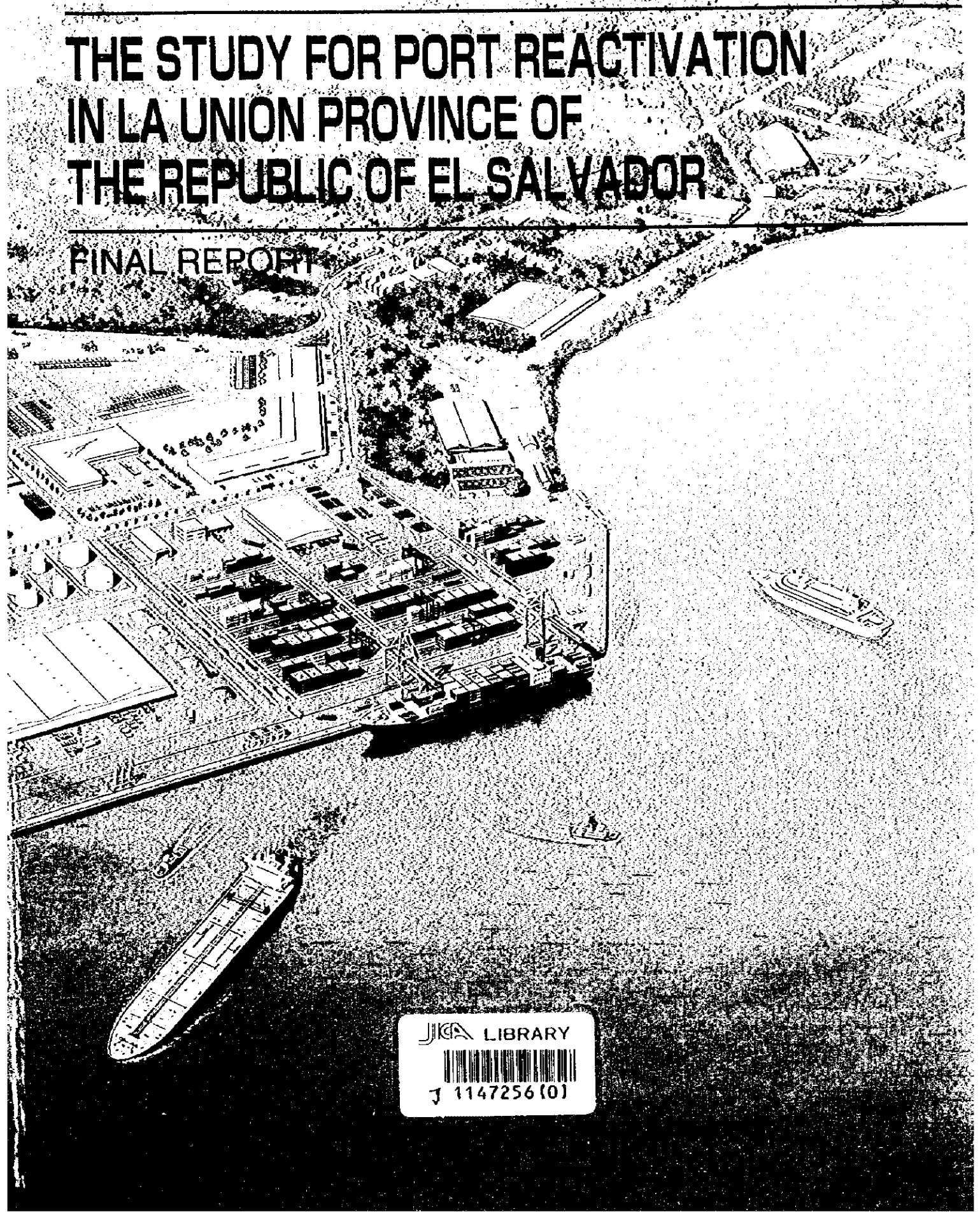


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)  
THE REPUBLIC OF EL SALVADOR

# THE STUDY FOR PORT REACTIVATION IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

## FINAL REPORT



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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)  
THE REPUBLIC OF EL SALVADOR

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# **THE STUDY FOR PORT REACTIVATION IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR**

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**FINAL REPORT**

**NOVEMBER 1998**

**THE OVERSEAS COASTAL AREA DEVELOPMENT INSTITUTE OF JAPAN (OCDI)  
NIPPON KOEI CO., LTD. (NK)**

## PREFACE

In response to a request from the Government of the Republic of El Salvador, the Government of Japan decided to conduct a feasibility study on Port Reactivation in La Union Province of the Republic of El Salvador and entrusted to study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Hajime Kawate, Executive Director of the Overseas Coastal Area Development Institute of Japan (OCDI) and consisted of OCDI and Nippon Koei Co., Ltd.(NK) to the Republic of El Salvador, 3 times between November 1997 and November 1998.

The team held discussions with the officials concerned of the Government of the Republic of El Salvador and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this will contribute to the proportion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of El Salvador for their close cooperation extended to the study.

November 1998



Kimio FUJITA

President

Japan International Cooperation Agency

## LETTER OF TRANSMITTAL

November 1998

Mr. Kimio Fujita  
President  
Japan International Cooperation Agency

Dear Sir,

I have the honor to submit herewith the Report for the Study for Port Reactivation in La Union Province of the Republic of El Salvador.

This report is the outcome of works between November 1997 and November 1998 which included three field surveys. The work was undertaken by the Overseas Coastal Area Development Institute of Japan (OCDI) and Nippon Koei Co., Ltd. (NK) as per the contract with the Japan International Cooperation Agency (JICA).

Based on the findings of surveys and utilizing data and information collected, and consistent with the scope of work which was agreed upon by both governments, the report is formulated to cover the following subjects;

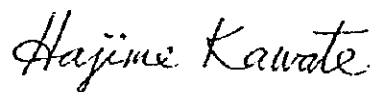
- (1) To formulate a master plan for the Port of La Union up to the year 2015
- (2) To conduct a feasibility study on a short-term plan up to the year 2005 based on the master plan.

The study shows the importance of the overall development of the Port of La Union and it's proper administration, management and operation. I earnestly hope that necessary measures will be taken to implement the projects and recommendations.

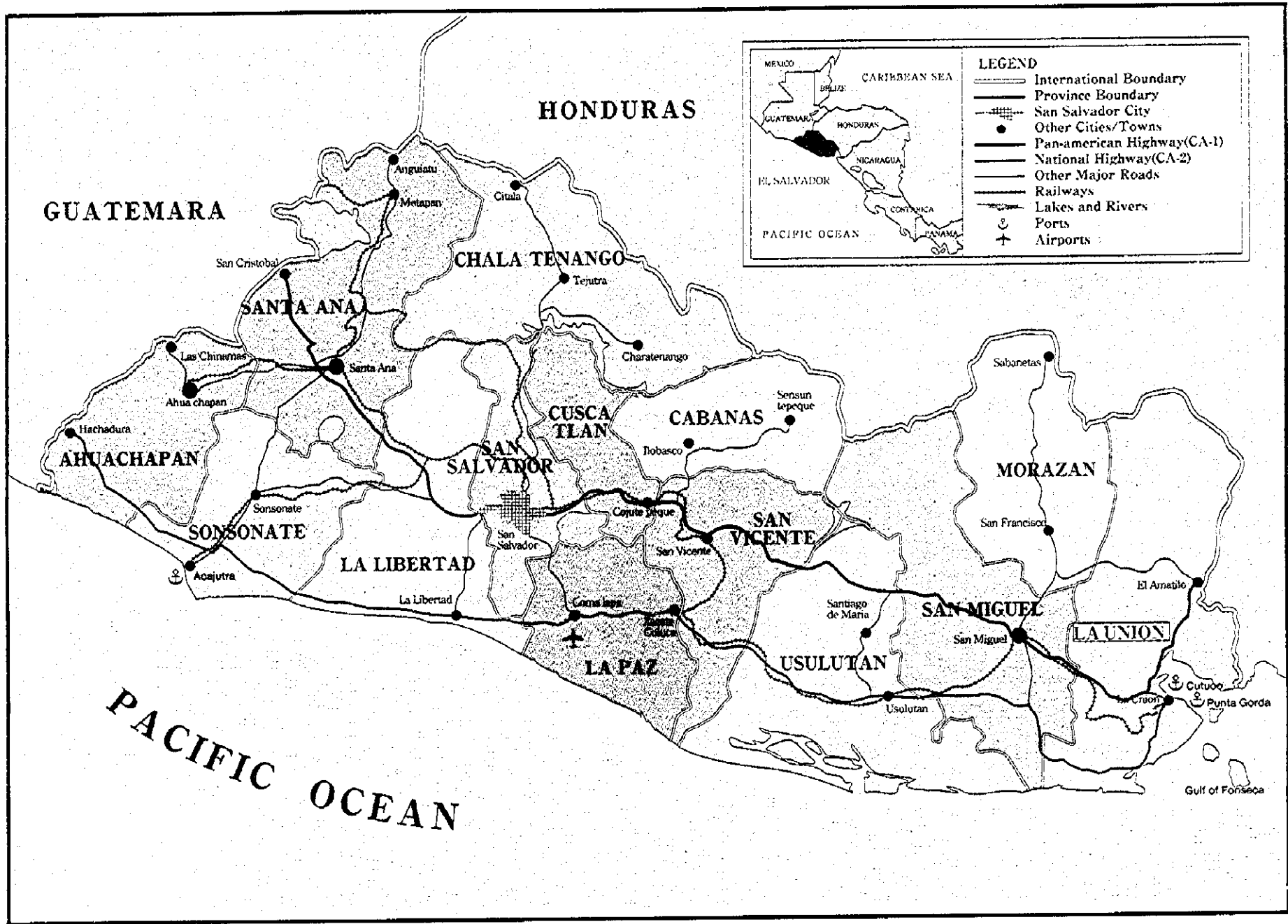
I would like to note that the completion of the study is greatly owed to the collaboration with CEPA (Comision Ejecutiva Portuaria Autonoma) and other related ministries, government agencies, shipping lines and agents.

I am also greatly indebted to JICA, the Ministry of Foreign Affairs, the Ministry of Transport and the Embassy of Japan in El Salvador for giving us valuable advice and assistance at every step throughout the course of the study.

Yours sincerely,

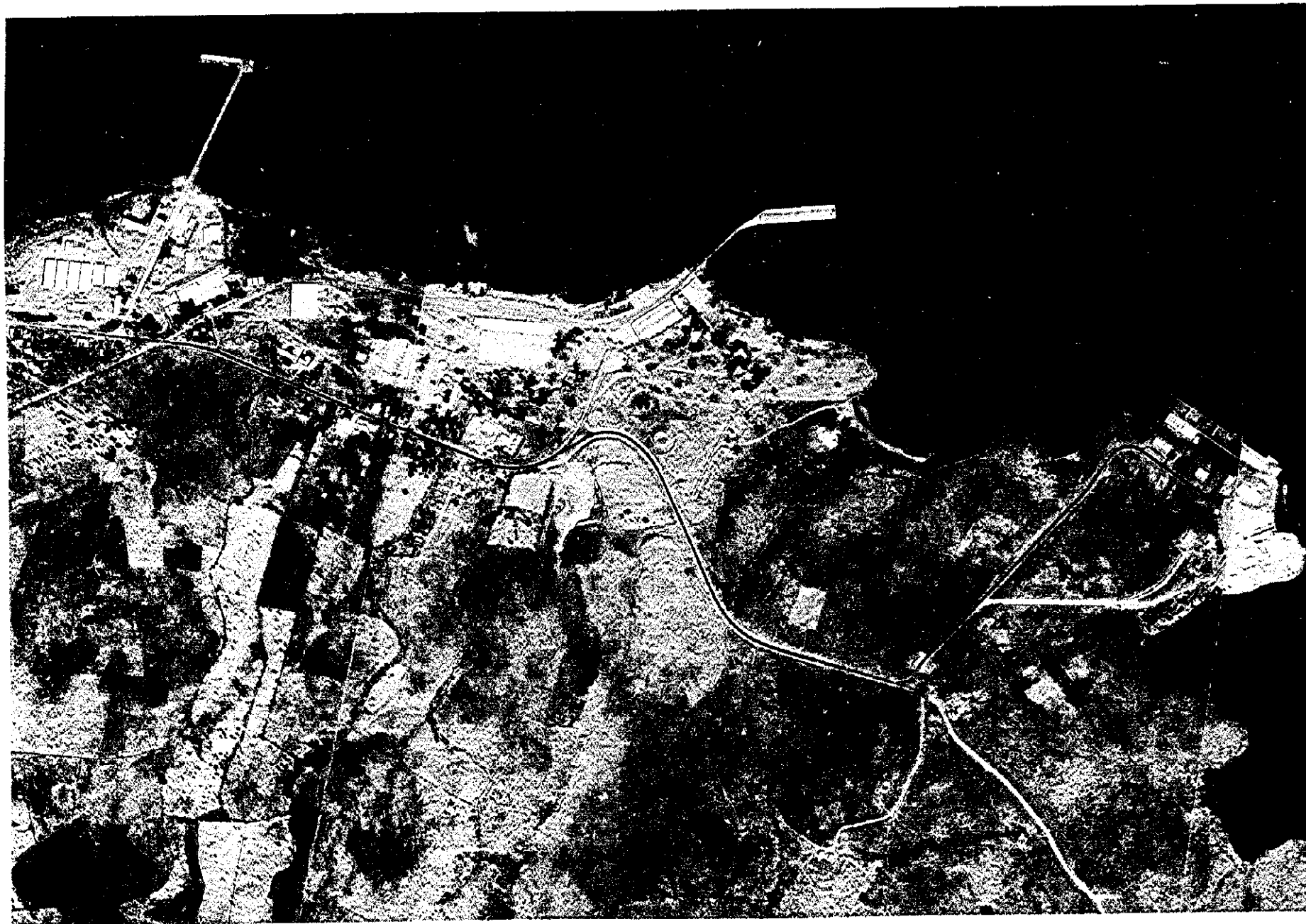


Hajime KAWATE  
Team Leader of Study for Port Reactivation  
in La Union Province of Republic of El Salvador



