CHAPTER 1

INTRODUCTION

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1.1 Background of the Study

1.1.1 Political and Economic Background

El Salvador is located in Central America and is adjacent to Guatemala to the west, Honduras to the north and the east, and the Pacific Ocean to the south. It covers 21,040.2 km^2 and has a population of about 5.12 million (1992 Census). The population density is 243 persons/km^2, the highest in Central America, and land for agricultural use per farm household is 1.9 ha, the smallest in Central America.

In 1980, civil war broke out and continued for 12 years concluding with the armistice agreement in 1992. It influenced the natural environment and economy as it not only destroyed various infrastructure and devastated the country but also impeded further progress in research and projects conducted before the war.

The growth rate of the GDP was negative in 1989, but 7.5% in 1993. The economic reconstruction policy adopted by the government after the war seems to be gradually progressing, although remittances from overseas contribute to 14.8% of the GNP. The development of agriculture, which is the basic industry, is indispensable for economic development.

1.1.2 Agriculture

The share of the agricultural sector (agriculture, forestry, fishery) in the GDP shows a downward trend. However, it contributed 13.7% to the GDP in 1995, after manufacture and commerce, and contributed almost half (9.3%) of the manufacturing share in the GDP.

Agricultural products made up 32.8% of the total export volume and the agricultural sector employed 35.5% of the working population in 1992. The development of most aspects of industry and commerce in El Salvador is supported by agriculture, which is considered to be the foundation for national economic development.

From another point of view, rapid economic reconstruction along with excessive increase in population and increase in unemployment ratio resulted in the concentration of the population in cities, expansion of the gap between rich and poor, and environmental destruction. Agriculture plays a key role in economic reconstruction as its development shall contribute to rural growth, food production, creation of employment opportunities, and the effective use of natural resources without destroying the environment.

The Socioeconomic Development Plan formulated for 1994-1999 also placed importance on

agricultural development, particularly natural resources development to increase productivity and reduce the gap between the rich and poor, as it is considered to contribute to rural growth and the expansion of other industries.

1.1.3 Necessity for Development in the Jiboa River Basin

The Jiboa River is one of the rivers having a huge potential for water resources development, along with the Lempa and San Miguel Grande Rivers. As the basin is adjacent to the capital city and has favorable access, it is expected to be a base for the production of exports such as coffee, and food staples e.g. maize, beans, vegetables and fruits, for the capital city. However, the present basin conditions are not favorable what with the destruction of social and agricultural infrastructure during the civil war. Basin population has also become concentrated because of the area's proximity to the capital city. Currently, the population density in the basin is 2.5 times the national average at 602.9 persons/km^2. Also, deforestation and soil erosion continue due to excessive cultivation and felling. These do not only impede effective use of resources but also incur low productivity and inundation in over 3,500 ha of land downstream.

Most farmers in the upstream and midstream basin areas cultivate the steep slopes on a small scale. Because this does not provide them much of an income, these farmers are very poor. In consideration of this condition, the Socioeconomic Development Plan gave emphasis on the improvement of agricultural productivity and farmers' income through crop diversification and agricultural reconstruction, in order to alleviate impoverished conditions and improve economic conditions. It also aims to activate national economy and establish public peace, and contribute to the development of concrete methods for the improvement of (steep) slope farming (more than 26%), where about 60% of all farmlands nationwide (about 1,225,000 ha) exist.

Thus the Jiboa River basin has become a condensed version of national problems, and the successful implementation of an agricultural development project in this basin could be a model for agricultural development nationwide.

1.1.4 Process of the Study

As a result of the situation mentioned above, the Government of El Salvador made a request to the Government of Japan in 1990 for technical cooperation for the formulation of the integrated agricultural development project in the Jiboa River basin. In response, the Government of Japan sent a Contact Mission in 1995. The Scope of Work and Minutes of Meeting were signed on 5 September 1995, and the Study Team was dispatched in January 1996.

1.2 Purpose of the Study

The purpose of the study is to formulate a master plan for the Integrated Agricultural Development Project in the Jiboa River Basin (about 60,600 ha). Basin conservation shall be considered and technology transfer shall be carried out during the course of the study.

1.3 Scope of Work

1.3.1 Study Approach

(1) Compatibility with National Development Plans

In order to formulate a plan that is in harmony with the National Reconstruction Plan and the 2nd Socioeconomic Development Plan being promoted by the Government of El Salvador, it is important to sufficiently understand the natural and social conditions of the country and the necessity of the Project.

(2) Formulation of a Development Plan Suitable for Resident Participation

It is important to make sure that the study would reflect the needs of the residents in order to gain active participation that would guarantee the continuance of the project.

(3) Agricultural Development Methods in Harmony with Basin Conservation Policy

It is important to raise the potential of the area for agricultural development and to activate the agricultural economy through development methods that would take into consideration the restoration and conservation of damaged and destroyed agricultural resources.

(4) Division of the Basin

Since the study area is large, the basin is divided into 5 blocks and the study shall be carried out according to the characteristics of each block.

(5) Formulation of Model Projects

Small scale model projects will be formulated and implemented to demonstrate the methods and set up a support network prior to execution of the master plan. This will allow the smooth implementation of the master plan and dissemination of the new methods on a wide scale. The model projects will be formulated in pilot areas selected in consideration of the potential for agricultural development and natural resource conservation.

(6) Recommendation for Related Systems

Improvements and additions to the project may be recommended by studying the present conditions of agricultural support systems, agrarian reform, credit systems, and farmers' organizations, etc.

(7) Cooperation with Relevant Institutions

Close and frequent discussions should be carried out with MAG, CENTA, SEMA, etc. Discussions should also be carried out with other concerned authorities and regional government agencies, to address any issue that may interfere with the study and its implementation.

1.3.2 Methods of the Study

The study is divided into 2 phases. The period and details of the main work allotted for each phase are as follows:

1) Phase I (January 1996 ~ July 1996)
   a) Study work in El Salvador (January 1996 ~ March 1996)
      (1) Collection and preliminary analysis of data and information
      (2) Reconnaissance survey and aerial photography
   b) Work in Japan (May 1996 ~ July 1996)
      (1) Preliminary formulation of master plan
      (2) Selection of pilot areas
2) Phase II (August. 1996 ~ March 1997)
   a) Work in El Salvador (August. 1996 ~ November 1996)
      (1) Collection and preliminary analysis of complementary data and information relevant to the master plan, and data and information on the pilot areas.
      (2) Reconnaissance survey
      (3) Preliminary formulation of model projects
   b) Work in Japan (November 1996 ~ January 1997)
      (1) Formulation of master plan and model projects
3) Explanation and discussion of the Draft Final Report (February. 1997)
4) Presentation of the Final Report

CHAPTER 2

NATIONAL STATUS OF EL SALVADOR

CHAPTER 2 NATIONAL STATUS OF EL SALVADOR

2.1 Administration and Policy

2.1.1 Administration

The Constitution of the Republic of El Salvador came into effect on 20 December 1983. It provides for a republican, democratic and representative form of government, composed of three Powers - Legislative, Executive, and Judicial - which are to operate independently. In March and April 1994, presidential, legislative and municipal elections were held. Mr. Armando Calderón Sol of the Alianza Republicana Nacionalista (ARENA) won and is the current president.

(1) MAG

The Ministerio de Agricultura y Ganadería (MAG) is the institution responsible for the formulation and enforcement of agricultural policies. The principal areas of activities are as follows:

- Planning and evaluation of policies
- Investigation, training on and extension of technologies related to agriculture, forestry and fisheries
- Preparation and dissemination of statistics on agriculture, forestry and fisheries
- Regulation of plant and animal health
- Conservation of the environment and natural resources

DGRNR is the executing organization of this development survey project. Its general functions are as follows:

- To observe the fulfillment of the legal framework and the execution of policies that regulate and direct the conservation and development of renewable natural resources.
- To design and implement the plans, programs and projects that contribute to the sustainable development of renewable natural resources and permit the rehabilitation, adjustment and integrated management of national hydrologic concerns.
- To set up and conserve selected protection areas, to guarantee the permanence and conservation of biological diversity.
- To prepare and diffuse information on renewable natural resources, meteorology and hydrology, in order to support development in relevant fields and agricultural economic activities.
- To promote the execution of programs and projects for the integral and rational use of resources, e.g. water, soil, fauna and flora.

- To direct irrigation and drainage techniques that permit the optimum utilization of renewable natural resources.

