

CORECA

REGIONAL COUNCIL FOR
AGRICULTURAL COOPERATION



GISA

INTER-INSTITUTIONAL GROUP
OF THE AGRICULTURAL SECTOR

FIRST AGRICULTURAL SECTOR MEETING OF THE CENTRAL AMERICAN
GOVERNMENTS WITH COOPERATING GOVERNMENTS AND INSTITUTIONS

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REGIONAL AGRO-ALIMENTARY
PROGRAM

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PEC/A8/91/3
PROJECT CAM/90/002
SPECIAL PLAN OF ECONOMIC COOPERATION
FOR CENTRAL AMERICA

The technical information for the First Agricultural Sector Meeting is presented in ten documents to facilitate reading by cooperating governments and institutions. The documents are:

Executive Summary

Importance of the Agricultural Sector.
Technical and Financial Assistance.
Summary of Project Profiles.

Documents 1 to 10 describe the eight regional programs on topics selected as being of priority by the Central American governments. The Programs are:

- PEC/AS/91/3: Regional Agro-alimentary Program.
- PEC/AS/91/4: Program on Irrigation, Drainage and Land Leveling.
- PEC/AS/91/5: Program on the Development of Biotechnology.
- PEC/AS/91/6: Program on Intra-regional Trade and Exports to Third Countries.
- PEC/AS/91/7: Program on Agroindustrial Development.
- PEC/AS/91/8: Program to Strengthen Plant and Animal Health Services.
- PEC/AS/91/9: Program on the Development of Border Areas.
- PEC/AS/91/10: Program to Strengthen Rural Enterprises.

Each Program consists of two components: one of regional scope and the other of national scope. The regional component involves cooperative projects and actions among the countries of the Isthmus, while the national component is made up of the investment projects to be carried out in individual countries.



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INTRODUCTION

This Regional Program contains a proposal for organizing support for the execution of a portfolio of six investment project profiles, selected by the Central American countries to increase their agroalimentary production. The support will be provided by regional organizations, which will contribute to ensuring greater efficiency and economy in the use of the investment resources obtained; this will be to the direct advantage of the national economies, in their efforts to achieve higher levels of food security.

The Regional Program is based on investment projects that are of interest to the countries; it also involves a series of joint actions for technical cooperation, through which regional organizations will complement national efforts. The Regional Program proposes a series of cooperation and integration mechanisms which will contribute to transferring the benefits between countries. Initially, these mechanisms will act on the selected projects to ensure a nationwide impact within each country; subsequently, they will facilitate the transfer of benefits generated by the new investment and technical cooperation resources for food security to all the member countries.

A Regional Food Security Committee is proposed which will be made up of top-level national officials – if it is accepted by the interested parties – who will coordinate the Regional Program. This Committee will have an executive secretary assigned to the Permanent Secretariat of the General Treaty on Central American Economic Integration (SIECA).

The national projects will be coordinated by National Food Security Committees, whose members will be representatives of the different sectors involved in that field. These National Committees will be linked to the Presidency of the Republic, they will be chaired by the vice presidents, and their secretaries will be high-ranking officials from the countries' planning systems.

The total cost of the Regional Program will be US\$150,650,300, with the countries' investment portfolio totaling US\$147,050,300, and the projects to be implemented by regional organizations, US\$3.6 million. These regional projects consist of nonrefundable technical cooperation projects. The Regional Program will be executed over a period of three years.

The Regional Program proposes a series of cooperation and integration mechanisms for agroalimentary development in the countries of the isthmus.

The Regional Program's national components will be coordinated by National Food Security Committees

I. FRAME OF REFERENCE

1. Macroeconomic Setting and Its Impact on the Regional Program

The capacity of the Central American countries to meet their peoples' food requirements has been seriously impaired. This problem stems from the crisis in agriculture which, in turn, is linked to the global economic crisis. The deepening of the economic crisis has compounded weaknesses in the economic performance of the region's most dynamic sectors, which are showing signs that they have exhausted their potential for growth. All these factors have aggravated the food-security situation in the isthmus.

Presently, the crisis is reflected in three ways: a stagnant job market; reduced purchasing power owing to inflationary pressures; and, the growing inability of campesino families to meet their food needs with their farm output.

Food-security management is based on the family shopping basket and national consumption patterns. To be successful, it should contribute to solving, in a satisfactory manner, problems related to instability of supply, shrinking demand, marketing distortions and inadequate biological use of foods, as well as important aspects of health, education and other services. It involves more than finding solutions at the sectoral level, as it entails managing a complex combination of social, financial, economic, technical and political forces.

Food-security management is not limited to government action alone, but involves private-sector organizations as well. The former draws up and implements comprehensive, permanent policies, and the latter ensures that these policies are managed efficiently, especially by the food-production sector and the food industry.

In the Central American isthmus, large sections of the population live in a situation described as chronic food insecurity, that is to say, millions of people are unable to meet their food needs. As a result, they are malnourished and suffer from protein-energy deficiencies, severe shortages of specific nutrients such as vitamin A and iron, and other problems. This has grave implications for high-risk population groups such as children, nursing and pregnant mothers, displaced persons, refugees and other economically-disadvantaged groups.

Chronic food insecurity exists in vast sectors of Central America.

Estimates show that the production of basic foodstuffs (corn, beans, rice, sorghum and milk) has grown at a rate of only 2.8 percent in the last few years, while population has grown at a rate of 2.9 percent, reflecting a precarious situation in terms of locally-produced foodstuffs. Moreover, from the economic viewpoint, annual per-capita income has rapidly diminished as a result of inflation and economic recession in the most dynamic sectors.

The growing inability of campesino families to meet their food needs on the basis of farm output can be explained, in the first place, by the fact that small-scale farms producing basic grains, increase their production volumes at rates lower than family population growth. Thus, the portion of their output devoted to food production is ever less sufficient for meeting family food needs. Secondly, scarce job opportunities for supplementing family incomes, frequently obliges campesino families to sell part of their production -- even if this means they have still less to consume.

The countries of the region have been obliged to increase their food imports in the last few years, including foods obtained through food assistance programs. It is estimated that imported food in the countries represents between 30 and 70 percent of the food supply. This places the region, as a whole, in a highly-vulnerable position and also provokes domestic food market distortions and disincentives to producers, owing to the inflow of imports. Coordination mechanisms between the countries should be designed to improve the administration of food assistance to the region.

Large food import volumes place the region in a highly-vulnerable position.

This economic situation demonstrates the urgent need to foster efforts to achieve food security in the region. The proposition is feasible because of the great potential for increasing food production and the availability of technology for upgrading the food industry. Increasing food production and productivity over the short term is the indicated strategy to follow for attaining greater food security. It will become more permanent if it is combined with the development of a food industry offering low-cost products of high nutritional value in the countries.

2. Options for Agroalimentary Production and Development

The Regional Program is designed to be implemented on two levels: the first will involve production investments from the portfolio of projects; the second aims at solving the socioeconomic problems of food security. The first level will be executed in the individual countries, and consists of six investment projects for increasing food production. It is the Regional Program's production component and is the responsibility of the countries. Each project is described in more detail in the attached documents.

The six investment outlines attached to this Regional Program make up the production component, the aim of the regional component is to solve socioeconomic problems of food security.

The Regional Program's second level of execution will involve setting up a regional coordination mechanism on food security, to be called the Regional Food Security Committee, made up of senior national officials. This regional administrative body will focus on providing support to three specific objectives: the first is to ensure that the regional organizations' package of technical cooperation projects complements joint efforts by the countries to improve food security, and to support the execution of investment projects in production activities in the countries.

The second objective is to promote preinvestment projects in the Central American private sector, which stem directly from the need for capital goods and inputs set forth in the national project profiles. This will make it possible to plan common incentives for the industrial sector, which has the capacity, in the short and medium term, to provide the capital goods and inputs needed by the projects in the investment portfolio. The third objective is to establish coordination mechanisms between the countries in order to facilitate a transfer of the benefits generated, within the framework of the regional integration process.

Impetus will be given to multi-sectoral actions aimed at overcoming the problems of population groups lacking specific nutritional inputs

The ultimate purpose of these efforts at the supranational level, which includes execution of the technical cooperation and preinvestment projects, is to further multisectoral actions to solve the problems of population groups with specific nutritional needs and to attain good nutritional levels, particularly for low-income population groups. The regional component seeks to facilitate governmental solutions to socioeconomic food-security problems over the short and medium term.

The Regional Food Security Committee's operating strategy will concentrate, during the first stage, on achieving maximum efficiency in the implementation of the national projects and in the allocation of the new resources, with a view to channeling them toward specific project objectives and ensuring suitable distribution to the countries from the outset. This initial action will produce immediate benefits by reducing unnecessary expenditures and preventing a duplication of efforts by the private sector and government. It will also contribute to avoiding the repetition of errors, which causes delays and consumes considerable resources.

Special emphasis will be placed on serving low-income groups.

Regional management of food security requires immediate efforts on the part of national statistics systems to provide studies on the food security situation of different strata of the population and, subsequently, a schedule for harmonizing the nutritional statistics of the countries of the region. More attention should be given to the upgrading of the statistics systems of low-income and other high-risk population groups: the proposed study can contribute considerably to updating such information. During the first stage, it will be possible

to harmonize nutritional information on the population groups living in a situation of food insecurity.

With a view to complementing these efforts, and to maintaining the nutritional information up to date -- especially as concerns the sectors with the lowest food security -- it will be necessary to have a flow of updated information that can be used as a basis for setting prices periodically for farmers, and monitoring the inflationary trends caused by food prices on the Consumer Price Index in the main cities of the countries.

The Regional Program will foster the development of the countries' food industry, justified by the fact that boosting production in the food industry requires modern infrastructure for research and technology transfer to existing companies, and to potential private-sector investors. The development of the food industry will be geared to offering low-cost products of high nutritional value. A technology-transfer service will be set up for the food industry to provide support in the selection of equipment, modernization of technological processes, and lowering of installation and assembly costs for new companies supported by the Regional Program.

Agroindustrial development will be geared to offering low-cost products with a high nutritional value.

The Regional Program will carry out the necessary research and transfer services for identifying and drawing up projects and for supporting the establishment of companies that will mass produce food products of high nutritional value. These products will represent a significant contribution to improving the nutrition of low-income groups by reducing the price of the shopping basket and improving the family diet.

Food-security management requires that support be provided for food production companies and that general quality standards be applied when purchasing from producers and when marketing products, both domestically and on regional markets. At the regional level, the Program should provide direct support to the countries in adopting standard quality measures, and provide technical assistance for enforcing these standards in each of the countries.

Rigorous quality standards will be applied for purchasing products from farmers and for placing them on the domestic or regional markets.

The following investment projects make up the Regional Program's national component:

Country	Project
El Salvador	1. Full Reactivation of Dairy Activities
Guatemala	2. Support for the Development of Food Production in Agriculture
Honduras	3. Fostering Dairy Production and Processing 4. Agricultural Development in the Jamastran Valley and the Watersheds of the Patuca and Coco Rivers 5. Production of Bacterins against Hemorrhagic Septicemia and Symptomatic Anthrax
Nicaragua	6. Livestock Rehabilitation and Agroforestry Protection

Direct private-sector participation will give renewed impetus to regional agroalimentary development.

New initiatives undertaken through the Regional Program's technical cooperation and investment projects to integrate agricultural activities with a view to fostering improved food security, should include the following: greater direct private-sector participation; preparation of a portfolio of specific food-security projects targeting high-risk population groups; direct support from regional organizations; and, concentration of investments in areas having comparative advantages.

3. Socioeconomic Situation of the Potential Beneficiaries

The population growth rate of Central America is very high. At present, the population of Central America stands at more than 30 million people. If the current trend continues, the population will double every 25 years. In 25 years' time, three-quarters of the inhabitants of the isthmus will be living in urban areas; the median age will be 20.

The population of Central America will be hard-hit by serious food and nutrition problems, if the situation follows the present course. These problems are described below.

- There are high nutritional deprivation indexes (protein, carbohydrates); serious vitamin A, iodine and iron deficiencies.
- Child mortality rates in El Salvador, Guatemala, Honduras and Nicaragua are seven-times higher than in the United States. In Panama and Costa Rica those rates are 2.4- and 1.6-times higher than in the United States, respectively.
- Child mortality rates (ages 1 to 4) in El Salvador, Guatemala, Honduras and Nicaragua are 15- to 20-times higher than in the United States. In Panama and Costa Rica the rates are six- and 1.4-times higher than in the United States.
- Retarded growth in children under five years of age is common. In Guatemala the rate is over 50 percent, El Salvador and Honduras register an intermediate rate (25% to 35%), and Costa Rica has a low rate (5%). No data are available for Nicaragua and Panama. The prevalence of retarded growth in school-age children is high in Guatemala and

Population growth in Central America is very high; current food and nutrition problems may continue or worsen.

Honduras (37% and 40%), intermediate in Nicaragua and Panama (19% and 22%) and low in Costa Rica (11%).

Thirty-eight percent of the population (10.6 million people) live in extreme poverty, meaning they have only enough to cover food expenses. In general terms, these figures apply to the target population of the Regional Program's food security projects of national scope.

In Central America, 38 percent of the population live in extreme poverty.

4. Institutional Conditions

The many causes of regional food-security problems require action on the part of different sectors; they also demand a multi-sectoral approach for overcoming food and nutrition problems.

Efficient food-security management requires immediate establishment of the Regional Food Security Committee, made up of senior national officials and assigned to SIECA, for coordinating and systematizing all related activities.

It is also necessary to set up National Food Security Committees in which all pertinent sectors are represented and whose membership also includes macroeconomic and sectoral policy-makers involved with food security. These Committees will come under the Presidency of the Republic and will be chaired by the Vice President; they will follow up on actions under way and will propose specific food-security projects aiming to improve the food and nutrition situation of the low-income population. The priorities set, and the resources needed, will be approved by the National Committees prior to being submitted to funding agencies.

The following regional institutions are expected to participate in the regional component:

- Action Committee in Support of Economic and Social Development in Central America and Panama (CADESCA)
- INutrition Institute of Central America and Panama (INCAP)
- Inter-American Institute for Cooperation on Agriculture (IICA)
- Tropical Agriculture Research and Training Center (CATIE)

A number of regional institutions will play a key role in providing support to the countries. These include CADESCA, INCAP, IICA and CATIE.

5. Legal Framework

The legal antecedents considered in this Regional Program are the accords signed in Limon and San Jose, Costa Rica. The special Protocol on basic grains, highlighted the urgency for the region of the Coordinating Commission for Marketing and Price Stabilization, within the framework of regional integration. Another important antecedent is that of the accords on the supply of dairy products.

The regional food-security component requires the definition of a region-wide legal framework for operations, within the process of economic integration, in accordance with the guidelines established by the presidents in the Plan of Economic Action for Central America (PAECA).

6. The Program in the Context of Regional Integration

The Limon and San Jose Accords on basic grains and dairy products constitute important precedents for the isthmus as a whole.

Actions have been carried out in the Central American countries to boost the complementarity of food supply. The specific accords were those of Limon and San Jose concerning staple grains and dairy products. The countries have agreed to resume those common initiatives, updating them as well as complementing them with investments to foster food production and to provide funds to cover basic food-shortage emergencies. This will bring about greater food security, more autonomy at the domestic level, and make it possible to purchase food when it is in short supply.

The regional mechanism for food-security coordination will provide regional follow-up on technical cooperation projects. It will also coordinate joint efforts to give priority to the investments aimed at solving specific food-security problems. At the same time, it will promote the design and implementation of the facilities and incentives common to the new investment projects to increase food production.

The aim is to establish a regional food production structure that can fully respond to national interests.

This mechanism will contribute to changing food production growth patterns and productivity levels, and will support the establishment of a more efficient agricultural base that is more economical in the use of production and investment resources. It will foster a regional food-production structure which responds to national interests and which will build on that agricultural base, with the mechanisms of the integration process, to speed up the reactivation of the countries' agricultural sector, in order to improve food security in the region.

II. REGIONAL PROGRAM DESCRIPTION

1. Justification

The reasons justifying the projects of the Regional Program are:

- The region has excellent food-producing potential for attaining greater food security.
- The institutional capacity of the regional organizations to boost food production and to promote efficient use thereof is good.
- It encourages greater managerial efficiency and high returns from the investment portfolio to foster specialized production in the region.

There is great potential in the isthmus to produce food products. Properly organized, efforts will contribute to improving food security.

2. Objectives

General

- To propose solutions for the population at high risk with regard to food security
- To increase food production and productivity and to promote the efficient use of agricultural output
- To modernize the food industry in order to meet the food demands of low-income groups
- To promote regionalization and specialization of production in the countries, according to their comparative advantages

Specialized national production should be promoted to reflect comparative advantages.

Specific

- To establish a regional mechanism for food-security coordination to support national efforts
- To establish coordination mechanisms between two or more countries in order to support:
 - Increased production and productivity of basic grains
 - Rehabilitation of specialized dairy production
 - Expansion of research and technology-transfer services in order to modernize the food industry

- To study the possibility of establishing common financial mechanisms for expanding services for joint purchases of agricultural inputs, and to design a fund to finance purchases of products in times of food shortages, thereby contributing to food security
- To promote the establishment of region-wide, private-sector agricultural organizations

3. Strategy

The Regional Program strategy is structured on two levels: investment in the countries; and, coordination-execution of co-operation and integration projects that have a bearing on food security at the regional level.

The Regional Program's strategy will be carried out on two levels. The first concerns the investments described in the national project profiles. The second is related to the coordination and implementation, at the regional level, of the food security cooperation and integration projects.

The second level consists of five stages:

1. Design, organization and operation of the regional mechanism for food-security coordination

This will include the following:

- Technical consultation missions to the countries
- Technical proposal for the creation of the Regional Food Security Committee and the establishment and/or consolidation of national committees at the country level
- Initial operations of the Regional Committee

2. Implementation of the selected cooperation and integration projects

The principal actions will be as follows:

- Promote accords between two or more countries to establish consultation mechanisms related to similar projects
- Define follow-up and evaluation methods for the investment and technical cooperation projects

3. Management for executing the portfolio of projects

The main actions included are the following:

- Define the types of specialized technical assistance required for managing the different investment and food security projects of the regional component
- Support private-sector training for managers of the region's food industries

Agreements will be signed between two or more countries in order to establish the necessary consultation mechanisms.

4. Promotion and organization of the private agricultural sector at the country level

This will include the following:

- Promotion and/or consolidation of national producers' associations
- Organization of national seminars
- Provision of technical assistance to the organizations in order to improve management skills

Support will be provided for establishing national producers' associations.

5. Promotion and organization of the private sector at the regional level

The principal actions will include:

- Making an inventory of national private-sector organizations related to the portfolio of projects
- Promoting regional private-sector organizations by product line
- Organizing regional seminars among private-sector organizations
- Drawing up draft bylaws for regional private-sector organizations
- Designing and supporting exchanges of the associations' experiences and achievements through the publication of institutional bulletins

Better private-sector organization will also be promoted at the regional level by means of seminars and institutional publications.

4. Projects and Components

The Regional Program consists of nine technical cooperation projects:

Project 1

Regional Food Security Committee

This technical cooperation project envisages the following components:

a. *Design of the Regional Committee.* This includes carrying out technical consultation missions to the national authorities, preparing a technical proposal for the establishment of the Regional Committee and creating and/or strengthening national committees.

b. *Calling of a Regional Committee meeting.* The Program will call a regional food-security meeting to discuss and analyze the technical proposal.

c. *Administration and follow-up of Regional Committee actions.* This includes establishing an executive secretariat answerable to the

Regional Committee, to be assigned to the SIECA, and programming the initial actions of said secretariat, in accordance with the Regional Committee's mandates and accords.

