CHAPTER 1 INTRODUCTION

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1.1 Background

El Salvador has three commercial ports: the Acajutla Port, Cutuco Ports and the Punta Gorda Port. The Acajutla Port is the sole international commercial port in the country located in Ahuachapan Province, and it handles solid bulk, liquid bulk and container cargo traffic. This port faces the Pacific Ocean and was structurally constructed as a jetty-type port. Also swells from the Pacific Ocean hamper efficient loading/unloading operations in the port as well. Thus it is not suitable for efficient container cargo handling. Other two Ports are situated in La Unión Province. The Punta Gorda Port mainly serves to fishery activities. About 1 km northwest from Punta Gorda Port, the Cutuco Port is located. The road distance between the Cutuco Port and the Capital City of San Salvador is around 185 km.

Before the civil war, the Cutuco Port had played an important role in export of coffee and raw cotton. The existing single jetty had been built between 1912-1915 with associated loading yards, storage sheds and other facilities. However, due to significant deterioration of its facilities, the Cutuco Port was closed in 1996. All the outdated port facilities are beyond repair to meet modern port requirements. Since that time, the functions of this commercial port were transferred to the Punta Gorda Fishing Port.

Considering the advantageous location and well sheltered conditions of the Gulf of Fonseca, the Government of El Salvador (the GOES) has plotted the port reactivation project in La Unión Province. The GOES has then carried out the Master Plan and Feasibility Study with technical assistance of the Government of Japan (the GOJ) in 1985. The Study concluded that the traffic of container and bulk cargoes of the country would steadily increase and recommended to implement a short-term port development plan. The plan recommended the construction of one (1) Container Berth, one (1) Multi-purpose Berth and one (1) Passenger Berth together with port-related facilities. The Study confirmed the viability of the Project, and the GOES requested further assistance from the GOJ for the detailed design of the Project.

The JICA Study Team was dispatched to prepare the detailed designs for the port reactivation in La Unión Province in 2001 August. The Study was carried out in close cooperation with the COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA), the government agency responsible for the development and management of ports in El Salvador, which has being acted as the counterpart agency on behalf of the GOES and concluded in 2002 October.

1.2 Objectives of the Study

The objectives of the Study are to carry out the necessary engineering services including review of the previous environmental study as well as additional environmental survey in order to complete the detailed design and draft bidding documents for the Project, and to transfer technology to the Salvadorean counterpart personnel in the course of the Study.

The study covers La Unión City, La Unión Province and its vicinity under the influence of the Project.

1.3 Scope of the Study

The detailed design was performed in two fiscal years which consists of following work components.

[First Year (Fiscal Year 2001)]

(1) Preparatory Work in Japan

I-(1)-1 Collection and Analysis of Relevant Data and Information
I-(1)-2 Formulation of Study Plan, Work/Investigation Method, Work Schedule, etc.
I-(1)-3 Preparation of Inception Report

(2) 1st Stage Work in El Salvador

[F/S Review and Basic Design]

I-(2)-1 Submission and Discussion of Inception Report
I-(2)-2 Review on Cargo and Passenger Traffic Forecast
I-(2)-3 Review on Requirements of Major Port Facilities
I-(2)-4 Review on Characteristics of Calling Ships
I-(2)-5 Review on Approach Channel and Basin
I-(2)-6 Review on Cargo and Passenger Handling System
I-(2)-7 Review on Port Layout Including On-land Facilities
I-(2)-8 Study on Operation and Port Management System
I-(2)-9 Preparation of Technical Specifications and Program for Field Investigation
I-(2)-10 Field Investigations
I-(2)-11 Environmental Survey
I-(2)-12 Tidal Current Survey
I-(2)-13 Preparation, Submission and Discussion on Progress Report (1)
I-(2)-14 Ship Simulation and Preparation of Ship Maneuvering Plan
I-(2)-15 Channel Sedimentation Analysis
I-(2)-16 Diffusion Analysis of Suspended Solid during Dredging Works
I-(2)-17 Study on Navigation Facilities
I-(2)-18 Basic Design of Civil Works
I-(2)-19 Basic Design of Land Reclamation and Dredging Works

I-(2)-20 Basic Design of Building Works
I-(2)-21 Basic Design of Utility
I-(2)-22 Basic Design of Cargo Handling Equipment and Tug Boat
I-(2)-23 Preliminary Construction Plan and Schedule
I-(2)-24 Preliminary Project Cost Estimate
I-(2)-25 Preparation of Environmental Study Report
I-(2)-26 Preparation of Basic Design Report
I-(2)-27 Preparation Submission and Discussion on Basic Design Report
I-(2)-28 Preparation of Design Confirmation Plan Report
I-(2)-29 Economic and Financial Evaluation of the Project

[Detail Design and Bidding Documents]
I-(2)-30 Detailed Design of Channel, Basin and Navigation Aids
I-(2)-31 Detailed Design of Civil Works
I-(2)-32 Detailed Design of Building Works
I-(2)-33 Detailed Design of Utility Works
I-(2)-34 Preparation, Submission and Discussion of Progress Report (2)
I-(2)-35 Port Operation and Maintenance Plan

[Work in FY 2002]

(1) 2nd Stage Work in El Salvador
II-(1)-1 Detailed Design of Cargo Handling Equipment and Tug Boat
II-(1)-2 Detailed Construction Plan and Schedule
II-(1)-3 Detailed Project Cost Estimate
II-(1)-4 Preparation of Project Implementation Plan
II-(1)-5 Preparation of Bidding Documents
II-(1)-6 Additional Environmental Study
II-(1)-7 Preparation of Assessment and Recommendations on the Project
II-(1)-8 Preparation of Draft Final Report
II-(1)-9 Submission and Discussion on Draft Final Report

(2) 1st Stage Work in Japan
II-(2)-1 Preparation of Concession Plan
II-(2)-2 Preparation of Final Report

(3) 3th Stage Work in El Salvador
II-(3)-1 Examination of Concession Plan

(4) 2nd Stage Work in Japan
II-(4)-1 Preparation of Draft Port Operation Report

(5) 4th Stage Work in El Salvador
II-(5)-1 Submission and Discussion of Draft Port Operation Report

(6) 3th Stage Work in Japan
II-(6)-1 Preparation of Final Port Operation Report

Figure 1.1 and Figure 1.2 show the schedule and flow chart of the Study respectively.

Work Item \ Year	First Year (FY 2001)									Second Year (FY 2002)									
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
[Preparatory Work in Japan]																					
I-(1)-1 Collection and Analysis of Relevant Data and Information																					
I-(1)-2 Formulation of Study Plan, Work/Investigation Method, Work Schedule, etc.																					
I-(1)-3 Preparation of Inception Report																					
[1st Stage Work in El Salvador]																					
[Basic Design and Detail Design]																					
I-(2)-1 Submission and Discussion of the Inception Repor																					
I-(2)-2-1 Review on Cargo and Passenger Traffic Forecas																					
I-(2)-2-2 Review on Requirements of Major Port Facilities																					
I-(2)-2-3 Review on Characteristics of Calling Ships																					
I-(2)-2-4 Review on Approach Channel and Basi																					
I-(2)-2-5 Review on Cargo and Passenger Handling Systen																					
I-(2)-2-6 Review on Port Layout Including On-land Facilities																					
I-(2)-2-7 Study on Operation and Port Management System																					
I-(2)-3-1 Preparation of Technical Specifications and Program for Field Investigatio																					
I-(2)-3-2 Field Investigations																					
I-(2)-4 Environmental Survey																					
I-(2)-5 Tidal Current Survey																					
I-(2)-6 Preparation, Submission and Discussion on Progress Report (1																					
I-(2)-7-1 Ship Simulation and Preparation of Ship Maneuvering Plai																					
I-(2)-7-2 Channel Sedimentation Analysis																					
I-(2)-7-3 Diffusion Analysis of Suspended Solid during Dredging Works																					
I-(2)-7-4 Study on Navigation Facilities																					
I-(2)-7-5 Basic Design of Civil Works																					
I-(2)-7-6 Basic Design of Land Reclamation and Dredging Works																					
I-(2)-7-7 Basic Design of Building Works																					
I-(2)-7-8 Basic Design of Utility																					
I-(2)-7-9 Basic Design of Cargo Handling Equipment and Tug Boa																					
I-(2)-7-10 Preliminary Construction Plan and Schedule																					
I-(2)-7-11 Preliminary Project Cost Estimate																					
I-(2)-7-12 Preparation of Environmental Study Report																					
I-(2)-8 Preparation of Basic Design Report																					
I-(2)-9 Preparation Submission and Discussion on Basic Design Report																					
I-(2)-10 Preparation of Design Confirmation Plan Repor																					
[1st and 2nd Stage Work in El Salvador]																					
[Detail Design and Bidding Documents]																					
I-(2)-11-1 Economic and Financial Evaluation of the Project																					
I-(2)-11-2 Detailed Design of Channel, Basin and Navigation Aid:																					
I-(2)-11-3 Detailed Design of Civil Works																					
I-(2)-11-4 Detailed Design of Building Works																					
I-(2)-11-5 Detailed Design of Utility Works																					
I-(2)-12-1 Preparation, Submission and Discussion of Progress Report (2																					
I-(2)-12-2 Port Operation and Maintenance Plan																					
II-(1)-1-1 Detailed Design of Cargo Handling Equipment and Tug Boat																					
II-(1)-1-2 Detailed Construction Plan and Schedule																					
II-(1)-1-3 Detailed Project Cost Estimate																					
II-(1)-1-4 Preparation of Project Implementation Plan																					
II-(1)-1-5 Preparation of Bidding Documents																					
II-(1)-2 Additional Environmental Study																					
II-(1)-3 Preparation of Assessment and Recommendations on the Projec																					
II-(1)-4 Preparation of Draft Final Report																					
II-(1)-5 Submission and Discussion on Draft Final Report																					
[1st Stage Work in Japan]																					
II-(2)-1-1 Preparation of Concession Plan																					
[2nd Stage Work in Japan]																					
II-(2)-1-2 Preparation of Final Report																					
[3rd Stage Work in El Salvador]																					
II-(3)-1 Examination of Concession Plan																					
[3rd Stage Work in Japan]																					
II-(4)-1 Preparation of Draft Port Operation Report																					
[4th Stage Work in El Salvador]																					
II-(5)-1 Submission and Discussion on Draft Port Operation Repor																					
[4th Stage Work in Japan]																					
II-(6)-1 Preparation of Final Port Operation Report																					