(2) Local Authority

El Salvador has 14 Departments and 262 municipalities. The Governors of the Departments are appointed by the central government. Municipalities exist as local self-governing bodies. In March and April 1994, presidential, legislative and municipal elections were held. ARENA retained the presidency and won effective control of the legislative assembly and the vast majority of municipalities.

The municipal council is made up of a mayor, trustee, and two or more councilors. The population of a municipality decides the number of councilors required and elections are held every three years.

2.1.2 Agricultural Policy

The Socioeconomic Development Plan (1994-1999) is an integration of national development plans by sector drawn up by each relevant ministry. The plan considers the expansion of agriculture as the basic force behind rural development, and sees the attainment of a productive and sustainable growth as a means of alleviating rural poverty. It also sees agricultural development as integral to the growth of other economic sectors.

The long-term objective of the plan is agricultural technical revolution, that is the transformation from a traditional to a dynamic, diversified and modern agriculture. Thus, MAG aims for sustainable agricultural development through crop diversification in order to improve agricultural and rural income and establish a more globally competitive market.

The objectives of the agricultural sector for 1994-1999 are as follows:

(1) To consolidate the foundations needed for crop diversification and a new agricultural production structure, by introducing profitable and environmentally friendly alternative production systems to improve productivity.
(2) To reduce rural poverty through improved productivity, employment and income.
(3) To strengthen the institutional and legal framework of the agricultural public sector.
(4) To expand irrigated agricultural areas and improve the management of water and soil resources.
(5) To strengthen the land tenure system and guarantee the legitimacy of land contracts to encourage investments in the sector.
(6) To consider a feasible rural credit system especially beneficial to small scale farmers.
(7) To help sustain agricultural development with the conservation and protection of natural resources, as well as pursue an agriculture that is free from organic and chemical

contamination.

MAG has three main programs for river basin management during the 1994-1999 period. They are the consolidation project of the Grande River basin in San Miguel, the agricultural development project of the lower basin of the Lempa River, and this project.

This development study aims at the conservation of natural resources and agricultural development. The government of El Salvador expects this study to contribute to national development.

The government adopted the structural adjustment policies proposed by IMF and the World Bank in 1989, which focused on smooth market operations and administrative improvement. However, it was difficult to deploy these policies at the national level during the civil war.

After the end of civil war in 1992, the government pursued the implementation of the 1992 peace accord along with economic reconstruction and social stabilization. This involved FMLN re-integration, civilian control, infrastructure reconstruction, economic recovery, reduction of absolute poverty, and promotion of human welfare.

In 1994, a new government was established. The Armando Calderon Sol Administration basically adopted the same policies but attached more importance to structural adjustment. Accepting the plan proposed by Finance Minister, Manuel Enrique Hinds, the administration announced a four-point development strategy in January 1995. Hinds proposed trade liberalization, public administrative reforms, reduction of the fiscal deficit by increasing the value-added tax (VAT), and the stabilization of the exchange rate.

The trade liberalization plan aims to reduce the tariff floor to 1% in 1996 and the ceiling to 6% by 1999. Under the plan, the authorities began tariff reductions in April 1995, cutting duties on imports of capital goods from 5% to 1%. The plan entails a 20% to 15% cut in tariffs on imported consumer goods between July 31 and November 30, 1996, a 15% to 10% reduction in tariffs on imported intermediate goods over the same period, a 5% to zero cut in tariffs on raw material imports, and the further reduction in tariffs on imported capital goods, from 1% to zero, on July 31.

The government's implementation of this plan was faced with mounting domestic criticism. It has proved unacceptable to many businessmen and producers, particularly to local businessmen, as long as there are no special policies that would help domestic producers become more competitive. An increase in VAT, from 10% to 13%, was implemented in July and administrative improvements, including retrenchments in the public sector, were carried out. The stabilization of the exchange rate has become a distant goal because of domestic opposition.

Smooth market operation prioritized in the structural adjustment policies is in accordance with

the MAG policy to create a globally competitive market through increase in the production of marketable agricultural products. Improvements in the administrative sector, however, shall restrict the activities of MAG because this shall entail budget and personnel cuts.

The war brought about a shortage of international assistance as donors fear negative repercussions. Since the signing of the peace accords in 1992, however, donor countries and international organizations have extended development assistance mainly through the implementation of economic reconstruction projects.

According to UNDP, El Salvador received a total of US$4,099,000,000 from external sources from 1992 to 1996. 45.1% of the amount was from bilateral assistance, 53.3% from multilateral assistance, and 1.6% from NGOs. USA contributed 63.5% of the bilateral assistance amount, while Japan donated 27.2%. IDB contributed 58.0% of the multilateral assistance and the World Bank granted 17.9%.

The distribution of bilateral cooperation funds by sector from 1992 to 1996 was as follows: 27.1% for the sector on general development issues (largest sector), 13.1% for the health sector, and 8.6% for the human settlements sector. As for the multilateral cooperation funds, 33.7% went to the sector on general development issues, 17.9% to the transportation sector, and 16.4% to the energy sector.

International assistance extended to the government of El Salvador mainly focused on economic growth and infrastructure reconstruction. Only 1.4% of the bilateral cooperation funds and 8.0% of the multilateral cooperation funds were allocated to the development of the agricultural, forestry and fisheries sector.

2.2 Socioeconomic Situation

2.2.1 Social Situation

In 1971, the country had a population of 3,554,648 and a population density of 169 persons/km^2. The national census conducted in 1992 showed that the population and population density of the country have increased to 5,118,599 and 243 persons/km^2, respectively, establishing El Salvador as the most densely populated country in Central America.

According to IDB, population growth slowed from an average annual rate of 3.4% in the 1961-70 period to 2.3% in 1971-80 and 1.5% in 1980-90. This was attributed to massive migration to foreign countries to seek refuge from the war. At least 1 million Salvadorans are living and working in the USA at present.

Estimating an average annual population growth rate of 1.73% for the period 1993-2010,

ISDEM forecasts the national population to be 5,871,424 in 2000 and 6,970,018 in 2010.

About half of the population live in urban areas and the capital, San Salvador, has a population of some 1.5 million. About 89% of the population are mestizos and 10% are indigenous. In 1992, life expectancy at birth was 65 years, and the infant mortality rate was 46 per 1,000 births.

Literacy rate of those aged ten and above was 76.1% in 1992. In the same year only 58% of the national population had access to safe water: 78% of the urban dwellers and only 16% of the rural population.

According to the UNDP, El Salvador was second in per capita GNP among countries in Central America in 1991, but fourth in the human development index (HDI) and 112th worldwide. HDI is the new parameter produced by UNDP to determine social and economic conditions. It is used instead of GNP, as the latter does not indicate the degree of social development. HDI is determined based on life expectancy, adult literacy, average number of schooling years, and real per capita GNP based on parity of purchasing power (PPP).

51% of the national population are in absolute poverty: 75% of the rural population and 20% of the urban population.

2.2.2 Economic Condition

In 1995, the GDP was 84,011,000,000 colones and the GNP was 83,172,000,000 colones. According to the BCR (Banco Central de Reserva de El Salvador), the GDP per capita at the current price was US$1,615 in 1995, and the GDP per capita at the constant price of 1990 was US$943.3.

The national economy is characterized by net external transfers occupying about 15% of the GNP. A considerable portion seems to be remittances from Salvadorans in the USA to families in El Salvador. These remittances will gradually decrease, as they come back to El Salvador or call their families to the USA. Another feature of the national economy is the small rate of internal savings (GDP). From about 3% during the civil war, it has recently increased to about 4%, but still relatively low compared with 17% of the other Central and South American countries. Future economic development depends on internal savings and a low rate generally results from social unrest. If remittances decrease, El Salvador must increase the rate of internal savings to establish public peace and eliminate poverty.

The growth rate of the GDP at the current price was 21.3% in 1993, 17.3% in 1994 and 18.8% in 1995. It is large due to the effect of inflation (higher than 10%). The growth rate of the GDP at the constant price of 1990 was 7.4% in 1993, 6.0% in 1994 and 6.1% in 1995. The growth rate of the GDP, in terms of agricultural contribution, at the same constant price

fluctuated, producing high rates of 8.0% in 1992 and 5.1% in 1995, and low rates of -1.4% in 1993 and -2.7% in 1994. This reflects the predominance of rainfed cultivation.

During the same period, the contribution of the manufacturing industry, construction and commerce to the GDP grew by about 8% each year. Banking and insurance institutions experienced an especially high growth rate of over 16% in 1994 and 1995. Economic growth was therefore dependent on these institutions, the manufacturing industry, as well as construction and commerce.