Location Map

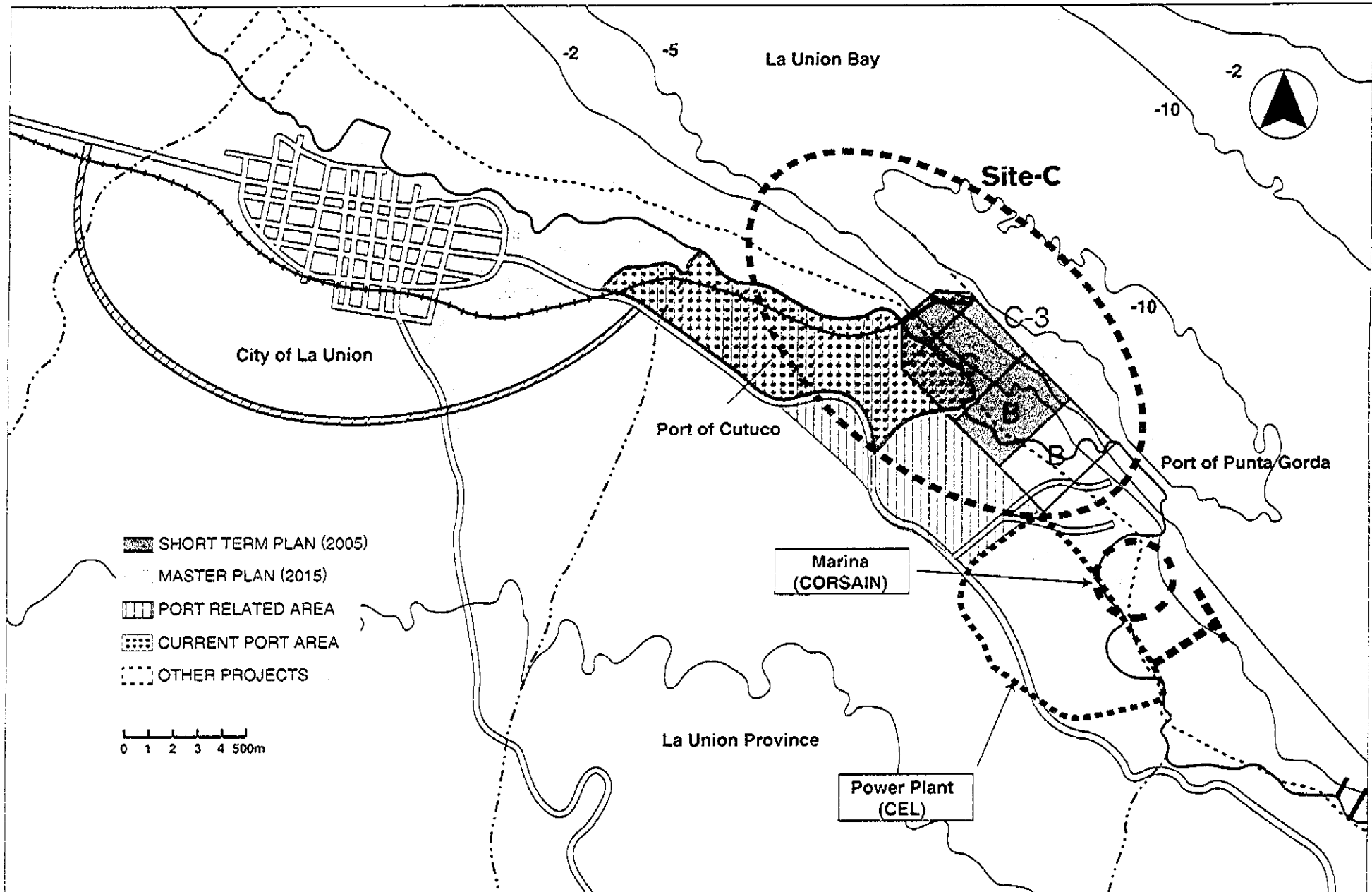


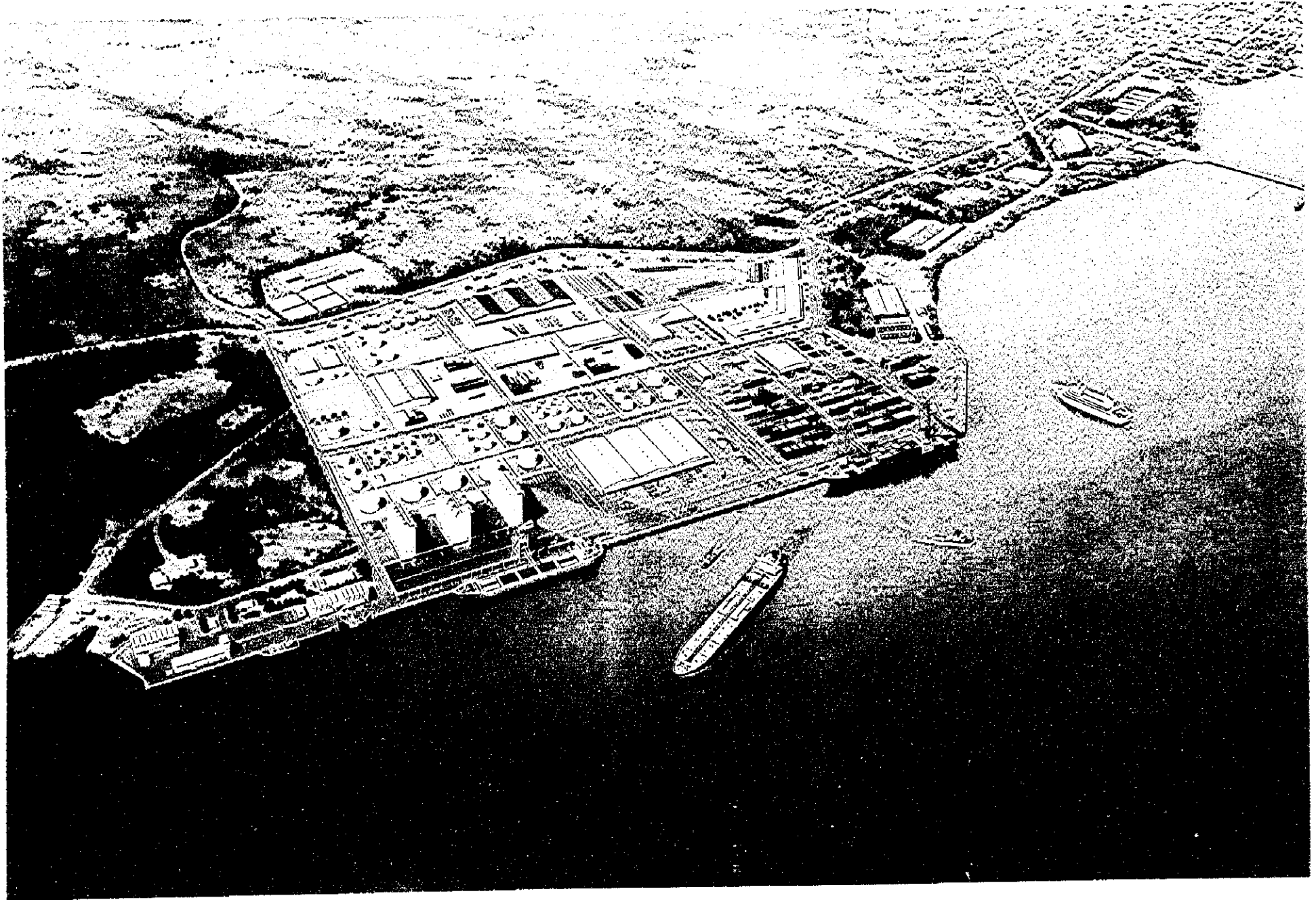


The Port of Cutuco (Present Situation)

# Recommended Alternative Plan (C-3)

– Container Terminal (C) and Bulk Terminal (B) –





Master Plan (2015)



## ABBREVIATION LIST

B	BCIE	Central American Bank for Economic Integration
	BCR	Benefit Cost ratio
	B/L	Bill of Lading
	BOD	Biochemical Oxygen Demand
	BOT	Build, Operate and Transfer
C	CEL	Comision Ejecutiva Hidroelectrica del Rio Lempa
	CEPA	Comision Ejecutiva Portuaria Autonoma
	CFC	Conversion Factor for Consumption
	CFS	Container Freight Station
	CIF	Cost, Insurance and Freight
	COD	Chemical Oxygen Demand
	CORSAIN	Corporacion Salvadorena de Inversiones
D	DO	Dissolved Oxygen
	DWT	Dead Weight Tonnage
E	EIA	Environmental Impact Assessment
	EIRR	Economic Internal Rate of Return
	EPZ	Export Processing Zone
F	FCL	Full Container Load
	FIRR	Financial Internal Rate of Return
	FOB	Free on Board
	FENADESAL	Ferrocarriles Nacionales de El Salvador
	FMLN	Frente Farabundo Marti de Liberacion Nacional
G	GDP	Gross Domestic Products
	GT (GRT)	Gross Tonnage
H	HHW	Highest High Water
I	IDB	Inter-American Development Bank
	IBRD	International Bank for Reconstruction and Development
	IEE	Initial Environmental Examination

L	LAQ	Lease a Quay
	LCL	Less than Container Load
	LLW	Lowest Low Water
	LUP	License to Use a Port
M	MALPOL	Prevention of Pollution of the Sea from Ships 1973 and the Protocol of 1978
	MHW	Mean High Water
	MLW	Mean Low Water
	MLWS	Mean Low Water Spring
	MSL	Mean Sea Level
	M.T.	Metric Ton
N	NPV	Net Present Value
O	ODA	Official Development Assistance
	OECD	The Overseas Economic Cooperation Fund, Japan
R	Ro-Ro	Roll-on Roll-off
S	SCF	Standard Conversion Factor
	SPM	Suspended Particulate Matter
	SS	Suspended Solid
T	TEU	Twenty-foot Equivalent Unit
	T-N	Total Nitrogen
	T-P	Total Phosphorus
U	UN	United Nations
	UNCTAD	United Nations Conference on Trade and Development
	UNDP	United Nations Development Programme
	US	United States of America

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## **EXECUTIVE SUMMARY**

**The Study for Port Reactivation in La Union Province of the Republic of El Salvador**

October 1997 - December 1998

Counterpart: Comision Ejecutiva Portuaria Autonoma (CEPA)

### **Background and Objectives of the Study**

1. El Salvador faces the Pacific Ocean with a coastline of 300 kilometers. It has three(3) major public ports: the Port of Acajutla (CEPA), only 85 km away from the capital to the south-west, the Port of Cutuco(CEPA-FENADESAL) and Punta Gorda (CORSAIN), facing the Gulf of Fonseca, in La Union Province in the eastern region.
2. Acajutla is the largest international port of the country. It handled 1.687 million tons of cargo in 1996. On the other hand, cargo volume at Cutuco fell drastically from 236 thousand tons in 1975 to 63 thousand tons in 1995 due to the civil war. It has been closed, in addition, since 1996 because of the possible collapse of its terribly timeworn and corroded structures built in the 1910s. At present, the neighboring fishery port of Punta Gorda is temporarily assuming its functions.
3. The port reactivation, including new port construction, in La Union Province is expected to play vitally important roles both in strengthening the maritime transport sector of the country, especially in container handling, due to its advantageous location and natural conditions in the Gulf of Fonseca, and thus in supporting the overall socio-economic activities of the said region.
4. Under such circumstances, the Government of El Salvador requested the Government of Japan to carry out the Study, which includes formulation of a Master Plan for port reactivation in La Union with a target year of 2015, and a feasibility study of a Short Term Plan for the period up to the year 2005.