Figure 1.1 Work Schedule

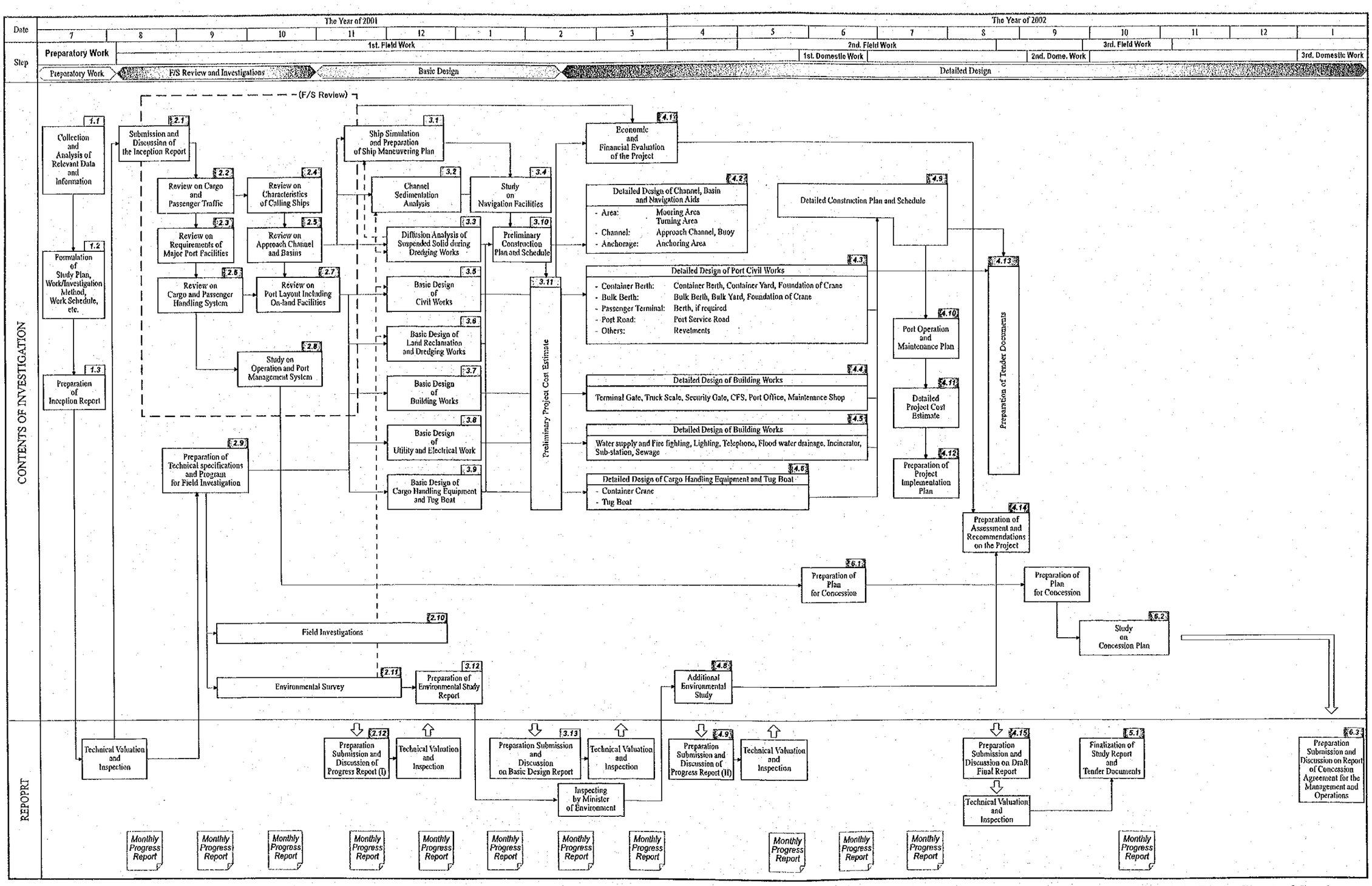

Figure 1.2 Flow Chart of Study

As a result of the Study, following reports and documents were prepared.

1. Final Report – Summary, English
2. Final Report – Summary, Spanish
3. Final Report – Summary, Japanese
4. Final Report – Main Report
5. Final Report – Appendices
6. Final Report – Environmental Management and Monitoring Plan
7. Prequalification Documents
8. Prequalification Evaluation Criteria
9. Design Calculation Report – Building, Utility and Miscellaneous Works
10. Quantity Calculation Report – Civil Works
11. Quantity Calculation Report – Building, Utility and Miscellaneous Works
12. Priced Bills of Quantities

(Bidding Documents for Package A : Civil and Building Works)

13. Bidding Documents Volume I – A : Instructions to Bidders, Bid Form, Contract Forms, Conditions of Contract
14. Bidding Documents Volume II –A : Bills of Quantities
15. Bidding Documents Volume III –A : Specifications
16. Bidding Documents Volume IV –A : Drawings

(Bidding Documents for Package B : Procurement of Cargo Handling Equipment)

17. Bidding Documents Volume I – B : Instructions to Bidders, Bid Form, Contract Forms, Conditions of Contract
18. Bidding Documents Volume II –B : Bills of Quantities and Specifications

(Bidding Documents for Package C : Procurement of Floating Equipment)

19. Bidding Documents Volume I – C : Instructions to Bidders, Bid Form, Contract Forms, Conditions of Contract
20. Bidding Documents Volume II –C : Bills of Quantities and Specifications
21. Design Calculation Report – Civil Works

1.4 Organization of the Study

The study organization for the Detailed Design on Port Reactivation Project in La Unión Province is shown in Figure 1.2 below. The Comisión Ejecutiva Portuaria Autónoma (CEPA) acted as a counterpart agency for the Project on behalf of the GOES and as a coordinating body with other organizations concerned. Under the control of CEPA, a steering committee and technical committee were established.

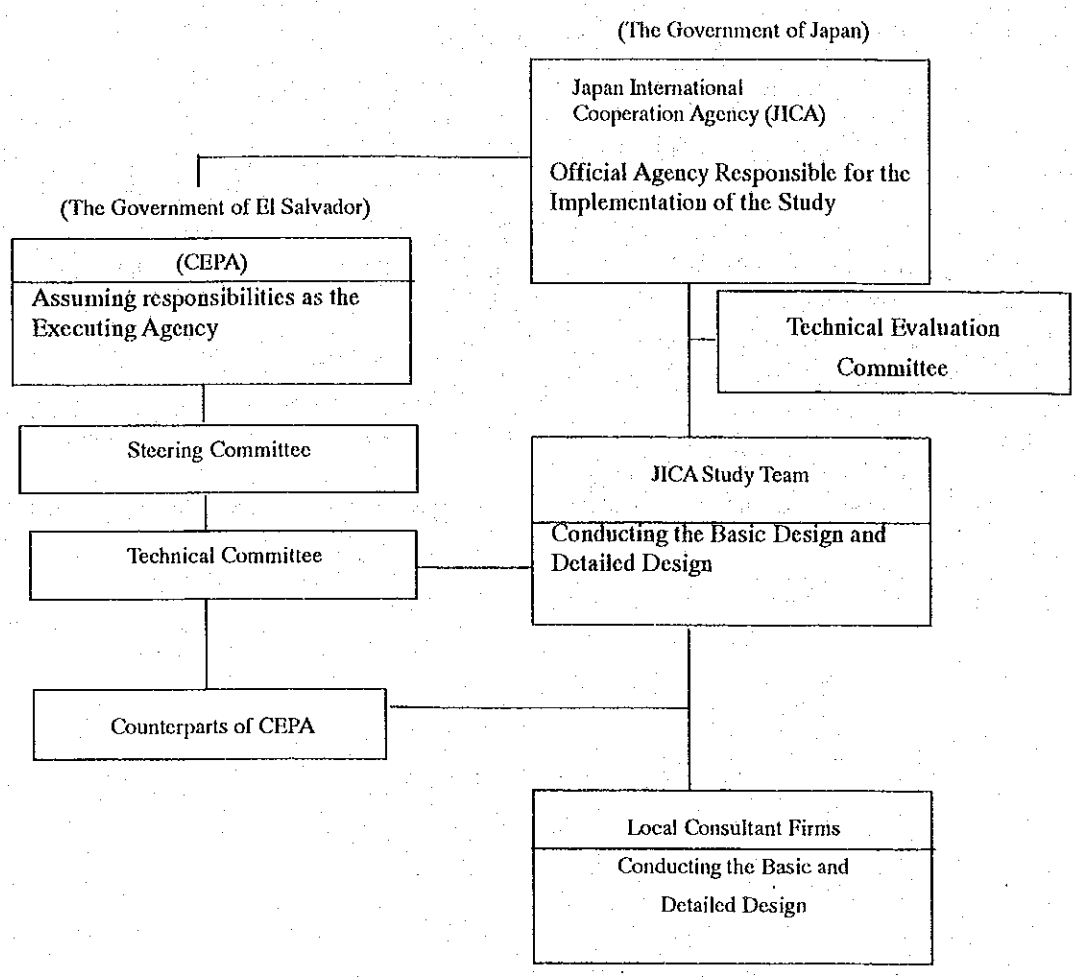

Figure 1.3 Study Organization

CHAPTER 2 EXISTING CONDITIONS

CHAPTER 2 EXISTING CONDITIONS

2.1 Socio-economic Condition of Project Area

2.1.1 Administrative Division of the Country

El Salvador is located in the center of the Central American Region with an area of 21,041 square kilometers stretching between 13.09° and 14.27° North Latitudes and 87.41° and 90.08° West Longitudes. It is the smallest country in the region.