Project 2

Managerial Information on Food Security

The managerial information system contained in the technical proposal envisages the following components:

Complete, up-to-date information will be available on the basic family shopping basket, as well as on the different aspects of food security as a whole.

- A data bank with information on supply and demand of products making up the different shopping baskets
- Updating production costs, as well as wholesale and retail prices at the farm level, with complete breakdowns of imported and locally-produced inputs and profit margins
- Full information on all aspects of family shopping baskets regarding nutrition, calories and proteins, by income level. Information on the overall cost of shopping baskets will also be provided, together with breakdowns of their components.
- Food-security management will have a complete quantitative data base on food-security projects being formulated, in the process of approval and being presented to funding agencies.

Initial actions will concentrate on:

1. Harmonization of food statistics on the target population. Specific tasks include:

- Diagnosis of the food-security situation of the target population
- Preparation of a proposal for harmonizing information on the food sector
- Strengthening of national statistical systems. This task includes drawing up a detailed technical proposal for a project profile entitled "Strengthening Statistical Information in the Central American Isthmus," prepared by SIECA.
- Regional technical meeting of statistical agencies to analyze and discuss proposals and specify the harmonization schedule to be followed in the countries

2. Strengthening of agrometeorological services in order to identify factors limiting food production, according to the peculiarities of the Central American region

This includes:

- Preparation of a detailed technical proposal for the Regional Agrometeorological Project (PRA 2) carried out by CATIE
- Calling of a regional technical meeting to analyze the final study
- Begin technical assistance to the countries in accordance with the technical proposal adopted.

Project 3

Research and Technology Transfer for the Food Industry

This has two components:

Component 1. Technological research

The technical proposal on food research will include promoting the cultivation and use by the food industry of corn and sorghum of high nutritional value, as well as beans.

A detailed proposal will be prepared and analyzed at a regional technical meeting to be attended by the countries. The profile of the proposal was prepared by the Nutrition Institute for Central America and Panama (INCAP).

Component 2. Technology transfer

In order to expand technology-transfer services for the food industry, actions will be taken to strengthen the Nutrition Institute for Central America and Panama (INCAP).

The technical proposal to strengthen these services will take into account:

- The study to determine the demand for technology transfer to the food industry on a regional scale. This study will be carried out with the participation of the pertinent national institutions.
- The inventory on the supply of technology-transfer services to the countries' food industries
- The establishment of the initial technical assistance actions to be taken to modernize the food industries in the countries, on the basis of the approved proposal

The Regional Program places special importance on all facets of research and technology transfer.

Project 4
Regional Quality Standards for Agroalimentary Products

This technical cooperation project includes two components, described below:

Regional quality standards will be established.

Component 1. Regional standards for basic grains and their byproducts

- Proposal to harmonize quality standards for the purchase of basic grains at the producer level
- Regional Technical Meeting on Basic Grains
- Establishment of technical assistance for the countries to assist them in enforcing the standards

Component 2. Regional standards on milk and dairy products

- Proposal to harmonize milk quality and hygiene standards for purchases at the farm level and at retail outlets for human consumption
- Regional Technical Meeting on Milk and Dairy Products
- Establishment of technical assistance for the countries to assist them in enforcing the standards

Project 5.
Reciprocal Technical Cooperation on Food Security

This technical cooperation project includes four components which, in turn, include the following actions:

Technical cooperation will include a training fund for representatives of the private sector.

Component 1. Fund for financing private-sector training at specialized centers

The initial actions are:

- Design of the Fund
- Organization and start-up of the Fund
- Agreements with specialized technological centers related to the food industry

Component 2. Advanced training scholarships for the private sector

- Master's degree scholarships. The Regional Program includes support to finance 20 scholarships.

Component 3. Short refresher courses

The actions provided for are:

- Short courses for private-sector technicians
- In-service training for private-sector technicians

Component 4. Meetings for agricultural private-sector executives

The initial actions provided for are:

- Design and organization of seminars
- Holding of the seminars
- Exchanges among the countries. The Regional Program will provide support to facilitate exchanges of highly-qualified technicians in the region.

Project 6

Harmonization of Investment Policies and Food Security Project Profiles

This technical cooperation project consists of two components:

Component 1. Harmonization of investment policies

The technical proposal to harmonize investment policies aims primarily to strengthen private-sector management skills in the execution of national projects.

Initial efforts toward harmonization will be:

- Drawing up a technical proposal that includes incentives for the private sector to expand and modernize infrastructure for storage of basic grains. The results expected are the elaboration of the proposal to harmonize legislation promoting these ends; discussion of that proposal at a regional technical meeting; and, technical assistance in two or more countries.
- Drawing up a technical proposal calling for incentives for the livestock-raising private sector to expand and modernize milk collection and storage equipment at the farm and milkshed levels. It would involve drawing up a proposal to harmonize legislation promoting these efforts; calling a regional technical meeting to discuss the proposal and approve a schedule to incorporate it into national legislation; and, technical assistance in two or more countries.
- Drawing up a detailed technical proposal for the Regional Program to Reorient Agricultural Credit (PRECA), designed by CADESCA; analyze said proposal at a regional technical meeting attended by the countries; and, subsequently, present it to cooperating agencies.

Private-sector management in the execution of the national investment projects will be strengthened.

A key aim of the Regional Program is to recover food security.

Component 2. Preparation of food-security project profiles

A portfolio of food-security projects will be submitted, aimed at:

- Encouraging families to consume recommended foods, in accordance with the calorie-protein content of the shopping basket
- Supplying vulnerable population groups with foods of high nutritional value
- Promoting school-breakfast campaigns
- Fostering campaigns on nutritional education

The initial actions contained in the Regional Program are:

- Drafting a guide for drawing up project profiles
- Drawing up project profiles
- Compiling a portfolio of project profiles to be submitted to assistance agencies
- Promoting the projects included in the portfolio

Project 7

Regional Agricultural Organizations of the Private Sector

This technical cooperation project includes the following two components:

Priority will be placed on Regional Program components aiming to strengthen the organizations of the private sector.

Component 1. Regional Dairy Farmers' Organization

The initial actions programmed are:

- Drawing up the proposal for the Regional Association
- Regional Technical Meeting of National Associations
- Organizing and holding of the Regional Congress of the Agricultural Private Sector
- Designing the Regional Association's institutional journal
- Writing and publishing the institutional journal

Component 2. Regional Basic Grains Producers' Organization

The actions programmed are:

- Drawing up the technical proposal
- Regional Technical Meeting of National Associations
- Organizing and holding the National Congress
- Designing the Regional Association's institutional journal
- Writing and publishing the institutional journal

Project 8***Expanding Services for Joint Purchases of Agricultural Inputs***

The Project includes the following actions:

- Studying the possibilities of expanding MULTIFER activities
- Regional Technical Meeting
- Approving the technical proposal

Project 9***Creation of a Food Security Fund***

This technical cooperation project will include the following initial actions:

- Technical consultation missions to the countries
- Drawing up the proposal
- Regional Technical Meeting
- Approving the technical proposal
- Preparing a funding request for a pilot fund to operate in one country of the region

The Food Security Fund will play a key role in the proposed activities

5. Goals

The goals of the regional component of the Program are:

Joint purchases of agricultural inputs by the six countries will result in considerable foreign-exchange savings.

Technical cooperation projects	Goals	
1. Regional Food Security Committee	Proposal	1
2. Managerial Information on Food Security	Proposal	1
-Strengthening of National Statistical Systems	Proposal	1
-Regional Agrometeorology Project	Proposal	1
3. Research and Technology Transfer for the Food Industry	Proposal	1
-Technical Research Services for the Food Industry	Proposal	1
-Technology Transfer Services for the Food Industry	Proposal	1
4. Reciprocal Technical Cooperation on Food Security		
-Fund to finance exchanges of specialized technicians	Proposal	1
-Scholarships for advanced training/private sector	Scholarships	12
-Short refresher courses	Courses	12
-Meetings of private-sector entrepreneurs	Meetings	3
-Intercambio de técnicos especializados	Técnicos	15
5. Regional Quality Standards for Agroalimentary Products		
-Regional standards on quality of basic grains	Standards	1
-Regional standards on quality of milk and dairy products	Standards	1
6. Harmonization of Investment Policies and Food Security		
-Agricultural private-sector incentives	Proposal	2
-Programs for reorienting agricultural credit	Proposal	1
-Food-security project profiles	Profiles	30
7. Regional Agricultural Organizations of the Private Sector		
-Regional Dairy Farmers' Organization	Proposal	1
-Regional Basic Grains Producers' Organization	Proposal	1
8. Expanding Services for Joint Purchases of Agricultural Inputs	Proposal	1
9. Food Security Fund	Proposal	1

6. Regional Program Beneficiaries

The target population of the specific actions of the regional component are, first and foremost, the region's low-income groups.

Different levels of poverty will be identified and classified according to nutritional requirements.

The different technical proposals to be drawn up under the regional component will deal, overall, with the poor sectors. Within this target population, different levels of poverty will be identified and classified according to the capacity to meet nutritional needs.

The population groups to be assessed among the beneficiaries of the regional component are:

- Families which -- even if their entire income were spent on food -- would be unable to cover the cost of the basic shopping basket, calculated at 1,600 calories a day.
- Families which -- even when spending their entire income on food -- are unable to satisfy their nutritional needs, calculated at 2,400 calories a day.
- Families which, even when spending only 60 percent of their incomes on food, are unable to fully satisfy their nutritional needs.

In this connection, the term "poverty deficit" is used, which means the resources that must be transferred to poor groups in order to overcome their situation of food insecurity.

The direct and indirect beneficiaries of the Regional Program's national component are:

Country	Direct	Indirect	Total
El Salvador	4 000	7 500	11 500
Guatemala	21 610	65 000	86 610
Honduras	2 120	7 000	9 120
	1 935	40 000	41 935
Nicaragua	2 000	6 000	8 000
Panama	500	1 000	1 500
Regional Program	32 165	126 500	158 665

Total beneficiaries (direct and indirect) of the Regional Program's national component is more than 150,000 people

III. ORGANIZATIONAL STRUCTURE

1. Executing Unit

The Regional Program will be coordinated by a Regional Food Security Committee made up of the countries' top-level officials. This Committee will have an executive secretary assigned to the Permanent Secretariat of the General Treaty on Central American Economic Integration (SIECA).

The Regional Food Security Committee will coordinate the actions of the Regional Program.

The national components will be coordinated by National Food Security Committees, made up of the different institutions related to food security. These national committees will be linked to the Presidency of the Republic and will be chaired by the vice presidents; the governments' senior planning authorities will serve as secretaries to the committees.

The regional organizations that provide support to the Regional Program will be invited to attend meetings of the Regional Food Security Committee, as permanent members.

It will be necessary to establish the National Food Security Committees, in which the sectors involved with food security will participate as permanent members. These Committees will be assigned to the Presidency of the Republic and chaired by the Vice President. They will follow up on actions under way and propose specific food security projects.

The executing unit of the Regional Committee will function as secretariat at regional meetings; it will follow up on actions with the aim of keeping abreast on Regional Program developments and preparing the technical proposals to be considered by the Program's regional component.

There will be close, ongoing links between the executing unit and SIECA, which is the technical organ of the economic integration mechanisms

The executing unit will serve as an instrument for implementing Regional Food Security Committee agreements and will act as the liaison with SIECA, which is the technical organ of the economic integration mechanisms. The executing unit will promote communication with the private sector, as well as with the countries providing assistance.

2. Plan of Action

The plan of action includes different activities that may be carried out simultaneously or in sequence. The most important of the Regional Program's technical cooperation actions, in its regional component, are set out below:

Plan of action

Project	Year		
	1	2	3
1. Regional Food Security Committee	■	■	■
2. Management Information on Food Security	■	■	
3. Research/Technology Transfer for Food Industry	■	■	
4. Regional Quality Standards	■		
5. Reciprocal Technical Cooperation	■	■	■
6. Harmonization Policies/Food Security Projects	■	■	■
7. Regional Private-Sector Organizations	■	■	■
8. Study on Joint Purchases Inputs	■		
9. Study on Food Security Fund	■		

3. Resources

The following resources should be budgeted to support the Regional Committee's executive unit:

Human resources

- Hiring of the director of the secretariat of the Regional Committee (2 years)
- Hiring of consultants to draw up technical proposals
- Hiring of consultants to provide specialized technical assistance for the regional component

Consultants will be hired to draw up technical proposals and to provide specialized technical assistance.

Equipment

- Computer equipment, programs and materials.

Bibliographical material, journals, publications

- Publications and printed matter

Logistic support provided by participating institutions

4. Participating Institutions

The Regional Program requires the participation of each country's national planning institutions. The national counterpart will act as the executing unit of the National Food Security Committees, and its participation will ensure the success of the technical cooperation projects in that area.

In order to facilitate execution of national investments, the ministries of agriculture will play an important role in following up on national projects in the portfolio of production investments.

The ministries of agriculture will play a key role in the follow up of national projects, working closely with the private sector

Regional organizations to be involved in executing the technical cooperation projects are the Action Committee for Economic and Social Development in Central America and Panama (CADESCA), the Nutrition Institute of Central America and Panama (INCAP), the Inter-American Institute for Cooperation on Agriculture (IICA), and the Tropical Agriculture Research and Training Center (CATIE).

These organizations will participate in the Regional Program as follows:

- Action Committee for Economic and Social Development in Central America and Panama (CADESCA). The Regional Program accepts the two proposals submitted as profiles, and will assign funds to develop them into a feasibility-level

technical proposal suitable for presentation to funding agencies. Following is a brief description of the two:

- Strengthening statistical systems in the Central American isthmus. Target institutions are the national statistical organizations of the countries; actions will be carried out by SIECA.
 - Program to reorient agricultural credit. This profile considers the participation of the countries' agricultural development banks.
- Nutrition Institute of Central America and Panama (INCAP). The Regional Program includes the following two proposals:
- Strengthening technological research into food of high nutritional value, suitable for mass consumption, for processing by the food industry (corn, sorghum, beans)
 - Expanding technology-transfer services for modernizing the food industry, with special emphasis on companies that produce enriched foods for the low-income populations
- Tropical Agriculture Research and Training Center. The Regional Program covers a profile of a proposal to strengthen agrometeorology information services. The proposal to be drawn up will concern stage two of the PRA 1 Project, already under way at CATIE.
- Inter-American Institute for Cooperation on Agriculture (IICA). The Regional Program contains a technical cooperation project for harmonizing policies among the countries with an eye to fostering agroalimentary development. This project will be directed and coordinated by IICA.

It should be emphasized that the nature of the participation of these institutions will be more clearly specified during the process of negotiation with the cooperating governments and institutions interested in supporting this Regional Program, and will take into consideration existing cooperative ties.

IV. COSTS AND FINANCING

1. Costs

The cost of the proposed Regional Program is US\$152,650,300.

Level		Amount (US\$ X 000)
1. Country Project		147 050.3
El Salvador	Full Reactivation of Dairy Activities	27 850.5
Guatemala	Support for the Development of Food Production in Agriculture	14 377.0
Honduras	Fostering Dairy Production and Processing	36 015.2
	Agricultural Development in the Jamastran Valley and the Watersheds of the Patuca and Coco Rivers	16 779.7
	Production of Bacterins against Hemorrhagic Septicemia and Symptomatic Anthrax	1 034.4
Nicaragua	Livestock Rehabilitation and Agroforestry Protection	50 993.5
2. Food Security Technical Cooperation and Integration		3 600.0
Regional Program (1+2)		150 650.3

Cost of the Regional Program:
US\$ 150,650,300

The cost of the Technical Cooperation Projects to Support Agroallimentary Development totals US\$3.6 million.

Projects	Amount (US\$ X 000)
1. Regional Food Security Committee	300.0
2. Management Information on Food Security	300.0
3. Research and Technology Transfer Services for the Food Industry	400.0
4. Regional Quality Standards for Food Products	177.8
5. Reciprocal Technical Cooperation	822.2
6. Harmonization of Investment Policies and Food Security Project Profiles	1 100.0
7. Regional Private-Sector Organizations	300.0
8. Study to Expand Services for Joint Purchases of Agricultural Inputs	100.0
9. Study on Food Security Fund	100.0
Total	3 600.0

The sum of US\$3.6 million will be earmarked for technical cooperation and integration projects

The annual scheduling for the resources is:

Project	1	2 Year	3	Total (US\$ X 000)
1. Regional Food Sec. Committee	195.0	105.0	0	300.0
2. Management Info. on Food Sec.	153.4	146.6	0	300.0
3. Res/Transf. Tech. for Food Ind.	306.0	94.0	0	400.0
4. Regional Standards	177.8	0	0	177.8
5. Reciprocal Tech. Coop.	558.3	155.9	108.0	822.2
6. Harmoniz. Pol/Food Sec. Proj.	711.0	103.5	285.5	1 100.0
7. Reg. Private-Sect. Orgs.	75.8	216.2	8.0	300.0
8. Study on Joint Purchases	100.0	0	0	100.0
9. Study Food Sec. Fund	100.0	0	0	100.0
Total	2 101.5	605.0	393.5	3 600.0

2. Financing

The financing structure for nonrefundable cooperation and integration projects is as follows:

Source	Amount (US\$ X 000)
External	3 424.2
Internal	175.8
Total	3 600.0

The financing structure by technical cooperation project is:

Project	External	Internal	Other contributions	Total (US\$ X 000)
1. Regional Food Sec. Committee	294.0	6.0	0	300.0
2. Management Info. on Food Sec.	282.0	18.0	0	300.0
3. Res/Transf. Techn. for Food Ind.	389.2	10.8	0	400.0
4. Regional Standards	165.8	12.0	0	177.8
5. Reciprocal Tech. Coop.	798.2	6.0	18.0	822.2
6. Harmon. Pol/Food Sec. Projects	1 088.0	12.0	0	1 100.0
7. Reg. Private Sect. Orgs.	219.0	6.0	75.0	300.0
8. Study on Joint Purchases	94.0	6.0	0	100.0
9. Study Food Sec. Fund	94.0	6.0	0	100.0
Total	3 424.2	82.8	93.0	3 600.0

V. ANALYSIS

1. Technical Analysis

The Regional Program is technically sound due to the region's present technological capacity to increase agroalimentary production. There is a need to design methodologies for conducting analyses of low-income population groups regarding their food-security situation, and to train technicians to draw up food-security projects.

It will be necessary to design methodologies for analyzing the food-security situation of low-income groups.

2. Institutional Analysis

The participating regional organizations have considerable experience in administering this type of program.

3. Legal Analysis

The proposed legal framework for food security requires the institutionalization of regional accords on this matter among the member countries. The Secretariat of the Regional Committee will draw up the technical proposals to be submitted to the countries for approval.

4. Financial and Economic Feasibility

In order to analyze the financial and economic feasibility of the Regional Program, refer to the results of the analyses carried out for the investment projects for each country.

5. Regional Program Impact

The Regional Program impact will be twofold:

The first is at the country level where the Regional Program will have an impact through the specific investment projects to boost food production. This will contribute to reducing the gap between the basic foodstuffs produced domestically and those imported. It will depend in large measure on making use of the agricultural potential with improved economy of production resources, and on the availability of foreign exchange invested to fuel the countries' economic growth.

