

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

SECRETARIAT OF AGRICULTURE, LIVESTOCK
AND RURAL DEVELOPMENT (SAGAR)
GOVERNMENT OF UNITED MEXICAN STATES

SECRETARIAT OF AGRICULTURE AND LIVESTOCK (SAG),
CHIAPAS STATE GOVERNMENT



**THE STUDY
ON
INTEGRATED AGRICULTURAL, LIVESTOCK
AND RURAL DEVELOPMENT PROJECT
OF THE SOCONUSCO REGION
(THE RURAL DEVELOPMENT DISTRICT NO.8 IN TAPACHULA)
IN CHIAPAS,
UNITED MEXICAN STATES**

FINAL REPORT

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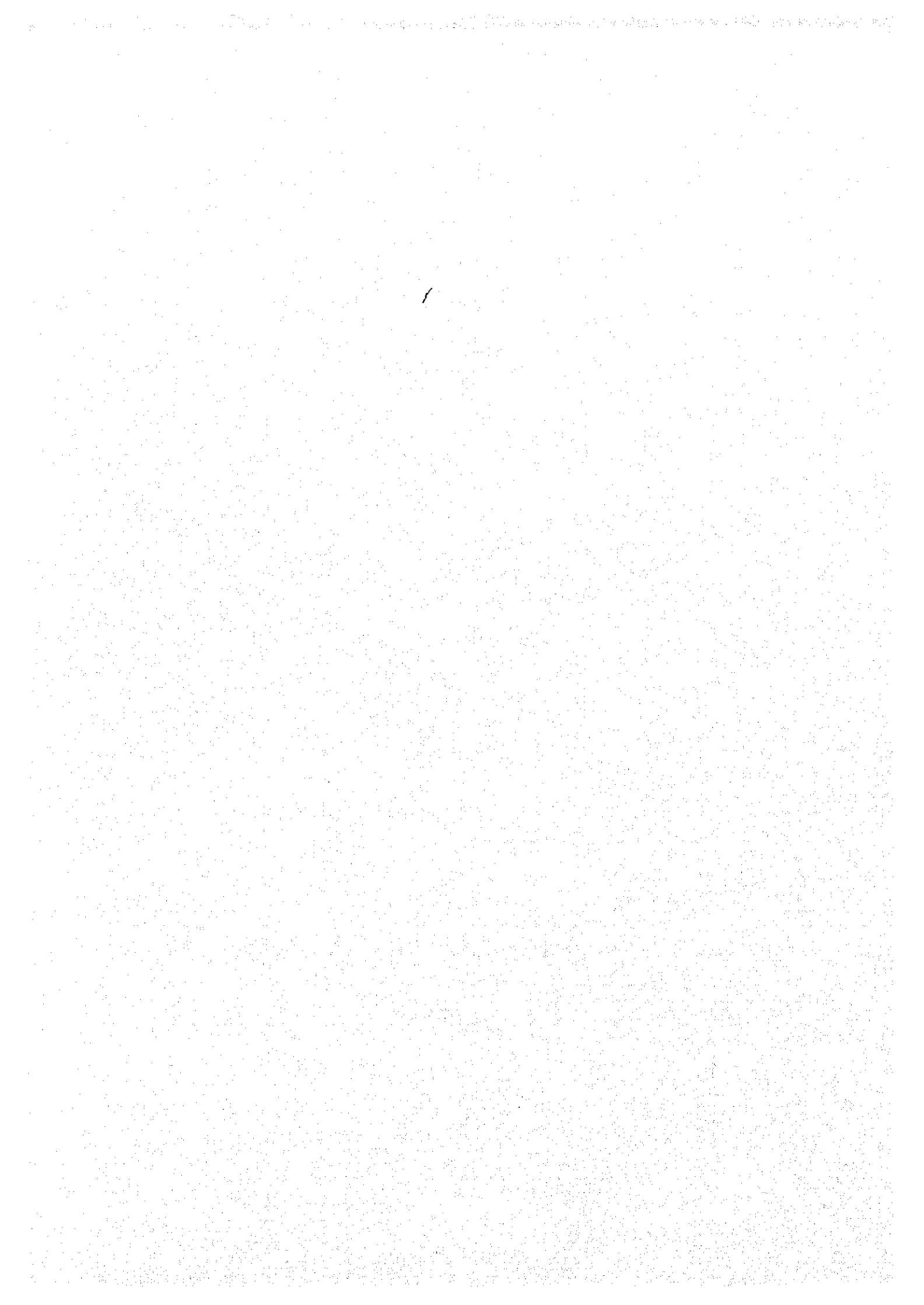
SEPTEMBER, 1999

PACIFIC CONSULTANTS INTERNATIONAL

NAIGAI ENGINEERING CO., LTD

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Exchange Rate (April 1999)		
US\$1.00	=	Mexican Peso 9.40
Mexican peso1.00	=	US\$0.106
US\$1.00	=	Yen 120.00

PREFACE

In response to a request from the Government of the United Mexican States, the Government of Japan decided to conduct the study on Integrated Agriculture, Livestock and Rural Development Project of the Soconusco Region (the Rural Development District No. 8 in Tapachula), in Chiapas, United Mexican States and entrusted the study to Japan International Cooperation Agency (JICA).

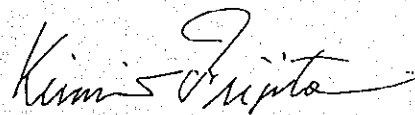
JICA sent to the United Mexican States a study team headed by Mr. Satoru Kido of Pacific Consultants International, three (3) times between June 1998 and August 1999.

The team held discussions with the officials concerned of the Government of the United Mexican States, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the United Mexican States for their close cooperation extended to the team.

September, 1999



Kimio FUJITA

President,

Japan International Cooperation Agency

Mr. Kimio Fujita
President
Japan International Cooperation Agency (JICA)

Transmittal Letter

We are glad to submit the Final Report for the Study on Integrated Agricultural Development and Rural Development of the Soconusco Region (The Rural Development District No.8 in Tapachula) in Chiapas, the United Mexican States.

This report consists of the master plan for agricultural and rural development of the region and the pre-feasibility study on priority projects, which have been prepared in due consideration of the advises and recommendations of relevant ministries of the Government of Japan and JICA on formulation of development plans as well as the discussions with the joint committee of the Mexican Government on the Draft Final Report and their comments on the report.

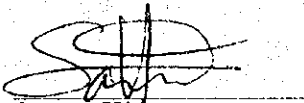
The Soconusco region, which is the target area of the present Study being located to the southwestern part of Mexico, has a foreseeable future because it is endowed with comparative advantages such as a variety of opportunities for selection of crops owing to abundant topographic and climatic resources and the convenience for shipment of agricultural produces under comparative development of transport infrastructures. Thus, it is judged that the region offers high potentials toward the enhancement of living conditions of farmers and activation of its economic sector, subject to introduction of appropriate cropping technologies and development of necessary infrastructure. In this regard, it is prerequisite that the development of the agricultural and rural sector should be proceeded in harmony with environmental conservation.

It is contemplated in the report such programs/projects as invigoration of rural society, strengthening of agricultural and livestock production system and alleviation of environmental degradation, which are considered to produce major socioeconomic impact. It is thus anticipated that these programs/projects be put into implementation as soon as possible following the implementation schedule proposed in the report.

Taking this opportunity express our sincere gratitude to the officials of your Agency, the Ministry of Foreign Affairs and the Ministry of Agriculture, Forestry and Fishery of the Government of Japan for their valuable advises and suggestions relevant to implementation of this Study. At the same time, we are highly appreciated to the officials of the Secretariat of Agriculture, Livestock and Rural Development (SAGAR) of the Federal Mexican Government, the Secretariat of Agriculture and Livestock (SAG) of the State Government of Chiapas and other public and private entities which have rendered us their amicable and devoted cooperation and support for successful implementation of the present Study.

Sincerely yours,

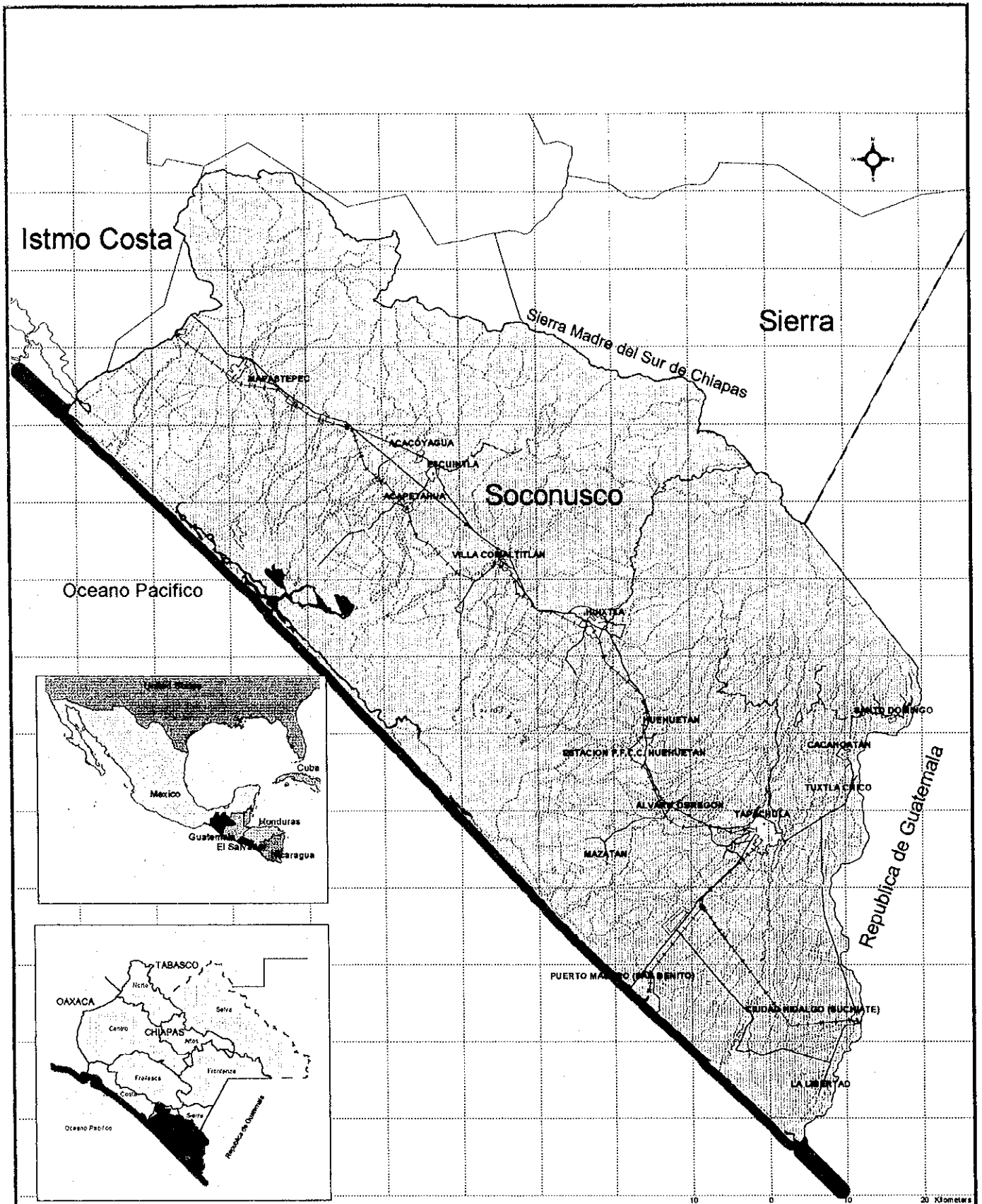
September 1999

A handwritten signature in black ink, appearing to read 'Satoru Kido', written over a horizontal line.