El Salvador is divided into 14 provinces and 262 municipalities (see Figure 2.1.1). El Salvador is neighboring on Honduras to the North, Guatemala to the West, Nicaragua to the East, and faces the Pacific Ocean to the South.

Figure 2.1.1 Provinces of El Salvador

2.1.2 Administrative Division of La Unión Province

La Unión province, located in the eastern part of the country, is divided into 18 municipalities grouped into two districts: Santa Rosa de Lima in the mountain area, and La Unión in the Gulf area.

The Figure 2.1.2 and Table 2.1.1 shows these divisions:

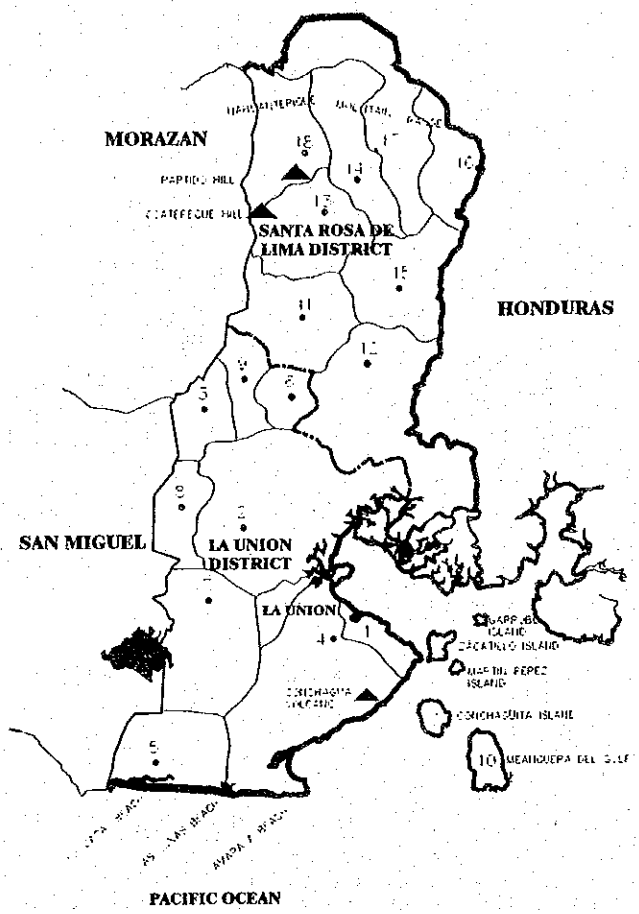

Figure 2.1.2 Administrative Division of La Unión

Table 2.1.1 Detailed Administrative Division of La Unión

District	Municipality
La Unión	1- La Unión
	2- San Alejo
	3- Yucuaquin
	4- Conchagua
	5- Intipucá
	6- San José
	7- El Carmen
	8- Yayantique
	9- Bolivar
	10- Meanguera del Golfo
Santa Rosa de Lima	11- Santa Rosa de Lima
	12- Pasaquina
	13- Anamoros
	14- Nueva Esparta
	15- El Sauce
	16- Concepción de Oriente
	17- Poloros
	18- Lislique

2.1.3 Gross Domestic Product

In the period of 1996-2000, the Salvadorean economy showed steady growth with an average annual rate of 3.5% in total Gross Domestic Product (GDP) as shown in Table 2.1.2. As to GDPs by sector, the Industrial Sector indicated the largest growth with 5.0% per annum in the same period, followed by Services (3.3%) and Agriculture (1.7%). Among the industrial sectors, the Manufacturing Sector saw the highest growth with 5.2% in the same period. By the year 2000, El Salvador showed a slowdown in economic activities with a growth rate of 2.0% to the preceding year of 1999. Despite the economic slowdown as a whole, the Manufacturing Sector showed a comparatively high growth rate of 4.5% to the preceding year.

Table 2.1.2 Historical Trend of Sectorial Gross Domestic Products (GDP) in 1991-2000

	Sector	Billion of US$ at 1995 constant price (growth rate (%) to the preceding year)										Average growth rate	
		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1991-2000	1995-2000
Gross Domestic Product	Agriculture	1.12	1.21	1.18	1.15	1.20	1.22	1.22	1.20	1.28	1.27	1.3%	1.7%
		-	8.1%	-2.6%	-2.3%	4.5%	1.2%	0.4%	-1.8%	6.5%	-0.8%	-	-
	Industry	1.97	2.15	2.14	2.31	2.46	2.52	2.71	2.89	2.99	3.09	5.3%	5.0%
		-	9.2%	-0.5%	8.0%	6.7%	2.2%	7.6%	6.7%	3.4%	3.5%	-	-
	(Manufacturing)	(1.54)	(1.70)	(1.67)	(1.79)	(1.92)	(1.95)	(2.11)	(2.25)	(2.33)	(2.44)	(5.5%)	(5.2%)
		(-)	(9.9%)	(-1.5%)	(7.4%)	(6.9%)	(1.7%)	(8.0%)	(6.6%)	(3.7%)	(4.5%)	(-)	(-)
	Services	3.81	4.06	4.65	4.99	5.33	5.41	5.60	5.78	5.94	6.05	5.1%	3.3%
		-	6.5%	14.5%	7.3%	6.7%	1.6%	3.6%	3.1%	2.8%	1.8%	-	-
	Total	6.90	7.42	7.97	8.45	8.99	9.14	9.53	9.87	10.20	10.41	4.6%	3.5%
		-	7.6%	7.4%	6.1%	6.4%	1.7%	4.3%	3.5%	3.4%	2.0%	-	-

Source: BCR (Banco Central de Reserva de El Salvador-Central Bank of Reserve of El Salvador). WB (World Bank)
Note: The Manufacturing Sector is shown separated from Industry Sector.

2.1.4 Population

According to the Monograph of La Unión Province published by the National Geographic Institute and the National Registry Center (CNR), the total population based on the 1992 census was 255,565. But it was expected that the population would increase a total of 13%, or to 289,021, by July 2000. The population density in the year 2000 will grow to 139 persons/km2. According to data of the Ministry of Public Health and Social Assistance (MSPAS), the annual population growth rate in 1998 was 2.18%, which is similar to the country's growth rate in 1992 which was 2.1%.

The cities in La Unión Province with higher number of residents and higher population density are La Unión and Santa Rosa de Lima.

2.1.5 Geography

La Unión province is located in the eastern zone of El Salvador and shares the border to the North and East with Honduras and faces the Pacific Ocean to the South and the Fonseca Gulf on the Southeast which is also shared by Honduras and Nicaragua.

This province has several volcanic islands and the major islands are Meanguera, Conchagüita, Meanguerita and Pirigallo islands, which form the municipality of "Meanguera del Golfo".

The natural vegetation in La Unión has drastically changed through the years. Eighty percent of the territory lacks permanent vegetation coverage. The tropical forest in the northern area was cleared up for the purpose of expanding lands suitable for agriculture and cattle raising. The high mountainous area of Conchagua became coffee plantations, while the few agricultural spots in the low areas became planted with basic grains. Maguey is planted in some forest areas on the coast where rocky and dry areas are predominant.

The main roads that cross the province are the Pan-American Highway (CA-1) and Littoral Highway (CA-2).

2.1.6 National Parks and Protected Areas

According to the Natural Protected Areas System (SANP) of the Ministry of Environment and Natural Resources (MARN), no legally defined national parks exist in La Unión Province

In La Unión Province there are two highly protected areas, these are Martín Pérez Island at the Fonseca Gulf, and the other one is a strip of land along the coastal line to the Southeast of the province, between El María and La Criba mountains, close to the Conchagua volcano.

The southern part of the province is included in the Salvadorean Biological Corridor, part of the SANP and also of the Mesoamerican Biological Corridor. MARN is considering to include the northern part of La Unión in the above-mentioned corridor in the future.

2.1.7 Industry of La Unión

Agriculture is the main economic activity of La Unión, followed by commerce, manufacturing, cattle raising, fishing and salt production. The major products are maize and beans followed by sesame, henequen, rice, sugar cane, vegetables and watermelon in a small scale. In the past, cotton was the most profitable crop of La Unión, but now it is planted on a small scale.

An important economic activity in La Unión is salt production. The national production of salt is concentrated in Usulután and La Unión, Usulután provides approximately 65% and La Unión 35% of the total. There are 850 hectares allocated for salt production mainly in the areas of El Tamarindo and La Unión Gulf, representing 27.4% of national total cultivated area (1.116.4 ha). Most of the salt is produced in La Unión by rough solar methods of great performance, but it is destined only for industrial use due to its low quality.

