	59 ㎡	

- Utility

Water supply	2 deepwell/water tank 60 ㎥
Fuel supply	Truck
Electricity	CENECO (Central Negros Elec. Company)
	Gen. Set 75KVA (1 unit)
Communication	VHF/SSB/Telephone/Radio
Navigation aids	1 bouy (PETRON Oil Depo)
	1 harbour light (coast guard)
Cargo handling	Folk light 15T capacity 3 unit,
	Crane 1-35T (Fixed), 1-25T (truck mounted),
	Truck 7 Trailors, 5-single van
Others	1 tag boat/pilot

- Ro/Ro Facility 2.8 m × 9 m 1 unit

Reclamation Area

- Berthing Facility

Berth length/depth	600m/2.0m
Type of structure	Steel sheet piles
Fendering system	Temporarily fender
Mooring fixture	15 bollards
Water basin	480,000 ㎡

- Supporting Facility

Warehouse	700 ㎡	Office	80 ㎡	2 units

- Utility

Water supply	City water (LUWA)
Fuel supply	Tank Truck
Electricity	CENECO
Communication	SSB/VHF/Telephone
Cargo handling	Folk lift 6 unit (2.5-5T)
	Crane 4 unit (20-35T)
	Truck 3 unit (6-10 wheel)

Source : JICA Study Team

D. Present Port Management and Operation

General

26. In the Western Visayas, there are reported to exist sixty three(63) ports and the majority of these ports are privately owned/operated piers and wharves as mentioned before. The ports are, in fact, under three(3) port management systems; PPA, local government, and private port systems. In Iloilo and Bacolod City, there are no major ports under the control of the city/provincial governments which are commonly used for short distance services.

27. Historically PPA has a large involvement in port development, management and administration in these cities. But only the base and terminal ports are under the PPA port systems. Other organizations and authorities such as DPWH, city and provincial governments are not concerned with these matters so much as PPA. Consequently PPA has great access to its local operation and administration through the establishment of field offices, the Port District Offices(PDO). PMO-Iloilo, generates a revenue from the use of port equipment, and the revenue is used for the repair and maintenance of the equipment. Figure 2-9 shows the organization charts of PMO Iloilo.

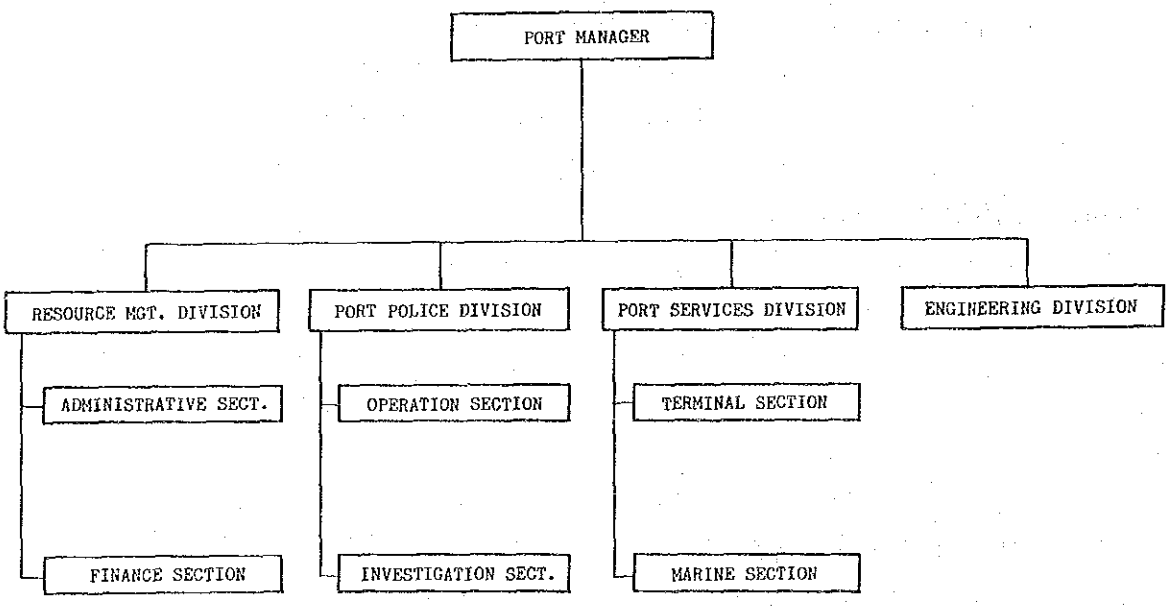


Figure 2-9 PMO Iloilo Organization Chart

Source: JICA Study Team based on the information form PPA.

28. PMO Iloilo has ten(10) responsible centers(RCs) all over the Western Visayas in order to manage operational activities rendered in these ports. These RCs can serve as PMO branches for ordinary port administration works and operational activities provided in the port. However, these RCs do not form parts of the organization structure of PMO Iloilo as shown in Figure 2-9. But in terms of data reporting or recording, statistics are classified according to respective locations of RCs as follows:

RC#1	Overall Management	RC#6	Dumaguit, Aklan
RC#2	Old Foreign Pier	RC#7	San Jose, Antique
RC#3	River Wharf	RC#8	ICPC (International Commercial Port Complex)
RC#4	Bacolod City	RC#9	Pulupandan, Negros Occidental
RC#5	Culasi, Roxas City	RC#10	Victorias, Negros Occidental

Port of Iloilo

1) Port Operation

29. Most of the port facilities belong to PPA(PMO Iloilo). But in terms of the services provided at the port, responsibility falls on either PPA or private sectors. Besides that, PPA grants several companies permission to provide arrastre/stevedoring services in the port district. For example, PPA is responsible for port traffic control, maintenance and port police. But pilotage and tugboat arrastre/stevedoring services, line handling, water supply service, and bunkering service are in the hands of private entities. PPA collects port charges, dues and shares from port the users and the contractors of above provisional services.

30. Summary of port services provided in the port of Iloilo is as follows:

Pilotage/towage	Iloilo Harbor Pilot Association
Water Supply	Iloilo Water Service Corporation (ILWASCO)
Oil Supply	CALTEX, PETRONPHIL etc.,

Stevedoring/longshoring, Line Handling	
	Iloilo Integrated Arrastre/stevedoring Company (ILIASCO)
	Visayan Veterans Port Services Inc., (VISVETS)
Storage(Warehouses)	
	PPA (inside the port area, transit sheds)
	Shipping Companies (outside the port area)
Passengers Guidance	
	PPA(of public relations)
	Shipping Companies(of business information)
Boarding Announcement	Shipping Companies
Ticket Issuance/check	
	PPA(for terminal fee)
	Shipping Companies(for passenger fare)
	* Some shipping companies collect not only passenger fare but also terminal fee at the same time, transferring the latter to PPA afterwards.
Traffic Control(Water Way, Land Area)	
	PPA
Port Charge Collection	PPA
Maintenance & Repair of the Port Facilities	
	PPA
Police	PPA
Firefighting	Ship Companies,Stevedoring/longshoring Companies(under the direction of PPA)

2) Cargo Handling Operation

31. As mentioned previously, stevedoring/arrastre services are provided by two(2) private companies. One is VISVETS which handles foreign cargo, the other is ILIASCO for domestic cargo handling. These cargo handling operators are obliged to pay 10% or 12% of the gross income to PPA as a share charge for the use of port facilities. The tariff rates by commodity type are approved by PPA. However, when proposing a change in the existing rate, PPA

has to discuss matters and examine the data and information collected in the dialogue and interviews with the port users before reaching a decision.

32. Productivity of the cargo handling, in terms of domestic traffic in this port, is roughly estimated at 15ton/hour/gang for break bulk, and 20-25ton/hour/gang for palletized cargo according to the interviews with PMO Iloilo. This is being handled by 8-10 workers/gang. The composition of a gang usually varies according to ship type, ship capacity, package type of cargo, machines to be used, and other factors. Based on interviews with cargo handling operators, the usual number of workers per gang engaged in stevedoring and arrastre operation are estimated according to the above.

33. The cargo handling operation by each wharf is described as follows;

(i) Old Foreign Pier

a. This pier is utilized solely for domestic cargo handling while other wharves in the base port of Iloilo but used for the foreign cargo handling. The passenger ships (mainly 10,000 GRT) call at this pier because it is easily accessible to the city center. Most of these vessels carry containerized or palletized break bulk cargo. Negros Navigation Co. Inc., Aboitiz Shipping Company, Sulpicio Lines etc., are major regular shipping companies which use this pier.

b. Container and break bulk cargoes are usually handled by fork-lifts with ship cranes. However, there is not a sufficient marshaling area (apron of less than 1,000 sq.m), resulting in congestion involving travelers and cargo on the apron of the pier.

(ii) Iloilo River Wharf

a. This wharf is developed along the Iloilo River. Its water depth in front of the quay is so shallow (-3m controlling draft of the ship) that domestic ships of less than 1,000GRT almost exclusively calls at this wharf. A few foreign vessels use the wharf and almost all the cargoes are transshipped to other countries.

b. Regular shipping companies are Amigo Shipping Company, Negros Navigation Co. Inc. and so on. Along the quay there are 26 private warehouses covering a total area of around 17,000 sq.m. PPA approves construction of warehouses inside the port area sub ject to the takeover of the facilities at the time of expiration (usually 20 years after the construction). Among the warehouses in the wharf, there is the passenger terminal house where the passenger ferry of Bacolod Express Co. is plied between loilo and Bacolod (Banago Pier).

c. The volume of break bulk cargo such as bagged cement, fertilizer, sugar, rice, and bottled cargoes is greater than the other types of cargo. Some general cargoes like grocery items are handled in containers.

d. Bagged cargo is loaded/unloaded manually on/from the shallow barges. While bottled cargo is handled by forklifts on the ship. In this case palletized and containerized cargoes are handled by forklifts with the use of ship cranes.

(iii) Iloilo Commercial Port Complex (ICPC)

a. ICPC is a newly constructed wharf with -10.5m controlling draft, thus larger vessels call at this port than vessels calling the other two(2) terminals (9000 GRT in the average of 1990). Almost all vessels are pure cargo vessels and only a few passenger ships (25,000 persons in 1990) call because ICPC is far from the city center.

b. There is a greater movement of foreign cargo than the domestic. However, no foreign containerized cargo is loaded/unloaded here, in contrast to the volume of domestic containerized cargo pass through the wharf. The prevalent types of foreign cargo are bagged fertilizer, rice, and cement. Almost all cargo is imported but little is exported. Some fertilizer and wheat are imported with bulk carriers, and is packed into the bags through the use of hoppers on the quay.

c. In terms of domestic traffic, the volume of containerized cargo handled is greater than other package types of cargo; they are itemized as electric appliance/instrument, auto parts, and grocery. These come mainly from Manila and are distributed over the Western Visayas from Iloilo. Dominant break bulk cargo is itemized as general cargo(inbound) and bagged fertilizer (outbound) which is transferred to Bacolod.

d. Cargo handling work is usually conducted by manipulating a mobile crane or ship equipped crane with a combination of forklifts.
Break bulk cargoes are often loaded/unloaded between trucks and ships directly by use of these machines. Bagged cargoes are carried between trucks and plane barges directly on the man shoulders (manually). Containers are also loaded/unloaded with a mobile crane, ship equipped cranes and forklifts, and transferred to storage yard (27,500 sq.m) in the wharf. Some are vanned or de-vanned in the CFS (Container Freight Station, 7,860 sq.m). As mentioned earlier, some fertilizer and wheat in pure bulk cargo is bagged using hoppers on the quay.

Port in Bacolod

1) Port Operation

34. While all terminals in Bacolod belong to certain private companies, PPA grants permission of port operation to these companies. RC#4 of PMO-Iloilo oversees administration of these private terminals. And the PMO collects usage fees (lay up fee), wharfage dues, and shares from the calling vessels, the stevedoring/arrastre companies, and for cargoes transported. However the PMO does not have provision for support services to the private operators. The revenue generated from the users is used for investment in port development and for the improvement of other PPA ports.

35. Both Banago Pier and Bacolod Reclamation Wharf are operated under the 3-year permission of PPA partly because they were built so long ago that PPA's transfer rules does not apply retroactively. The terminal operators

can collect berthing fees from the shipping companies without permission of PPA.

Table 2-8 Terminals in Bacolod

Pier/Wharf	Banago	Reclamation Wharf
Owner of the pier	NENACO	BREDCO
Shipping Companies	NENACO	Trampers
Stevedoring/Arrastre	BPSS	BREDCO/Arass.
Type of Cargo	Container	Bag, Bottle,Scrap
	Bag,Pallet	break Bulk
Passenger	Passenger	Cargo Only
Origin/destination	Manila	Iloilo
		Iloilo,etc.

Source: Interview with PPA

Note : NENACO = Negros Navigation Co. Inc., BPSS = Banago Port Stevedoring Services, BREDCO = Bacolod Reclamation Development Co.

36. Banago Pier and Reclamation Wharf are considered to be the candidates for Ro/Ro terminals in this study. The port services provided at these terminals are listed as follows;

(Banago Pier)

Pilotage/towage	Pulupandan Harbor Pilotage Association
Line Handling	Porter Cooperative Association
Water and Oil Supply	NENACO (Negros Navigation Co. Inc.)
Stevedoring/Longshoring	BPSS(Banago Port Stevedoring Services)
Storage(Warehouses)	NENACO
Passengers Guidance	NENACO
Boarding Announcement	NENACO
Ticket Issuance	NENACO
Traffic Control in the Parking Area	NENACO

	PNP(Philippines National Police)
Traffic Control in the Port Area	
	NENACO
	PNP
Charge Collection	PPA, NENACO
Maintenance & Repair of the Facilities	
	NENACO
Port Police	PNP
Firefighting	PNP,NENACO

(Reclamation Wharf)	
Pilotage/towage	Pulupandan Harbor Pilotage Association
Line Handing, Stevedoring/Longshoring	
	BREDCO Stevedoring Arrastre Company
Water and Oil Supply	
	(Water) Amity Trucking Company
	(Oil) SHELL, CALTEX
Storage(Warehouses)	BREDCO
Traffic Control in the Parking Area	
	BREDCO
	PNP
Traffic Control in the Port Area	
	BREDCO
	PNP
Charge Collection	PPA, BREDCO
Maintenance & Repair of the Facilities	
	BREDCO
Police	PNP
Firefighting	PNP,BREDCO

37. Almost all of the responsibilities for each terminal operation are taken by the NENACO and BREDCO since the pier and wharf are owned by themselves. PPA's main concern is on the fees and dues collection even at the privately owned/operated terminals.