## **Method of the Study**

5. For the Master Plan, cargo volume in 2015 is forecasted according to two different GDP growth rate scenarios based on the past growth and the future prospect: Case 1 (5.0 % till 2005 and beyond up to 2015), and Case 2 (the same till 2005 but 3.5 % after that).
6. Most containers are basically handled at La Union, considering its advantageous natural conditions and high efficiency of container handling. Regarding other cargoes, the total volume is shared properly between Acajutla for the western/central region and La Union for the eastern region, corresponding to the future population of the region.
7. After required number of berths are calculated ( same for both cases) on the basis of the target of cargo handling efficiency, appropriate project sites are selected, and the corresponding layout plans are prepared and evaluated from various points of view. Two alternatives are selected and proposed: one under the given condition for the Study, excluding the concession area of the existing Cutuco, and the other without considering it.
8. The Short Term Plan with a target year of 2005 is formulated under the framework of the Master Plan. It is evaluated from various viewpoints such as the national economy, financial situation of CEPA and the environment.

## **Outline of the Projects**

9. The basic target of the development of the Port of La Union up to the target year of the Master Plan is identified as follows.
  - (1) to become a core of distribution of international trading cargo in the eastern region
  - (2) to become a core of regional and economic development
10. In order to accomplish the target, the development and planning of the port of La Union should be based on the following requirements.
  - (1) to fully cope with the international trading cargo of El Salvador on the Pacific side together with the Port of Acajutla ( No more container

- outflow to the Port of Quezal in Guatemala should be allowed.)
- (2) to offer the service for container cargo of the country, including the southern part of Honduras, and other cargoes of the eastern region, while remaining cargoes of the western/central region are handled at Acajutla, taking advantage of geographical and natural conditions of respective ports ( Acajutla is originally constructed for bulk cargo and its container handling is affected by a swell )
  - (3) to cope with increasing foreign trade and the growing containerization
  - (4) to support the development of the eastern region ( improvement of related infrastructures and development of EPZs )
  - (5) to serve as a alternative port to Acajutla in case of earthquake and as a back-up port to handle heavier or taller cargoes

11. The Master Plan with a target year of 2015 and the Short Term Plan for the period up to the year 2005, considering the policy of CEPA, is summarized as follows;

(1) Project sites

at the existing Port of Cutuco

(2) Main facilities to be developed

a) The Master Plan (2015)

One(1) container priority terminal ( -13 ( -14 \*) m x 300m )

terminal area 12 ha with two(2) gantry cranes

Two(2) bulk cargo priority terminals ( -13 ( -14 \*) m x 520 (-560\*)m )

(\*) to accommodate easy future expansion at need

Related works such as navigation channel and access road

Project cost: approximately 150 million US dollars

b) The Short Term Plan (2005)

One(1) container priority terminal, one(1) bulk cargo priority terminals and related works will be implemented.

Project cost: approximately 94 million US dollars

## Evaluation

12. The Economic Internal Return Rate (EIRR) calculated based on the countable benefit is 14.2 % and the Financial Internal Return Rate (FIRR) is 6.3 %. Therefore, the project is judged as being feasible both economically and financially. In addition, it will contribute a lot to regional development such as job generation.

13. No technical problems are found in the project execution. Furthermore, the EIA revealed no significant unfavorable impact related to the project. Dredged materials are disposed properly, and impact on private activities is limited to the short term stage.

14. It should be duly said that not only this project but also other related projects such as establishment of EPZs and improvement of social infrastructures should be realized as soon as possible to bring about multiplied favorable effects on the development of the region as well as the port.

## Recommendation

(1) To fulfill the responsibility as public sector ( overall plan in the national standpoint and arrangement of basic infrastructures)

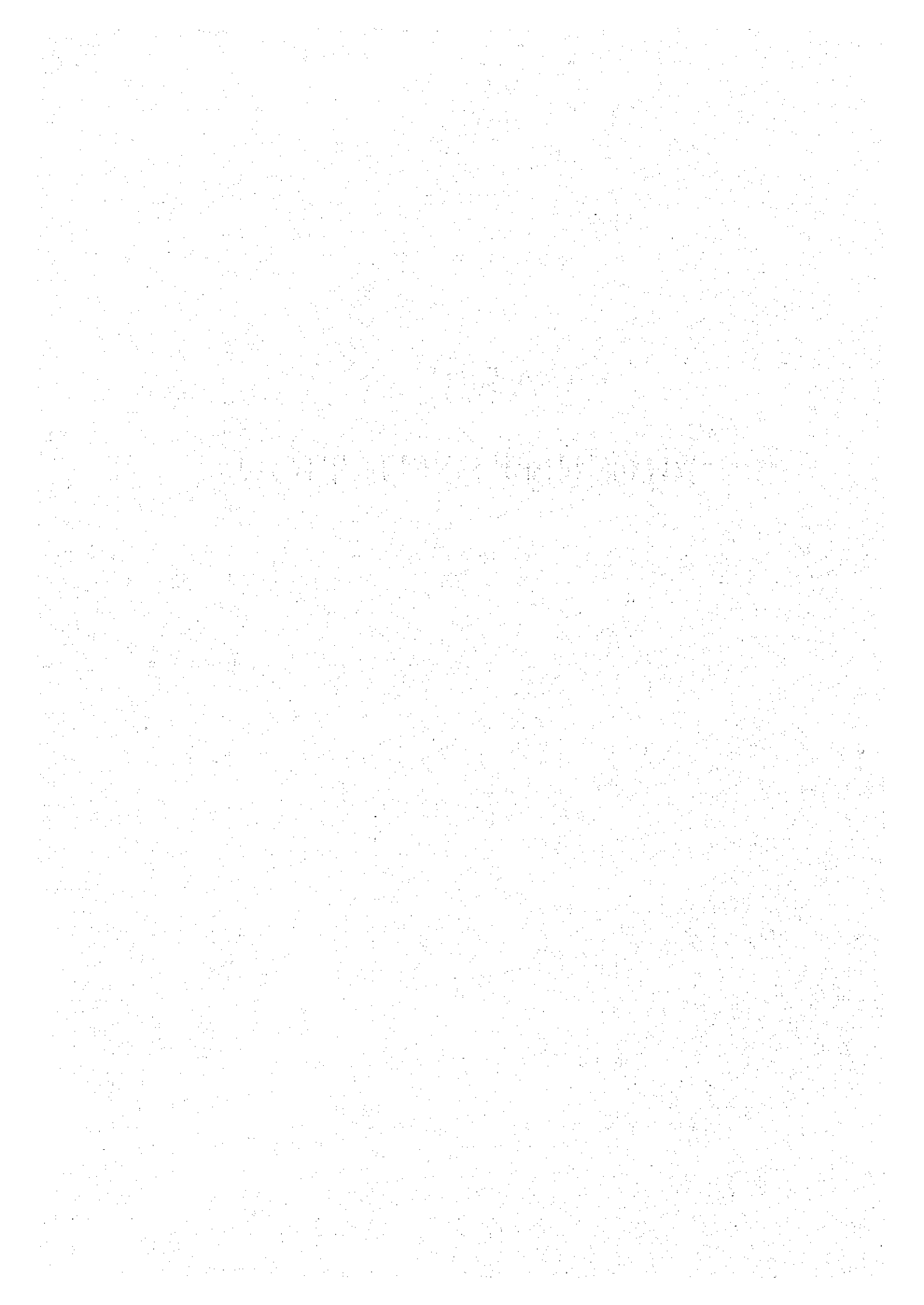
(2) To strengthen the whole organization of CEPA ( swift and sound decision making, proper administration on private participation, overall and flexible planning, utilization of statistics system, marketing promotion, establishment of environment section, etc.)

(3) To make necessary preparations for the new port ( smooth finance, marketing and promotion involving shipping agencies and consignees, establishment of high efficiency and reliability, incentive for private participation under proper competitive environment )

(4) To play an important role in both regional development and national development, contributing to various kinds of economic activities directly and indirectly.

(5) To administrate and coordinate port development based on the overall plan( the Master Plan) with related authorities and persons

**PART I**  
**PRESENT SITUATION**



## 1. GENERAL DESCRIPTION

### 1.1 General Aspects of the Country

1. El Salvador is located in the heart of Central America. With an area of 21,041 square kilometers (see Table 1-1-1), it is the smallest country in the region. It shares borders with Guatemala on the west, and Honduras on the north and east. To the south, it is said to have a 352 kilometer shoreline facing the Pacific Ocean. Nicaragua is located a short distance away, southeast, across the Gulf of Fonseca (see Figure 1-1-1).

2. The country has 5.8 million inhabitants. It is the most densely populated in Central America with an average of 260 inhabitants per square kilometer. There has been a strong migration out of the country, mainly to the United States.

3. The country is composed of 14 provinces known as departments and can be divided into three different geographic regions as shown in Table 1-1-1.

Table 1-1-1 Characteristics of Provinces (1992)

Province	Area (km <sup>2</sup> )		Population (1992)	
the western region Ahuachapan Santa Ana Sonsonate	4,489	(21.3%)	1,066,824	(21.1%)
the central region Chalatenango La Libertad San Salvador Cuscatlan	5,312	(25.2%)	2,347,754	(46.5%)
the eastern region La Paz Cabanas San Vicente Usulután San Miguel Morazan La Union	11,240	(53.5%)	1,633,347	(32.4%)
<b>Total</b>	<b>21,041</b>	<b>(100%)</b>	<b>5,047,925</b>	<b>(100%)</b>

Source: Ministry of Economy

4. The capital city of San Salvador is located in the central region. The population reached 1,512,125 in 1992 with an increase of 106.2% from 1972 according to the Ministry of Economy. Other major cities include Santa Ana (population: 458,587; increase rate: 36.5%) in the western region and San Miguel (population: 403,411; increase rate: 1.09%) in the eastern region.
5. In the past, what is today El Salvador was populated by different tribes such as the Maya and Pipiles. Like other neighboring countries, it became a Spanish colony in 1528 as a result of the Spanish conquest of the New World. For a period of 160 years after its independence in 1821, El Salvador went through a time of civil unrest, anarchy and military regimes.
6. In such unstable circumstances, the whole country entered a civil war instigated by FMLN (Frente Farabundo Marti de Liberacion Nacional) in the early 1980's. Through the mediation of the United Nations, however, the accords to end it peacefully were signed between the government and FMLN in January, 1992.
7. Since then, a democratically elected government has been directing its efforts towards the recovery and steady growth of the economy and towards the rehabilitation and development of its infrastructure. Recently, the government published its 5-year plan (1994-1995) for economic and social development.
8. An important component of the 5-year plan is the reactivation of the Port in La Union. By strengthening the maritime transportation sector of the country, this project is expected to contribute to the development of the eastern region of the country which was severely affected by the civil war.
9. The government planned to build a container terminal at the Port of Acajutla. This project was shelved three years ago due to technical reasons and the national government gave priority to the development of the eastern area of the country.
10. This project is one of the most important projects to support the development of the eastern region as well as an electrical power development project. Recently, the government signed the document concerning the "dry canal" with the government of Honduras.
11. The "dry canal" is a major project meant to connect the Port of Cutuco (El Salvador) on the Pacific side with the Port of Cortez (Honduras) on the Atlantic side by means of a highway. It can be interpreted as a manifestation of the current government's policy and priority to develop the eastern region.