There are some domestic industries, such as canned seafood factories, daily commodities farming, fishery, palm tree hats and mats, brooms, clay bricks and tiles, pottery, etc. The commodities are consumed mainly in Santa Rosa de Lima, La Unión, as well as exported mainly to Honduras and Nicaragua.

La Unión province enjoys the natural condition of the Fonseca Gulf with an area of approximately 405 km2. Besides, there are several beaches located in the continental shelf in the South.

Marine artesanal fishery accounts for the main income source for the six municipalities on the coastal area of the province (La Unión, Meanguera, Pasaquina, San Alejo, Conchagua, and Intipucá). In 1992, the artesanal fishery attained by the ten fishing villages of La Unión accounted for 20% of the gross domestic product, or equivalent to 43% of the national artesanal fishery.

The industrial fishing fleet operating in La Unión is estimated at around 30 to 35 boats. They belong to big fishing enterprises.

2.2 Natural Conditions

2.2.1 Meteorological Conditions

(1) General Climatic Conditions at the Site

According to the climatic classification of the Holdridge system, La Unión Province belongs to the tropical rain forest and subtropical forest zones in the South of the northern mountainous area which belongs to the subtropical forest zones.

Also according to the zone classification of Koppen, Sapper and Lauer, the La Unión Port area belongs to the hot tropical savanna and its land elevation is between 0 and 8 meters above sea level.

The rainy season in the entire country is from May to October and the dry season is from November to April.

(2) Temperature and Rainfall

Historical temperature and rainfall data of La Unión were collected up to the year 2000, while wind data up to the year 1986. Until the year 2000, the weather station of La

Unión had been located on a small hill in the suburbs of La Unión city at the following coordinates.

North Latitude	13°20´
West Longitude	87°53´
Altitude	95.0m

A new weather station was set up in August 2001, in the premises of the Cutuco Port, in front of the existing Administration building. This new station automatically records temperature, rainfall and wind data. During the period between the decommissioning of the old station and the setting up of the new one, no data on rainfall and temperature were collected.

1) Temperature

El Salvador has a narrow range of temperature changes with a reported annual mean temperature between 24°C and 28°C. The monthly maximum, mean and minimum temperatures of the last 5 years, from 1996 to 2000 are shown in Table 2.2.1.

According to this table, the average temperature in the last five years at La Unión City ranged from 27°C to 30°C. The highest maximum temperature of 37.2°C recorded in April 2000 and the lowest minimum temperature of 18.1°C in January 1997.

Table 2.2.1 Max. Mean and Min. Temperature in La Unión City (1996-2000) **(Unit °C)**

Temperature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	35.5	35.6	36.7	37.2	36.8	35.1	34.7	35.8	33.7	33.2	34.2	34.6
Mean	27.7	28.5	29.5	30.5	29.5	27.6	28.1	28.1	27.0	27.0	27.2	27.4
Minimum	18.1	18.9	18.7	21.9	23.2	22.8	22.3	21.2	20.7	20.5	19.9	18.3

2) Rainfall

During the rainy season, the atmospheric climate brings tropical showers, thunders, and rarely gusts of wind.

According to the rainfall pattern, the rainy season normally lasts from May to October and the dry season from November to April.

The total annual rainfall in La Unión in the last 5 years has varied from 1,300 to 2,100 mm as shown in Table 2.2.2. The annual average of the last 5 years is 1,780 mm and the total rainfall in the rainy season from May to October accounts for about 94 % of total annual rainfall. In the year 1997, i.e. one year before the Mitch hurricane, the annual rainfall dropped significantly.

Table 2.2.2 Monthly Average Rainfall in La Unión (1996-2000)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0	10	1	32	586	209	324	184	297	202	20	0	1,865
1997	2	3	0	19	72	474	146	47	316	133	58	2	1,272
1998	0	0	17	1	164	284	363	304	200	482	308	0	2,123
1999	0	0	2	0	188	365	223	155	649	259	13	5	1,859
2000	0	0	0	8	304	203	165	180	779	118	25	1	1,783
Ave.	0	3	4	12	363	307	244	174	448	239	85	2	1,780

Table 2.2.3 shows the number of rainy days for the last 5 years by month. The highest average occurrence of rain is in September with 23 days.

Table 2.2.3 Number of Rainy Days in La Unión (1996-2000)

(Unit: day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	1	2	1	7	20	17	21	16	26	16	8	0	135
1997	1	1	0	3	6	20	9	9	21	12	8	2	92
1998	0	0	3	2	7	16	19	23	17	26	11	2	126
1999	0	0	1	1	11	23	17	18	27	21	5	1	125
2000	0	0	0	2	15	17	15	17	26	12	5	1	110
Ave.	0	1	1	3	12	19	16	17	23	17	7	1	117

Source: Ministry of Agriculture and Cattle

(3) Wind

The monthly average wind velocity and dominant wind direction in La Unión City from 1970 to 1985 are shown in Table 2.2.4. According to this information, the average wind velocity is about 3 m/sec from January to April and 2 m/sec from May to December. As to the predominant wind direction, NE prevails from November to February and SW from March to October.

Wind records are not available after 1986 due to the breakdown of the recording instrument during the civil war.

The ocular wind observation data by Beaufort Scale in La Unión are available from 1996 to 2000 as shown in Table 2.2.5 with converted average wind velocity in parentheses.

It shows the wind velocity observed during the period was 1.3 – 2.6 m/sec, which was in the same range as that observed by instrument between 1970 and 1985.

(4) Seaward Visibility and Mists

According to the pilots of the Cutuco Port, no fog or mist has been observed in the La Unión area.

Table 2.2.4 Monthly Average Wind Velocity and Dominant Wind Directio (1970-1985)

(Unit: m/sec)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave.
1970										2.0	2.6	3.3	2.6
										SW	NE	E	-
1971	3.3	3.3	3.6	4.2	2.8	2.1	1.8	2.1	2.2	2.0	2.0	2.6	2.6
	E	SW	E	SW	SW	SW	E	SW	SW	SW	SW	E	SW
1972	3.0	3.7	3.3	3.2	2.3	2.5	2.8	2.4	2.0	1.9	1.9	2.7	2.6
	E	SW	SW	SW	SW	SW	E	E	E	SW	S	E	SW
1973	3.7	3.8	3.3	3.3	2.6	2.2	2.2	2.1	2.0	1.7	2.0	2.8	2.5
	E	E	S	S	S	SW	E	S	S	E	E	E	E-S
1974	3.2	4.0	3.2	3.6	2.9	2.0	2.2	2.5	2.0	2.0	2.2	3.0	2.7
	E	E	S	E	S	S	NE	E	S	NE	NE	E	E
1975	3.5	3.3	3.2	3.5	2.7	2.1	2.2	1.9	1.8	1.7	1.8	2.6	2.4
	E	S	S	S	S	S	S	S	S	SW	NE	NE	S
1976	3.8	4.2	3.5	2.8	2.5	1.8	2.6	2.3	2.0	1.9	2.9	2.8	2.7
	NE	NE	E	S	SW	SW	NE	NE	S	S	NE	NE	NE
1977	3.4	3.4	3.4	3.3	2.4	2.0	2.8	2.2	2.1	1.9	2.2	2.3	2.6
	NE	NE	S	NE	S	NE	E	SE	SE	SE	NE	NE	NE
1978	3.3	3.5	3.3	2.7	2.5	1.9	1.8	1.9	1.8	1.6	1.9	2.7	2.3
	NE	NE	NE	S	SW	NE	NE	SW	SW	SW	SW	NE	NE
1979	3.1	3.6	3.4	2.9	2.2	1.8	1.5	1.5	1.6	1.7	2.0	2.4	2.2
	NE	NE	SW	SW	SW	SW	SW	SW	SW	SW	NE	NE	SW
1980	2.6	3.1	3.1	3.1	2.3	1.8	1.8	1.7		1.6	1.8	2.7	2.3
	-	-	E	SW	SW	SW	SW	SW	SW	SW	NE	NE	SW-NE
1981	2.7	3.3	2.7	3.2	2.1		1.6	1.8	1.6	1.6	1.9	2.1	2.2
	NE	NE	SW	E	S	SW	SW	SW	S	SW	NE	NE	SW
1982	2.3	2.5	2.8	2.5	2.0	1.5	1.9	2.1	1.8	1.7	2.0	2.4	2.1
	E	E	E	SW	SW	SW	E	E	SW	SW	E	E	E
1983	2.8	2.4	2.7	2.4	2.5	1.8	1.9	1.6	1.5				2.1
	NE	SW	SW	SW	SW	SW	E	E	SW	-	-	-	SW
1984	2.4	2.6	2.4	2.6	2.0	1.5	1.5	1.4	1.3	1.3	1.6		1.8
	NE-E	NE	SW	SW	SW	SW	E	SW	SW	SW	NE	NE	SW
1985			2.8	2.2	1.7	1.6	1.4	1.3	1.2	1.1			1.6
	E	E	E	SW	SW	SW	NE	SW	SW	SW	SW	NE	SW
Ave.	3.0	3.3	3.1	3.0	2.3	1.9	2.0	1.9	1.8	1.7	2.0	2.6	

Note: Monthly average of instantaneous wind velocity of daily records at 7:00, 14:00 and 4:00

Table 2.2.5 Wind Beaufort Scale from 1996 to 2000

m/scc. in ( )