Increased food production will signify a higher level of food security.

Income structures will be improved and food-related inflationary pressures will be reduced. Purchasing power of the family shopping basket will increase.

The second impact will be felt at the regional level and concerns the cooperation and integration projects that will complement national efforts and orient them toward more efficient solutions involving two or more countries within the framework of agricultural integration. Its socioeconomic aspects will contribute to improving income structures, lowering food-related inflationary pressures and increasing purchasing power for the basic family shopping basket.

ANNEX

Project 1. Regional Food Security Committee

Components	Total (US\$)
Regional Food Security Committee	300 000
1.1 Design of the Regional Committee	29 900
Technical consultation missions	8 500
Technical proposal	11 150
Technical meeting	10 250
1.2 Organization of the Regional Committee	11 600
Regional food-security forum	11 600
1.3 Administration and Follow-up	258 500
Secretariat of the Regional Committee	238 000
Initial actions	20 500

Project 2. Managerial Information System on Food Security

Components	Total (US\$)
Managerial Information System on Food Security	300 000
2.1 Statistical Food Information on the Target Population	89 775
Formulation of diagnosis of food situation	47 700
Technical proposal to harmonize systems	9 175
Regional Technical Meeting of Statistical Agencies	10 400
Technical assistance to the countries	22 500
2.2 Agrometeorological Information Services	55 400
Detailed technical proposal	18 350
Regional Technical Meeting	12 550
Technical assistance to the countries	24 500
2.3 Strengthening of National Statistical Systems	154 825
Detailed technical proposal	20 225
Regional Technical Meeting	12 550
Technical assistance to the countries	122 050

Project 3. Research and Technology Transfer for the Food Industry

Components	Total (US\$)
<i>Research and Technology Transfer for the Food Industry</i>	400 000
<i>3.1 Design of Research Services</i>	22 900
Technical proposal	14 250
Regional Technical Meeting	8 650
<i>3.2 Use of corn with high nutritional value</i>	51 100
<i>3.3 Use of high nutritional value sorghum</i>	40 950
<i>3.4 Use of beans</i>	40 950
<i>3.5 Design of Transfer Services</i>	244 100
Study on the demand for services	67 500
Inventory of supply of services	56 250
Technical proposal	14 250
Regional Technical Meeting	12 050
Technical assistance to the countries	90 050

Project 4. Reciprocal Technical Cooperation

Components	Total (US\$)
<i>Reciprocal Technical Cooperation</i>	822 200
<i>4.1 Training Fund</i>	22 375
Technical proposal	11 350
Regional Technical Meeting	11 025
<i>4.2 Advanced Training Scholarships (Master's Degrees)</i>	380 000
<i>4.3 Short refresher courses and in-service training</i>	336 000
Short courses	240 000
In-service training	96 000
<i>4.4 Meetings of entrepreneurs and technicians</i>	27 950
<i>4.5 Exchange of technicians</i>	55 875

Project 5. Regional Quality Standards for Food Products

Components	Total (US\$)
<i>Regional Quality Standards for Food Products</i>	177 800
<i>5.1 Design of technical standards for milk and dairy products</i>	88 800
Technical proposal	16 150
Regional Technical Meeting	10 250
Technical assistance to the countries	62 400
<i>5.2 Design of technical standards on basic grains</i>	89 000
Technical proposal	16 125
Regional Technical Meeting	10 250
Technical assistance to the countries	62 625

Project 6. Harmonization of Investment Policies and Food Security Projects

Components	Total (US\$)
<i>Harmonization of Investment Policies and Food Security Projects</i>	<i>1 100 000</i>
<i>6.1 Harmonization of Investment Policies</i>	<i>49 500</i>
Technical proposal	32 400
Regional Technical Meeting	17 100
<i>6.2 Formulation of Food Security Project Profiles</i>	<i>961 250</i>
Guide for formulating profiles	20 625
Formulation of profiles	587 000
Portfolio of project profiles	68 125
Project promotion	33 000
Regional Forum to Finance the Portfolio	252 500
<i>6.3 Program for Reorienting Agricultural Credit</i>	<i>89 250</i>
Technical proposal	71 000
Regional Technical Meeting	18 250

Project 7. Regional Agricultural Private-Sector Organizations

Components	Total
<i>Regional Agricultural Private-Sector Organizations</i>	<i>300 000</i>
<i>7.1 Regional Dairy Farmers' Organization</i>	<i>150 000</i>
Technical Proposal	27 125
Regional Technical Meeting	10 750
Regional Farmers' Congress	92 375
Design of Institutional Journal	11 750
Editing and publication of the journal	8 000
<i>7.2 Regional Basic Grains Producers' Organization</i>	<i>150 000</i>
Technical proposal	27 125
Regional Technical Meeting	10 750
Regional Producers' Congress	92 375
Design of Institutional Journal	11 750
Editing and publication of the journal	8 000

Project 8. Study on Joint Purchases of Agricultural Inputs

Components	Total (US\$)
<i>Study on Joint Purchases of Agricultural Inputs</i>	<i>100 000</i>
Technical consultation missions to the countries	10 500
Technical proposal	25 250
Regional Technical Meeting	11 250
Trade Missions	53 000

Project 9. Study to Establish a Food-Security Fund

Components	Total (US\$)
<i>Study to Establish a Food-Security Fund</i>	<i>100 000</i>
Technical consultation missions to the countries	9 500
Technical proposal	78 650
Regional Technical Meeting	11 850

EL SALVADOR

FULL REACTIVATION OF DAIRY ACTIVITIES

(Project)

1991

PROJECT CAM-90-002 UNDP/PAHO/PEC

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INTRODUCTION

Since the 1950s, the Ministry of Agriculture and Livestock (MAG) of El Salvador has implemented actions to upgrade livestock services and promote livestock activity in the country. The Center for Livestock Development (CDG) (formerly known as the General Directorate of Livestock (DGG)), responsible for livestock development as well as animal health activities, and the leading center for livestock research, executed during the 1970s and 1980s along with the National Agricultural Training Center (CENCAP), extension services and training geared toward small- and medium-scale livestock ranchers. This work came to an end when the agrarian reform was instituted, which divided agricultural tasks into regions, and the social crisis deepened.

A livestock and animal health program, under CENCAP and financed with external resources, was recently concluded. The program was unable to achieve its objectives and goals fully, since it was undertaken during the difficult period of the 1980s. The only permanent remains of the program are infrastructure works and equipment.

Support to livestock activities has not been equal to that given to crop agriculture, in terms of resources, consistency and follow-up. From 1980-1988, the livestock subsector received an average of only 2.6 percent of the credits granted to the agricultural sector annually. The lack of well-defined policies, working programs and national livestock development programs involving technology generation, transfer and training for livestock farmers and the establishment of support activities (credit, marketing and industrialization), have limited the growth of the national livestock sector. Isolated, unplanned actions, with no continuity, were carried out and have not greatly contributed to the development of the sector, which is currently in a state of crisis.

The updated statistics of 1984 on the national livestock sector, as well as the projects for processing plants and milk collection centers (1990) carried out by national consultants, constitute the actions and technical documentation which served as the basis for formulating this Project.

The Project described herein has a six-year duration and will be executed in two stages. The executing unit will be managed by a non-governmental organization that will monitor, provide follow-up and evaluate progress made, in order to guarantee the full reactivation of dairy farming in El Salvador.

The Project will remove obstacles to milk production through joint efforts between the State and the private sector, especially farmers in the traditional sector.

An agreement will be signed by cooperating agencies financing the Project and the government to formalize Project execution. National institutions participating in the Project will include the Secretariat of Natural Resources, the National Federation of Farmers and Cattle Ranchers of Honduras (FENAGH), processing plants, the Honduran Committee of Private Enterprise (COHEP) and banks, through which the credit component will operate. The commitment acquired by these entities and the shared responsibility for execution will ensure the success of the Project.

I. FRAME OF REFERENCE

1. Macroeconomic Setting and Its Impact on the Project

During the 1980s, the economy of Honduras was characterized by negative growth and a climbing unemployment rate, resulting from the contraction of regional and international demand, limited financing from external sources, and a drop in the terms of trade in the export sector.

Given a difficult socioeconomic context, planned activities should have a positive impact on lower-income groups.

Further aggravating these conditions were the political problems of the region, which produced capital flight and a fall in private investment. The GDP grew at a rate of only 0.9 percent annually, compared to a sharp increase in the population growth rate (3.5%). This led to a serious deterioration in the living conditions of the population, particularly in the poorer sectors.

Agriculture continues to be the most important economic activity in the country. In 1988, it comprised 33 percent of the GDP; employed 50 percent of the economically active population, and generated more than 70 percent of the country's revenues through exports. Minimal growth (1.3%) was registered in the livestock subsector, making it impossible to meet the demand for livestock products, particularly milk and other dairy products.

In April 1990, Honduras enacted an Economic Structural Adjustment Law. This law provides for a series of measures aimed at reducing the fiscal deficit by cutting public spending and increasing exports by lowering their prices vis-a-vis international prices and modifying the exchange rate. It also calls for special support to be given to the food production sectors, under the Food Emergency Plan.

The application of this law has created certain conditions that may end up hindering economic development. These include increased production costs attributable to higher prices of imported inputs, caused by the new value of foreign exchange; an increase in the minimum wage, which has an important impact on cost performance; and, the elimination of all tax incentives for production and changes in income tax rates.

The Food Emergency Plan provides the framework for all efforts to boost food production.

The State's strategy has been to support the establishment of new enterprises in order to increase competitiveness among suppliers of services and in production, by privatizing services traditionally provided by the State, with a view to freeing up market prices.

During 1989, the demand for milk was 392 million liters. This was met with nationally-produced liquid milk (328 million liters), and imported dry milk equivalent to 64 million liters of liquid milk.

Per-capita consumption is estimated at 79 liters, 16 percent of which is imported. Optimal per-capita consumption (150 liters) would represent a 45-percent deficit in milk production.

The goal is to increase milk production and reduce dependency on imports.

This Project promotes activities to boost national production to satisfy the current demand, and to increase milk consumption to meet nutritional requirements. It will do so using a two-pronged approach. In the first place, actions will target areas where farmers have a greater capacity to respond, and which can reach the proposed increased levels of production more quickly. Next, actions will focus on the traditional sector in these production areas.

In 1989, milk production reached 328 million liters, at an average of 27 million liters a month. Real monthly production volumes vary according to climatic conditions. During the rainy season (June to October), pasture conditions improve and there is sufficient feed for the cattle. In the dry season, production and productivity levels drop.

Part of the milk production is taken to four processing plants and to some smaller enterprises which process only 28 percent of the output. Two of these plants are owned by the SULA Dairy Products Company, a State-owned enterprise. The other two are the privately owned LEYDE, S.A., and the DELTA Dairy Industry. The smaller enterprises operate in Olancho and El Progreso.

Two of Honduras' four major processing plants are run by the State and two belong to the private sector.

Enterprises	Warehouse/refrig. capacity (liters/day)	Processing capacity (liters/day)
SULA - San Pedro Sula	80 000	120 000
SULA - Tegucigalpa	30 000	60 000
LEYDE - La Ceiba	67 000	120 000
Others	8 000	8 000
Total	185 000	288 000

The substitution of dry milk imports will produce foreign exchange savings; it also will increase the value added of the milk produced in the country, since most will be used by the processing plants

During the rainy seasons of 1985 and 1986, processing plants operated at 71 percent capacity; during the summer, the operating capacity was only 50 percent.

The importation of dry milk produced 64 million liters of liquid milk. Part of this volume is used by the milk processing industry.

2. Analysis of Production Options and of the Technical Environment

The analysis of possible alternatives began with a description of production problems on dairy farms. A study of the principal milk-sheds indicates that poor milk output is due to the following factors:

- Unsatisfactory feed for cattle, due to poor pastures in the dry season, and the limited use of concentrates, mineral salts, mowed pastures and forage conservation techniques
- Livestock quality is generally poor, in spite of the fact that a national livestock center operates in the Comayagua Valley. Some specialized producers in the area provide improved breeding stock, but not enough to meet the demand.
- Inadequate management of cattle and of milk on the farm. There is no well-defined sanitary plan to provide measures for preventing contamination and ensuring sanitary control in herds. Poor milking and storage techniques mean a high percentage of the milk does not meet the standards of the processing plants.
- Minimal infrastructure and facilities for handling animals and for conserving production
- Lack of small-farmers' organizations. Some associations exist, but none for dairy farmers; these associations are inefficient and are not geared toward developing production.
- Not enough milk collection centers. Only a small part of the milk is marketed through processing plant circuits; this is due particularly to a lack of processing plants in strategic locations, combined with insufficient roadways and transportation for milk.

More and better milk collection centers will be installed.

- Low coverage and quality of technical assistance services provided by the State

The technical solution proposed by the Project includes actions for the five milksheds in the country: Zone I, Atlantida and Colon; Zone II, Cortes, Santa Barbara and Copan; Zone III, El Paraiso, Olancho and Yoro; Zone IV, Comayagua, Francisco Morazan, Intibuca, La Paz, Lempira and Ocotepeque; Zone V, Choluteca and Valle.

The Project also includes medium-term actions that will affect all the dairy farmers in the country, totaling approximately 90,000 farms. The study also indicated that the short-term actions would concentrate on milksheds which could respond immediately by increasing milk production. Milksheds II, III and IV contain the majority of the country's dairy farmers; the last two alone account for approximately 60 percent of the farms.

3. Socioeconomic Situation of Potential Beneficiaries

The Project is designed for small-, medium- and large-scale milk producers. To qualify for the Project, they must produce milk for industry and/or have farms in areas that show a good potential for milk production.

The beneficiaries will be located within the operating range of the processing plants; the operating range is defined as the existing plants and the area they could cover as a result of Project activities.

The technological changes to be introduced by the Project can be applied in any milkshed or the area served by the processing plants. Up-to-date information was used to prepare technology options, based on working farms on the Atlantic coast.

In order to obtain a more thorough understanding of the characteristics of potential beneficiaries, statistical information was gathered on a sample of suppliers for one of the processing plants. The sample represents 5 percent of the total number of Project beneficiaries.

4. Institutional Conditions

The principal government institutions providing support to the agricultural sector are the Secretariat of Natural Resources (SRN), the National Agricultural Development Bank (BANADESA), the National Agrarian Institute (INA) and the Central Bank, through its Agricultural Credit Project Unit.

The Project aims to establish optimum distances between the farms and the processing plants.

Extension services are essential to meet producers' needs for technological know-how.

The Secretariat of Natural Resources, through its General Directorate of Livestock, provides national extension services. Its three main programs are animal health, livestock development, and livestock research, and its objectives are to satisfy the producers' needs for technical assistance.

The National Agricultural Development Bank is the State entity that provides credit assistance to the livestock subsector. Within the financial system, it manages the largest loan portfolio. Nevertheless, due to inadequate supervision of loans, many of these loans are used to finance other activities.

The Central Bank, through its Agricultural Credit Project Unit, provides good technical and credit assistance to farmers. It is currently negotiating with the World Bank for funds to execute a fourth project.

Associations of dairy farmers will gradually be strengthened

Private-sector organizations are not well developed. During the 1960s, several associations were created with support from the government to bring together farmers from the private sector (non-reformed). These associations operate at the department level and belong to the National Federation of Farmers and Cattle Ranchers of Honduras (FENAGH). They are made up mainly of medium- and large-scale producers.

In most cases, the cattle ranchers' associations lobby for solutions to problems caused by the Agrarian Reform Law and by price policies. They also organize livestock exhibitions to demonstrate the progress made in breeding genetically improved cattle.

The number of private enterprises providing technical assistance to farmers must be increased, particularly to small-scale farmers, who are frequently overlooked.

There are no private enterprises that provide technical assistance to farmers, with the exception of some professionals who offer these services on an individual basis and some processing plants which do the same for their suppliers. Private banks offer this type of service to their clients. Although private banks provide less credit assistance than does the government, there is greater supervision and monitoring of operations on farms receiving credit.

5. Legal Framework

The legal framework of the Project is based on three important laws which determine the country's economic performance and, specifically, its milk production activities.

Economic Structural Adjustment Law. This law sets forth the policies and measures governing the country's economic process. Adjustment measures include a floating exchange rate, increased bank interest rates, repeal of all tax exemptions, reform of the income tax system, increased sales taxes, modification of taxes on the manufacture of petroleum byproducts, and various budgetary measures.

National Dairy Commission (CONAL). This is a joint commission set up to study the problems facing dairy activities, and to identify and recommend policy measures to promote dynamic and sustained development in milk production, processing, marketing and consumption. Resolutions issued by CONAL have helped establish production security, which has encouraged positive growth of national dairy activities.

Price control regulations. Price controls are necessary to protect consumers. Nevertheless, it should be noted that when they affect producers' profit margins, they have a negative impact, since they become a disincentive to production. Pricing must be handled in such a way as to balance the needs of the consumer and those of the producers -- especially given the country's current economic situation, where monthly price increases affect the cost structure of milk production.

Price policies play a major role in milk production: a healthy balance must be struck between the needs of producers and the needs of consumers.

6. The Project in the Context of Regional Integration

The Project intends to approach the economic integration of the countries of Central America in two different ways.

First, the possibility will be examined of signing agreements with countries of the area to fill some of the needs of the components of the Project. Some of these components are:

- Provision of improved breeding stock. There are no enterprises in Honduras that specialize in raising heifers that have been artificially inseminated with genetically improved breeding stock; an alternative would be to import these heifers. In Central America, Costa Rica and Nicaragua could serve as suppliers since they have a better stock of breeding animals. Ecological conditions are similar among the three countries, making the transfer likely to succeed.
- Reciprocal technical cooperation among countries to upgrade the organization of dairy farmers. Costa Rica's excellent experience in organizing dairy farmers could serve as support to the actions proposed in this Project.

At the regional level, this type of project will create positive exchanges through the supply of improved breeding stock and horizontal technical cooperation. Special emphasis will be placed on increasing contacts among farmers' organizations.

The second option would involve receiving support from specialized regional institutions. This support would be formalized in technical cooperation projects designed to successfully introduce the technological changes included by this Project.

II. PROJECT DESCRIPTION

1. Justification

As part of its strategy to develop the agricultural sector, the government has assigned second priority to increasing milk production, with a view to achieving self-sufficiency in this commodity and providing the country with a greater degree of food security.

Justification for the Project lies in that it will have the following impact on the Honduran economy and on the agricultural sector:

- It will replace imports of milk and dairy products. The cost of milk imports from large milk-producing countries is high and is geared to dramatically reducing their own surpluses. The new exchange rate makes this possible and the country will save foreign exchange as a result.
- It will improve livestock capital, enabling dairy farmers to increase their productivity per animal. The objective is to have access to a source for replacing breeding stock and thus enable dairy farmers to improve the quality of their herds more rapidly and efficiently, with animals adapted to the ecological conditions of the country.
- It will reduce production costs through better livestock management techniques and new technology.
- It will establish milk storage equipment on the farms and a modern system of collection centers, located in selected sites in the principal milksheds of the country.
- It will stabilize monthly milk production in the principal milksheds of the country, with the use of improved pastures and on-farm fresh milk storage facilities.

A new exchange rate can contribute to reducing imports of milk and other dairy products.

- It will study the possibility of installing a milk drying plant to process surplus milk during the peak season, which can later be used to supply the domestic market during the low season. Consideration may also be given to the possibility of setting up sterilization plants for processed milk.

The feasibility of installing a milk-drying plant is being studied, with a view to storing processed milk for use in low milk production seasons.