The ratio of agriculture, forestry and fisheries in total GDP was 13.7% in 1995. However, with agro-industry contributing 9.3%, it totaled about 23%. Agricultural exports, from crop farming, livestock farming and agro-industry, occupied 32.8% of the total export volume in 1995. The economically active population (EAP) in agriculture was 35.5% in 1992, underscoring the importance of the agricultural sector.

The national economy is becoming more global recently. The price of exports has increased from 8,890,000,000 colones in 1993 to 10,930,000,000 colones in 1994, indicating a 23% rate of increase. Another 23% rate of increase was recorded when the price of exports escalated to 14,536,000,000 colones in 1995. Price of imports has increased from 18,550,000,000 colones in 1993 to 22,524,000,000 colones in 1994, showing a 21% rate of increase, which later soared to 30% as the price rose to 29,334,000,000 colones in 1995.

The current accounts in the balance of payments indicate a deficit in trade balance as imports prevail over exports. The balance of payments is in the black on the whole from the surplus of capital inflow, which constitutes external assistance, investments and remittances. It was in the black at US$146,600,000 in 1995.

The revenue of the central government was US$1,307,000,000 in 1995 and expenditures were US$1,359,000,000. This resulted in a public budget deficit of US$-52,000,000. The ratio of deficit to revenues, however, decreased from 27.7% in 1991 to 4.0% in 1995. Expenditures for education and public works increased, while the defense budget decreased. The rate of expenditure for agriculture and livestock farming decreased from 6.3% in 1990 to 2.0% in 1994, and temporarily increased to 2.9% in 1995. It slightly decreased to 2.4% in 1996 and will likely further decrease to 2.1% in 1997.

As for public debts in 1995, domestic debts totaled US$1,373,000,000 and external debts amounted to US$2,042,000,000. The external debts totaled US$2,243,000,000. Capital expenditures in balance of payments totaled US$160.5,000,000 in 1995, only 9.7% of the export volume (14,537,000,000 colones = US$1,661,000,000; as US$1 = 8.75 colones). The condition of external debts is healthy.

The consumer price index (CPI) decreased from 19.9% in 1992 to 12.1% in 1993 and 8.9% in

1994. It slightly increased, however, to 11.4% in 1995. The CPI for foods was 5.8% in 1995, clothing 4.8%, housing 22.3%, and miscellaneous 13.0%. Although the CPI for foods and clothing is stabilizing, the CPI for housing and miscellaneous items is still high. The daily wage for workers in factories in the autumn of 1996 was ¢ 50. Agricultural workers were paid ¢ 25. Because the minimum wages are not in par with the inflation rate, a lot of the workers are suffering from poverty.

The total number of banks and financiers nationwide is 127 and 91, respectively. San Salvador covers over half of the total number, with 68 banks and 58 financiers. Deposit money in El Salvador is concentrated in San Salvador. The sum of deposits in banks in San Salvador was 67.5% in June 1995 and 65.1% in March 1996. The sum of deposits of financiers in San Salvador was 71.7% in 1995 and 70.7% in 1996. The ratio of other departments is relatively insignificant at less than 2%. Financial markets in the rural areas of El Salvador are not well developed however.

Agriculture, forestry and fisheries had 12.8% of the total credit from banks in 1994 and 13.4% in 1995. Credit for coffee was 6.8% in 1994 and 7.0% in 1995, and for sugarcane, 1.7% and 1.6%, respectively. Thus, these traditional crops occupied the majority of credits for the agricultural sector.

In April 1996, the interest rate for time deposits over 1 year was 13.51%, and under 1 year, from 13% to 14%. The interest rate for borrowing funds for 6 months to 1 year was 18.80%, and from 13% to 14% for under half a year. Unless the interest rate is higher than the inflation rate, banking cannot succeed. This is why interest rates are high in El Salvador. Credit for periods over one year are not granted because of the risk of change in value due to inflation, exchange rates and the remaining effects of social unrest brought on by the civil war.

Generally speaking, El Salvador has achieved smooth economic growth from industrialization driven by banks and insurance, manufacturing industry, construction and commerce, since the civil war. Although current accounts are in the red, capital accounts are in the black. There are no problems regarding repayment of external debts.

High inflation brings pressure and stress to people's life. 51% of the national population is at the absolute poverty level, and of this ratio 20% live in the urban area and 75% in the rural area. Although agriculture is still important to national economic growth, the rate of expenditures for this sector among governmental expenditures tends to decrease, and rural finances have not yet been developed.

2.3 Basin Conservation

2.3.1 Soil Conservation

(1) Present Condition

Due to the absence of data on recent soil conservation practices in El Salvador, *"Economic and Institutional Analyses of Soil Conservation Projects in Central America and the Caribbean (1993)"* was used as a reference. According to the study on soil conservation conducted from 1987 to 1989, soil conservation is practiced in about 22% of the total farmland area. Table 2.3.1.1 shows the soil conservation techniques adopted according to the size of the producer's holding. The most frequently adopted soil conservation techniques are live barriers made of trees and shrubs, and dead barriers. In general, soil conservation techniques are more extensively used in large farms than in small ones. Of the small scale farmers, the tenant farmers often apply conservation techniques (See Table 2.3.1.2).

Small scale farmers intensively cultivate their lands, mostly with annual crops (grains), and are less likely to benefit from financial and technical assistance than large scale farmers. Hence they do not conduct sustainable agricultural practices. Small farmers are sometimes accused of deteriorating the ecological system. On the other hand, however, they are victims of land impoverishment and environmental problems. Consequently, it is essential to extend soil conservation techniques to this group of farmers.

(2) Soil Conservation in El Salvador

The several soil conservation projects implemented by the government of El Salvador since 1955 through the Ministry of Agriculture and Livestock (MAG) have been interrupted by the civil war. After 1969, the DGRNR became in charge of soil conservation measures. During this period, programs and projects related to land and water resources were executed under state organizations such as the CENREN, the Committee for Hydroelectricity of Lempa River, and NATC. However the public agriculture and livestock sector can barely implement such projects due to lack of communication with relevant authorities and lack of funds. Recent developments and transfer of soil conservation techniques are evident in the cooperation shared by local and international institutions for the development of the basins of Lempa River and its tributaries (transfer of afforestation techniques was conducted in the Cabanas, Usultan, and Morazan prefectures).

Soil conservation techniques have been widely extended in El Salvador through crop cultivation, agricultural ecology, and the education of farmers. Contour cropping on steep slopes was the most widespread soil protection measure, followed by popular techniques such as mulching, use of crop residues, and planting of windbreak trees. Two large-scale projects,

the Metapan Project and Cerron Grande Project, have been implemented in the past for the prevention of floods and soil deposits in lower basin areas, to conserve the basin and control soil erosion. The supervision of these projects was first carried out by DGRNR and later became the responsibility of the CENREN. Measures such as rock wall barriers, bench terraces and ditches were introduced in the Cerron Grande Project. Further, seeds, fertilizers and farming implements were provided to farmers to diffuse and promote the use of soil conservation techniques.

The third large soil conservation project, the Guacotecti Project, began in 1987 and mainly focused on assistance in agroforestry. Soil conservation methods applied were similar to those of the Cerron Grande Project, and farmers were granted incentives to participate. The effects of these incentives, however, are still not clearly assessed.

The soil conservation model project recently implemented in a small area of the Lake Coatepeque basin introduced hillside ditches with live barriers, sabo dams (stone walls and gabions), bench terraces, farmland conservation methods (contour cropping, pasture cultivation, intercropping, mulching), vetiver grass planting, tree planting (including afforestation of river banks), and canals. Based on this model project, it can be concluded that soil conservation techniques, e.g., farmland conservation methods, sabo dams, are established in the study area. The soil conservation techniques in this model farm were established by the farmers at a daily wage of 55 colones/farmer.

Currently, the FAO/CENTA is executing soil conservation techniques as a component of a sustainable agricultural development plan in 34 small areas within the Cobanas, Usulatan and Morazan prefectures. According to the chief of FAO, the work involves educating farmers and the extension staff on the necessity and importance of soil conservation techniques and the application of the techniques. Accordingly, the activities of the FAO/CENTA are focused on conducting observation tours for both farmers and the extension staff to areas where soil conservation is well established, and the application of these methods. However, the latter is impeded by the lack of extension staff and maintenance vehicles.

The problems encountered in the extension of soil conservation techniques were the ignorance of the rural population of soil conservation techniques, and the securement of labor force. Consequently, the second concern of FAO/CENTA is to educate the farmers about soil conservation techniques and examine the possibility of extending these techniques with limited manpower. The third concern is the collection of data on soil conservation in El Salvador for the economic evaluation of soil conservation works.