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1996	1.7 (2.0)	1.6 (1.8)	1.4 (1.6)	1.1 (1.1)	1.2 (1.2)	1.0 (0.9)	1.0 (0.9)	1.1 (1.1)	1.0 (0.9)	1.1 (1.1)	1.4 (1.6)	1.5 (1.7)	1.2 (1.3)
1997	1.6 (1.8)	1.8 (2.1)	1.6 (1.8)	1.5 (1.7)	1.3 (1.8)	1.0 (0.9)	1.2 (1.2)	1.2 (1.2)	0.9 (0.8)	0.9 (0.8)	1.1 (1.1)	1.6 (1.8)	1.3 (1.4)
1998	1.5 (1.7)	1.6 (1.8)	2.3 (3.0)	1.9 (2.0)	2.0 (2.5)	1.4 (1.6)	1.3 (1.4)	1.2 (1.2)	1.3 (1.4)	1.5 (1.7)	1.5 (1.7)	2.0 (2.5)	1.6 (1.9)
1999	2.2 (2.8)	2.0 (2.5)	1.9 (2.3)	2.2 (2.8)	1.9 (2.3)	1.7 (2.0)	1.7 (2.0)	1.9 (2.3)	1.8 (2.1)	1.9 (2.3)	2.1 (2.7)	2.1 (2.7)	1.9 (2.4)
2000	1.9 (2.3)	2.3 (2.8)	2.1 (2.7)	2.3 (3.0)	2.0 (2.5)	2.0 (2.5)	1.7 (2.0)	2.2 (2.8)	2.1 (2.7)	2.1 (2.7)	1.6 (1.8)	2.4 (3.2)	2.0 (2.6)
2001	2.5 (3.4)	2.5 (3.4)	2.2 (2.8)	2.0 (2.5)	2.1 (2.7)	1.9 (2.3)	NA	NA	NA	NA	NA	NA	

Note: Figures in ( ) is velocity in m/sec converted from Beaufort Scale.

2.2.2 Oceanographic Conditions

(1) Tidal Pattern

A one-month tide measurement was carried out by the JICA Study Team in September-October 2001 with an automatic tide recorder installed at the Cutuco Port. The tidal patter in the Cutuco area is semi-diurnal having two occurrences of high waters a day and the tidal range in spring tides is about 3 meters. The following tide levels are computed based on the analysis of tidal harmonic constants.

High Water Level of Ordinary Spring Tide (HWOST)	CD +3.37 m
Low Water Level of Ordinary Spring Tide (LWOST)	CD -0.13 m
Chart Datum Level (CDL)	CD ±0.000 m

(2) Tidal Current

A current measurement survey was carried out for this Study in September 2001 to observe current speeds and directions. A maximum current speed of 1.79 m/sec was observed in the proposed inner channel area, while the current speeds in the proposed outer channel ranged from 0.8 to 1.60 m/sec. In the proposed offshore dumping site, the current did not exceed 0.7 m/sec.

(3) Wave

An offshore wave climate is acquired from the UK Meteorological Office (UKMO) global wave model covering the period January 1994 to January 2002. Wave climate tables for the wave prediction point at 12° N 88° W were obtained, which is in deep water offshore from the Gulf of Fonseca. Table 2.2.6 presents the offshore wave climate in terms of significant wave height against direction at this point.

The most common sector from which waves originate is from the south-westerly (165°-255°N) to which the gulf is exposed. There is another, smaller peak in the wave direction distribution from the 45°-75°N sector, but as these are heading offshore from

the gulf they will not contribute to inshore waves. All waves on the climate table are less than 4 m, but there is a very wide range of wave periods.

Table 2.2.6 Annual Mean Offshore Wave Climate
(Significant wave height against direction)

Wave Height		Direction (Degree from N)										
Hs	From	-15	15	45	75	105	135	165	195	225	255	285
(m)	To	15	45	75	105	135	165	195	225	255	285	315
0.00 -	0.50	0.00	0.01	0.00	0.01	0.01	0.01	0.03	0.03	0.00	0.01	0.00
0.50 -	1.00	0.29	0.72	0.39	0.03	0.03	2.61	6.46	4.07	1.56	0.98	0.00
1.00 -	1.50	1.74	4.28	2.39	0.49	0.20	15.28	20.51	7.94	2.10	1.37	0.02
1.50 -	2.00	1.32	2.35	1.21	0.23	0.09	6.80	6.98	2.30	0.49	0.23	0.05
2.00 -	2.50	0.55	0.34	0.09	0.02	0.00	0.67	1.40	0.47	0.08	0.03	0.00
2.50 -	3.00	0.06	0.08	0.01	0.00	0.00	0.05	0.16	0.03	0.01	0.00	0.00
3.00 -	3.50	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00
3.50 -	4.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3.97	7.78	4.09	0.79	0.34	25.42	35.55	14.84	4.24	2.62	0.07

Note : Figures are percentages of the total number of observations in the data selection.
Source : UK Meteorological Office Global Wave Model

In order to estimate the nearshore wave height, Point 1 and Point 2, the refraction and shoaling of waves as the travel inshore to the coast is modeled using TELURAY wave refraction model. Two points were chosen within the proposed channel (see Figure 2.2.1). TELURAY model is used to transform the offshore wave conditions to these nearshore points accounting for refraction and shoaling effects. It predicts wave activity at neashore sites by representing the effects of refraction and shoaling on all components of a given offshore spectrum.

Tables 2.2.7 and 2.2.8 show the wave climates for the nearshore points in the area of the proposed channel. It is noted that these are unbroken waves although as the waves are small, they area unlikely to have broken before reaching any of these point.

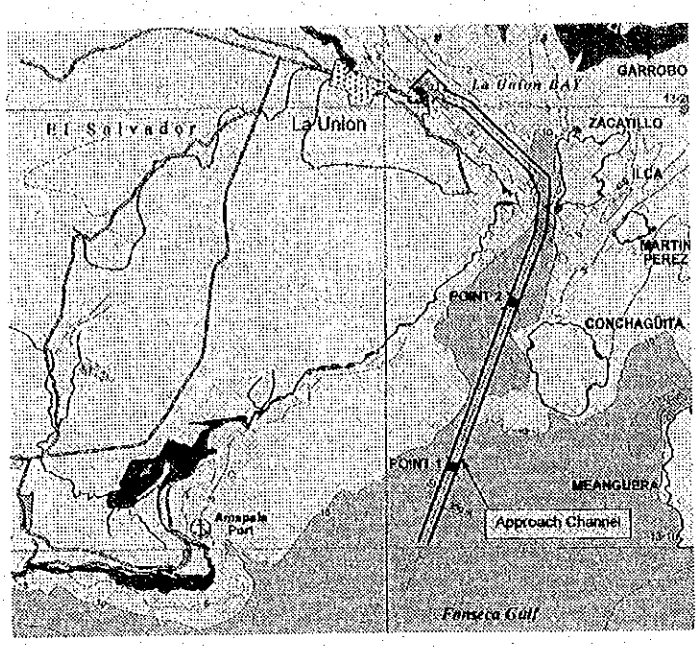

Figure 2.2.1 Location of Wave Climate Predicted

Table 2.2.7 Annual Mean Wave Climate at Point 1

Wave Height		Direction (Degree from N)									
Hs	From	150	160	170	180	190	200	210	220	230	240
(m)	To	160	170	180	190	200	210	220	230	240	250
0.00 -	0.50	6.86	4.32	0.53	0.04	0.04	2.28	3.63	1.77	0.09	0.01
0.50 -	1.00	0.00	0.00	0.25	2.74	6.59	9.42	1.39	0.14	0.00	0.00
1.00 -	1.50	0.00	0.00	0.01	15.96	21.65	2.17	0.15	0.00	0.00	0.00
1.50 -	2.00	0.00	0.00	0.00	6.11	6.52	0.32	0.00	0.00	0.00	0.00
2.00 -	2.50	0.00	0.00	0.00	0.68	1.17	0.03	0.00	0.00	0.00	0.00
2.50 -	3.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00
3.00 -	3.50	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Total		6.86	4.32	0.79	25.54	36.14	14.22	5.17	1.91	0.09	0.01

Note : Figures are percentages of the total number of observations in the data selection

Table 2.2.8 Annual Mean Wave Climate at Point 2

Wave Height				Direction (Degree from N)			
Hs	From	170	180	190	200	210	220
(m)	To	180	190	200	210	220	230
0.00 -	0.50	7.30	2.09	10.03	4.35	3.10	0.10
0.50 -	1.00	0.25	16.10	29.73	1.29	0.09	0.00
1.00 -	1.50	0.01	7.11	8.68	0.09	0.00	0.00
1.50 -	2.00	0.00	0.39	0.16	0.00	0.00	0.00
2.00 -	2.50	0.00	0.00	0.01	0.00	0.00	0.00
Total	7.56	25.69		48.61	5.73	3.19	0.10

Note : Figures are percentage of the total number of observations in the data selection

2.2.3 Geological and Geotechnical Conditions

The territory of El Salvador is situated at the intersection of the tectonic plates of the Circum-Pacific Belt and characterized by four structural alignments. The east-west trend, presumably the oldest alignment, is repeatedly reactivated until recent time with a subordinate north-south alignment. The north-west trend, accompanied by the north-east alignment, is associated with horizontal movements. Especially the east-west trend contributes to the occurrence and distribution of the volcanoes.

Because of its structural features, the topography of El Salvador can be classified into four units: (1) the coastal plain, (2) the coastal block mountains; (3) the main volcanic chain of Pleistocene and recent cones lying within the median trough, the interior valley; and (4) the northern mountains. The coastal plain, composed of the alluvial volcanic sediments, is the flat coastal belt along the Pacific coast with a maximum elevation of about 50 m above sea level. The coastal block mountains include the Balsam and Jucuarán ranges that are separated and delimited by east-west trend faults. The main volcanic chain is a line of volcanoes, including the Santa Ana, San Salvador, San Vicente, Tecapán, Usulután, San Miguel, and Conchagua volcanoes.