Satoru Kido

Team Leader

The Study on Integrated Agricultural, Livestock and
Rural Development of the Soconusco Region
(The Rural Development District No. 8 in Tapachula)
in Chiapas



LOCATION MAP OF STUDY AREA



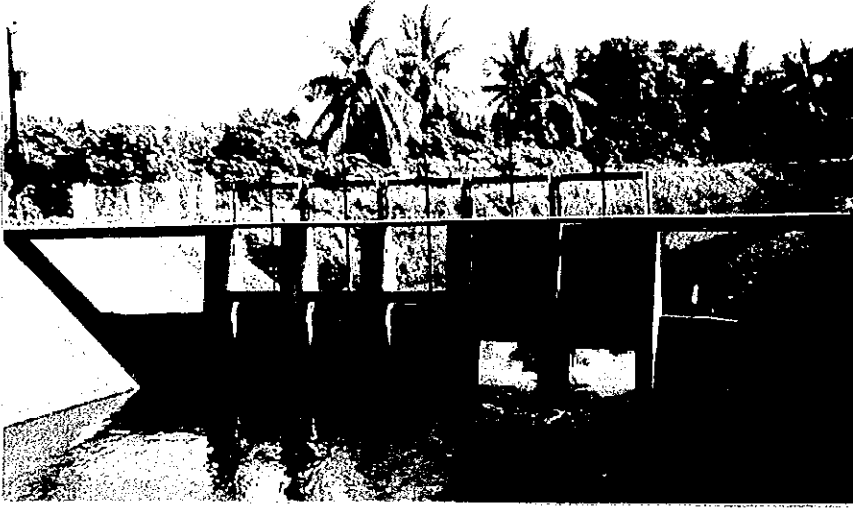
Signature of the minutes of meeting on the Inception Report



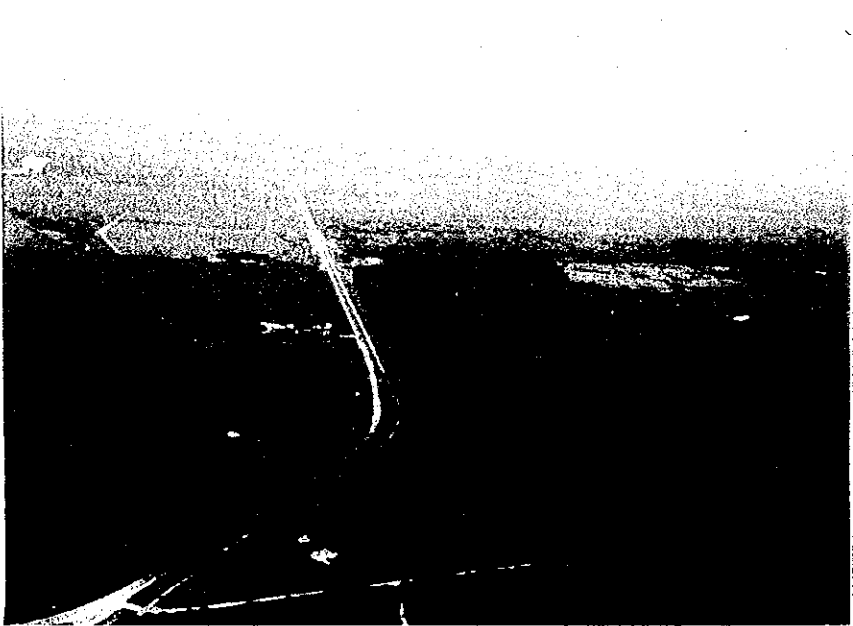
Signature of the minutes of meeting on the Draft Final Report



The first work shop for rapid rural Appraisal



Main irrigation canal at irrigation district No. 46 (District of Suchiate and sub'district of Cacahoatán); Upper stream from this gate is earth canal and the lower stream is concrete lined.



Suchiate sector, plantations of mango and banana



Cultivation of maize under minimum tilling practice



Coffee cultivation at
steep land



Maize cultivation at
mountain area
(Between Huixtla
and Motocintla)



Natural protection reserve
La Encrucijada (La Palma)



Most predominant breed of cattle is crossbreed of Cebu with Brown Swiss



Crossbreed of sheep with goat



Swine farming by rural women (Most prevailing breed is Large White Landrece)



Production of certified seeds at INIFAP's experimental farm



Extension services on land Conservation



Flower cultivation with shading of Banana

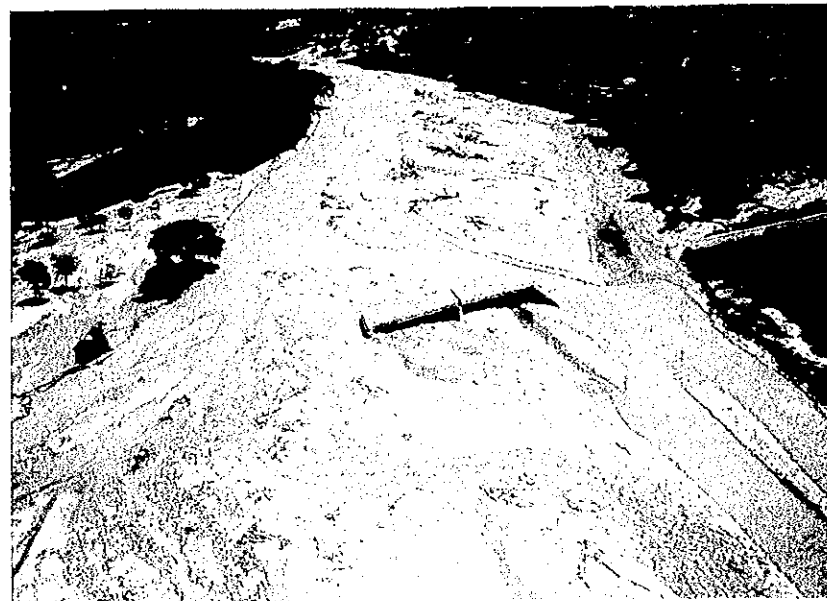


Ornamental crop (Palma camedor)



Disaster taken place in
September 1998

Landslide and erosion at
mountain side area

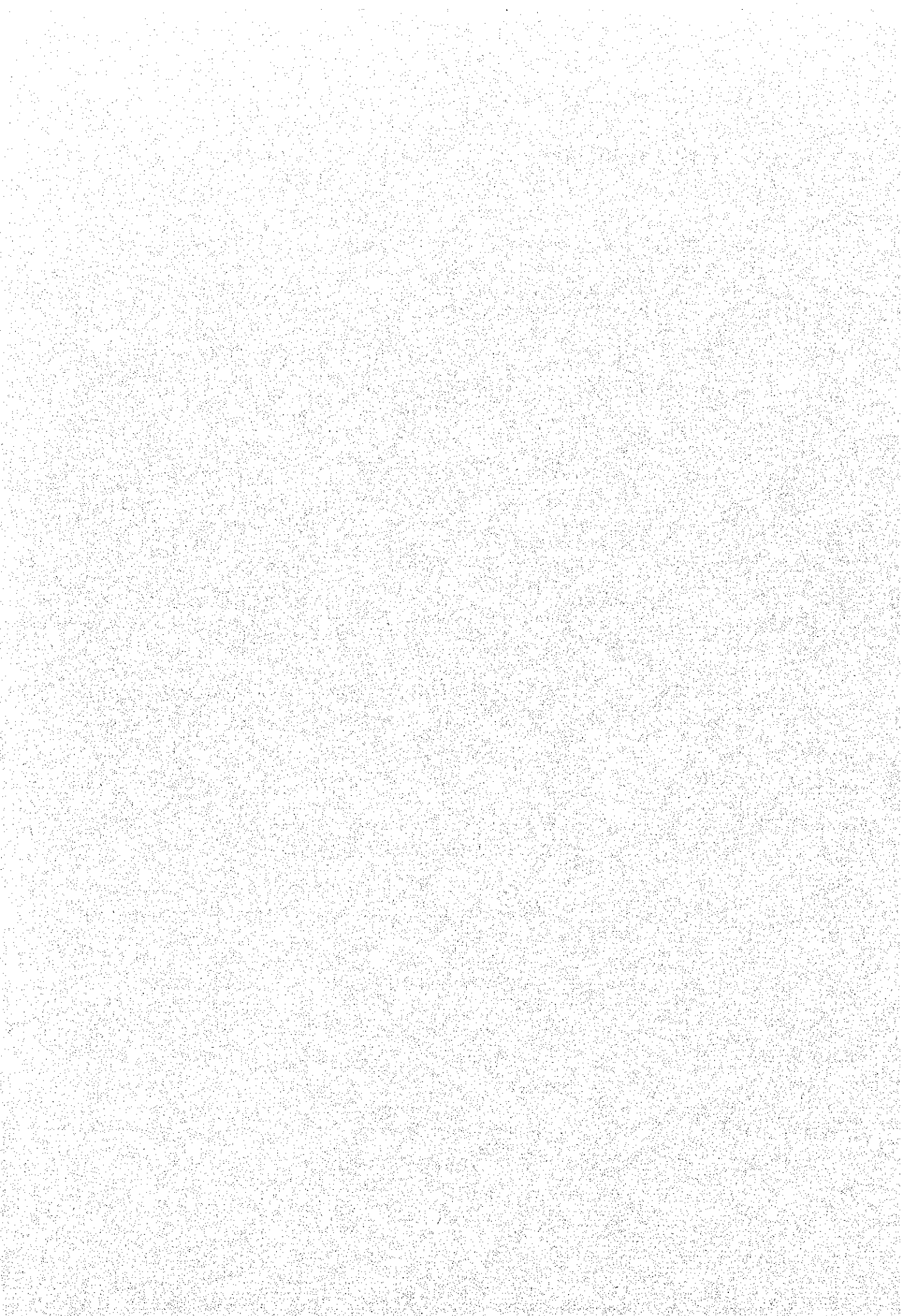


Destruction of a bridge
at the Federal Highway
No. 200
(Over Cintalapa river)



Urban area buried due to
sedimentation of sand and
clay (Valdivia)

SUMMARY AND RECOMMENDATION



1. INTRODUCTION

1.1 Background of the Study

The Government of the United Mexican States had requested the Government of Japan the implementation of the Study on Integrated Agriculture, Livestock and Rural Development Project in the Soconusco Region, the State of Chiapas (hereinafter referred to as "the Study"), in December 1996. In response to this request, the Government of Japan had decided to conduct the Study through Japan International Cooperation Agency (JICA) and had sent a mission to carry out a preparatory study from September to October and the mission concluded the Scope of Work (S/W) for the Study on October 2, 1997.

Based on this S/W, JICA dispatched the Study Team to Mexico to carry out the field work for three times from June, 1998 to July, 1999 for the purpose of carrying out the field survey, accumulating data and information which are necessary to formulate the Master Plan and Pre-feasibility Study. After each of the field work, work was carried in Japan and the Master Plan and Pre-feasibility Study formulated.