From 1975 to 1980, some soil conservation practices were carried out at the experimentation farm of the soil erosion research center during the Metapan Project. This was, however, interrupted by the war. Since then the project has been suspended due to shortage of funds

and unfortunately there are no reliable documentation of the results of the experiment. It is, therefore, essential to fully prepare a demonstration farm, collect reliable data, and economically evaluate the costs of conservation works.

As mentioned in section 1.2 of Chapter 2, the government of El Salvador considers soil conservation as an important concern because of its relevance to agricultural development and the preservation of natural resources, two of the policies most essential to the development of the agricultural and livestock industry.

Table 2.3.1.1 Soil Conservation Techniques in El Salvador by Size of the Producer's Holding

(percent of producers)

Size of holding (hectares)	*Permanent plants*	*Live barriers*	*Dead barriers*	*Improved drainage*	*Borders*	*Terraces*	*Total*[a]
0.0-1.9							
Row	6.9	14.5	9.8	3.6	4.4	1.3	16.4
Column	62.7	60.3	51.3	65.5	61.5	62.5	58.2
2.0-4.9							
Row	12.9	27.2	21.1	2.7	7.7	3.1	30.1
Column	22.7	21.9	21.4	12.7	11.9	12.1	20.6
5.0-19.9							
Row	6.6	18.8	23.3	4.3	8.4	2.0	26.7
Column	9.0	11.7	18.2	11.7	17.5	14.3	14.1
20.0-49.9							
Row	8.3	21.6	29.4	8.4	10.4	2.6	32.4
Column	3.2	3.7	6.4	6.4	6.0	5.2	4.7
50.0-99.9							
Row	14.2	36.0	33.4	10.8	11.0	7.4	38.7
Column	1.5	1.7	2.0	2.3	1.8	4.1	1.6
100.0-199.9							
Row	17.8	31.2	22.7	15.5	15.5	6.9	34.3
Column	0.8	0.5	0.6	1.4	1.1	1.6	0.6
200.0 and up							
Row	17.0	24.2	15.7	18.3	22.2	6.5	26.4
Column	0.1	0.2	0.2	0.1	0.2	0.2	0.2
Producers							
Row	7.8	17.0	13.3	3.8	5.7	1.8	20.1
Column	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a. The total reflects producers who used one or two of the techniques

Table 2.3.1.2 Soil Conservation Techniques in El Salvador by Form of Tenure

(percent of producers)

Form of tenure	*Permanent plants*	*Live barriers*	*Dead barriers*	*Improved drainage*	*Borders*	*Terraces*	*Total*[a]
Owner							
Row	7.7	17.4	15.1	3.1	6.8	2.3	20.5
Column	65.6	68.4	75.9	54.5	80.2	85.5	68.1
Tenants							
Row	5.2	34.8	11.0	11.8	10.8	2.5	35.8
Column	7.0	21.4	8.9	32.3	19.8	14.5	18.6
Beneficiary of Decree 207							
Row	9.4	7.6	8.9	2.2	n.a.	n.a.	11.7
Column	27.4	10.2	15.2	13.2	n.a.	n.a.	12.1
Producers[a]							
Row	7.8	17.0	13.3	3.8	5.7	1.8	20.1
Column	100.0	100.0	100.0	100.0	100.0	100.0	100.0

n.a. Not applicable.

a. Reform cooperatives are not included in this table.

2.3.2 Forestry

(1) Present Condition

The disorderly expansion of agricultural lands, e.g. coffee plantations, cotton and sugarcane fields, the intensification of subsistence agriculture and extensive stock raising in the mountainous areas, and the illogical utilization of mangrove forests have rapidly decreased the natural forests in El Salvador, which used to cover 80% of the country's land surface. One estimate indicates that natural forests cover only about 184,500 ha of the national territory at present.

The natural forest consists of three different stand types: conifer, broadleaf and mangrove. The coniferous forest is made up of tree species such as Pino ocote (Pinus oocarpa), Pino caribe (P. caribbaea), Pino blanco (P. pseudostrobus), Pino resinoso (P. ayacahuite) and Ciprés (Cupressus lusitanica). This forest type covers 48,000ha of the national territory and is found in the moist subtropics elevated at 500 m - 2,500 m above sea level. It is distributed in the northern part of the country, in the departments of Santa Ana, Chalatenango, and Morazanno.

The evergreen and deciduous broadleaf forest of 90,700 ha is a mixture of economically important tree species such as Laurel (Cordia alliodora), Cedro (Cedrela sp.), Conacaste

(Enterolobium cyclocarpum), Madrecacao (Gliricidia sepium), and Bálsamo (Myroxilon balsamum). Mangroves, which make up 45,300 ha of the land, can be found in salt water areas on the coast and constitute tree species such as Mangle colorado (Rizophora mangle), Sinchuite (Lagncularia racemosa), Ishtaten (Aicennia nitida), and Botoncillo (Conocarpus erecta).

Since the above figures were based on the results of an aerial photographic survey in 1973 - 75, they are not applicable at present as the forest area nationwide has significantly decreased. For instance, of the 100,000 ha of mangrove forests in 1950, only 26,000 ha was reportedly left in 1989. And according to the figure estimated by FAO in 1993, forest and woodland areas cover 104,000 ha, only about 5 % of the land surface.

The figures improve though to a certain extent when approximately 150,000 ha of coffee plantations are included, raising the total forest cover ratio in the country from 5% to 12%. Coffee plantations, in addition to their contribution to the national economy by producing coffee beans, are also important in terms of fuelwood production from shade trees and for soil erosion control and water conservation.

The mountainous slope areas, which should have been maintained originally as forest including protected areas, reportedly account for 48 % of the country's land surface. Therefore, deforestation of these areas has become a serious national problem especially because they bring about adverse economic and social effects such as loss of land productivity by soil erosion, decrease in water retention capabilities, deterioration of weather conditions, and loss of biodiversity etc.

In addition to the fourteen state nurseries nationwide under the management of DGRNR (Direccion General de Recursos Naturales Renovables), there are many nurseries established according to the Community Nursery System guided by the government forest policy, where rural people independently produce seedlings for self-consumption. However, due to insufficient technology and financing, reforestation activities, such as seedling production and planting, have not always been successful. Although tree plantations were reported to be about 12,000 ha in 1980, a significant increase could not be expected because of defective growth, felling and forest fires that occurred during that period.

(2) Demand for Wood

The total demand for wood in El Salvador is estimated to be 4,900,000 m^3 per year, of which 4,600,000 m^3, or 94 %, is used as fuelwood (3,900,000 m^3 by households and 700,000 m^3 by industries). 77 % of the population of the country or 98 % of the rural population utilize fuelwood for cooking, and about 45 % of all energy consumed in the country is derived from wood produced from forests including coffee plantations.

2,900,000 m^3 of wood harvested from coffee plantations each year contributes to domestic

fuelwood consumption. This figure exceeds the 1,700,000 m^3 of fuelwood produced from the forests.

On the other hand, a total of 250,000 m^3 of wood is consumed for lumber each year in El Salvador, 80 % of which is saw timber of the pine species imported from Guatemala, Honduras and Nicaragua.

(3) Basic Forestry Policy

Based on the current forest conditions mentioned above, the Government of El Salvador has recently proposed the following objectives and strategies of the basic forestry policy:

1) Objectives
   a) To recover deforested areas with the participation of the public sector, private enterprises, NGO (ONG: Organizacion No Gubernamental) and rural communities.
   b) To establish an agroforestry system in order to provide the necessary products for the country, and improve the living conditions of rural communities.
   c) To strengthen and develop institutional organizations in connection with the conservation and utilization of forest resources.

2) Strategies
   a) To establish a Salvadoran Protected Areas System (SISAP-Sistema Salvadoreño de Areas Protegidas), and provide the legal, technical and financial capacity for its effective function.
   b) To formulate forest policies and regulations in order to motivate the private sector to facilitate reforestation and management of protected areas.
   c) To improve people's awareness on the importance of forest resources conservation.
   d) To develop and transfer technology for agroforestry programs for soil and water conservation in critical zones.
   e) To strengthen the institutional capacity of the forestry sector in order to promote efficient administration of the forests and protected areas sector.