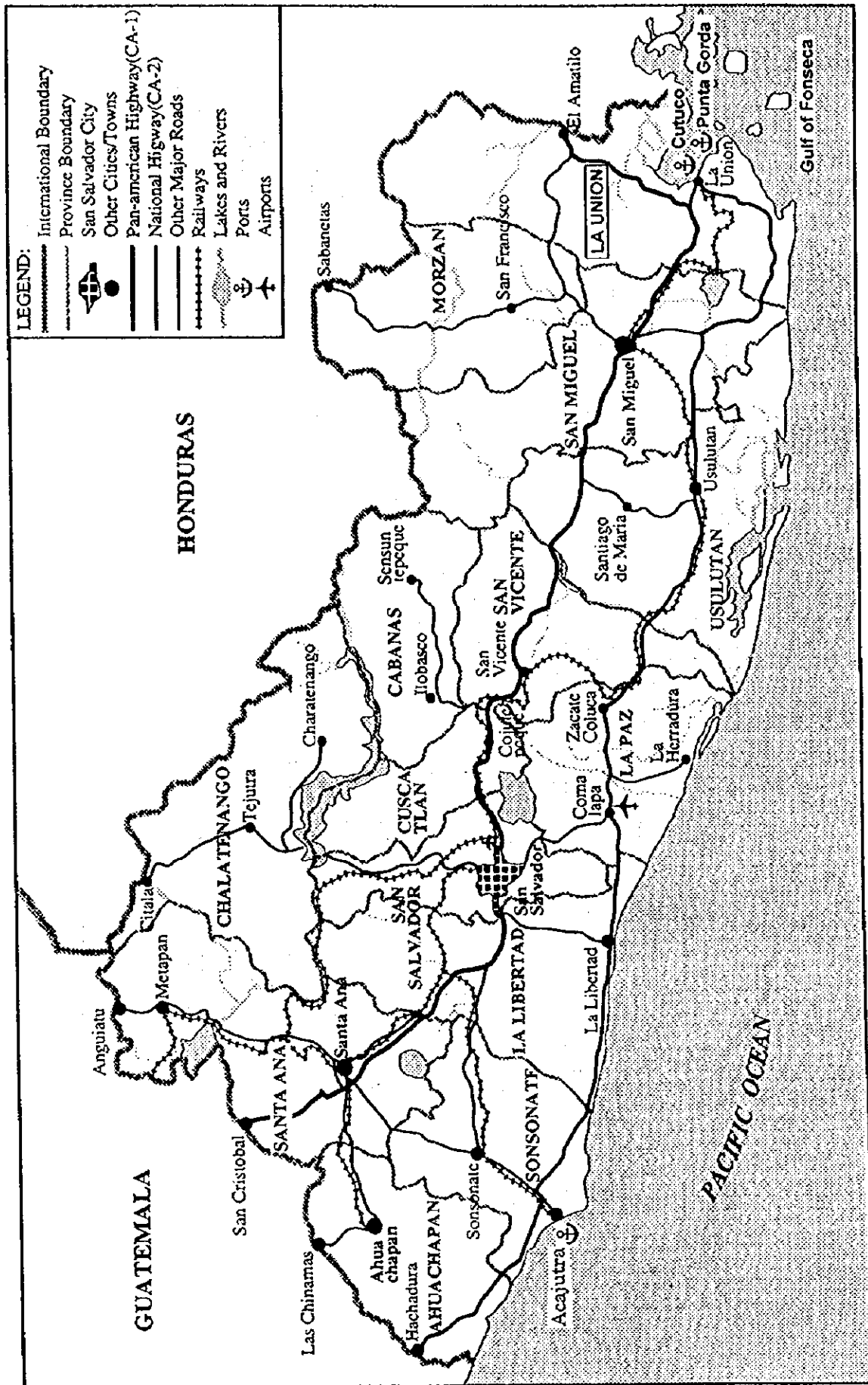


Figure 1-1-1 Map of El Salvador

## 1.2 Natural Conditions

### 1.2.1 Geography

1. Most part of the land area is the plateau with the altitude between 500 m. and 1,200 m. having the narrow coastal plain of some 25 km. width. The main geological feature of El Salvador is the two volcanic chains running parallel from WNW to ESE. On the volcanic chain near the coastal line, many volcanoes such as San Miguel (2,130 m. above sea level), Santa Ana (2,365 m. above sea level) range in a row. Many cities such as San Salvador, Santa Ana and San Miguel are situated between two chains.

2. Lempa river originated in Guatemala flows into the Pacific Ocean across the national territory. Grande river is next to Lempa river. There are some lakes, lagoons and estuaries.

3. Although the country lies in the tropical zone, its weather is likely to that of the subtropic or temperate zone mainly because of its altitude.

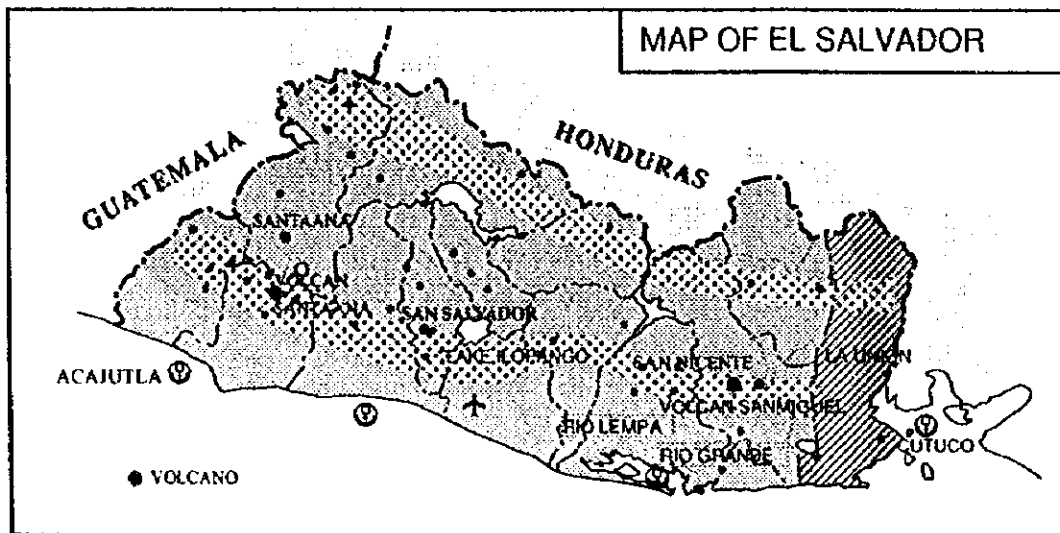


Figure 1-2-1 Map of El Salvador

## 1.2.2 Meteorology

4. From December to May, the gentle NE trade system predominates with winds usually between NE and NW. From May to November, the equatorial belt of calms lies farther N and winds from the S and W predominate. During this season, land and sea breezes are common, with occasional SW squalls. This period coincides with the rainy season and frequent thunderstorms blow from the W and SW. The violent, local squalls that occur in connection with these thunderstorms are known as "Chubascos".

5. Winds from the N are common in the cool season. Along this coast, the wet and dry seasons are clearly defined. The rainy season lasts from May to November and the remainder of the year constitutes the dry season. In some sections along the middle of this area, a decrease in rainfall occurs for several weeks during the summer. This dry spell is known as the "Veranillo". Much of the rainfall along this coast occurs in the form of thundershowers.

### NORMAL CLIMATE CONDITIONS:

6. El Salvador has two seasons and two transition periods and they are defined statistically, as follows:

RAINY SEASON: From May the 21st. to October the 21st.

TRANSITION PERIOD: From October the 21st. to November the 20th.

DRY SEASON: From November the 21st to April the 21st.

TRANSITION PERIOD: From April 22nd. to May the 20th.

As rainy season starts on May the 21st. Since May to ends July, the annual water average is 1,800 milliliters. During August and September are expected several periods of 2 or 3 continuous rainy days. This is a normal climate condition.

### ABNORMAL CLIMATE CONDITIONS:

#### El Niño Effect:

7. This phenomenon occurs every 4 or 5 years, its duration is about 14 months. El Niño of 1997 have affected the season schedule: the rainy season started late than usual and dry season also. This phenomenon affects extremely the weather conditions of El Salvador, because the dry zones are more than never, and in some other areas of the country there are rains when they are not expected.

## Hurricanes:

8. There are two types of hurricanes, the Pacific Ocean generated type and the Atlantic one.

**The Pacific Ocean:** This kind of hurricanes have their origins mostly on the border of El Salvador and Guatemala, the route they take is to the Northwest toward to the California Coast, in United States. The frequency in a 10 years period is only 3 hurricanes, which none of them have affected to El Salvador.

**The Atlantic Ocean:** They origin in West Africa and they always go toward the Caribbean Coast and also affect the Mexican Gulf, the frequent is high: from 5 to 8 hurricanes per year, among those only one affected El Salvador in the past, its name was the Fifi Hurricane, it was very strong. (Figure 1-2-2)

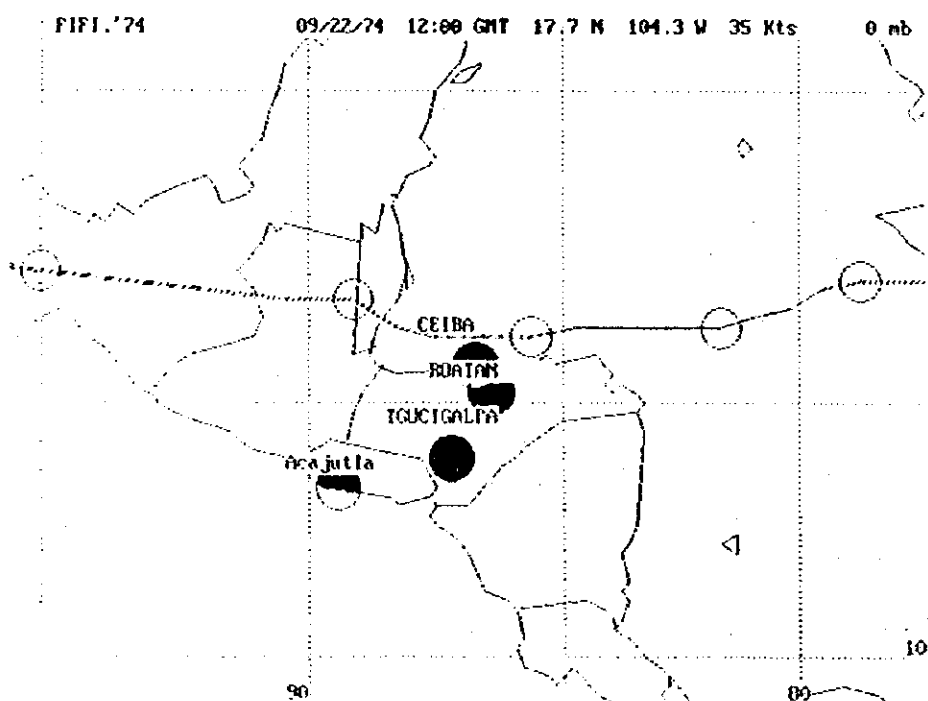


Figure 1-2-2 Track of Hurricane "FIFI"

### 1.2.3 Seismicity

9. El Salvador is located on a high seismic activity zone. The main seismic causes in the national land are:

- 1- The volcanic chain which creates the Pacific Seal Belt that passes through all the country land.
- 2- A geologic fault system that goes principally to Northwest-Southeast.
- 3- The subduction process between the Cocos and Caribbean tectonic intraplates movement origin earthquakes near the Salvadorean coast zones.

10. The seismic active zones in the country and in the ocean since 1985 to 1996 are shown in Figure 1-2-3, Table 1-2-1. It is important to mention that the zones such as Berlin-Santiago de Maria and Conchagua do not show all the information because of the few instrumental equipment in those areas.

11. Table 1-2-2 shows the more destructive earthquakes chronology of El Salvador. The Mercalli Modified Scale is used on these maps. In La Union, many frequencies are shown in the Table, but destructive earthquakes are not recorded. In these 80 years, the Cutuco Port has no damages by the earthquakes.

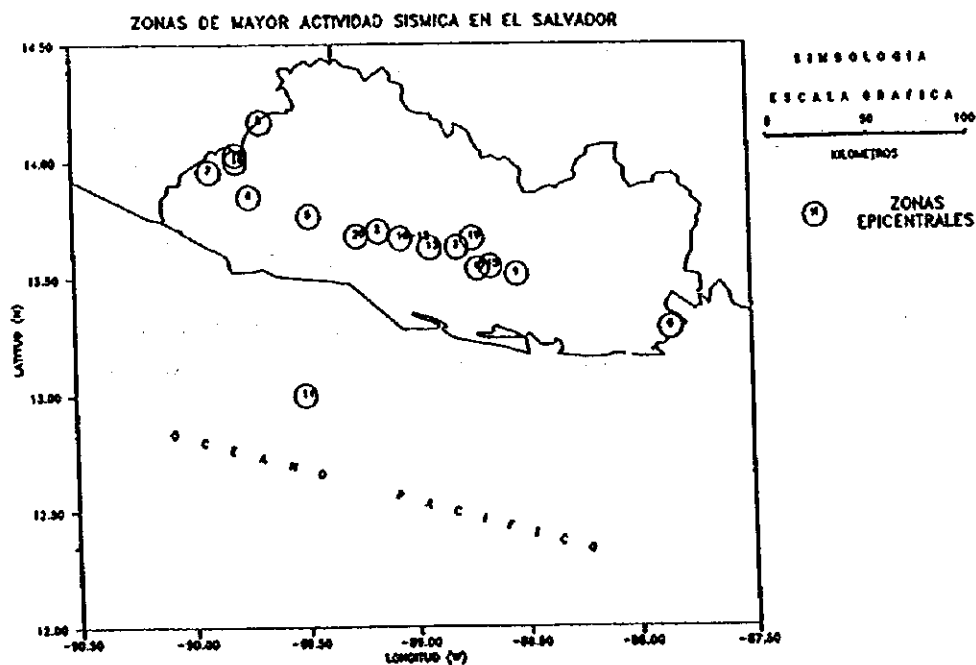


Figure 1-2-3 Main Seismic Active Zones

Table 1-2-1 Frequencies of Earthquakes by Active Zone 1985 - 1996.