1.2 Objectives of the Study

The objectives of the Study are as follows:

- (1) In view of effective accomplishment an enhancement of quality of life and increase in agricultural income among small farmers, to formulate a Master Plan for sustainable integrated agriculture, livestock and rural development project with focus laid on formulation of infrastructure development for agricultural production and grass-roots-assisted small-scale projects/programs that might serve supporting small farmers in embarking them with their own funds covering a total area of 5,996 km² in the Soconusco Region, in the State of Chiapas, and to undertake evaluation of formulated projects/programs at pre-feasibility level.
- (2) To conduct technology transfer to the Mexican counterpart personnel regarding study methodology and flow and concept on formulation of development plan for respective discipline.

1.3 Study Area

The Study area covers the whole area of the Soconusco Region located in the south-western part of the country and at the international border with the Republic of Guatemala. The area has a territorial extension of 5,996 km² comprising a total of 16 municipalities.

1.4 Major Components of the Study

The Study is conducted in two phases viz., Phase I and Phase II and the major components of the Study are as follows.

- (1) Phase I Study (June – December, 1998)
 - 1) Field Works in Mexico (June – October 1998)
 - 2) Home Office Works in Japan (October - December 1998)

- (2) Phase II Study (January – September 1999)
- 1) Field Works in Mexico (February – April 1999)
 - 2) Home Office Works in Japan (May – July 1999)
 - 3) Secondary Field Works in Mexico (July 1999)
 - 4) Preparation of the Final Report (September 1999)
- To prepare the Final Report, based on the comments from the Government of Mexico on the Draft Final Report.

2 NATIONAL AND REGIONAL SOCIO-ECONOMIC BACKGROUND

2.1 *General Conditions of the United States of Mexico*

- ◆ Land area: 1,964,381 km²
- ◆ Administrative division: 31 states and one Federal District
- ◆ Population: 91,158,290 (1995)
- ◆ Population in rural area: 26.5% (1995)
- ◆ Macroeconomic factors;
 - Annual increasing of GDP: 4.8% (1997 – 1998)
 - Payment balance: - US\$ 15,786 millions
 - Public debt: 38.2% of GDP (1997)
 - Net International Reserve: US\$ 30.1 billions (1998)
 - Consumer price index: 18.65 (Dec. 97 – Dec. 98)

2.2 *National Development Plan*

- ◆ National Development Plan 1995 – 2000

- | | |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Principle Components: | <ol style="list-style-type: none"> 1) Sovereignty to the end of the 20th century 2) Aspiration by the nation of right and a country of law 3) Democratic development 4) Social development 5) Economic growth. |
| Social Development | <ol style="list-style-type: none"> 1) To expand coverage and to improve the quality of the basic services 2) To harmonize the growth with territorial distribution of population 3) To facilitate equal regional development 4) To give major attention to economically and socially handicapped people 5) To boost an integrated policy for social development |
| National Financing Development | <ol style="list-style-type: none"> 1) To promote domestic saving as fundamental basis for financing national development and to rely on external resources to complement domestic resources 2) To establish conditions to secure stability of the economic activity 3) To promote efficient use of resources for development 4) To forge environmental policies for the sustainable economic development 5) To formulate relevant sector policies. |

◆ National Program for Financing Development 1997 – 2000

- Main Objectives
- 1) To accomplish an annual growth of GDP higher than 5%
 - 2) To strengthen domestic financing sources
 - 3) To eliminate vulnerability of the economy facing with an inflow of foreign resources
 - 4) To maintain stable macroeconomic environment
 - 5) To improve social welfare.

2.3 Salient Features of the Agriculture Sector in Mexico

The agricultural sector in the national economy is:

- ◆ 26% of national population is living in the rural area (1995)
- ◆ Approximately 22% of EAP (1997)
- ◆ GDP with participation of only 5.9% (1998)
- ◆ Foreign trade is also in small portion covering only 5.8% in exports and 5.6% in imports, respectively for the year of 1997.

Agricultural products:

Maize is the leading crop of the country accounting for almost half of the total cultivated area of the crops. Other important crops next to maize are beans (frijol), basic grains (wheat & sorghum) and permanent crops (Coffee and sugarcane) and the area covered by these six crops including maize represent about 86% of the total cultivated area

Trade of agro-products:

Coffee and cotton, which together accounted for nearly half of the country's agricultural exports in value terms in 1980 and close to 40% for the period 1980 - 89. Recently, diversification of exports has been in progress and the participation of the two products in total exports has declined to 19% for the period 1990-96. By contrast, tomato, melon, watermelon and other vegetables and fruits have accomplished distinguished growth in their exports in these days. The export of beef also expanded significantly, by 230% for the period 1990-97 in comparison of the period between 1980-89.

2.4 National Policies and Plans on Agricultural and Rural Development

In line with the general macro-economic reform program undertaken by the federal government since 1988, the agriculture sector's policy reforms has been in progress and the major issues relevant to these reforms are explained below.

- ◆ Price Policies: Before 1990, farm-gate prices were guaranteed. Recently, guaranteed prices were abolished and the Mexican government substituted the agreement prices for 12 crops. In March 1999, Mexican government decides to withdraw purchasing maize and frijol by the guaranteed price through CONASUPO.
- ◆ International Trade Policies: Under NAFTA, 42 percent of tariff codes were liberalized with tariffs on foodstuffs and cotton to be phased out over the period of 15 to 20 years.

- ◆ Property Rights and Markets for Land and Water: In early 1992, Article 27 of the Constitution and the Agrarian Reform Laws were modified to give land ownership directly to residents of agrarian communities (ejidos and communal lands) and to allow them to develop new forms of economic association.

Alianza para el Campo has four major objectives, namely: 1) To recover profitability of farming activities, 2) To increase agricultural output higher rate than demographic growth of the nation, 3) To exterminate poverty and 4) To maintain the agricultural trade balance in surplus.

To compensate farmers for reduced protection implied by NAFTA and GATT and the anticipated elimination of producer price support, the Government of Mexico introduced PROCAMPO. The number of beneficiaries for PROCAMPO was estimated to be 3.3 million at the beginning, but the number of farmers actually benefited by the program is declined to 2.9 million for the year of 1998. The payment per ha for the last three years is \$ 484 for 1996, \$ 556 for 1997 and \$ 626 for 1998.

2.5 Characterization of the State of Chiapas and State Development Plan

The socioeconomic profile of Chiapas State.

- ◆ Territorial Extension: 75,634 km² (8th largest state in Mexico accounting for 3.8% of the national land)
- ◆ Population: 3,584,786 (1995); 3.9% of the national population
- ◆ Rate of Increment of Population: 3.7%/year (Average of 1980 – 95), higher than national average (2.1%)
- ◆ Economic: The contribution of the primary sector to the formation of the Gross Regional Product is very high (18.4% - 2.7 times as high as the national average).
- ◆ Income Level per population : The highest proportion (37.4%) of the population who gets income inferior to the minimum wage.
- ◆ Education Level: the illiteracy rate is 26.2%.
- ◆ Coverage Rate of Social Infrastructure: Greater portion of the local population are not in a position to enjoy ameliorated living life due to lower coverage rate of social infrastructure
- ◆ Public Financing: In 1997, close to half (47%) of the gross income of the state government.

The agriculture and livestock sectors in the state have the following aspects:

- ◆ The agriculture and livestock accounts for 23% of the Gross Regional Product (GRP) of the State.
- ◆ The most of the farmers depend on the rain fed agriculture and the share of irrigated land is low, showing only 3% compared to the country's' average of 24%.
- ◆ The farming practice follows the traditional practice with labor force and low input of improved seed and agricultural chemicals and also the mechanization level is underdeveloped.

The Government of the State of Chiapas had forged the Agricultural and Livestock Development Program 1995 – 2000 comprising the following strategic policies:

- ◆ To give social and juridical assurance to farmers in order to use their lands more intensively.

- ◆ To alleviate an outstanding dissociation between crop farming and livestock.
- ◆ To empower traditional farmers and to encourage non-traditional ones who have managed to overcome experimental stage.
- ◆ To orient to switch land use in accordance with land suitability and marketing conditions.
- ◆ To facilitate ecological-productive farming.
- ◆ To change paternalism by means of training, incentives and assistance on the basis of promises at community level.

3. PRESENT CONDITIONS OF THE STUDY AREA

3.1 *Natural Conditions*

Climate

The climate of the Study Area is classified into 8 regions, influenced by the diversity of the topographic factors.

The rainfall of the Study Area is concentrated in the season during April to October, showing the defined dry and wet season. Major part of the area is classified into the tropical rainy areas, with the annual rainfall of more than 1,500 mm to 4,000 mm. The average annual rainfall in the Study areas was calculated as 2,450mm.

The mean temperature is 28°C in the plain area and 23°C in the mountainous area. The variance of the daily temperature is high in the highland area and low in the plain area.

Hydrology and Water Resources

The rivers are 13 main streams and other tributaries throughout the region and the majority of them originate at Sierra Madre.

The river mouths are frequently closed, showing the stagnation of the water in the swampy area. Because of this reason, the water runs between the rivers through the lowland swamp. The total basin area accounts for 6,234km², of which is part of the foot of a mountain and the upland with abundant rainfall accounts for about 55% of the whole area and the part where little compared rainfall occurs becomes 45%.

Topography, Soils and Land Use

The landform is divided into 1) coastal dune, 2) brackish water area (back marsh) and mangrove, 3) alluvial plain, 4) fan and flood plain, and 5) mountains.

Regarding the topography, the flat pain areas of equal to or less than 100 m altitude accounts for about 54% of the whole area, 100-800 m accounts for 23%; more than 800 m becomes about 23%. As for the slope and land distribution, inclination degree of 0~ 3 degrees accounts for 57% the land area; 3~12 degrees becomes 16% of the area, 12~35 degrees occupies 24%; and more than 35 degrees accounts for 3% of the land area.

The parent material of the soils in the Study Area is volcanic ash from Mt. Tacana and active volcanoes in Guatemala, which are rich in feldspar. It greatly contributes to the fertility of the soils in the Study Area. There are 8 soil units observed in the Study Area.

The land use of the Study area are as follows: annual crops (25.3%), forests (25.1%), perennial crops (24.1%), grazing lands (16.6%), sand dune and swamps (7.8%) and urban area (1.2%). This land use varies in accordance with land heights; in the lowest part in which annual crops and grazing lands are outstanding and small area of swamp lands mangroves are found; in the sector fluctuating between 20 and 100 meters above sea level (masl), lands are generally used for cultivation of annual crops; coffee cultivation represents in the lands with the height 400 – 1,000 masl and the lands higher than 1,200 masl are covered by forests in their greater portion.

3.2 Socioeconomic Conditions

The Study area (the Soconusco Region) is located in the south-eastern part of the State of Chiapas between 14° 10' and 15° 20' North Latitude and 92° 10' and 93° 10' West Longitude and abounds on the Republic of Guatemala alongside its eastern limit. The Soconusco Region, which is one of the nine economic regions constituting the State of Chiapas is composed of sixteen municipalities, has a total territorial extension of 5,475.5 km² and a population of 622,044 in 1995.