2.3.3 Water Management

(1) General Condition

There are currently no laws pertaining to basin management in the Republic of El Salvador. A public institution in the basin is currently executing various countermeasures for the management of the river and the conservation of the forest area. The countermeasures constructed for river management, in view of the importance of flood control measures, are groins and embankments. Although a law on forest conservation was enacted in 1973, it is considered to be ineffective in enforcing forest conservation measures.

(2) Water Resource Management in the Basin

There is no comprehensive law for the development and management of water resources, and river management in the Republic of El Salvador at present. Water resource related projects, e.g. hydropower development, irrigation, water supply facilities construction, are conducted under their respective sectors. ANDA takes charge of the water supply works projects, MAG the irrigation projects, and CEL the electric power station project.

With regard to water resource development and management, MAG and CEL take care of surface water projects, and ANDA takes care of groundwater projects. Due to the absence of government policies on the development and management of rivers, water resources, and river basin, MAG, CEL, and ANDA proceed with the projects, bearing the objectives of each development project in mind, without holding discussions. Now, there is a need to adopt a comprehensive water resource policy that would establish the reciprocal relationship among these three sectors.

At present the government of El Salvador is tentatively organizing a water resource national improvement committee and the committee for the modification of techniques for modernization, for the comprehensive use and management of water resources. The government is also accelerating its efforts in the establishment of water-use and water management laws.

DGRNR appropriates the management and operation of water resources under the supervision of MAG. It is currently creating a database for all data accumulated on meteorology, hydrology and river discharge. It has not started using the data yet. Moreover, because of the civil war, some of the data taken between 1970 and 1990 are gone. The observation stations are trying to gradually reconstruct lost data.

2.4 Agriculture

2.4.1 Agriculture

(1) General Condition

According to the FAO 1993 data, at 64.7%, El Salvador has the highest rate of utilization of farmlands and pastures in Central America. Because of the small land area, the distribution of agricultural land per person, farmlands per economically active person, and pasture per farmer in 1993 was the smallest in Central America at 0.13 ha, 1.16 ha, and 0.97 ha/farmer, respectively. The rate of irrigated farmland was 16.4%, second to Costa Rica (22.6%).

The area cultivated with annual crops nationwide decreased from 30.1% in 1970 to 28.2% in 1987, while area planted with permanent crops increased from 7.8% to 9.7% during the same

period. Also, from 1970 to 1987, natural pasture decreased from 26.2% to 19.6%, while improved pasture increased from 5.5% to 7.6%.

With the implementation of agrarian reform, farms over 70 ha make up 0.7% of the number of farms in 1971 and occupied 38.7% of the total farm area. The average area of farms over 70 ha was 289.3 ha. This distribution improved somewhat to 1.0% of the number of farms and 28.4% of the total farm area in 1987; farms over 70 ha averaged 132.5 ha. Farm areas generally averaged 5.4 ha in 1971 and 4.7 ha in 1987.

(2) Farmer

The economically active population (EAP over 15 years of age) in agriculture has increased from 416,728 persons in 1961 to 581,661 persons in 1991-92. The rate of total EAP in this sector, however, has decreased considerably from 60% in 1961 to 32.6% in 1991-92, indicating the involvement of the increased population in other industries. During the same period, the number of farmers owning over 1 ha of land has increased from 118,687 to 136,171, and the number of farmers owning less than 1 ha has increased from 96,456 to 96,821. However, when expressed in terms of EAP percentage, farmers owning over 1 ha decreased from 28.5% to 23.4% and those with less than 1 ha decreased from 23.2% to 16.6%.

Also, during the 30 years from 1961 to 1991-92 and in contrast with owner-farmers, landless farmers have increased from 27.6% to 34.1%, permanent wage workers from 12.4% to 13.2%, family laborers from 8.4% to 12.6%、 and unemployed agricultural EAP from 5.3% to 10.0%.

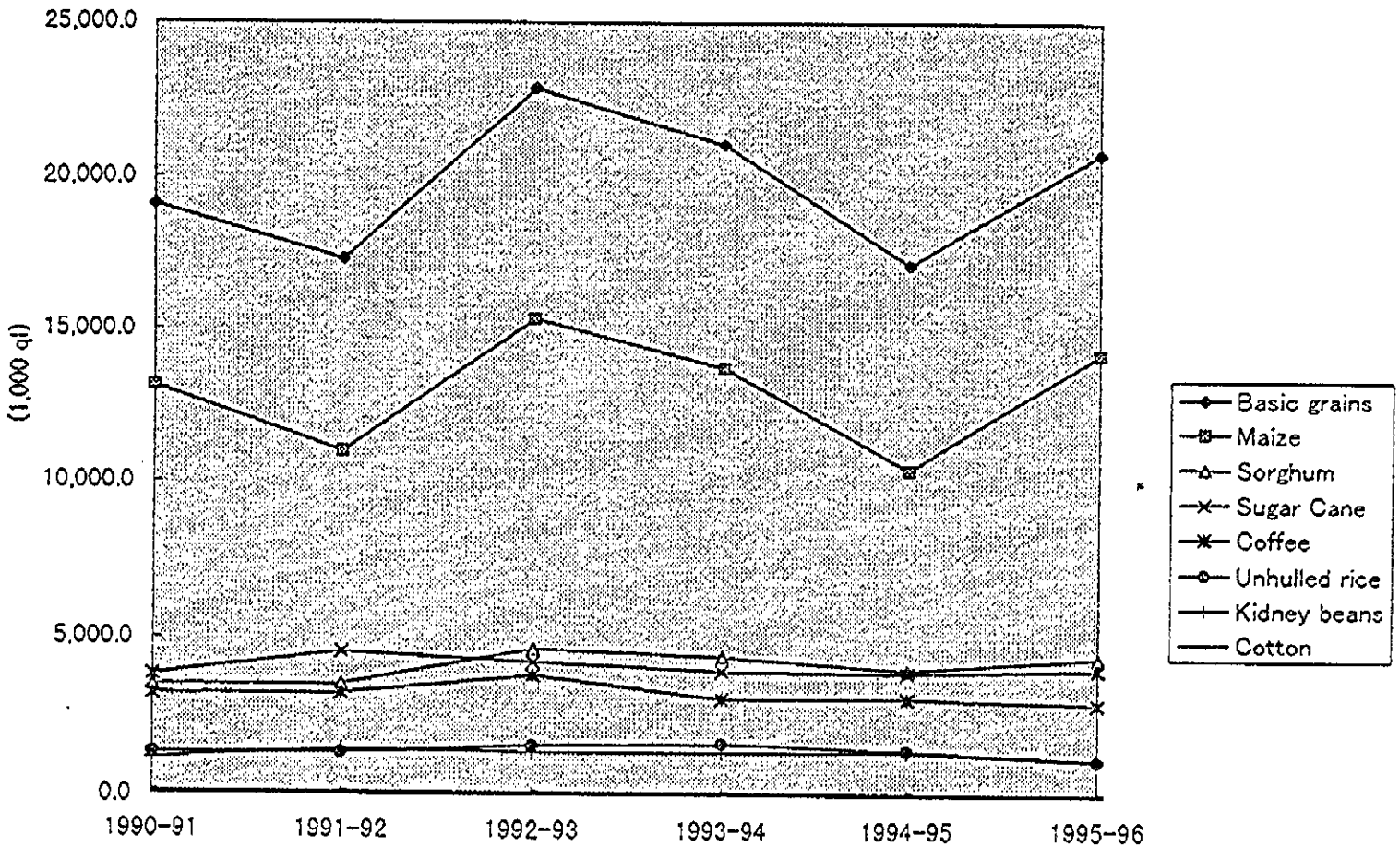
(3) Agricultural Products

According to data from BCR, production of coffee increased from 3,248,000 ql in 1991-92 to 3,820,000 ql in 1992-93, and then decreased to 2,900,000 ql in 1995-96 (Figure 2.3.1). Because the cultivated area was a constant 234,000 Mz, changes in production reflect fluctuations in yield. Cotton decreased from 78,000 ql in 1991-92 to 33,000 ql in 1994-95 and became statistically negligible after that due to reduction in cultivated area as the international price decreased.

Sugarcane production decreased from 4,563,000 ql in 1991-92 to 3,879,000 ql in 1994-95, but recovered a little to 3,997,000 ql in 1995-96. Since the change in yield was small (about 57 s.t./Mz versus 55.4 s.t./Mz in 1994-95), the main cause is the decrease in cultivated area. Because sugarcane is produced mainly under contract with milling companies, the decrease in cultivated area reflects the business policy of the sugar mills.

