7. DEVELOPMENT PLAN RELATED TO THE PORT OF LA UNION

7.1 National Development Plan

1. What follows is the outline of the "Economic and Social Development Plan 1994-1999"of the present Government of El Salvador.

(1) Principal Actions of Macro-economy Policy

1) Reduction of Inflation

To reduce the rate of inflation at the steady level of digit, by which the investment may be promoted through the reduction of the rate of interest, creating more employment and increasing the productivity and wages.

Table 7-1-1 Inflation Rate in the Past 10 Years(1987-1996)

Years	87-89	90	91	92	93	94	95	96
Inflation rate(%)	20.4	19.3	9.8	20.0	12.1	8.9	11.4	7.4

Source: MIPLAN, Central Bank

(Note) According to the authorities, the inflation rate of the year 1997 is expected to be reduced at the level of around 2.5%.

2) Elimination of Fiscal Deficit

To increase revenue and rationalize expenditure. Improvement of the administration of taxation , as well a continuation of privatization process, will be a fundamental element to increase the revenue. As for the expenditure, it is necessary to keep on changing its composition in favor of social sectors and financing of goods and services and investment, and to start a process of modernization of the State to use more efficiently the public resources.

3) Increase of Domestic Saving

4) Maintenance of Liberalization of Macro-prices

Rate of interest, exchange rate and wages are macro-prices of the economy which must be maintained free.

5) Increase of Exports and Regional Integration

6) Realization of Pending Structural Reforms

Table 7-1-2 Forecast of GDP, 1994-1999

Years	94	95	96	97	98	99
GDP(%)	5.5 (6.2)	5.5 (6.5)	6.0 (3.0)	6.0	6.5	7.0
GDP per capita	3.1	3.2	3.7	3.7	4.2	4.7

Source : Central Bank ( ): realized

(2) Sectorial Strategy of Social Development to Overcome Poverty

1) Education and Culture
- To raise the school attendance rate of basic education
- To reduce the non-literacy rate, especially in rural area

2) Health and Nutrition
- To improve the health conditions and the nutritional level for children less than 5 years old and mothers in pregnancy or lactation
- To avoid the proliferation of contagious disease and to consolidate coverage of infantile vaccination
- To improve the physical and environmental condition of population, especially in rural or urban-marginal zones
- To strengthen health education
- To establish universal medical care insurance

3) Family and Vulnerable Group
- To consolidate a role of the National Family Secretariat (SNF) as coordinative and integrative organization
- To arrange legal scheme more adequate to the real necessities of population
- To consolidate the national system of attention to minors

4) Development of Community and National Reconstruction
- To strengthen and consolidate the process of peace and reconciliation
- To fortify economic and social reactivation of the State through construction ,reconstruction and rehabilitation of the big and small infrastructure
- To make efforts to mitigate the poor situation of the majority of population
- To promote the development of the community of the most vulnerable groups, facilitating their incorporation to the national development process
- To strengthen the capacity of the governmental organizations in special areas of the urgent social projects

5) Water and Drainage

·To offer water and drainage services to the communities that lack of them
·To rehabilitate and extend the existing water and drainage services
·To reach and maintain levels of quality of water supplied to population
·Progressive decentralization of the potable water and drainage services to the viable institutions
·To improve the coordination among the institutions of water/drainage sector

6) Housing
·To meet the housing demand of the lowest strata of population
·To extend the Social Register Program of Real Estate to secure the rights of property of the lowest income sector
·For the low and medium income sector, to lead private sector to offer lower cost housing
·To consolidate the policy of FSV(Social Fund for Housing) to extend loans
·To develop housing projects in a compatible form with the urban development plan and the protection of environment

7) Micro-enterprise
·To develop an adequate financial market to reduce the transaction costs
·To form and train human resources
·To restructure the promotional institutions
·To modernize and review the legal framework

8) Access to Land
·To assure fulfillment of the peace agreement regarding access and possession of the land
·To foment and facilitate private transaction of the lands, especially on behalf of the small farmers
·To assure higher security in property rights and private possession of land
·To stimulate investment in the agricultural sector
·To speed up the procedure of land transfer in the process of agrarian reform
·To speed up the procedure of the Bank of Land
·To restructure the institutional framework of the sector

9) Social Security
·To implement the social security system based on individual capitalization
·To promote equity in the social security systems
·To raise the coverage to population
·To rearrange and modernize the management of different programs
·To reestablish financial solvency of the systems and to guarantee the long-

term technical and financial viability

(3)Sectorial Strategy of Economic Development and Infrastructure

1) Energy

- To strengthen the capacity for design, coordination and administration of the sectorial policy and to establish the mechanism of efficient regulation to reduce the participation of the State in commercial activities of the sector
- To improve access, quality and confidence of the service and capacity adaptable to the changes of demand
- To improve operational and administrative efficiency of the sector
- To promote private participation
- To eliminate the distortion of the actual rates policy
- To diversify and develop new energy sources
- To reorganize and privatize the distribution sector of electric power

(Note) National coverage of electricity in 1999 is aimed at 71.5% (urban:100%, rural :40%).

2) Telecommunication

- To promote private participation
- To orient the investment of public sector toward raising the coverage in the rural area
- To strengthen normative and regulative capacity of the State
- To increase efficiency of the enterprises of telecommunication services

3) Transport

- To increase private participation in the transport sector (land, air, and sea), in maintenance, providing service in concession, elaboration of study and execution of expansion works, for modernization and efficiency of the system

《 Investment Plan》

- Rehabilitation and construction of urban and interurban road network
- Construction and rehabilitation of the bridges in and out of the cities
- Construction of by-pass
- Restoration of railroad and reconditioning railroad equipment
- Extension of AIES (International Airport El Salvador)
- Integral rehabilitation of Acajutla Port
- Restoration of Cutuco Port

4) Agriculture

- To consolidate the base of diversification and transformation of agricultural

productive structure to increase its productivity

- To realize more clean agriculture without organic/chemical contamination
- To reduce rural poverty by increasing family income, productivity and job
- To strengthen and modernize the institutional and legal framework to be more efficient
- To expand irrigation for enlarging agricultural lands, productive reconversion and improvement of water and soil, mainly for medium and small farmers
- To accelerate the land transfer program, fortify the security of land possession and guarantee legality of the contracts, to stimulate investment in the sector
- To take account of a rural credit system capable of meeting the financial request swiftly and timely, especially to small farmers

5) Fishery

- To take account of a regulative organization which will carry out its functions efficiently, including coastal-marine resources
- To define transparently the rights of exploitation of fishery, to promote private investment
- To increase foreign currency income arising from fishery, through the diversification of exploitation and the development of new markets
- To increase jobs and productivity of fishermen

6) Tourism

- To incorporate El Salvador in the flow of international tourism, expanding its capacity to receive tourists, facilitation and tourist infrastructure
- To promote regional, ethnic and business tourism to increase foreign currency income

(4) Environment and Territorial Development

1) Objective

- To strengthen the legal framework and the mechanism of implementation
- To restructure the institutional framework
- To establish an efficient territorial plan

2) Protection and Conservation of Environment

- To impel a procedure of transfer of the productive lands of the country
- To obtain the maximum benefit of water resources
- To restore devastated areas, conserve natural ecosystem, reforest areas

without woods and establish agro-forest system
- To conserve, rehabilitate and promote sustainable utilization of coastal-marine resources
- To conserve bio-diversity, study it for better knowledge and promote its sustainable and steady utilization
- To improve the quality of life and health of population, reducing the level of environmental contamination through basic drainage program and sanitary education
- To strengthen the participation of society in environmental conservation and its capacity to manage resources in a sustainable way

3) Territorial Development
- To procure rearrangement of activity and use of urban soil through application of urban regulations and territorial /municipal rearrangement plan
- To promote modernization and rearrangement of medium cities, to stimulate their development through the access to a better quality of life of the habitants
- To strengthen a process of modernization and decentralization of public administration by means of territorial planning and rearrangement
- To impel territorial/municipal planning of depressed critical areas and special development areas
- To promote the study and location of Export Processing Zone (EPZ) and necessary infrastructure adjacent to medium size cities

(5)Modernization of Public Sector

1) Long-term Objective
- Administrative and managerial reform, including institutional rearrangement and simplification of procedures
- Administrative decentralization and municipal strengthening
- Privatization of state enterprises and services; deregulation in certain areas and development of regulatory framework
- Modernization of management of human resources and civic service
- Modernization of fiscal and financial administration, especially in budget

2) Principal Objective of '94-'99
- To improve the capacity of management of economic and social policy
- To consolidate the new role of the State
- To realize the necessary reforms of social sectors

7.2 Regional Development Plan Related to the Development of the Ports Activities

7.2.1 Road Improvement Plan

1. Road is one of the elemental factors for economic growth of the country. The import or export cargoes through sea ports are mainly transported by roads in El Salvador. It is, accordingly, very important that the main roads through which cargoes are transported will be kept safe and efficient.

2. The Government of El Salvador(Ministry of Public Works, MOP) has the Road Improvement Plan up to the year 1999. Table 7-2-1 shows its plan and Figure 7-2-1 shows its location.

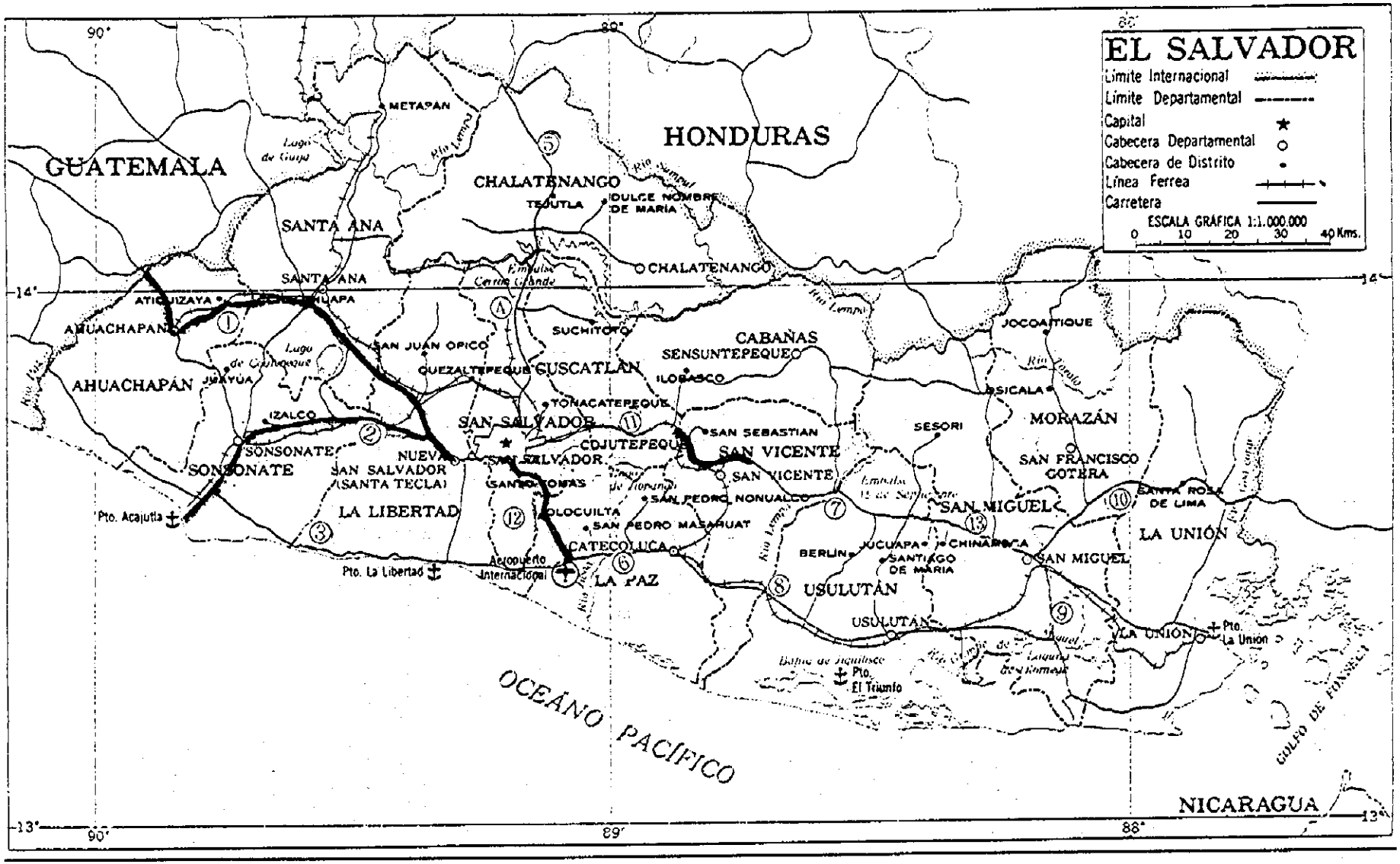
3. On the other hand, in El Salvador, four-lane roads are very limited as shown in the Figure 7-2-1. To shorten the transportation hours(which contributes to rapid service) and to meet the increase of cargoes in the future, it will be necessary that the main roads, especially Pan-American Highway, should be expanded to 4 lanes as soon as possible.

Table 7-2-1 Road Improvement Plan up to 1999

As of 1 December 1997

No.	Project	Works	Long.(km)	Advance(%)	Finance	Remarks
1	ElPortezuelo-Las Chinams-El Jobo	Expansion	45.00	0.0	B.I.D.	
2	La Cuchilla -Sonsonate-Acajutla	Expansion	61.77	89.0	B.I.D.	
3	Desvio Acajutla-La Libertad	Rehabilitation	76.60	91.0	B.I.D.	
4	Desvio San Jose Las Flores - Quitasol	Rehabilitation	31.00	38.0	B.I.D.	
5	Quitasol-El Poy	Reconstruction	45.00	1.0	B.I.D.	
6	Comalapa-Zacatecoluca	Rehabilitation	26.10	73.0	B.I.D.	
7	Cuscastlan	Construction	0.87	14.0	OECF	bridge
8	San Marcos Lempa	Construction	1.37	21.0	OECF	bridge
9	San Miguel -El Derilio	Reconstruction	18.30	27.5	B.I.D.	
10	San Miguel-Agua Salada - Goascoran (planned)	Reconstruction	55.00	8.0	B.I.D.	(from)
11	S. Martin-San Rafael Cedros	Rehabilitation	21.00		OECF	1999
12	S.Salvador-Comalapa-Airport	Rehabilitation	39.00		BCIE	1998
13	Desvio Santisgo de Maria - San Miguel	Rehabilitation	26.00		BCIE	1998

Source: Ministry of Public Works



Source: Ministry of Public Works

: 4-lane roads

Figure 7-2-1 Map of Road Improvement Plan up to 1999

4. For La Union Province, the road from La Union City to San Miguel City (which is one the big three cities of El Salvador and business center of the East Region) is the key route for its social and economic development. The actual condition of this road seems not so good for transportation of cargoes. However, there is not an improvement plan for this road in the five-year program of the Government. Improvement and expansion(to 4 lanes if possible) of the road will be necessary to meet rapid service and the increase of cargoes in the future.

7.2.2 Municipal Project

5. The Municipality of La Union has five-year(1998- 2002) development plan as follows:

·Health	Construction of health center etc.
·Potable water	Introduction of potable water from La Union to Cutuco and Punta Gorda, construction of water tank, etc.
·Structures	Construction of community center, etc.
·Environment	Construction of a plant of black water treatment, etc.
·Infrastructure	Extension of the roads-6km x 5m wide- Punta Gorda, etc.
·Education	Increase of classroom, etc.

6. The introduction of potable water from La Union to Cutuco and Punta Gorda and the extension of the roads (Punta Gorda) are scheduled as a mid term plan of 1999 to 2000.

7. As to infrastructure, the Municipality also has the following plans:

(1) General restoration of roads and avenues of the City through coordination with the Ministry of Public Works(MOP)
(2) To negotiate with the Central Government through the MOP regarding the expansion of the road La Union-San Miguel as a mid term plan
(3) Direct support to investors in installations of development project especially for creation of employment

7.2.3 Dry Canal

8. On November 3, 1997, in San Pedro Sula of Honduras, the Act of Agreement was signed between Salvadorian Foundation for Economic and Social Development(FUSADES) of El Salvador and Foundation Grand Project of

National Transformation(FGPTN) of Honduras, for the purpose of development of inter-oceanic highway (Dry Canal), in the presence of the Republic Presidents of both countries who attended and signed the Act as witnesses of honor.