The economic activities in the Soconusco Region are highly dependent on the agricultural and livestock sector including forestry and fishing. About 45% of the economically active population (EAP) in the region were represented by the primary sector. At present, coffee, banana and mango constitute the leading agricultural products, covering more than 80% in value terms among the principal 13 agricultural and livestock products.

Industrial sector in the region is closely linked with agricultural production; industries in the field of packing and processing agricultural products and manufacturing of intermediate and durable materials for packing of fruits and vegetables.

3.3 Agriculture and Livestock Raising

Agricultural Production

The cultivation area of coffee and maize are 37 % and 25 % of total cultivation area respectively and they account for about 60 % of total cultivation area, then in the order of mango, cacao and sesame.

The cultivation type in the Study Area is classified into three types, i.e. 1) Cultivation under rain fed condition at rainy season; 2) Cultivation under irrigation at dry season; 3) Cultivation under residual soil water follows the rain fed cultivation.

Livestock Industry

The study area possesses the 7.5% of state total cattle, ranked 6th, and the highest number of swine and sheep, 25% and 20% respectively, and second highest number of poultry, consist of 17%.

University of Chiapas (UNACH) campus located in Huehuetán is the only livestock research institution in the regions, however their scope is limited to local cattle studies

Agricultural Research and Extension Services

The UNACH at Huehuetán carry out research on livestock and animal husbandry. However, agricultural extension services is not carried out, because of the budget and equipment shortage.

DDR and CADER are scheduled to be transferred to the state government as decentralization of power. But CADER and SAG carry the extension service together as it is under processing period.

The private company and the government organization are supplying the seed and the seedlings, which are inspected and certified by SNICS

3.4 Agricultural and Rural Infrastructure

Agricultural Infrastructure

The irrigation facilities were constructed by SAGAR, CNA and individual farmers, but the large scale one, the 46th Irrigation District, was constructed by the CNA. There are around 140 small scale irrigation units. The small scale irrigation farms are formed by 140 units of organizations and individual farmers, having a projected irrigable area of 42,000 ha, but it has only 31,000 ha of actual irrigable area.

The drainage facilities which were installed in the study area are the drainage canals of the and the main drainage canal and the group of river levees constructed in the Hydraulic Project of the Coastal Area of Chiapas by CNA.

Rural Infrastructure

The main road network in the study area is relatively well constructed and maintained, but the rural roads of rural areas are not. The rural road conditions are becoming bad, and the rural roads that are not covered with asphalt, have serious problems of locomotion in the rainy season.

Tapachula City is the only one that has a large scale water treatment facility. Major towns of each municipality have small-scale water treatment facilities, but the rural communities have none. The water supply facilities are concentrated in urban areas, being most of rural communities without it, needing an urgent improvement of the present condition.

Despite of all municipality centers have their sewerage pipelines, there is no one with water treatment facility. So, all sewerage is drained to the rivers without any treatment, polluting them.

84% of the households are provided with electricity and about 100 non-electrical communities exist in the remote area.

3.5 Rural Finance

In Mexico, especially after the financial crisis taken place at the end of 1994, financial institutions have been circumspect in granting loans to farmers. At present, FIRA, an affiliated financing institution with Mexico's Central Bank - Banco de Mexico (BANXICO), leads the rural finance market. FIRA does not give credits directly to beneficiaries, but functions as the "Second Floor" bank channeling its financial resources targeted to farmers and farm entrepreneurs through BANRURAL and commercial banks.

During the period 1992 - 1997, close to 47% of the agricultural credit amount had disbursed to fruits production, which is followed by cattle farming (23%), annual crops production (18%) and agro-industrial development (11%).

3.6 *Rural Society and Farmers' Organization*

Rural Society

Rural society of the ejido is composed of farmers, who were farm worker of the plantation before the agrarian reform, are settled by obtain the land use right, and landless farmers who settled from within the Chiapas State or the surrounding states. Rural community (village) of the ejido is managed by autonomous organization of the ejido. However, in most communities of the ejido, organization of ejido farmers is not in progress caused by lack of relationship among farmers and low cooperative awareness.

Health and Public Welfare

The public health system consists of SSA, IMSS, ISSSTE and ISECH, and these institutions are responsible for the people. The related institutions to these health services are DIF, INI and Red Cross. The provision of health services in rural area, is principally responsibility of SSA and IMSS-UMR.

The DIF in each municipality strives to solve the problems on poor family, mother and children and handicap persons as the social weak, and juvenile delinquency.

Farmers' Organization

Most the existing farmer's organizations are established in order to obtain the credit. However, by default of the credit, most the organizations are inactive.

Though the organization formed by large-scale farmers is generally active, most the organization of small-scale farmers is stagnated and/or suspended in their activities.

The water users' organization is organized in accordance with the regulations of the National Water Law and these associations carry out operation and maintenance for the irrigation facilities of the No. 46 Irrigation District. These associations were organized simultaneously at the completion of the construction of irrigation facilities, and water control and operation and maintenance works for the facilities was transferred from C.N.A. to these associations.

There are three type of women organization in rural area of the region such as SSS established by only rural women, UAIM in the ejido, and DIF group in each village.

Although the activities aiming to improve living conditions by rural women in a part of the area are carried out briskly, the women's social status remains low because of the traditional male-dominated society.

3.7 *Commercialization of the Agricultural Products and Agro-industry*

Balance of Supply - Demand

The region depends on the most part of he agricultural product from other region. These product are the bean, wheat, soy bean, eatable oils, orange, pineapple, onion, chili, tomato, lemon, ovine and porcine livestock, chicken for meat, eggs and milk, among others. On the other hand, the region sends to the interior of the country, sesame, oil of African palm, mango, banana, watermelon, coffee, cocoa, papaya, soy bean, sugar, bovine and ovine livestock, and milk.

System of Agricultural Commercialization

80 percent of the coffee produced in the region are exported and the main exportation place becomes in order of the United States of America, Germany and Holland.

The bananas cultivated with irrigation and high technology has cable system and packer and at least 25% of their production is exported.

The corn that is produced in Mexico competes with the import article and about half of the domestic production is turned to national demand and depends on the import article.

The commercialization of the livestock in foot is carried out through middlemen that buy in each municipality the young bulls to fatten them outside of the region.

Agricultural Processing Facilities

There are many coffee processing facilities in the area. The medium and large farmers have modern installation of peeling, fermentation, cleaning and drying, producing coffee beans with high quality. The ejido utilizes manual processing installation with old type fermentation units and the bean is dried under the sun.

Other installation are cacao fermentation, African coconut oil and oil refining, cashew nut processing, sugar production and mango canning.

Commercialization Facilities, Transport Infrastructure and Market Information

There are 20 government warehouses in the regions with a combined capacity of 58,100 tons.

The agricultural and livestock production flows in their biggest part outside of the region toward other states and international markets is made possible through of quick roads of terrestrial transport, as the toll freeway, Pan-American railroad and Puerto Madero marine terminal, etc.

The market information of the agricultural and livestock products of the region is operated by SAGAR through the organism ASERCA, This information is supplemented with the SNIM that also publishes prices of the main agricultural products.

3.8 *Environment and Environmental Preservation*

Owing to a influence of the altitude difference in the Study Area, the vegetation shows the significant variance of vegetation, existing tropical, highland, Savanna and swampy type. However, in the term of the vegetation, the native vegetation is scarcely. "Reserva de la Biosfera El Triunfo" "Reserva de la Biosfera La Encrucijada" area are significant reservation area located in the Study Area, in term of the legal reservation.

The erosion problem caused by the topographic factor, inadequate farming practice and inadequate construction method, is a deterioration of soil fertility in the upper and middle basin, and a sedimentation problem for the lower basin, specially in a swamp area. The water pollution problems has a origin in a inadequate treatment of the sewage water and coffee plant at the upper basin, because of the water supply of the urban area are depending on these water resources as a font.

3.9 Public Finance

The public investment of the agricultural and livestock sector at the state level for the year 1998 was represented by loans (40% of the total budget), coming from the development bank (FIRA) via direct loans or discounted to the commercial bank (BANCRI). On the other hand, a great majority (97.5%) of SAGARs budget was assigned to PROCAMPO, while almost half of this budget was assigned to *Alianza para el Campo*.

3.10 Investigations into Natural Disaster (Flooding occurred in September 1998)

Characteristics of the Torrential Rainfall

The rainfall on Margaritas and Despoblado Rivers, situated on the north-western part of the Huixtla river, reached a scale exceeding 200 years of return period.

According to the disaster report of the CNA, 23 municipalities are affected in the Chiapas state as follows: Damaged Inhabitants (bout 700,000 persons); Damaged Farmers (about 40,000 persons), Damaged Agricultural Area (about 100,000 ha), Washed / Damaged Residences (about 16,000 families).

The damaged agricultural area and farmers in the largely damaged municipalities are as follows. Approximately 24% (98,000 ha) of the total agricultural area and 47% (22,500 families) of the farmers suffered from the flood.

Causes of Disaster

Meteorological Factor: Torrential rainfall with return period over 200 years and a long duration of the rainfall.

Geographical Factor: Due to the steep relief and river slope, many hillsides collapsed and debris flowed in the upstream basin. Because of the steep river slope suddenly changed to a gentle slope at the foot of the Sierra Madre de Chiapas mountains. The thick weathered granite layer was founded widely at the upstream basin, meanwhile, the weak fractured rock layer distributed near the big faults. Those layers increased the debris disaster.

Human Factor: The lack in flow cross sections under the road and railway bridges accumulated driftwood and rocks at their piers and abutments. These accumulations dammed up the floodwater increasing the damages of the corresponding bridges and roads.

3.11 River Sediment / Disaster Prevention

River Sabo

The slope and structure of the river courses are irregular and the width varies from narrow to wide, preventing an easy flow of the currents.

Topography and Geology in the Study Area

The geological component is divided into hard rock distributed in the mountain area and soft sediment in the plane area. The granitic rocks are exposed to the weather with the soft crust reaching more than 10 meters in thickness, the reasons for which are taken out many slope failures in high inclined slope and cuttings along roads.

Condition of the Sediment Production and Movement

The configuration of sediment production can be classified into the following: ← Surface Failure, ↑ Large-scale Slope Failure, → Slope Failure by Road Cutting, ↓ Failure of Undercut Slope and ° Debris Flow.

3.12 Summary of Development Potentials and Constraints

The potentials and constraints on development of the agricultural, livestock and rural development of the Soconusco region may be resumed as given in the table below.