After total basic grain production increased from 17,301,000 ql in 1991-92 to 22,913,000 ql in

Figure 2.3.1 Productions of Main Crops by Harvesting Year



1992-93, it decreased to 17,104,000 ql in 1994-95, and subsequently recovered to 20,770,000 ql in 1995-96. This reflects a change of priorities between maize and sorghum. After maize production increased to 15,338,000 ql in 1992-93, it decreased to 10,399,000 ql in 1994-95 and recovered to 14,173,000 ql in 1995-96. After sorghum production increased to 4,656,000 ql in 1992-93, it decreased to 3,957,000 ql in 1994-95 and recovered to 4,369,000 ql in 1995-96. Basic grain production, which is dependent on the climate, decreased due to droughts in 1993 and 1994.

Production of kidney beans decreased gradually from 1,462,000 ql in 1992-93 to 1,133,000 ql in 1995-96. This decrease was not caused by fluctuations in yield, but by decrease in cultivated area, from 111,000 Mz in 1991-92 to 88,000 Mz in 1995-96. After unhulled rice production increased from 1,341,000 ql in 1990-91 to 1,619,000 ql in 1993-94, it decreased to 1,094,000 ql in 1995-96, mainly due to decrease in cultivated area, from 24,000 Mz in 1992-39 to 14,000 Mz in 1995-96. After the yield increased from 57.3 ql/Mz in 1991-92 to 71.6 ql/Mz in 1993-94, it decreased to 66.0 ql/Mz in 1994-95 and then increased to 81.0 ql/Mz in 1995-96.

Aside from sugarcane, which is cultivated under contract, the areas to be cultivated with main crops are decided by the farmers. Recently though, farmers increased the area for the cultivation of non-traditional vegetable crops as recommended by MAG. MAG is developing a system where farmers can plan their crops and buy supplies based on recent market information to be provided by DGEA.

(4) Problems

A major problem with Salvadorian agriculture is the easy flow of foreign products transported by road from other Central American countries. For example, in September 1994 the producer price of white maize was $10.47/ql in El Salvador, $10.04/ql in Guatemala, $9.59/ql in Honduras, $5.66/ql in Nicaragua, and $9.27/ql in Costa Rica. White maize from El Salvador has the highest price in Central America. The producer price of beef in El Salvador and Honduras was $0.95/lb, second to $1.04/lb in Guatemala, but higher than $0.75/lb in Nicaragua and $0.86/lb in Costa Rica.

Trade liberalization adopted by the present government according to the structural adjustment policy promoted massive inflows of cheap agricultural products from neighboring countries. The rate of self-sufficiency from maize was 93.8% before 1991 and 89.2% after 1991. The self-sufficiency rate in rice production was 95.1% before 1991 and 84.3% after 1991. The increase in importation after the civil war caused these decreases in self-sufficiency. The present average tariffs on agricultural imports are 20%, but sometimes imported agricultural products are cheaper than domestic products in the market. If the authorities will cut tariffs on consumer goods by 15% through the trade liberalization policy, imports of agricultural products will further increase.

Under these conditions, El Salvador needs to improve the yield and quality of basic grains and to introduce crop diversification, in order to become a competitive adversary in the world market. Accordingly, an increase in tariffs was proposed to protect domestic agricultural products. However, this would be difficult to implement because it would be contrary to the present economic policy.

Added value from non-traditional products in the agricultural sector has increased from 7.67% in 1989 to 9.75% in 1993. The cultivated area of non-traditional agricultural products has also increased from 52,050 Mz in 1989 to 58,796 Mz in 1993.

As previously mentioned, the agricultural sector is an important industry because it contributed 13.7% to the total GDP in 1995, and with the inclusion of the 9.3% share of the agro-industry, a total of 23%. Further, agricultural related products occupied 32.8% of the total export volume in 1995, and the agricultural EAP was 35.5% in 1992. Agriculture is the main industry in rural areas where 75% of the population are in absolute poverty. Agricultural development would not only significantly contribute to national economic growth, but also to the stabilization of social conditions in the rural areas by improving farmers' incomes. The promotion of measures to stabilize social conditions in rural areas is currently not a priority in the government's national development plans.

Further, for national environmental conservation, it is necessary to provide appropriate agricultural technical assistance to farmers cultivating on slopes and hillsides. Nevertheless, the agricultural budget has decreased and external assistance to agriculture is limited.

The activities of extension agents, who have direct contacts with farmers, were restricted in rural areas during the civil war. It was difficult to assemble farmers for agricultural extension activities. CENTA started the EDO program through CVP 4 years ago. The success of this program is expected to make up for the loss of activities resulting from the war and construct an effective rural extension system. The government, however, adopted the structural adjustment policy and pushed for the reduction of governmental influences. CENTA and MAG cannot dispatch enough agents because of budget curtailments.

2.4.2 Livestock

(1) Livestock administration

In broad jurisdictional demarcation, the livestock sector is clearly assigned to MAG, which relegates animal husbandry (livestock farm management) to CENTA and livestock health sanitation to DGSVA (396 officers). Livestock health sanitation involves the prevention, diagnosis and treatment of animal diseases, the monitoring of epidemics in the country, management of a sperm bank, recording of breeding stock, and meat inspection. DGSVA has

been formulating a new organizational structure which shall be immediately implemented in January 1997 upon approval.

CENTA has CDT in Izalco where research on the farming of dairy cattle, swine, rabbit and honey bees are carried out. DGSVA, on the other hand, has managed an artificial insemination unit in Matazano and distributed qualified cattle semen to 34 semen banks nationwide. In the grass root level, the extension workers of CENTA have also assisted livestock farmers in vaccination, or collaborates with regional laboratories regarding animal health control activities.

Concerning human resource development, a public agricultural college (ENA) in San Andres offers several courses in crop production, animal husbandry, fish-culture and agro-processing. There are also two schools financed by FAO that train in slaughtering activities at Jobo in the department of Sonsonate and Suchitoto in the department of Cuscatlan.

(2) Livestock Sector in the Agricultural Industry

Table 2.4.2.1 shows the contribution of the livestock sector in the agricultural industry. The total production of cattle, swine and poultry occupies nearly 30 percent of the gross agricultural production, implying the importance of the sector in the agricultural industry.

Table 2.4.2.1 Agricultural Production by Sub-sector

(Unit: ¢ million)

	1992	(%)	1993	(%)	1994	(%)
Commodity	10161.2	100.0	11719.1	100.0	13468.6	100.0
Coffee beans	1766.6	17.4	1848.6	15.8	2858.2	21.2
Cotton	85	0.8	87.9	0.8	54.8	0.4
Basic grains	2226.5	21.9	3146	26.8	3074.5	22.8
Sugar cane	555.7	5.5	590.3	5.0	579.7	4.3
Others	1270	12.5	1512	12.9	1861.8	13.8
Animals(bovine, pig)	1677.9	16.5	1615.5	13.8	1820.2	13.5
Poultry	1668.1	16.4	1942.9	16.6	2089.2	15.5
Forest	587.2	5.8	587.3	5.0	648	4.8
Fisheries	324.3	3.2	388.6	3.3	482.2	3.6

Source: Banco Central de Reserva : Revista Trimestral; Enero-Marzo-Abril-Junio/1996

(3) Demand and supply of animal products

The major animal products in El Salvador are chicken meat, egg, beef, milk and pork. Table

2.4.2.2 shows the amount of animal products and estimated consumption per capita per year. Beef which was exported until 1990 has become an import since 1991; 92.2 % of the beef supply in 1993 was domestically produced. Chicken production meets the domestic demand and is being consumed at a rate of around 12 kg per capita per year, more than twice that of beef consumption. Moreover, El Salvador exports chicks to neighboring countries and 10 major chicken enterprises monopolize the domestic market. The ratio of chicken, beef and pork consumption in 1993/94 was 64.5 %, 26.3 %, and 9.3 %, respectively.

Table 2.4.2.2 Estimated Animal Products and Consumption per Capita in El Salvador

Animal Products	Year	Domestic Production	Export	Import	Estimated Consumption	Domestic supply	Population	Estimated Consumption
		(t)	(t)	(t)	(t)	(%)	x10000	kg/head/year
Beef	1985	23,510	906		22,604	104.0	473.9	4.96
	1986	18,919	219		18,700	101.2	480.9	3.93
	1987	21,107	1,065		20,042	105.3	488.8	4.32
	1988	24,997	871	2	24,129	103.6	497.6	5.02
	1989	28,153	1,211	2	26,942	104.5	507.1	5.55
	1990	27,236	784	10	26,462	102.9	517.2	5.27
	1991	27,625		1,151	28,776	96.0	527.9	5.23
	1992	21,785		2,510	24,295	89.7	539.5	4.04
	1993	27,763		2,364	30,127	92.2	551.7	5.03
Chicken	1994	68,100					563.3	12.09
No of Eggs	1994	960,000,000					563.3	170.4
Pork	1993	9,880					551.7	1.79
Milk	1993	280,000					551.7	50.75

Source: Compiled based on the data of DGAC/DGSVA and the FAO 1993 Statistics.