9. Outline of the terms of the agreement is as follows:

(1) To take necessary actions for promoting construction of inter-oceanic highway between Salvadorian ports of the region of Fonseca Gulf (the Port of Cutuco including Punta Gorda) and Atlantic ports in the northern region of Honduras (the Port of Cortes) and modernization of these ports with priority.

(2) To create an "Inter-oceanic Committee of Central America"(CICA) integrated by the Presidents and Vice-presidents of both Foundations, Executive Secretary of FGPTN and Executive Director of FUSADES, and advisors who will be necessary for the execution of the project. The Committee will have sufficient competence to carry out this agreement.

(3) To promote the private sectors of the region to organize an "Inter-oceanic Corporation of Central America" as a private mercantile organization, with preferential Central American capital, to meet technical and economic demand which the viability of the project will require.

10. Construction of the "Dry Canal" will start after the establishment of the above Committee and Corporation. At the same time, financial and technical feasibility study should be conducted by consultants. Therefore, it is at present difficult to forecast when the construction of the Canal will start and be completed.

11. Completion of the Canal will contribute remarkably to the development of a new Port of Cutuco, as a quantity of cargoes will be transported through the port to/from the Port of Cortes by way of the Inter-oceanic highway. The shipping agents also are expected to be concerned with investing in the port activities.

12. In October 1997, the Agreement of " Dry Canal" between Cortes Port of Honduras and Corinto Port of Nicaragua was signed by the Republic Presidents of both countries. The study on dredging of access channel and the rehabilitation and modernization of Corinto Port was already conducted by the organizations of the United States in 1993.

13. According to the Plan, the Canal will be constructed not by

constructing a new high-way but improving and expanding the existing roads (partly 4-lane roads if necessary). The completion of this Canal will affect the "Dry Canal" concept between a new Cutuco Port and Cortes Ports. To be more incentive and competitive, it will be necessary for the new port to be attractive of the facilities, tariffs, port services, etc.

7.2.4 Export Processing Zone (Zona Franca)

(1) Legal Scheme

14. Law and Regulations

- Decree No.56 (Law) 20 September 1990
- Decree No.461(Regulations) 15 March 1990
- Decree No.753(Modification) 19 April 1991
- Decree No.211(Modification) 26 March 1992
- Decree No.606(Modification) 25 January 1996

(Note) Modification of the Law is to be proposed to the National Congress in the middle of December 1997.

15. Objectives

1) Creation of employment
2) Promotion of foreign trade and acquisition of foreign currencies
3) Transfer of technology

16. Development and Administrative Organization

At the start, the public organization only was authorized, and after 1989 by amendment of the Law, private companies have been authorized as development and/or administrative organizations.

17. Users

1) Manufacturing industry
2) Commerce
3) Service linked to international trade

18. Obligations

According to the present Law, the merchandises more than 85% (textile and apparel manufacturing:100%) should be exported outside Central American countries, but this obligation might be abolished by new Law.

19. Tax Incentives

1) Income tax	100% exempt	10 years-renewable
2) Municipal tax on assets and patrimony	100% exempt	10 years-renewable
3) Import duties	100% exempt	10 years-renewable
4) Tax on dividends	100% exempt	10 years-renewable
5) Not subject to value added tax(IVA)		

(Note) Exemption for 10 years-renewable might be abolished and be indefinite by new Law.

(2) Actual Activities

20. There are six Export Processing Zones(EPZ, Zona Franca) which are operating in El Salvador as of December 1997. Table 7-2-2 involves the following information:

1) Name of EPZ
2) Location
3) Establishment year
4) Land area(ha)
5) Number of enterprises
6) Number of employees
7) Main business items

Table 7-2-2 Export Processing Zones in El Salvador

Name of EPZ	Location	Established	Area (ha)	No. of Co.	Number of Employee	Main Business Items
San Bartolo	S.Salvador	1975/76	74.3	12	n.a.	textile(8),paper bag(1), handbag(1),jewelry(1), capacitor(1)
El Pedregal	La Paz	1989	70.0	9	4,700	textile(7),globe(1), toys repair(1)
El Progreso	S.Salvador	1991	2.1	4	n.a.	textile(3), plastics(1)
San Marcos	S.Salvador	1991	8.9	9	n.a	textile(8), embroidery(1)
American Park	La Libertad	1993	12.5	2	n.a.	textile(2)
Exportsalva	La Libertad	1994	28.5	7	n.a.	textile(7)

Source: FUSADES and hearing

(Note) According to the Central Bank, the number of labor force in the EPZs as of July '97 was 29,615, increasing by 2% compared with the same month of the previous year.

21. Table 7-2-3 shows the export and the added value of *Maquiladora industry (including EPZs) for the past eight years('90-'97). Both the export amount and the added value have increased extraordinarily by almost ten times within seven years from '90 to '96.

* "Maquila" involves Free Zone(EPZ) and Bonded Areas (Recintos Fiscales).

Table 7-2-3 Export of Maquiladora Industry (1990-1997)

Unit: US$

Year	Export (f.o.b.)	Added Value	Volume(kg)	Observations
1990	81,083,040.55	17,153,264.83	n.a.	
1991	136,756,774.83	26,439,523.18	n.a.	
1992	198,243,977.69	42,096,393.42	n.a.	
1993	290,112,352.88	70,142,223.94	n.a.	
1994	430,377,519.50	108,411,604.08	n.a.	
1995	646,950,117.40	154,810,117.95	n.a.	
1996	795,114,170.21	183,794,657.20	69,298,589.03	
1997	966,938,843.55	225,860,085.30	77,676,691.92	January to November

Source: Central Bank

22. The Central Bank has commenced the classification of the export by each EPZ and Bonded Area as from1996. Table 7-2-4 shows the export value and the added value of each EPZ and Bonded Area for the years '96-97'. The share of six EPZs increased from 54.0% (① / ③)in '96 to 61.6% in '97(as of September).

Table 7-2-4 Export of Maquila by EPZ/Bonded Area(1996-1997)

Unit: million US$

Name of Zone	1996			1997		
	FOB	Ad. Value	No.of Co.	FOB	Ad. Value	No.of Co.
American Park	31,328	9,029	2	20,493	5,158	2
El Progreso	60,656	14,686	3	49,646	14,688	4
Exposalva	39,055	11,053	6	80,502	20,197	7
San Bartolo	136,604	30,411	9	142,825	32,635	12
San Marcos	88,848	20,615	6	112,685	23,782	9
El Pedregal	72,742	15,711	10	74,903	18,968	9
Total ①	429,234	101,506	36	481,055	115,427	43
Bonded Area ②	365,627	82,494	103	299,466	69,701	88
Grand Total ③	794,861	184,000	139	780,521	185,128	131

(Note) 1997: figures from January to September

Source: 1.Central Bank 2. Number of enterprise of EPZ in 1997: direct hearing

(3) Future Prospect

23. In addition to the above 6 EPZs, a new EPZ called "Concordia" Industrial Park is scheduled to begin its construction in January or February 1998 in Usultan Province, eastern region.

24. Concordia Industrial Park is owned and operated by Costa Inversiones, S.A. de C.V. The land area of the Park is 39 ha, where 43 industrial enterprises, with about 6,000 workers, are expected to operate in the future.

25. The sea-borne cargo of import and re-export to/from Concordia EPZ will be transported mainly through the new Cutuco Port, because the Park is located near Usulutan City whose distance to La Union City is only 84 km. via Litoral High Way(CA 2).

7.2.5 Development Potential of an EPZ near a new Cutuco Port

26. The eastern region that suffered the damage of the civil conflict has been underdeveloped compared with the others as shown in Table 1-3-9 ,but there are no economic development plans which are specific in this region.

27. In order to promote national and regional economy, many developing countries have set up EPZs within their territory. As stated in the above 7.2.4 (2), in El Salvador, EPZs have contribute to national and regional development through the promotion of foreign trade, acquisition of foreign currencies and creation of employment.

28. As the EPZ is closely related to the port through its import of raw materials, parts etc. and re-export of its products, many countries have set up EPZs adjacent to or near the port such as: Barranquilla, Buenaventura, Cartagena and Santa Marta in Colombia; Esmeraldas in Ecuador; Iquique, Arica and Punta Arenas in Chile; Ilo in Peru; Cortes in Honduras.

29. As shown in the above Table 7-2-2, in El Salvador all the EPZs are located away from the sea port. However, to develop an EPZ adjacent to or near the new Cutuco Port along with the port development might be effective for regional development of the east region, through the creation of employment opportunity and economic activities by synergistic effect of the both developments.

30. To set up an EPZ, potentiality of available land(100 ha or more), port

facilities, labor force, public services (inland transportation, power supply, water supply, communications etc.) and existing industry (availability of supplemental raw materials) should be considered.

31. Table 7-2-5 shows a tentative land use plan of an EPZ with an area of 100 hectares.
(Note) Colon Free Zone:196 ha, Barranquilla:100 ha, Iquique:230 ha, Ilo:164 ha

Table 7-2-5 Land Use Plan of EPZ (tentative)

Land Use	Area(ha)	Descriptions
Factory lo	75.0	1.Small size 10 ha 2. Medium size 30 ha 3.Large size 35 ha
Road	15.0	Boulevard, Main road, Sub-road, Sidewalk, Patrol road
Administrative facility	1.5	Administration building, fire station
Service facility	2.0	Service building (restaurant, clinic, bank, etc.), Gas station, Bus terminal
Utility	2.0	Electric sub-station, Sewage treatment plant, Water supply tank
Park	4.5	Sport ground, Park, Garden
Total	100.0 ha	

32. This EPZ, in addition, could be expected to function as a transshipment center of sea cargo when the Dry Canal between a new Cutuco Port and Cortes Port will be opened in the future.

33. As to the administration of EPZ, the administrative company of Esmeraldas EPZ, Ecuador, is a mixed (public and private)body where 75% of the paid-capital has been held by the Port Authority ; Iquique EPZ, Chile, is managed by a public-private corporation; Ilo Industrial EPZ, Peru, is managed by a public sector, while in Colombia the management was privatized in 1994.

34. In El Salvador, five EPZs excluding San Bartolo Free Zone are managed by private companies. However, to develop strongly an EPZ near a new Cutuco Port, it is recommendable that the administration company (development /operator company) could be a mixed body (a joint venture of public sector and a powerful private company) for the time being in the beginning.

8. OTHER RULES AND REGULATIONS RELATED TO THE PROJECT

8.1 Rules and Regulations on Structural Design

1. There are no technical standards for the port facilities in El Salvador. So the port facility design will be executed in accordance with "Technical Standards for Port and Harbour Facilities in Japan", or standards as follows:

> "Port Planning, Design and Construction", the American Association of Port Authorities.

2. There is a "Technical Standard for Earthquake Design" published by the Ministry of Public Works. But, this Standard is to be applied to housing.

3. Those especial structures such as bridges, tunnels, piers and others are not regulated by this standard and must be designed based on the known international rules.

8.2 Major Unit Construction Cost

8.2.1 General

1. Construction costs are estimated carefully on the basis of the preliminary design, construction methods and work schedule of the project. The cost estimate is also based on the comprehensive study of the reasonable construction method such as availability of construction material and construction equipment, workable conditions of the site considering equipment procured from abroad.

2. Following premises and conditions are adopted for the cost estimate:

1) Costs are estimated considering that the construction works are carried out in accordance with international tender regulations.

2) The exchange rate of the foreign currency is assumed as follows:
1 US$ = 8.69 colons.
1 US$ = 130 Yen

3) The information on the market prices of labor, construction materials and the rental charges of the construction equipment and machinery, etc. is collected verbally from construction companies as well as CEPA .

4) Construction costs are divided into a foreign currency portion and a local portion, which are defined basically in accordance with the following categories:

a) Foreign portion:
- Imported construction equipment, materials, and goods for the purpose of this project.
- Imported materials such as fuel procured in the local market.
- Salary allowance and indirect cost for the foreign staff.

b) Local portion:
- Construction equipment and machinery procured locally.
- Construction materials and goods procured locally.
- Salary allowance and indirect cost for the local staff.

5) The rate of physical contingency is estimated at 10%.

6) Taxes/ Duties on the imported equipment are excluded from the cost estimate.

7) The cost of land acquisition is excluded from the cost estimate.

8.2.2 Conditions of the Cost Estimate

3. The situations of labor force, construction materials and construction equipment are important factors in the cost estimate. These conditions in El Salvadoor are as follows:

(1) Labor force for the construction works

4. Laborers required for construction works are available any time in El Salvadoor.

(2) Construction materials

5. Main materials necessary for the project at the Port of Cutuco are steel pipe piles and reinforced concrete piles, stones, cement, aggregates for concrete, sand for fill, etc. Steel materials such as H-shaped sheet piles, steel cube pile, steel sheet pile, angle and iron rods,. etc. are imported from abroad.

6. There are some quarry sites around La Union province and stone produced by crusher have been used for construction works so far. Moreover, Armor stone adopted for the protection of the revetment have to be produced at some quarries and transported to the site.

7. Ready mixed concrete is also available from the temporary concrete plant facilitated by private contractors and Portland cements are available from local factories.

(3) Construction equipment and machinery

8. As for the construction equipment and machinery, standard type and size of construction machines have been used for construction works such as road construction, bridge construction and buildings on the land are available in El Salvadoor. On the contrary, there are not any working vessels for the construction purpose in El Salvadoor even though crane barge and flat barges.

8.2.3 Major Unit Cost

(1) Labor Cost

9. Unit Cost for labor is as shown in following Table 8-2-1.

Table 8-2-1 Basic Labor Cost per Day

(Unit: Colon)

	Type of Occupation	Direct Cost per Day
1	Common worker	48.15
2	Watch man	48.15
3	Night watchman	48.15
4	Brick layer	57.80
5	Carpenter	57.80
6	Assembler	57.80
7	Plumber	57.80
8	Tin-man	57.80
9	Painter	57.80

(2) Construction Material Cost

10. Unit Cost of main construction materials is as shown in Table 8-2-2.

Table 8-2-2 Unit Cost of Materials

(Unit: Colon)

		Material	Unit	Cost F.C	Cost L.C
1	Fuel	Kerosine	gallon	9.36	---
2	Fuel	Regular gasoline	gallon	13.94	---

c.f) Unit cost will be indicated later on.

8.3 Rules and Regulations on Environmental Preservation

1. In El Salvador, focus on environmental problems and possible solutions have been increasing in the last few years. In the 1970's, Salvadoran biologists started to voice their opinions with respect to the alarming rate of pollution of the rivers and estuaries, primarily caused by the unregulated use of pesticides in agriculture, specially the cotton plantations. the escalation of incidents of kills of sea and coastal species often observed floating in the rivers, estuaries and ocean alarmed the Salvadoran population, who began to demand an environmental policy and related lows.

8.3.1 Policy on Environmental in El Salvador.

2. In the 1980's, a number of institutions and private citizens groups have begun to show concern for the environmental problems mentioned above. Ecological institutions were created with support of the media. These institutions started various campaigns designed to create ecological awareness at different levels of government and public.

3. As a result, in 1990 the government of El Salvador organized the Executive Secretary of Environment (SEMA), under the Ministry of Agriculture, and later reorganized under the Ministry of Planning. SEMA was in charge of all matters related to the environment. SEMA was also in charge of establishing an environmental policy for the country.

4. In 1997, the government of El Salvador organized the Ministry of Environment and Natural Resources. At present the Ministry has a small number of technical personal, the majority being professionals with considerable experience, including the minister who previously served as the first Executive Director of SEMA.

5. At present the country does not have an environmental policy. The new Ministry is in process of designing and implementing a National environmental Policy.

8.3.2 International Agreements

6. MARPOL 73/78. This agreement is related with the spill of oil, control the vessels in the port, certification and inspection of vessels. In general MARPOL is related with the protection of the marine environmental. However El Salvador had participated in many international meeting but at the present not signed such agreement.

7. The authorities are conscient of the importance of such

agreement for the protection of the marine environment. On the other hand the National Authority is making the effort to sign in the future the mentioned agreement.

8. BASILEA agreement, related with control across the border movements of dangerous wastes. VIENA agreement - Protection of the ozone layer. MONTREAL PROTOCOL, Related substances that disturbe the ozono layer.

8.3.3 Related Laws

9. At present the National Law of the Environment is before the country National Assembly for approval and ratification.

10. The draft national law includes 127 articles, article 1 establishes that the law has the objective to establish the principles and basics normatives for conservation and recuperation of the Environment for the sustainable use of the national resources, conduct the public and private environmental procedures.