Sectors	Potentials	Constraints
Policies of federal and state governments	<ul style="list-style-type: none"> Expansion of agricultural exports to the markets of USA and Canada owing to liberalization of trade of agro-products under NAFTA. Even ejido farmers can expand their farmland and farming activities as a consequence of the constitutional reform of the article No. 27. 	<ul style="list-style-type: none"> Competition in agricultural trade with products made in the USA and Canada is reinforced under NAFTA. Abolishment of guaranties prices for crops other than maize and beans. Greater portion of the public finance of the state government depends on transfer of fund from the federal government, so planning of development project on the initiative of the state government is difficult.
Rural society	<ul style="list-style-type: none"> Already exist producers' and women's associations, which have experience formation and administration of rural organization. Rural organization may be reinvigorated with empowerment of leaders of associations. 	<ul style="list-style-type: none"> Leaders of associations are not capable of administrating their organization adequately. Individualism prevails. High illiteracy and fertility rates among rural women.
Natural conditions and resources	<ul style="list-style-type: none"> Abundant rainfall The amount of rainfall in the rainy season is so plentiful that makes it possible to cultivate crops which require much water under rain-fed condition. Small streams and tributaries are distributed widely and an intake of water in small scale from them is possible. Diversified climate and topographic conditions owing to the variety of land elevation from coast to 2,000 m enable to realize diversification of agricultural and livestock activities. 	<ul style="list-style-type: none"> Seasonal irregular distribution of rainfall is predominant with extremely small amount of rainfall in the dry season. Even though high precipitation is expected in the rainy season, the use of this resource for irrigation purpose is not convenient because of significant land slope condition together with limited basin area. The cultivating capacity of water resources at the upper basin is far small in comparison with the abundance of precipitation. There remains very small room for additional use of river discharge at the dry season. Riverbed at upper reach of the plain basin is composed of gravel, so intake of water there is not easy.
Agriculture	<ul style="list-style-type: none"> Climate condition favors production of tropical fruits to be exported to the North American market. Variation of topographic and climate conditions enable to realized diversification of crops Farm management ability of farmers is high and farmers are ready to accept innovated farming technologies and to introduce non-traditional crops such as flowers and rambutan. There are many conventional fauna and flora which may be used as regional advantageous products. 	<ul style="list-style-type: none"> Delay in farm mechanization and joint-use of farm labor force. Crops are not necessarily cultivated according with land suitability. Natural conditions are not utilized in an adequate manner. As farming technology is under-developed, quality of agricultural products are inferior. Soils are deteriorated in their chemical and physical properties. Farming practice at abrupt lands causes soil erosion.

Sectors	Potentials	Constraints
Livestock	<ul style="list-style-type: none"> High marketability of livestock products at domestic and neighboring countries' markets Farmers are interested in raising swine, poultry and other minor animals. Productivity of pasture is high, so intensified livestock activity is viable. 	<ul style="list-style-type: none"> Lack of high-quality breeds Inadequate system of animal health Livestock farming techniques are not appropriate Shortage of slaughterhouse and absence of quality control. Under-utilization of livestock resources biased with conventional livestock farming system. Inconsistent supply of animal feeds declines livestock productivity.
Research and extension of farm technologies	<ul style="list-style-type: none"> Research and development capability of public institutions are high. Supply of seeds and plants by public and private agents is consistent. 	<ul style="list-style-type: none"> Number of extension workers as well as materials and equipment at extension offices are deficient. Demonstration farms are in shortage without being allocated necessary budget. INIFAP's budget is deficient.
Rural finance	<ul style="list-style-type: none"> Making access to "Alianza para el Campo", farmers can reduce their farm investment by 50%. FIRA's credit accompanies technical assistance services. FIRA has a number of qualified engineers and has established valuable agriculture-related information and flexible evaluation system. 	<ul style="list-style-type: none"> Access to rural credit is difficult because of rigid eligibility of users. Resources to be allocated to rural finance are not enough. Soar loans are outstanding. Banks are declined to provide credit to agro-industry sector, because it is not easy to make precise profitability analysis of the sector.
Agricultural production infrastructure	<ul style="list-style-type: none"> Operation and maintenance of irrigation system is made by water users' association and institutional arrangement related with this privatization process is made. There are about 21,600 ha of lands which are irrigable but not put into cultivation. Land reclamation projects such as rural road network and drainage improvement are developed at plain area. 	<ul style="list-style-type: none"> Low irrigation efficiency. Physical deterioration of intake facilities. Elevated cost in operation and maintenance of irrigation system depending on groundwater. Lack of data and information relevant to development of groundwater. Drainage system development is under-developed.
Rural infrastructure	<ul style="list-style-type: none"> Trunk road network is well developed and maintained. Water supply system at urban area and its surrounding zone is consolidated. Electricity is provided to all municipalities and supply capacity of electricity is sufficient. 	<ul style="list-style-type: none"> Inferior rural road surface condition causes difficult accessibility in the rainy season. Insufficient road maintenance equipment Water supply capacity in rural area is not sufficient. Operation and maintenance of water supply system is inadequate. Epidemic diseases stemmed from potable water are common.
Agricultural marketing system and agro-industry	<ul style="list-style-type: none"> There is a room for expansion of consumption in tropical fruits both at domestic and international markets. Transportation infrastructure network of commodities is relatively developed. 	<ul style="list-style-type: none"> Producers are not in a position to make direct access to market and prices of farm products are fixed by middlemen. Without proper and timely market information, producers can not make marketing strategies of their products to receive an optimum price. Market-oriented producers' association is not organized. Processing facilities of farm by-products are scarce. Inferior quality of farm produces discourages their better marketing.
Environment	<ul style="list-style-type: none"> Biodiversity owing to topographic variety and land elevation. Resources for ecotourism (Tacana Volcano, El Triunfo Natural Protection Area, etc) exist. Proportion of vegetation in the region as a whole is high. Local inhabitants pay attention to forestation and some of them have realized it. 	<ul style="list-style-type: none"> Decline of forest caused by agricultural development and fire at mountain zone. Water contamination caused by domestic and industrial sewage. Investigation on environmental resources such as exotic species is not made satisfactorily. Low morale of local population relevant to environmental conservation. Environmental education is under-developed. Due to frequent occurrence of natural disasters, environmental condition is deteriorated such as sedimentation at river bed, inundation and sedimentation in environmental conservation areas.

4. DEVELOPMENT PLAN

4.1 DEVELOPMENT SCENARIO

4.1.1 Basic Policies

Development plans to be forged under the present master plan shall aim to be a highly viable one, which is suitable to the prevailing rural society without confronting any severe obstacles, so the benefits to be produced can be extended to as many strata as possible, covering the complete community in the region.

4.1.2 Establishing the target year

The target years of the present Master Plan shall be 2005 for the short-term, 2010 for the medium-term and 2020 for the long-term. Programs will be set in view to attaining development objectives by the end of each respective term.

4.1.3 Proposed Beneficiaries

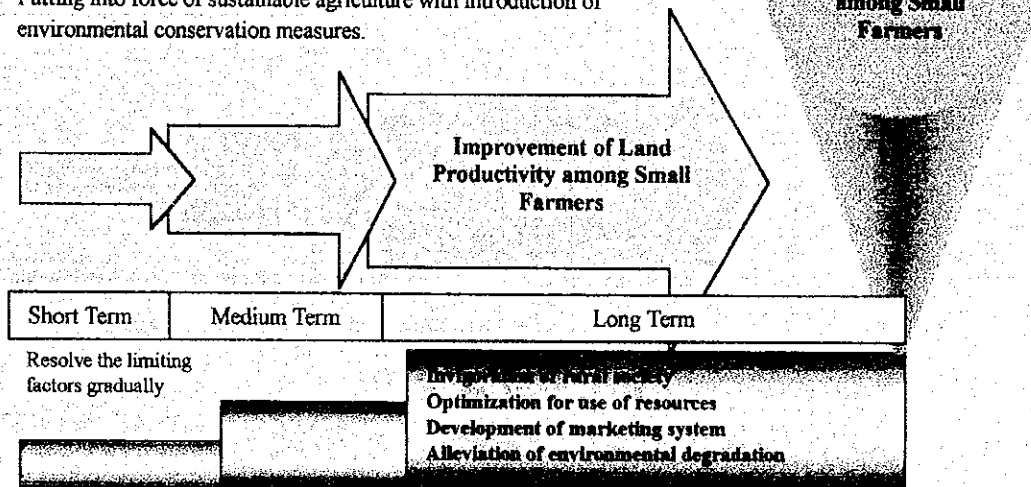
The final target of the present master plan are fundamentally the low-income farmers (both strata of small property ejidatarios). Nevertheless, if this plan is only targeted to them, it could limit the economic development of the region and therefore the commercial and business producers will be considered when necessary.

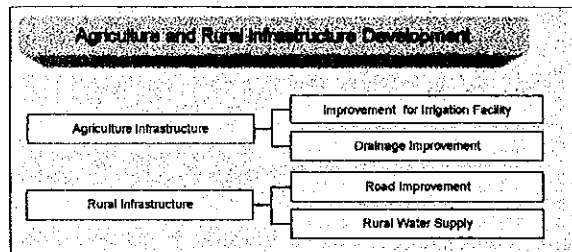
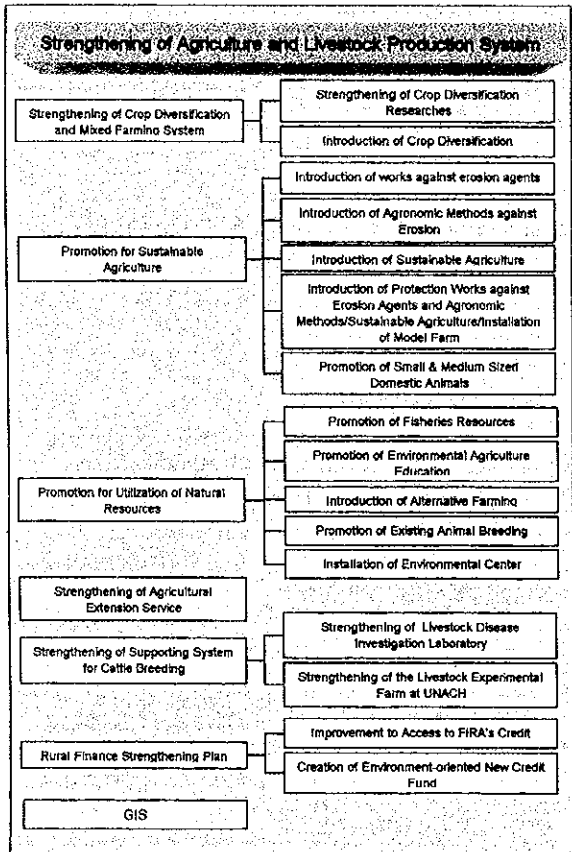
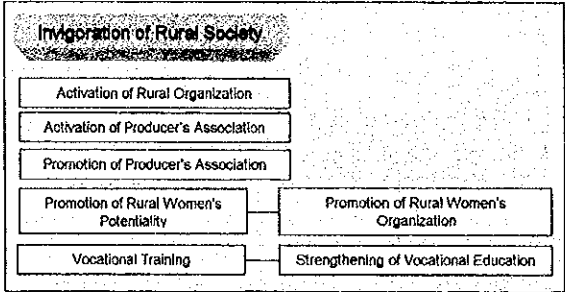
4.2 Development Strategies

The development strategies of the present master plan are to be forged in such manner as to make better use of the abundant natural resources advantage of the region in order to reach the main objective which is to increase the income of agricultural and livestock farmers in order to contribute to improve their quality of life.