2) Cargo Handling Operation

38. Stevedoring/arrastre services are provided by private companies such as Banago Port Stevedoring Services at Banago Pier, and BREDCO Arrastre at Bacolod Reclamation. Average productivities of cargo handling as reported to PMO Iloilo are 24.60RT(net)/gang/hour(Banago Pier), and 13.13 RT(gross)/gang/hour (Bacolod Reclamation).

39. Both Banago and Reclamation Area terminals are utilized for domestic cargo transportation, but they differ on the type of services provided in these terminals. Banago pier handles the liner ferries carrying both cargoes and passengers while Reclamation wharf handles purely tramper cargo. Cargo handling work is similar to the port of Iloilo (Old Foreign Pier, River Wharf and ICPC) because cargo transported does not differ much from that of the base port. The gang is composed of 8 - 10 workers. And usually 2-3 gangs/ship are engaged in stevedoring and arrastre operation.

40. Complementing previous paragraphs, the cargo handling operation is further explained below;

(i) Banago Pier

a. This is a polygonal pier, where the 3 sides are used as berthing spaces for vessels owned by NENACO. NENACO plies regular passenger ferries between Iloilo-Bacolod, terminating at one side of the pier. The other sides are for larger ferry ships for/from Manila, there is also a mooring area for pure cargo vessels.

b. The pier has such a limited apron that handling activity is often difficult. As a result when a ferry boat is moored, passenger traffic stream and cargo handling work are converged on the narrow apron of the pier.

c. Transportation equipment, palletized fruit and vegetable, fish and prawn, and bagged sugar are the dominant items of break bulk cargo. These goods are loaded/unloaded onto/from ships by use of ship equipped cranes or a mobile crane with forklifts manipulated

quayside. Some are stored on the pier(in the warehouses or on the heaping place), the rest is moved between trucks and ships directly. These trucks are usually hired by the shippers to carry the cargo to their warehouses.

d. A fair amount of cargo that moves through the pier is containerized, and containerized ratio rose to 52.3% of the total cargo in 1990. The prevalent goods packed in the containers are animal foods, palay rice, fish and prawn, general cargo such as grocery items, auto parts, and other daily necessities. The stevedoring/arrastre company manipulates a mobile crane(owned by NENACO) or ship equipped cranes with forklifts to transfer the container cargoes between the ship and the quay or the trailers.

e. Some containers are stored on the quayside but almost all are carried from/to the stacking yards outside the port(NENACO has 2 operation yards separate from each other). NENACO, not the stevedoring/arrastre company, is responsible for the container yard operation, that is vanning or devanning the containers, and transferring them, loaded on the trailers' platform, to/from the pier.

(ii) Reclamation Wharf

a. The wharf is constructed linearly, and water depth is so shallow in front of the quay that the vessels with small draft like barges call to load/unload cargo, which are used for tramper services between Iloilo and Bacolod.

b. Break bulk is the common type of the cargo, which includes bagged goods such as cement, fertilizer, palay, rice and sugar, and bottled cargo.

c. In the case of bottled beer, forklifts both on the apron and on the barges pass cases of beer from one side to the other. Bagged cargo is mainly loaded/unloaded manually(over the shoulder). And the cargoes are usually conveyed between a barge and trucks directly.

d. When conventional vessels use the wharf, cargo handling is performed by ship equipped cranes. Forklifts are utilized for palletized cargo, but nonpalletized cargo such as lumber or scrap iron are directly loaded/unloaded to/from the trucks through the use of mobile cranes.

[References]

1. Implementation program for feeder ferry development project, DPWH, January 1986

2. Medium-term public investment program 1988-1992, NEDA

3. Updating of the ferry study under the road feasibility studies 3, DPWH, June 1987

4. Nationwide Roll-on Roll-off transport development study, Commodity flow analysis, June 1990

5. Feeder ports study, Asian Development Bank, October 1989

6. Review of transport projects in the MTPIP, 1987 - 1992, NEDA, DOTC, DPWH, PNR, PPA, MARINA, January 1988

Chapter 3 Natural Conditions

A. Meteorology

1. Table 3-1 shows the meteorological data in Iloilo City covering the period from 1951 to 1990. This data was obtained from the Iloilo city PAGASA station.

Table 3-1 Meteorological Data in Iloilo 1951-1980

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temp. C	26	26	27	28	29	28	27	27	27	27	27	27	26
Rain (mm)	46	25	30	46	122	258	302	341	263	252	173	1959	101
(day)	8	6	5	5	11	18	20	20	19	18	14	157	13
Humid. %	82	80	76	74	77	82	84	85	84	84	84	81	84
Cloudy	6	6	5	5	6	8	8	8	8	7	7	7	7
Wind	NE5	NE6	NE5	NE5	NE3	SW3	SW3	SW4	SW3	NE3	NE4	NE5	NE4

2. Since there is no PAGASA station in Bacolod, the hourly wind data during the operation time (from 6am to 8pm) recorded at the Bacolod Airport of the Air Transportation Office (DOTC) was utilized. Table 3-2 shows the wind data summarized for each months of 1990. However, for the purpose of further detailed engineering, it is recommended to set up a meteorological observatory as a permanent station in Bacolod to record continued meteorological information for the project.

Table 3-2 Wind data summary in Bacolod (1990)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Wind	N4	N4	N5	N4	N4	N4	S4	S5	S4	N4	N4	N5	N4

Source; JICA study team

B. Topographical Conditions

3. (Iloilo)

The province of Iloilo is the southeastern portion of Panay Island and located between latitude $10^{o}40'N$ and $11^{o}30'N$ and longitude $122^{o}02'E$ and $123^{o}10'E$. The south and east of Iloilo province are bounded by Iloilo strait and Guimaras strait. There are three lowland plain in Panay Island such as Sara plain, Banate plain and Pototan plain which contain Iloilo City. The prominent highland are Sara Peneplane, the Culasi Central divide, the Anilao plateau, and rolling hills of Passi.

4. (Bacolod)

Bacolod is the capital of Negros Occidental and lies between $9^{o}N$ to $10^{o}50'$ latitudes and $122^{o}20'E$ to $123^{o}30'E$ longitudes. It has an area of 13,672 square kilometer. The Negros Island is characterized by three physiographic units namely Southern Highlands, Northern Highland and Western plain. Bacolod is located in the western plain which is the most important strategic area of the island and extends about 160 km. The east of the west plain lies the Canloan mountain range which consist of major volcanic peaks such as Canloan (2,450m), Madalagan (1,879m) and Silay (1,530m). Bacolod is located about 30 km northward from the mouth of Bago river which is one of the major river in the west plain.

C. Hydrographic/Oceanographic Condition

Hydrography

5. (Iloilo)

Iloilo faces the Iloilo strait and Guimaras strait. Guimaras Island lies on the other side of the Iloilo strait. The depth of Iloilo strait ranges from 10m to 20m below MLLW and the deepest is 70m. Oton bank extends in the center of Iloilo strait from the front of Iloilo City towards southwest with a depth of 0.5m to 5.0m below MLLW. The depth of Guimaras strait between Dumangas Pt. in Panay Island and Navaras Pt. in Guimaras Island is about 5.0m to 15m below MLLW. There are several banks such as Iguana bank in this area. The depth

of Iguana bank ranges from 2.0m to 4.0m below MLLW. Navigation aids are provided to mark this area. The sand beach in Iloilo extends both southwestwards and northeastwards with a length of 0.2 to 1.0 km offshore.

6. (Bacolod)

Bacolod faces the Guimaras strait. The entire sea shore at Bacolod is quite shallow. The sand beach extends about 2 km offshore with only 2.0m depth below MLLW at 1 km offshore. The depth of water is 20m below MLLW at the center of Guimaras strait. The nearest bank, Logiog bank is located at the front of Pandan Pt. about 20 km southwestwards from Bacolod. Results of hydrogrphic survey for Iloilo and Bacolod are shown in Figures 3-1 and 3-2.

Tide

7. The tide elevation in Iloilo and Bacolod are as follows.

	Iloilo	Bacolod (Banago)
Mean Higher Highwater	1.57m	2.05m
Mean High Water	1.30m	1.76m
Mean Sea Level	0.75m	1.01m
Mean Low Water	0.21m	0.26m
Mean Lowest Low Water	0.00m	0.00m

These data are based on tide prediction. In order to comfirm these data, field survey was carried out from August to September in 1991. Results on data analysis are shown in Note A-2-3-1.

Current

8. (Iloilo)

Currents caused by flood and ebb tide traverse in opposite direction northeast and southwest in Iloilo. The previous report on the current observation in Iloilo, was carried out in Feb. 1980 at Pala-Pala, 3 km westward from old foreign pier, showed the maximum velocity ranging from 0.70 to 1.30 knots

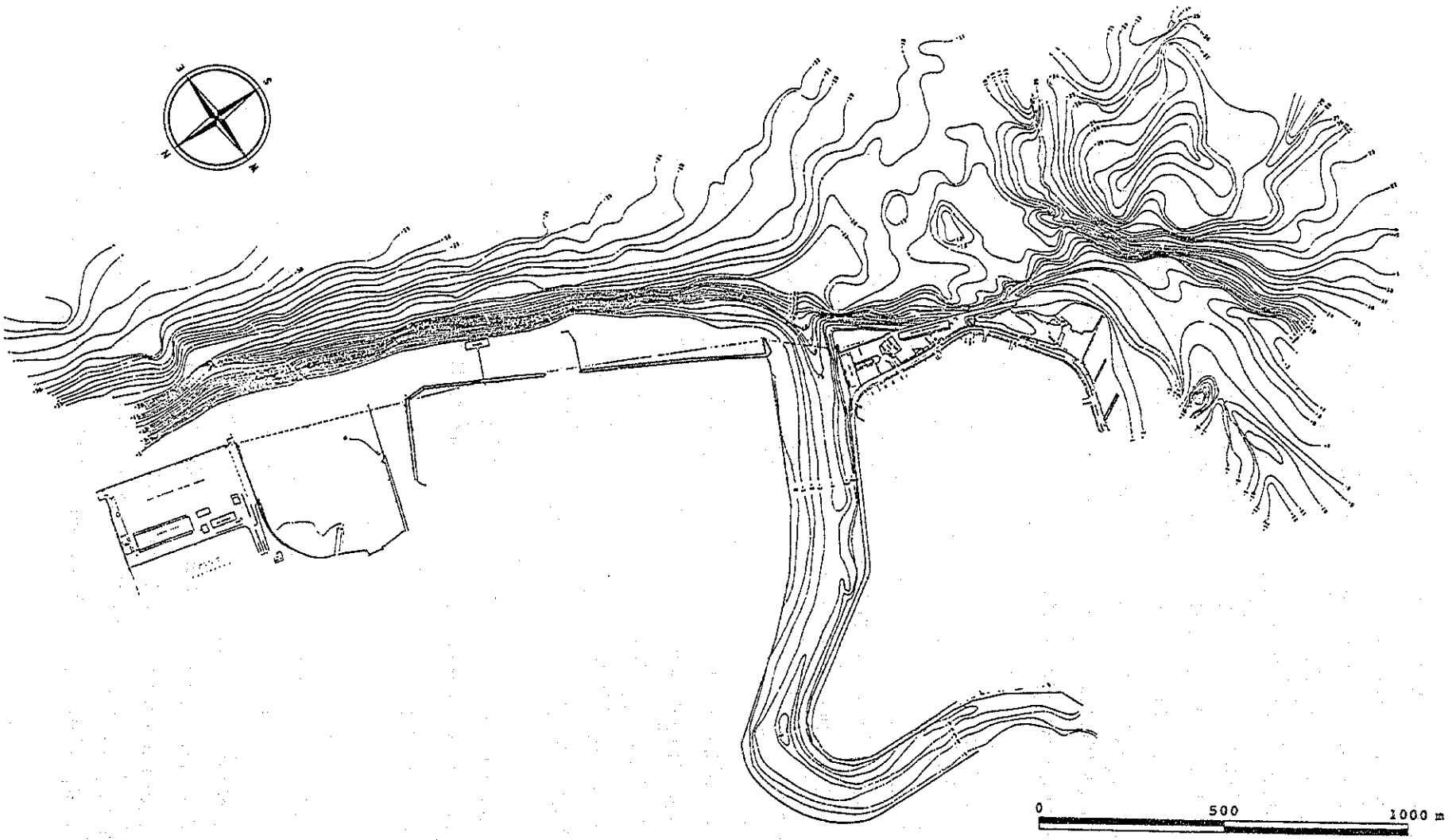


Figure 3-1 Topographic and Hydrographic Survey (Iloilo)
Source: JICA Study Team

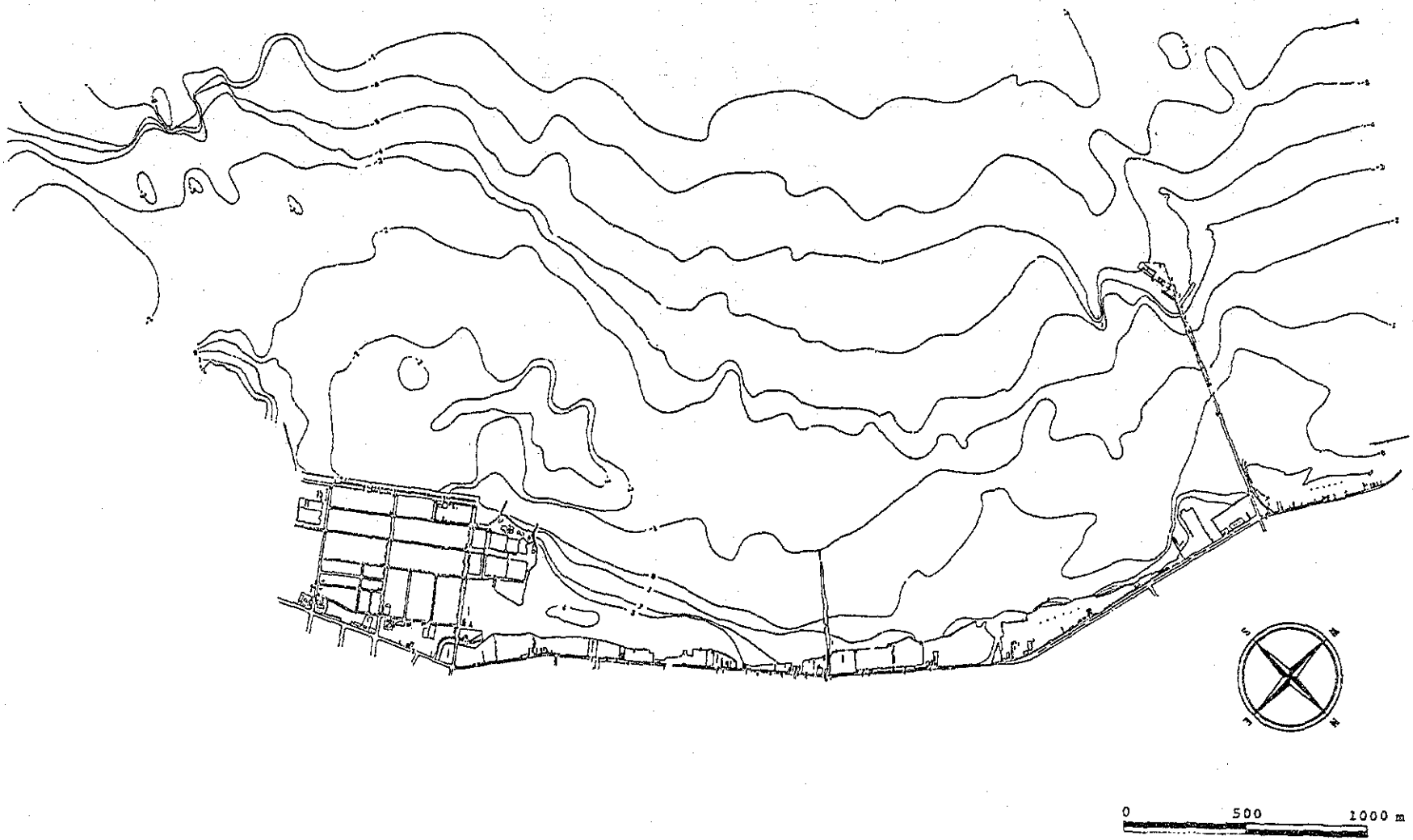


Figure 3-2 Topographic and Hydrographic Survey (Bacolod)

Source: JICA Study Team

compare to 1.0 to 2.0 knots on the marine chart. The same report also showed that the maximum current velocity arises within 2 hours after high and low tide peak.