2. Objectives

General

- To promote and increase milk production in order to meet domestic needs without resorting to imports, thus achieving a greater degree of food security in the country
- To encourage greater per-capita milk consumption

Specific

- To increase the average milk production per animal, through ongoing technical assistance and credit support for on-farm investments, and to provide working capital to the farmer
- To improve milk storage and collection conditions in the service areas of the processing plants and in areas showing potential for rapidly increasing milk production
- To organize dairy farmers in order to foster integrated dairy development
- To establish conditions for installing a milk drying plant
- To upgrade the management capabilities of technology-transfer services associated with farmer organizations

Project objectives include boosting technical and credit assistance, improving milk storage and collection centers and strengthening farmers' organizations

3. Strategy

The Project strategy is to:

- Concentrate actions on existing milksheds, particularly those in the processing plant's service area
- Take specific action to draw dairy farmers from the traditional sector into the circuit of the processing plants
- Organize the supply of technical assistance provided by the private sector, preferably from existing professional associations, by forming private technology-transfer companies

In order to maximize participation of both the State and the private sector, producers' organizations will have to be strengthened.

- Design and implement Project operations to involve joint participation of the State and the organized private sector
- Propose a price management system that guarantees a profit margin for the dairy farms and contributes to financing the modernization of the collection systems and new processing technologies, and that enable the producers, the storage and collection centers and the processing plants to recover their investments

4. Subprojects and Components

The Project will be divided into six subprojects designed to:

- Provide improved breeding stock
- Improve the milk storage and collection circuit
- Improve milk processing techniques
- Improve cattle nutrition and feed
- Organize and provide training to producers
- Facilitate private technical assistance

Subproject 1. Providing improved breeding stock

This subproject will include the following four components:

- In-kind credit. Producers will repay their loans with deliveries of milk to the processing plants, which, in turn, will pay the institution in charge of managing the loans.
- Improved or purebred heifers to be delivered to the producers under the in-kind credit system will be imported and purchased in the country.
- Animals will be provided, depending on the needs of the different strata of beneficiaries, and as established by the private technical assistance units.
- Preferential interest rates will be given to ensure that loan recovery does not represent a hardship to users, and to provide incentives for investment.

Improved breed or purebred heifers will be delivered to producers through a special credit system.

Subproject 2. Improvement of the milk storage and collection circuit

- Conditions for storing and collecting milk will be improved in the service areas of the processing plants, and in the areas where traditional farmers can be incorporated into the circuit.

The location and capacity of the collection centers must respond to the real needs of the producers.

- Collection centers will be established in accordance with the dairy industry's needs.
- Farms will be equipped with small refrigeration tanks, pursuant to recommendations of the private technical assistance units.

Subproject 3. Milk processing

- The possibility will be studied of establishing small-scale milk processing plants in dairy areas not reached by existing processing plants.
- Financing will be sought to expand the operating capacity of existing processing plants, in accordance with identified needs and the feasibility of doing so.
- A study will be made of the possibility of installing a milk-drying plant in order to be able to gradually substitute imported dry milk with domestically-produced dry milk.

Appropriate funding is needed to expand existing processing plants.

Subproject 4. Improvement of cattle nutrition and feed

- Hay will be produced according to the needs of each region.
- Regional banks will be established for pasture and leguminous seeds and planting materials.
- Credit will be provided for the construction of silos.
- Technology transfer for ensilage and the preservation of fodder

Subproject 5. Organization and training of farmers

- Farmers and cattle ranchers will be encouraged to form organizations, which will facilitate Project execution.
- A training plan on milk production and hygiene will be formulated for Project beneficiaries.

Subproject 6. Private technical assistance

- Financing will be sought for establishing private technical assistance companies.
- Technical assistance services provided by processing plants for dairy farmers will be fostered. Beneficiaries can pay for the services with a percentage of their milk deliveries.
- Dairy farmer associations will be encouraged to hire professional agriculturalists operating in their service area.

Farmers using the technical assistance services provided by the processing plants can pay for the services with a part of their milk deliveries.

The Project will encourage the public sector and farmers' associations, or the processing plants, to sign agreements on how to improve technical assistance services.

- Agreements will be signed by the Secretariat of Natural Resources (SNR) and dairy farmer associations or processing plants, through which SNR technical personnel will provide assistance to producers and work with them, full time, to execute Project activities.
- Technical assistance actions at the farms will be scheduled by the technical experts in coordination with Project beneficiaries, and will follow Project guidelines.

5. Goals

The goals of this six-year Project are as follows:

Description	Goals to 1996	
1. Feed and nutrition. Improved pastures	Manzanas	24 200
Construction of silos (Capacity 50 mt)	Silos	2 130
2. Acquisition of breeding stock	Head	4 000
3. Private technical assistance (PTA) Creation of PTA enterprises	Units	27
4. Milk production in 1996	Million liters	106.0
5. Gross value of milk production	US\$ million	42.5
6. Milk storage and collection		
Refrigeration tanks (capacity 1,200 liters/day)	Tanks	30
Collection centers		
Capacity 30,000 liters/day	Centers	2
Capacity 20,000 liters/day	Centers	1
Capacity 10,000 liters/day	Centers	1
7. Milk drying plant	Study	1

6. Project Beneficiaries

The Project has two categories of beneficiaries:

Category 1. Farmers supplying milk to processing plants

During the first year, more than 1,300 farmers who supply the plants will benefit from the Project. Over 800 more will be brought in during the life of the Project.

The Project will benefit 1,320 producers beginning the first year. This amount was based on information provided by the processing plants concerning the size of the farms, production levels, number of dairy cows and the availability of pastures.

Category 2. Traditional farmers within the service range of the processing plants who can be incorporated into the circuit

As of year two, the Project will incorporate new suppliers, at a rate of 10 percent a year, for a total of 806 producers during the Project execution. A total of 2,126 beneficiaries will have been reached by Project end.

7. Support Services for Production

The principal services proposed are:

- State research and extension services. The Secretariat of Natural Resources will improve its services to generate milk-related technology.
- Private technical assistance. Various types of private technology-transfer enterprises will be created through the Project, to be organized by production area.
- Credit assistance. The Agricultural Credit Unit of the Central Bank is being proposed as administrator of the funds. The Bank will coordinate programming with the executing units of the Project, and will decide through which banks the credits will be processed.
- Collection, storage and marketing services for milk production. The processing plants will provide various services to complement those established and organized by farmers.
- Organization of farmers. The National Federation of Farmers and Cattle Ranchers of Honduras will provide support for the establishment, registration and implementation of associations formed during the execution of the Project.

Private technical assistance services will be increased.

The National Federation of Farmers and Cattle Ranchers will serve as the model for new farmers' associations.

III. ORGANIZATIONAL STRUCTURE

1. Executing Unit

Two Project execution options were considered. The first would involve only private-sector participation, while the second would call for mixed private- and public-sector participation. The private sector might be represented legally by a nongovernmental organization (NGO); under the second option, the State would be represented at three levels, as follows:

National level

An Executive Committee will be set up, consisting of the following institutions: the Secretariat of Natural Resources; the National Federation of Farmers and Cattle Ranchers of Honduras (FENAGH); representatives from milk-processing enterprises; a representative from the Honduran Committee of Private Enterprise (COHEP); and, one from the Central Bank of Honduras.

Regional level

Regional committees will be established, made up of the Secretariat of Natural Resources, representatives from milk-processing plants in the region and representatives from milk-producers' associations set up in each region for this purpose. FENAGH and the National Dairy Commission will be responsible for these actions.

Local level

Local committees will be organized, made up of the technical assistance unit of the locality and producers operating in the areas of Project activities.

An agreement between cooperating agencies and the government of Honduras will make it possible to organize farmers at the national, regional and local levels.

In order to set up this structure, an agreement will be signed between the cooperating entities financing the Project and the government. National institutions represented will include the Secretariat of Natural Resources, the National Federation of Farmers and Cattle Ranchers of Honduras (FENAGH), the milk-processing plants, the Honduran Committee of Private Enterprise (COHEP) and banks, through which the credit component will be channeled. The success of the Project rests on the commitment assumed by these entities and the sharing of responsibilities in executing the Project.

2. Plan of Action

The plan of action is divided into three levels of work, that correspond to the levels proposed for the executing units.

The plan of action of the national executive committee includes establishing the rules, procedures and structure of the operating strategies to be followed, and policies to be executed in order to ensure Project success. It will also analyze and program Project investments and propose follow up and evaluation mechanisms for the activities carried out by the different subprojects and components. One of its functions will be to establish a standard methodology for measuring Project impact and for disseminating its achievements.

A management information system must be set up to ensure the smooth operation of Project activities.

The regional committees will define the service areas of the processing plants, identify and select beneficiaries, grant credit, analyze investment plans at the farm level, and integrate and bring regional plans of operation into line with services provided by technical assis-

tance enterprises. These committees are to supervise the field and on-farm activities of the subprojects and components. A management information system should be set up to provide national executive committee with information for developing Project activities.

The principal functions of the local committees will be to conduct an assessment of dairy farms; identify farm needs, based on the assessments and reflecting the Project's components; determine credit or financing needs; support the formulation of farm business plans; reach agreement on production goals by farm, to reflect Project goals; periodically evaluate the Project, based on the guidelines set up by the national executive committee; and prepare regular reports, as required by the national committee.

3. Resources

The Project will require the following resources:

- Resources to improve 24,215 manzanas of pasture
- Construction of silos. Each silo will have a 50-metric-ton capacity; approximately 2,100 silos will be needed.
- Purchase of 4,000 head of cattle for breeding stock (heifers and bulls)
- Creation of 27 technical assistance units
- 1,200-liter refrigeration tanks: 30 units
- Collection centers:
 - 30,000 liters (2)
 - 20,000 liters (1)
 - 10,000 liters (1)
- Milk-drying plant: equipment needed to set up one plant

The Project developed a model for a private technical assistance services enterprise to demonstrate its profitability. It was felt that this type of enterprise was the best way to carry out the actions because it will ensure the impact of services provided, and consequently, the achievement of Project goals.

The private technical assistance services promoted by the Project will contribute to achieving the proposed goals.

Resources needed to implement this enterprise include: vehicles; veterinary equipment; training equipment; computer equipment; office equipment; and other materials.

4. Participating Institutions

It is felt that the associations should assume a new role with regard to the technical services they provide to their members.

The principal institutions to participate in the Project include:

Private, public and joint institutions will participate in the Project.

Private institutions and organizations

- Associations of dairy farmers
- The National Federation of Farmers and Cattle Ranchers
- Milk processing plants

Joint institutions and agencies (state and private)

- National Dairy Commission

Government institutions

The National Dairy Commission (with state and private components) provides valuable experience on the strengthening of the joint institutional model

- Secretariat of Natural Resources
- General Livestock Directorate
- National Agricultural Development Bank
- Central Bank of Honduras

IV. COSTS AND FINANCING

1. Costs

Total cost of the Project: US\$36 million

The Project will require a total investment of approximately US\$36 million. The following is a breakdown for the short and long term:

(US\$ X 000)

Item	Short term	Long term	Total
Investment	9 910.8	9 995.7	19 906.5
Improvement of pastures	2 524.2	0	2 524.2
Construction of silos	1 275.6	0	1 275.6
Technical assistance 1	6 111.0	0	6 111.0
Breeding stock	0	2 400.0	2 400.0
Technical assistance 2	0	599.4	599.4
Refrigerator tanks and collectors	0	996.3	996.3
Preinvestment: milk processing, study, construction, installation of drying plant	0	2 000.0	2 000.0
Drying plant equipment	0	4 000.0	4 000.0
Operations	16 108.8	0	16 108.8
Milk production	13 210.2	0	13 210.2
Technical assistance 3	2 667.0	0	2 667.0
Project management	231.6	0	231.6
Total cost	26 019.6	9 995.7	36 015.3

Notes:

Technical Assistance 1: Cost to producer for use of services

Technical Assistance 2: Creation of and investment in private enterprises

Technical Assistance 3: Operating costs of technical assistance enterprises

2. Financing

The government will select the funding sources needed to execute the Project, making sure that the financial conditions are consistent with the objectives proposed for developing milk production and processing in the country.

External short- and long-term financing requirements (US\$ X 000)

Item	Short term	Long term	Total
Investment	9 910.8	3 995.7	13 906.5
Improvement of pastures	2 524.2	0	2 524.2
Construction of silos	1 275.6	0	1 275.6
Technical assistance 1	6 111.0	0	6 111.0
Breeding stock	0	2 400.0	2 400.0
Technical assistance 1	0	599.4	599.4
Refrigerator tanks	0	996.3	996.3
Preinvestment		4 000.0	4 000.0
Drying plant equipment	0	4 000.0	4 000.0
Total external funding	9 910.8	7 995.7	17 906.5

Slightly less than half of total Project funds (approximately US\$18 million) will be required from external sources; internal sources will cover slightly more than that amount.

Domestic short- and long-term financing requirements (US\$ X 000)

Item	Short term	Long term	Total
Preinvestment	0	2 000.0	2 000.0
Study, construction and installation of drying plant	0	2 000.0	2 000.0
Operations	16 108.8	0	16 108.8
Milk production	13 210.2	0	13 210.3
Technical assistance 3	2 667.0	0	2 667.0
Project management	231.6	0	231.6
Total domestic funding	16 108.8	2 000.0	18 108.7

V. ANALYSIS

1. Technical Analysis

The Project is designed to benefit existing dairy farmers rather than new ones, and its investments are therefore not geared to developing new farms. Project actions are designed to improve and correct situations that could reduce the efficiency of farm production, in order to increase milk supply in the short term.

Support will mainly target existing farmers. The objective of the Project is to increase the milk supply in the short term.

Projected milk production increases will be easily met if the proposed actions are carried out.

Dry milk imports can be totally or partially eliminated by increasing production efficiency and productivity on dairy farms.

2. Institutional Analysis

The organization proposed for executing the Project is sound. It will bring together all the agencies involved in developing dairy farming under a common cause. This shared responsibility will ensure compliance with the commitments taken on by each entity, the timely application of programmed actions and the appropriate assignment of responsibilities to each. Individual and isolated actions have already been carried out; this common effort will create greater confidence in achieving Project objectives and eliminate the duplication of efforts.

The country has made approximately 50 percent of total financing available, which demonstrates the interest at different levels of the public and private sectors involved in the Project.

Because the different agencies involved in dairy activities are interested, and in agreement, with regard to the need and advisability of executing projects such as this, and because both the public and private sectors will contribute resources for the development of dairy farming in Honduras, the government has made the decision to commit resources to the Project.

3. Legal Analysis

The legal framework for the activities of the Project is the series of policy measures identified, selected and executed by the National Dairy Commission. Due to its nature and purposes, it is considered that Project execution will not be affected by current legal provisions.

4. Financial and Economic Feasibility

The financial feasibility of the Project can be measured by calculating the internal rate of return (IRR) and the net present value (NPV). These indicators were calculated from figures gathered on on-farm production costs and revenues, and from a calculation of the types of investment needed to implement technical assistance.

Both the IRR and the NPV indicate the feasibility of the Project.

The results of these calculations show that the Project is economically and financially feasible. The resulting internal rate of return is 28 percent, higher than any interest rates in force in the national banking system. Its results are even more favorable when the recommended rate is 16 percent. Calculated at 16 percent, the NPV is positive.

It should be noted that calculations of the IRR and the NPV do not take into account the investments in collection tanks and the acquisition of equipment for the drying plant. These will be dealt with separately, as the Project envisages a preinvestment component in which complementary studies will be conducted on the installation of the drying plant and the milk collection centers.

With regard to Project sensitivity studies, it should be noted that the alternative chosen includes annual increases based on a 15 percent inflation rate. It also takes into consideration possible fluctuations in the value of the national currency vis-a-vis the United States dollar.

The variables studied are as follows:

Variables	IRR (%)
- Ten percent (10%) annual increase in operating costs	24.1
- Twenty percent (20%) annual increase in operating costs	19.7
- Twenty percent (20%) annual increase in operating costs and five percent (5%) increase in income	24.6

5. Project Impact

Impact will be felt in the generation of jobs, increases in farmers' incomes, and foreign-exchange savings. In addition, the country will benefit from the incorporation of new production areas into the milk processing plant circuit.

A total of 1,280 direct jobs will be generated during Project execution on beneficiary farms, as will a total of 120 jobs for professional agriculturalists who will provide private technical assistance.

A total of 2,126 farmers will see an increase in their incomes to an estimated total value of US\$32.4 million, as a result of increased milk production on their farms over the six-year period.

Foreign-exchange savings will be gained from partially substituting dry milk imports, made possible by the increases in milk production.

The installation of new collection centers in areas not currently benefiting from the guaranteed market of the dairy industry will help strengthen national milk production. The Project will also ensure a stable supply of milk throughout the year.

Impact: Approximately 1,300 direct jobs will be generated, in addition to 120 jobs for professionals who will provide private technical assistance. More than 2,000 farmers will increase their incomes for a total value of US\$32 million.

HONDURAS

AGRICULTURAL DEVELOPMENT IN THE JAMAISTRAN VALLEY AND THE WATERSHEDS OF THE PATUCA AND COCO RIVERS

(Project)

1991

PROJECT CAM-90-002 UNDP/PAHO/PEC

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INTRODUCTION

In the early 1970s, sporadic and uncontrolled expansion of the agricultural frontier from the central-eastern region of Honduras toward the Patuca and Coco river basins — along the Nicaraguan border — caused the destruction of vast forests in the southeastern part of that country. During the eighties, the farmers suffered from a number of political and military incidents that forced them to abandon their parcels, thereby hampering the integration of the two river basins into the economy of the country.

In 1981, studies were initiated on the development of the aforementioned river basins; these studies were concluded in 1989, and consisted of general maps, soil maps and territorial studies of the layout of the Patuca and Coco river basins. This technical documentation served as the basis for the preparation of this Project, whose main objective is to promote the development of the area, making appropriate use of the soils and conserving the natural resources of the border zone. The Project proposes to develop the area in stages, in order to effectively integrate it into national life. The first stage would involve working on the exploited areas of the Jamastran Valley; the second would consist of zoning agricultural production in the two river basins.

The integrated development of the selected area will serve as a model for similar regions

The Project will be carried out over a four-year period by the Ministry of Natural Resources; a Regional Agricultural Committee will be established to serve as a follow-up and evaluation mechanism that will systematize the actions carried out, in order to facilitate the application of successful technical and economically-sound solutions in other areas with the same problems.

I. FRAME OF REFERENCE

1. Macroeconomic Setting and Its Impact on the Project

The economy of Honduras is based primarily on the agricultural sector. During the 1980s, its performance fell sharply, with agriculture's share in the GDP shrinking from 35 percent to 30 percent. The economic crisis intensified the structural problems of the industrial and agroindustrial sectors, hampering the country's possibilities for growth. Industrial conversion has been proposed as a means of dealing with this situation. This crisis revealed very clearly that the

The Project will contribute to overcoming structural constraints in the agricultural sector

main structural constraints on agricultural growth were still in existence. These include lack of security in the land tenure system, lack of effective and stable measures ensuring the profitability of agricultural enterprises, institutional shortcomings related to agricultural banking resulting in ineffective financial support, and the dispersion of efforts among agricultural sector institutions.

In the agricultural sector, substantial growth for certain crops and livestock activities counteracted the sharp decline observed for others. Two of the country's main activities, cattle raising, and agriculture, illustrate this best. During the eighties, cattle raising activities fell from 24 percent (1980) to 19 percent (1989), whereas coffee production increased from 21 percent to 28 percent during the same period.