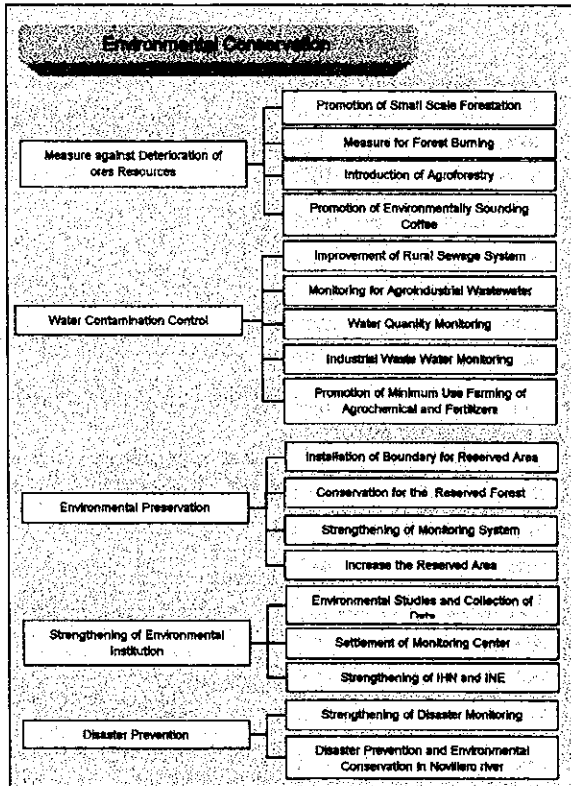
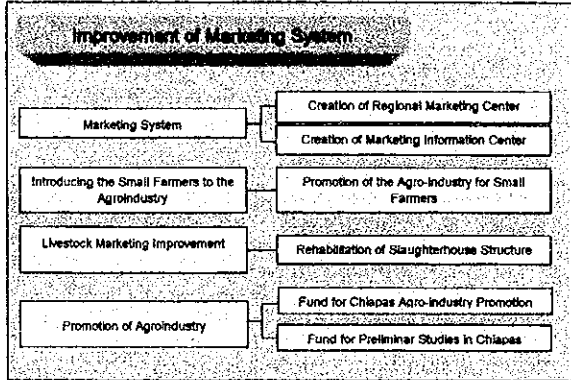
(Optimization of Potentials)

- Improvement of land productivity with introduction of intensive and mixed farming.
- Possibility to raise land productivity along with development of marketing system.
- Putting into force of sustainable agriculture with introduction of environmental conservation measures.





INTEGRATED AGRICULTURE, LIVESTOCK AND RURAL DEVELOPMENT IN THE SOCONUSCO REGION



Overall Development Plan

4.3 Development Plan

4.3.1 Overall Development Plan of the Master Plan

RURAL ORGANIZATION ACTIVATION PLAN	
Objective	In order for the community organization at village level to function effectively through the activation of low community awareness of rural people, the leader training, formation of village development group and enlightening of community awareness will be carried out, together with the environmental conservation of rural community and improvement of rural life environment will be planned.
Content	<ul style="list-style-type: none"> • Training for DIF promoter on the scout of rural leaders • Training for rural leaders • Formation of group for village environment development • Establishment of spontaneously problem solution system within communities
Method of Implementation	A study and seminar will be carried out for the training of DIF promoter, which will be carried out mainly by DIF with the cooperation of SEDESOL, COPLADE, SAG and SAGAR.
PRODUCERS' ORGANIZATION ACTIVATION PLAN	
Objective	In order to improve low farmer's consciousness for producers' organization and autonomous managerial awareness for its organization which brings about the main cause of inactivity in agricultural production, it will develop leader's capabilities of the existing producers' organization and change the member's consciousness. Also, the activation and reorganization of the existing organization will be planned. The existing organization will be reorganized by giving the function of credit, technical support, supply of farm input, marketing of farm products, and perform the activation through effective management of the organization, contributing to a profitable agricultural and livestock production.
Content	<ul style="list-style-type: none"> • Training for the capabilities development of producer organization's leaders • Group formation aiming to the change of member's consciousness • Reorganization of the existing organization
Method of Implementation	The training courses will be done through seminars, studies and combined with the observation of advanced organizations and carried out mainly by SAGAR, with the cooperation of related authorities such as UNACH and ECOSUR.
PRODUCERS' ORGANIZATION PROMOTION PLAN	
Objective	The formation of associations amongst ejidatarios and small property owners will be promoted since they are characterized by low interest and low enthusiasm to form into associations, the deficiency in cooperative awareness will be organized, making possible a closer connection with the outer system (public administration and markets).
Content	At the implementation stage of this subprogram, participation to the organization will call out to unorganized farmers. The farmers who make a stand against participating with the existing organization will be promoted on the next stage to form group organization of farmers at village level.
Method of Implementation	Agricultural staff and DIF promoter of the municipality with the collaboration of DIF promoters will be in charge of the promotion to form producers associations; and will provide services as consultants for management and guidance after being organized.
RURAL WOMEN ORGANIZATION PROMOTION PLAN	
Objective	The organization of rural women will be carried out to provide women's empowerment for rural development and conservation of rural life environment as a foundation of rural society. Furthermore, the elevation of education level of rural women in the traditional male-dominated society in the region and the generation of participating opportunity to rural society will be performed, planning for the improvement of their social status.
Content	<ul style="list-style-type: none"> • Organization of women: family of a member of an existing productive organization • Organization of women: family of non-organized farmers, etc.
Method of Implementation	The organization of women will be carried out under the orientation of agricultural personnel and DIF promoter of the municipality with the cooperation of SAGAR and FIRA

VOCATIONAL EDUCATION STRENGTHENING PLAN OF AGRICULTURE AND LIVESTOCK	
Objective	In order to nurture the human resources of agricultural and livestock development, basic educational facilities and equipment of technical secondary and high schools of agriculture and livestock, as the basic and secondary vocational educational institutions, will be provided. By increasing agricultural production in the practical farm, utilizing the facilities and equipment provided, these schools will plan to improve the educational level through rearrangement and expansion of educational facilities and equipment spending the proceeds of farm products efficiently. In addition, due to making education substantial, improvement of teacher's qualification will be planned.
Content	<ul style="list-style-type: none"> • Strengthening of the facilities and equipment for technical secondary schools of agriculture and livestock • Strengthening of the facilities and equipment for technical high schools of agriculture and livestock
Method of Implementation	The Secretariat of Education from the federal government, will prepare the program to supply and maintain the schools, for each one of the high schools, taking into consideration the characteristics of each region. The training for improvement of teacher's training will be carried out with the cooperation of UNACH, Huchuetán campus, and INIFAP.

4.3.2 Strengthening of Agriculture and Livestock Production System

PROJECT FOR STRENGTHENING OF INVESTIGATION FOR CROPS DIVERSIFICATION AND DIVERSIFIED FARMING SYSTEM	
Objective	Facilitate research and technology development on crop diversification through the supply of equipment and necessary material for research.
Content	<ul style="list-style-type: none"> • Research on temperate fruit trees into the mountainous area. • Studies on rice cultivation at poor drainage soils.
Method of Implementation	since INIFAP (Rosario Izapa experimental unit) has many achievements on improved varieties of coffee, cacao, and beans, and in the development of new cultivation techniques, INIFAP will carry out the research and development mentioned in this project, with the support from SAGAR and SAG.
PROJECT FOR CROP DIVERSIFICATION AND MIXED FARMING SYSTEM	
Objective	This project aims to strengthen the small-scale farming by crop diversification and mixed farming system, which is based on the various agro-environmental condition, instead of single and unstable monocultivation system.
Content	Farmers group (producers' association), will be organized in order to send their crop in large volume, pack agricultural products jointly through a commercialization channel fixed without intermediaries and reduce the cost of production by purchasing inputs together and establishing farming practices in group.
Method of Implementation	Crops mentioned above would be planted at each farmer's field and small or medium animals will be raised in each farmer's garden. But collection and shipment will be carried out by group work so it gets to the market for sale. Since it requires farming fund and agricultural technical assistance to introduce new crops and livestock, municipality will give indirect aid to the farmers.
PROMOTION OF SUSTAINABLE AGRICULTURE	
Objective	For a sustainable agriculture it requires the introduction of protection works against erosion, keeping soil fertility and promoting sustainable agriculture.
Content	<ul style="list-style-type: none"> • Introduction of works against erosion agents (terrace and stopping of erosion) • Introduction of agronomic methods against erosion (introduction of vegetal covers, minimum farming, etc.) • Introduction of sustainable agriculture (organic matter, milpa, etc.) • Demonstrative fields for the introduction of works against erosion agents, agronomical methods and sustainable agriculture

	<ul style="list-style-type: none"> • Introduction of domestic animal husbandry for the production of organic matter
Method of Implementation	The present implementation will be realized by supplying agricultural loans for each farmer, except the demonstration fields, which will be implemented depending of public funds. The farmers will participate in the operation and maintenance of the demonstration field and will be responsible for their agricultural development. The role of the government agencies will be to provide technical assistance, amongst other things.
PROMOTION FOR UTILIZATION OF NATURAL RESOURCES	
Objective	The production in harmony with the environment will contribute to a sustainable increase of production and living conditions, therefore the combination of an efficient use of resources together with environmental education must be done.
Content	<ul style="list-style-type: none"> • Promotion of the use of fishery resources at blackish water • Promotion of alternative crops and the introduction for traditional ones • Promotion of native animal breeding • Promotion of education on environment-oriented agriculture • Creation of environmental education center
Method of Implementation	The majority of the subprograms contemplated here are of public interest and therefore, their execution will be carried out within the framework of public finances, except for its operation and maintenance, which will be carried out by the farmers.
PROJECT FOR STRENGTHENING AGRICULTURAL EXTENSION SERVICE	
Objective	This subprogram will consolidate the basis for the strengthening between public agencies in charge of extension services and producers.
Content	<ul style="list-style-type: none"> • To assign agricultural engineers to the municipalities to coordinate services for agricultural extension services to be provided by government agencies to the farmers • Provide adequate equipment, vehicles and material to be used for extension services of CADER and PEAT
Method of Implementation	Each municipality will be responsible for financing the assignation for the agricultural engineers
STRENGTHENING OF THE LIVESTOCK TECHNOLOGY	
Objective	Establish the appropriate programs for disease control and carry out research on the proper breeding systems for the region through the consolidation of federal laboratories and producers.
Content	<ul style="list-style-type: none"> • Strengthening of federal Laboratory for Animal Disease research in Mapastepec. • Strengthening the experimental field for veterinary in UNACH, Campus Huehuetán.
Method of Implementation	The present program will be developed by SAGAR utilizing federal budget and on the other hand, the UNACH will utilize it's own budget to carry out research.
STRENGTHENING OF THE RURAL FINANCE SYSTEM	
Objective	Facilitate the access to agricultural credits, specially for low income farmers through programs out of the ordinary from FIRA and to widen the coverage for agricultural credit by creating a trust fund especially to be managed by state government.
Content	<ul style="list-style-type: none"> • Facilitate the access through existing non conventional channels (PROCREA for FIRA, Programa de Credito con Garantia PROCAMPO, Programa Especial Para Beneficiarios De La Alianza Para El Campo • Establishment of new funds of financing for the ones excluded from the banking system (Establishing State funds for rural development and a financial entity of micro-credit and creating a State fund for sustainable agriculture projects)
Method of Implementation	The improvement of access to the existing credits must be carried out by FIRA, BANRURAL, SAGAR, SAG and other concerned organisms. On the other hand, funds for agricultural development and environmental improvement must be created by settling a Development Credit Promotion Division in the state government. This division will be responsible for the preparation of the fund, distribution of credit, technical advice for credit management, credit guarantee for farmers and information concerning credit to the farmers. The micro-credit will be supplied directly to the farmers, but the agricultural development fund and the special credit for agriculture and environment will be supplied having an agent between the bank and the farmer.
GIS IMPROVEMENT PLAN	
Objective	The GIS System puts in order information and collected data to be processed and used, regarding the Soconusco region making it possible to be shared amongst the interested institutions.