The project site is represented by a general terrain with a comparatively sharp slope from the Conchagua Volcano (1.243 m above sea level) and declining toward the Fonseca Bay. In the south of the project site, a small hill with a top height of about 50 m exists.

In order to grasp the subsoil condition of the site, total of 41 borings were drilled an field/laboratory tests were performed.

Figure 2.2.2 shows general subsoil profile covering the area between the hill and the proposed port site. Below the hill a massive rock layer of ANDESITE is located at an elevation of 0 to 15 m below sea level near the shore and exposed at the top of the hill. This rock layer is covered by a silty sand layer with a thickness of 20 to 30 m. The top

soil has a thickness of 0 to 30 m and consists of silty clay. It is observed that the subsoil conditions on the landside and seaside are quite different as shown in Figure 2.2.2, and the subsoil layers are discontinued. The soil layer below the seabed is composed of silty clay deposited on a gravelly sand layer. Below these layers, a thin layer of gravelly/sandy clay exists on the LAVA.

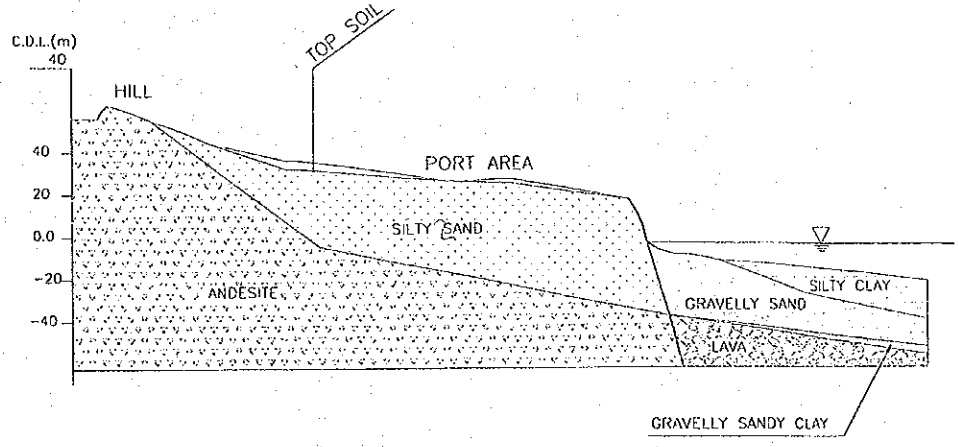

Figure 2.2.2 Geological Profile of Port Area

On the other hand, the subsoil condition along the proposed berth line extending from the Punta Gorda Fishing wharf is shown in Figure 2.2.3. A silty clay layer with an average N-value of 1 is deposited below the seabed. This layer is quite soft and the material is very fine, thus it will cause significant settlement by reclamation if it will not be removed. Under this layer, a gravelly sand layer having a thickness of between 7 to 12 m exists. This layer contains rubble or gravel of the 0.2 cm to 100 cm in diameter at an average contents of 20% to 40% in volume. Due to the existence of rubble and gravel, most part of this layer has N-value of more than 50. In the case of non penetration into the rubble and gravel of the layer, the average N-value is 30. A gravelly sand clay layer with an average N-value of 30 exists on the top of the massive LAVA strata.

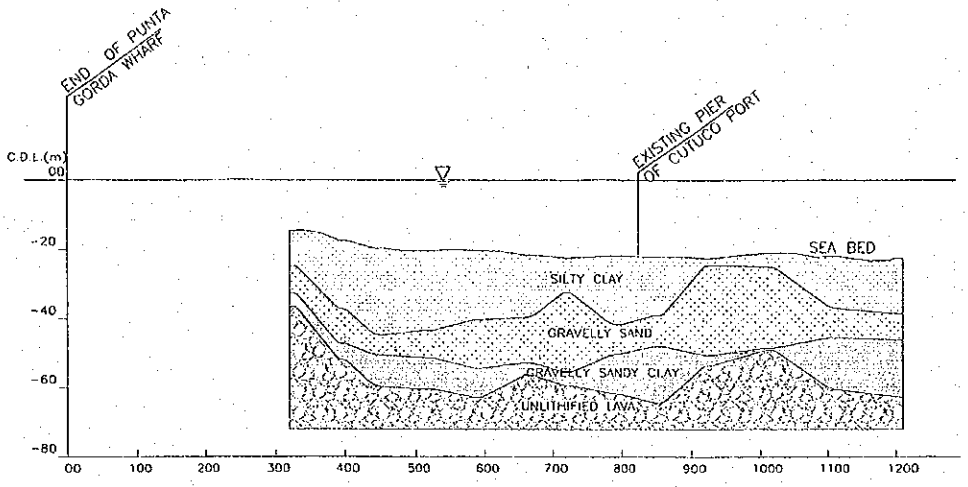

Figure 2.2.3 Geological Profile Along Proposed Berth Line

2.3 Development Plans

2.3.1 National Development Plan

The current National Development Plan was issued in January 1998. It contains the analysis of problems identified, country vision, development concepts, and main challenges.

The objectives of the Plan are;

1) Integration of the nation with other countries in Central America and open a global market in a competitive way.
2) Creation of industry clusters and construction of necessary transportation infrastructure to trigger and sustain the new economic and social initiatives.
3) Decentralization of services and strong regional development
4) Increase of industrial production base

The proposed actions for the National Development Plan were issued in November 2000. The following five target regions with particular needs to achieve the goals of the plan are identified;

- North Region – Lempa River
- Fonseca Gulf Region
- South-Center Region – Comalapa
- Region of the volcanoes
- Region of the metropolitan area of San Salvador

The eastern part of the country formed by four provinces, namely; Usulutan, San Miguel, Morazan and La Union, is as the region with the lowest economic and social development indicators. La Union Province is the only one that faces the Fonseca Gulf in the Pacific Ocean.

This region has many identified deficiencies in terms of education, health, jobs, and inherited lack of infrastructure and bad utility services. The only project identified to create a domino effect of progress is the construction of La Union Port and the related road infrastructure improvements.

For the eastern region development, the Plan considers the implementation of three major projects for regional reactivation. These are:

1) The La Union Port development project;
2) The recovery of the "Rio Grande" basin with agro industrial development; and
3) The construction of the Northern Corridor Highway which will connect the easternmost part with the westernmost part of the country.

The Fonseca Gulf Region is considered as a strategic gateway to the world commerce and the plan gave particular importance to the construction of the La Union port to create a modern transportation facility. Another important project is the construction of the 118 km long longitudinal northern corridor highway from Metapan in the Santa Ana Province to Concepcion de Oriente in La Union Province.

These three complementary projects will directly resolve the historical dependency on un-diversified agriculture, inappropriate road infrastructure, and inefficiency of transport network.

2.3.2 Puebla Panamá Plan

The Puebla Panamá Plan (PPP) which is a regional integration plan including seven Central American Countries and southern Mexico encompassing 102 million km^2 and 63 million citizens, was announced in early 2001 by President Fox of Mexico.

PPP has three essential goals:

1) To increase the transportation and industrial infrastructure in the region, improving the capacity of export industries;
2) To shift the region's economy from agriculture to equipment assembly and manufacturing by industrial estates; and
3) To expand private control over the development of natural resources

Land privatization is key to all the three goals.

The Puebla-Panamá corridor is a 4,370 km long corridor which traverses the region along the pacific coast, taking advantage of the more gently topography along this area. This corridor passes thought El Salvador from Hachadura in Ahuachapan to El Amatillo in La Union Province at a distance of approximately 40km from the La Union Port, providing a high capacity transportation link from the port to the entire region.

The Puebla-Panamá Plan envisages implementing cross-isthmus dry canal mega

projects for trans-oceanic movement of goods. These mega projects involve the construction of deep sea ports on both coasts, capable of hosting large ocean going freighters. The La Union Port is expected to function as a gateway in the Pacific coast.

Honduras has already constructed 107 kilometers of four-lane highway from Villa San Antonio to the Goascoran border with El Salvador near the El Amatillo Border. The Cortes Port is planned to be the counterpart port for the La Union Port in the Atlantic coast to function as a dry canal.

2.4 Existing Port Activities

2.4.1 Acajutla Port

(1) Major Port Facilities

The Acajutla Port located in the Pacific Ocean is El Salvador's main port, it is. The port consists of a commercial port and an oil terminal. The commercial port of Acajutla was built in 1952 and began operations under the autonomous port authority of CEPA, while the oil terminal which has a single offshore unloading buoy is operated by Refinería Petrolera de Acajutla, S.A. de C.V. (RASA - Petroleum Refinery of Acajutla).

The commercial port consists of an access pier and three jetties : A, B and C. Specialized cargo handling equipment for loading/ unloading import and export bulk cargoes is installed along the access pier and the jetty B. Additionally, the port has a buoy system for berthing of up to 12 m draft tanker ships which supply the two refineries.

The Acajutla Port has eight berths constructed on the three jetties with the following characteristics.