In the Project's area of influence, thousands of hectares of forests are destroyed every year, as a consequence of the haphazard exploitation of the area by small farmers, the practices of large-scale cattle ranchers, and the indiscriminate felling of timber.

The indiscriminate felling of trees will be arrested, and the land tenure situation will be improved.

In order to correct these structural constraints, the government has undertaken to realign the economy over the medium term (1990-1995), with a view to achieving more stable and efficient economic performance in all production sectors. The structural changes deal with four basic areas, which include agrarian reform and agroforestry, regarded as the cornerstone of the development policy that seeks to transform the production apparatus of the agricultural sector. These macroeconomic measures will contribute to eliminating restrictions on the production structure in the Project's area of influence.

This Project will also contribute to accomplishing certain measures adopted by the government, particularly as concerns improving the land tenure system, actively fostering security in the rural areas, providing incentives for a more efficient use of production resources, improving and organizing natural resource management, generating productive employment opportunities, and increasing agricultural production and productivity.

2. Analysis of Production Options and of the Technical Environment

Numerous farming and livestock activities can be undertaken successfully in the Project's area of influence, and can be exploited intensively and very profitably over the medium term. There is a great potential for coffee production in the highlands; the lowlands offer possibilities for intensive farming and livestock activities, except in the Guineo Valley and adjacent plains whose soils are not suitable for intensive agriculture.

Production alternatives recommended for developing the area were: improving dual-purpose livestock production (milk and meat), renewing coffee plantations, and reforesting deteriorated areas with promising species. These options were studied and it was considered that they should complement activities carried out under the Project.

Complementary actions at three levels: dual-purpose livestock, renewal of coffee plantations and reforestation

The first alternative studied and proposed was the development of dual-purpose livestock raising, based upon the results of a study made in 1981 by the Ministry of Natural Resources. The technical action proposed will aim to eliminate the main problems identified by the initial study in the Trojes and Arenales area, where integrated livestock activities were to be encouraged. Problems identified were the following: the use of traditional techniques in livestock raising and management and in forage production systems, which required improvement and upgrading in the short term; a low capacity to support cattle activity, due to inadequate pasture rotation, disregard for soil types and not allowing for fallow periods; the lack of technology for preserving drought-resistant forages and grasses; the lack of food supplements, such as urea, molasses, concentrates and hay pastures; extensive practice in herd management of not dividing animals by age and size, allowing free breeding and maintaining a disproportionate cow-bull relationship. Serious shortcomings also exist in the marketing systems for milk, meat and their byproducts.

The main zootechnical indicators of dual-purpose cattle raising show that technology levels are very low or non-existent. The 1.7 liters of milk are produced per cow daily, and the mortality rate is 5.8 percent. Based on the area's potential, daily output per cow could be four liters, and mortality could be reduced to one half the current rate.

The purpose of zoning livestock production is to make more efficient use of large areas within the Patuca and Trojes basins, with a view to increasing beef and milk production in the short term for the central and southeastern regions. Simultaneously, zoning will reduce pressure on the forests.

Large portions of the Patuca river basin will be put into production.

The second option complements the first, and concerns the renewal of the coffee plantations. Coffee is the traditional crop in the southeastern region, and some 16,000 hectares of plantations are located in El Paraiso, Danli and Trojes. There are approximately 3,000 hectares of coffee plantations in the locality of Trojes. The Project aims to renew and modernize coffee cultivation practices on 1,000 hectares of coffee farms in Trojes and the highlands of the Jamastran Valley.

Making appropriate use of lands in the highlands would contribute to increasing agricultural productivity in the short term. The Project will contribute to improving the quality of the coffee output by in-

The proposed actions will have a marked effect on increasing exports and creating jobs

The devastated forests will be replanted with rapid-growing *Leucaena leucocephala* trees, a species of many uses.

stalling small-scale coffee processing infrastructure (coffee processing plants) on medium-size farms. This will contribute to boosting exports and provide more employment opportunities in the area, as coffee requires a large number of workers. The Project will also help reduce the pressure of the farming community on the forests.

The third option, which would complement the two others, involves the introduction of promising tree species for firewood, posts and charcoal production, as well as for other uses. *Leucaena leucocephala* (white popinac) plantations would be initially introduced. It is a native Mexican species which has adapted well in Guatemala, El Salvador, Honduras and Nicaragua. Plantations of this wood in Central America are established below 800 meters above sea level. This tropical leguminous species can be used for a variety of purposes and has been used as an alternative for reforesting destroyed wooded areas. Its products can be used for forage, firewood, charcoal, lumber, posts and organic fertilizer. It is also used for windshields or fire barriers, as a shade tree, for building structural frames and for recovering and reforesting slopes. It reproduces easily; once established in a favorable environment, it must be controlled since it can spread as rapidly as a weed. It is mainly used for the production of fire wood and forage, because of its rapid reproduction, recovery ability and easy management. Technological models of plantations for fire wood have been established with populations of 4,500 to 6,500 trees per hectare.

This subproject would be implemented in the Patuca River basin, which has the appropriate climate and rainfall conditions for the cultivation of *Leucaena leucocephala*. It would be regarded as a complement to the livestock subproject, and would provide a new and additional source of income for farmers. It would also contribute to the conservation of natural forests and the reforestation of this basin.

Overall, the primary purpose of the Project is to arrest the haphazard expansion of the agricultural frontier, at the expense of the natural forest reserve of coniferous and latifoliate species in the Patuca and Coco river basins. It aims to contribute to conserving these forest reserves by implementing the three aforementioned options, thus helping to introduce efficient agricultural exploitation in the area.

3. Socioeconomic Situation and Potential Beneficiaries

The area of influence of the Project consists of 547,000 hectares (5,740 km²). It borders to the north with the continental divide of the Azacualpa mountains, El Incendio and Patuca, and to the south with Nicaragua. The territory is located in the southeastern and northeastern regions of the country, and includes a part of the municipalities of Danli, El Paraiso, Trojes in the Department of El Paraiso, and Catacamas and Juticalpa in the Department of Olancho.

The Departments of El Paraiso and Olancho show relative socioeconomic development. Total population is 538,000 inhabitants, with 89,000 in the rural areas. The illiteracy rate is high (39%), school attendance is low (33%), and the economically-active population is estimated at 45 percent.

The government is working to provide farmers with titles to their land. Thirty-seven cooperatives and rural settlements there have benefited from agrarian reform, receiving 5,000 hectares of land, half of which (2,500 ha) is considered apt for farming activities.

The most important crops in this area are staple grains (maize, beans, rice). Following in importance are coffee, tobacco, sugar cane and bananas. Dual-purpose (milk and meat) cattle are raised locally, as well as hogs and fowl.

Some agroindustrial enterprises operate in the area, such as cigar factories, coffee processing plants, a meat packing plant and a dairy processing plant (cheese and butter).

The economic situation of potential beneficiaries depends on their resources: the estimated annual income per 50-hectare farm is approximately US\$1,330; 100-hectare farms show an annual income of US\$2,670.

4. Institutional Conditions

All agricultural public-sector institutions are represented in this area. A Regional Agricultural Committee (CAR) functions under the supervision of the representative of the Secretariat of Natural Resources (SRN), to coordinate actions and to prevent overlapping of efforts in the agricultural sector.

The institutions will be strengthened with qualified personnel and financial resources to enable them to perform satisfactorily. Technology outreach services must also be upgraded, with a view to equipping them to respond immediately to production problems on the farms. Government development banks do not provide sufficient credit to ensure full adoption of technology transferred to cattle ranchers and coffee growers.

The socioeconomic impact in the selected areas, which are already relatively developed, will be evident in the first years of Project life.

All population strata will be positively affected by Project implementation. Agroindustrial activities will be strengthened.

The private sector will assume a more dynamic role through the proposed activities. Farmers' associations will increase their participation.

It is important to point out that the institutional structure is not top-heavy, although there is a shortage of credit available for livestock activity and coffee growing.

Private-sector participation is very low. To overcome this problem, actions should be taken in the short term to promote farmers' associations and to encourage full participation on their part, with a view to reducing the costs of the technology transfer services delivered by the Project.

5. Legal Framework

The agricultural activities would be carried out within the legal framework established to promote agricultural growth: the Agrarian Reform Law, the Forestry Development Law and the Livestock Development Law, among others. Despite the existence of these legal provisions, during the 1970s and the 1980s, the forests of the Patuca and Coco river basins were subject to systematic and rapid deforestation.

It is evident that there is a need to enforce the pertinent legal provisions governing the creation of forestry reserves, and strict control should be exercised over the exploitation of the region's resources. New legislation in the form of a bill on forestry incentives is currently being discussed. It proposes a number of incentives for the private sector to encourage the conservation of forests and boost reforestation efforts. Once adopted, it will contribute decidedly to the conservation of renewable resources in the Patuca and Coco river basins.

6. The Project in the Context of Regional Integration

Project efforts will help bring peace to the area, facilitate trade between Honduras and Nicaragua, and contribute to regional integration.

The Project is intended to develop a zone bordering with Nicaragua. Although initially it would be implemented in only one country, its progress would have a favorable impact on both. In the first place, it will contribute to bringing peace and to repopulating an area which has been in turmoil over the past ten years. In the second place, it will boost border trade and contribute to generating a more fluid interchange between the two countries. This would justify investments by both countries to construct road infrastructure and improve electricity services and telecommunications between the two countries. In the third place, it would organize the agricultural base of a new development area for both countries, within the context of Central American economic integration.

II. PROJECT DESCRIPTION

1. Justification

The Project would serve as a model for a broad area with considerable agricultural potential, an area originally covered by latifoliate and coniferous forests subjected to systematic and accelerated destruction. The aim is to take immediate action to conserve the natural resources, especially in those areas of the two river basins which have not yet been affected.

The Project will create a more efficient and economically sound agricultural base in a border area which could later become a development area for the region, through cooperation between the two neighboring countries.

The soil and climatic characteristics of the selected area are appropriate for accelerating, in the short term, integrated livestock activity, modernized coffee production, and exploitation of fauna and flora resources. Combined, these activities will bring an immediate halt to shifting agriculture, the use of range livestock activities, and the indiscriminate extraction of timber by lumber companies. This would make it possible to enforce protection of natural forest reserves.

The Project falls under the government's agricultural development strategy of making more efficient use of the land, improving the use of natural resources and creating productive employment opportunities.

2. Objectives

The Project aims to accomplish the following objectives:

General

- To promote the territorial organization of the Patuca and Coco river basins
- To incorporate the area's production into the national economy, and increase income levels of small-farm households
- To discourage shifting agriculture and range livestock activity
- To produce more dairy and meat products for the urban population

Intensification of livestock activities, modernization of coffee growing, exploitation of flora and fauna consistent with the protection of natural forests. The Project will have a positive impact on the environment.

The incomes of small farmers will be increased. At the same time, reactivation in the area will have a positive impact on the national economy.

Specific

- To increase livestock productivity by strengthening farm management skills and upgrading livestock capital
- To start renewal of coffee plantations by upgrading technology use and supporting the establishment of coffee processing plants
- To encourage the planting of *Leucaena leucocephala* in the Patuca river basin, for purposes of reforestation and for producing forage for cattle

3. Strategy

Zoning will be used for organizing the exploitation of this territory, and will consist of the following actions:

- Begin marking the borders of forest reserves
- Encourage the organization of farmers
- Transfer technology organized from a business perspective which promotes changes proven on a commercial scale, and complements support technical assistance offered to the producers
- Provide training to beneficiaries with a view to equipping them to make full use of their farm resources, and to conserve the river basins
- Upgrade technical assistance, provide access to credit, and organize the harvest and post-harvest services
- Involve the organized private sector in the decision-making process, in order to improve Project implementation, ensure ongoing follow-up and evaluate progress of work done

Sound business practices will be used to boost production. The private sector will play a decisive role.

4. Subprojects and Components

The proposed activities are organized into three subprojects: livestock activity, coffee cultivation and reforestation.

Three subprojects have been designed to operate within the context of this Project to protect the natural resources of the Patuca and Coco river basins and develop the highlands of the Jamastran Valley. The three subprojects concern: the development of dual-purpose livestock activities, the modernization and renewal of coffee plantations, and reforestation of devastated areas with rapid-growing, multi-use tree species.

Subproject 1. Development of dual-purpose livestock activities

This subproject aims to reduce the surface area devoted to livestock activity, by concentrating cattle raising on appropriate parcels which have access to road infrastructure and electric power. This will be complemented by the transfer and adoption of

improved technology that is compatible, from technical and economic points of view, with prevailing production systems. Also envisaged is the training of farmers and technical personnel in matters relative to livestock production and management, and to handling of the products at farm level.

Surveys of the area have shown that the cattle ranches are of medium size. Thus, 50- and 100-hectare parcels were selected as production models, in order to define investment needs, determine costs, and assess the financial and economic feasibility of the subproject. The Project aims to develop a total of 425 farms, of which 245 average 50 hectares in size, and the remaining 180 averaging 100 hectares, for a total of approximately 30,500 hectares.

This subproject will strengthen technical assistance by improving the delivery of the services and involving better-qualified personnel. It will cover operating expenditures, equipment and tools.

Subproject 2. Modernization and renewal of coffee plantations

The area covered by this subproject includes the highlands of the Patuca River basin, the municipality of Trojes, and parts of the municipalities of Danll and El Paraiso. Some 15,800 hectares of coffee, distributed among 3,600 farms, exist in these three municipalities. This subproject consists of two complementary components: renewal of 1,000 hectares under cultivation, and establishment of 50 farm-level coffee processing plants. A twofold objective is thus sought: to increase productivity and to improve coffee quality for export purposes.

A specific farm model has not been selected to estimate investment needs. Renewal would be carried out on parcels over five hectares in size. In order to estimate investment needs, operating costs and the financial and economic feasibility for the 1,000 hectares of coffee plantations, calculations were based on three 300-hectare sections, as this constitutes a less-costly alternative for the provision of technical assistance and credit services under the Project.

The second component envisages the installation of 50 coffee processing plants which can process an average of 2,178 quintals per year of parchment coffee. This represents the output of a modernized 35-40 hectare farm. Coffee growers would not necessarily have to have a farm of that size to install a processing plant. In addition to processing their own coffee, they could process the coffee of their neighbors. Investment needs, operating costs, and financial and economic feasibility were estimated on the basis of one processing plant. It is expected that the installation of the processing plants will take three years: 20 during the first year, 15 during each of the remaining two years.

Project methods will be used in other places: the Project's multiplying effect will contribute decisively to agricultural reactivation.

The characteristics of each area and its comparative advantages will be rigorously respected. For instance, intensive reforestation will be undertaken in the Patuca river basin.

Subproject 3. Reforestation with multi-use trees

The reforestation subproject with multi-use trees was designed specifically for the Patuca river basin. The tree species selected is *Leucaena leucocephala*, locally known as *guaje*, which has a wide range of uses. It produces an enormous amount of wood per year. Temperature, elevation and rainfall conditions in the Patuca river basin are highly favorable for this tree, which has already been successfully introduced in other parts of Honduras.

This subproject aims to reforest some 3,000 hectares over a period of three years. It will benefit 120 farms, and an average of 25 hectares will be reforested per farm.

5. Goals

Subproject 1. Development of dual-purpose livestock activity

- To gradually and progressively upgrade livestock activities on 425 farms, 245 of which measure some 50 hectares, and 180 averaging 100 hectares
- To improve 30,250 hectares for livestock activities, mainly in the Trojes municipality and the Patuca river basin
- To increase milk production in the area from 1.3 million liters (without the Project) to 3.4 million by the eighth year of Project activity
- To increase the number of head of cattle for the market, from 3,000 (without the Project) to 10,900 by the ninth year of Project activity

Subproject 2. Modernization and renewal of coffee production

- To renew 1,000 hectares of coffee, comprised of three 334-hectare sections. Each group would receive technical and credit assistance for installing and maintaining the crop. Total output expected: 57,000 quintals of dry parchment coffee in seven years
- To install 50 farm-level coffee processing plants over a period of three years, with a total expected output of 1,089,900 quintals

Subproject 3. Reforestation with multi-use trees

- To promote the reforestation of 3,000 hectares in the Patuca river basin over a period of three years. This would complement the livestock component, since the *Leucaena leucocephala* trees would provide forage and serve as live fence posts. Approximately 18 million *Leucaena* trees would be planted.

Livestock activities will be improved on over 400 farms, and meat and milk production will increase notably.

The relationship between the different components will foster secondary benefits: the *Leucaena* trees will provide forage for the livestock, and will also serve as live fence posts.

6. Project Beneficiaries

When the Livestock Development Program for the Recovered Zone was formulated in 1981, some 540 cattle ranches in the Trojes municipality alone were targeted to benefit from subproject 1. Inclusion of the Patuca river basin, which is chiefly used for livestock activity, and the Jamastran Valley, boosts these figures considerably. It is estimated that 425 parcels would be served by the livestock subproject.

The beneficiaries of subproject 2 are located in the municipalities El Paraiso, Danil and Trojes. A total of 3,629 working farms were identified, with approximately 16,080 hectares in coffee. Most of the activity of this subproject will take place in Trojes, which has 584 farms with 2,860 hectares under cultivation. Among the three municipalities, it is expected that there are more than 1,258 farms measuring over five hectares in size, and a total of 12,395 hectares devoted to coffee. Renewal of 1,000 hectares of coffee plantations will affect 8 percent of the five-hectare farms identified. The coffee processing plants can service the needs of a 35-40 hectare modernized farm. In these three municipalities, only an estimated 190 parcels have that much planted in coffee, but a viable alternative is to establish the processing plants on smaller farms, which can provide services to neighboring farmers.

The beneficiaries of subproject 3 (reforestation) are the farmers settled in the Patuca river basin, where an immense area has been deforested. Calculations were based on a 25-hectare model: following this plan, 3,000 hectares would be reforested, benefiting some 120 farmers.

Overall, the Project will directly benefit some 645 farms, for a total of 34,250 hectares. The number of beneficiaries was calculated at three producers per farm.

More than 600 farms totaling over 34,000 hectares will benefit directly.

Description	Farm	Ha	Beneficiary
50-ha livestock model	245	12 250	735
100-ha livestock model	180	18 000	540
<i>Subtotal</i>	425	30 250	1 275
Renewal of coffee plantations	100	1 000	300
Reforestation with <i>Leucaena</i>	120	3 000	360
Total	645	34 250	1 935

About 50 agricultural public-sector technicians will improve their skills through their involvement in the Project

7. Support Services for Production

Technical personnel from the agricultural public sector stationed in the southeastern part of Honduras would be directly involved in the Project. Seventeen work with the Ministry of Natural Resources and the National Agrarian Institute, seven with the National Agricultural Development Bank, and 13 with the Honduran Coffee Institute.

III. ORGANIZATIONAL STRUCTURE

The Regional Agricultural Committee will serve as the executing unit and will coordinate the activities of the public and private sectors.

1. Executing Unit

Project coordination will be the responsibility of the Regional Agricultural Committee. Private livestock and coffee growers' organizations would participate on this committee.

The Project proposes a credit line for producers, complemented by technical assistance.

Subproject 1 (livestock) will be served by BANADESA and/or the Agricultural Credit Project of the Central Bank of Honduras, which specializes in credit for livestock activities. It is suggested that a professional team be set up, with sufficient resources to provide technical assistance to credit beneficiaries, and to ensure adequate and timely follow-up. The institutional location of the technical team will be determined when the way in which credit will be channeled to cattle ranchers is established.