11. The protection of Environment is a basic obligation of the Government, Municipalities and the inhabitants in a way complementary to execute the constitution mandates which are included in the articles 117 and 69 of the Political Constitution of El Salvador, in that sense the article 117 established:

> "It is of social interest the protection, rehabilitation development and utilization of the national resources.
> The State shall establish the economic incentives and should provide the necessary technical assistance for the development and implementation of adequate programs".

12. The protection, conservation and improvement of natural resources and the environment will be the objective of other special laws...

13. The national law of the environment in the chapter III dedicated 15 articles (22 to 36 articles) related with the system of Impact Assessment.

14. The article 24 mentions that all the activities, works or projects require an environment impact assessment (EIA). In the same article in the incise "c" mentions that to build a port it is necessary an environmental permit issued by the competent authority.

15. Every large project should prepare an EIA which will be evaluated by the Ministry of Environment.

16. In such sense the disposal above mentioned are according with the Draft National Law are according to the standards of JICA and fulfill the international requirements. On the other hand the international experience of JICA in the construction of port in many countries is very significative.

17. El Salvador has some secondary laws related with the environment and natural resources such as:

18. Forestry Law, 1973. Based in decree law, number 268 promulgated by the National Assembly.

19. General law concerning the fisheries activities based in decree law Number 1 (1979), published in the official paper number 191, volume 2265.

20. The law include 95 articles related with the concesion of licences for catching fish and the protection of the fisheries resources.

8.3.4 Basic Frame of Administration

21. Environmental management in El Salvador is shared by the following institutions:

- Ministry of Health
- Ministry of Agriculture
- Ministry of Education
- Attorney General's Office
- National Assembly's Committee on Health and Environment
- National Civil Police (PNC)
- Vice Ministry of Housing
- Ministry of Public Works
- SEMA, which will be eventually absorved by the Ministry of the environment and National Resources.

8.3.5 Institution

22. The Ministry of the Environment and Natural Resources will be in charge of all matters related to the environment and natural resources in the country of the implementation of corresponding laws and regulations.

23. It must be noted that there are over a hundred non gobernamental organizations (NGO's) in El Salvador, that promote the protection of the environment.

8.3.6 Related Organization

24. The Ministry of the Environment and Natural Resources is organized according to the organization chart shown in Appendix 2, Exhibit 1.

8.3.7 Environmental Standards

25. At present there are no environmental standards in El Salvador but the Ministry of Health to a certain degree has established in the Health Codes some procedures applied to the industrial control of pollution generated by different processes.

26. For execution of new projects it is recommended to use the International Standards like the ones established by the World Bank. It is necessary to mention that in the future the Ministry of Environmental must define the Environmental Standards.

PART II

MASTER PLAN

9. BASIC CONCEPT OF THE DEVELOPMENT PLAN OF THE PORT OF LA UNION

9.1 Expected Function for the Port of La Union in the International and Domestic Trade

1. In planning the future of the Port of La Union, the following factors are important for traffic projection;

(1) Cargo from/to the east coast of the U.S. and Europe via the ports on the Atlantic side of Guatemala and Honduras

2. The cargo movement seems to be established for cargo from/to the east coast of the U.S. and Europe. Almost all the cargo, especially containers, are being transported from/to the Port of Santo Tomas (Guatemala) and the Port of Cortes (Honduras). (The share of Pacific side seaborne traffic for El Salvador's total trade volume is around 40-50% in the last ten years and that of container cargo is assumed to be similar.)

3. The competition among the ports on the Caribbean Sea is very keen. These ports are well developed and have frequent container lines service. Even if the Port of La Union is improved, the route via the Panama Canal is not so competitive because it would take more time and be more expensive in container transportation.

4. On the other hand, the cargo movement has grown between Asia and North/Central America. However, the growth of Asian traffic has slowed down recently.

(2) Relationship with the competitive ports of neighboring countries (see Figure 9-1-1)

5. The Port of Quetzal is said to be very reliable and efficient in handling cargo and serving container liners. Some major shipping agencies, including one of the biggest U.S. firms and some of the biggest from Europe have transferred their base from the Port of Acajutla to the Port of Quetzal for moving cargo not only from/to El Salvador but also from/to Honduras and Nicaragua. (That is, cargoes around Guatemala, El Salvador, Honduras and Nicaragua are always looking for the most convenient port over the border lines.)

6. At present, only four container liners call at the Port of Port of Acajutla (TMM Line, weekly; NYK Line, biweekly; and the others, less than 4 times a year) in 1996.

7. Concerning reliability, the Port of Quetzal is not affected by a swell like the Port of Acajutla. In efficiency, cargo handling was privatized and is operated well in the Port of Quetzal, while it is still managed directly by the government agency, CEPA, in the Port of Acajutla. (As analyzed before, however, productivity is increasing at a small but steady pace at the Port of Acajutla.)

8. The origin and destination of major cargo of El Salvador is concentrated around the capital of San Salvador. The Port of La Union is located at the same distance to the east of the capital as that of Port of Quezal in Guatemala to the west. The Port of La Union is a national port, so an additional CIQ control on the border to transit cargoes is not necessary. Domestic transportation is also said to be safer in El Salvador than in neighboring countries in terms of robbery.

9. If the use of the Port of La Union is the same as that of the Port of Quetzal, the Port of La Union would be able to attract most of the national cargo in a short time. Naturally, this would require the improvement of the access road to the port, of the national road network, of the efficiency and reliability of the port, and the establishing of frequent services and competitive tariffs. (Needless to say, improvement of infrastructure will also contribute to national and regional development.)

10. The Port of La Union is near southern Honduras, where valuable agricultural products like melons are grown for the lucrative U.S. west coast market(equivalent to 400TEUs/week). The growers are looking for container transportation. Under some circumstances, the cargo from/to Honduras to/from the Pacific Rim might go through this port instead of through the Port of Quetzal. It might be applicable to the cargo from/to Nicaragua to/from the Pacific Rim as well.

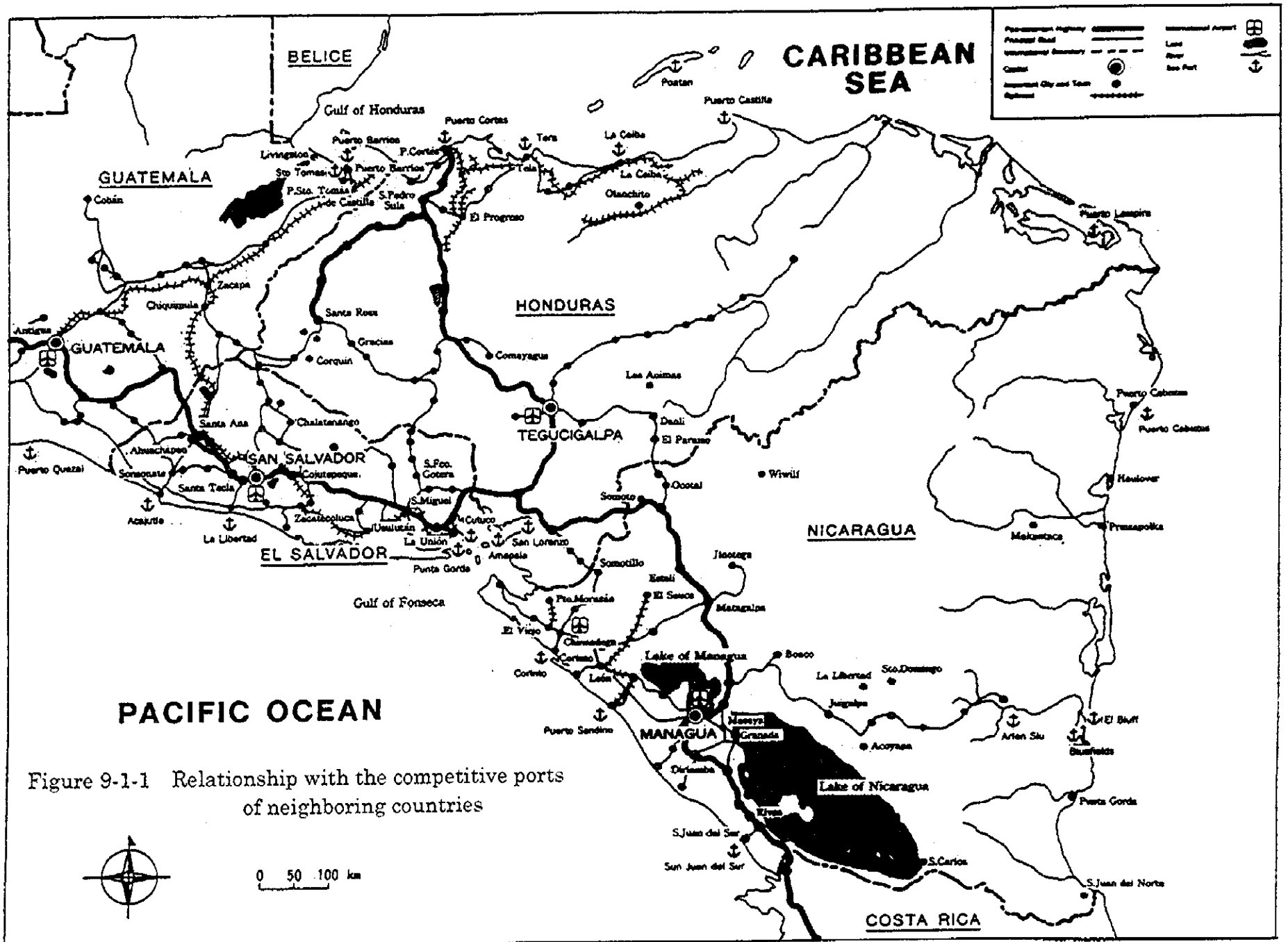


Figure 9-1-1 Relationship with the competitive ports of neighboring countries

11. It is important for the Port of La Union to draft and execute its Master Plan as soon as possible before ports in neighboring countries around the Gulf of Fonseca do the same. Generally speaking, the first port to come on board captures more regular users than the following ones. (At present, the closest Port, San Lorenzo in Honduras, would have a large handicap in increasing the 6m depth of its long shallow channel to serve large ships. In addition, the area is surrounded with mangrove, which is a disadvantage in today's environmentally conscious world.)

(3) Relationship with the Port of Acajutla

12. At present, most of the cargo of the country is handled at the Port of Acajutla, except for a significant part of containers which are handled in neighboring countries. Other general cargo, dry bulk cargo and liquid bulk cargo are gathered here for export, or for distribution from the port to the whole country.

13. In many cases, reliable regular services at the port are more important than the transportation cost for container cargo, because the related activities after or before the port are scheduled on a daily or weekly basis (i.e., Material or parts supply (export) for assembling or selling in the U.S. and other countries.)

14. On the other hand, less valuable bulk cargo prefers economical sea transportation to land transportation. If the Port of La Union is constructed in the eastern region as well as the Port of Acajutla in the western and central region, bulk cargo to/from its origin prefers the closer port.

15. In the case of oil and oil products, processing plants and distribution centers are already integrated around the Port of Acajutla, the capacity of which covers the whole country and can supply some of the demand in neighboring countries, if necessary, with easy expansion possible in coordination with the Port of Acajutla.

16. Concerning the transportation of oil products to the eastern region, they would prefer the use of oil barges from Acajutla to a new port when it is built in La Union.

17. A propane gas company, which has more than 70% of the market share of the country, just started its operation at the Port of Punta Gorda in April 1996. The company installed 20 tanks behind the port to distribute the imported product over the country. Previously, it used to buy the product from the biggest plant in Acajutla.

18. Although the capital city accounts for 60% of the national gas consumption, the company has found its way in La Union. According to the company, the consumption share of the east region will increase 20% to 22% in the next 5 years, while that of the rest of the country will remain the same or decrease.

19. Just to cope with the demand of the country, the company will increase the number of tanks to 30 and build an additional new large tanker as soon as possible. It intends to expand to southern Honduras, where the gas is transported from the not so near Port of Cortes, and to western Nicaragua, too. These countries are potential users of gas as they still use firewood which is getting harder to find. The company will need a deeper pier there.

20. Concerning other bulk cargoes, reasonable part of them would be handled at the Port of La Union in proportion to its nearness to the point of origin or destination of the cargo. For example, the total 14 provinces of the country might be divided into two major areas: the western and central region (area 46.5% and population 67.6%; Ahuachapan, Santa Ana, Sonsonate, Chalatenango, La Libertad, San Salvador, and Cuscatlan); and the eastern region (area 53.5% and population 32.4%; La Paz, Cabanas, San Vicente, Usulutan, San Miguel, Morazan, and La Union), taking into consideration the distance from the Port of Acajutla and the Port of La Union (see Figure 9-1-2).

21. Regarding container cargo, financial considerations play a large role in determining to which port the cargo will go. However, at least one port should specialize in container cargo in El Salvador. (The Port of Acajutla was originally designed for bulk cargo, and will be affected by a swell in precise container handling.) The container terminal should be equipped with efficient quay cranes and a large back-up area of more than 10 hectares with sufficient reefer bays behind the pier.

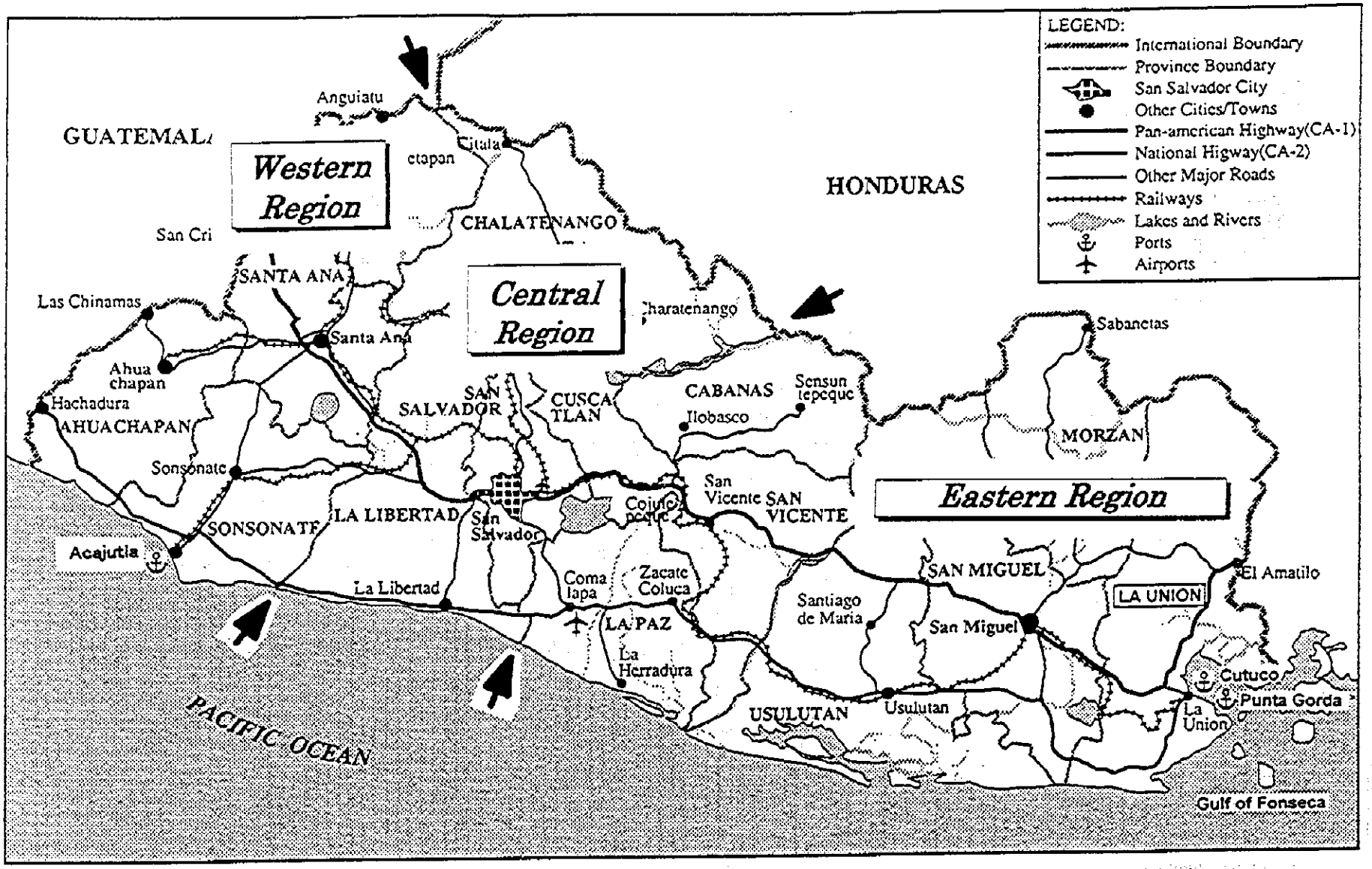


Figure 9-1-2 Western Region, Central Region and Eastern Region

(4) Progress of Containerization

22. Recently, the share of container traffic in El Salvador is around 5-10% for import cargo, 20-60% for export cargo, and 5-15% for total cargo in volume(ton). Although dry and liquid bulk cargo generally isn't suitable for containers, the remaining general cargo also hasn't been containerized to a large extent(around 30% for import, 60% for export and 40% for total general cargo in 1996).