9. (Bacolod)

The existing information of current in Bacolod is base on BREDCO (Bacolod Real Estate Development Company; Private) survey data which was carried out in 1979. The data shows that the direction of littoral current at flood and ebb tides are southeast and northeast respectively.

10. Current observation was carried out to look up its direction and velocity. Results on data analysis are also shown in Note A-2-3-1.

Wave

11. The wave climate in Iloilo and Bacolod were studied based on the PAGASA wind data and ATO (Air Transportation Office, DOTC) wind data observed in 1990. Result of this study are shown in Note A-2-3-2. Based on the Log Books of the ferries currently plying between Iloilo and Bacolod, operations in 1990 was stopped only once during the occurence of Typhoon Ruping. Details of wave estimation are shown in Note A-2-3-3.

12. Figure 3-3 shows the summary of natural condition for wind,wave and current.

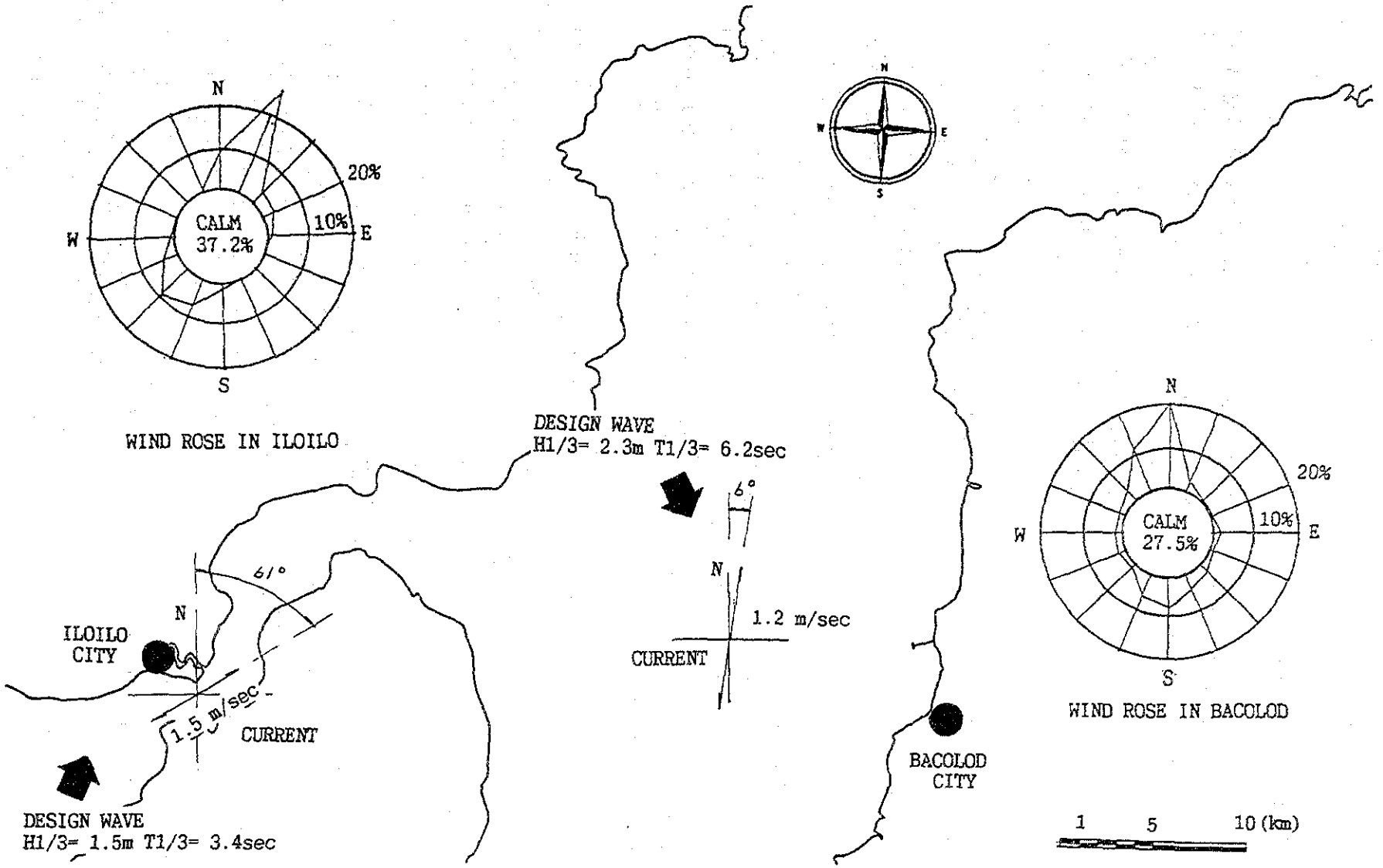


Figure 3-3 Summary of Natural Condition (Wind, Wave and Current)

Source: JICA Study Team

D. Geological Conditions

Sub-soil Condition

13. To verify the subsoil condition in Iloilo and Bacolod, off-shore Boring was carried out. Results of boring and laboratory test are shown in Note A-2-3-1.

14. Subsoil material in Iloilo consisted mainly of sand from the existing sea bed up to about -30m. The hard strata below this layer is with N- Value more than 50.

15. Laboratory test for each borehole in Iloilo are as follows:

Borehole	No. 1	No.2
Specific Gravity	2.52 to 2.71	2.57 to 2.68
Water Contents	9.8 to 40.1 %	14.0 to 22.0 %
Plasticity Index	0.8 to 5.1 %	None Plastic

The Grain size analysis indicates the presence of 5% very fine soil while 95% are of silt and sand.

16. Subsoil condition in Bacolod is summarized as follows: Fine sand of about 1.5 m thickness exist at sea bed. Soft to Medium clay is found below the sand layer and extending to about 4 m depth. The hard strata exist at the depth of about 15 m below sea bed. The summary of the each component are as follows.

i) Surface sand (silt to medium sand)

Specific gravity	2.64 - 2.76
Water Contents	16.0 - 64.0
Plasticity Index	NP - 39.0

ii) Clay (soft to medium clay)

Specific gravity	2.48 - 2.67
Unit weight	1.48 - 1.86 (t/ m^3)
Water Contents	74 - 81 (%)

Liquidity Limits	50 - 61
Plasticity Limits	25 - 31
Unconfined Compression Strength	2.0 3.4 (t/m²)
Cohesion	1.0 1.7 (t/m²)

17. Figures 3-4 to 3-6 shows the subsoil profile in Iloilo and Bacolod.

Siltation

18. Figures 3-7 to 3-9 shows the comparison of existing survey data on sea bed profile for Iloilo and Bacolod. According to the latest survey data in Figures 3-8 and 3-9, dredged areas in Bacolod are presently varied due to siltation up to elevation before dredging. In the case of Iloilo, there is no significant changes in sea bed profile except line-1 of Figure 3-7.

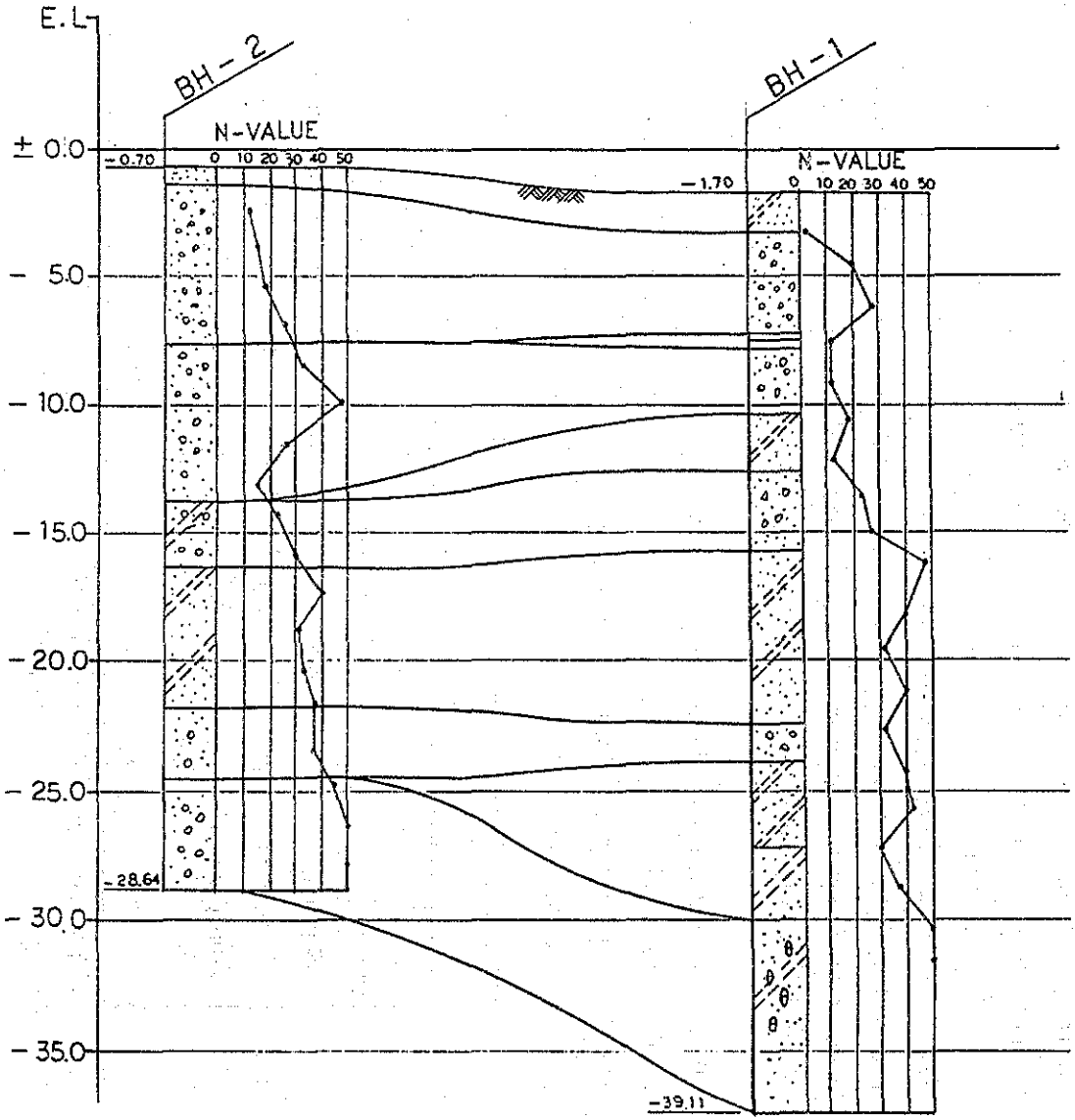
19. In order to examine the characteristics of siltation, sea bed material and sea water were sampled and tested. Table 3-3 shows the result of testing. The other conditions on siltation study are wave and current which are estimated and observed in this study.

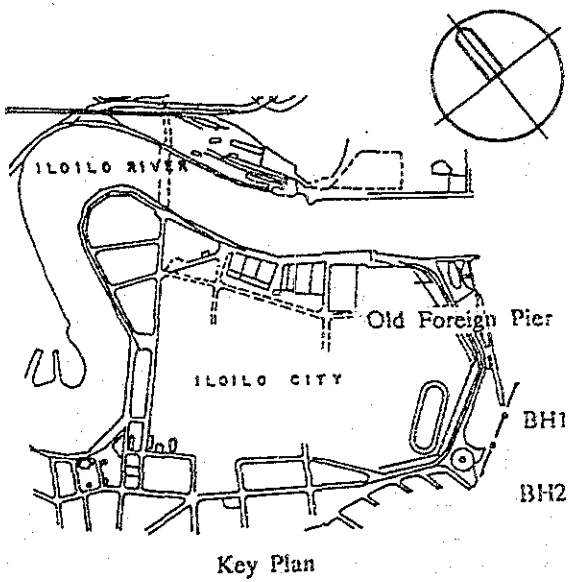
20. In addition to the information mentioned above, sand catchments were installed for 2 weeks to measure the volume of suspended solid in water directly. Results obtained are shown in Table 3-4.