In the case of subproject 2 (coffee), credit will be channeled through BANADESA or BANCAFE. It is also recommended that a technical team be established for the coffee subproject, under the Honduran coffee organization, IHCAFE. The same applies to subproject 3: credit for reforestation will be made available through BANADESA, or other public and private credit institutions active in the region. In this case, the technical support team would be placed under the COHDEFOR regional office.

2. Plan of Action

The following plan of action is suggested:

Special emphasis will be placed on enforcing legal provisions, established with a view to preventing the destruction of forests

- To organize and structure the actions of the Regional Agricultural Committee
- To take immediate steps to stop the destruction of natural forests in the area, by creating a forest reserve, as provided for by law

- To determine the criteria for selecting initial and subsequent Project beneficiaries, on the basis of their capacity to repay loans, and to start making initial loans with funds allocated by the Project to the financial institutions
- To organize the technical assistance services to be provided to target farmers
- To monitor the activities carried out during the first year of the Project, and evaluate those activities

3. Resources

The Project is designed to use, to the extent possible, the physical and human resources of the institutions operating in the area. The three subprojects include a budget item for technical assistance, with the purpose of improving the effectiveness of these services.

Total resources are estimated on the basis of personal services, operating costs, purchases of equipment, and contingencies for a four-year period. The coffee subproject should maintain technical assistance services for a seven-year cycle. Technical assistance for the reforestation subproject should be provided for five years.

Upgraded technical assistance and accompanying training are among the benefits of the Project.

Following is an itemized list of resources necessary for implementing the Project:

Subproject 1. Livestock development

Upgrading production and milking infrastructure	Farms	425
Improvement of fences	Km	2 415
Installation of water supply equipment	Farms	425
Improvement of pastures	Ha	17 545
Cattle for breeding		
-Bulls	Head	605
-Cows	Head	3 025

The infrastructure installed for accomplishing the proposed objectives will be used for many different activities.

Subproject 2. Renewal of coffee plantations

Renewal of coffee plantations	Plots	120
	Ha	1 000
Coffee processing plants	Number	50
Wooden shed, motor, fermentation tanks, water collection tanks, machinery	Capacity quintals	2 178

Subproject 3. Reforestation

Installation of nursery	ha	75
<i>Leucaena</i> plantations	ha	3 000

4. Participating Institutions

The Regional Agricultural Committee will be comprised of organizations of the agricultural sector operating in the area, and several private agricultural organizations. It will coordinate Project implementation, as explained above. Also scheduled for participation are BANADESA and/or the Central Bank's Agricultural Credit Project, BANCAFE, IHCAFE, COHDEFOR and private banks.

IV. COSTS AND FINANCING

1. Costs

Total Project costs are estimated at US\$16,779,700 million.

The overall cost of the Project has been estimated at nearly US\$17 million.

Subproject	(US\$ X 000)
1. Livestock development	10 260.9
Investments in farms	4 976.0
Production costs	5 043.4
Technical assistance	241.5
2. Renewal of coffee plantations	3 529.4
Investments in crops	1 667.7
Production costs	1 398.4
Investments in processing plants	307.0
Operating-Installation costs	60.7
Technical assistance	95.6
3. Reforestation	2 989.4
Investments in crops	2 200.5
Operating costs	609.0
Technical assistance	179.9
Total	16 779.7

The cost per each direct beneficiary (1,935 beneficiaries) would be US\$8,600.

2. Financing

The Project's financial requirements for a four-year period cover investments, operating costs and the cost of technical assistance.

A total of US\$9,852,700 for a four-year period is being requested in external funding. The external funds would be distributed to the sub-projects as follows:

Subproject	(US\$ X 000)
1. <i>Livestock development</i>	4 976.0
2. <i>Coffee</i>	2 676.1
- <i>Renewal of coffee plantations</i>	2 369.1
- <i>Coffee processing plants</i>	307.0
3. <i>Reforestation Leucaena</i>	2 200.6
Total	9 852.7

Local financing to be provided for the Project amounts to US\$6,927,000. The external financing requirements were estimated on the basis of the following:

Approximately 40 percent of Project financing will be picked up by local sources.

- Financing will be sought to cover investments in the livestock subproject for a two-year period.
- For the coffee subproject, financing will be sought for the investments required to renew coffee plantations over a period of four years, and to install coffee processing plants over a period of three years. It will also cover 50 percent of the subproject's operating expenditures through an annual revolving fund (the banks usually finance the operating costs of coffee growers).
- In the case of the reforestation subproject, financing will be sought to cover 100 percent of the installation costs over a period of three years.

V. ANALYSIS

1. Technical Analysis

The Project analysis demonstrates that it is technically sound. Conditions in the Trojes area and the Patuca river basin are favorable for developing dual-purpose livestock activities. Coffee growing is traditional in the municipalities of Trojes, Danli and El Paraiso. Coffee cultivation techniques are well known and, given that lands in the target area are appropriate for this crop, increases in productivity can be expected in the very short term, especially in Trojes.

Direct technical support will be available for the implementation of scheduled activities

Conditions in the Patuca river basin are appropriate for the cultivation of *Leucaena*, thus no problems are envisaged in establishing the plantations. Although this crop is not very well known in the area, and farmers have no experience in raising it commercially, direct technical assistance will be provided to ensure proper plantation management, and to help farmers overcome their technical shortcomings.

The input-output coefficients used to project the results from improving livestock production practices, increasing productivity on renewed coffee plantations and upgrading coffee quality through the establishment of processing plants, indicate that each of the subprojects will be economically profitable, and that the proposed goals are attainable through Project implementation.

The technologies recommended for the livestock development and the coffee renewal subprojects, consist of practices that are easy to apply and that can be readily adapted and adopted by the farmers. The area already has a basic herd which can be improved in the short term, as well as modern coffee plantations. The farmers have ample experience in both cattle raising and coffee growing.

2. Institutional Analysis

There are public and private organizations in the region with experience in providing credit for livestock and coffee activities. Thus, the Project can go into action immediately. Although scarce resources represent a financial limitation, the institutional financial services infrastructure is in place, and no major difficulties are envisaged in obtaining the counterpart funds required for implementing the Project.

3. Legal Analysis

The primary legal problem in the area of legalization of property rights of farmers, is being tackled by the government. This will strengthen Project actions, and give it access to the facilities that banking institutions will set up for farmers. The public and private sectors have already taken steps to expedite resolution of the land tenure situation, especially in the Patuca basin.

Another factor that will contribute to Project success is the adoption by the government of legal measures to create forest reserves, and a new tax incentives law, of which there is already a bill under discussion. Approval of this law will provide incentives for planting *Leucaena* trees throughout the region. In other respects, the Project does not face any legal obstacles that might hamper implementation.

The government will pay special attention to giving Project beneficiaries legal titles to their land. The private sector will support and help expedite this process

4. Financial and Economic Feasibility

The internal rate of return (IRR), and the net present value (NPV), taking into account the financial costs, show the following results:

Description	IRR (%)	NPV (US\$)
Livestock subproject	20.75	1 013.8
Coffee plantation subproject	18.08	4 801.8
Coffee processing subproject	22.17	2,384.0

The sensitivity analysis of the livestock subproject at the farm level was based upon the following parameters:

Variable	IRR (%)
50-ha farm	
(10 percent annual increase in operating costs, and US\$0.25 increase in milk prices)	19.68
100-ha farm	
20 percent interest on investment loans	19.76
Annual increase in operating costs	17.27

The sensitivity analysis of the coffee subproject (plantation renewal) was based upon the following parameters:

Variable	IRR (%)
10% annual increase in operating costs	7.55
20% interest on the medium-term loan (15% increase on the short-term loan)	11.15

The sensitivity analysis of the coffee subproject (processing plants) was based upon the following parameters:

Variable	IRR (%)
Coffee processing plants	
10 percent annual increase in operating costs	21.32
20 percent interest on the medium-term loan	19.5

In the case of the reforestation subproject, the IRR analysis based on the sale of fire wood is negative when 12 percent interest is applied to the funds received by the farmer to meet 100 percent of the investment expenditures (-3.7%). Under an "interest free" alternative, the IRR improves somewhat (+7.3%). It must be remembered, however, that this subproject will provide many social benefits, such as reforestation, fire wood, forage, organic fertilizer, fence posts and lumber. Nevertheless, it will be necessary to solve the problem of financing, which can be done if its role in the important and complementary livestock subproject is taken into account.

The financial analysis reflects the conviction that the indicators of one subproject can justify lower indicators in the other subprojects or components. In other words, social benefits were taken into account.

Additional parameters and scenarios

In order to facilitate economic assessment of the Project, a further analysis was made, using alternate scenarios. The following results were obtained:

- For the financial analysis, the following parameters were used: revenues and costs at market prices; discount rate, 12 percent; and useful life of the Project, 20 years. The following results were obtained: internal rate of return (FIRR), 33.9 percent; benefit/cost ratio (B/C), 1.7; and net present value (NPV), US\$ 23.153 million.
- For the economic analysis, the following parameters were used: elimination of taxes and subsidies; correction factor for skilled labor, 80 percent and useful life of 20 years.

Under these circumstances the results were:

Description	EIRR (%)	B/C
-Livestock development	25.4	1.4
-Rehabilitation of coffee farms	39.6	1.3
-Coffee processing plants	66.8	2.4

5. Project Impact

Results by year 8: 13 million liters of milk; 10,000 head of cattle; gross receipts of US\$3 million in coffee sales; reforestation of 3,000 hectares.

With regard to subproject 1 (livestock), it is estimated that the 425 farms will produce, by the eighth year, 13.4 million liters of milk, for an estimated value of US\$3.1 million. Production estimates for the 50-hectare model farm, by the eighth year, would amount to 22,080 liters, for an estimated value of US\$5,080. The 100-hectare farm model will have an estimated output of 44,160 liters, for a value of US\$10,160. Additionally, the sale of livestock for breeding purposes, and for slaughter, is estimated at 9,550 head, for an estimated value of US\$1.6 million for the 425 farms, by the eighth year.

In the case of the coffee subproject, it is estimated that, with a production of 57 quintals of parchment coffee per hectare, harvests of 57,000 quintals would be obtained from the 1,000 hectares. At an average sale price of US\$56 at the farm gate, this would represent a gross income of US\$3.2 million. Assuming that coffee would sell for US\$70 per quintal FOB, foreign-exchange revenues would amount to US\$4 million. Finally, the 50 coffee processing plants installed would improve the quality of 108,900 quintals of coffee.

Furthermore, coffee growing is relatively labor intensive. Planting the crop requires 227 work days per hectare, and the harvest requirement is 35.5 work days per hectare. The planting of 1,000 hectares will require 227,000 work days, and, at harvest time, based on an average of 57 quintals per hectare of parchment coffee, it is estimated that 35,500 work days will be generated per year.

Many jobs will be created. Similarly, other social benefits will be generated by the three subprojects

The social benefits of the reforestation project include the conservation of existing forests and the recovery of devastated forests. Three thousand hectares will be reforested, and this will generate the following additional benefits: production of organic fertilizers, forage, fence posts and seeds for human consumption, in addition to 700,000 loads of firewood every five years.

The proper management of forest reserves will improve the agroecological systems of the Patuca and Coco river basins.

HONDURAS

**PRODUCTION OF BACTERINS AGAINST
HEMORRHAGIC SEPTICEMIA AND SYMPTOMATIC
ANTHRAX**

(Project)

1991

PROJECT CAM-90-002 UNDP/PAHO/PEC

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INTRODUCTION

In the mid 1970s, the government of Honduras initiated the Animal Health Program, funded by the Inter-American Development Bank (IDB). The Program called for the establishment of an administrative and sanitary infrastructure for the diagnosis of animal diseases and the development of a campaign to control and eradicate brucellosis and bovine tuberculosis. The IDB funding was used to set up and equip a quarantine station, administrative offices, a national central reference diagnostic laboratory and seven regional diagnostic laboratories, and to launch an animal health campaign in the country.

Honduras has the administrative and sanitary infrastructure to diagnose, control and eradicate animal diseases.

Through the implementation of this program, Honduras has acquired a national veterinary laboratory network to support the development of livestock. The network is administered by the General Directorate of Livestock and staffed by profession microbiologists, veterinarians, chemists and pharmacists, laboratory technicians and administrative personnel. The regional laboratories provide diagnostic services to the whole country, while the central laboratory provides three different types of services: diagnosis, research and production of biologics.

At the beginning of the 1980s, the veterinary laboratories and the central laboratory were converted into the Honduran Veterinary Research Institute (IHIMV). The Institute has diversified its production of biologics to include simple bacterins against symptomatic anthrax, hemorrhagic septicemia and malignant edema; double bacterin (*Pasteurella-Clostridium*) and triple bacterin (*Pasteurella-C. Septicum-C. Chauvoei*).

In the mid-1980s, the Development Program for Cattle Production and Animal Health (PROFOGASA) was implemented to support the technological services of the General Directorate of Livestock of the Secretariat of Natural Resources, funded by the IDB. The success of this program has contributed to the development of cattle raising in the country.

Qualified personnel and the necessary infrastructure exist for the production of bacterins

The Institute has qualified personnel and the necessary infrastructure for producing bacterins experimentally. Honduras is importing more than two million doses annually. The Institute has already produced the vaccine and has shown it to be of good quality; it has the capacity to produce 1,600 doses per month.

The government intends to step-up its efforts to support the production of vaccines against hemorrhagic septicemia, symptomatic anthrax and malignant edema, on a larger commercial scale. This

would make it possible to meet the domestic demand in the short term and, over the medium term, to begin supplying bacterins to other Central American countries. The government of Honduras would require the technical and financial participation of cooperating agencies and countries to supplement its own limited resources for carrying out this Project.

I. FRAME OF REFERENCE

1. Macroeconomic Setting and Its Impact on the Project

The government grants top priority to animal disease control programs.

The livestock subsector plays an important role in the economic development of Honduras. It is one of the key sources of exports, dietary protein and employment. Animal disease control programs hold top priority for the country. Sufficient amounts of veterinary products to control cattle diseases must be readily available at a reasonable price. Analytical laboratory services provide technical support for the General Directorate of Livestock to protect the nation's livestock industry.

The following is a breakdown of the domestic demand for bacterins during the 1987-1989 period:

Year	Population (number of animals)	Domestic demand	Supply (number of doses)	Deficit
1987	2 870 000	2 900 000	2 100 000	800 000
1988	3 046 000	3 100 000	2 232 000	868 000
1989	3 215 000	3 500 000	2 500 000	980 000

The Project aims to meet the domestic demand and help satisfy regional needs.

Bacterins are being imported to meet the domestic demand. These imports increased in 1989, absorbing larger amounts of foreign exchange. Because the exchange rate has more than doubled, making access to foreign currency more costly, the price of imported vaccines has risen, which in turn, pushed up the costs of controlling cattle diseases. If the Institute were able to produce more bacterins, it could, in the short term, supply national needs with better products than those imported, in terms of both price and quality. It could also meet part of the demand from the rest of Central America.

There is a large domestic market for this product. While 3.5 million doses were requested in 1989, importers provided only 2.5 million, which indicates a current shortfall of approximately one million doses. In percentage terms, imports are meeting 72 percent of the domestic demand, while 28 percent of the domestic needs go unmet.

Estimates for the domestic demand for bacterins for 1991-2000 are as follows:

Year	Domestic demand Number of doses	Year	Domestic demand Number of doses
1990	3 600 000	1996	4 400 000
1991	3 700 000	1997	4 500 000
1992	3 900 000	1998	4 700 000
1993	4 000 000	1999	4 800 000
1995	4 100 000	2000	5 000 000

Initially, the Project would cover the domestic shortfall. It will then meet full domestic demand, in the short term, and finally, in the medium term, reach out to the Central American market. The countries of Central America constitute a ready market. Statistics show that Costa Rica imported 4,730,500 doses of bacterin from Mexico in 1988 and 2,675,000 in 1989, for an annual average of 3,702,750 doses. This large Costa Rican market could be supplied by production from the Project.

Costa Rica could provide a large market for bacterins produced by the Project.

2. Analysis of Production Options and of the Technical Environment

The Honduran Veterinary Research Institute (IHIMV) is headquartered at Nueva Aldea, Km 15, in the jurisdiction of Tegucigalpa, Francisco Morazan Department. The Institute has the necessary technology to produce bacterins, as well as specialized technical personnel, equipment and materials, and animal laboratory facilities. Bacterins have been produced on an experimental basis, and the high quality of these products in controlling diseases has already been established.

The technical problem that must be solved is how to produce more than seven million doses a year, on a commercial scale. The Project will produce simple, double and triple vaccines against hemorrhagic septicemia, symptomatic anthrax and malignant edema.

More than seven million doses need to be produced annually on a commercial basis to combat hemorrhagic septicemia, symptomatic anthrax and malignant edema.

The needed technological know-how already exists. Three types of commercial products will be obtained:

1. Simple bacterin against symptomatic anthrax (inactive cells of *Clostridium chauvoei*)
2. Simple bacterin against hemorrhagic septicemia (Types A and *D Pasteurella multocida*)

3. Double bacterin against symptomatic anthrax and hemorrhagic septicemia (cells from *Clostridium chauvoei* and *Pasteurella multocida*)

The three types of vaccines will be marketed in 50 ml vials (10 doses); 100 ml vials (20 doses); and 250 ml vials (50 doses).

3. Socioeconomic Situation of Potential Beneficiaries

The Project will benefit small, medium and large cattle ranches, regardless of whether they are covered by agrarian reform. Estimates indicate that approximately 95,000 producers in Honduras are raising cattle.

If the beneficiaries are divided into strata, most of them fall into an intermediate group of farms measuring between 20 and 400 hectares. This group contains 36 percent of all the operations, owning 66 percent of the land and 66 percent of the cattle:

Size (hectares)	Farm (%)	Area (%)	Cattle (%)
Less than 20	63.0 %	15 %	22%
20 to 400	36.0 %	66 %	66%
More than 400	0.9 %	19 %	12%

Ninety-nine percent of the growers suffer losses.

Small- and medium-scale producers suffer the greatest losses to the presence of diseases that could be controlled if this type of vaccine were more readily available. Eighty-eight percent of the national herd, and 99 percent of the growers, are in this group.

These diseases have their heaviest impact on the smallest growers, who do not have the necessary income to purchase veterinary products to treat their animals.

4. Institutional Conditions

The Institute boasts modern infrastructure. The central laboratory alone has buildings, industrial and office equipment, furniture and an inventory valued at approximately 2.5 million lempiras. This amount does not include the regional laboratories.

The Institute receives a specifically allocated annual budget of approximately 419,900 lempiras. Most revenues from the sale of biologics come from the rabies vaccine: 306,000 lempiras in 1987 and 275,000 lempiras in 1989. The Institute does not reinvest its earned income in modernizing its equipment or expanding its facilities.

The Institute provides livestock diagnostic and health services to prevent diseases in domestic animals. These services are offered free of charge. It has specialized units for diagnosis, research and the production of biologics. The Secretariat of Natural Resources is studying the possibility of charging for the Institute's services in order to recover at least costs incurred. The Institute has a specialized area for the production of biologics, which is made up of the following units: laboratory animal facilities; canine and feline rabies vaccines; bacterins; and antigens. The administrative and accounting system is operated by the General Directorate of Livestock.

In order to ensure the profitability of the Project, fees will be charged for veterinary diagnostic and health maintenance services.