<i>No.</i>	<i>Zone</i>	<i>Period</i>	<i>Nos. of earthquakes</i>
1	Berlin-Santiago de Maria	April 1985	>5,000
2	San Salvador	October 1986	>10,000
3	San Vicente	January 1987	>200
4	Apañeca-Izalco	June 1989	>50
5	Ateos-Sacacoyo	October 1990	>200
6	Conchagua	February 1991	>7,000
7	Ahuachapan	July 1992	>400
8	Candelaria de La Frontera	January 1994	>30
9	Chanmico-Volcan de San Salvador-Lago de Ilopango-Volcan de San Vicente *	April 1994	>90
10	Lago de Ilopango	July 1994	>50
11	Zona de Subduccion	October 1994	>45
12	Lago de Ilopango	June 1995	>50
13	Lago de Ilopango-Volcan de San Vicente	July-August 1995	>100
14	Costas Nicaraguenses **	March 1996	>170
15	Volcan de San Vicente-Rio Lempa	May 1996	>25
16	Atiquizaya-San Lorenzo	May 1996	>10
17	Suroriente Volcan de San Vicente	September 1996	>35
18	San Lorenzo	September 1996	>25
19	Noreste Volcan de San Vicente	October 1996	>10
20	Antiguo Cuscatlan	Octubre 1996	>9

\* It is not on the map, because the zone is too big to represent it.

\*\* It is not on the map, because that places are located out of the Salvadorean borders.

Table 1-2-2 Chronicle of Main Earthquakes in El Salvador.

Date	Time	Location	Magnitude	Depth (km)	Maximal Intensity	Epicenter	Damages	References
May 23 1576	-	-	-	-	-	Between San Marcos and Santo Tomas, San Salvador.	Total San Salvador destruction	Lomnitz and Schulz (1966)
Sep. 30, 1659	-	-	-	-	-	-	Big eruption of San Salvador volcano, total destruction of San Salvador.	Lomnitz and Schulz (1966)
April 16, 1854	-	-	-	-	-	The intensity was near to San Jacinto, San Salvador.	San Salvador in ruins, the capital city was moved to Santa Tecla	Lomnitz and Schulz (1966)
April 18, 1902	-	-	Ms=7.9 (Alfaro et al, 1990)	-	-	-	A Tsunami in Ahuachapan destroyed Barra de Santiago, Cara Sucia and Garita Palmera. Damages at the east of San Salvador.	Martinez (1978)
July 18, 1912	-	-	Ms=5.9 (White and Harlow, 1993)	-	-	-	Big earthquake caused damages in Armenia, Izalco and Santa Ana.	Martinez (1978)
June 8, 1917	-	-	Ms=6.5 (White and Harlow, 1993)	-	-	-	Eruption of San Salvador Volcano. An earthquake destroyed Armenia and caused damages in Ateos, Sacacoyo and San Julian. A second earthquake damaged San Salvador, Apopa, Nejapa, Quezaltepeque, Opico and Santa Tecla.	Jordan and Martinez (1978)
May 6, 1951	17:02	13.50° N 88.42° W	6.25 (USGS)	20	VIII in Jucuapa and Chinameca	Jucuapa and Chinameca	400 or 500 persons died.	Mayer-Abic (1951)

Table 1-2-2 Chronicle of Main Earthquakes in El Salvador.

Date	Local Hour	Location	Magnitude	Depth (KM)	Maximal Intensity	Epicenter	Damages	References
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Sep. 30, 1659	-	-	-	-	-	-	Big eruption of San Salvador volcano, total destruction of San Salvador.	Lomnitz and Schulz (1966)
April 16, 1854	-	-	-	-	-	The intensity was near to San Jacinto, San Salvador.	San Salvador in ruins, the capital city was moved to Santa Tecla	Lomnitz and Schulz (1966)
April 18, 1902	-	-	Ms=7.9 (Alfaro et al. 1990)	-	-	-	A Tsunami in Ahuachapan destroyed Barra de Santiago, Cara Sucia and Garita Palmera. Damages at the east of San Salvador.	Martinez (1978)
July 18, 1912	-	-	Ms=5.9 (White and Harlow, 1993)	-	-	-	Big earthquake caused damages in Armenia, Izalco and Santa Ana.	Martinez (1978)
June 8, 1917	-	-	Ms=6.5 (White and Harlow, 1993)	-	-	-	Eruption of San Salvador Volcano. An earthquake destroyed Armenia and caused damages in Ateos, Sacacoyo and San Julian. A second earthquake damaged San Salvador, Apopa, Nejapa, Quezaltepeque, Opico and Santa Tecla.	Jordan and Martinez (1978)
May 6, 1951	17:02	13.50° N 88.42° W	6.25 (USGS)	20	VIII in Jucuapa and Chinameca	Jucuapa and Chinameca	400 or 500 persons died.	Mayer-Abic (1951)



April 12, 1961	16:20	13.10° N 88.90° W	5.75 (USGS)	122	VI in San Salvador	Pacific Ocean	Little damages in San Salvador and South zone of El Salvador	USGS No 30 61 (1191). GRC (Internal Report)
May 3, 1965	04:01	13.65° N 89.15° W	M <sub>s</sub> =6.0 (WHITE)	10	VII in San Salvador	San Salvador	125 dead, 400 injured and 4000 houses destroyed.	USGS No. 44 65 (1965). Lornitz and Shultz (1966) White et al (1987).
February 4, 1976	03:02	15.32° N 89.08° W	M <sub>s</sub> =7.5	5	IX in Guatemala city. V in San Salvador	Guatemala	In Guatemala there were 254,750 destroyed houses, over 22,700 dead and more than 76,000 injured. There were no damages at San Salvador.	Geological Survey (1976)
June 19, 1982	00:22	13.35° N 89.63° W	7.0	80	VII in San Salvador	Pacific Ocean	According to the Salvadorean Red Cross report, 8 persons died and 96 were injured. Almost 5000 persons lost their houses.	GRC (1983)
April 23, 1985	09:16	13.56° N 88.67° W	mb=4.8 (USGS)	-	VI in Berlin	Berlin area, Cuscatlan Province	Over 5,000 earthquakes registered, 167 of them were sensible in the epicenter area.	USGS (1985) GRC (1985)
October 10, 1986	11:49	13.67° N 89.19° W	mb=5.4 (GRC-USGS)	8	VIII-IX in San Salvador	San Salvador	1,500 dead, 10,000 injured, 60,000 houses destroyed o high damaged.	Alvarez (1987)
November 3, 1988	08:47	13.88° N 90.45° W	mb=5.6 (USGS)	69	VI in Ahuachapán	Pacific Ocean. To the south of San Jose Province, Guatemala	5 persons died, some injured and almost 100 houses were damages al South Guatemala.	USGS (1988) GRC (Internal Report)

Glossary:

- : No data registered
- mb : Magnitude of body waves
- M<sub>s</sub> : Magnitude of surface waves
- USGS : United States Geological Survey
- GRC : Geotechnical Research Center
- PROF : Depth in kilometers
- MM : Intensity Scale of Mercalli Modified

#### 1.2.4 Tsunami

12. Tsunamis result from submarine earthquakes and may cause rises in water level considerable greater than those predicted tidal heights.

13. A Tsunami catalogue is compiled containing 50 events in the period 1539 to 1996. All earthquakes occurred along the both Caribbean and Pacific coasts of Central America, except two regional (from Ecuador and Chile) and one distant (from Aleutian). Not all have reliable information, 9 (20%) events reported have some degree of uncertainty in the earthquake and/or tsunami occurrence. Among the events there is one possible seiche in the Nicaragua Lake, and a curious case of a lahar from the Cosiguina volcano crater lake triggered by local earthquake.

14. The numbers of events reported increased dramatically after the middle of the XIX Century, 43 (86%) occurred between 1850 and 1996. Probably it is a consequence of the lack of population living near the coast before that time. The number of events is 4 (8%) for the XVI-XVIII centuries, 11 (22%) in the XIX, and 35 (69%) in the XX century.

15. The number of better documented tsunami events are 34 (68%) locals, one regional, and one distant (according to the epicentral location of the tsunamigenic earthquake). The local tsunamis, 22 (65%) are in the Pacific side, and the rest 12 (35%) in the Caribbean coast. A preliminary seismotectonic regionalization of the earthquakes sources shows that, in the Pacific, 16 events could be generated by the Cocos Caribbean Subduction Zone (COCOS-CARIB), 1 (one) event by the Panama Fracture Zone (PFZ), and 2 events by intraplate (Panama Block) shallow faults (Canal Discontinuity and Azuero-Torio Fault Zone). In the Plates Boundary (NOAM-CARIB), and 7 events with the North Panama Deformed Belt (NPDB). The above shows the non common case of tsunamigenic earthquakes related with a strike-slip fault system both in the Caribbean and Pacific.

16. There are ten local tsunamis with specific damage report, seven in the Pacific coast, and the rest in the Caribbean. All of them have tsunami magnitude (m) in the Imamura-Iida scale between 0-2.5.

17. The total number of casualties due to local tsunamis is less than 300. This number could increase to approximately 500 in case that the February 2, 1902 El Salvador event is confirmed to had been trigger by an earthquake. The damages reported go from coastal and ship damage to small towns destruction, and there does not exist a quantification of them.

18. The major damaging local tsunamis are: the Nicaragua september 2, 1992, tsunami earthquake ( $M_s=7.2$ ,  $m=2.5$ , 170 casualties) in the Pacific coast, the Honduras Gulf event of august 4, 1856 ( $M_s=7-8$ ,  $m=2$ ) and the Panama September 7, 1882 ( $M_s=7.9$ ,  $m=1$ , 75-100 casualties) in the central and eastern Caribbean coast.

19. The only non-local tsunami that has a damage report is related with the Aleutian earthquake of March 10, 1957 ( $M_s=8.1$ ) that produced damages and some casualties along the El Salvador coast, and total destruction of part of Acajutla Port, in that moment in construction.

Table 1-2-3 Tsunami List for Central America, 1939-1996

No	DATE	TIME	EARTHQUAKE SOURCE PARAMETERS			TSUNAMI PARAMETERS			TECTONIC REGION	OCEAN
			Lat (°N)	Lon (°W)	M <sub>s</sub> /I	T	REGION	m		
1	1939-1124	---	---	---	---	L	Honduras Gulf, HON	--	NO-CA	C
2	1979-0316	---	---	---	---	L	Cano Island, CR	--	CO-CA	P
3	1621-0502	---	8.97	79.5	5.6-6.0	L	Panama la Vieja, PAN	--	CANAL DISCONTINUITY	P
4	1798-0222	---	10.2	82.9	VI-VI+	L	Matina, CR	-1	NPDB	C
5	1822-0507	---	9.5	83.0	7.6	L	Matina, CR	-1	NPDB	C
6	1825-02--	---	---	---	5-5.5	L	Rosatan Island, Honduras Gulf, HON	--	NO-CA	C
7	1844-05--	---	11.2	84.8	7.0-7.3	S?	Nicaragua Lake, NIC	--	CO-CA	M-L
8	*1854-0805	05:30	8.3	83.0	7.25	L	Golfo Dulce, CR	1.5	(CO-CA)	P
9	1855-0925	---	---	---	6-6.5	L	Trujillo Bay, Honduras Gulf, HON	--	NO-CA	C
10	*1856-0804	---	---	---	7-8	L	Omoa, Honduras Gulf, HON	2	NO-CA	C
11	*1859-0826	---	13.0	87.5	6-6.5	L	Amapala, Fonseca Gulf, HON	1.5	CO-CA	P
12	*1859-1209	---	13.7	89.8	7-7.9	L	Acajutla Bay, SAL	1.5	CO-CA	P
13	1873-1014	00:05	10.2	80.0	V	L	Colon & Panama, Harbors, PAN	--	NPDB	C
14	*1882-0907	09:18	10.0	79.0	7.9	L	San Blas Coast, PAN	2	NPDB	C
15	1884-1105	---	4.0	78.0	---	L?	Acandí, Colombia	--	Colombia	P
17	1902-0118	23:23	14.7	91.6	6.3	L?	Ocos, GUA	--	(CO-CA)	P
18	*1902-0226	---	13.0	89.0	7.0	7L	Pacific Coast, GUA-SAL	2		P
19	1902-0419	02:24	14.9	91.5	7.5	L?	Ocos, GUA	-1	CO-CA	P
20	1904-0120	14:50	7.0	82.0	7.0	L?		--		P
21	1904-1220	03:42	9.2	82.8	7.65	L	Bocas del Toro, PAN	--	NPDB	C
22	1905-0120	18:23	9.85	84.68	6.8	L?	Coco Island, CR	--	(CO-CA)	P
23	1906-0131	15:36	1.0	81.3	8.2	R	Tumaco, Ecuador San Carlos, PAN Potrero Bay, CR	--	ECUADOR	P
24	1906-----	---	---	---	---	T	El Salvador Coast, SAL	--		P
25	1913-1002	04:23	7.1	80.6	6.7	L	Azuero Peninsula, San Miguel Gulf, PAN	-1	AZUERO-TORIO P.E.	P
26	1915-0907	01:30	13.9	89.6	7.7	L?	El Salvador Coast, SAL	0.5	CO-CA	P
27	1916-0131	---	---	---	---	T	Panama Canal, PAN	--		P
28	*1916-0424	02:21	9.2	83.1	6.3	L	Bocas del Toro, PAN	0	NPDB	C
29	1916-0525	---	12.0	90.0	7.5	7L?	El Salvador	--		P
30	1919-0429	23:14	13.5	87.5	6.7	L	Corinto, NIC	--	(CO-CA)	P
31	*1919-1212	---	---	---	---	L	El Ostiel, NIC	--	(CO-CA)	P
32	1920-1206	---	---	---	---	L	Fonseca Gulf	--		P
33	1926-1105	07:55	12.3	85.8	7.0	L	Offshore, NIC	--	(CO-CA)	P