Table 3-3 Testing Result for Sea Bed Material and Sea Water Sample

Item		Iloilo	Bacolod	Remark
SS.(ppm)		460	270	(by sea water sample)
Sieve test Analysis (%)	Gravel	0.1	-	(by sea bed material)
	Sand	96.3	20.0	
	Silt	3.6	80.0	
	Clay	-	-	

Source; JICA Study Team



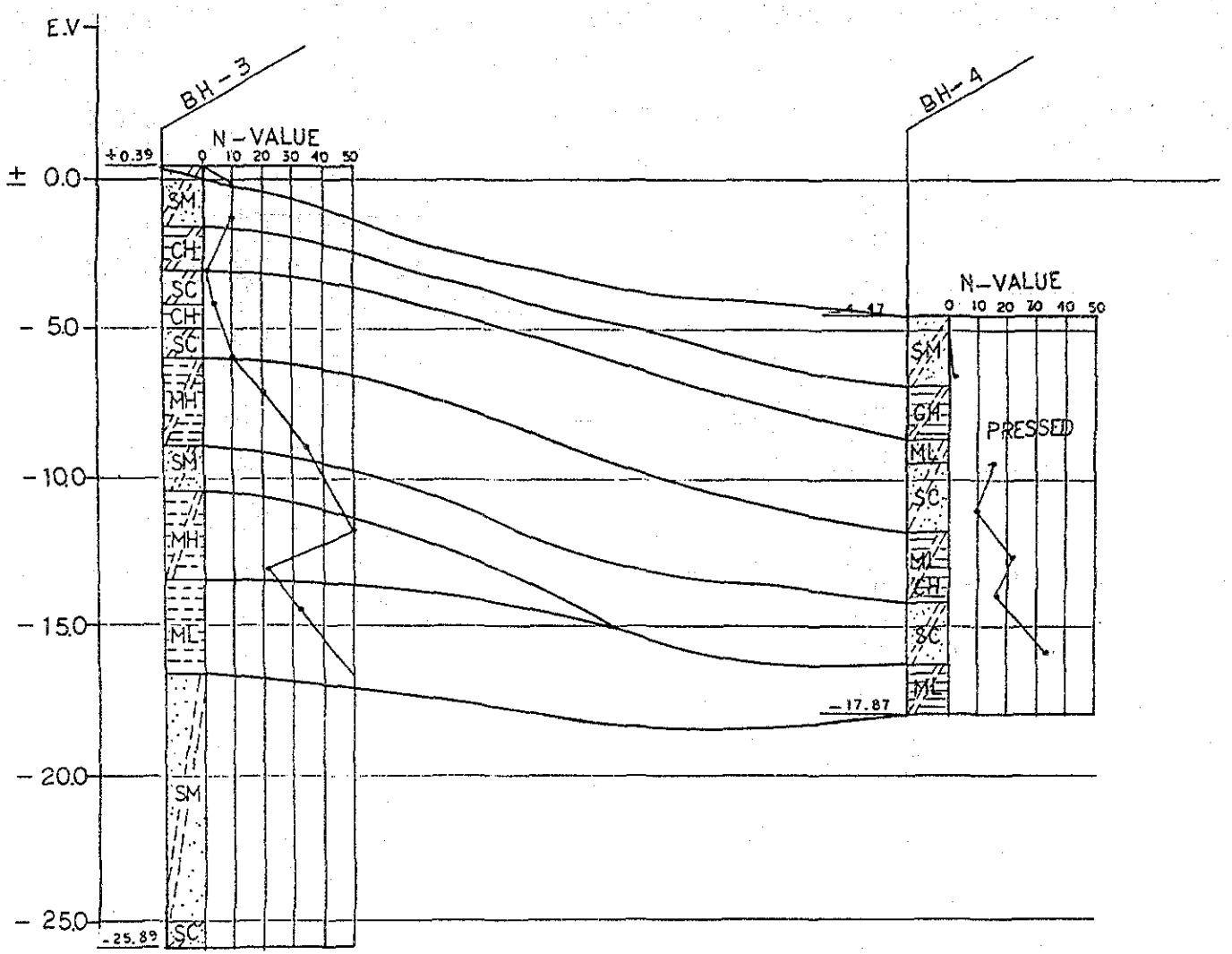


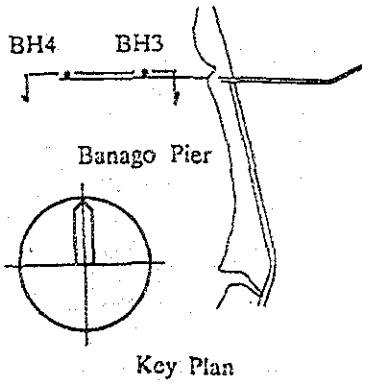
Key Plan

LEGEND :

SAND
CLAY
SANDY
CLAYEY
SILTY
SHELLS
GRAVELLY
W/GRAVEL

Figure 3-4 Subsoil Profile in Iloilo
Source: JICA Study Team





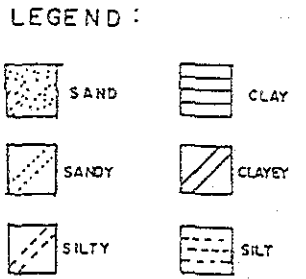
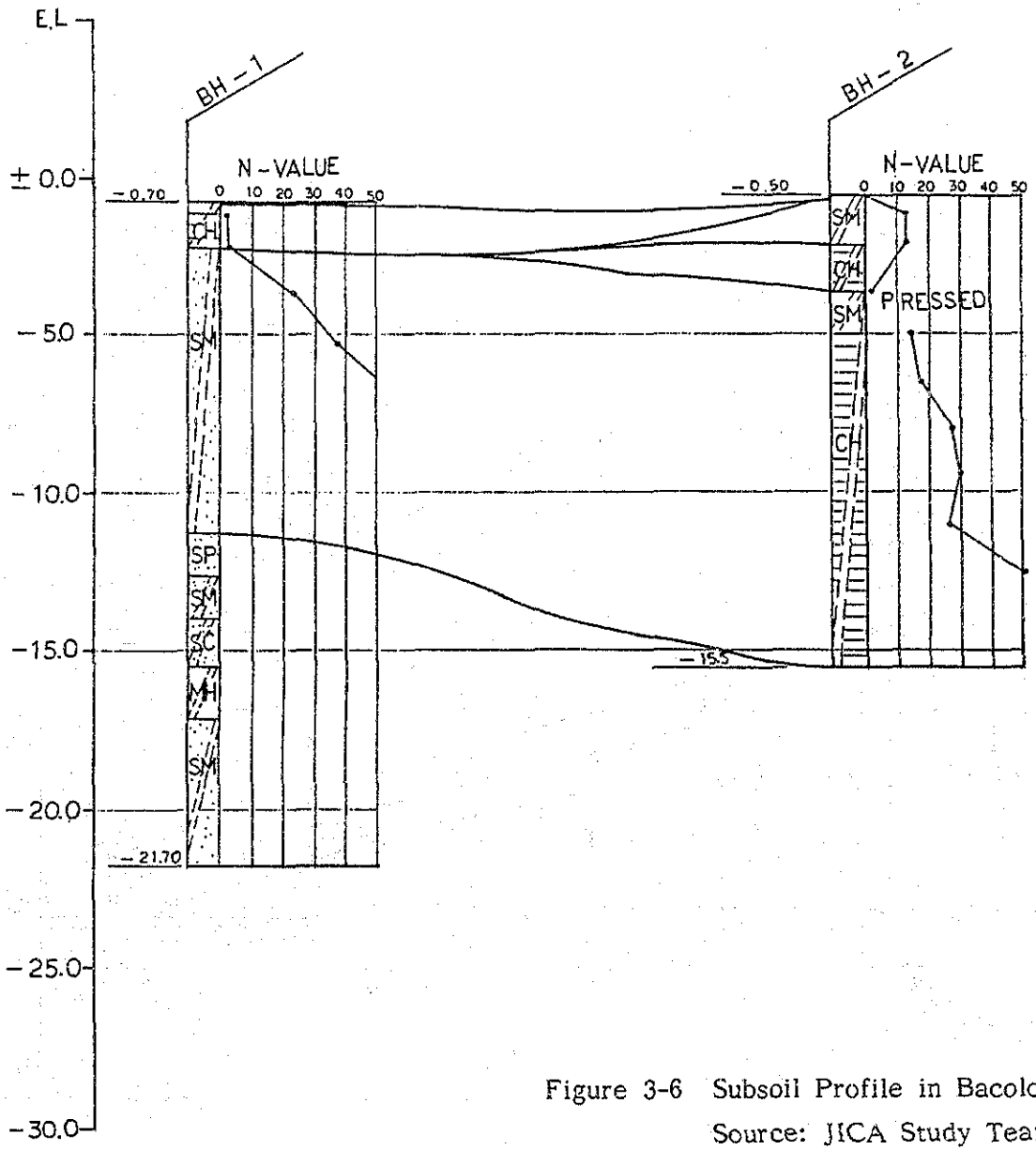
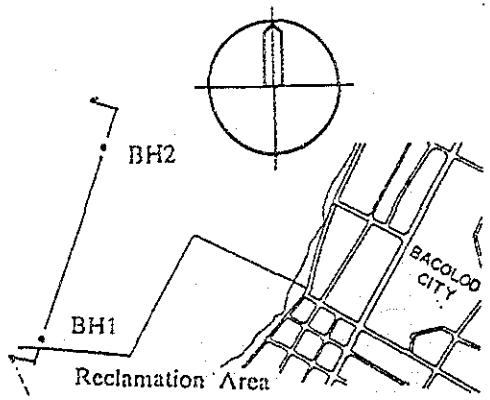