23. Coffee could be mentioned as one example of containerizable general cargo which is traditional for this country and able to be containerized. Containerized ratio of exported coffee is not so high, ranging from 40%(1993) to 70%(1996). The ratio is expected to increase drastically in the future. This kind of trend should be fully considered in forecasting container demand.

(4) Generation of New Cargo by Development of the Eastern Region

24. For the time being, there do not seem to be concrete plans for the development of the eastern region. However, a certain gap between the western and central regions and the eastern region exists in terms of development progress. For example, GDP per capita by province in 1996 is US$ 1,951-2,285 for the western region (3 provinces); US$ 1,583-4,028 for the central region (4 provinces); and US$ 1,096-2,265 for the eastern region (7 provinces).

25. It is necessary to consider the current gap and how to reduce it in the future. For this purpose, the average cargo volume per capita related to the GDP per capita by classified category concerning many countries could be referred to in forecasting cargo demand.

26. The development of the area which suffered during the civil war should be included in the cargo demand forecast as much as possible. Precise statistics on this issue have not been found during the stay of the Study Team in El Salvador. However, the most devastated areas are said to be the northern parts of Morazan and La Union provinces.

27. The cargo handling volume at the Port of Acajutla reached more than two million tons in 1995, the most ever recorded. The figure was achieved without the sufficient development of the above areas. Based on

this fact, cargo productivity in areas other than the above areas can be calculated. (For example, the unknown productivity of war-torn areas could be calculated or assumed using the productivity of developed areas.)

28. The construction of the highway as one component of the "dry canal" would accelerate the development of the east region as an important infrastructure. (It could be identified as the important manifestation of the present government's commitment to the development of the region.)

29. At the same time, some optimistic signs for the development of the Port of La Union are explained as follows;

(a) Traditional products such as shrimp would have a bright future. Shrimp is being exported to Miami from El Salvador through the Port of Santo Tomas on the Caribbean Sea (1,600 boxes of 40' containers a week). The next target is the west coast market of the U.S. They are awaiting direct container service, too. The eastern region (La Union and El Triunfo) processes 50% of the total shrimp harvested by the country.

(b) The export of processed tuna products from the neighboring Port of Punta Gorda could also be promising. The port has been working as a tuna port as originally designed, with Spanish investment in processing factories behind the port.

(c) Some coffee in containers would also utilize the new Port of La Union. At least, coffee in bags used to be shipped from the Port of Cutuco, since part of the coffee production areas are in the eastern region.

(d) As well, imports improving the quality of life of the region's citizens should be given priority. Even around La Union, traffic has almost doubled in the period of 7 years (1990-1996). Car imports are expected to increase rapidly as in the capital of San Salvador. Southern Honduras and western Nicaragua regions could become the hinterland of the port.

30. In addition, a new Export Processing Zone (EPZ) could be established, close to the port. This zone would receive the benefits of the

port directly. Those in the eastern region such as the provinces, La Union, Morazan, San Miguel, Usulutan, etc., could take great advantage of the accessibility to the port. To develop such EPZs along with the port might be effective for regional development.

31. Such EPZs would be supported by good Salvadorian workers, taking into consideration that EPZs are already well developed in the western and central region, and that a lot of Salvadorians are well established in the west coast of the U.S., which would facilitate attracting foreign investors.

32. One EPZ of around 100 hectares would need 200,000 tons of import and 250,000 tons of export based on examples of neighboring countries.

9.2 Relationship of the Port of La Union with the Port of Acajutla

1. In this section, the relationship of the Port of La Union with the Port of Acajutla will be identified. The concept was already mentioned in the previous section.

2. Appropriate major functions of the Port of La Union and the Port of Acajutla could be considered as follows;

(1) The Port of Acajutla

a) Container cargoes

3. Basically, the port was constructed for bulk and general (conventional, not containerized) cargo handling forty to fifty years ago. The port could increase its capacity by the installation of a new dual-purpose crane on Pier C, which is included in the rehabilitation plan in a feasibility study by a German consulting firm. However, the increase in capacity would not be sufficient to cope with the future demand. An ample backyard area and proper equipment is vital for container handling.

4. It must be remembered that the port may be struck by a swell especially in the change of seasons, the period of which is very long (more than 10 seconds), and that there may be no way to sufficiently protect the port from it. The precise handling of containers will be delayed because of ship motion

caused by the swell. It also implies further expense obliged to shipping agencies and cargo consignees, and they will thus choose a more reliable and efficient port.

b) Other general cargoes and dry and liquid bulk cargoes

5. The port will principally handle the cargoes from/to the western and central region.

(2) The Port of La Union

a) Container cargoes

6. The port will be equipped to serve ships with container cargo. Needless to say, it will be able to handle the cargo unable to be received by the Port of Acajutla once volume surpasses its limited handling capacity (around 30,000 boxes for the existing capacity, or around 40,000-60,000 boxes with the installation of a new dual-purpose crane on Pier C.)

7. The port might attract the most containers in the country, from southern Honduras and western Nicaragua, if it becomes an efficient and reliable port, with improved road access and competitive tariffs.

b) Other general cargoes and dry and liquid bulk cargoes

8. The port will serve mainly the cargo from/to the eastern region. The table below depicts the historical cargo movement through the Port of Acajutla and the Port of Cutuco. Based on the table, the Port of Cutuco has handled 10-20 % of the import cargo, 20-30% of the export cargo and more than 20% of the total cargo.

c) Others

9. In addition, the need for an alternative port to the Port of Acajutla in case of earthquake has been pointed out.

10. The Port of La Union will also work as a buck-up port for heavier or taller cargo which could not be handled at Acajutla and an overflow port to some Acajutla traffic during peak periods.

(Note)
Needless to say, the port would lighten the burden of the existing Acajutla Port, where all the national cargo is now concentrated, and thereby extend its dwindling capacity. In any event, the existing Acajutla Port would not be able to meet the whole demand generated by the current favorable development of the country due to its capacity constraint sooner or later. (The appropriate maximum capacity of Acajutla is calculated as around 2,500,000 - 3,000,000 (t).)

Table 9-2-1 Historical Cargo Movement through the Port of Acajutla and the Port of Cutuco

Unit: thousand ton

Year	The Port of Acajutla			The Port of Cutuco			Total	Share of Cutuco		
	Import	Export	Total	Import	Export	Total		Import	Export	Total
1975	504	333	837	104	132	236	1,073	17.1%	28.3%	22.0%
1976	803	382	1,184	127	123	250	1,434	13.7%	24.4%	17.4%
1977	1,191	441	1,631	128	120	248	1,879	9.7%	21.5%	13.2%
1978	1,086	369	1,455	109	144	254	1,708	9.1%	28.1%	14.8%
1979	854	461	1,315	105	101	206	1,521	11.0%	17.9%	13.5%
1980	819	285	1,105	66	100	166	1,271	7.5%	26.0%	13.1%
1981	754	264	1,018	74	59	133	1,151	8.9%	18.3%	11.5%
1982	518	231	748	34	51	85	834	6.2%	18.0%	10.2%
1983	816	349	1,164	82	54	135	1,300	9.1%	13.3%	10.4%
1984	795	240	1,035	60	27	88	1,123	7.0%	10.3%	7.8%
1985	873	274	1,147	77	36	113	1,260	8.1%	11.6%	9.0%
1986	923	208	1,131	71	16	87	1,218	7.1%	7.2%	7.1%
1987	911	159	1,070	61	16	78	1,147	6.3%	9.4%	6.8%
1988	875	180	1,055	65	12	77	1,132	6.9%	6.3%	6.8%
1989	837	110	947	58	9	67	1,014	6.4%	7.6%	6.6%
1990	977	215	1,193	46	6	52	1,244	4.5%	2.6%	4.2%
1991	1,028	239	1,267	48	1	50	1,317	4.5%	0.5%	3.8%
1992	993	308	1,301	67	0	67	1,368	6.3%	0.0%	4.9%
1993	1,184	320	1,503	41	0	41	1,544	3.3%	0.0%	2.7%
1994	1,573	303	1,876	83	0	83	1,959	5.0%	0.0%	4.2%
1995	1,729	333	2,061	63	0	63	2,124	3.5%	0.0%	3.0%
1996	1,388	299	1,687	19	0	19	1,706	1.4%	0.0%	1.1%

Source: Annual Statistics: The Port of Acajutla and the Port of Cutuco (CEPA)

10. TRAFFIC PROJECTION FOR THE PORT OF LA UNION

10.1 Methodology for Traffic Projection

1. There are two methods commonly used to forecast the future cargo volume. The first one is a macro forecast. Based on the assumption that the cargo volume handled at the port reflected the economic activity in the port hinterland, the total cargo volume is estimated using the historical relation between cargo volume and macro economic indices such as GDP and population. The second is a micro forecast, which estimates each commodity group individually based on related indices and the forecast demand and supply situation.

10.2 Socio-economic Frame for the Target Year

10.2.1 Hinterland Identification of Port of Acajutla and La Union

1. As container cargo companies prefer reliable regular service transportation over transportation cost, all container cargo will concentrate to La Union new port, except for the small volume which can be handled at Acajutla port. On the other hand, bulk cargo which is not expensive prefers economical sea transportation to faster land transportation. Therefore, after completion of La Union new port, bulk cargo to/from its origin or destination will be handled at the closest port. The distance between the capital of each Department and the ports is used to identify the respective hinterland. Hinterland identification of the two ports for cargoes excluding container cargo is shown in Figure 10-2-1. Western Region of Region 1 and 2 belong to Acajutla port hinterland, while Eastern Region of Region 3 and 4 belong to La Union New port hinterland.

10.2.2 Population and its Distribution

2. The hinterland population of each port and shares in 2005 and 2015 are shown in Table 10-2-1. Though the total population ratio of Region 3 and 4 shows a downward tendency between 1996 and 2000, taking into consideration the impact of regional development being pursued by the government including new port construction, study team assumed that after year 2000, total population ratio of both hinterlands will maintain the same level.

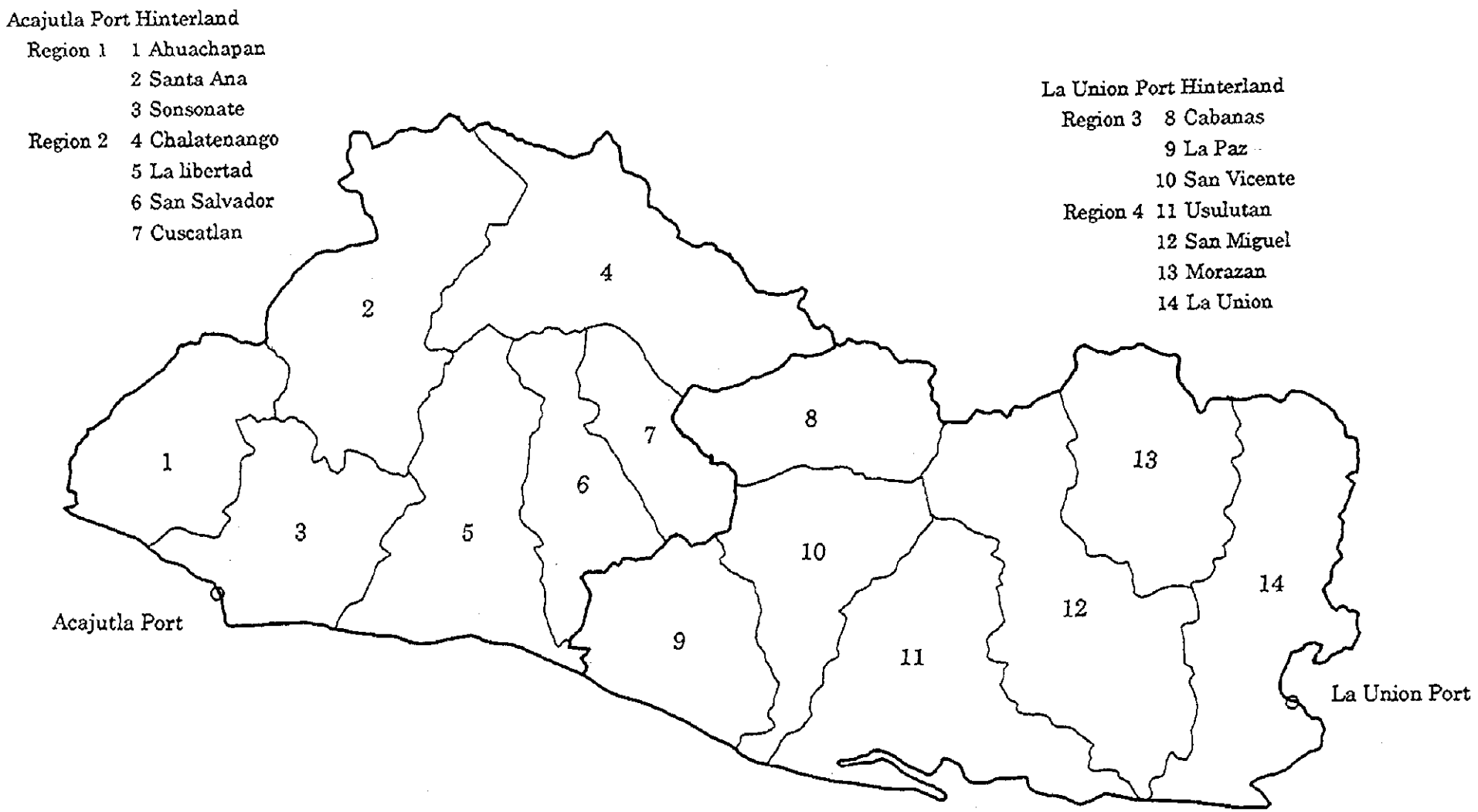


Figure 10-2-1 Hinterland Identification Acajutla Port and La Union Port

Table 10-2-1 Hinterland Population of 2 Ports

year	Region 1, 2	ratio	Region 3, 4	ratio	Total
1996	3,984,000	0.69	1,803,000	0.31	5,787,000
2000	4,388,000	0.70	1,888,000	0.30	6,276,000
2005	4,807,000	0.70	2,068,000	0.30	6,875,000
2015	5,577,000	0.70	2,400,000	0.30	7,977,000

Note : Year 2000 population and ratio are projected by Ministry of Economy
Population ratio of Year 2005 and 2015 is assumed by study team

10.2.3 Gross Domestic Products (GDP)

(1) GDP Growth Rate

3. There are no authorized or published projections of the future GDP up to 2005 for the Short-term plan or 2015 for the Master plan, although the government has issued the Plan of Economic and Social Development (1994-1999). The GDP trend from the peace agreement of 1992 to the present indicates that growth rate varied between 3.0% and 6.5% (the average is 5.0%), while that from the early years of the 1980s to 1997, including the time of war conflict, is about 3.5%. According to the latest projection of the IDB, GDP growth will stay at 5.0% up to 2000. This may be too optimistic since there is some cause for concern over the future economic growth of El Salvador. However, taking into consideration the IDB forecast and the past performance of the GDP growth from the viewpoint of economic recovery and development, the following two cases are assumed as economic frames.

1) Case 1

4. GDP growth rate will stay at 5.0% till 2005, and beyond up to 2015. This is a favorable case, and is an achievable target with the efforts of the government.

2) Case 2

5. The growth is the same till 2005 as in Case 1. From that year, however, it will be in the area of 3.5%(the average growth in the past).