Table 2.4.1 Berth Facilities of Acajutla Port

Type of Jetty	Jetty No.	Berth No.	Length (m)	Depth (m)	Type of Structure	Cargo/Vessel Handled
Pier	A	A1	152.0	9.0	Sheet Pile Type	General Cargo, Solid and Liquid Bulk
		A2	152.0	10.0	Sheet Pile Type	General Cargo, Solid and Liquid Bulk
Pier	B	B3	137.0	9.0	Steel Pile Type	General Cargo, Solid Bulk
		B4	148.0	10.0	Steel Pile Type	General Cargo, Solid Bulk
		B5	137.0	9.0	Steel Pile Type	General Cargo, Solid Bulk
		B6	152.0	9.0	Steel Pile Type	General Cargo, Solid Bulk
Pier	C	C7	152.0	12.0	Concrete Caissons Type	General Cargo, Solid and Liquid Bulk
		C8	152.0	12.0	Concrete Caissons Type	Containers

The port has a covered storage area of 36,542 m^2 and an open storage area of 109,375 m^2.

(2) Cargo Operation

a) Dry bulk cargoes operation

One ship loader/unloader is installed on the Pier B for loading/unloading dry bulk cargoes and is connected by conveyor belt to silos. Crane rails are installed in the center of the Pier B.

The Berths No. B3 and B4 are located on the outer side of the jetty and are on the same line, and the Berths B5 and B6 are located on the inner side of the jetty and are also on the same line. Then the Berths B3/B4 and berths B5/B6 are located back to back on either side of the jetty. The unloader can serve the Berths B3 and B4, and the loader can serve the Berths B3, B4, B5 and B6.

However the loader and unloader cannot work at the same time because they are installed on a same crane. Both of them are connected with the conveyor belt. Then the unloaded cargoes are transported directly to the factory, which is located behind the port, and the cargoes for loading are supplied from landside directly.

b) Container handling operation

The container storage yard is located behind the port at a distance of about 1,500 m from the port.

A straddle carrier system was introduced in the terminal and the operational equipment is as shown in Table 2.4.2.

Table 2.4.2 Straddle Carrier Inventory

Name	Capacity	Procured year	Condition
Straddle carrier	35t	1991	Good
Straddle carrier	35t	1991	Good
Straddle carrier	30t	1978	Normal
Forklift	30t	1991	Good

(3) Present Traffic

The volume of cargo passing through the Acajutla Port and the Salvadorean economy have experienced a steady increase in the last ten years (1991 – 2000), as reflected by an average growth rate of 7.9% of cargo volume in this period.

According to the statistics on the Acajutla Port published by CEPA in 2000, the total volume of cargo passing through the port was 2.46 million MT composed of 2.02 million MT in imports and 440,000 MT in exports (see Tables 2.4.3 and 2.4.4).

Table 2.4.3 Historical Trend of Imported Cargo Volume Handled at Acajutla Port in 1991-2000

Package Style		Commodity	1991			1992			1993			1994			1995			1996			1997			1998			1999			2000			Average Annual Growth Rate in 1991-2000	Average Annual Growth Rate in 1995-2000	Share in 2000
			Import	Containerized	%	Import	Containerized	%	Import	Containerized	%	Import	Containerized	%	Import	Containerized	%	Import	Containerized	%	Import	Containerized	%	Import	Containerized	%	Import	Containerized	%	Import	Containerized	%			
General Cargo including Container Cargo	Suitable for container cargo	Groceries	7,253	6,410	88.4%	16,173	7,399	45.7%	7,081	5,190	73.3%	5,478	4,374	79.8%	10,504	5,896	56.1%	11,159	4,623	41.4%	12,622	3,342	26.5%	19,635	4,930	25.1%	22,105	7,044	31.9%	22,411	14,626	65.3%	13.4%	16.4%	28.6%
		Textile	1,778	1,651	92.9%	1,266	1,128	89.1%	4,133	3,958	95.8%	4,468	4,501	100.7%	4,048	4,024	99.4%	4,355	4,355	100.0%	5,764	5,749	99.7%	6,647	6,637	99.8%	6,127	6,123	99.9%	9,240	9,038	97.8%	20.1%	17.9%	11.8%
		Industrial products	26,073	6,744	25.9%	18,977	6,520	34.4%	19,261	5,821	30.2%	17,148	7,167	41.8%	15,356	10,131	66.0%	12,755	8,696	68.2%	12,386	8,878	71.7%	9,787	5,015	51.2%	9,453	3,861	40.8%	7,952	5,080	63.9%	-12.4%	-12.3%	10.2%
		Electric appliances & electronics	2,181	1,324	60.7%	2,243	1,595	71.1%	1,915	1,688	88.1%	1,645	1,501	91.2%	1,882	1,318	70.0%	1,395	1,133	81.2%	1,849	1,836	99.3%	1,014	1,007	99.3%	1,094	1,093	99.9%	5,762	4,714	81.8%	11.4%	25.1%	7.4%
		Spare parts	4,791	3,598	75.1%	5,309	4,268	80.4%	5,656	4,617	81.6%	5,952	5,175	86.9%	5,617	4,849	86.3%	4,425	3,778	85.3%	4,439	3,434	77.4%	4,745	4,398	92.7%	5,438	4,897	90.1%	5,270	5,080	96.4%	1.1%	-1.3%	6.7%
		Hardware	4,659	2,004	43.0%	4,144	1,905	46.0%	4,908	2,193	44.7%	7,452	4,475	60.1%	6,689	4,103	61.3%	2,887	2,514	87.1%	4,007	3,660	91.3%	4,910	4,337	88.3%	4,283	4,162	97.2%	3,729	3,748	99.2%	-2.3%	-10.8%	4.8%
		Rubber tyres	1,699	1,413	83.2%	1,460	1,425	97.6%	2,507	2,507	100.0%	2,877	2,842	98.8%	2,949	2,946	99.9%	2,624	2,637	100.5%	2,499	2,499	100.0%	2,878	2,878	100.0%	2,482	2,482	100.0%	3,447	3,447	100.0%	8.2%	3.2%	4.4%
		Plastic material and fiber articles	1,263	938	74.3%	1,357	1,255	92.5%	1,770	1,423	80.4%	2,044	1,865	91.2%	2,308	2,004	86.8%	1,820	1,795	98.6%	2,283	2,185	95.7%	2,329	2,313	99.3%	2,823	2,743	97.2%	2,755	2,755	100.0%	9.1%	3.6%	3.5%
		Machinery	3,259	4,652	142.7%	3,926	1,324	33.7%	3,653	2,908	79.6%	7,037	4,834	68.7%	8,594	3,192	37.1%	2,178	1,129	51.7%	3,343	1,453	43.5%	11,530	5,444	47.2%	2,360	1,879	79.6%	2,631	1,421	54.0%	-2.4%	-21.1%	3.4%
		Construction materials	419	390	93.1%	749	689	92.0%	1,124	1,124	100.0%	17,741	498	2.8%	21,143	682	3.2%	16	16	100.0%	2,998	120	4.0%	22,466	0	0.0%	28,545	0	0.0%	63	63	100.0%	-19.0%	-68.8%	0.1%
		Paper in roll	14,884	9,218	61.9%	10,203	1,366	13.4%	1,502	877	58.4%	845	414	49.0%	1,173	56	4.8%	388	378	97.4%	292	292	100.0%	6,975	225	3.2%	8,832	164	1.9%	55	55	100.0%	-46.3%	-45.8%	0.1%
		Others	22,449	12,331	54.9%	19,652	16,778	85.4%	27,433	17,617	64.2%	26,292	19,342	73.6%	20,875	17,944	86.0%	13,052	11,562	88.6%	15,338	13,502	88.0%	21,634	12,838	59.3%	14,560	13,049	89.6%	14,959	13,845	92.6%	-4.4%	-6.4%	19.1%
		Sub-total	90,708	50,673	55.9%	85,459	45,652	53.4%	80,946	49,923	61.7%	98,979	56,988	57.6%	101,139	57,145	56.5%	57,058	42,613	74.7%	67,820	46,950	69.2%	114,550	50,022	43.7%	108,102	47,497	43.9%	78,324	63,872	81.5%	-1.6%	-5.0%	100.0%
	Mixed	Chemical products	7,020	1,768	25.2%	10,100	2,879	28.5%	9,290	2,852	30.7%	12,896	5,783	44.8%	10,627	5,398	50.8%	5,289	2,904	54.9%	11,285	2,419	21.4%	16,370	4,063	24.8%	17,106	4,980	29.1%	19,026	4,022	21.1%	11.7%	12.4%	100.0%
	Unsuitable for container cargo	Iron and Steel, and their products	55,028	785	1.4%	73,909	1,166	1.6%	92,469	1,402	1.5%	83,652	1,191	1.4%	109,814	1,168	1.1%	105,897	606	0.6%	132,168	4,251	3.2%	234,835	477	0.2%	200,988	224	0.1%	220,909	2,351	1.1%	16.7%	15.0%	84.0%
		Fertilizer in bag	6,011	297	4.9%	820	38	4.6%	9,225	549	6.0%	17,149	230	1.3%	25,346	120	0.5%	8,104	87	1.1%	14,916	0	0.0%	13,495	1,421	10.5%	14,739	0	0.0%	22,579	0	0.0%	15.8%	-2.3%	8.6%
		Vehicles	5,467	38	0.7%	11,354	281	2.5%	9,697	268	2.8%	13,530	622	4.6%	17,885	331	1.9%	5,900	176	3.0%	10,552	49	0.5%	12,047	192	1.6%	11,905	32	0.3%	10,403	46	0.4%	7.4%	-10.3%	4.0%
		Nonferrous metal products	574	163	28.4%	1,259	409	32.5%	2,424	0	0.0%	4,732	529	11.2%	6,101	1,393	22.8%	506	101	20.0%	2,193	511	23.3%	4,699	1,427	30.4%	5,160	0	0.0%	7,018	70	1.0%	32.1%	2.8%	2.7%
		Cereals in bag	13,628	66	0.5%	14,687	1,034	7.0%	19,668	0	0.0%	15,048	17	0.1%	7,161	0	0.0%	1,228	68	5.5%	2,197	2,135	97.2%	2,741	0	0.0%	9,191	1,264	13.7%	2,227	126	5.7%	-18.2%	-20.8%	0.8%
		Sub-total	80,708	1,349		102,029	2,928		133,483	2,219		134,111	2,589		166,307	3,012		121,635	1,038		162,026	6,946		267,817	3,517		241,986	1,520		263,136	2,593	1.0%	14.0%	9.6%	100.0%
	Total		178,436	53,790		197,588	51,459		223,719	54,994		245,986	65,360		278,073	65,555		183,982	46,555		241,131	56,315		398,737	57,602		367,194	53,997		360,486	70,487		8.1%	5.3%	
Dry Bulk		Cereals	364,583			210,860			271,898			409,114			374,955			422,145			581,488			617,417			612,803			726,677			8.0%	14.1%	60.8%
		Fertilizer	273,264			260,881			258,369			267,671			231,315			246,000			323,934			212,505			246,098			240,666			-1.4%	0.8%	21.7%
		Soybean flour	57,679			88,355			58,074			80,703			108,535			111,337			122,171			170,266			162,193			158,623			11.9%	7.9%	15.3%
		Maize flour	4,102			6,291			6,091			6,913			14,659			20,765			16,146			7,789			13,459			24,686			22.1%	13.0%	1.4%
		Others	2,998			15,873			3,335			6,884			58,630			11,589			5,266			7,925			9,004			8,788			12.7%	-31.6%	0.8%
		Total	702,626			582,260			597,767			771,285			788,094			811,836			1,049,005			1,015,902			1,043,558			1,159,440			5.7%	8.0%	100.0%
Liquid Bulk		Diesel oil	23,296			61,816			168,750			333,310			370,685			152,252			138,074			162,445			171,368			202,986			27.2%	-11.3%	38.3%
		Gasoline																			12,128			104,935			118,892			128,268					25.1%
		Animal and vegetable fats	48,551			41,075			46,171			28,770			35,843			18,962			59,781			57,323			71,248			65,198			3.3%	12.7%	13.8%
		Soybean oil																						13,558			24,353			19,804					4.1%
		Alcohol	0			0			31,920			38,887			69,679			21,337			20,157			17,101			19,869			17,753				-23.9%	3.9%
		Butane gas	21,810			25,509			38,710			53,727			65,965			66,662			58,551			17,320			13,704			15,086			-4.0%	-25.6%	3.3%
		Caustic soda	0			0			0			12,150			7,893			7,441			8,185			12,940			14,872			15,015				13.7%	3.1%
		Alkane (methane hydrocarbonite)	1,115			1,837			3,033			2,660			2,860			2,722			2,682			3,389			3,951			5,364			19.1%	13.4%	0.9%
		Others	40,009			71,557			59,693			70,087			93,701			108,449			54,095			45,306			28,005			30,965			-2.8%	-19.9%	7.4%
		Total	134,781			201,794			348,277			539,591			646,626			377,825			353,653			434,317			466,202			500,439			15.7%	-5.0%	100.0%
Grand Total			1,015,843			981,642			1,169,763			1,556,862			1,712,793			1,373,643			1,643,789			1,848,956			1,876,954			2,020,365			7.9%	3.4%	