Figure 3-5 Subsoil Profile in Bacolod

Source: JICA Study Team





Key Plan

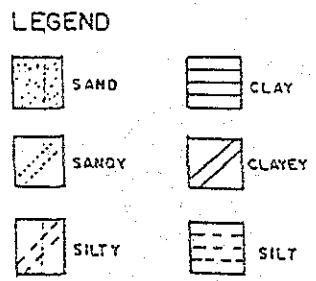


Figure 3-6 Subsoil Profile in Bacolod

Source: JICA Study Team

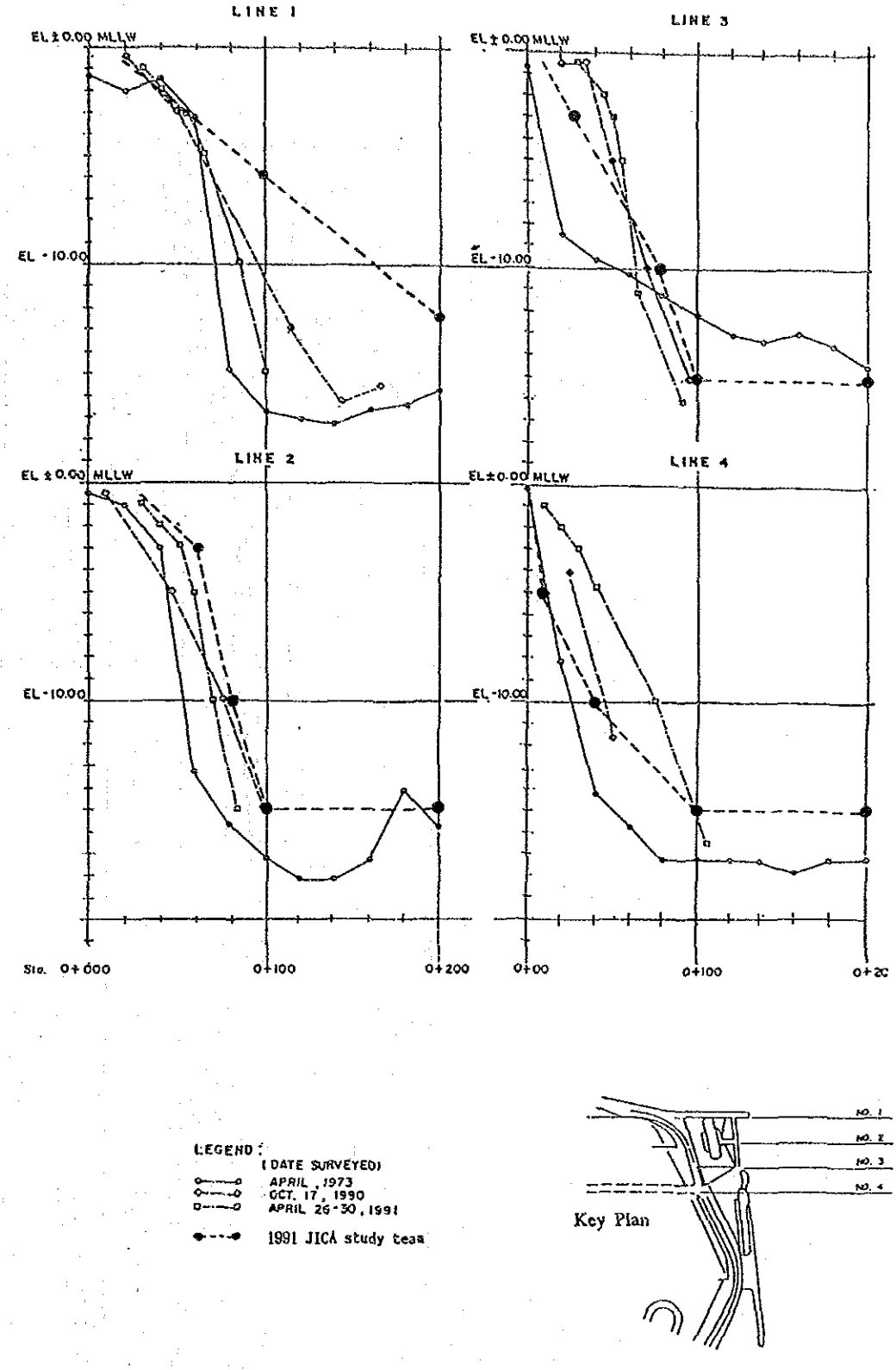


Figure 3-7 Sea Bed Profile (Iloilo)
Source: JICA Study Team

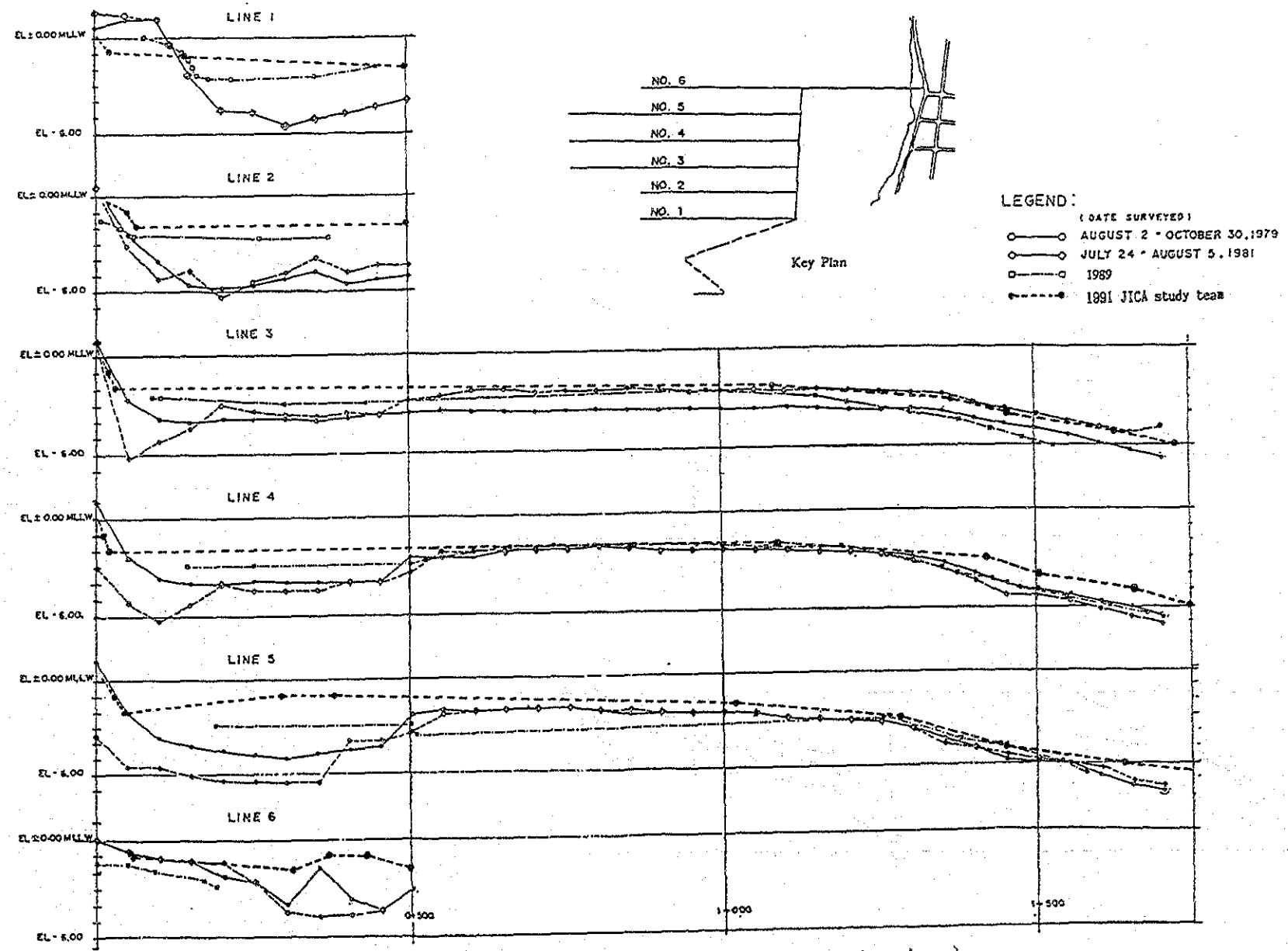


Figure 3-8 Sea Bed profile (Bacolod Reclamation Area)

Source: JICA Study Team

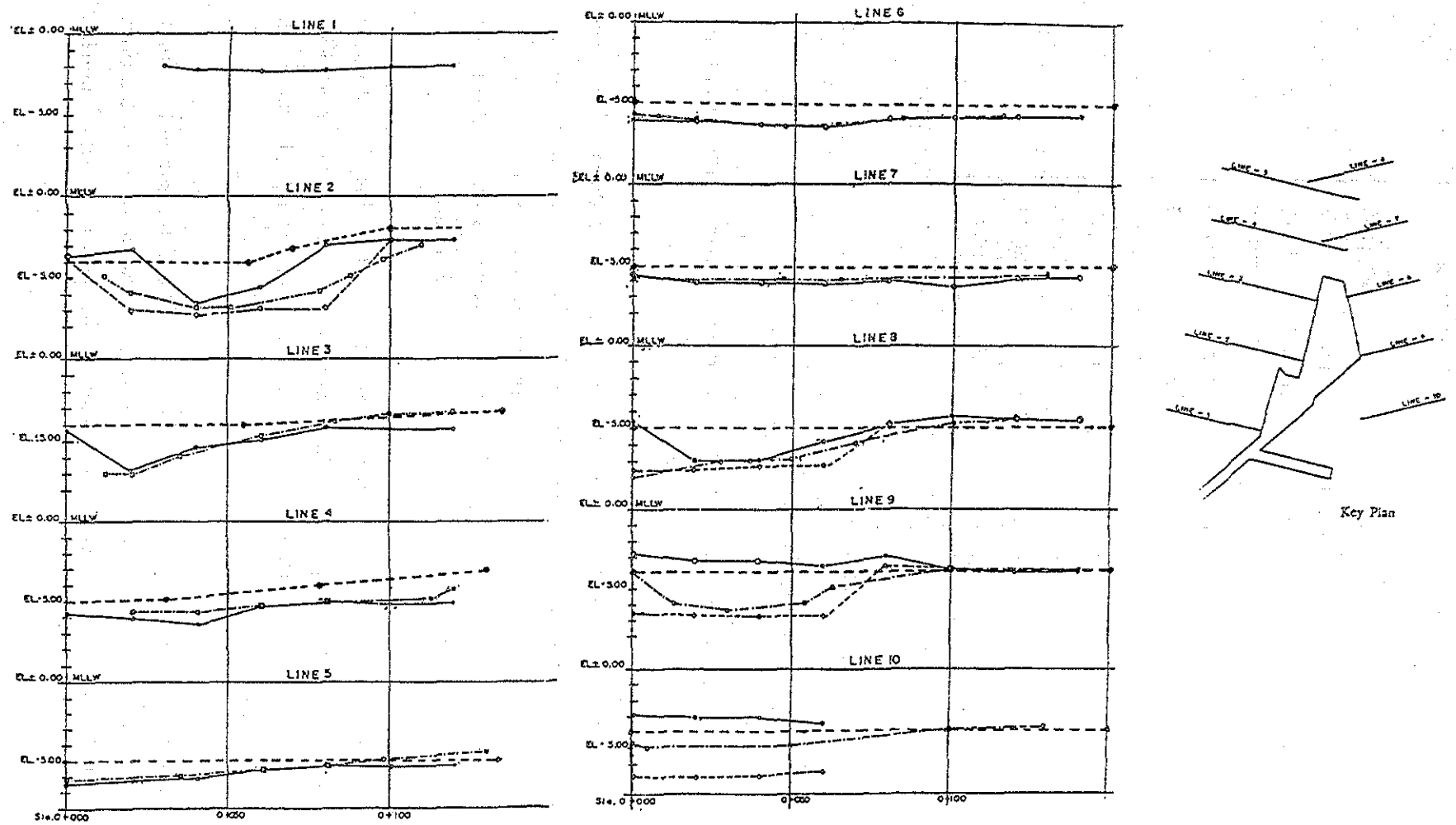


Figure 3-9 Sea Bed Profile (Banago Pier)

Source: JICA Study Team

Table 3-4 Test Result for Sand Catchment

		Water Depth	
	Direction	-4.0	-2.5
Upper Layer	North	10.05	20.13
	East	6.67	16.93
	South	7.90	16.96
	West	5.70	7.26
Lower Layer	North	9.60	25.77
	East	6.80	26.20
	South	13.60	26.11
	West	7.40	26.71

(Unit in g)

Source; JICA Study Team

21. These test results show the following;

i) Heavy siltation is expected in Iloilo and Bacolod from the result of suspended load in sea water testing.

ii) Sea bed material in Iloilo is mainly composed of medium sand, and most of wave coming to the project site is too small to move the sand. Velocity of current shows enough speed to move sea bed material but its direction is almost parallel to the project site. Most of sea bed material is expected to pass through the project site.

iii) Based on the result of sand catchment test in Bacolod, siltation is active in all direction at -2.5m below MLLW. At -4.0m below MLLW, movement of siltation shows prevailing direction which is between north and south.

22. The heavy siltation will be expected in Bacolod caused by current. Since there is a reference tide station at Banago, it is recommended to add functions as the periodic observation of current and siltation to assist possible marine

development at Bacolod.

23. Further discussion on this matter is presented in Note A-2-3-4 Siltation Study.

[References]

1. Daily and Monthly Summaries of Meteorological Observations, 1986, PAGASA Climate Data Section Climatology Branch, June 1989

2. Climate of the Philippines 1984, PAGASA

3. Tide and Current Table, 1991. Bureau of Coast and Geodetic Survey

4. Master Plan Report on Iloilo Fishing Port Complex, Fishing Ports package I, Ministry of Public Work, 1980

Chapter 4 Demand Forecast

A. Methodology of Demand Forecast

1. In the Nationwide Long-term Ro/Ro Transport Development Plan, demand forecast is calculated, applying the formula appeared in Highway Planning Manual (1982) by the Ministry of Public Works and Highways with some modifications. The formula is to estimate traffic growth rate on the basis of elasticity against growth rate of per capita income and population. In the demand forecast of Iloilo-Bacolod link, this macro-forecast formula is also applied at the target year of 1997 on both passenger and cargo traffic. Furthermore for the cargo transport in the link, commodity-wise demand forecast is carried in order to identify potential Ro/Ro cargo. The outline of the forecast method is shown in Figure 4-1.

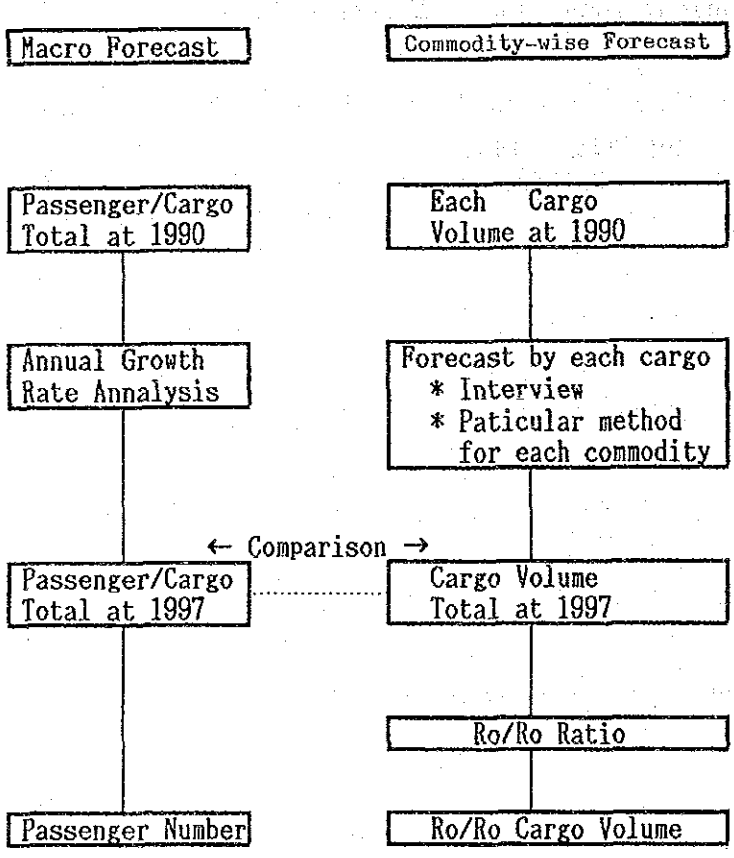


Figure 4-1 Outline of the Forecasting Method

Source: JICA Study Team

2. For the commodity-wise forecast, commodities which will possibly be carried by Ro/Ro vessels should be selected among all the existing cargo and then classifications of commodities to be used by the forecast should be determined. Table 4-1 shows the various features of cargo by the type of water transportation. Taking into account particularly the Batangas-Calapan Ro/Ro transport and the existing ferry in the link, 11 commodities are selected, as shown in Table 4-2.

Commodity classification of NSO statistics (13 commodities) is different from the PPA monthly report (25 commodities). Commodity Flow Analysis, 1990 has been carried out by Ro/Ro Office using the NSO classification. In this demand forecast, the NSO formula is also used, because only the NSO Statistics indicate the origin of cargo by province. For cargo volume, PPA figures are utilized.

Table 4-1 Commodity-wise Selection Transported by Ro/Ro Vessel in the Rink

Commodity-wise	Inter Is. Major Com.	Inter Pr. Major Com.	Inter Po. Major Com.	Ex. Ferry Major Com.	Major Com. Ba - Ca	Ex. G.C.V Major Com.	Ex. Bul.V Major Com.	Future Ro Commodity	Result of Selection
Palay & Rice	P	I	Io	O	O	O			O
Fertilizer	P	I	Io		O	O			O
Mineral Oil	M	M	M						
Fruits & Veg.	P	I	Io	O	O				O
Sugar	N	O	Ba			O	Δ		O
Beer & Soft Dr	P	I	Io		O			O	O
Cement	P	I	Io		O				
O.G.C	M	M	M	O	O	O	Δ		O
Fish & F Pre.				O					O
Copra					O				
Empty Vehi.					O			O	O
Molasses							Δ		
Cargo Total	M	M	M						

P : Main Flow Commodity from Panay Is.
N : Main Flow Commodity from Negros Is.
M : Mutual Flow Commodity
I : Main Flow Commodity from Iloilo Pro.
O : Main Flow Connodity from Negros Occ. Pro.
Io : Main Flow Connodity from Iloilo Port
Ba : Main Flow Connodity from Bacolod Port

Inter Is. : Inter Island
Inter Pr. : Inter Province
Inter Po. : Inter Port
Ex. Ferry : Existing Ferry
Ex. Bul.V : Existing Bulk Vessel
Ex. G.C.V : Existing General Cargo Vessel

Source : JICA Study Team

Table 4-2 Commodity Comparison Table of NSO Statistics and PPA Monthly Report

NSO Classification		PPA Classification
1	Palay & Rice	Palay & Rice
2	Corn	Corn
3	Sugar	Sugar,Molasses
4	Copra	Copra
5	Logs	Logs, Plywood & Veneer, Lumber
6	Beer & Soft Drink	Bottled Cargo
7	Pulp	Paper & Pulp
8	Iron & Steel	Iron & Steel,
9	Fertilizer	Fertilizer
10	Cement	Cement
11	Fruits & Vegetables	Fruits & Vegetables
12	Mineral O.Product	Mineral O.Product, Crude Minerals, Crude Pet. Ref.Petroleum & Prod.
13	Rest Group	Abaca, Live Animals, Fish & F.Preparation, Munufactured Metal, Wheet, Animal Feed, Textile Fiber, Chemicals, Sclap, Garment, Tabacco, Machinery & E.Equipment, Furniture, Other.G.Cargo, Transport Equipment

Source : NSO Statistics, 1989, NSO
: Annual Statistical Report 1990, PPA

3. Since the existing Iloilo-Bacolod ferry (two vessels 3 round trip a day) transports passengers between two ports almost exclusively, all the passengers of the link can be deemed to be the potential Ro/Ro passengers in future. On the other hand, the ferry transports only 18.7% of the total cargo of the link. The future Ro/Ro transport will carry more extended share of cargo because it attracts much more clients by its enlarged capacity and its improved services. It means that more thought should be given for identifying future role of Ro/Ro ferry in terms of cargo transport.