36	*1934-0718	01:36	8.1	83.6	7.5	L	Chiriquí Gulf, PAN	1.5	FFE	F
39	1941-1205	10:46	8.7	83.2	7.6	L	Pta. Dominical, CR	-1	CO-CA	F
36	1941-1206	---	10.0	85.3	6.9	L	Nicoya Gulf, CR	-2	(CO-CA)	F
37	1950-1005	16:09	10.0	82.7	7.9	L	Coasts CR-NIC-SAL	-1	CO-CA	F
38	1950-1023	16:13	14.3	91.8	7.3	L	Coasts GUA-SAL	-1	CO-CA	F
39	*1951-0803	06:24	13.0	87.5	6.0	LM	Potosí, Fonseca Gulf, HON	--	(CO-CA)	F
40	1952-0513	19:31	10.3	85.3	6.9	L	Puntarenas, CR	-3	CO-CA	F
41	1956-1024	14:42	11.5	86.3	7.3	L7	San Juan del Sur, NIC	--	CO-CA	F
42	*1957-0310	14:42	51.63	175.41	8.1	D	Acajutla, SAL	--	ALBUTAM	F
43	1960-0522	19:11	-36.2	73.50	8.5	R7	La Unión, Fonseca G., SAL	--	CHILE	F
44	1962-0312	11:40	8.0	89.9	6.7	L	Armuélias, Chiriquí O., PAN	-1	CO-CA	F
45	1964-0925	10:38	15.6	92.6	6.0		Pacific Coast	--		F
46	1974-0204	09:01	13.2	89.2	7.5	L	Cortez, Morón G., HON	-0.5	NO-CA	C
47	1974-0711	16:54	7.43	78.12	7.0	L	Jaqué, Darién, PAN	-1		F
48	1990-0325	13:16	9.8	84.8	7.0	L	Puntarenas & Quepos, CR	0	CO-CA	F
49	1991-0422	21:56	9.6	83.2	7.6	L	Bocas del Toro, PAN	1	NPDB	C
50	*1992-0902	00:16	11.7	87.4	7.2	L	Nicaragua Coast Bahía de Salinas, and Papagayo G., CR	2.5	CO-CA	F

\* = damage report  
 T = tsunami type  
 L = local tsunami  
 R = Regional Tsunami  
 D = Distant Tsunami  
 S = seiche  
 LH = Lahar  
 M = tsunami magnitude  
 NO-CA = North America-Caribbean plate boundary  
 CO-CA = Cocos-Caribbean subduction zone  
 NPDB = North Panama Deformed Belt  
 I = IMX intensity scale  
 ? = event included in previous tsunami specific catalogues. But is poor documented, doubtful or are contradictory reports before the tsunami symbol refers to the earthquake event and after to tsunami event.  
 ( ) = inferred in this study, only when was considered obvious  
 C = Caribbean  
 P = Pacific  
 N-L = Nicaragua lake

Table 1-2-4 Qualitative Imamura-Iida Tsunami Magnitude (m) Scale.

M	H (Tsunami height)	Damage
4	30 m	Considerable damage along more than 500 km of coastline
3	10-20 m	Considerable damage along more than 400 km of coastline
2	4 - 6 m	Damage and lives lost in certain landward areas
1	2 m	Coastal and ship damage
0	1 m	Very small damage
-1	50 cm	None

## 1.3 Socio-Economic Activity

### 1.3.1 Population

1. First population census was conducted in 1930. Additional census followed 1950, 1961, 1971 and 1992. The result of those census are shown in Table 1-3-1. The population of Region 2 had recorded a greater growth rate compare with the other three regions except for the period between 1950 to 1961. The growth rate of population of Region 3 and Region 4 slowed remarkably after 1971. In comparison to 4 region, Region 2 has more than 45 % of population and it's share continue to increase. The metropolitan area of San Salvador is the most densely populated area in the country with approximately 29 % of the total population living there. Other densely populated cities are Santa Ana and San Miguel.

2. A projection of El Salvador's population to the year 2025 was prepared by the Ministry of Economy in 1995. The result are shown in Table 1-3-2 and Figure 1-3-1. Population projection by Department to the

Table 1-3-2 Population Projection to the year 2015

	unit : thousands								
Year	1995	1996	1997	1998	1999	2000	2005	2010	2015
Male	2,776.3	2,835.3	2,896.1	2,957.8	3,019.6	3,080.7	3,380.3	3,662.6	3,929.8
Female	2,892.3	2,951.8	3,012.4	3,073.5	3,134.7	3,195.3	3,494.6	3,778.1	4,047.6
Total	5,668.6	5,787.1	5,908.5	6,031.3	6,154.3	6,276.0	6,874.9	7,440.7	7,977.4
growth rate (%)	2.1	2.1	2.1	2.0	2.0	1.9	1.7	1.5	1.4

Source : Ministry of Economy

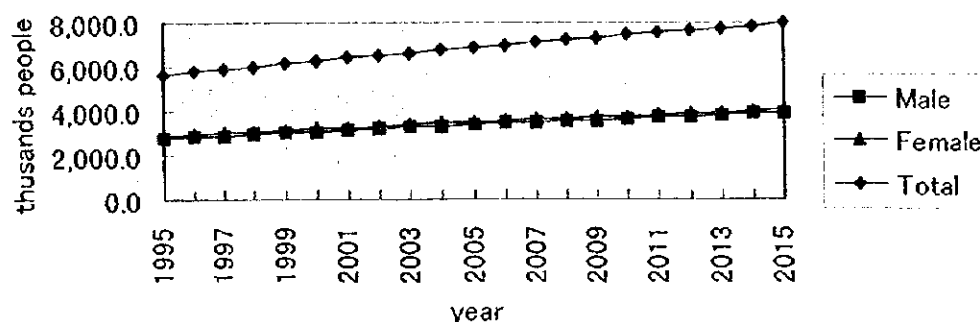


Figure 1-3-1 Population Projection to the Year 2015

Table 1-3-1 Result of Population Census

Year	1930			1961			1971			1992		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Region 1												
Ahuachapan	39,730	39,303	79,033	47,921	46,725	94,646	65,764	64,946	130,710	90,533	87,939	178,472
Santa Ana	77,875	76,618	154,493	101,275	101,180	202,455	128,560	130,595	259,155	167,076	168,777	335,853
Sonsontate	50,030	50,187	100,217	60,274	60,053	120,327	83,298	83,634	166,932	119,439	117,620	237,059
Sub Total	167,635	166,108	333,743	209,470	207,958	417,428	277,622	279,175	556,797	377,048	374,336	751,384
share (%)			23.27			20.24			22.17			21.14
growth rate(%)						25.07			33.39			34.95
Region 2												
Chalatenango	41,694	41,522	83,216	53,361	52,498	105,859	65,309	64,688	129,997	88,091	84,754	172,845
Cuscatlan	41,088	42,275	83,363	139,997	156,455	296,452	55,376	57,666	113,042	75,996	76,329	152,325
La Libertad	60,916	57,444	118,360	72,901	71,103	144,004	101,743	101,737	203,480	143,211	142,364	285,575
San Salvador	92,861	98,264	191,125	139,997	156,455	296,452	218,753	244,475	463,228	346,377	387,068	733,445
Sub Total	236,559	239,505	476,064	406,256	436,511	842,767	441,181	468,466	909,647	653,675	691,015	1,344,690
share (%)			33.19			40.87			36.23			37.83
growth rate(%)						77.03			7.94			47.83
Region 3												
Cabanas	29,452	29,629	59,081	38,732	38,896	77,628	47,292	47,298	94,590	66,073	65,008	131,081
La Paz	43,467	42,166	85,632	48,085	48,758	96,843	64,820	65,839	130,659	91,066	90,864	181,930
San Vicente	38,323	39,401	77,724	42,980	44,597	87,577	55,974	56,946	112,920	77,589	75,809	153,398
Sub Total	111,242	111,195	222,437	129,797	132,251	262,048	168,086	170,083	338,169	234,728	231,681	466,409
share (%)			15.51			12.71			13.47			13.12
growth rate(%)						17.81			29.05			37.92
Region 4												
La Union	37,492	37,076	74,568	54,977	54,738	109,715	73,784	74,324	148,108	112,485	108,530	221,015
Morazan	37,871	37,790	75,661	48,232	48,497	96,729	59,174	60,207	119,381	78,662	77,390	156,052
San Miguel	63,530	63,052	126,582	85,125	86,109	171,234	114,790	117,031	231,821	159,592	160,910	320,602
Usulután	62,451	62,855	125,306	80,789	81,560	162,349	102,091	104,970	207,061	146,900	147,597	294,497
Sub Total	201,344	200,773	402,117	269,123	270,904	540,027	349,839	356,532	706,371	497,739	494,427	992,166
share (%)			28.03			26.19			28.13			27.91
growth rate(%)						34.30			30.80			40.46
El Salvador	716,780	717,581	1,434,361	1,014,646	1,047,624	2,062,270	1,236,728	1,274,256	2,510,964	1,763,190	1,791,459	3,554,649
growth rate(%)			43.78						21.76			41.56