In summary, the Institute has modern infrastructure and trained personnel and can serve as a basis for initiating the commercial production of bacterins. Nevertheless, additional financial resources are needed to expand the facilities and pay for equipment, supplies, inputs, reagents, culture medium, laboratory animals, additional personnel, specialized training for commercial production, and the active promotion of sales. Above all, funds are needed to organize the Institute's bacterin production section into a specialized business venture that can supply the large Central American market.

The Institute will be organized as a specialized business venture, producing bacterins for the Central American market

If privatization is an option, business and professional groups directly related to the production and consumption of the product could continue to execute the Project in an efficient, business-like fashion. A private company would administer the bacterin production area within the Institute's facilities. The arrangement could be formalized by a five-year, renewable agreement between the government and the private sector.

5. Legal Framework

The Institute's production of biologics is governed by the pertinent provisions of the Pan American Health Organization (PAHO) and the World Health Organization (WHO). The antigens and vaccines produced at the Institute have been sent to international centers to be registered and to undergo quality control. The antigens and vaccines are continuously analyzed to ensure that they meet standards of safety, sterility, purity, sensitivity and potency.

As a government enterprise, the Institute is exempt from paying taxes on income generated from the production and sale of biologics. Product listings must be filed with the registry of trademarks and patents of the Ministry of Economy; the records are updated annually for a fee of 75 lempiras. The Ministry of Public Health holds an agreement with the Secretariat of Natural Resources to purchase vaccines, so they will be available for national health-care campaigns. IHIMV products can be freely sold to the public.

Income generated from the sale of biologics is tax-free

The Animal Health Law provides the legal framework of the Project and sets standards and procedures for the control of biologics and chemical-pharmaceutical products for veterinary use.

6. The Project in the Context of Regional Integration

All the countries of Central America experience many of the same livestock health problems. The technology is available for solving these problems through joint actions, using human and technical resources that already exist in the countries of Central America. A clear example is disease control for septicemia and anthrax, which requires producers to vaccinate their animals every year.

The Project will produce bacterin vaccines against hemorrhagic septicemia, symptomatic anthrax and malignant edema. In order to meet domestic demand and, in time, the demand in Central America. To this end, agreements can be signed which will allow the country to sell this product on the regional market.

Agreements will be signed to ensure sale of the product on the regional market

II. PROJECT DESCRIPTION

1. Justification

- As imports are substituted and bacterins are eventually exported, short-term savings will be realized and foreign exchange will be generated over the medium term.
- The Project will spur technological development for the production of biologics in Honduras and in the other Central American countries.
- Conditions are favorable for preparing a high-quality veterinary product that will be well-received by cattle ranchers.
- The Project will guarantee the domestic market a better, safer and more-economical supply of veterinary products than can be obtained through imports.
- Fewer external funds will be needed; they will supplement investments already made by the country.

2. Objectives

General

- To produce bacterins on a commercial scale to meet local demand in the short term, and, in the medium term, export to the Central American market

The Project is a classic means to strengthen Central American integration.

Specific

- To obtain the appropriate infrastructure and specialized equipment for the commercial production of bacterins
- To provide a source of animals to be used in testing vaccines, inputs and reagents
- To obtain specialized technical assistance for commercial production and quality control of the vaccine
- To facilitate training for personnel so they can work more efficiently on a commercial scale
- To promote sales in domestic and Central American markets

The training of specialists will lead to growth in other chemical-pharmaceutical areas.

3. Strategy

In order to achieve the proposed objectives, a three-stage strategy must be developed:

Stage 1

Organize and Implement the Project. This will include recruiting additional technical personnel, implementing a cost accounting system for the production of bacterins and providing a budget with the Project's own earnings to be reinvested in the production of biologics. The means must be obtained to expedite direct importation of the necessary equipment, supplies and inputs. This stage will conclude with the expansion or remodeling of the physical plant, particularly the facilities for breeding laboratory animals.

Stage 2

Produce the bacterins commercially. The module for producing 200,000 doses per month will go into operation. This stage will culminate with the execution of technical cooperation agreements needed for the efficient commercial production of bacterins, and the establishment of quality control for the commercial product. Resources will be available to increase the permanent stock of culture medium, reagents and laboratory animals.

Stage 3

Promote the product among growers. The private sector plays an active role. Promotional activities will be carried out through the extension service of the Secretariat of Natural Resources, with specially designed advertising, and supply contracts will be signed with livestock associations from the countries of Central America for the sale of the Institute's products.

Carefully targeted advertising will be used to penetrate the market, sales policies will be coordinated through contracts with livestock associations throughout the isthmus.

4. Components

The Project will be divided into six components:

- Organizing the management structure and the administrative system
- Expanding or remodeling the building and the facilities for breeding laboratory test animals
- Providing advisory services and training
- Producing the bacterins
- Promoting the product on the domestic market
- Promoting the production for the Central American market

Component 1. Organizing the management structure and the administrative system

This component will cover the start-up activities of the Project, such as recruiting technical personnel, implementing the cost accounting system for the production of bacterins, and budgeting Project earnings for reinvestment in the production of biologics. Paperwork will need to be completed to expedite direct imports of the necessary equipment, supplies and inputs.

Component 2. Expanding or remodeling the building and the facilities for breeding laboratory test animals

Under this component, the Project will commission the expansion or remodeling of physical facilities, especially the area for breeding laboratory animals. The first step will be to draw up detailed blueprints for expanding and remodeling the Institute's present facilities.

Component 3. Providing advisory services and training

This component will include the establishment of technical cooperation agreements for training laboratory personnel in the commercial production of bacterins. It will also include technical support for implementing strict quality control of commercial products offered on the domestic and Central American markets.

Component 4. Producing the bacterins

Production will build up according to the following timetable:

- *Year 1.* A total of 15,000 doses will be produced at the rate of 5,000 doses in each of the second, third and fourth quarters, based on the experimental module of 1,666 doses/month.
- *Year 2.* Demand will be 3.9 million doses. The Project will produce 2.4 million doses at the rate of 600,000 doses per

Physical facilities will be expanded and remodeled to increase production and improve quality

quarter, based on three commercial modules of 200,000 doses per month. The remaining 1.1 million doses will be covered with imports during June.

- *Year 3.* The demand will be 4 million doses. Production will reach 4.8 million doses, at a rate of 1.2 million doses per quarter, based on six commercial modules of 200,000 doses per month. The year will begin with a balance of 1.3 million doses from Year two, and the remaining 2.7 million doses will be supplied by July.
- *Year 4.* Demand will reach 4.1 million doses. There will be a 2.1-million-dose balance on hand from Year three. The 2 million still needed will be available by May. The plant will produce 4.8 million doses, at a rate of 1.2 million doses per quarter, based on six commercial modules of 200,000 doses per month.
- *Year 5.* Demand will reach 4.3 million doses. Production will rise to 5.4 million doses, at a rate of 1.8 million doses during the first three quarters. There will be a balance of 2.8 million doses on hand from Year four. The remaining 1.5 million doses to meet the year's demand will be available by March. This will leave a balance of 5.7 million doses for Year six.
- *Year 6.* Demand will reach 4.4 million doses. Production will total 7.2 million doses, at a rate of 1.8 million doses each quarter. This amount, plus a balance of 700,000 doses from Year five, can be exported.

Production is planned over six years, based on a study of demand in Honduras and the rest of Central America.

The proposed production model (200,000 doses per month) would have to be reproduced as many times in a given month as necessary in order to meet the Central American demand, either partially or wholly. The Project could begin to export 8.5 million doses to the countries of Central America.

The Project could be exporting 8.5 million doses to the other countries of the isthmus by the sixth year.

Component 5. Promoting the product on the domestic market

This component will promote the commercial product among cattle growers through the extension services of the Secretariat of Natural Resources, using specially-designed advertising materials.

Component 6. Promoting the product on the Central American market

This component includes activities to establish supply contracts with livestock associations in the countries of Central America. Resources for this component are not included in the Project budget, since it is understood that the Institute will use the revenues obtained over the five years, to cover the costs of a promotional campaign aimed at Central American markets.

5. Goals

Projections for the next 10 years show that vaccine production is fully justified.

The Project will produce enough bacterins to supply the domestic market in the short term and, in the medium term, export to Central American markets.

Year	Domestic demand	Domestic supply	Production of bacterins	Previous year balance	Imports	Exports
1	3 700	2 600	0	0	2 600	0
2	3 900	5 200	2 400	0	2 800	0
3	4 000	6 100	4 800	1 300	0	0
4	4 100	6 900	4 800	2 100	0	0
5	4 300	8 200	7 200	2 800	0	0
6	4 400	2 000	7 200	5 700	0	8 500
7	4 500	4 500	13 000	0	0	8 500
8	4 700	4 700	13 200	0	0	8 500
9	4 800	4 800	13 300	0	0	8 500
10	5 000	5 000	13 500	0	0	8 500

6. Project Beneficiaries

The number of direct beneficiaries of the Project can be estimated on the basis of the following facts:

- Cattle to be immunized in Honduras. The livestock population to be vaccinated was determined as a percentage of the national herd. It is estimated that 26 percent of the total population will need vaccination the first year, rising to 96 percent by the third year. It is important to note that calves are vaccinated twice a year and adult animals, only once a year.

(Thousand head of cattle)

By the third year, 96 percent of the national herd will have been vaccinated.

Year	Total population	Total needing vaccination	%
1	3 657	0	0
2	3 805	1 024	27
3	3 952	3 804	96
4	4 100	3 952	96
5	4 247	4 100	96
6	4 394	4 247	96
7	4 542	4 400	96
8	4 690	4 500	96
9	4 837	4 600	96
10	4 984	4 700	96

- An estimated 95,000 Honduran livestock producers will benefit from the Project. The following is a breakdown of the beneficiaries during the life of the Project:

Year	Producers
1	26 840
2	96 500
3	97 100
4	97 700
5	98 300

- If the Project exports to other Central American countries, it could contribute to livestock development by protecting approximately 10.4 million head of cattle (1988).

An estimated 10 million cattle will be protected with the exported vaccines.

7. Support Services for Production

Bacterin production will receive the following support services:

- Applied research in disease control. Organizations that will support the Project are: the General Directorate of Livestock, the National Livestock Center and the Ministry of Health.
- Training in the commercial production of bacterins. The specialized institutions will be: the United Nations Food and Agriculture Organization (FAO), the Inter-American Institute for Cooperation on Agriculture (IICA) and the Pan American Health Organization (PAHO).

III. ORGANIZATIONAL STRUCTURE

1. Executing Unit

The Honduran Veterinary Research Institute will be responsible for carrying out the Project, through a specialized section for bacterin production.

Executing Unit: Honduran
Veterinary Research Institute

The follow-up and control system will be based on annual plans of operation. Clients from the Honduran and Central American private sector will be encouraged to participate in the evaluation.

Privatization of vaccine production will improve the prospects for success of the Project.

2. Plan of Action

Annual plans of operation will include a detailed schedule of actions for executing the Project: commercial production; training technical personnel; and, promoting the product in the local market.

Minimal experimental production of 1,666 doses per month will be organized during the first year; commercial production will begin in the second year, to cover that year's short-fall; by the third year, production levels will be high enough to meet the domestic demand.

The first year's plan of operation will include the following specific actions:

Quarter I.

- Administrative system organized
- Technical support provided for execution

Quarter II.

- Equipment and supplies ordered
- A vehicle acquired
- Building expanded or remodeled
- Laboratory animal facilities expanded
- Advisory services and training provided

Quarter III.

- Laboratory animal facilities continue to expand
- Technical staff expands
- Production and office equipment installed
- Advisory services and training continue

Increases in technical personnel and equipment, advisory services and training activities will give a strong boost to the pharmaceutical industry.

The Secretariat of National Resources will provide ongoing promotion of the Project, with intense publicity through the mass media.

3. Resources

The principal resources needed by the Project are:

- Human resources: technical staff (15 professionals)
- Resources for the production of bacterins: equipment, glassware, supplies and other inputs
- Resources to expand the capacity of the laboratory animal facilities: equipment, supplies and inputs

4. Participating Institutions

The following institutions will participate in the Project:

-
- **Secretariat of Natural Resources**
 - Animal Health Standards and livestock control Vaccine quality control
 - Extension Service Promotion and dissemination of vaccine use

 - **Livestock Federation** Active participation in organizing demand

 - **Marketing enterprises** Participation in organizing veterinary sales outlets

 - **Specialized Institutions** The Inter-American Institute for Cooperation on Agriculture (IICA), the United Nations Food and Agriculture Organization (FAO) and the Pan American Health Organization (PAHO)
-

IV. COSTS AND FINANCING

1. Costs

Cost of Project: US\$1,034,400
over a five-year period

The Project will cost an estimated US\$1,034,400. The following is a breakdown of the principal costs:

Item	Amount
1. Organization and technical and administrative management	167 200
2. Expansion and remodeling of building and laboratory animal facilities	102 000
3. Training and advisory services	24 100
4. Commercial production	7 36 300
5. Promotion for domestic market	4 800
Total	1 034 400

The investment schedule of the Project is as follows:

Year	Amount/Dollars
1	298 400
2	146 900
3	148 200
4	221 800
5	219 100
Total	1 034 400

2. Financing

External Financing (long term):
US\$864,820

Local Financing (short term):
US\$ 169,580

The following finance structure will apply to the Project:

Source	Short term	Long term	Total
External	0	864 820	864 820
Local	169 580	0	169 580
Total	169 580	864 820	1 034 400

V. ANALYSIS

1. Technical Analysis

The Project will make it possible for the IHIMV to expand its infrastructure and obtain qualified personnel for the production of bacterins. The technology for commercial production has proven to be of high quality and the vaccine has been widely accepted by cattle growers.

2. Institutional Analysis

The bacterin production section will be comprised of an administrative department, a production department, a quality control department, laboratory services, an advisory committee, a technical committee, a warehouse, laboratory animal facilities, a sales department and a promotion and publicity department. The Institute has secured sufficient investment resources to support the Project.

The institutional structure consists of the IHIMV bacterin production section.

3. Legal Analysis

The Institute was created in 1977 as the Central Laboratory and began to operate in its present form on November 1, 1980.

The products will be of high quality according to international standards.

Antigens and vaccines produced by the Institute are sent to international centers for identification and quality control, pursuant to provisions of the Pan American Health Organization (PAHO) and the World Health Organization (WHO).

The Pan American Zoonosis Center (CEPANZO), headquartered in Buenos Aires, Argentina, has reported that the products meet the standards for safety, sterility, purity, sensitivity and potency.

The product is registered with the Department of Trademarks and Patents of the Ministry of the Economy, and production is regulated by the Animal Health Law, under its section on the control of biological, chemical and pharmaceutical products for veterinary use.

Should the activity be privatized, the business sector related to production and distribution has counterpart funds available for the Project.

4. Financial and Economic Feasibility

The commercial feasibility of the vaccine was analyzed, with highly satisfactory results. Sales prices for Bacterin II (Double) on the domestic market are 0.42 and 0.54 lempira per dose, and 0.43 and

0.60 lempira per dose for Bacterin III (Triple). Price comparisons for imported products, and the two production models studied, indicate:

- *Module I: 16,000 doses per month.* The current production cost of a dose of bacterin is 0.46 lempiras. This is 0.04 lempira above the lowest price of the imported product, and 0.18 lempira below the highest price of the imported product. The production cost is too high to allow for competitive pricing.
- *Module II: 200,000 doses per month.* The production cost of a dose of bacterin in batches of 200,000 is 0.18 lempira. This is 0.24 lempira below the lowest price of the imported product, and 0.42 lempira below the highest price, suggesting that production at these levels would be highly profitable. However, the most valid point of comparison would be the sale price for wholesalers, distributors and retailers. If costs for distribution, promotion and a reasonable profit are added to the production costs, doubling the sale price to 0.36 lempira per dose, prices would still be competitive with those of the imported product. The cost per dose of Bacterin I (Single), II (Double) and III (Triple) is similar.

The module producing 200,000 doses per month is highly profitable.

Financial analysis of the Project, including internal rate of return (IRR) and net present value (NPV), shows that it is profitable.

IRR and B/C ratio: higher than interest rates offered by the Honduran banking system; positive NPV

The results give both an inferred IRR and a benefit/cost ratio higher than the interest rates offered by the country's banking system; the NPV is positive:

Internal rate of return (IRR)	45.01%
Net present value (NPV)	US\$3,323,233
Benefit/cost ratio (B/C)	1.4%

In order to test how changes in costs and benefits would affect the internal rate of return, a sensitivity analysis was conducted with two variables:

Variable	IRR (%)
1. 20% increase in total costs and 10% decrease in benefits (pessimistic)	22.3
2. 10% increase in total costs and 10% decrease in benefits	28.6

5. Project Impact

The Project would have the following direct impact:

- The country would save US\$912,600 in foreign exchange from Years three to six.

More than US\$900,000 savings in foreign exchange (years three to six). More than US\$3 million in foreign-exchange earnings (years six to '10). Control of septicemia and anthrax

- The country would generate US\$3,187,500 in foreign exchange from Years six to 10.
- In total, the Project would net US\$3,296,600 in foreign exchange.
- Furthermore, cattle growers could control septicemia and anthrax, thus improving production in the livestock subsector.

NICARAGUA

LIVESTOCK REHABILITATION AND AGROFORESTRY PROTECTION

(Project)

1991

PROJECT CAM-90-002 UNDP/PAHO/PEC

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INTRODUCTION

Nicaragua's livestock production has fallen dramatically in recent years, taking its toll on the rest of the national economy. In an effort to reactivate livestock production, the government conducted a diagnosis to determine the causes of this decline. In conjunction with different interested parties (government authorities, technical cooperation institutions and representatives from the livestock sector, etc.); it then proceeded to prepare a medium- and long-term rehabilitation program, taking into account the major recommendations set forth in the diagnosis.

Finally, with the technical counsel of RUTA II, the government assembled a team, made up of functionaries from the Ministry of Agriculture and Livestock and the Nicaraguan Investment Fund (FNI), to conduct a feasibility study for livestock rehabilitation. This study has been completed and has, furthermore, provided the groundwork for the preparation of this profile. The Project includes financial resources for livestock rehabilitation, made available by the United States Agency for International Development (USAID) to the government of Nicaragua.

The feasibility study conducted with the technical assistance of RUTA II attests to the viability of this Project.

I. FRAME OF REFERENCE

1. Macroeconomic Setting and Its Impact on the Project

During the 1980s, Nicaragua experienced an acute economic slump, best reflected by the fall in production and exports -- the majority in the primary sector. The Nicaraguan economy relies on agricultural production which, during this same period, neared a veritable standstill, as observed in the decline in area planted and yields obtained.

Export-oriented livestock production plays a vital role at the macroeconomic level.

In the livestock subsector, the national herd fell from 2.8 million head in 1977 to 1.6 million in 1989. During the same years, annual beef production fell from 110 million pounds to 72 million, while exports tumbled from 70 to 20 million pounds.

In an attempt to reverse this downward trend, the present administration is focusing its attention on the recovery of exportable agricultural products, particularly those which are net generators of foreign exchange, as well as those earmarked for domestic consumption, in

order to increase the supply of basic goods to the Nicaraguan people.

The strategy for reactivating agricultural and livestock production is to prioritize programs which promote those commodities of greatest historical and economic relevance. These include coffee, livestock, cotton and basic grains.