4. Taking the existing Batangas-Calapan link as an example, Ro/Ro vessel transports almost all of the volume of link cargo. The major commodities transported are as follows (from PPA monthly report '1990):

- Palay & Rice
- Fruits & Vegetables
- Copra
- O.C.G.
- Fertilizers
- Beer & Soft Drinks
- Cement
- Empty Vehicle

These commodities are deemed as a potential cargo for the Ro/Ro transport, not only in the Batangas-Calapan link but also in other links/routes. According to the above, the future role of Ro/Ro vessel on this link is considered as follows;

- Passenger ferry
- Substitute role for existing general cargo vessel
- Short trip car ferry for small vehicles
  (eg. jeepney, bike)
- Long trip car ferry for bus/truck

With this in mind, share of the future Ro/Ro ferry in total cargo flow in the link will be determined.

5. As has been stated in paragraph 1 of this chapter, for the macro-forecast, the Highway Planning Manual formula is applied. However, the growth rate of per capita income is substituted by the growth rate of personal expenditure, since the region-wise projection of income is not provided for. For determining the socio-economic parameters, it should be studied what region/province/city constitute the hinterland of the link. The analyses of the present seaborne traffic are needed for defining of the hinterland.

B. Analysis of Present Seaborne Traffic

Passenger

6. The passenger traffic between the two islands (Panay island & Negros island) is shown in Table 4-3 using 1989 NSO statistics. While this figures are considered to be less than the actual traffic numbers, it can be said that the majority of passenger traffic occurs between the two islands. The table shows also that the most of the traffic between two islands is generated between Iloilo province and Negros Occidental province.

Table 4-3 Passenger Flow between Two Island

Between	From	To	Passenger No.	Between	From	To	Passenger No.
Island	Panay	Panay	2,207	Province	Iloilo	Iloilo	0
		Negros	71,487			Negros.Oc	71,487
	Negros	Panay	31,590		Negros.Oc	Iloilo	31,590
		Negros	0			Negros.Oc	0

Source : NSO Statistics,1989,NSO

7. The origin/destination survey was carried out on August 1st and 2nd 1991. Table 4-4 shows the following facts;

- Iloilo-Bacolod link is the main connection between the Panay Island and Negros Occidental

- Iloilo province has a 90% share of the total number of the production/attraction. Iloilo city accounts for the biggest share in the province with 70-73%. The second and third are located to the west along the coastal road.

- Negros Occidental is almost 100% of the total number of the production/attraction. Bacolod city accounts for the biggest share with 68-69%. Silay City, Talisay and Victorias are followed which locate at the north along the Negros coastal road.

- A few passengers from/to Guimaras make use of this link (Guimaras-Iloilo-Bacolod).

Figure 4-2 names main municipalities of the passenger's production and attraction.

Table 4-4 The Passenger Number and Percentage of Passenger Production and Attraction by Province

A. Iloilo/Bacolod

Origin			Destination		
Iloilo Prov.	3,543	90.9%	Negros Occidental	3,830	98.3%
(Iloilo City	2,590	66.4%)	(Bacolod City	2,606	66.9%
Antique Prov.	151	3.9%	Negros Oriental	12	0.3%)
Capiz Prov.	109	2.8%			
Alkan Prov.	38	1.0%			
			Negros Is. Total	3,842	98.5%
Panay Is. Total (incl. others)	3,841	98.5%			
Guimaras Is.	20	0.5%			
Total (incl. others)			3,898	100%	

B. Bacolod/Iloilo

Origin			Destination		
Negros Occidental	2,926	97.5%	Iloilo Prov.	2,673	89.7%
(Bacolod City	2,015	67.1%)	(Iloilo City	1,894	63.6%)
Negros Oriental	16	0.5%	Antique Prov.	97	3.3%
			Capiz Prov.	64	2.1%
			Alkan Prov.	8	0.3%
Negros Is. Total	2,942	98.0%	Panay Is. Total	2,842	95.4%
			Guimaras Is.	77	2.6%
Total (incl. others and unanswered)			3,002	100%	

Source: JICA Study Team based on JICA O/D Survey

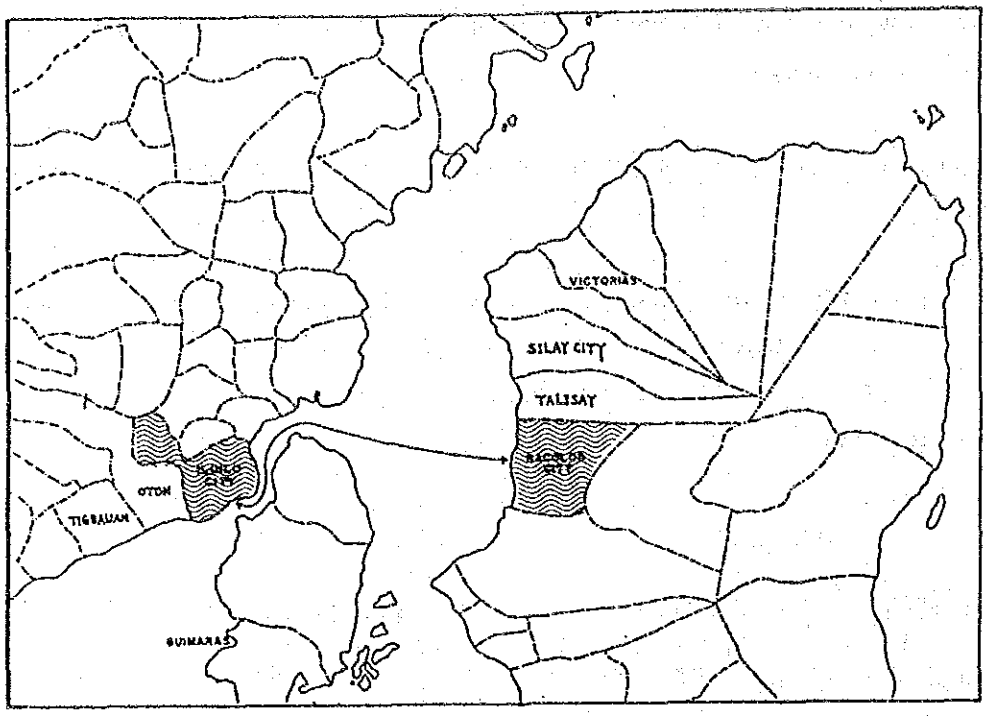


Figure 4-2 Main Municiparities of the Passenger's Production and Attraction in Western Visaya
Source: JICA Study Team based on JICA O/D Survey

8. Table 4-5 is the existing cargo movement between the two islands using 1989 NSO statistics. This table shows that the cargo movement between ports of two islands is about at 150,000 - 190,000 M tons, and the flow from Panay to Negros is rather great. While the main cargo commodities from Panay to Negros are "Rice", "Fertilizer", "Beer & Softdrink", "Cement" and "Fruits & Vegetables", the major cargo commodity from Negros to Panay is "Sugar". The cargo listed under "Mineral Oil Product" and "Rest Group" shows the mutual cargo movement.

9. The cargo movement between ports in the Iloilo and Negros Occidental represents the major portion of the cargo movement between the two islands. The major commodities from Iloilo to Negros Occidental are the same commodities found in interisland cargo movement. The major commodity from Negros Occ. to Iloilo province is "Sugar".

10. PPA Monthly Report 1990 gives information about flow of cargo by commodity and mode. Following are the cargo type and mode of vessels between Iloilo/Bacolod link:

General Cargo	Ferry	Iloilo	20,393 = 15,911	(Jan-Jun, Aug-Dec) Bacolod(Banago)
"	General Cargo Vessel	Iloilo	4,232 = 11,393	(Jan-Jun) Bacolod(Banago)
"	"	Iloilo	48,247 = 9,891	(Jan-Jun) Bacolod(Reclamation)
Bulk	Bulk Vessel	Iloilo	0 = 12,130	(Jan-Jun) Bacolod(Reclamation)

Note : Upper figure shows the flow of Iloilo to Bacolod
Lower figure shows the inverse flow

Table 4-5 Cargo Movement of Interisland and Interprovince

Unit : Metric ton

O / D	Total		Rice		Corn	
	P,I. I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba
Panay	1,897	189,268	26	37,557	0	1,705
Iloilo	807	174,222	0	34,922	0	1,705
Iloilo	168	141,396	0	33,239	0	1,212
Negros	147,853	24,286	345	7	3	0
Neg.Oc.	123,639	7,196	202	7	3	0
Bacolod	43,676	1,487	117	7	3	0

O / D	Sugar		Copra		Log & Wood	
	P,I.I.P	N,N.O,Ba	P,I I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba
Panay	502	6,996	45	226	4	512
Iloilo	502	6,746	0	226	0	512
Iloilo	0	977	0	137	0	163
Negros	121,384	22,668	1,009	0	89	24
Neg.Oc.	99,335	583	1,009	0	89	24
Bacolod	21,534	203	569	0	61	0

O / D	Beer & Soft		Pulp & Paper		Iron & Steel	
	P,I.I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba
Panay	46	2,192	0	219	2	779
Iloilo	20	2,192	0	219	0	779
Iloilo	20	2,009	0	189	0	254
Negros	34	1,252	55	0	132	0
Neg.Oc.	12	1,247	55	0	132	0
Bacolod	2	1,247	55	0	108	0

O / D	Fertilizer		Cement		Fruits & Vege.	
	P,I.I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba
Panay	0	80,368	675	1,997	85	2,407
Iloilo	0	68,362	0	1,997	81	2,407
Iloilo	0	53,197	0	570	0	2,265
Negros	93	35	614	1	311	2
Neg.Oc.	93	35	614	1	311	2
Bacolod	93	35	614	1	311	2

O / D	Mineral O.Pro.		Rest	
	P,I.I.P	N,N.O,Ba	P,I.I.P	N,N.O,Ba
Panay	0	19,963	512	34,346
Iloilo	0	19,963	205	34,192
Iloilo	0	19,855	147	27,275
Negros	11,334	0	12,449	296
Neg.Oc.	9,386	0	12,397	296
Bacolod	9,386	0	10,821	1

Note : P=Panay Is., N=Negros Is., I.P=Iloilo Pro., N.O=Negros Oc.
I=Iloilo City Ba=Bacolod City

Upper line shows the movement between islands
Middle line shows the movement between provinces
Lower line shows the movement between cityes

Source : NSO Statistics ,1989

11. The main commodities transported by each mode are as follows;

Ferry	/to	Banago	Fish & F.Preparation
	/to	"	Palay & Rice
	/to	"	Fruits & Vegetables
	mutual		O.G.C (Other General Cargo)
General Cargo Vessel	/to	Banago	Wheat
	/from	"	Sugar
	mutual		O.G.C
	/to	Reclamation	Palay & Rice
	/to	"	Wheat
	/from	"	Sugar
	/to	"	Fertilizer
	mutual		Cement
	mutual		O.G.C
Bulk Vessel	from	Reclamation	Molasses

C. Determining of Socioeconomic Framework

12. Since the growth rate of per capita expenditure are provided for only in terms of region, there is no other way than utilizing the region-wise growth rate for demand forecast. On the other hand, population projection is worked out by Philippine government for each province.

Population

13. Paragraph 67, Chapter 8 of Volume I describes the method of population projection of hinterland which is applied for the demand forecast of long-term Ro/Ro plan. The above method is also applicable for the demand forecast of Iloilo-Bacolod link.

Table 4-6 shows the projected annual growth rate of population in the Region VI which is applied for gaining future traffic demand.

Table 4-6 Average Annual Growth Rates of Population in Region VI

Unit : Percent

Province	Census 1980-1990	Population Projection Low	Medium	High	Assumtion	Population 1990-1995	Projection 1996-1997
Panay							
Aklan	1.60	2.02	2.18	2.26	Low	1.50	1.08
Antique	1.65	2.13	2.29	2.37	Low	1.66	1.27
Capiz	1.73	2.26	2.43	2.51	Low	1.75	1.30
Iloilo	2.10	1.91	2.06	2.13	High	1.94	1.76
Negros							
Neg.Occ	1.58	2.21	2.37	2.44	Low	1.65	1.22

Source: JICA Study Team

The population of the target year 1997 is estimated by the above assumption. The result is shown in Table 4-7.

Table 4-7 Estimated Population of Panay Is. and Negros Is.

	Panay		Negros	
Population	Aklan	418,951	Negros Occ.	2,510,581
at 1997	Antiqu	442,653	Negros Ori.	1,026,074
	Capiz	654,018		
	Iloilo	1,879,740		
	Total	3,395,362	Total	3,536,655

Source: JICA Study Team

14. For passenger forecast, population of Iloilo and Negros Occidental provinces are applied since the both provinces generate more than 90% of passengers (see Table 4-4).

Economic Framework

15. From the future economic frame work of Philippines, the per capita expenditure growth rate in region VI is estimated at 4.5 %.

Agricultural Situation

16. Panay island is one of the main producer of rice, fruits and vegetables. Negros occidental is the main producer of sugar. Since the weather condition affects agricultural production production of the above goods changes year by year. However, at the target year 1997, present agricultural features will remain unchanged. Production and consumption of agricultural goods will be applied the commodity-wise forecast.

Table 4-8 Analysis Method of Commodity-wise Demand Forecast

Item	Detail		Method Remark	Remark
Names of Commodity	Palay & Rice		Surplus/deficit Analysis	
	Fruits & Veg.			
	Sugar		Individual Analysis	Production Analysis
	Fertilizer			Consumption Analysis
	Bottled Cargo		Production Schedule + Annual Growth Rate Analysis	
	Other General Cargo	Corn	Annual Growth Rate Analysis	
		Copra		
		Log & Woods		
		Pulp & Paper		
		Iron & Steel		
		Cement		
		Mineral O.Pro		
		Rest Group		
	Empty Vehicles		Individual Analysis	

Source: JICA Study Team

Macro Demand Forecast

17. Annual growth rate analysis is applied to the macro passenger/cargo traffic. The formula is as follows:

Passenger/cargo volume of year 1997 = Base Year Passenger /Cargo Volume × Assembled Traffic Growth Rate (ST)

$$T = \{ (E \times I/100 + 1) \times (P/100 + 1) - 1 \}$$

Note:

E = 1.5 for passenger ; 1.2 for cargo

I = Growth rate for per capita expenditure in constant price 1972

P = Average population growth rate per annum

In this analysis, the growth rate for per capita expenditure and the annual growth rate of population are adopted using the same figures as the long term demand forecast. The result of the calculation is as follows:

for passenger	1991 - 1995	T = 8.65 %
	1996 - 1997	T = 8.31 %
for cargo	1991 - 1995	T = 6.82 %
	1996 - 1997	T = 6.48 %

18. The result of the calculation for total passenger volume in 1997 is as follows:

Total Passenger = 783,843 × 1.776
= 1,392,000

The number of passenger transported by the Bacolod Express is estimated based on the MARINA data at 1990. The present passenger number is 87,988 person.