6. Figure 10-2-2 and Table 10-2-2 show GDP projection of El Salvador.

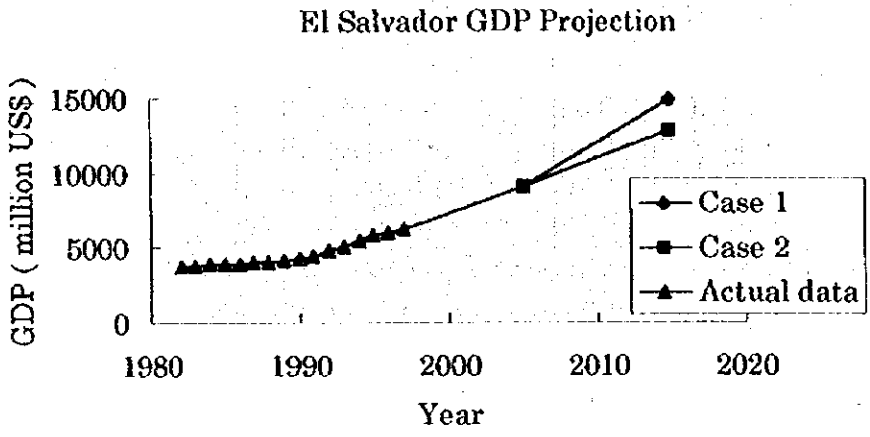


Figure 10-2-2 El Salvador GDP Projection

Table 10-2-2 GDP Projection Case 1 and Case 2

year	GDP US$ (1987 constant price)	
	Case 1	Case 2
1996	5,929,710,000	5,929,710,000
1997	6,166,900,000	6,166,900,000
2005	9,111,111,000	9,111,111,000
2015	14,841,040,000	12,852,122,000

(2) GDP per Capita of each Port's Hinterland

7. Economic impact of new port development will rapidly reduce the disparity of GDP per capita between the Eastern Region (Region 3 and 4) and the Western Region (Region 1 and 2). In the year 2015, the average GDP per capita of the Eastern Region will catch up to the average level of whole El Salvador.

10.3 Forecast of Cargo Volume

10.3.1 Macro Forecast

1. Forecast of import cargo volume and export cargo volume was conducted individually and total cargo volume was obtained by combining of these forecast results.

(1) Forecast of El Salvador Total Import Cargo Volume

2. Table 10-3-1 shows El Salvador's import, export and total cargo

Table 10.3.1 El Salvador Total Trade Volume Throughput by Transport Mode

unit : ton

year	Import				Export				Total			
	Sea	Land	Air	Total	Sea	Land	Air	Total	Sea	Land	Air	Total
1987	971,631	1,007,024	6,784	1,985,439	175,579	178,853	4,747	359,179	1,147,210	1,185,877	11,531	2,344,618
1988	940,010	975,000	6,869	1,921,879	191,946	163,339	6,260	361,545	1,131,956	1,138,339	13,129	2,283,424
1989	888,542	1,026,217	6,826	1,921,585	118,958	174,071	5,409	298,438	1,007,500	1,200,288	12,235	2,220,023
1990	1,023,184	1,328,875	7829	2,359,888	221,163	196,172	6,530	423,865	1,244,347	1,525,047	14,359	2,783,753
1991	1,076,682	1,415,649	8,936	2,501,267	239,832	216,680	7,871	464,383	1,316,514	1,632,329	16,807	2,965,650
1992	1,059,685	1,703,156	11,187	2,774,028	308,334	293,901	11,704	613,939	1,368,019	1,997,057	22,891	3,387,967
1993	1,224,743	1,558,051	12,697	2,795,491	319,551	324,429	13,442	657,422	1,544,294	1,882,480	26,139	3,452,913
1994	1,655,644	1,917,190	15,234	3,588,068	303,307	154,115	15,673	473,095	1,958,951	2,071,305	30,907	4,061,163
1995	1,791,565	2,452,973	15,958	4,260,496	332,532	331,947	16,006	680,485	2,124,097	2,784,920	31,964	4,940,981
1996	1,407,525	1,821,098	16,116	3,244,739	298,617	543,793	16,511	858,921	1,706,142	2,364,891	32,627	4,103,660

Source : CEPA

volume throughput from 1987 to 1996 by transportation mode.

3. Total import cargo volume of El Salvador is forecast by its correlation with GDP. The correlation between the cargo volume and GDP from 1987 to 1996 is expressed in the following equation.

$$Y = 0.000907 X - 1{,}611{,}320 \quad (R = 0.878)$$

Where, Y : Total import cargo volume of El Salvador
X : GDP

Case 1
Year 2005 X = 9,111,111,000
Y = 6,652,000 ton
Year 2015 X = 14,841,040,000
Y = 11,849,000 ton
Case 2
Year 2015 X = 12,852,122,000
Y = 10,045,000 ton

(2) Forecast of El Salvador's Total Export Cargo

4. Total export cargo volume of El Salvador is forecast by its correlation with GDP. The correlation between the cargo volume and GDP from 1987 to 1996 is expressed in the following equation.

$$Y = 0.000208 X - 477{,}632 \quad (R = 0.880)$$

Where, Y : Total export cargo volume of El Salvador
X : GDP

Case 1
Year 2005 X = 9,111,111,000
Y = 1,417,000 ton
Year 2015 X = 14,841,040,000
Y = 2,609,000 ton
Case 2
Year 2015 X = 12,852,122,000
Y = 2,196,000 ton

5. Table 10-3-2 shows result of macro forecast of El Salvador's total cargo trade volume.

Table 10-3-2 Summary of El Salvador Total Trade Cargo Volume Projection

unit : ton

year	Import Cargo Volume		Export Cargo Volume		Total Cargo Volume	
	Case 1	Case 2	Case 1	Case 2	Case 1	Case 2
2005	6,652,000		1,417,000		8,069,000	
2015	11,849,000	10,045,000	2,609,000	2,196,000	14,458,000	12,241,000

(3) Forecast of Sea Borne Import Cargo Volume

6. Forecast of the sea borne cargo volume is carried out by correlation between the cargo volume and GDP and /or the past time trend.

1) Scenario 1

7. Forecast sea borne cargo volume is obtained by forecasting the total import cargo volume multiplying it with the sea borne cargo share. Sea borne cargo volume share throughput from 1987 to 1996 is shown in Table 10-3-3.

Table 10-3-3 Sea Borne Cargo Volume Share Throughput

year	Import	Export	Total
1987	0.489	0.489	0.489
1988	0.489	0.531	0.496
1989	0.462	0.399	0.454
1990	0.434	0.522	0.447
1991	0.430	0.516	0.444
1992	0.382	0.502	0.404
1993	0.438	0.486	0.447
1994	0.461	0.641	0.482
1995	0.421	0.489	0.430
1996	0.434	0.348	0.416

8. Sea borne cargo refers only to cargoes handled in El Salvadoran coastal ports, Atlantic coast port cargo is not included. As average share of sea borne import cargo between 1987 to 1996 is 44 %, therefore, forecast sea borne cargo volume is obtained by multiplying total forecast import cargo volume by 44%.

Case 1

Year 2005 6,652,000 × 0.44 = 2,927,000 ton

Year 2015 11,849,000 × 0.44 = 5,214,000 ton

Case 2

Year 2015 10,045,000 × 0.44 = 4,420,000 ton

2) Scenario 2

9. Correlation between sea borne import cargo volume and years by linear regression obtained from Table 10-3-1 is shown below.

$Y = 86,710 X - 171,478,694 \quad (R = 0.815)$

Where, Y : Total sea borne import cargo volume of El Salvador
X : Year

Year 2005 Y = 2,375,000 ton
Year 2015 Y = 3,242,000 ton

(4) Forecast of Sea Borne Export Cargo

10. Forecast of sea borne export cargo volume is carried out by correlation between the cargo volume and GDP and /or the past time trend.

1) Scenario 1

11. Forecast sea borne cargo volume is obtained by multiplying the total forecast export cargo volume by the sea borne cargo share. As average share of sea borne export cargo between 1987 to 1996 is 49 %, therefore, forecast sea borne export cargo volume is as follows.

Case 1
Year 2005 1,417,000 × 0.49 = 694,000 ton
Year 2015 2,609,000 × 0.49 = 1,278,000 ton
Case 2
Year 2015 2,196,000 × 0.49 = 1,076,000 ton

2) Scenario 2

12. Correlation between the sea borne export cargo volume and years by linear regression obtained from Table 10-3-1 is shown below.

$Y = 20,466 X - 40,506,635 \quad (R = 0.835)$

Where, Y : Total sea borne export cargo volume of El Salvador
X : Year

Year 2005 Y = 528,000 ton

Year 2015 Y = 732,000 ton

13. Table 10-3-4 shows result of macro forecast of sea borne cargo volume .

Table 10-3-4 Summary of Sea Borne Cargo Volume Projection

unit :ton

			2005	2015
Import	Scenario 1	Case 1	2,927,000	5,214,000
		Case 2	2,927,000	4,420,000
	Scenario 2		2,375,000	3,242,000
Export	Scenario 1	Case 1	694,000	1,278,000
		Case 2	694,000	1,076,000
	Scenario 2		528,000	732,000
Total	Scenario 1	Case 1	3,621,000	6,492,000
		Case 2	3,621,000	5,496,000
	Scenario 2		2,903,000	3,974,000

10.3.2 Micro Forecast

(1) Import General Cargo

14. Main commodities of import general cargoes are iron, industrial products and vehicles. These three commodities accounted for 48.9% and 52.3 % of the total import general cargo volume in 1994 and 1995 respectively.

1) Iron

15. Import volume of iron throughput in1984 - 1996 is shown in Table 10-3-5. All iron for domestic consumption is imported and this tendency will continue up to the target date. Generally speaking, the consumption volume has a close relation with the GDP. The correlation between the GDP and import volume of iron from 1984 to 1996 is expressed in the following equation.

$Y = 0.0000278 X - 57,154$

Y : Iron import volume

X : GDP

r = 0.818

Case 1

Year 2005 196,000 tons

Year 2015 355,000 tons

Case 2

Year 2015 300,000 tons

Table 10-3-5 Iron Import Volume Throughput

unit : ton

year	Acajutla
1984	41,681
1985	36,737
1986	56,034
1987	77,778
1988	69,779
1989	59,677
1990	42,765
1991	55,028
1992	73,909
1993	92,469
1994	83,652
1995	109,814
1996	105,897

Source : CEPA

2) Vehicles

16. Import volume of vehicle throughput from 1984 -1996 is shown in Table 10-3-6.

Table 10-3-6 Import Vehicle Volume Throughput

unit : ton

year	Acajutla
1984	5,576
1985	8,126
1986	3,062
1987	5,827
1988	5,546
1989	5,355
1990	4,017
1991	5,467
1992	11,354
1993	9,697
1994	13,530
1995	17,885
1996	5,900

Source : CEPA

Import volume of vehicle was stagnant from 1984-1990 due to the war. After the peace agreement, import volume of vehicles has been increasing smoothly except for 1996. The import volume has certain relation with the GDP. The correlation between the GDP and import volume of iron from 1991 to 1995 is expressed in the

following equation.

$Y = 0.00000824 X - 30,296$

Y : Vehicles import volume

X : GDP

r = 0.932

Case 1

Year 2005 45,000 tons

Year 2015 92,000 tons

Case 2

Year 2015 76,000 tons

3) Industrial Products

17. Import volume of industrial products throughput from 1984 -1996 is shown in Table 10-3-7. Import volume of industrial products has been decreasing after peaking in 1990, however, taking into consideration the industrial structure of El Salvador, it is necessary to increase import volume of industrial product. Therefore, study team adopted the maximum volume of the past.

Year 2005 30,000 tons

Year 2015 30,000 tons

Table 10-3-7 Industrial Products Import Volume Throughput

unit : ton

year	Acajutla
1984	27,495
1985	26,190
1986	24,275
1987	22,649
1988	20,653
1989	19,414
1990	30,438
1991	26,073
1992	18,977
1993	19,264
1994	17,148
1995	15,356
1996	12,755

Source : CEPA

4) Others

18. Import volume of others throughput from 1984 -1996 is shown in Table 10-3-8. Though a portion of fertilizer and cereals has been imported as general cargo, it is expected that almost of these cargoes will be handled as bulk cargo,

when adequate port facilities are completed. Therefore, these two commodities were not included in other general commodities. Commodities in this category are food, construction materials, steel products and textiles. The import volume of others has a relation with GDP. The correlation between the GDP and others in 1990 to 1996 is expressed in the following equation.

$Y = 0.0000338 X - 81,801$

Y : Import volume of others

X : GDP

$r = 0.885$

Case 1

Year 2005 226,000 tons

Year 2015 420,000 tons

Case 2

Year 2015 353,000 tons

Table 10-3-8 General Other Cargo Import Volume Throughput

unit : ton

Year	Acajutla and Cutuco
1984	98,295
1985	103,368
1986	109,077
1987	96,991
1988	93,073
1989	88,163
1990	67,934
1991	74,375
1992	79,320
1993	73,396
1994	106,159
1995	116,916
1996	50,103

Source : CEPA

Note : Container Box Weight is not included

5) Cargo related to EPZ

19. Presence of the new port will accelerate activities of vicinity EPZ's. As almost all 6 of existing EPZ's total area is 200ha are located in the Western region, it is expected that another 100ha of new EPZ's will be developed near the new port in the Eastern region in proportion to the population ratio of Western region and Eastern region. These new EPZ's and Concordia EPZ in Usultan will want to take advantage of the new port, therefore, it is expected that all materials and products for those EPZ's will be handled through the new port. According to interviews and

data of Ministry of Economy, average productivity in EPZ is 2,372 ton/ha. Table 10-3-9 shows expected cargo volume from/to EPZ adjacent to the new port.

Table 10-3-9 Cargo Volume Related to EPZ Adjacent to New Port

EPZ	Area of factory lot (ha)	Cargo volume (ton)
EPZ adjacent to a new port	75	177,900
Concordia EPZ (Usultan)	29	68,788
Total	104	246,688

20. Operation of the new EPZs are unlikely to be in full swing immediately after the new port open, therefore the study team assumed 30 % of the forecast cargo volume will be handled at the new port in the year 2005.

Case 1

Year 2005 247,000 × 0.3 = 74,000 tons

Year 2015 247,000 tons

Case 2

In proportion to total GDP

Year 2015 247,000 × 12,852,122,000 / 14,841,000,000 = 214,000 tons

(2) Import Dry Bulk Cargo

21. Main commodities of import dry bulk cargoes are cereals, fertilizer and soybean flour. These three main commodities volume accounted for 97% and 92% of the total import dry bulk cargo volume in the years 1994 and 1995 respectively.

1) Cereals

22. Import volume of cereals throughput from 1984 -1996 is shown in Table 10-3-10. Production of wheat is very small in El Salvador and the almost all domestic consumption is imported. As total consumption volume of wheat is related to the population, future import volume will in the long term be estimated by its relation with population. The correlation between the population and import volume of cereals in 1990 to 1995 is expressed in the following equation.

$Y = 0.0752 X - 51,384$

Y : Cereals import volume

X : Population

$r = 0.802$

Year 2005 466,000 tons

Year 2015 549,000 tons

Table 10-3-10 Cereals Import Volume Throughput

unit : ton

year	Acajutla
1984	273,049
1985	204,029
1986	274,054
1987	199,949
1988	210,144
1989	221,226
1990	301,138
1991	364,582
1992	210,860
1993	271,898
1994	409,114
1995	374,955
1996	422,145

Source : CEPA

2) Fertilizer

23. All domestic consumption of fertilizer is imported and this tendency will continue up to the target date. Import volume throughput is shown in Table 10-3-11. Consumption volume has stagnated since 1986 due to the war. According to the interview with the fertilizer company, annual maximum domestic consumption in the past was about 350,000 tons in the period from 1975 to 1978. It is expected that consumption volume will catch up the that of peak volume consequently, once the wasted fields of the Eastern Region recover.

Year 2005 350,000 tons
Year 2015 350,000 tons

Table 10-3-11 Fertilizer Import Volume Throughput

unit : ton

year	Acajutla			Cutuco	Total
	dry bulk	general	total		
1984	154,463	21,941	176,404	42,897	219,301
1985	290,901	1,580	292,481	63,993	356,474
1986	250,289	2,062	252,351	53,669	306,020
1987	248,666	215	248,881	34,302	283,183
1988	235,102	288	235,390	39,297	274,687
1989	244,522	4,521	249,043	39,891	288,934
1990	323,472	2,765	326,237	33,312	359,549
1991	273,264	6,011	279,275	26,594	305,869
1992	260,881	820	261,701	35,523	297,224
1993	258,369	9,225	267,594	37,062	304,656
1994	267,671	17,149	284,820	44,296	329,116
1995	231,315	25,346	256,661	18,742	275,403
1996	246,000	8,104	254,104	15,201	269,305

Source : CEPA

3) Soybean Flour

24. Import volume of soybean flour throughput in 1984 -1996 is shown in Table 10-3-12. Main consumption of soybean flour is livestock feeding. Production of soybean is very small in El Salvador and almost all domestic consumption is imported. Import volume of soybean flour is proportionate to the total population of El Salvador. The correlation between the population and import volume of soybean flour from 1989 to 1995 is expressed in the following equation.