Source : Ministry of Economy

Table 1-3-3 Population projection at El Salvador by Province

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Region 1</b>																
Ahuachapan	289,047	294,945	300,938	307,056	313,327	319,780	326,430	333,259	340,243	347,357	354,578	361,983	369,496	377,141	384,814	392,446
Santa Ana	503,997	512,991	522,139	531,516	541,197	551,259	561,752	572,625	583,804	595,212	606,773	618,633	630,903	643,275	655,521	667,392
Sonsonate	399,854	409,232	419,019	429,143	439,533	450,116	460,894	471,915	483,176	494,678	506,420	518,522	530,988	543,633	556,274	568,725
Sub Total	1,192,898	1,217,168	1,242,096	1,267,715	1,294,057	1,321,155	1,349,076	1,377,793	1,407,223	1,437,247	1,467,771	1,499,128	1,531,387	1,564,049	1,596,609	1,628,563
growth rate(%)		2.03	2.05	2.06	2.08	2.09	2.11	2.13	2.14	2.13	2.12	2.14	2.15	2.13	2.08	2.00
<b>Region 2</b>																
Chalatenango	190,040	191,208	192,501	193,866	195,245	196,583	197,920	199,295	200,645	201,912	203,035	203,964	204,740	205,436	206,127	206,890
Cuscatlan	192,119	194,216	196,413	198,643	200,844	202,951	204,939	206,852	208,725	210,536	212,501	214,459	216,446	218,432	220,389	222,290
La Libertad	584,971	603,370	622,509	642,159	662,096	682,092	702,341	722,992	743,757	764,349	784,478	804,194	823,511	842,624	861,485	880,107
San Salvador	1,724,517	1,777,799	1,831,532	1,884,700	1,936,290	1,985,294	2,031,792	2,076,461	2,119,172	2,159,793	2,198,193	2,233,696	2,266,387	2,297,282	2,327,400	2,357,761
Sub Total	2,691,647	2,766,593	2,842,955	2,919,368	2,994,475	3,066,920	3,136,992	3,205,600	3,272,299	3,336,650	3,398,207	3,456,233	3,511,084	3,563,774	3,615,401	3,667,048
growth rate(%)		2.78	2.76	2.69	2.57	2.42	2.28	2.19	2.08	1.97	1.84	1.71	1.59	1.50	1.45	1.43
<b>Region 3</b>																
Cabanas	148,302	149,248	150,173	151,079	151,968	152,842	153,696	154,532	155,352	156,162	156,964	157,709	158,395	159,096	159,889	160,850
La Paz	269,244	273,805	278,465	283,209	288,022	292,887	297,806	302,790	307,836	312,943	318,107	323,343	328,666	334,086	339,429	344,821
San Vicente	152,236	153,575	155,265	157,173	159,165	161,105	163,009	164,967	166,957	168,953	170,937	172,923	174,928	176,925	178,888	180,793
Sub Total	569,782	576,628	583,903	591,461	599,155	606,834	614,511	622,289	630,145	638,058	646,008	653,990	661,989	670,057	678,206	686,464
growth rate(%)		1.20	1.26	1.29	1.30	1.28	1.27	1.27	1.26	1.26	1.25	1.23	1.22	1.22	1.22	1.22
<b>Region 4</b>																
La Union	274,581	277,390	280,298	283,246	286,173	289,021	291,738	294,425	297,067	299,727	302,450	305,301	308,249	311,197	314,051	316,715
Marazan	169,319	170,072	170,861	171,692	172,569	173,499	174,493	175,548	176,646	177,768	178,897	180,066	181,285	182,507	183,679	184,757
San Miguel	440,722	447,372	455,270	463,049	471,341	480,276	489,887	500,084	510,824	522,037	533,798	546,022	558,942	572,264	585,753	599,173
Usulután	329,656	331,370	333,077	334,973	336,541	338,332	340,173	342,053	343,964	345,901	347,855	349,908	352,053	354,200	356,199	357,942
Sub Total	1,214,278	1,226,704	1,239,506	1,252,962	1,266,624	1,281,128	1,296,311	1,312,110	1,328,501	1,345,453	1,362,940	1,381,297	1,400,539	1,420,168	1,439,682	1,458,387
growth rate(%)		1.02	1.04	1.09	1.09	1.15	1.19	1.22	1.25	1.28	1.30	1.35	1.39	1.40	1.37	1.31
<b>El Salvador</b>	5,668,605	5,787,099	5,908,460	6,031,506	6,154,311	6,276,037	6,396,890	6,517,798	6,638,169	6,757,408	6,874,926	6,990,658	7,104,999	7,218,048	7,329,898	7,440,662
Male	2,776,279	2,835,313	2,896,114	2,957,835	3,019,645	3,080,704	3,141,208	3,201,720	3,261,938	3,321,594	3,380,300	3,438,107	3,495,190	3,551,601	3,607,388	3,662,603
Female	2,892,326	2,951,786	3,012,346	3,073,491	3,134,666	3,195,333	3,255,682	3,316,078	3,376,230	3,435,844	3,494,626	3,552,551	3,609,809	3,666,447	3,722,513	3,778,059
growth rate(%)		2.06	2.05	2.03	1.99	1.94	1.89	1.86	1.81	1.77	1.71	1.66	1.61	1.57	1.53	1.49

Source: Ministry of Economy



year 2010 is shown in Table 1-3-3. The growth rate of total population of El Salvador will decrease from 2.1% to 1.4% by the year 2015. The population growth rate of 4 region, Region 1,2,3 and 4 in the year 2010 is estimated as 2.00%, 1.43%, 1.22 % and 1.31% respectively.

### 1.3.2 Gross Domestic Products

3. The gross domestic products (GDP) structure by sector in the period 1992 to 1996 is shown in Table 1-3-4 By the end of the 1970s, El Salvador prevailed as an agricultural country. The agricultural sector directly contributed 25% of the GDP, agricultural exports accounted for about 67% of the country's total foreign currency, generated more than 25% of the income tax and provided jobs to more than 50% of the population.

Table 1-3-4 GDP by Sector 1992 -1996 at 1990 Constant Price  
unit : million Colones

year	1992	1993	1994	1995	1996
Agriculture	6,722.8	6,549.6	6,394.0	6,683.1	6,814.4
share(%)	16.5	15.0	13.8	13.6	13.6
Industry	11,087.8	11,037.9	11,916.0	12,714.0	12,938.0
share(%)	27.3	25.3	25.7	25.8	25.7
Service	22,554.0	23,523.4	24,991.2	26,726.3	27,325.2
share(%)	55.5	53.9	54.0	54.3	54.4
Statistic Discrepancy	278.1	2,527.1	2,977.0	3,114.5	3,169.6
Total	40,642.7	43,638.0	46,278.2	49,237.9	50,247.2

Source : Central Bank

4. Significant changes have occurred in the structure of GDP since the 1980s, partly due to the armed conflict and partly due to the impact of economic policy. Two distinctive features of the change during the period are the decline of agriculture and emergence of new production sectors such as service, finance, and free zone assembly industries. Agriculture's contribution to GDP plummeted from 30% in 1980 to 14% in 1996., while that of service, trade, restaurants and hotels swelled from 9% in 1980 to 20% in 1996. Financial services have boomed as well, largely with the emergence of activities related to family remittances from abroad. The GDP growth rate at current price is shown in Table 1.3.5 and historical trend of GDP per capita is shown in Table 1-3-6.

5. The economic recovery has been reflected in high rates of GDP growth averaging 5.5% per annum since 1990, the third highest rate in Latin America after Chile and Peru. This remarkable economic recovery took place in a very favorable climate that combined the end of the armed conflict, burgeoning foreign capital inflows from external lending and

remittance from abroad, and high levels of idle installed capacity in industry. As the peace process began, the economy reacted vigorously to the sudden release of longstanding pent-up demand for goods and service. As a result, both of GDP and GDP per capita had an upward trend since 1991 with the exception of a slowdown in 1996.

Table 1-3-5 GDP Growth Rate at Current Price

unit : %					
Year	1992	1993	1994	1995	1996
GDP	7.5	7.4	6	6.3	3
Agriculture	8	-1.4	-2.4	5.6	0.6
Manufacturing Industry	9.9	8.3	7.3	7	3.5
Construction	6.4	8.3	11.5	6	1.2
Commerce, Service	11.5	6.5	8.6	8	3.9
Bank, Insurance	21.4	10.7	16	17.2	16
Other	2.7	2.8	3.9	4.2	2.6

Source : Central Bank

Table 1-3-6 Historical Trend of GDP per Capita

Year	US\$ at current price	Colones at 1990 constant price	Growth rate %
1975	399	9,219	0.4
1976	552	9,451	2.5
1977	680	9,852	4.2
1978	707	10,145	3.0
1979	751	9,322	-8.1
1980	779	8,271	-11.3
1981	741	7,323	-11.5
1982	754	6,812	-7.0
1983	842	6,878	1.0
1984	939	6,927	0.7
1985	1,125	6,908	-0.3
1986	743	6,843	-0.9
1987	846	6,929	1.3
1988	989	6,964	0.5
1989	1,131	6,926	-0.5
1990	938	7,140	3.1
1991	1,022	7,258	1.6
1992	1,019	7,646	5.3
1993	1,281	8,035	5.1
1994	1,454	8,335	3.7
1995	1,687	8,655	3.8
1996	1,828	8,743	1.0

Source : Central bank

6. The growth of GDP for the years 1997 to 2000 is expected to be about 5%, considering corrections in sector and macroeconomic imbalances, combined with structural reforms. These will energize the economy and bring about sustained and equitable growth. An important factor to achieve this will be the fostering of public and private investment. Agriculture, manufacturing and construction will exhibit faster growth. The external position will improve as the current account deficit is narrowed through more dynamic exports and inflation settling at international levels over the longer term. Projection of GDP growth rate to the year 2000 is shown in Table 1-3-7.

Table 1-3-7 GDP Growth Rate Projection to the Year 2000

year	GDP growth rate (%)
1997	4.0
1998	4.5
1999	5.5
2000	5.5

Source: IDB, *EL SALVADOR COUNTRY PAPER JUNE 1997*

7. A census of GDP per capita by Department was conducted by UNDP in 1996. The range of GDP per capita is extensive. The highest GDP per capita is in San Salvador, with a value of 4 times of La Union. The result of the census is shown in Table 1-3-8.

Table 1-3-8 GDP per Capita by Department in 1996

Department	GDP per Capita (US\$)
Region 1	
Ahuachapan	1,951
Santa Ana	2,285
Sonsonate	2,171
Region 2	
Chalatenango	1,361
Cuscatlan	1,986
La Libertad	3,193
San Salvador	4,028
Region 3	
Cabanas	1,262
La Paz	1,895
San Vicente	1,583
Region 4	
La Union	1,096
Morazan	1,176
San Miguel	2,265
Usulután	1,819

Source : UNDP

### 1.3.3 Trade

8. During 1995 trade deficit of El Salvador increased 28 % to US\$ 1,691 million. Exports increased 33% to US\$ 1,661 million while imports grew 30% to US\$3,352 million. Foreign trade value by commodities in 1992 to 1995 is shown in Table 1-3-9. Traditional exports are concentrated in four products, coffee (representing a full of 80%), sugar, cotton and shrimp, all highly influenced by external prices. Nontraditional exports grew 350% in 1994, 15 % in 1995 and 6% in 1996 accounting for 34% of total exports. Imports have risen rapidly, fueled by economic expansion, tariff reduction, exchange rate appreciation and substantial family remittances. In fact, purchases from abroad doubled between 1992 and 1996.

Table 1-3-9 Foreign Trade by Commodity

	Million US\$			
year	1992	1993	1994	1995
Total Exports (FOB)	795.6	1,021.8	1,249.3	1,661.3
Coffee	153.4	227.8	275.3	363.8
Animal Products	30.1	37.1	40.8	44.9
Food, Beverage and Tobacco	90.6	90.2	96.5	115.3
Chemical Products	65.7	74.4	80.8	103.5
Papar and Cardboard	44.6	57.5	61.3	65.3
Textile Industry	90.9	98.0	102.5	117.2
Metal Manufactures	30.5	43.2	47.5	57.2
Electric Appliances and Materials	15.3	21.1	23.8	28.8
Shoes and Leather Goods	12.8	14.6	18.2	17.0
Assembly Industry	198.1	290.1	431.4	656.7
<b>Total Imports (FOB)</b>	<b>1,854.5</b>	<b>2,132.2</b>	<b>2,574.0</b>	<b>3,352.4</b>
Animal/Vegetable Products	124.4	112.1	165.9	173.2
Mineral Products	216.7	205.4	224.0	287.1
Chemical Products	252.0	272.9	301.0	374.9
Plastic, Rubber and Resines	99.3	114.0	130.5	167.3
Textile Industry	95.3	110.8	109.6	146.7
Metal Manufacturing	134.8	152.9	173.1	228.9
Electric Appliances and Materials	251.1	340.2	391.3	505.3
Transportation Materials	194.1	240.9	286.5	364.4
Assembly Industry	156.0	220.0	322.7	499.0
<b>Trade Balance</b>	<b>1,058.9</b>	<b>1,110.4</b>	<b>1,324.7</b>	<b>1,691.2</b>

Source : El Salvador Central Reserve Bank

9. The volume ( in tons) and Value ( thousands of colon) of Trade by mode of transportation in 1994 are shown in Table 1-3-10. Imports via ocean freight represented 65.2% of the total in volume but only 32.7% in value. Imports via land freight represented 34.5% in volume and 54.9% in value. In export, ocean freight represented 42.6% of the total in volume, 26.3% in value. Exports via land freight represented 56.6% of the total volume and 68.2% of the value. The value of cargo transported by land is quite high.