The future transported number by Bacolod Express is estimated as follows;

Passenger of bacolod = 87,988 × 1.776 = 156,266
Express at 1997

= 156,000 person

Thus the transported passenger number of Ro/Ro is estimated as follows;

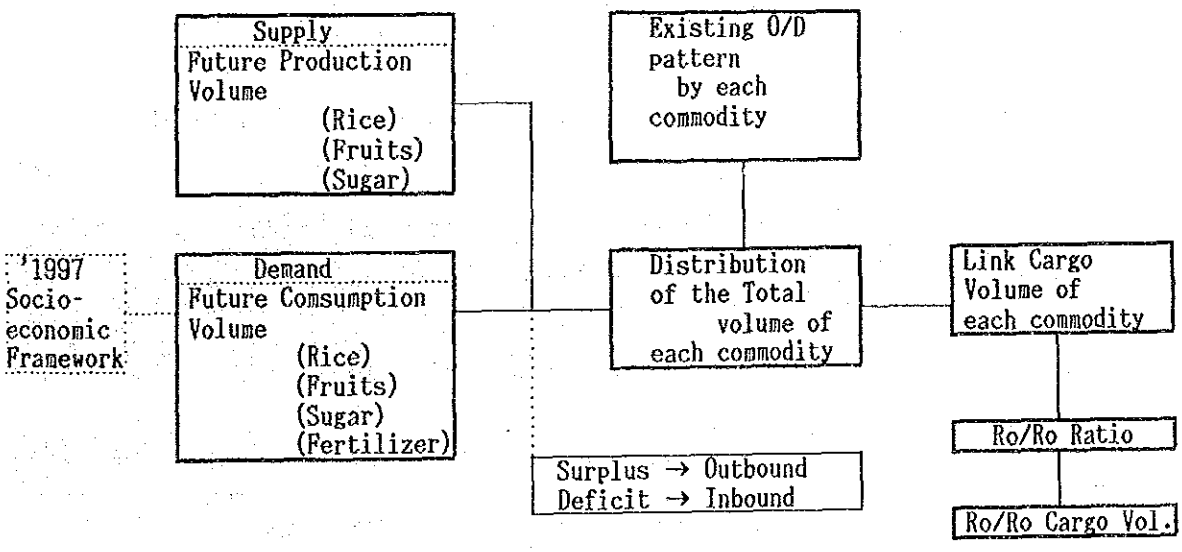
Passenger of Ro/Ro = 1,392,000 - 156,000
at 1997 = 1,236,000 person

19. The total volume of cargo form in 1997 are estimated as follows;

Total Cargo = $126,404 \times (1.0682)^5 \times (1.0648)^2$
= 199,000 M ton

Commodity-wise Demand Forecast

20. Each agricultural commodities' estimation is carried out according to the flowchart of Figure 4-3.



Note: (Fruits) means fruits and vegetables.

Figure 4-3 Flowchart of Surplus/Deficit Analysis
Source: JICA Study Team

1) Palay & Rice

21. Palay & rice is the surplus commodity in Panay island and the deficit commodity in Negros island. Panay is the major producer of rice. From the NSO statistics, this commodity is transferred from the Panay to Negros. The estimation is carried out using the surplus/deficit analysis.

- Production -

22. Table 4-9 show the production statistics of palay & rice. From these statistics, the future production volume of palay & rice is estimated using the time series analysis.

Panay Island : $Y = -2{,}630{,}565 + 1{,}756\ X$

Negros Occ. : $Y = 2{,}803{,}197 - 1{,}290\ X$

where Y ; estimated production

X ; Year (eg. 1997)

Panay Island : Y(1997) = 877,821 M ton

Negros Occ. : Y(1997) = 225,184 M ton

Table 4-9 Production Statistics of Palay & Rice in Region VI

Unit : Metric Ton

Province	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Panay											
Aklan	101,840	105,205	102,925	85,080	89,095	90,200	85,520	76,271	79,229	85,155	76,125
Antique	81,015	96,710	91,255	84,100	93,725	93,225	98,065	97,195	86,927	92,200	85,164
Capiz	265,075	249,545	238,635	162,495	196,480	187,540	202,265	225,841	213,488	191,252	175,336
Iloilo	493,460	498,590	478,730	407,300	461,530	474,500	511,900	534,167	504,763	469,288	352,413
Sub Total	941,390	950,050	911,545	738,975	840,830	845,465	897,750	933,474	884,405	837,895	689,038
Negros											
Negros.O	214,430	205,655	211,180	227,000	224,455	254,345	242,015	244,901	237,540	243,651	197,694
Total	1,155,820	1,155,705	1,122,725	965,975	1,065,285	1,099,810	1,139,765	1,178,375	1,121,945	1,081,546	886,732

Source : Estimated production,area harvested and yield per hectore,by croptype,WESTERN VISAYA

- Consumption -

23. The consumption ratio of palay & rice is 94.07 kg/capita/year from 1985 - 1988. This number is expected to increase in line with the increase of per capita consumption. The expected consumption ratio is shown in Table 4-10 together with other agricultural items.

Table 4-10 Net Food Disposal Ratio in Philippines

Unit: Food/Capita/Year (Kg)

YEAR	Rice	Fruits & Vegetables	Refined Sugar
1985	94.26	44.22	9.40
1986	93.28	45.75	8.80
1987	94.03	49.74	9.90
1988	94.71	40.90	11.60
Ave.	94.07	45.15	9.93
1997	100.65	48.31	10.62

Note: Net Food Disposal at 1997 = Average Value Growth Rate (1.07)

Source: Supply and Utilization Accounts of Selected Agricultural Foods and Animal Food Items, BOAS 1989
Statistical Handbook on Supply and Utilization Accounts of Fruits and Vegetable Products, BOAS 1989

24. The result of the analysis is shown in Table 4-11. The entire deficit is transported from the other province. Table 4-12 shows the distribution pattern of palay & rice transported in Bacolod port. From this pattern, the volume of palay & rice transported from Iloilo to Bacolod is estimated as follows;

Volume = 27,506 t × 0.816 = 22,000 t/year

Table 4-11 Production/Consumption of Palay & Rice

Unit: Commodity: MT, Population: Person

Year	Place	Production	Population	Consumption	Surplus/Deficit
1997	Panay	877,821	3,395,362	303,805	574,016
	Negros Occ	225,184	2,510,581	252,690	-27,506

Source: JICA Study Team

Table 4-12 Distribution Patern of Each Commodity

Sugar

Unit: MT

Ori/Des	Aklan	Antique	Capiz	Iloilo P/C	Guimaras	Cebu	Manila	Others	Total
Negros Oc	-	-	110	99,335	14,479	21,648	1,057,806	61,697	1,245,075

Transported Volume from Bacolod to Iloilo ; 21,534 (A)
Transported Volume from Victorias ; 897,329 (B)
A/B = 2.6%

Source : NSO Statistics ,1989

Palay & Rice

Unit: MT

Ori/Des	Negros Oc.		
Iloilo P	34,922	Iloilo	
Cebe	1,805	City (B)	33,293
Aklan	1,100		
Manila	2,423		
Total	40,250 (A)		B/A = 81.6%

Source : NSO Statistics ,1989

Fertilizer

Unit: MT

Ori/Des	Negros Oc.		
Iloilo P	68,362	Iloilo	
Leyte	39,596	City (B)	53,196
Cebe	4,157		
Others	3,306		
Total	115,421 (A)		B/A = 46.1%

Source : NSO Statistics ,1989

Fruits & Vege.

Unit: MT

Ori/Des	Negros Oc.		
Iloilo P	2,407	Iloilo	
Cebe	92	City (B)	2,264
Manila	2,901		
Total	5,400 (A)		B/A = 41.9%

Source : NSO Statistics ,1989

2) Fruits & Vegetables

25. Future transportation volume of Fruits and Vegetables is estimated in the same way as Palay & Rice shown in Figure 4-3. The future production volume is estimated by the following formula using the time series analysis:

Panay Island : $Y = -6,869,638 + 3,747\ X$
Negros. Occ : $Y = 5,057,706 - 2,433\ X$

where Y ; estimated production
X ; Year (eg. 1997)

Panay Island : Y(1997) = 243,490 MT
Negros. Occ : Y(1997) = 12,927 MT

26. The consumption ratio of this commodity is estimated to be 48.31 kg/cap/year. Although the result of the surplus/deficit analysis shows no deficit in Negros Occidental, as a matter of fact, movement of the commodity between two ports did exist in the past. Thus, the link volume of this commodity is estimated using the annual growth rate analysis.

27. Annual growth rate of this cargo is the same as the total cargo growth rate. The estimated future cargo volume is as follows;

$$\text{Volume} = 6,004 \times (1.067)^5 \times (1.064)^2$$
$$= 9,400 \text{ MT/year}$$

3) Sugar

28. Sugar is the main commodity produced in Negros island but it is exported from Iloilo port. The future link cargo volume is estimated using the production time series analysis.

29. The historical production statistics of sugarcane in Region VI are shown in Table 4-13. The future production volume is estimated by the following formula.

Table 4-13 Production Statics of Sugarcane in Region VI

Unit: 1,000 Metric Ton

Province	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Panay										
Capiz	362	446	453	399	196	152	138	259	465	369
Iloilo	1,033	1,020	865	803	619	445	408	465	645	656
Sub Total	1,395	1,466	1,318	1,202	815	597	546	724	1,110	1,025
Negros										
Negros.O	12,211	13,121	12,878	13,432	8,051	7,328	7,206	9,181	12,180	9,979
Total	13,244	14,141	13,743	14,235	8,670	7,773	7,614	9,646	12,825	10,635

Source : Estimated production,area harvested and yield per hectore,by croptype,WESTERN VISAYA

Panay Island : $Y = -156,323 + 79X$

Negros. Occ : $Y = -1,477,151 + 747X$

where Y ; estimated production

X ; Year (eg. 1997)

Panay Island : Y(1997) = 1,554,000 MT

Negros. Occ : Y(1997) = 16,091,000 MT

30. The production ratio of sugar from sugarcane is 95 kg/t:sugarcane. The production volume in 1997 is estimated as follows ;

Panay Island : $Y(1997) = 1,554,000 \times 0.095$

$= 147,000$ MT

Negros. Occ : $Y(1997) = 16,091,000 \times 0.095$

$= 1,528,000$ MT

31. The future consumption of sugar is 10.62 kg/capita/year. Thus the consumption of sugar is;

Consumption of Sugar in Negros: Occ. = $2,510,581 \times 10.62 = 26,000$ MT

The production volume of sugar in Negros Occ. at 1997 is estimated at 1,501,000 MT.

32. The future link cargo volume is estimated using the existing distribution pattern of sugar (Table 4-12). The result is;

Link Cargo Volume = 1,501,000 × 0.026 = 39,000 MT

4) Fertilizer

33. Fertilizer is consumed for agricultural production in both islands. A large portion of fertilizer is imported at the port of Iloilo (ICPC) by ocean going vessels and is distributed to the other provinces in Region VI. Other portions of fertilizer are directly transported from Samar/Layte to the province directly. The ratio of transported fertilizer from Iloilo to Bacolod is shown in Table 2-11.

34. The consumption volume of fertilizer in both island is estimated using the following formula;

Fertilizer Consumption = Fertilizer Consumption Ratio × Future Production per unit Production volume

The average fertilizer consumption ratio for each commodity is shown in Table 4-14. Thus the fertilizer consumption volume in 1997 is estimated as follows;

Table 4-14 Estimation of Fertilizer Consumption at 1997

Commodity	Production MT	Unit Consumption MT	Consumption MT
Panay			
Palay & Rice	714,160	54.5	38,922
Fruits & Vege.	532,903	18.3	9,752
Sugarcane	1,554,000	10.1	15,695
Total			64,369
Negros Occ.			
Palay & Rice	249,441	51.3	12,796
Fruits & Vege.	180,701	26.3	4,752
Sugarcane	16,091,000	10.3	165,737
Total			183,286

Source: JICA Study Team

35. The transported volume of fertilizer from Iloilo to Bacolod is calculated from the NSO distribution pattern.

Link Cargo Vol. = 183,286 × 0.461 = 84,000 MT

5) Beer & Softdrink

36. Beer & softdrink is transported mainly from Iloilo to Bacolod. This movement is expected to continue in the future. The traffic volume is estimated using the annual growth rate analysis.

37. A new beer factory has begun operation in Bacolod city from January 1991. Since this factory intends to supply the beer to Iloilo province, the link cargo volume is estimated by the annual growth rate analysis plus the production schedule of this factory.

38. The estimated link cargo volume is as follows;

Estimated cargo volume from Annual Growth Rate Analysis

$$\text{Bottled Cargo} = 1{,}444 \times (1.0682)^5 \times (1.0648)^2$$
$$= 2{,}346 \text{ MT}$$

Estimated cargo volume from "Sun Miguel" Production Schedule

New Cargo = Beer Cargo in 1991 × Population Growth Rate(1.206)
(120,000Case/Month = 10,368 MT)
= 12,503 MT

Thus, the total link cargo volume is;

Link Cargo Vol. = 2,346 + 12,503 = 14,849 = 15,000 MT

6) Other Cargoes

39. Other commodities are not expected to play a important role in the movement of cargo volume nor do these have a particular pattern to their movement. The link cargo volume of these commodities is estimated using the annual growth rate analysis.

40. Estimated commodities and their traffic cargo volumes is 1990 are shown in Table 4-15. The annual growth rate of these commodities are the same as the ratio of total cargo. The result of the estimation is shown in Table 4-15.

Table 4-15 Estimated Volume of "Other Cargoes" at 1997

Unit: MT

Commodity	Vol.at 1990	Growth Rate per Year 1990 - '95 (%)	1996 - '97 (%)	Timed Value	Vol.at 1997
Corn	740				1,167
Copra	0				0
Log & Woods	47				74
Pulp & Paper	0	6.82	6.48	1.577	0
Iron & Steel	1,106				1,744
Cement	2,594				4,091
Min.O.pro	697				1,099
Rest Group	48,659				76,735
Total	53,843				84,910

Note : Cargo Movement persentage = Iloilo to Bacolod = 56 % ,
Bacolod to Iloilo = 44 %

Source : JICA Study Team

7) Empty Vehicles

41. Following the case of Batangas - Calapan route, empty vehicles such as buses, trucks and jeepnys are expected to be transported on board Ro/Ro vessels on this link. The future demand forecast of empty vehicles could be estimated using the transportation pattern of the bus service or transportation pattern of the existing Batangas - Calapan link.