$Y = 0.0303 X - 72,710$

Y : Soybean flour import volume

X : Population

$r = 0.909$

Year 2005 136,000 tons

Year 2015 169,000 tons

Table 10-3-12 Soybean flour Import Volume Throughput

unit : ton

year	Acajutla
1984	79,540
1985	11,130
1986	45,903
1987	29,239
1988	101,262
1989	79,073
1990	77,400
1991	57,679
1992	88,355
1993	58,074
1994	80,703
1995	108,535
1996	111,337

Source : CEPA

4) Others

25. Others import dry bulk cargoes consists of carbon soda , corn flour, slag, and others. Table 10-3-13 shows others total volume throughput.

Table 10-3-13 Other Dry Bulk Cargo Import Volume Throughput

unit : ton

year	Others Total
1984	15,515
1985	105,277
1986	45,872
1987	128,054
1988	24,754
1989	19,827
1990	4,551
1991	7,100
1992	22,164
1993	9,426
1994	13,797
1995	73,289
1996	32,354

Source : CEPA

As the import volume of all commodities has fluctuated every year, study team adopted the average volume.

Year 2005 39,000 ton
Year 2015 39,000 ton

(3) Import Liquid Bulk Cargo

26. Main commodities of import liquid cargoes are diesel oil, butane gas, lubricants, alcohol 5, cotton seed oil and fatty oil.

1) Diesel Oil

27. Import volume of diesel oil throughput from 1984 -1996 is shown in Table 10-3-14. All domestic consumption of diesel oil is imported and this tendency will continue up to the target date. Diesel oil is the main commodity of import liquid bulk and import volume suddenly increased in 1993. Diesel oil is mainly used for transportation equipment and industrial purposes. Study team assumed that the future import volume is proportionate to the import volume of 1995 and GDP.

Case 1

Year 2005	587,000 tons
Year 2015	956,000 tons

Case 2

Year 2015	828,000 tons

Table 10-3-14 Diesel Oil Import Volume Throughput

unit : ton

year	Acajutla	Cutuco	Total
1984		9,822	9,822
1985		9,510	9,510
1986		15,578	15,578
1987		19,695	19,695
1988		20,590	20,590
1989		12,492	12,492
1990	4,067	12,708	16,775
1991	23,296	19,746	43,042
1992	61,816	29,905	91,721
1993	168,750	3,902	172,652
1994	333,310	31,952	365,262
1995	370,685	29,911	400,596
1996	152,252	3,944	156,196

Source : CEPA

2) Butane Gas

28. Import volume of butane gas throughput from 1988-1996 is shown in

Table 10-3-15. All domestically consumed of butane gas is imported and this tendency will continue up to the target date. Import volume of butane gas is proportionate to the GDP. The correlation between the GDP and import volume of butane gas from 1988 to 1995 is expressed in the following equation.

Table 10-3-15 Butane Gas Import Volume Throughput

unit : ton

year	Acajutla
1988	12,481
1989	18,525
1990	17,891
1991	21,810
1992	25,509
1993	38,710
1994	53,727
1995	65,965
1996	66,662

Source : CEPA

$Y = 0.0000296 X - 107,983$

Y : Butane gas import volume

X : GDP

$r = 0.975$

Case 1

Year 2005 162,000 tons

Year 2015 331,000 tons

Case 2

Year 2015 272,000 tons

3) Lubricants

29. Import volume of lubricants throughput from 1984 -1996 is shown in Table 10-3-16. Import volume of lubricants has varied from 0 to 18,471 tons in the period from 1984 to 1996. No import activity was conducted in the period from 1989 to 1992, then in 1993 import activity resumed. Import volume has been decreasing after peaking in 1994 . Study team adopted the maximum volume of the past.

Year 2005 18,000 tons

Year 2015 18,000 tons

Table 10-3-16 Lubricants Import Volume Throughput

unit : ton

year	Acajutla
1984	3,666
1985	4,026
1986	7,189
1987	7,649
1988	7,354
1989	0
1990	0
1991	0
1992	0
1993	5,549
1994	18,471
1995	14,344
1996	11,765

Source : CEPA

4) Alcohol 5

30. As alcohol 5 is a material for ethyl alcohol, import volume is proportionate to the export volume of ethyl alcohol. Import volume of alcohol 5 and export volume of ethyl alcohol throughput from 1993 -1996 are shown in Table 10-3-17.

Table 10-3-17 Alcohol 5 Import Volume and Ethyl Alcohol Export Volume Throughput

unit : ton

year	Alcohol 5 import volume	Ethyl Alcohol export volume
1993	31,920	25,515
1994	38,887	39,674
1995	69,679	53,770
1996	21,337	33,793

Source : CEPA

Case 1

Year 2005 110,000 tons

Year 2015 180,000 tons

Case 2

Year 2015 156,000 tons

5) Cotton Seed oil

31. Import volume of cotton seed oil throughput from 1984 -1996 is shown

in Table 10-3-18. Cotton fields of the Eastern Region were converted to sugar cane fields, consequently, imported cotton seed oil volume has increased. Main consumption for cotton seed oil is for foodstuff. Therefore, import volume of cotton seed oil is proportionate to the population. The correlation between the population and import volume of cotton seed oil from 1986 to 1995 is expressed in the following equation.

$Y = 0.0219 X - 80{,}967$

Y : Cotton seed oil import volume

X : Population

$r = 0.929$

Year 2005 70,000 tons

Year 2015 94,000 tons

Table 10-3-18 Cotton Seed Oil Import Volume Throughput

unit : ton

year	Acajutla
1984	3,400
1985	14,928
1986	24,811
1987	12,267
1988	19,368
1989	24,049
1990	30,720
1991	31,693
1992	38,720
1993	31,977
1994	27,948
1995	43,585
1996	29,538

Source : CEPA

6) Fatty Oil

32. Import volume of fatty oil throughput from 1984 -1996 is shown in Table 10-3-19. Import volume of fatty oil has fluctuated in the range of 18,962 to 48,551 tons in the period from 1984 -1996. Therefore, the study team adopted the past maximum volume.

Year 2005 49,000 tons

Year 2015 49,000 tons

Table 10-3-19 Fatty Oil Import Volume Throughput

unit : ton

year	Acajutla
1984	26,693
1985	32,567
1986	40,463
1987	30,493
1988	32,655
1989	31,456
1990	47,582
1991	48,551
1992	41,075
1993	46,171
1994	28,770
1995	35,843
1996	18,962

Source : CEPA

7) Others

33. Liquid bulk cargo of others consists of alkane, caustic soda, soya oil and others. Table 10-3-20 shows others total volume throughput.

Table 10-3-20 Others Liquid Bulk cargo Import Volume Throughput

unit : ton

year	Others Total
1984	18,052
1985	6,789
1986	9,561
1987	21,535
1988	11,723
1989	7,636
1990	10,725
1991	10,031
1992	34,674
1993	30,749
1994	56,949
1995	60,869
1996	89,074

Source : CEPA

As the imported volume of all commodities has been increasing since 1992, the relation between cargo volume and time series is expressed by the following equation.

$$Y = 5,286 X - 10,490,487$$

Y : Others liquid cargo import volume
X : Year
r = 0.780

Year 2005 108,000 ton
Year 2015 161,000 ton

(4) Export General Cargo

34. Main commodities of export general cargoes are coffee and sugar in bag. These two commodities accounted for 90% and 95% of the total export general cargo volume in the years 1994 and 1995 respectively. In addition, presence of the new port will accelerate activities of EPZs. It is expected that cargoes from/to EPZs will be handled at the new port.

1) Coffee

35. Export volume of coffee throughput from 1984 -1996 is shown in Table 10-3-21.

Table 10-3-21 Coffee Export Volume Throughput

unit : ton

year	Acajutla	Cutuco	Total
1984	123,141	24,181	147,322
1985	96,292	19,298	115,590
1986	67,908	12,418	80,326
1987	94,332	14,946	109,278
1988	76,956	11,571	88,527
1989	54,481	8,392	62,873
1990	107,313	5,189	112,502
1991	76,802	279	77,081
1992	72,698		72,698
1993	100,313		100,313
1994	76,651		76,651
1995	69,987		69,987
1996	67,744		67,744

Source : CEPA

According to interviews and data of Coffee Association of El Salvador ,annual production of coffee is almost 150,000 tons of which domestic consumption is about 12,000 tons. Balance of 138,000 tons is for export. Export share of each custom office throughput is shown in Table 10-3-22. Though the share of Pacific coast ports (Acajutla, Cutuco and La Hachadura)has dropped recently, it is expected that the export share will return to same level of the early 90's after completion of

new port.

Table 10-3-22 Coffee Export Volume Share by Custom Office Throughput

year	Acajutla	Cutuco	La Hachadura	Las Chinamas	Anguiatu	El Amatillo
90/91	0.602	0.002		0.001	0.395	
91/92	0.560	0.004		0.001	0.435	
92/93	0.578		0.000		0.421	
93/94	0.600		0.018		0.382	
94/95	0.639		0.038		0.322	
95/96	0.465		0.053		0.475	0.007

Year 2005 138,000 × 0.6 = 83,000 tons
Year 2015 83,000 tons

2) Sugar in Bag

36. Export volume of sugar in bag throughput from 1984 -1996 is shown in Table 10-3-23. Export volume of sugar is highly influenced by international market price, therefore, the study team adopted the maximum volume of the past. According to the interview with the Sugar Association of El Salvador, maximum annual production volume of sugar is about 500,000 tons. After reduction of domestic consumption volume, export sugar products are separated into 3 items, sugar in bag , molasses and dry bulk sugar. As sugar in bag is the highest value added commodities of the three items, the study team adopted the maximum volume of the past.

Year 2005 41,000 ton
Year 2015 41,000 ton

Table 10-3-23 Sugar in Bag Export Volume Throughput

unit : ton

year	Acajutla
1991	7,481
1992	40,261
1993	40,879
1994	11,752
1995	33,305
1996	29,267

Source : CEPA

3) Others

37. Others consists of food, sesame, cotton, balsam, machinery, industrial products and others. Table 10-3-24 shows others export total volume throughput. As the export volume of all commodities has fluctuated every year, the study team

adopted average volume.

Year 2005 11,000 tons
Year 2015 11,000 tons

Table 10-3-24 Export Others General Cargo Volume Throughput

unit : ton

year	Others Total
1984	17,922
1985	23,826
1986	15,264
1987	9,299
1988	10,890
1989	8,798
1990	8,726
1991	13,535
1992	6,111
1993	9,288
1994	10,108
1995	5,116
1996	2,012

Source : CEPA

4) Cargo related to EPZ

38. Presence of the new port will accelerate activities in the EPZ's. Export cargo volume is assumed to be the same as that of import .

Case 1
Year 2005 74,000 tons
Year 2015 247,000 tons
Case 2
Year 2015 214,000 tons

5) Shrimp

39. Shrimp is one of the traditional products of El Salvador. Annual production volume from 1993 to 1997 is shown in Table 10-3-25. Production volume of shrimp has tended to increase gradually every year with the exception of 1996. The relation of shrimp production volume and time series is expressed by the following equation.

$Y = 179.45 X - 353,511$

Y : Shrimp production volume
X : Year

r = 0.771

Year 2005 6,000 tons

Year 2015 8,000 tons

Table 10-3-25 Shrimp Production Volume Throughput

unit : ton

year	Shrimp
1993	4,012.4
1994	4,227.5
1995	4,909.7
1996	4,568.6
1997	4,739.1

Source : CENDEPESCA

(5) Export Dry Bulk Cargo

1) Sugar

40. Export volume of sugar throughput from 1984 -1996 is shown in Table 10-3-26. Main commodity of export dry bulk is sugar, whose trade volume is highly influenced by international market price. The total export dry bulk cargo volume at ports has fluctuated since 1984. Domestic consumption will be expected to increase along with the population growth, therefore, export volume will not be expected to increase significantly.

41. According to interviews and data of the Sugar Association of El Salvador, the maximum sugar production volume in El Salvador is about 500,000 tons while consumption volume was 220,000 tons in 1996. Export dry bulk sugar volume is obtained by subtracting sugar in bag as general export cargo and molasses as export liquid bulk cargo from the total export volume. Table 10-3-27 shows the result of calculation.

Table 10-3-26 Dry Bulk Cargo Sugar Export Volume Throughput

unit : ton

year	Acajutla
1984	85,381
1985	111,670
1986	99,240
1987	37,787
1988	78,105
1989	29,100
1990	47,935
1991	60,390
1992	100,007
1993	78,277
1994	91,372
1995	70,786
1996	79,517

Source : CEPA

Table 10-3-27 Summary of Sugar Export Volume Projection

unit : ton

year	Total Production	Domestic Consumption	Export Volume			
			total	In Bag	Molassess	dry bulk
1996	400,000	220,000	180,000	29,000	72,000	79,000
2005	500,000	261,000	239,000	41,000	72,000	126,000
2015	500,000	303,000	197,000	41,000	72,000	84,000

(6) Export Liquid Bulk Cargo

42. Main commodity of export liquid bulk cargoes are ethyl alcohol and molasses.

1) Ethyl Alcohol

43. Export volume of ethyl alcohol throughput from 1984 -1996 is shown in Table 10-3-28. According to interviews with the main export company, ethyl alcohol is processed by alcohol 5 imported from European countries and main export market is the US. Since 1989, export volume of ethyl alcohol has been increasing except for year 1996. Future export volume of ethyl alcohol is proportionate to the volume in 1995 and GDP.

Case 1

Year 2005 85,000 tons

Year 2015 139,000 tons

Case 2

Year 2015 120,000 tons

Table 10-3-28 Ethyl Alcohol Export Volume Throughput

unit : ton

year	Acajutla
1984	0
1985	12,842
1986	7,897
1987	6,082
1988	0
1989	5,160
1990	4,095
1991	8,581
1992	11,157
1993	25,515
1994	39,674
1995	53,770
1996	33,793

Source : CEPA

2) Molasses

44. Export volume of molasses throughput from 1986 -1996 is shown in Table 10-3-29. Molasses is produced from sugar cane like sugar. Trading volume of molasses is highly influenced by international market price. Export volume of molasses has fluctuated since 1990. Therefore, export volume of molasses will not increase significantly.

Table 10-3-29 Molasses Export Volume Throughput

unit : ton

year	Acajutla
1986	7,031
1987	0
1988	0
1989	0
1990	37,501
1991	60,966
1992	66,470
1993	51,145
1994	57,700
1995	57,022
1996	72,423

Source : CEPA

Year 2005 72,000 ton
Year 2015 72,000 ton

(7) Domestic Cargo

45. According to leading oil refining company of El Salvador, it is expected that some portion of refined oil for domestic consumption will be transported to the new port in La Union by tanker after being refined at Acajutla..

1) Import volume of crude oil and refined oil

46. Import volume of crude and refined oil throughput from 1984 -1996 is shown in Table 10-3-30. Total import petroleum volume at ports is forecast by its relation with GDP. The correlation between the cargo volume and GDP from 1984 to 1996 is expressed in the following equation.

$$Y = 0.000255\,X - 327{,}096 \quad (R = 0.897)$$

Where, Y : Total import petroleum volume at ports
X : GDP (million US$)

Case 1

Year 2005 X = 9,111,111,000
Y = 1,996,000 ton

Year 2015 X = 14,841,040,000
Y = 3,457,000 ton

Case 2

Year 2015 X = 12,852,122,000
Y = 2,950,000 ton

Table 10-3-30 Crude and Refined Oil Import Volume Throughput

unit : ton

year	Acajutla
1984	591,913
1985	644,213
1986	677,961
1987	696,963
1988	727,624
1989	701,368
1990	745,720
1991	890,833
1992	951,183
1993	997,703
1994	934,805
1995	1,067,887
1996	1,279,309

Source : CEPA

2) Domestic sea transport volume of refined oil

47. Study team adopted 10% as the sea borne refined oil transport cargo volume share for domestic consumption on the assumption that 30% of Eastern region oil consumption will rely on sea transport.

Case 1

Year 2005 1,996,000 × 0.1 = 200,000 ton

Year 2015 3,457,000 × 0.1 = 346,000 tons

Case 2

Year 2015 2,950,000 × 0.1 = 295,000 tons

(8) Transit Cargo to/from South Honduras

48. La Union new port will take 50% of container cargo handling to/from southern part of Honduras. San Lorenzo port cargo throughput and container cargo handling volume throughput are shown in Table 6-3-5 and 6-3-6 of the Progress report.