Table 1-3-10 Trade Volume and Value by Mode of Transportation  
in 1994 ( January to November )

Import

Mode	Custom Office	Volume		Value	
		(ton)	share	(thousands Colones)	share
Maritime	Acajutla	1,797,439	(97.94)	5,340,382	(96.68)
	La Union	37,781	(2.06)	183,253	(3.32)
	Total	1,835,220	65.17	5,523,635	32.70
Land	El Amatillo	155,360		848,363	
	La Hachadura	101,489		561,138	
	Anguiatu	114,645		33,023	
	San Cristobal	113,628		1,088,930	
	El Poy	42,509		98,740	
	Central	375,536		5,864,186	
	Santa Ana	33,486		530,975	
	Las Chinamas	33,414		246,760	
	Feria Internac	0		0	
	Total	970,067	34.45	9,272,115	54.89
Air	El Salvador	10,578	0.38	2,096,748	12.41
Total	Grand Total	2,815,865		16,892,498	

Export

Mode	Custom Office	Volume		Value	
		(ton)	share	(thousand colones)	share
Maritime	Acajutla	235,368	(100)	1,682,810	(100)
	La Union	0		0	
	Total	235,368	42.59	1,682,810	26.27
Land	El Amatillo	86,637		970,549	
	La Hachadura	45,915		374,099	
	Anguiatu	11,298		126,024	
	San Cristobal	50,422		826,956	
	El Poy	19,214		207,009	
	Central	16,153		297,056	
	Santa Ana	68,584		1,285,963	
	Las Chinamas	14,802		279,051	
	Total	313,025	56.64	4,366,707	68.16
	Air	El Salvador	4,263	0.77	356,682
Total		552,656		6,406,199	

Source : Ministry of Economy Anuario Estadístico 1995

Table 1-3-11 Trade Partner Countries

## Exports Value by Destination

year	1991		1992		1993		1994		1995		1996	
	million US\$	%	million US\$	%	million US\$	%	million US\$	%	million US\$	%	million US\$	%
USA	323.1	44.9	398.3	50.1	519.0	50.3	606.3	48.5	855.7	51.8	954.9	53.4
Germany	105.4	14.6	36.3	4.6	52.9	5.1	122.9	9.8	139.6	8.5	158.9	8.9
Japan	15.6	2.2	4.4	0.6	11.3	1.1	7.1	0.6	14.2	0.9	10.3	0.6
Guatemala	108.0	15.0	135.9	17.1	161.3	15.6	177.4	14.2	217.2	13.1	210.6	11.8
Honduras	21.5	3.0	30.6	3.8	47.9	4.6	56.1	4.5	79.6	4.8	97.5	5.4
Nicaragua	20.7	2.9	30.8	3.9	35.0	3.4	37.0	3.0	42.3	2.6	53.7	3.0
Costa Rica	44.0	6.1	59.9	7.5	66.1	6.4	72.8	5.8	88.2	5.3	93.3	5.2
Others	81.7	11.3	99.3	12.5	138.6	13.4	169.8	13.6	215.2	13.0	210.0	11.7
Total	720.0		795.5		1,032.1		1,249.4		1,652.0		1,789.2	

## Imports Value by Origin

year	1991		1992		1993		1994		1995		1996	
	million US\$	%	million US\$	%	million US\$	%	million US\$	%	million US\$	%	million US\$	%
USA	681.4	45.0	833.8	45.0	1,076.8	50.2	1,233.6	47.9	1,674.8	50.3	1,606.7	49.9
Germany	59.9	4.0	78.0	4.2	66.4	3.1	72.1	2.8	89.0	2.7	97.8	3.0
Japan	68.3	4.5	88.6	4.8	97.1	4.5	142.7	5.5	142.1	4.3	114.1	3.5
Guatemala	164.0	10.8	196.6	10.6	206.7	9.6	242.1	9.4	303.9	9.1	279.8	8.7
Honduras	18.7	1.2	30.2	1.6	34.4	1.6	45.8	1.8	54.7	1.6	70.3	2.2
Nicaragua	17.5	1.2	16.2	0.9	17.2	0.8	31.5	1.2	36.6	1.1	54.1	1.7
Costa Rica	41.4	2.7	61.6	3.3	68.6	3.2	78.5	3.0	97.0	2.9	101.7	3.2
Others	461.8	30.5	549.5	29.6	577.5	26.9	727.9	28.3	931.0	28.0	898.0	27.9
Total	1,513.0		1,854.5		2,144.7		2,574.2		3,329.1		3,222.5	

Source : Central Bank

10. The trade partners of El Salvador and the value represented by each (1991 to 1996) are shown in Table 1-3-11. The share of both imports and exports from/to the USA is almost 50 %. Guatemala is next largest trading partner although its share of the total has been decreasing. The share of volume in exports and imports of Honduras, Nicaragua and Costa Rica is stable at 13 % and 6 % respectively.

### 1.3.4 Balance of Payments

11. Remittances have played a crucial role in developing of the Salvadorean economy. They contribute to economic recovery through increased consumer demand, providing significant flows of resources affecting monetary and exchange policy, financing more than 50% of the trade deficit, alleviating the social cost of economic adjustment and even modifying the country's work ethic. Table 1-3-12 shows the balance of payments of El Salvador from 1992 to 1995 and Table 1-3-13 shows Impact of Remittance

Table 1-3-12 Balance of Payments

year	Million US\$			
	1992	1993	1994	1995
Trade Balance	1,058.9	1,110.4	1,324.7	1,691.2
Unilateral Transfer	934.4	1,043.4	1,285.1	1,389.5
Current Account Balance	151.5	78.8	179.0	275.6
Capital Account Balance	216.8	204.1	161.0	422.2
Balance of Payment	65.4	125.5	143.1	146.6

Source : El Salvador Central Reserve Bank

Table 1-3-13 Impact of Remittance

year	Remittance		Remittance / Exports (%)	Remittance / Imports (%)
	US million \$	(%) GDP		
1990	345	6.8	53.6	26.0
1991	542	9.2	92.3	42.0
1992	708	11.9	118.4	45.0
1993	823	11.8	125.8	47.0
1994	1,001	12.3	80.0	42.0
1995	1,195	12.4	72.0	40.0
1996	1,179	11.2	94.0	36.0

Source : IDB, Central Bank

12. Since the mid 1980s and particularly during the 1990s as a result of the peace process and the legalization of foreign exchange houses, family remittances have flowed into the country in very significant amounts, representing 11.2 % of GDP in 1996. Since 1990 family



remittance have increased in importance and represent more than 80% of the trade deficit.

### 1.3.5 Price

13. A priority of the government of El Salvador is to control inflation, though fiscal and monetary discipline determined by the liberalization of interest rates, the exchange rate and the flows of external capital. The Consumer Price index from 1987 to 1995 is shown in Table 1-3-14.

Table 1-3-14 Consumer Price Index  
1987 = 100

year	Consumer Price Index
1987	100.00
1988	119.93
1989	140.91
1990	174.83
1991	199.30
1992	222.03
1993	263.99
1994	291.96
1995	321.68

Source : Central Bank

### 1.3.6 Exchange Rate

14. The national currency is the colon, which during the last few years has maintained a stable exchange rate at 8.75 colon per US\$ 1.00. The flow of remittances has helped push up the value of the currency upwards. Exchange rate from 1990 to 1996 is shown in Table 1-3-15.

Table 1-3-15 Exchange Rate in 1990 -1996

year	Exchange Rate	
	sell	buy
1990	7.66	7.69
1991	8.01	8.08
1992	8.37	8.45
1993	8.70	8.78
1994	8.72	8.78
1995	8.72	8.79
1996	8.72	8.79

Source : Central Bank

## 1.4 Transportation

### 1.4.1 Road

1. The existing road network remains insufficient though gradual improvement has been observed. In the mid 1980's, the total length of the road network had reached the level of 12,000 km thanks to expansion and pavement projects funded by the government during the 1950's to 1960's. However, many roads require large scale rehabilitation because some sections were torn apart during the civil war while other sections are in poor condition.

2. At present, the total length of the roads network is estimated at 12,500 km, including major city roads under local authorities jurisdiction and the national roads under the Ministry of Public Works. According to the national statistics, in 1994 the length of national roads was 9,847 km (79%), of which only 16% are paved roads (see Table 1-4-1).

Table 1-4-1 Present Condition of National Road Network

(Unit: km)

	1990	1994
<b>Total</b>	<b>12,312</b>	<b>12,540</b>
<b>Class</b>		
Special Road	119	246
1 <sup>st</sup> Class Road	656	607
2 <sup>nd</sup> Class Road	1,026	1,103
3 <sup>rd</sup> Class Road	1,847	1,740
Local Road	6,152	6,149
Municipal Road	2,510	2,693
<b>Pavement</b>		
Paved Road	1,814	1,969
Gravel Road	3,541	3,524
Dirt Road	6,957	7,047
<b>Traffic Condition</b>		
Without Restriction	5,355	5,492
With Restriction	4,447	4,354
Only for Dry Season	2,510	2,693

Source: Annual Statistics 1995 (Ministry of Economy)

3. There are two roads of prime importance which run through the country. One is the Pan-american highway (CA-1) which connects the North and South American continents. It runs from San Cristobal on the west border with

Guatemala, via San Salvador and San Miguel, to El Amatillo on the east border with Honduras. The traffic volume was 2,000 to 8,000 vehicles /day in 1996, excluding the traffic concentration around the capital which ranged from 8,000 to 43,000 vehicles/day.

4. The other is the Litoral (Coastal) national highway (CA-2). It runs along the Pacific coastline, south of the Pan-american highway. It is vitally important for maritime port development since it runs through Acajutla in the western region and Cutuco in La Union via Zacatecoluca and Usulután in the eastern region. The traffic volume was 1,000 to 5,000 vehicles /day in 1996.

5. Acajutla is connected with San Salvador via Sonsonate. Its major part is wide enough for four lanes and in relatively good condition.

6. Major parts of the Pan-american and Litoral highways have been under rehabilitation and improvement with support from IDB, Japan and other countries. This includes a major bottleneck at the bridge crossing the Lempa river.

7. This rehabilitation work will be finished by the year 2000 and will greatly increase and facilitate transportation to the eastern region. However, even after the rehabilitation, most parts of these highways will consist of 2 lanes except the 4-lane highway between San Salvador and Santa Ana. The route between San Miguel and La Union is not scheduled to undergo rehabilitation. The City of La Union puts priority on increasing the cargo traffic capacity of this route.

8. All other major roads should be rehabilitated as soon as possible since almost all domestic cargo transportation relies on roads.

9. In addition, a master plan for national road network should be prepared as soon as possible. In the plan, principal roads should have at least 4 lanes to cope with the increasing traffic demand.

10. In 1993 the number of registered cars was about 209,169; 156,979 are private cars (75%), and others are buses(3%), trucks(6%), military vehicles(10%) and others(5%). This number has greatly increased with the massive importation of used vehicles. As an example, traffic volume even in La Union has almost doubled in the seven years from 1990- to 1996.

## 1.4.2 Railroad

11. El Salvador has a national railroad corporation named Ferrocarriles Nacionales de El Salvador (FENADESAL), which operates narrow-gauge railroads. Total length of the railroad network is 639 km.

12. One railroad reaches the Port of Acajutla to the west through San Salvador, as well as the Port of Cutuco in La Union facing the Gulf of Fonseca to the east. The second railroad runs 150 km from San Salvador to Guatemala, and a third one runs from Santa Ana to Ahuachapan in the western region of the country.

13. They are of a single track, slow (15 km/h) and inefficient, and have been used mainly for cargo transportation. In addition, they were damaged heavily during the civil war. They haven't been rehabilitated at all since cost-performance seems to have been a priority in the improvement of roads.

Table 1-4-2 Railroad Transportation

	1990	1995
Passenger-kilometers	5,938,002	4,518,435
Tonnage-kilometers	37,540,563	13,385,678
Traveling Distance	527,138	206,314
Passenger	380,004	291,512
Cargo (t)	324,720	136,749

Source: Annual Statistics 1995 (Ministry of Economy)

## 1.4.3 Air Transportation

14. El Salvador is said to have the most modern international airport in Central America. The airport began operations in 1980 with Japanese financial and technical support. The main airstrip is 3,200 m long and is located in Comalapa, 42 km south of San Salvador.

15. Major airlines operating out of the airport include American Airlines, United Airlines, Continental Airlines, Iberia and airlines from neighboring countries. TACA (Transportes Aereos Centroamericanos), El Salvador's national airline, uses the airport as its base of operations. It flies to major cities in Central America, Mexico City, Miami, Los Angeles, San Francisco, Washington, D.C., New York, Houston and New Orleans.

16. Domestic air transportation is not as important given the size of the country and the short distances between cities.

17. Civil aviation affairs are under the control of CEPA(Comission Ejectiva Portuaria Autonoma), which administrates ports such as Acajutla and FENADESAL(railroads).

Table 1-4-3 Air Transportation

Passenger	Arrival		Departure	
	1990	1995	1990	1995
Number of Flight	6,348	16,317	6,346	16,280
Total <sup>(1)</sup>	264,193	514,181	240,600	409,202
Transit	160,858	7,821		
Cargo (kg)	1990	1995	1990	1995
Total <sup>(2)</sup>	7,829,086	15,958,193	6,530,228	16,006,349
Mail	322,158	241,041	124,753	141,735

(Note) (1):Transit excluded; (2) Mail excluded

Source: Annual Statistics 1995 (Ministry of Economy)