Content	The basic information of GIS will be compiled in the present study. But, information renovation must be carried by each organism in the future. The information management organism, according to the level and know-how, can be the ECOSUR University.
Method of Implementation	Achieve compatibility of data and information through the preparation of data and basic information and to renovate them. The renovation will be carried out by the participation of the linked public offices.

4.3.3 Agricultural and Rural Infrastructure Improvement

IRRIGATION PROJECT	
Objective	To improve or construct the irrigation facilities for an efficient farm usage by increasing the actual irrigation area in small-scale irrigation units. It will be done by shallow wells for an effective land use in the coastal area and will construct small reservoirs in the suitable area for small reservoirs.
Content	The target facilities of the project are 49 irrigation units (9,350 ha of surface) but are not completely utilized, also the improvement or construction of irrigation diversion weirs, pumping stations and deep wells will be carried out. At the same time, improvement of irrigation systems with diversion weirs, pumping stations and irrigation project for small-scale area in the coast is being planned.
Method of Implementation	For the planning and implementation of the project, water users associations or individual farmers will work as the executing body under the support and inspection of State Government and use of local consultants and contractors.
DRAINAGE IMPROVEMENT PROJECT	
Objective	The drainage improvement will eliminate the inundation damages, increasing productivity and reduce the disaster caused by flooding.
Content	To carry out the construction of secondary and smaller drains connecting to the existing main one without changing of affecting the basin.
Method of Implementation	The present project is being implemented by the Chiapas Coastal Area Water Management Works, but it would be desirable if CNA continued it.
ROAD IMPROVEMENT PROJECT	
Objective	The improvement of rural roads and reinforcement of the road maintenance machinery will contribute to increase the agricultural production and improve the living conditions of the inhabitants.
Content	<ul style="list-style-type: none"> • Improvement of rural road • Reinforcement of road maintenance machinery
Method of Implementation	The road improvement will be realized by the present responsible organization without substantial changes, but increasing the efficiency of its activities. It is reasonable that the CEC will be responsible for the improvement of the asphalt roads, and the SCT and CNA for the remaining ones.
IMPROVEMENT PROJECT OF RURAL WATER SUPPLY	
Objective	The installation of water supply facilities is required for the improvement of the water supply conditions in order to increase the living conditions of the inhabitants who are drinking contaminated water from the rivers.
Content	The target communities for this project are those without water supply, more than 100 inhabitants. The house connection system utilizing deep well is proposed for those communities. In this system, the groundwater is pumped up from deep wells by submersible pumps. The water is then stored in an elevated tank and distributed through pipelines to individual houses. This water supply system is an independent water supply system to be operated and maintained by each community. So, new organizations for operation and maintenance will be established for each system. Those new organizations will be under the responsibility of each municipality.
Method of Implementation	Each respective municipality will work as the executing organization under the support and inspection of State Government and the use of local consultants and contractors.

4.3.4 Marketing System Improvement and Processing Sector Promotion

IMPROVEMENT OF THE MARKETING ROUTE	
Objective	In order to attend the expansion of agricultural and livestock products due to the diversification of crops and to the increase of productivity, it is necessary to establish a regional supply center for the agricultural products, so the farmer can easily access the wholesale markets.
Content	Establishment of a wholesale market: (In order for the products to arrive to the market, a regional wholesale market should be established, together with the direct integration of the population and the farmers). Since this center would have such an important role as a wholesale market, it would be best if it were set in Tapachula City, since this is considered as the center of the region. Formation of a market information center: (This center will be created to facilitate the acquisition of regional information allowing the producers to know with more precision the market variations and selling the products for the best price).
Method of Implementation	Tapachula municipality will be responsible for the establishment of a Supply Center and SAG will be in charge of creating the Information Center
PARTICIPATION OF SMALL FARMERS IN THE MARKET	
Objective	The monocultivation system is common between small farmers, and the productivity is very low. Also, there is a lack of suitable transportation ways, hence the products are sold to brokers who buys for lower prices. To avoid these problems, associations of small farmers must be formed for joint productions. A processing installation also can be established to elevate the value of the products. With the mixed and diversified production, the small farmers will facilitate the direct participation in the market increasing their profits.
Content	<ul style="list-style-type: none"> • Construction of small scale humid coffee processing units for small farmers • Renovation of the existing obsolete humid coffee processing units • Installation of coffee bean drying unit
IMPROVEMENT OF THE EXISTING SLAUGHTERHOUSES	
Objective	For a secure and hygienic distribution of meat, the inspection structure before slaughter, improvement of the existing slaughterhouses, construction of new ones and swine and sheep processing units must be strengthened. Also, the management should be improved at the slaughterhouses to secure hygienic meat, so as to promote its consumption and increase farmers profit.
Content	<ul style="list-style-type: none"> • Rehabilitation of existing slaughterhouses and support installations according to national norms and requirements of design and hygiene. • Supply equipment, implements and materials for the renovation of slaughterhouses /abattoirs such as depilatory machine, blood treatment facilities, derivatives and waste treatment facilities, incinerators, scales, simple disease diagnosis equipment, etc. to secure hygienic meat. Also, proper waste disposal must be carried out. • Improve the management and function of slaughterhouses/abattoirs in order to provide a better service to the public and to produce a better quality and healthier meat. Wastes from the slaughtering process should be treated.
Method of Implementation	The municipalities, owners of the respective slaughter houses/abattoirs will be responsible for the implementation of this project.
PROMOTION OF AGRICULTURAL PROCESSING SECTOR	
Objective	Promote the development of agroindustry by awarding support services to businesses who are interested.
Content	<ul style="list-style-type: none"> • State fund for the agribusiness promotion • Promotion of the agro-product processing sector in the region, participating as stockholder in firms at the beginning. • Support small and medium industry through low interest financing for the purchase of machinery, equipment and capital. • Assist with financing agricultural and livestock companies who want to increase their productivity adding quality to their productive processes through technology improvement and training of human resources. • Budget for Preliminary Studies for Pre-investment • Promote studies on economical, financial and technical aspects to enable the development

	<p>of the agro-products processing sector utilizing the regional natural resources in a wide range;</p> <ul style="list-style-type: none"> Finance studies of technical, economical and financial feasibility upon request of growers associations in Soconusco region or upon request of some organism from the State government.
Method of Implementation	SDE will be responsible for the implementation of the project

4.3.5 Alleviation of Environmental Degradation

MEASURES AGAINST DEFORESTATION	
Objective	Many conservation programs are ongoing such as Forestry reserve conservation, increase of forestry areas, conservation of existing flora and diversities, production of hardwoods through forestry and these are being achieved by fighting erosion by forestry actions, natural resource conservation, increase in soil fertility, giving a profitable activity to the farmers located in land not apt for agricultural production and increasing regional economy.
Content	<ul style="list-style-type: none"> Stimulation of small scale forestry Measures against fire Agro-forestry activities and forestry Stimulation for the introduction of environmentally friendly coffee (Stimulation for the utilization of native trees for shadows)
Method of Implementation	The present program has profitable and conservation characteristics. The profitability will be achieved by agricultural credits for the farmers and the conservation by the assistance of the government.
WATER POLLUTION CONTROL	
Objective	Improvement of the quality of water in the urban system and in the lower section of the river basins.
Content	<ul style="list-style-type: none"> Improvement of waste water in rural zones Measures against contamination of water caused by industrial water Monitoring of the water contamination sources coming from agricultural activities Monitoring of the water contamination sources coming from agricultural and industrial activities Stimulation for the minimum use of agriculture inputs
Method of Implementation	Because of the nature of this program it will be carried out within the public expense.
MEASURES FOR THE ENVIRONMENTAL RESERVES	
Object	Achieve ecological conservation through the execution of the necessary measures for the protected natural areas.
Content	<ul style="list-style-type: none"> Enlargement of the environmental protected areas Signaling of ways in the Environmental protected Areas Monitoring strengthening Promotion of forest conservation
Method of Implementation	The program will be executed as public works.
STRENGTHENING OF ENVIRONMENTAL INSTITUTIONS	
Objective	Increase the quality of ecosystems, strengthening the institutions in charge of environmental preservation actions.
Content	<ul style="list-style-type: none"> Opening of offices and control posts of IHA and INE Environmental studies and data arranging Establishment of trustfunds
Method of Implementation	The trust shall be established in order to guarantee the preservation activities. Public funds will be used for this.
PROJECT OF DISASTER PREVENTION MONITORING STRENGTHEN	
Objective	To plan for disaster prevention measures it is required to reinforce the monitoring system of

	basic data.
Content	Establish a disaster prevention center for the management, data collection and periodic measurements of rainfall, river discharges, water level, sand sediments, etc, as to create a database.
Method of Implementation	The present plan is to strengthen the CNA hydrological measurement structure. So, the responsible organism must be the CNA and a CNA disaster prevention center must be settled in Tapachula.
PROJECT OF DISASTER PREVENTION AND ENVIRONMENTAL CONSERVATION IN NOVILLERO RIVER	
Objective	Establish emergency measures against river disasters with the execution of a feasibility study.
Content	The present project can be divided in sand/earth disaster survey in the upstream and flood control survey in downstream covering an area is the 409 km ² .
Method of Implementation	The feasibility study will be carried out by a multilateral organism or by the government of an industrialized country under technical cooperation program.

5. IMPLEMENTATION PROGRAM AND PROJECT COST

5.1 *Estimated Project Cost*

In order to establish the programs from the Master Plan it requires an investment 48,185 million Pesos, which is broken down by sector program in the following manner.

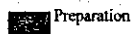
Sector Program	Investment per term (\$1,000 pesos)			
	Short	Medium	Long	Total
Invigoration of Rural Society	12,465	715	1,420	14,600
Strengthening of Agriculture and Livestock Production System	1,208,621	1,098,823	26,570,414	28,877,858
Agricultural and Rural Infrastructure Development	1,666,447	1,828,628	6,025,351	9,520,426
Improvement of Marketing System	571,971	0	0	571,971
Alleviation of Environmental Degradation	4,981,652	2,187,538	2,031,350	9,220,540
Total	8,441,156	5,115,704	34,628,535	48,185,395

5.2 *Program Of Implementation*

The program for the execution of the Master Plan is shown in the following page.

Program/Project	Short Term					Middle Term					Long Term										After	
	2000	2001	2002	203	2004	2006	2006	2007	2008	2009	2010	2011	2012	2013	2014	2016	2016	2017	2018	2019		2020
General Project																						
1 Invigoration of Rural Society																						
Rural Organization Activation																						
Producer's Association Activation																						
Producer's Association Promotion																						
Rural Women's Promotion																						
Vocational Training																						
2 Agriculture and Livestock Sector Strengthening																						
Strengthening of Crop Diversification and Mixed Farming																						
Farming Diversification																						
Promotion of Sustainable Agriculture																						
Promotion of Utilization of Natural Resources																						
Strengthening of Agricultural Extension and Services																						
Strengthening of Supporting System for Cattle Breeding																						
Rural Finance Strengthening Plan																						
GIS																						
3 Agricultural and Rural Infrastructure Development																						
Irrigation Improvement																						
Drainage Improvement																						
Road Improvement																						
Rural Water Supply Improvement																						
4 Marketing System Improvement																						
Marketing System Improvement																						
Introduction of Small Farmers to the Agroindustry																						
Improvement of Slaughterhouse																						
Agroindustry Promotion																						
5 Environmental Conservation																						
Measure Against Forest Resources Deterioration																						
Water Contamination Control																						
Environmental Protection Area																						
Strengthening of Environmental Institutions																						
Strengthening of Disaster Monitoring																						
Study for Environmental Protection in Navillero river																						

Legend



Project Execution Schedule

5.3 Implementation Schedule

5.3.1 Proposal for execution

The programs/projects are classified into public sector initiatives and private sector initiatives, judging from their components. The programs/projects from the private sector initiative, will be further divided into two categories according to their financial source: those implemented with direct investment from the beneficiaries and those implemented with loans from the public sector. The public sector-initiative projects/programs, on the other hand, comprises two categories: those implemented with public finance but their operation and maintenance is transferred to beneficiaries (Quasi-public sector-initiative) and those with genuine nature of public works (Public sector-initiative).