49. Cargo handling volume of San Lorenzo port has been gradually increasing, therefore, future volume is forecast using time series analysis. Correlation between container cargo handling volume and time series is expressed by the following equation.

$Y = 211.7X - 410{,}005 \quad (R = 0.815)$

Where, Y : Container cargo handling volume at San Lorenzo ports (TEU)

X : Year

Year 2005 Y = 4,450 TEU

Year 2015 Y = 6,570 TEU

Therefore La Union new port will handle 50 % of these container cargo

Year 2005 Y = 2,220 TEU

Year 2015 Y = 3,280 TEU

50. The ratio of total TEU between laden container and empty container is 6:4. The ratio of TEU between import container and export container is 3:7. Average loaded weight is assumed to be the same as Acajutla port. Conversion factor from TEU to box number is applied using the same factor of Acajutla port. Taking into consideration these conditions, container volume to/from the south

part of Honduras which will be handled in La Union new port is shown in Table 10-3-36 and 10-3-37

(9) Present Transit Cargo from/to Quetzal port

51. According to interviews with a shipping company, Quetzal port is handling about 80 boxes of container transit cargo per week from/to El Salvador, Honduras and Nicaragua. Cargo volume share of the three countries is about 4:1:1, therefore, from the cargo handling volume throughput of Quetzal port (Progress report Table 6-3-1) following transit cargo distribution Table 10-3-31 can be obtained. Annual average El Salvadoran transit cargo volume from/to Quetzal port is 11,000 tons and 4,000 tons.

Table 10-3-31 Quetzal Port Transit Cargo Distribution

unit : ton

year	Total			El Salvador		Honduras		Nicaragua	
	Import	Export	Total	Import	Export	Import	Export	Import	Export
1991	4,785	2,658	7,443	3,545	1,418	620	620	620	620
1992	5,012	2,785	7,797	3,712	1,485	650	650	650	650
1993	8,931	4,962	13,893	6,615	2,646	1,158	1,158	1,158	1,158
1994	34,266	19,037	53,303	25,382	10,153	4,442	4,442	4,442	4,442
1995	23,581	13,101	36,682	17,467	6,987	3,057	3,057	3,057	3,057
1996	13,949	7,749	21,698	10,333	4,133	1,808	1,808	1,808	1,808

(10) Result of the Forecast

52. Results of micro forecast is shown in Table10-3-32 and Figure 10-3-1. Although there is a slight difference between the macro forecast (see Table 10-3-4) and micro forecast , the difference is negligible. Hence, the cargo volumes handled at the El Salvadoran port for the target year will be forecast as those obtained by the micro forecast method.

Table 10-3-32 Summary of Micro Forecast

unit : ton

		2005	2015
Import	Case 1	2,677,000	4,051,000
	Case 2		3,669,000
Export	Case 1	502,000	680,000
	Case 2		628,000
Total	Case 1	3,179,000	4,731,000
	Case 2	0	4,297,000

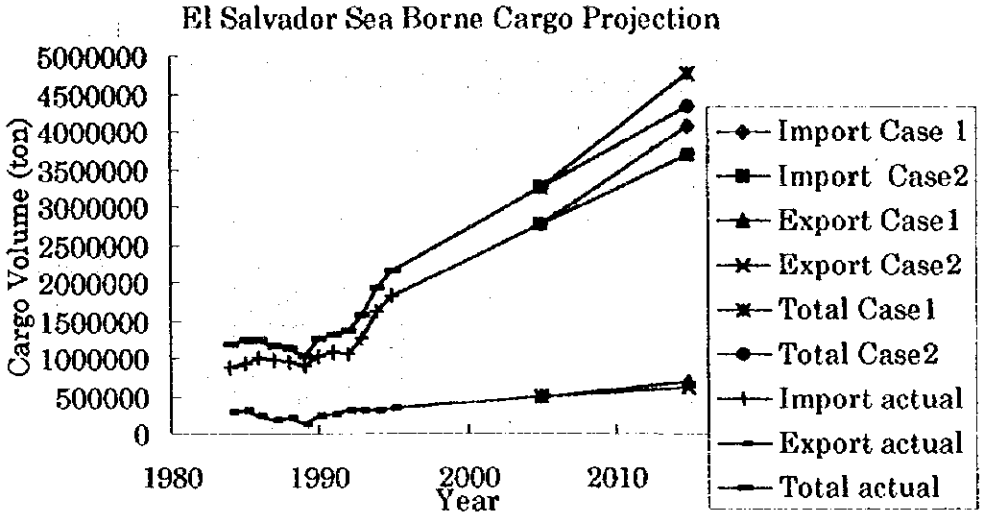


Figure 10-3-1 Result of Micro Projection

53. Table 10-3-33 shows a detailed summary of the micro forecast.

10.3.3 Forecast of Container Cargo Volume at Ports

54. Container cargo volume is obtained by multiplying the containerizable cargo volume by the containerization ratio.

(1) Containerization Rates

55. Import cargo and export cargo containerization ratio of Acajutla port are presented in Table 10-3-34 . The containerization ratio during the planning period is calculated by the following equations which were obtained by the regression analysis with the datum of Table 10-3-34.

$$\text{Import} \quad Y = \frac{0.80}{1 + 0.889^{\,t-7.261}}$$

$$\text{Export} \quad Y = \frac{0.90}{1 + 0.835^{\,t-7.510}}$$

Where Y : Ratio of Containerization
t : Number of years from 1984

56. Figure 10-3-2 and 10-3-3 show import and export cargo containerization

Table 10-3-33 Result of Micro Forecast

unit: ton

		Commodity	2005	2015	
				Case 1	Case 2
Import	General Cargo	Iron	196,000	355,000	300,000
		Vehicle	45,000	92,000	76,000
		Industrial products	30,000	30,000	30,000
		Others	226,000	420,000	353,000
		Cargo related to EPZ	74,000	247,000	214,000
		Transit cargo from Quetzal port	11,000	11,000	11,000
		total	582,000	1,155,000	984,000
	Dry Bulk Cargo	Fertilizer	350,000	350,000	350,000
		Cereals	466,000	549,000	549,000
		Soybean flour	136,000	169,000	169,000
		Others	39,000	39,000	39,000
		total	991,000	1,107,000	1,107,000
	Liquid Bulk Cargo	Diesel Oil	587,000	956,000	828,000
		A5	110,000	180,000	156,000
		Cotton seed oil	70,000	94,000	94,000
		Butane gas	162,000	331,000	272,000
		Lubricants	18,000	18,000	18,000
		Fatty oil	49,000	49,000	49,000
		Others	108,000	161,000	161,000
		total	1,104,000	1,789,000	1,578,000
	Total		2,677,000	4,051,000	3,669,000
Export	General Cargo	Sugar	41,000	41,000	41,000
		Coffee	83,000	83,000	83,000
		Others	11,000	11,000	11,000
		Cargo related to EPZ	74,000	247,000	214,000
		Shrimp	6,000	8,000	8,000
		Transit cargo to Quetzal port	4,000	4,000	4,000
		total	219,000	394,000	361,000
	Dry bulk Cargo	Sugar	126,000	83,000	83,000
	Liquid Bulk Cargo	Molases	72,000	72,000	72,000
		Ethyl alcohol	85,000	139,000	120,000
		total	157,000	211,000	192,000
	Total		502,000	688,000	636,000
Grand Total			3,179,000	4,739,000	4,305,000

Note : EPZ is Cargo related to Export Processing Zone

Table 10-3-34 Acajutla Port General Cargo Containerization Ratio

year	Import Cargo			Export Cargo		
	General Cargo	Containerized Cargo	Containerized Ratio	General Cargo	Containerized Cargo	Containerized Ratio
1984	165,051	44,784	0.271	141,145	49,284	0.349
1985	132,196	29,408	0.222	120,404	38,671	0.321
1986	162,171	38,881	0.240	83,259	36,443	0.438
1987	143,798	46,094	0.321	103,707	33,970	0.328
1988	139,017	54,772	0.394	87,974	27,897	0.317
1989	114,630	47,532	0.415	113,604	26,318	0.232
1990	101,917	50,651	0.497	98,838	18,738	0.190
1991	117,397	53,969	0.460	110,097	24,126	0.219
1992	112,325	50,012	0.445	115,251	19,147	0.166
1993	117,497	53,324	0.454	59,597	49,764	0.835
1994	148,804	63,547	0.427	86,810	41,376	0.477
1995	150,374	64,056	0.426	75,148	53,729	0.715
1996	81,285	45,772	0.563	69,792	55,595	0.797

Source : CEPA
Note : Container Box Weight is not Included
Import Volume of Iron and Vehicle is not Included
Export Volume of Sugar in Bag is not Included

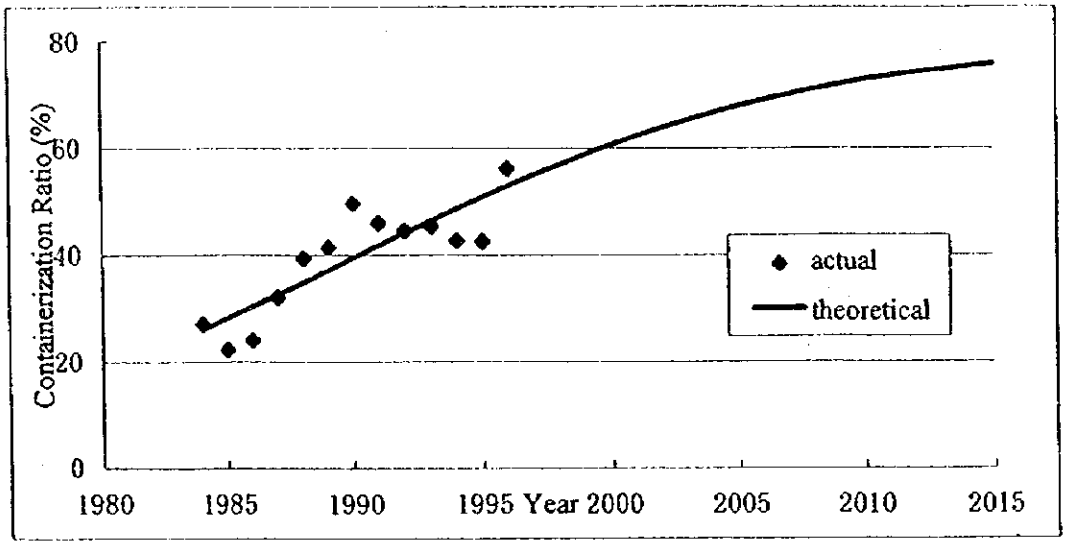


Figure 10-3-2 Import Cargo Containerization Ratio

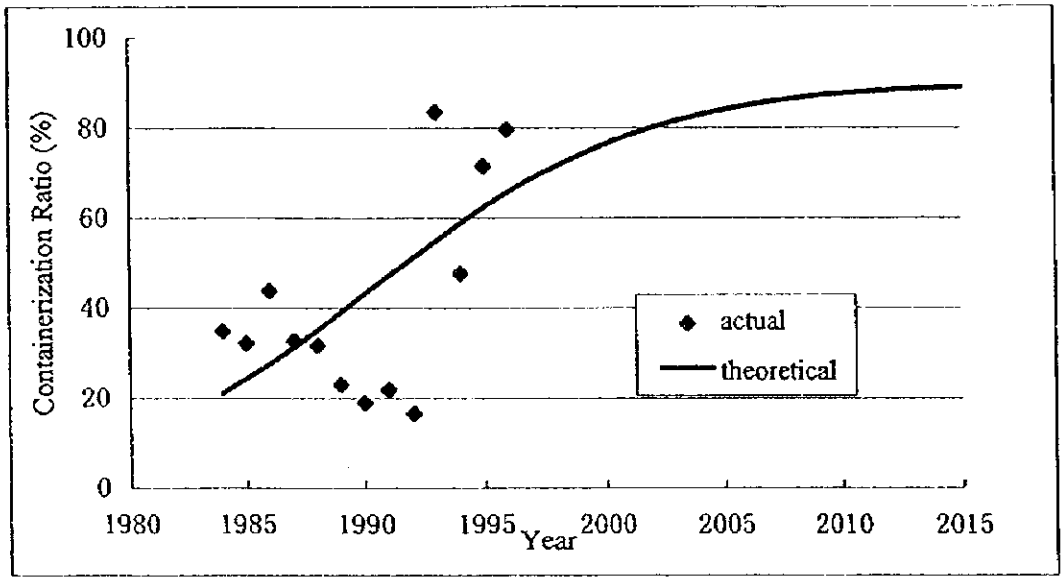


Figure 10-3-3 Export Cargo Containerization Ratio

ratio. The limit of the ratio of containerization for import cargo and export cargo is assumed as 80% and 90% respectively. The above ratios exclude iron and vehicle in import cargo and sugar in bag in export cargo. These cargoes are so called non containerizable cargo, therefore, 10% is applied to iron and vehicles .

(2) Container Cargo Volume

57. Import Container Cargo Volume

Case 1

Year 2005 341,000 × 0.694 + 241,000 × 0.1 = 261,000 ton

Year 2015 708,000 × 0.791 + 447,000 × 0.1 = 605,000 ton

Case 2

Year 2015 608,000 × 0.791 + 376,000 × 0.1 = 519,000 ton

58. Export Container Cargo Volume

Case 1

Year 2005 178,000 × 0.826 = 147,000 ton

Year 2015 353,000 × 0.847 = 299,000 ton

Case 2

Year 2015 320,000 × 0.847 = 271,000 ton

(3) Average Load Weight

59. The projected containerized cargo volumes were converted into loaded TEU based on Acajutla's containerized cargo volumes. Average weight of import cargo in the period from 1984 to 1996, 8.6 tons/TEU is used to forecast the container volume.

(4) Ratio of Loaded and Empty Container

1) Imports

60. Acajutla port laden container and empty container throughput from 1984 - 1996 shown in Table 10-3-35 is reviewed to determine the ratio of empty to loaded import containers. During this period, Acajutla port handled a total of 78,548 loaded import TEU and 36,633 empty import TEU. The ratio of loaded import TEU and empty import TEU is 0.73 : 0.27. This ratio is applied to the forecast period to project the number of empty import TEU to be handled at ports.

2) Exports

61. It is assumed that an equal number of import and export TEU' will be

Table 10-3-35 Acajutla Port Laden Container and Empty Container Throughput

year	Import					Export					Total				
	Laden		Empty		Total	Laden		Empty		Total	Laden		Empty		Total
	TEU	share	TEU	share	TEU	TEU	share	TEU	share	TEU	TEU	share	TEU	share	TEU
1984	4,330	0.793	1,129	0.207	5,459	3,976	0.698	1,722	0.302	5,698	8,306	0.744	2,851	0.256	11,157
1985	3,598	0.655	1,893	0.345	5,491	2,886	0.539	2,468	0.461	5,354	6,484	0.598	4,361	0.402	10,845
1986	4,215	0.715	1,684	0.285	5,899	2,530	0.481	2,730	0.519	5,260	6,745	0.604	4,414	0.396	11,159
1987	5,272	0.769	1,588	0.231	6,860	2,879	0.458	3,411	0.542	6,290	8,151	0.620	4,999	0.380	13,150
1988	5,962	0.868	907	0.132	6,869	2,281	0.327	4,691	0.673	6,972	8,243	0.596	5,598	0.404	13,841
1989	4,937	0.862	789	0.138	5,726	2,365	0.354	4,322	0.646	6,687	7,302	0.588	5,111	0.412	12,413
1990	5,173	0.913	494	0.087	5,667	1,593	0.296	3,786	0.704	5,379	6,766	0.613	4,280	0.387	11,046
1991	5,543	0.899	623	0.101	6,166	1,890	0.339	3,680	0.661	5,570	7,433	0.633	4,303	0.367	11,736
1992	5,794	0.657	3,024	0.343	8,818	5,052	0.577	3,706	0.423	8,758	10,846	0.617	6,730	0.383	17,576
1993	7,052	0.600	4,701	0.400	11,753	8,105	0.677	3,868	0.323	11,973	15,157	0.639	8,569	0.361	23,726
1994	8,808	0.560	6,917	0.440	15,725	9,255	0.599	6,187	0.401	15,442	18,063	0.580	13,104	0.420	31,167
1995	9,774	0.607	6,328	0.393	16,102	9,697	0.600	6,462	0.400	16,159	19,471	0.604	12,790	0.396	32,261
1996	8,090	0.552	6,556	0.448	14,646	7,480	0.552	6,083	0.448	13,563	15,570	0.552	12,639	0.448	28,209
total	78,548	9.450	36,633	3.550		59,989	6.497	53,116	6.503		138,537	7.987	89,749	5.013	
average		0.727		0.273			0.500		0.500			0.614		0.386	

Source : CEPA

handled at the port each year.