Source: Compiled by the study team using the original data from CEPA

Table 2.4.4 Historical Trend of Exported Cargo Volume Handled at Acajutla Port

Unit: tons

Package Style	Commodity	1991			1992			1993			1994			1995			1996			1997			1998			1999			2000			Average Annual Growth Rate in 1991-2000	Average Annual Growth Rate in 1995-2000	Share in 2000
		Export	CNT	%	Export	CNT	%	Export	CNT	%	Export	CNT	%	Export	CNT	%	Export	CNT	%	Export	CNT	%	Export	CNT	%	Export	CNT	%	Export	CNT	%			
General Cargo including Container Cargo	Coffee	76,802	15,388	20.0%	72,698	13,884	19.1%	100,313	43,198	43.1%	76,651	33,350	43.5%	69,987	48,937	69.9%	67,744	53,762	79.4%	26,597	18,832	70.8%	18,499	18,482	99.9%	10,309	10,309	100.0%	4,879	4,757	97.5%	-26.4%	-13.8%	44.0%
	Machinery	495	486	98.2%	762	211	27.7%	2,128	457	21.5%	2,103	227	10.8%	170	86	50.6%	89	15	16.9%	517	425	82.2%	3,149	21	0.7%	637	404	63.4%	2,862	1,281	44.8%	21.5%	-1.1%	25.8%
	Groceries	385	385	100.0%	775	759	97.9%	1,064	1,064	100.0%	747	746	99.9%	668	708	106.0%	424	429	101.2%	177	177	100.0%	747	747	100.0%	162	131	80.9%	619	619	100.0%	5.4%	-2.1%	5.6%
	Others	20,206	7,687	38.0%	44,969	4,314	9.6%	47,024	5,045	10.7%	19,061	7,053	37.0%	37,628	3,998	10.6%	30,802	1,389	4.5%	58,022	3,939	6.8%	25,009	4,773	19.1%	27,135	1,946	7.2%	2,736	1,657	60.6%	-19.9%	-21.8%	24.7%
	Total	97,888	23,946	24.5%	119,204	19,168	16.1%	150,529	49,764	33.1%	98,562	41,376	42.0%	108,453	53,729	49.5%	99,059	55,595	56.1%	85,313	23,373	27.4%	47,404	24,023	50.7%	38,243	12,790	33.4%	11,096	8,314	74.9%	-21.5%	-14.9%	100.0%
Dry Bulk	Sugar	60,390			100,007			78,277			91,372			70,786			79,517			118,957			223,818			176,702			256,367			17.4%	1.5%	100.0%
	Others	0			0			0			0			26,628			0			0			0			0			0					0.0%
	Total	60,390			100,007			78,277			91,372			97,414			79,517			118,957			223,818			176,702			256,367			17.4%	1.5%	100.0%
Liquid Bulk	Molasses	60,966			66,470			51,145			57,700			57,022			72,423			110,330			159,303			165,924			149,512			10.5%	-0.7%	88.4%
	Ethyl alcohol	8,581			11,157			25,515			39,674			53,770			33,793			9,216			12,170			24,164			19,644			9.6%	5.5%	11.6%
	Others	0			2,394			0						0						1,000			0											0.0%
	Total	69,547			80,021			76,660			97,374			110,792			106,216			120,552			171,473			190,088			169,156			10.4%	-0.2%	100.0%
Grand Total		227,825			299,232			305,466			287,308			316,659			284,792			324,822			442,695			405,033			436,619			7.5%	-0.2%	

Source: Compiled by the study team using the original data from CEPA

2.4.2 Cutuco Port

(1) Port Facilities

The Cutuco Port is located in the Fonseca Gulf on the Pacific Ocean, 185 km from the capital city of San Salvador, and is connected to the road and railway network. It has a pier type jetty connected to land by a 168 m long access bridge, two berths and a storage area.

(2) Present Traffic

1) Import

Operation of the jetty under the administration of CEPA for accommodation of commercial vessels was ceased in 1996 due to the facility's obsolete and deteriorated condition. It has been left unused since then, and its condition has further worsened year by year in spite of piecemeal attempts to restore it. Since the closure of CEPA's jetty, the Punta Gorda wharf under the administration of CORSAIN (Corporación Salvadoreña de Inversiones) was used instead for handling commercial vessels. This wharf had been originally designed as a fishing port serving mainly tuna fleets. Fertilizer had been the traditional import cargo passing through the Cutuco Port, but since 1997 liquid propane gas (LPG) has been discharged at the Punta Gorda wharf followed by cement in 1998 (see Table 2.4.5).

Table 2.4.5 Historical Trend of Imported Cargo Volume Handled at Cutuco Port

(Unit: MT)

Package Style	Commodity	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Conventional Cargo	Cement										3,000
	Total										3,000
Dry Bulk	Fertilizer	26,594	35,532	37,062	44,296	18,742	15,201	19,569			32,000
	Salt										3,800
	Others	2,146	1,420		6,752	14,347					
	Total							19,569			35,800
Liquid Bulk	Diesel oil	19,746	29,905	3,902	31,952	29,911	3,944				
	LPG							19,902			79,579
	Butane Gas										10,056
	Total							19,902			89,635
Grand Total		48,486	66,857	40,964	83,000	63,000	19.145	39,471	N.A	N.A	128,435

Source: CEPA
Note: In 1991, an exports volume of 1,279 MT was recorded and this represents the only exports data available in the last ten years. Figures for 2000 are those of the Punta Gorda Port.

2) Export

There have been no records of exports via the Cutuco Port since 1991, but actually some quantity of coffee had been loaded at the port until 1990. On the

other hand, other major export cargoes such sugar and molasses have not been exported via the Cutuco Port, although sugar plantations prevail in the eastern provinces of San Miguel and Usulután, and in the east of central provinces of La Paz and San Vicente. The reason is that until the privatization of sugar manufacture in the middle of the 1990s, the production capacity of sugar factories narrowly met local demand only. Currently, there is excess sugar for export from the eastern provinces via the Acajutla Port, due to a remarkable increase in production efficiency of sugar factories, especially the ones in San Miguel and San Vicente.