Due to limited availability of financial resources from the federal and state governments to be earmarked for implementation of projects/programs contemplated in the Master Plan, it is proposed in principle to put these programs/projects into implementation under private sector-initiative, with an arrangement to be made for procurement of necessary funds. By contrast, public sector-initiative projects/programs shall be those which are considered to be difficult to attract participation of beneficiaries for capital investment.

5.3.2 Implementation of Private Sector-initiative Programs/Projects

As cited before, private sector-initiative programs/projects are deemed to be implemented with own fund of the proposed beneficiaries or through financial assistance rendered by banking institutions.

Taking into account the present situation of the region's farmers, especially the producers of level of subsistence, financial assistance plays an important role to facilitate the execution of the programs/projects for the Master Plan. The following is a proposal to reinforce rural financing:

1. Improvement of the access to FIRA's credit
2. Establishment of Micro-Credit System
3. Creation of Environmental-oriented New Credit Fund

The role of federal and state governments are to undertake necessary agreements and coordination for making agricultural and livestock production of the region more sustainable; specifically, to subsidize interest for rural finance, to support farmers in the acquisition of credit, promotion for rural organization, strengthening of technical extension services, monitoring of environmental conservation activities, etc.

5.3.3 Execution of programs/projects by quasi public initiative

The programs/projects in this category do not foresee construction of public works but will be executed in response of social needs. Since the proposed direct beneficiaries are limited to a small number of producers, an exceptional agreement is required for this planning stage. The execution should cover the following steps:

1. Planning of the installations
2. Previous arrangement and coordination for the acquisition of financial resources
3. Detailed planning and final design of construction works
4. Construction of civil works and acquisition of materials and equipment

5. Execution of programs/projects
6. Transference of finished works to the beneficiaries

5.3.4 Execution of programs/projects for public initiative

This category of programs/projects should be executed through a budget agreement of the government for public investment and the following terms should be taken:

1. Arrangement of procurement of financial resources for projects
2. Detailed planning and final design of construction works
3. Construction of civil works and acquisition of materials and equipment
4. Implementation of projects

Before the programs/projects are started, it is proposed to acquire the necessary resources from the federal and state governments from public investment programs, as well as a loan from a foreign country (countries) or international banking institutions.

5.3.5 Implementing Organization

Various spheres are envisaged as the components of programs/projects and these may be integrated in three major categories: infrastructure development, encouragement and promotion for beneficiaries' participation and consolidation for strengthening of technical extension services. On the other hand, according with the project's scale and technical sophistication, they may be categorized into two groups: those to be implemented under the sponsorship of the state and federal governments and those to be implemented under the initiative of beneficiaries with a support to be rendered by municipal government.

5.4 *Evaluation of the Project*

The present Master Plan consists of five programs: 1) Amelioration of rural society, 2) Strengthening of institutional supporting services, 3) Development of agricultural and rural infrastructure, 4) Marketing system improvement, and 5) Deceleration of environmental degradation.

Economic Benefits

- Increase in farm income due to diversification and intensification of cropping activities
- Operation of profits and agroindustry and marketing activities
- Elimination of decrease in production owing to soil conservation and sustainable farming practice
- Cost reduction to be realized in relation with environmental conservation farming system
- Alleviation of post-harvest loss due to improvement of marketing system
- Cost saving and reduction of products' damage in the process of transport as a consequence of development of road network

Social Benefits

- Generation of job opportunity resulting from an expansion of farming activities and development of marketing and agroindustrial activities
- Invigoration of rural society's activities with promotion of rural organizations
- Enhancement of institutional supporting services (extension services, rural finance, etc.) to

farmers

- Decrease of epidemics owing to improvement of water quality
- Deceleration of environmental degradation
- Protection of biodiversity
- Rise in consciousness of regional population in terms of environmental conservation

Secondary synergy effects

- Increase in crops and livestock production as well as elevated quality of these products to be stemmed from strengthening of institutional supporting services
- Invigoration of regional economic activities
- Expansion of agricultural exports and decrease in imports of grains
- Upgrading environmental circumstances of the region

Bringing about the above-mentioned benefits and effects, the implementation of agriculture, livestock and rural development is anticipated to lead to expansion of agricultural products and upgrading of these product, which, in turn, will contribute to the expansion of marketing services of agro-products and development of agroindustry. In sum, the project shall give the regional economy an impetus to getting rid of the prevailing blockade. In particular, the social impact of the project shall be significant because the major target beneficiaries of the development plan is small and marginal farmers represented by *ejidatarios* who are socio-economically handicapped at present. In addition, a number of measures relevant to basis environmental conservation shall serve establishment of basis for promoting environmental improvement of the region, and putting into force of environment-oriented and organic farming shall become catalyst for making natural resources of the region sustainable so that some generations in the future could also make use of them.

5.5 Evaluation of Initial Environmental Impact

In an implementation of the Master Plan, the sector, which will have environmental impact, is the part of agriculture and rural infrastructure improvement. In a Planning of the mentioned sector, the consideration to the environmental aspect is necessary. In following Table, the result of the examination is shown.

	Socio Economic Issues	Public Health	Cultural Property Issues	Biological and Ecological Issues	Soil and Land Resources	Hydrology, Air and Water Quality
Invigoration of Rural Society	Positive Impact	-	-	-	-	-
Strengthening of Agriculture and Livestock Production System	Positive Impact	-	-	-	Positive Impact	-
Agriculture and Rural Infrastructure Development	Possible Impact	Possible Impact	Possible Impact	Possible Impact	Positive Impact	Possible Impact
Improvement of Marketing System	Possible Impact	-	-	-	Positive Impact	-
Alleviation of Environmental Degradation	Positive Impact	Positive Impact	Positive Impact	Positive Impact	Positive Impact	Positive Impact

6: SELECTION OF PRIORITY PLANS

Although the short term programs/projects contemplated in the Master Plan are indispensable for Soconusco region for the achievement of a sustainable development of the agricultural and livestock sector and harmony with environmental conservation, the following 8 programs/projects have been identified as eligible taking into consideration the experience and ability in the execution of projects for the development of the public sector, budget availability for public financing, etc.

Programs/Projects	Profile
Rational use of natural resources	Promotion of rational use of the region's natural resources by introducing alternative crops to those traditionally being used, intensive use of water resources, etc.
Promotion for Sustainable Agriculture	Fight the soil resources degradation and as a consequence, achieve the practice of a more sustainable cropping thanks to the introduction of the agronomic method and engineering against erosion, motivation for a larger use of organic fertilizers and materials.
Strengthening of Extension Service	Strengthening of the technical assistance system and extension of farming technology, which are in process of becoming federal by being transferred from the SAGAR to the SAG with the purpose of increasing farm productivity among marginal and survival level producers.
Agricultural Diversification and Introduction of Mixed Farming Activities	Foreseen as to elevate the farm income level, to introduce alternated cropping in the coffee grounds, coca grounds and corn land, with crops such as commercial trees, flowers, cashew, as well as mixed livestock-farming activity.
Measures Against Deforestation	Promotion of small scale reforestation, prevention of forest fires, agroforestry, environmentally friendly coffee crops in order to recover the vegetal coverage in the mountain area.
Improvement of Access to the Rural Finance System	To ameliorate the bottleneck in the access to the rural financing system to help producers to start improvement of their farming system.
Promotion of Participation of Small Farmers in Agro-Industry	To make easier for the organized coffee and cocoa producers to create by own initiative, processing plants for their products.
Promotion for Formation of Farmers' Association	To promote the organization of coffee producers at the survival level by putting an emphasis in their leaders' training.

By analyzing the content of the programs/projects, it was concluded that these programs/projects are classified into two categories; one related to the increase in farm productivity and improvement of the quality of life among farmers engaging subsistence farming and the other in adequate management and conservation of the environment. In this context, the pre-feasibility study will be carried out regarding the following two plans which comprise the program/projects with similar contents and objectives:

Agricultural Productivity Improvement Plan for the Subsistence Farmers:

(Programs/Projects comprised: Strengthening of extension services, agricultural diversification and introduction of mixed farming activities, improvement of access to the rural finance system and promotion for participation of small farmers in agribusiness)

Environment-oriented Agricultural and Rural Development Plan:

(Programs/Projects comprised: Promotion for sustainable agriculture, measures against deforestation and promotion for utilization of natural resources)

7. COMPREHENSIVE PROJECT FOR THE IMPROVEMENT OF AGRICULTURAL AND LIVESTOCK PRODUCTIVITY OF LOW INCOME FARMERS

7.1 Objective of the Project

The objective of the project is to increase productivity and therefore achieve the improvement in the level of well being for low-income farmers without the requirement of a considerable investment. In order to achieve this objective, a variety of proposals are shown for agricultural diversification and the realization of agriculture combined with cattle raising so these farmers can improve their current situation. In this sense, more emphasis will be given to the formulation of a model scheme for field management both feasible and practical for its execution without confronting obstacles. Consequently, special attention will be provided so that low-income farmers can initiate the proposed plans immediately.

The most important component of the project will be to increase the productivity of the crops handled by low-income farmers in the subproject areas and in a complementary manner, it will propose to diversify the planting activity, introducing a combined agriculture with cattle raising of minor species that would serve as a model scheme which could be duplicated in other areas of similar agro-climatic and socioeconomic conditions. Since the development of an area cannot be reached with only one agronomic component, besides the agricultural and livestock development plan, the project will also undertake the following plans: hydro-agricultural development to improve agricultural yields; improvement of the commercialization system to facilitate the movement of agricultural and livestock products and the agroindustrial development; strengthen extension services as an effective link between public institutions and producers; improvement of the rural financing system to promote a better access of the producers to financial credit; and strengthen rural organization in order to enjoy the common benefits amongst those affiliated.

7.2 Selection of Pre-Feasibility Target Areas

(1) Selection of Target Crops

The selection of the target crops is done by taking into consideration the predominating planted surface, concentration of low income producers and high vulnerability to the change of external environment that requires an immediate measure to alleviate the negative effects and based on this, corn and coffee have been identified as the crops.

(2) Selection of the Development Area

In order to carry out the pre-feasibility study, the areas to be selected will have the following conditions so they have the best possibility of establishing crop diversification and combination with cattle raising.

- That a group of small farmers who understands and agrees with the plan objectives, and who have a great interest in improving their agriculture.
- That a majority of ejido producers and small-scale private farmers exists.
- That they have representative agro-climatological and socioeconomic conditions for growing corn and coffee.