(5) Ratio of TEU and Container Box

62. During the period from 1984 to 1996, Acajutla port handled a total of 174,136 loaded and empty containers of which 54,227 (31 %) were 40-foot containers and 119,909 (69 %) were 20-foot containers. This yields a TEU/container box ratio of 1.31 TEU per container box. The projected levels of loaded and empty container movements were divided by this ratio to project the container movements at the Port of El Salvador.

(6) The ratio of FCL and LCL

63. Table 10-3-36 shows Acajutla port FCL (full container loaded) and LCL (less container loaded) throughput. During the period of 1984 to 1996, average ratio of 40 foot container FCL and LCL in import and export is 0.95 and 0.05, and 20 foot container FCL and LCL is 0.7 and 0.3 respectively.

10.3.4 Distribution of Cargoes to Port of Acajutla and La Union

64. Distribution of cargo volume by ports is estimated by proportional representation using economic indices of the hinterland, on the assumption that cargo volume originating to/from a hinterland has a close relationship with economic indices of the hinterland. Bulky cargo such as dry bulk and liquid bulk cargo cannot be easily transported to another hinterland without a mass transport system such as railways or pipeline, therefore, hinterland distribution of bulk cargo is proportionate to the population of the hinterland.. As to container cargo, because the handling capacity of Acajutla port is limited to 30,000 Boxes (39,000 TEU), balance of container cargo will be handled in La Union new port.

65. Distributed cargo volume share of the ports is proportionate to the population of hinterlands in the long term, however, cargo handling share of the new port will be smaller than the population share immediately after opening, therefore, 20 % share is applied in the short term, which Cutuco port recorded around the time of 1975 .

66. Bulky cargo and general cargo distribution share of the 2 Ports

Year 2005 Acajutla port : La Union port = 0.80 : 0.20
Year 2015 Acajutla port : La Union port = 0.70 : 0.30

Table 10-3-36 Acajutla Port Container Cargo FCL and LCL Throughput

year	40'													Total	20'													Total
	Import							Export							Import							Export							
	FCL	ratio	LCL	ratio	total	Empty	Total	FCL	ratio	LCL	ratio	total	Empty	Total		FCL	ratio	LCL	ratio	total	Empty	Total	FCL	ratio	LCL	ratio	total	Empty	Total	
1984	1,032	1.00	0	0.00	1,032	207	1,239	927	1.00	0	0.00	927	441	1,368	2,607	2,325	1.00	0	0.00	2,325	715	3,040	2,122	1.00	0	0.00	2,122	840	2,962	6,002
1985	690	0.90	76	0.10	766	301	1,067	157	0.27	433	0.73	590	433	1,023	2,090	1,513	0.73	553	0.27	2,066	1,291	3,357	454	0.27	1,252	0.73	1,706	1,602	3,308	6,665
1986	992	0.96	43	0.04	1,035	170	1,205	175	0.44	227	0.56	402	824	1,026	2,231	1,842	0.86	303	0.14	2,145	1,344	3,489	425	0.25	1,301	0.75	1,726	1,482	3,208	6,697
1987	1,348	0.96	61	0.04	1,409	138	1,547	206	0.48	226	0.52	432	851	1,283	2,830	1,934	0.79	520	0.21	2,454	1,312	3,766	474	0.24	1,541	0.76	2,015	1,709	3,724	7,490
1988	1,617	0.97	56	0.03	1,673	132	1,805	216	0.63	125	0.37	341	1,554	1,895	3,700	2,147	0.82	469	0.18	2,616	643	3,259	406	0.25	1,193	0.75	1,599	1,583	3,182	6,441
1989	1,223	0.93	96	0.07	1,319	172	1,491	169	0.32	355	0.68	524	1,341	1,865	3,356	1,619	0.70	680	0.30	2,299	445	2,744	395	0.30	922	0.70	1,317	1,640	2,957	5,701
1990	1,290	0.96	60	0.04	1,350	121	1,471	159	0.39	253	0.61	412	990	1,402	2,873	1,954	0.79	519	0.21	2,473	252	2,725	277	0.36	492	0.64	769	1,806	2,575	5,300
1991	1,087	0.97	38	0.03	1,125	108	1,233	174	0.57	129	0.43	303	740	1,043	2,276	2,757	0.84	536	0.16	3,293	407	3,700	406	0.32	878	0.68	1,284	2,200	3,484	7,184
1992	1,320	0.87	192	0.13	1,512	770	2,282	1,119	0.90	129	0.10	1,248	968	2,216	4,498	2,240	0.81	530	0.19	2,770	1,484	4,254	1,746	0.68	810	0.32	2,556	1,770	4,326	8,580
1993	1,869	0.95	91	0.05	1,960	1,266	3,226	1,545	0.73	559	0.27	2,104	1,228	3,332	6,558	2,691	0.85	459	0.15	3,150	2,169	5,319	2,139	0.55	1,758	0.45	3,897	1,412	5,309	10,628
1994	1,994	0.94	130	0.06	2,124	1,736	3,860	2,041	0.92	172	0.08	2,213	1,620	3,833	7,693	3,208	0.70	1,352	0.30	4,560	3,445	8,005	3,153	0.65	1,676	0.35	4,829	2,947	7,776	15,781
1995	1,905	0.94	115	0.06	2,020	1,775	3,795	1,839	0.94	113	0.06	1,952	1,875	3,827	7,622	3,820	0.67	1,914	0.33	5,734	2,778	8,512	3,727	0.64	2,066	0.36	5,793	2,712	8,505	17,017
1996	1,516	0.96	57	0.04	1,573	1,495	3,068	1,289	0.94	87	0.06	1,376	1,449	2,825	5,893	3,521	0.71	1,423	0.29	4,944	3,566	8,510	3,336	0.71	1,393	0.29	4,728	3,185	7,913	16,423

Source : CEPA

67. Table 10-3-37 shows micro forecast result and Table 10-3-38 shows distribution of container cargo.

10.4 Forecast of Vessel Size and Vessel Calls

10.4.1 Present Condition of Calling Vessel Size

1. In Table 3-1-7 and 3-1-13 of the Progress Report the calling vessel throughput of Acajutla port and Cutuco port are shown.

10.4.2 Forecast of Vessel Size

2. In the period between 1987 and 1996, the average size of each type of vessel, conventional cargo vessel, mixed cargo vessel, dry bulk cargo vessel ,liquid bulk cargo vessel and oil tanker increased 41%, 56%, 25% ,92% and 15% respectively. The year to date calling records up to October 1997 are shown in Table 3-1-9 in the Progress Report. The average size of conventional cargo vessel is still growing. However, the maximum size of dry bulk cargo vessel and liquid bulk cargo vessel have already reached panamax class. The relation between average size of each type of vessel and time series is expressed in the following equations.

1) Conventional Vessel

$Y = 626.9 X - 1,229,053 \quad (R = 0.766)$

2) Mixed Vessel

$Y = 1,162 X - 2,299,965 \quad (R = 0.729)$

3) Dry Bulk Cargo Vessel

$Y = 563.2 X - 1,095,656 \quad (R = 0.700)$

4) Tanker

$Y = 905.2 X - 1,788,255 \quad (R = 0.831)$

5) Oil Tanker

Table 10-3-37 Distribution of Cargo Traffic

unit : ton

			El Salvador Cargo		La Union New Port Cargo Volume		
			total volume	Acajutla	La Union	Honduras Cargo	Total
2005	Import	General Cargo	682,000	378,718	203,282	7,282	210,564
		Break Bulk cargo	321,000	256,800	64,200		64,200
		Container cargo	261,000	121,918	139,082	7,282	146,364
		(TEU)	41,745	19,500	22,245	1,110	23,355
		Bulk Cargo	2,095,000	1,676,000	419,000		419,000
		Dry Bulk cargo	991,000	792,800	198,200		198,200
		Liquid Bulk cargo	1,104,000	883,200	220,800		220,800
		Total	2,677,000	2,054,718	622,282	7,282	629,564
	Export	General Cargo	219,000	126,266	92,734	7,282	100,016
		Break Bulk cargo	72,000	57,600	14,400		14,400
		Container cargo	147,000	68,666	78,334	7,282	85,616
		(TEU)	41,745	19,500	22,245	1,110	23,355
		Bulk Cargo	283,000	226,400	56,600		56,600
		Dry Bulk cargo	126,000	100,800	25,200		25,200
		Liquid Bulk cargo	157,000	125,600	31,400		31,400
		Total	502,000	352,666	149,334	7,282	156,616
	Domestic	Liquid Bulk cago	200,000		200,000		200,000
		Total	3,379,000	2,407,384	971,616	14,563	986,179
2015 Case1	Import	General Cargo	1,155,000	506,918	648,082	10,758	658,840
		Break Bulk cargo	650,000	385,000	165,000		165,000
		Container cargo	605,000	121,918	483,082	10,758	493,840
		(TEU)	96,766	19,500	77,266	1,640	78,906
		Bulk Cargo	2,896,000	2,027,200	868,800		868,800
		Dry Bulk cargo	1,107,000	774,900	332,100		332,100
		Liquid Bulk cargo	1,789,000	1,252,300	536,700		536,700
		Total	4,051,000	2,534,118	1,516,882	10,758	1,527,640
	Export	General Cargo	394,000	126,754	267,246	10,758	278,004
		Break Bulk cargo	95,000	66,500	28,500		28,500
		Container cargo	299,000	60,254	238,746	10,758	249,504
		(TEU)	96,766	19,500	77,266	1,640	78,906
		Bulk Cargo	291,000	205,800	88,200		88,200
		Dry Bulk cargo	83,000	58,100	24,900		24,900
		Liquid Bulk cargo	211,000	147,700	63,300		63,300
		Total	688,000	332,554	355,446	10,758	366,204
	Domestic	Liquid Bulk cago	346,000		346,000		346,000
		Total	5,085,000	2,866,672	2,218,328	21,516	2,239,844
2015 Case2	Import	General Cargo	984,000	447,418	536,582	10,758	547,340
		Break Bulk cargo	465,000	325,500	139,500		139,500
		Container cargo	519,000	121,918	397,082	10,758	407,840
		(TEU)	83,011	19,500	63,511	1,640	65,151
		Bulk Cargo	2,685,000	1,879,500	805,500		805,500
		Dry Bulk cargo	1,107,000	774,900	332,100		332,100
		Liquid Bulk cargo	1,578,000	1,104,600	473,400		473,400
		Total	3,669,000	2,326,918	1,342,082	10,758	1,352,840
	Export	General Cargo	361,000	126,660	234,340	10,758	245,098
		Break Bulk cargo	90,000	63,000	27,000		27,000
		Container cargo	271,000	63,660	207,340	10,758	218,098
		(TEU)	83,011	19,500	63,511	1,640	65,151
		Bulk Cargo	275,000	192,500	82,500		82,500
		Dry Bulk cargo	83,000	58,100	24,900		24,900
		Liquid Bulk cargo	192,000	134,400	57,600		57,600
		Total	636,000	319,160	316,840	10,758	327,598
	Domestic	Liquid Bulk cago	295,000		295,000		295,000
		Total	4,600,000	2,646,078	1,953,922	21,516	1,975,438

Table10-3-38 Container Cargo Distribution

Case 1

		Total Volume (ton)	Acajutla							La Union						
				40'			20'				40'			20'		
			Volume	Laden	Empty	Total	Laden	Empty	Total	Volume	Laden	Empty	Total	Laden	Empty	Total
2005	Import	268,282	121,918	3,384	1,251	4,635	7,483	2,768	10,250	146,364	4,053	1,499	5,552	8,961	3,315	12,276
	FCL			3,214			5,762				3,850			6,900		
	LCL			169			1,721				203			2,061		
	Export	154,281	68,666	1,942	2,693	4,635	4,289	5,961	10,250	85,615	2,366	3,186	5,552	5,233	7,043	12,276
	FCL			1,806			2,788				2,200			3,401		
	LCL			136			1,501				166			1,832		
2015	Import	615,758	121,918	3,384	1,251	4,635	6,494	3,756	10,250	493,840	13,693	5,064	18,757	30,277	11,199	41,476
	FCL			3,215			5,000				13,008			23,314		
	LCL			169			1,494				685			6,964		
	Export	309,758	60,254	2,182	2,453	4,635	4,824	5,426	10,250	249,504	6,897	11,860	18,757	15,250	26,226	41,476
	FCL			2,029			3,136				6,414			9,913		
	LCL			153			1,688				483			5,338		

Case 2

		Total Volume (ton)	Acajutla							La Union						
				40'			20'				40'			20'		
			Volume	Laden	Empty	Total	Laden	Empty	Total	Volume	Laden	Empty	Total	Laden	Empty	Total
2005	Import	268,282	121,918	3,384	1,251	4,635	7,483	2,768	10,250	146,364	4,053	1,499	5,552	8,961	3,315	12,276
	FCL			3,214			5,762				3,850			6,900		
	LCL			169			1,721				203			2,061		
	Export	154,281	68,666	1,942	2,693	4,635	4,289	5,961	10,250	85,615	2,366	3,186	5,552	5,233	7,043	12,276
	FCL			1,806			2,788				2,200			3,401		
	LCL			136			1,501				166			1,832		
2015	Import	529,758	137,548	3,384	1,251	4,635	7,483	2,767	10,250	392,210	11,273	4,214	15,487	24,927	9,320	34,247
	FCL			3,215			5,762				10,709			19,194		
	LCL			169			1,721				564			5,733		
	Export	281,759	55,499	1,759	2,876	4,635	3,891	6,359	10,250	226,260	5,928	9,559	15,487	13,331	20,916	34,247
	FCL			1,636			2,529				5,513			8,665		
	LCL			123			1,362				415			4,666		

$Y = 1{,}593.7\,X - 3{,}122{,}167 \quad (R = 0.905)$

3. Table 10-4-1 shows projection of average size increase ratio of conventional cargo vessel, mixed cargo vessel, dry bulk cargo vessel ,tanker and oil tanker compared with the average size of 1997 using above equations.

Table 10-4-1 Vessel Size Growth Rate

	Growth rate %	
	2005	2015
Conventional cargo vessel	22	49
Mixed cargo vessel	42	95
Dry bulk cargo vessel	16	35
Tanker	37	84
Oil tanker	21	47

10.4.3 Forecast of Vessel Calling Frequency

4. Forecast of calling frequency is based on the assumption that cargo loading ratio will maintain the same level of 1997. Vessel size and calling frequency by vessel type at La Union new port are forecast in Table 10-4-2 and 10-4-3.

Table 10-4-2 La Union New Port Vessel Size and Calling Frequency Projection

Case 1

Type of Vessel	Year 2005				Year 2005			
	Import		Export		Import		Export	
	Size DWT	Calling frequency Number	Size DWT	Calling frequency Number	Size DWT	Calling frequency Number	Size DWT	Calling frequency Number
General Cargo	17,900	17	17,900	2	22,300	36	22,300	2
General + Container	19,400	105 (87)	19,400	91(87)	24,200	253 (171)	24,200	178 (171)
Dry Bulk cargo	29,300	11	16,600	3	34,400	16	19,400	3
Tanker	22,200	25 (1)	20,400	3 (1)	30,700	43 (1)	28,300	4 (1)
Gas Tanker	8,300	9			11,500	14		
Oil Tanker	22,200	18			30,700	23		

Note : ( ) Import and export activity in same time

Table 10-4-3 La Union New Port Vessl Size and Calling Frequency Projection

Case 2

Type of Vessel	Year 2005				Year 2005			
	Import		Export		Import		Export	
	Size DWT	Calling frequency Number	Size DWT	Calling frequency Number	Size DWT	Calling frequency Number	Size DWT	Calling frequency Number
General Cargo	17,900	17	17,900	2	22,300	30	22,300	2
General + Container	19,400	105 (87)	19,400	91 (87)	24,200	211 (152)	24,200	159 (152)
Dry Bulk cargo	29,300	11	16,600	3	34,400	16	19,400	3
Tanker	22,200	25 (1)	20,400	3 (1)	30,700	38 (1)	28,300	4 (1)
Gas Tanker	8,300	9			11,500	11		
Oil Tanker	22,200	18			30,700	19		

Note : ( ) Import and export activity in same time