42. The existing bus service in Panay island and Negros island is operated by the Ceres Bus Co. Ltd. The monthly bus service in the islands is shown as follows (Figure 4-4):

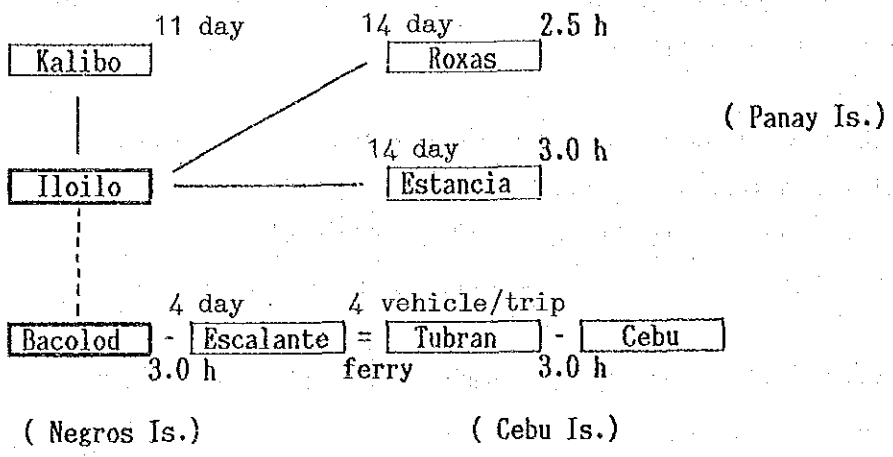


Figure 4-4 Existing Bus Service Route in Panay Is. and Negros Is.
Source: JICA Study Team based on the Interview at Site Survey

Based on an interview with the bus company, there is potential for a new bus service from Iloilo to Cebu using the Iloilo/Bacolod Ro/Ro if such service is commercially viable. From the existing bus service trip of these islands, the number of new bus service on board Ro/Ro vessels is estimated at three(3) for each Ro/Ro trip.

D. Results of Demand Forecast

Total Demand Forecast of the Link

43. Result of demand forecast is shown in Table 4-16.

Table 4-16 Summary of Demand Forecasted

Unit: MT

Year	Total	Commodity	Cargo Volume at 1990	Cargo Volume at 1997	Iloilo-Bacolod	Bacolod-Iloilo
(Cargo)		Palay & Rice	17,000	22,000	22,000	-
		Fruits & Vegetable	6,000	9,000	9,000	-
		Sugar	32,000	39,000	-	39,000
1997	199,000	Fertilizer	65,000	84,000	84,000	-
		Bottled Cargo	1,000	15,000	3,000	12,000
	(Iloilo to Bacolod)	Other Cargo	52,000	84,000	47,000	33,000
		Total	178,000	253,000	165,000	84,000
(Passenger)						
1997	1,236,000	(Iloilo - Bacolod)				

Source: JICA Study Team

Ro/Ro Ratio

44. Based on the above estimation, the transported volume of Ro/Ro vessel is calculated using the Ro/Ro ratio. Ro/Ro ratio is the percentage of the cargo volume transported by Ro/Ro vessel of the total link cargo volume.

(Fruits and Vegetables)

45. Since fruits and vegetables is perishable cargo, these cargoes cannot be stored. For this reason daily service of vessels is required. The forecasted Ro/Ro ratio is considered as 100 %.

(Palay and Rice)

46. Palay and Rice is classified as Ro/Ro suitable cargo. The cargo style is bag. There exist many small shippers or consignees in Iloilo city for this cargo. They will use Ro/Ro service in the future because of expecting the faster loading/unloading service using their own trucks. About half of the link cargo volume may transfer into Ro/Ro (Ro/Ro ratio 50 %).

(Sugar)

47. The existing transport situation of sugar is that the commodity is transported from Bacolod city (Reclamation Area) to Iloilo city (River Port) mainly by barges. The storage facility of sugar exists near the River Port. It is quite probable that the existing transport system will remain for the future. On the other hand, since the occupancy ratio of River Port is very high, it may be expected that Ro/Ro vessels will carry the portion which exceeds the present transport volume. The estimated transport volume of Sugar is as follows;

Transport Volume
of Sugar = 39,000 MT - 32,000 MT = 7,000 MT

(Bottled Cargo)

48. Bottled cargo is also classified as Ro/Ro suitable cargo. It consists of beer and other bottled cargo of this link. Beer is efficiently transported from Bacolod (Reclamation Area) to Iloilo (River port) by barge of San Miguel Co.. Based on interview with San Miguel corporation, the potential for cargo transport to shift Ro/Ro is not expected. By contrast, other bottled cargo is expected to be transported by Ro/Ro. The Ro/Ro ratio of other bottled cargo is assumed to be the same as other general cargo (60%). Thus the transported volume of bottled cargo is as follows;

Transport Volume
of Bottled Cargo = 2,000 × 0.6 = 1,200 = 1,000 MT (Iloilo to Bacolod)

(Other General Cargo)

49. Half of the total amount of Other General Cargo is transported by ferry. This percentage is expected to increase in the future with the beginning of Ro/Ro operation. The shifting ratio to Ro/Ro is considered to run parallel with the logistic curve. The formula and expected Ro/Ro ratio is shown in Figure 4-5. Thus the transported volume of Other General Cargo is as follows;

Transport Volume of Other General Cargo	(Iloilo to Bacolod) = 47,000 × 0.6	= 28,000 MT
	(Bacolod to Iloilo) = 33,000 × 0.6	= 20,000 MT

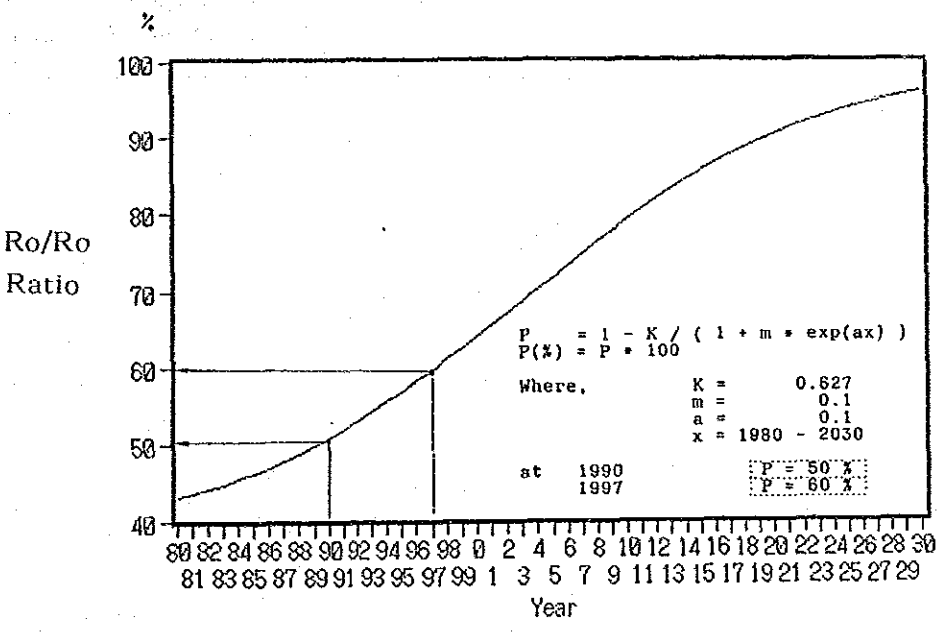


Figure 4-5 Logestic Curve of Ro/Ro Ratio of General Cargo
Source: JICA Study Team

Estimated Ro/Ro Cargo Volume

50. From the above estimation, the expected Ro/Ro cargo volume of the link is shown in Table 4-17.

Table 4-17 Ro/Ro Cargo Volume Transported by the Link

Unit : Metric Ton

Commodity	(Link Cargo Volume) Iloilo-Bacolod	Bacolod-Iloilo	Ro/Ro Ratio (%)	(Ro/Ro Cargo Volume) Iloilo-Bacolod	Bacolod-Iloilo
Palay & Rice	22,000	0	50	11,000	0
Fruits & Vege.	9,000	0	100	9,000	0
Sugar	0	39,000	-	0	7,000
Fertilizer	84,000	0	-	32,000	0
Bottled Cargo	2,000	12,000	(60)	1,000	0
Other General Cargo	47,000	33,000	60	28,000	20,000
Total	164,000	84,000		81,000	27,000
	Total = 248,000			Total = 108,000	
				Total Ro/Ro Ratio = 44 %	

Source: JICA Study Team

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1. Updating of the ferry study under the road feasibility studies 3, DPWH, June 1987

2. Regional handbook on land and other physical resources, 1990

3, Nationwide Roll-on Roll-off transport development stydy: Commodity flow analysis, June 1990

4. Ports feasibility studies and design project, IBRD

5. Feeder ports study, Asian development Bank, October 1989

6. Review of transport projects in the MTPIP, 1987 - 1992, NEDA, DOTC, DPWH, PNR, PPA, Marina, January 1988

Chapter 5 Alternatives of Ro/Ro Terminal Site

A. Ro/Ro Vessel Size of the Link

Optimal Size and Type of Vessel -- a conceptual analysis

1. In order to estimate every possible development and decide on the optimal size and type of vessels and facilities to be adopted, various factors peculiar to the service route, such as length of the route, nature and volume of traffic, conditions of ports, type of required shipping service etc. should be considered.

2. The length of the service route is one of the important factors in determining the appropriate type, size and speed of vessels to be acquired and assigned to the trade. It will have a direct impact on the ship's days at sea and consequently on the duration of voyage, number of voyages in a certain period, carrying capacity during that period and finally the transport cost per unit of cargo. In general, the longer the proportion of sea transit in a voyage time, the economy of scale, in other words, the advantage of larger and faster vessels tends to be greater, while the greater the proportion of the time spent at ports the effects of cargo handling productivity, which largely depend on the shipping technology to be adapted, on the unit cost tends to be more conspicuous.

3. There have been some arguments concerning the relationship between the length of route and the type of vessels, namely Ro/Ro and Lo/Lo types. As a general rule, it may be observed that the Ro/Ro type will have ever increasing advantages over the Lo/Lo type on shorter sea routes like Iloilo-Bacolod because there are remarkable differences in cargo handling productivity on the cargo unit cost between Ro/Ro and Lo/Lo.

4. Investment plans are often drawn up on the optimistic assumption that a certain amount of cargo and number of passengers would be secured and consequently that the resultant unit cost should be smaller than that of the present technology.

Where ship operators are acting individually without coordinated planning, the results undermine the economic viability of the operators. It is,

therefore, advisable to coordinate action among the relevant authorities and operators in introducing a new type of passenger cargo vessel for the route.

5. The major constraint in choosing the suitable size and type of ships is the condition of the port. It is likely that a ship with the type and size that is most suitable for a selected trade route from the viewpoint of the nature and volume of the traffic on the route may not be actually operational in the trade because of inadequate port conditions. Since lives of new vessels are usually expected to exceed twenty years, future upgrading plans of the port of Iloilo and Bacolod should also be taken into consideration in the selection of the type and size of new passenger cargo vessels.

6. In general, Ro/Ro services could be economical on inter-island short sea trades, and the required amount of investment would be relatively small since the terminal facilities are simple.

Furthermore, Ro/Ro ferries can accommodate not only containers but also vehicles, palletized cargoes and passengers, such greater flexibility will provide a cheaper and better service than specialized container ships on short sea routes.

7. Taking into consideration the various factors mentioned above, the vessel considered most suitable to service the route will be a vehicular passenger cargo ferry with two ramp ways both on her bow and stern as mentioned below.

8. To ensure that the vessel is both useful and effective for services on the route, it is most important that she will be able not only to load general cargo and a sufficient numbers of containers, but also to carry various kinds of vehicles such as trucks, buses, jeepnies and private cars etc. as well as many passengers.

The vessel may come alongside the jetty with either her head in or head out, as she has two ramp ways on her bow and stern.

9. On her making fast to the jetty, loading and unloading works of cargo and vehicles can commence immediately because the ramp door is opened easily and quickly. She has also a tween-screw on her stern and bow thrusters on both sides which will make her turn by herself very quickly even in a narrow basin, provided the water depth is sufficient.

10. A considerable wide car deck ensures enough strength for heavy vehicles. Also, an additional its height will allow large and tall vehicles such as buses, laden trucks and container on chassis to be loaded and fastened with prepared lashing materials if necessary. Her bunkering of fuel will be required about every several days in the case of an extended continuous voyage at service speed, as she is designed only for short distance transportation between Iloilo and Bacolod.

11. The number and size of vessels which is suitable for the route will also be decided based on the estimated traffic volume of cargo and passenger in the future.

In terms of the cargo handling method, the pallet system will be recommended to load and unload cargoes in both Iloilo and Bacolod until conditions for the Ro/Ro transportation system by trucks and other vehicles are improved to a satisfactory level.

Assumed Size of Ro/Ro Vessels on Iloilo-Bacolod Link

12. Ro/Ro vessels which are used in the study route will probably be acquired from the overseas second hand market. In terms of newly built vessels, it is possible to estimate the cost to a certain extent, even when the market is fluctuating, while in terms of second hand vessels, it is nearly impossible to ascertain their real prices in Japan because the market for second hand vessels does not exists there actually and their bargained prices between sellers and buyers are not opened and usually never revealed. Nevertheless, in order to make a port plan, it is necessary to determine the size of vessels which will be employed on the service route by using several means.

13. The long-term Ro/Ro development plan (Part I) proposes standard of Ro/Ro vessel size on the study link/route as a basis of port facility planning. The concept appears in the Table II-2, VOL. I as shown below again. According to the distance and cargo volume for Ro/Ro vessel, the Iloilo/Bacolod link is falling in the category of 2,000 grt in the table below. However, the JICA Study Team try to select the vessels of the most likely size by setting three alternatives (Table 5-1).

Proposed Standard on Ro/Ro Vessel Size

(Unit: grt.)

Distance / Cargo Volume (MT)	less than 10 NM	10 - 50 NM	more than 50 NM
More than 100,000		2,000	
20,000 - 100,000	300	1,000	2,000
Less than 20,000		500	

14. Ro/Ro operation in the study link will surely be carried out by one or more private shipping company. Private companies tend to be more keen about the cost in terms of both acquisition and operation than public sector. JICA study team carried out a comparison of annual total cost (capital cost and operation expense) according to 1,000 grt., 1,500 grt. and 2,000 grt., which are probable for the study link.

15. It is to be noted that this comparison was made to determine the size of vessels as to obtain the water depth and other data of the ports in total planning. Consequently, the result does not preclude the possibility that the shipowners plying the route may use other size and type of vessel than the most economical size and type.

16. Taking into consideration the available factors and information, the acquisition costs of second hand vessels of three alternatives are assumed respectively as shown in the Table 5-1. As can be seen in the same table the annual total costs of vessels including annual operation costs which are calculated based on the actual factors from shipping firms are indicated below.

2,000 grt.	32.2 mil. Pesos
1,500	29.5
1,000	26.0