(4) Regional Laboratory for Animal Health Control

Aside from the DGSVA laboratory in Matazano, there are 4 regional laboratories monitoring animal epidemic in El Salvador. These are in Texitepeque, Cega Izalco, San Vicente, and San Miguel, as shown in Table 2.4.2.3. However, the laboratory in San Vicente has become inoperative since June 1995 due to some problems. Major activities of these laboratories are:

- analyze samples brought in,

- give lectures to the members of cooperative farms on animal sanitation,
- visit places and give lectures on animal sanitation,
- diagnose animals in the field.

Outbreak of animal plague in the country is reported to DGSVA headquarters via each regional lab, and is recorded in the database. There are some issues on animal sanitation control about smuggling of live animals from Honduras and the importation of contaminated meat from Nicaragua and Honduras. DGSVA only have vaccines against the bacteria papilomatosis. The Ministry of Health produces vaccines against rabbies. Other necessary vaccines are imported from Mexico and Guatemala.

Table 2.4.2.3 Regional Animal Health Control Office

Region	Regional Animal Health Control Office	Location	Department
Region I	Laboratorio Regional de Texistepeque Laboratorios Regional de Cega Izalco	Texistepeque Cega Izalco	Santa Ana Sonsonate
Region II	Nacional de Laborarios	Matazano	San Salvador
Region III	Laboratorios Regional de San Vicente	San Vicente	San Vicente
Region IV	Laboratorios Regional de San Miguel	San Miguel	San Miguel

Source : JICA Study Team/1996

2.4.3 Inland Fisheries

(1) Administration

CENDEPESCA which is under MAG is responsible for the regulation of the fisheries sector in El Salvador. CENDEPESCA has 162 officers (technical officer: 43 staff) and underwent restructuring in late 1995. Its main duties are:

1) Supervision of the fisheries sector
2) Conduct of research/laboratory work and supply of fry fish to breeders
3) Conduct of extension work for fishermen
4) Control illegal fishing activities to conserve marine resources

CENDEPESCA manages 4 hatcheries, namely in Santa Cruz Porrillo, Atioccoyo, Izalco and El Zope. The first three hatcheries mainly produce 2 million tilapia fry fish annually, and the last one, stationed with 3 Taiwanese experts, annually produce 20 million fries of both fresh water and marine shrimps. Fries are sold to major fish farms within 7 hours from each hatchery. Concerning human resource development, a public agricultural college (ENA) and a vocational training school at La Union offer courses in fish culture and fishing methods.

(2) Control of fishing activities

The fisheries supervisory section in El Salvador is divided into five sub-sections for marine fisheries and 2 sub-sections for inland fisheries, as shown in Table 2.4.3.1. 30 of the staff of CENDEPESCA supervise illegal fishing activities in collaboration with the national police. The Jiboa River basin is under the jurisdiction of the Cerron Grande supervisory section, and a police box is constructed at Apulo in the Ilopango Lake area.

Table 2.4.3.1 Fisheries Supervisory Sections in El Salvador

Classification	Fisheries Supervisory Sections
Marine section	Acajutla, La Libertad, La Herradua, Puerto El Triunfo, La Union
Inland fisheries section	Cerron Grande, Coatepeque

Source: JICA Study Team/1996

(3) Fisheries sector

The contribution of the fisheries sector to the gross agricultural production in El Salvador has, as mentioned in Table 2.4.2.1, slightly increased from 3.2 % in 1992 to 3.6 % in 1996. However, the contribution of the sector is markedly small, more so when classified under inland fishery.

(4) Other donor cooperation

In the fisheries sector, Taiwan has dispatched 3 experts to the El Zope hatchery in Sonsonate to extend guidance in shrimp culture. PRADAPESCA, an organization financed by EC, has a branch office in El Salvador and implemented shrimp projects including marine shrimp.

2.4.4 Agrarian Reform

The government has implemented agrarian reform in order to improve the distribution of farmlands which are concentrated in the hands of a few people. The implementing organizations are as follows.

- ISTA (Salvadoran Institute for Agrarian Reform): requisition of lands; temporary management of requisitioned lands before their transfer to small scale farmers; planning of transfer of lands; guidance in agricultural techniques after transfer of lands; and promotion of the organization of agricultural cooperatives.
- FINATA (National Finance of Agricultural Lands): offer of lands expropriated by the Ministry of Justice to farmers for agricultural use; compensation of former landowners; financially support farmers to buy agricultural lands.

- BDT (Bank of Lands): financially support small and medium scale farmers to buy lands for crop production, livestock farming, or forestry.

The laws for agrarian reform are as follows.

- Decree 154 established in 1980 stipulates the expropriation of 500 ha or more of agricultural lands owned by large scale landowners to be distributed among small and medium scale farmers.
- Decree 207 established in 1980 stipulates the transfer of agricultural lands under 7 ha to tenant farmers.
- Decree 842 established in 1981 stipulates the distribution of existing national lands held by ISTA.
- Decree 839 established in 1987 stipulates the right of landless farmers to negotiate with landowners for the purchase of lands.

The direct beneficiaries of decree 154 and 842 totaled 36,558 persons (199,496 ha) in 1988-89 and the area allotted per person was 5.5 ha. The direct beneficiaries of decree 207 totaled 42,562 persons (62,504 ha) and the area allotted per person was 1.5 ha. The direct beneficiaries of decree 839 amounted to 2,283 persons (5,701 ha) and the area appropriated per person was 2.5 ha. The total number of direct beneficiaries was 81,403 persons (267,701 ha) and the average area per person was 3.3 ha.

ISTA has promoted the formation of cooperatives in order to maintain large scale traditional cash crop farming in lands to be transferred to small and medium scale farmers, after the transfer. A cooperative is an organization of farmers jointly working towards better production. There were 92 cooperatives in region I (Ahuachapan, Santa Ana, Sonsonate) in 1988-89. These cooperatives hold 60,445 ha, 75% of which are lands transferred through agrarian reform. In region II (Chalatenango, La Libertad, San Salvador, Cuscatlan), 83 cooperatives hold 47,565 ha, 50% of which are transferred lands. In region III (La Paz, Cabañas, San Vicente), 72 cooperatives hold 30,179 ha, 80% of which are transferred lands. In region IV (Usulutan, San Miguel, Morazan, La Union), 81 cooperatives hold 61,296 ha, 77% of which are transferred lands. In total, 328 cooperatives hold 199,486 ha of land, 75% of which are lands transferred by agrarian reform.

In 1988-89, 30.3%, 60,469 ha, of farmlands owned by agricultural cooperatives were cultivated collectively. Individually operated farmlands totaled 29,649 ha, 14.9% of the total area owned by cooperatives, and pastures totaled 44,808 ha, 22.5% of the total area owned by cooperatives. Forests covered 23,737 ha, 11.9% of the total area owned by the cooperatives. Wastelands covered 9,498 ha and infrastructure 11,631 ha, 4.8% and 5.8%, respectively, of the total area owned by cooperatives. Fallows totaled 19,694 ha, 9.9% of the area owned by cooperatives. 19% of individually operated farmlands are farmlands of non-associates. The

distribution of farmlands of non-associates is 7% in region I, 15% in region II, 10% in region III, and 38% in region IV.

In 1988-89, the number of associates of cooperatives in region I was 12,142 persons, of which 1,229 (10%) were women. The cooperatives in region II was made up of 10,047 persons, 1,404 (14%) of which are women; cooperatives in region III totaled 6,669 persons, 888 (13%) were women; and cooperatives in region IV had 7,700 persons, 951 (12%) were women. Therefore, the total number of associates of cooperatives was 36,558 persons, 4,272 (12%) of which were women.

About half of the cooperatives received technical assistance from ISTA, but none from the extension office because the activities are outside the objectives of the extension office. Technical assistance by ISTA focuses on the cultivation of traditional cash crops like coffee and sugarcane. These cooperatives receive loans for the purchase of lands from FINATA or BDT and from banks or financiers for agricultural inputs.

The government plans the abolishment of ISTA with the successful implementation of the land reform program. The plan also intends to hand over the title of the lands to the cooperatives by exempting then from paying the remaining 70% of the loan, if they can repay 30% of the debts for acquisition by 30 June 1997.

2.5 Environment

2.5.1 Comprehensive National Environmental Law and SEMA

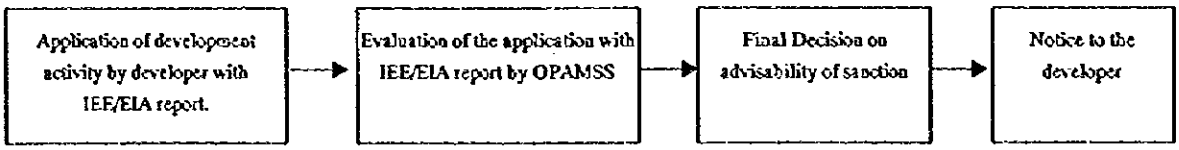
The revised draft of the comprehensive environmental law in the Republic of El Salvador was submitted to the vice president with another draft of the creation law of SEMA, and is currently under consideration. SEMA is currently undergoing organizational restructuring, but is still introduced as an autonomous institution in the new document. Thus, as a substitute for the comprehensive environmental law, the guidelines of the World Bank stipulated in the "Environmental Assessment Source Book" are being applied provisionally in the Republic of El Salvador without legal binding force, but only in agreement with the donor agencies' requirement, until the said law is enacted. On the other hand, other government entities involved in environmental concerns are also in the course of deliberating laws and regulations for the sector under the framework of the environmental law of SEMA.

2.5.2 Environmental Impact Assessment Law

The Environmental Impact Assessment (EIA) Law is currently being prepared by SEMA. As previously mentioned, the only prerequisites are the environmental requirements of donor agencies,

such as USAID and the IDB.

Apart from the drafting of the EIA Law, the San Salvador Metropolitan Area Planning Office (OPAMSS) imposed a mandatory EIA regulation on the 17 municipalities within the metropolis in 1990. Of the 17 municipalities six are partially included in the Study Area, and they are Soypango, Ilopango, San Marcos, San Martin, Santo Tomas, and Santiago Texacuango. Thus, any developer proposing to undertake a new project in any of these municipalities is subject to this regulation and not permitted to proceed unless an environmental impact assessment (EIA) is concluded. The conduct of an IEE/EIA is imposed on any developer and will have a direct effect on the processing of loans. The importance of this system is illustrated below.



This system may or may not be applicable outside of the San Salvador Metropolitan Area, depending on the regulations of each municipality and the policies of OPES.

2.5.3 Agrochemical Use Control Law

The production, importation, and export of pesticides and fertilizers, including their safe use, are regulated by the Agrochemical Control Law, Decree No.315, enacted in 1973, and is enforced by MAG and a co-entity of MOH. 15 of the pesticides restricted from importation and marketing in El Salvador are listed in Table 2.5.1 below.

Table 2.5.1 Agrochemicals Restricted in El Salvador

Product	Classification	Year banned	Product	Classification	Year banned
DDT	Insecticide	1980	DIELDRIN	Insecticide	1980
2,4,5 TP	Herbicide	1980	ENDRIN	Insecticide	1986
2,4,5 T	Herbicide	1980	CHLORDANE	Insecticide	1986
LEPTOPHO	Insecticide	1980	HEPTACHLOR	Insecticide	1986
PARATHION	Insecticide	1980	CLOREDIMEFORM	Insecticide	1987
DIMETHOATO	Insecticide	1980	TEXAFENO	Insecticide	1988
PCNB	Fungicide	1980	CLORANFENICOL	Antibiotics for animals	1988
ALDRIN	Insecticide	1980			

Source: DGSVA/MAG

MAG has officially registered the authorized agrochemicals which include 140 fertilizers and 260 pesticides.

2.5.4 Water-Use Law

The bill of the new Water-Use Law is drafted by the Coordinating Unit for Modernization (UCM), established in August 1995 and consists of **MAG, ANDA** and **MIPLAN.** The bill aims to unify control of hydro-resources, giving **CONRA** (National Council on Water Resources) supervisory control and appointing government organs like **ANDA, CEL, MAG, MOPH and MOP** concerned with water-use under the jurisdiction of **CONRA.**

2.5.5 Environmental Administration

SEMA was established in July 1991 and placed under the auspices of the Ministry of Foreign Affairs in August 1995. It is responsible for coordinating policies and strategies for the conservation of natural resources and the environment, and supervises their enforcement. However, the current environmental administration does not seem to be unified under SEMA due to the reconstruction of the government. SEMA itself is in the course of reorganization and might be transferred to another ministry. Other governmental organs responsible for the environment are as follows:

Other Governmental Entities Related to Environmental Administration

Environmental Field/ Responsible Government Organ	Principle Activity
1) Natural resources:	
- MAG	Conservation and improvement of natural resources
Municipal Government	Conservation and replenishment of renewable natural resources
- Ministry of Health	Investigation of external atmosphere to protect atmosphere
2) Air	
- Ministry of Labour	Control of air pollution (smoke from factories)
- University of El Salvador	Conduct studies on air pollution
- DGRNR/MGA	Observation of atmosphere and weather, agro-weather and tidal change
- DGVSA/MAG	Control of agrochemical use (pesticides, fertilizer, agro-input)
3) Water	
- Ministry of Health	Survey pollution of lakes, marshes, rivers, potable water
- ANDA	Exploitation of potable water for urban use, purification and supply of potable water
- Irrigation*drainage/MAG	Formulation evaluation and implementation of irrigation/drainage projects
- DGRNR/MAG	Observation of river flow, water level, hydrological survey, hydrogeological survey
- OSPA/MAG	Water quality/sewage control in reserved areas
- CENDEPESCA	Surveillance of aquatic resources in fresh water and marine
4) Energy	
- Ministry of Health	Protection of humans from radioactive rays
5) Minerals	
- CEL	Planning/Guiding/Construction of power station (hydraulic/thermal power)
- Ministry of Public Works	Investigation/evaluation of mineral resources

6) Landscape	
- San Salvador Institute of Tourism	Development of sightseeing resources/administrative guidance
- DGRNR/MAG	Guidance in administration of natural parks/reserved areas, including conservation work
7) Cultural Heritage	
- Ministry of Education	Conservation, edification and management of cultural assets
	national museum/archaeological site
	Administrative management of forest, national zoo, natural history
	Investigation and evaluation of natural resources in cooperation with MAG

Source: Estrategia Nacional del Medio Ambiente/1994

2.5.6 Ratified International Convention/Treaty on Environment and Natural Resources

The Republic of El Salvador has signed the following 16 international treaties and conventions for ratification in September 1994. The date in the parenthesis refers to the date of ratification or signing.

1) Convention on Wildlife, Vegetation and Natural Landscaping Protection for American Countries (Jan. 5, 1942)
2) Convention on International Quarantine Protection for Flora (Feb.2, 1953)
3) Atmosphere, Underwater, and Space Nuclear Weapons Tests Prohibition Treaty (Ratified on Dec 3, 1964).
4) Convention on International Trade in Endangered Species of Wild Fauna and Flora: CITES. (Jul. 29, 1987).
5) Convention on American Nations' Archaeological, Historical and Artistic Heritage Defense (San Salvador Convention, Aug. 11, 1980)
6) United Nations Convention on the Law of the Sea (Dec. 5, 1984)
7) Baseline Convention on Cross-Border Movement of Dangerous Waste Materials and its Elimination (May 24, 1991)

8) Convention on Biological Diversity (Earth Summit ECO 92; signed March 1994; presented to the UN Sept. 8, 1994).

9) Framework Convention on Climate Change (Earth Summit ECO 92-A; Central American Region Convention was signed on Oct 29, 1993; ratified Jul. 1994 and published in the Official Newspaper No. 154, on Aug. 23 1994).

10) Vienna Convention for Ozone Layer Protection (Oct 2, 1992.)

11) Montreal Protocol Related to Ozone Layer Damaging Substances. (Signed Oct 2, 1992)

12) Cross-Border Regional Treaty Regarding Hazardous Waste Management, XIII Central America and Panama Presidents' Summit (signed Dec 12, 1992)

13) Central American Environment and Development Committee, CCAD.(Dec 12, 1989)

14) Central American Committee on Inter-Parliamentary Environment and Development: CICAD (DEC 9, 1990)

15) Convention on Central American Environmental Protection (Dec 12, 1989)

16) Convention on Central American Biodiversity Protection (Jun. 5, 1992)