During the better part of the decade under review, capital goods and inputs for agricultural production were heavily subsidized by an overvalued local currency and credits. This situation led to inefficient allocation of resources from a socioeconomic perspective. However, the adoption of economic reforms has led to more efficient management of these resources.

The Project is part of the efforts being undertaken to improve the national economy, and figure on the Agenda for Salvaging the National Economy, which seeks to reactivate production activity in the short term and recover over the medium and long term, former levels of material well-being.

The Project is part of the Agenda for Salvaging the Nicaraguan Economy; reactivation of the agricultural sector is a key item on this agenda.

2. Analysis of Production Options and of the Technical Environment

One of the primary objectives of the economic policies currently in effect is to reactivate key areas of export agriculture. Livestock production is at the forefront of these activities because of: its capacity to generate foreign exchange; the wealth of related experience enjoyed by a relatively-high percentage of the rural Nicaraguan population; its potential for recovery, and the extensive participation of social sectors, especially small- and medium-scale producers living in zones with high production potential.

Essentially, the Project will be implemented in Regions II, V and VI, covering the departments of Leon, Chinandega, Boaco, Chontales, Matagalpa and Jinotega. Close to 72 percent of Nicaragua's cattle herd are found in these regions. Moreover, these regions boast the majority of land and soil best suited for livestock production, namely 1.2 million of a total of 2.1 million hectares, both ideal for this activity, and unforested.

In addition to the serious decline in the national herd, livestock productivity levels are at an all-time low. Indicators of production performance have remained almost constant over the last thirty years. Between 1965 and 1977, however, a number of farms adopted simple herd and pasture management techniques requiring limited investments, and succeeded in achieving high productivity levels, such as an 80 percent calving rate, increases of 140 percent and 125 percent, respectively, in per hectare milk and beef production, and a reduction in calf mortality to only four percent.

Some of the major causes of the low levels of productivity include high mortality rates, weight-loss and failure to tap productive capacity during the summer season, for lack of adequate feed; high calf mortality rates due to infectious-contagious diseases, for lack of timely vaccination, and attacks from local and exotic parasites, for failure to deworm and disinfect the umbilicus of the newborn calf, and low calving rates because of mineral deficiencies (phosphorus and calcium).

Proven livestock technologies are available to combat animal health problems

Several valid technologies are available which, if applied by livestock producers, could remedy these problems and, furthermore, double current production levels in the short-term.

3. Socioeconomic Situation of Potential Beneficiaries

Cattle production in Nicaragua is basically conducted by small- and medium-scale producers. The small producers, who devote themselves essentially to cattle raising, account for close to 73 percent of the country's total number of livestock producers; they also own 40 percent of the national herd. This type of producer owns an average of 20 head of cattle.

The medium-scale livestock producers account for 15 percent of the country's cattle raisers and own approximately 30 percent of the national herd. This type of producer has an average of 76 head of cattle. Together, the small- and medium-scale producers represent approximately 88 percent of the country's livestock farmers and possess 70 percent of the total number of existing head of cattle.

The small livestock producer devotes himself exclusively to cattle raising, while the medium-scale producer divides his time between this activity and breeding steers with his own stock.

Small- and medium-scale livestock producers (88 percent of total cattle ranchers) are potential beneficiaries

4. Institutional and Financial Conditions

The know-how and capacity of the institutions involved in the administration of the Project will ensure its successful implementation. The Nicaraguan Investment Fund has been known to manage as much as US\$30 million per year for investment purposes.

The National Development Bank (BND) will be responsible for delivering credit to livestock producers. The Bank has 68 branches across the country, has managed some US\$50 million in livestock-related credit, and has processed 13,600 loan applications from livestock producers. Due to the scarcity of external funding, these institutions are currently handling lesser amounts; nevertheless, they boast a superior operational infrastructure.

Concerning support services for production, the General Directorate of Agricultural Technology (DGTA) boasts several decades of

experience administering service programs for livestock producers. In recent years, it has delivered technical assistance to 500 such producers across the country.

5. Legal Framework

For Project Implementation purposes, Nicaragua has duly-established institutions to represent it before any government or organization. In this case, the pertinent institution would be the Central Bank of Nicaragua, duly created by virtue of Decree 525 of 16 September 1960; the Bank is an autonomous entity with an indefinite lifespan and its own equity capital. There are also other institutions capable of implementing projects. The Nicaraguan Investment Fund (FNI), duly created by virtue of Decree 1360, published in Number 280 of La Gaceta Oficial of 13 December 1983, would be responsible for implementing this specific Project.

II. PROJECT DESCRIPTION

The objectives of the Project include strengthening dual purpose livestock production and increasing exports

1. Justification

Livestock rehabilitation is vital to the country's economic interests. The Project is of national scope and can be justified by the relative abundance of livestock production resources, the prospects of achieving significant increases in production levels via improved productivity levels, and the severe decline which this activity has witnessed in recent years.

The Project aims at strengthening dual-purpose cattle production and generating exports. It will benefit hundreds of Nicaraguan families by increasing their income levels and providing a steady and productive source of employment.

2. Objectives

General

The proposed activities will also represent a driving force for domestic activities

To contribute to the reactivation of cattle production, promote the partial recovery of exports and boost domestic consumption of beef and milk, taking full advantage of the natural resources on the country's cattle ranches

Specific

- To provide the necessary financial resources to livestock producers who must invest monies to restore the operating capacity of their production units
- To recover previous productivity levels by implementing programs which have an impact on animal nutrition and

health, genetic improvement and management of livestock production units

- To assist those institutions helping livestock producers solve their problems, to render their management and support efforts more effective
- To further explore livestock-specific problems, in order to facilitate decision-making concerning possible solutions
- To strengthen livestock associations and entities marketing livestock products, in an effort to boost the decision-making power of producers
- To determine the size of the national cattle herd and its geographic distribution, and to quantify resources for cattle production
- To provide technical assistance to livestock producers with a view to enabling them to upgrade their technological know-how and increase the productivity of the dairy cattle herd

The Project seeks to strengthen livestock associations as well as the marketing process.

3. Strategy

The strategy is based on the development of several components which can be broken down as follows:

- Providing credit to livestock producers for funding the following activities: restoration of farm infrastructure which is currently in a state of disrepair, especially corrals, fences and pastures, and purchase of livestock required to restore the productive balance of the livestock unit
- Providing support to livestock units by means of technical assistance, veterinary services and a supply of breeding bulls to improve genetic quality
- Launching actions to improve land and soil use management on livestock farms, in order to take full advantage of natural resources
- Undertaking actions to conserve and improve forest and mountain areas through reforestation, to promote the production of firewood and fencing posts

Increase of the national herd will be pursued, while taking natural resources into account, efforts will be made to maintain the ecological balance.

4. Subprojects and Components

The Project will consist of four subprojects: credit, production support programs, environmental conservation, and preliminary and pre-investment studies.

Subproject 1. Credit

This subproject is concerned with farm investment plans, livestock associations, municipalities – to improve the services they provide to

the livestock sector -- and genetic plants involved in artificial insemination to improve the delivery of this service to the country's cattle ranches.

The credit component for farm investment plans will finance 2,000 cattle ranches, classified into five different categories of production units defined according to producer type. The five categories are:

Pilot experiments with dual-purpose cattle, will benefit not only the country but Central America as a whole

- 28-hectare semi-specialized dairy farms. These production units would be transformed from traditional dual-purpose units into semi-specialized dairy production units. They are located in suitable ecological zones, at more than 400 meters above sea level, receive 1,800 to 2,500 mm of rainfall over a nine-month period and have an average temperature of 22° Centigrade.
- 80-hectare, dual-purpose, dairy-oriented farms. These traditionally dual-purpose production units, with low productivity levels, would be converted into dual-purpose dairy farms. They are located between 400 and 1,000 meters above sea level, receive 1,000 to 1,800 mm of rainfall over an eight-month period and the average temperature is 26° Centigrade.
- 200-hectare, dual-purpose, beef-oriented farms. These farms would have the same ecological features as the dual-purpose, dairy-oriented production units.
- Breeding farms in humid zones (700-hectare). This type of farm would be located between 100 and 1,500 meters above sea level, receive 1,800 to 2,500 mm of rainfall over a nine-month period and have an average temperature ranging from 22° to 24° Centigrade. Here, the Project would begin by raising dual-purpose cattle and later proceed to breed its own steers.
- Breeding and fattening in dry zones (700-hectare farms). The majority of these farms would be located in the arid areas of regions II and V, at altitudes between 0 and 400 meters above sea level, with rainfall levels of between 800 and 1,200 mm over a six-month period and an average temperature of 26 degrees centigrade.

The Project will generate countless benefits for the target area

The credit to livestock associations will be used to improve the services they receive. Resources will be used to purchase vehicles, store products for distribution to members, set-up veterinary pharmacies and establish livestock marketing centers. This component also includes financing an agroindustrial milk-processing cooperative in Julgalpa, Chontales, known as the Chontales Agricultural and Livestock Cooperative (CACHO), and rehabilitating the cheese factory.

The credit earmarked for municipalities is designed to strengthen the capacity of the municipal slaughterhouses, to render this service more competitive and ensure that it is conducted under optimum

hygienic and sanitary conditions so that byproducts can be given commercial use.

Credit for genetic plants is designed to strengthen the National Center for Genetic Improvement (CENAMEGE), promote the production of genetic material and expand artificial insemination services. Financing for farms with improved cattle breeds is also being considered.

Subproject 2. Production support programs

This subproject consists of a grant to cattle production support programs currently implemented by the Ministry of Agriculture and Livestock: Pastures, Animal Health and Technology Transfer. These programs will serve as the vehicle for delivering the services required to improve the productivity levels of the Project's beneficiary farms.

The pastures component will provide the necessary resources for restoring pasturelands, which are in a state of deterioration in almost all of the livestock units.

The animal health component is concerned with improving the capacity of the quarantine services to prevent the introduction of exotic diseases into the country, supporting the Project's beneficiary units with disease-control actions, strengthening the National Network for Disease Diagnosis and Research, and promoting the exchange of experiences between technicians and producers.

The technology transfer component includes direct technical assistance for livestock producers and massive dissemination of methods to improve current production performance indicators.

Subproject 3. Environmental conservation

This subproject aims to make full use of natural resources by means of land and soil use management techniques on livestock farms, and the conservation and improvement of forest and mountain areas. Reforestation for the production of firewood and fencing posts would constitute a major component.

Special consideration will be given to land and soil use management and to improving forest and mountain areas.

Subproject 4. Special studies

This subproject is designed to carry out the studies required to systematize and consolidate the livestock rehabilitation and agroforestry protection process in the medium- and long-term. Its components include: preparation of an Agricultural Cadastral Census, diagnosis of agroindustrial processing of beef and milk, and their backward and forward linkages in the livestock subsystem, and phase two of the livestock study.

5. Goals

- To effect farm investments over a three-year period: 444 farms (22 percent of the total) in year one; 1,000 (50 percent) in year two, and 556 (28 percent) in year three, for a total of 2,000 units
- To provide production support programs which will aim at improving productivity levels of 2,000 cattle herds over a five-year period, 59 of which are for breeding and fattening, 89 for breeding, 312 dual-purpose, beef-oriented and 1,540 dual-purpose, dairy-oriented
- To improve farm investments and support programs at production levels by raising the calving rate from 45 to 70 percent; reducing calf mortality from 10 to 4 percent; halving the adult mortality rate from two to one percent, and increasing the pasture carrying capacity from 0.8 to 1.3 animal units per hectare
- These improvements in the production units benefiting from the Project should make it possible to:

Produce an additional 449.9 million liters of milk over 15 years

Produce an additional 53200 tons of beef in 15 years

Increase the national herd by 643,100 head in 15 years

The Project will improve 2,000 livestock herds over five years

The increase in beef production will have an immediate impact on domestic consumption and the trade balance.

6. Project Beneficiaries

The farm investments, production support programs and environmental conservation investments (90.8 percent of the total amount) will benefit a total of 2,000 livestock units, including private producers and cooperatives; the majority are small producers (77 percent of the total). The remaining 15 percent and 8 percent, respectively, are medium- and large-scale livestock producers and cooperatives. The per-capita investment of the Project is US\$8,400, with an estimated average of three beneficiaries per production unit.

The principal beneficiaries will be small-scale livestock producers and cooperative members. Per-capita investment will total US\$8,400.

The small-scale producers will be granted preferential treatment for the following reasons: the better part of the national herd is produced on small units; this sector shows the lowest levels of livestock technology use; small-scale livestock producers have been neglected and consequently have not received the support they require to improve their production units, and the well-being of their families, which has deteriorated over time.

7. Support Services for Production

The General Directorate of Agricultural Technology (DGTA) is the entity designated to provide livestock-related technical assistance and technological support to beneficiary farms. The BND will extend and supervise the credit envisaged for the Project. The Institute for Natural Resources and the Environment (IRENA) will provide the necessary plant material and technical assistance required to reforest the farms.

III. ORGANIZATIONAL STRUCTURE

1. Executing Unit

The executing unit will be located in the FNI. Its key functions will be to supervise the credit component, which will be implemented through the FNI's General Directorate of Credit Programs, oversee the production support actions implemented by the DGTA, and monitor the reforestation support actions undertaken by IRENA.

The executing unit will ensure compliance with Project commitments and monitor the reforestation efforts.

The executing unit will operate directly under the Office of the Executive Director of the FNI, and will be made up of a coordinator, an agricultural economist, a veterinarian, an agronomist specializing in pasture management, a zoo technician specialized in genetics, and the necessary support staff.

The unit will have a board of directors, made up of the director general of the FNI, with deputy minister status, the deputy minister of Agriculture and Livestock; the deputy minister of IRENA and the president of the National Livestock Commission. The Council will meet on a monthly basis to evaluate the Project's progress.

2. Plan of Action

- To disburse loans to improve the production infrastructure of the livestock farms during the first three years
- To rehabilitate fences, pastures and corrals
- To purchase cattle for delivery to beneficiaries during the last two years of the Project
- To build and outfit 14 marketing centers by the end of the third year

- To establish 19 veterinary pharmacies during the first two years of the Project
- To rehabilitate the Chontales Cooperative over the course of the first three years of the Project
- To recondition the six municipal slaughterhouses during the first three years
- To strengthen genetic plants during the first three years of Project implementation
- To reforest cattle ranches during the first three years
- To conduct pre-investment studies during the four years of Project implementation

3. Resources

The additional resources needed for implementing the Project, depend on the financial requirements for rehabilitating the 2,000 live-stock farms. They also depend on the complementary services needed for making optimum use of these farms, such as support, coordination and follow-up, and Project evaluation services.

The financial resources earmarked for rehabilitating the 2,000 farms are allocated primarily for: establishing and rehabilitating 266,337 hectares of pasture, purchasing 47,787 breeding cows and acquiring 5,029 bulls.

As for support services, resources will be channeled into promoting the genetic improvement of beneficiary livestock units. This will require the purchase of 15 bulls for semen production, four vehicles and insemination equipment.

In order to deliver the necessary veterinary services, three different training courses must be offered, and materials and equipment for the diagnostic laboratories and quarantine posts, as well as two vehicles, must be purchased.

The pasture program requires setting up a pasture laboratory; conducting five training courses; hiring two advisers; providing the pertinent agricultural machinery (a combine, baler, stationary shredder, rotary mower and trailer), and purchasing four motor vehicles and six motorcycles. The pre-investment studies will also require advisers and other personnel and the purchase of 40 vehicles to conduct the cadastral survey. Lastly, Project management will call for the professional services of a group of five specialists for a five-year period, as well as five vehicles and office equipment.

Resources will be used largely to rehabilitate pastures and purchase breeding cows and bulls.

The pastures program will commence in the laboratory and then be transferred into the field; excellent personnel and equipment will contribute to its success.

4. Participating Institutions

The institutions which will be directly involved in the management of the Project are: the FNI, which will house the executing unit and supervise the credit component; the BND, which will be responsible for granting credit to livestock producers, associations and municipalities; the DGTA, which will deliver support services and technical assistance to the beneficiaries, and IRENA, which will provide technical assistance to promote reforestation efforts.

Institutional strengthening will focus on improving the FNI's capacity to manage, evaluate and monitor the Project, and, on increasing the capacity of the DGTA to provide technical assistance to livestock producers, since the level of attention required of the Project exceeds current capabilities. The DGTA is presently providing technical assistance to approximately 400 livestock producers across the country.

Increased technical assistance capacity will be one of the prime examples of the Project's impact.

IV. COSTS AND FINANCING

1. Costs

The total cost of the Project is US\$50,903,400.

Subprojects	(US\$ X 000)
Credit	40.221,5
Support to production	500,0
Environmental conservation	8 110,8
Preliminary and pre-investment studies	1.266,3
Supervision, administration and evaluation	894,9
Total	50.993,5

Total cost of Project:
US\$50,903,400

The costs of the credit subproject are broken down as follows:

Close to 80 percent of total resources will be earmarked for the credit subproject

Components and categories	(US\$ X 000) -
<i>Credit for farm investments</i>	38 052.4
28-hectare dairy model	5 161.5
80-hectare dual-purpose model	12 701.6
200-hectare dual-purpose model	8 133.1
700-hectare breeding and fattening model	3 506.2
700-hectare breeding model	8 550.0
<i>Credit to livestock associations</i>	1 289.1
Livestock marketing centers (14)	576.1
Veterinary pharmacies (19)	329.8
Rehabilitation processing plant	
Agricultural cooperative	383.3
<i>Credit for municipal slaughterhouses</i>	347.6
<i>Genetic plants</i>	532.4
Total	40 221.5

2. Financing

Financing for the Project is being requested for a five-year period. The disbursement schedule and funding sources are as follows:

Funds will be disbursed over a five-year period to facilitate Project execution.

Disbursement schedule

Year	(US\$ X 000)
1	6 942.3
2	13 274.3
3	15 592.5
4	11 076.0
5	4 109.5
Total	50 993.5

Sources of Project funding

Contributions	(US\$ X 000)
<i>External resources</i>	30 795.0
Long-term loan	29 054.6
Technical cooperation	1 740.4
<i>Producers</i>	8 065.5
<i>National financial system</i>	4 022.2
<i>Donation</i>	8 110.8

In keeping with the country's financial practices, the beneficiaries of projects of this kind, contribute 20 percent of the total cost of the investment.

The terms and conditions for long-term loans, as recommended in the feasibility study, are as follows: for models 1, 2 and 3, 10 years to pay, including a three-year grace period, at 12 percent per year on outstanding amounts; for models 4 and 5, 12 years to pay, including a three-year grace period, at 12 percent per year on outstanding amounts.

Short-term and working-capital loans will be financed over a period of one year, at 14 percent per year on outstanding amounts. The guarantees furnished by the borrower are those regularly requested by the National Financial System.

Conditions for securing long-term loans from external sources will be similar to those applied to the special operations fund of the Inter-American Development Bank: 40 years to pay, including a 10-year grace period, at one percent for the first 10 years and two percent for the subsequent years.

V. ANALYSIS

1. Technical Analysis

The proposed farm models are technically sound. The Project aims at improving and making use of existing infrastructure. The models entail technologies which are financially and economically appropriate and promote optimum land and soil use through more intensive use and efficient pasture management.

2. Institutional Analysis

The advantage of having the executing unit located in the FNI, is the latter's technical and operating capacity to efficiently manage the financial resources of the Project. Full use will also be made of the existing banking infrastructure across the country, to effect disbursements to beneficiaries in a timely fashion. The FNI's General Directorate of Credit Programs will transfer the financial resources to the commercial banks, so that they, in turn, can deliver the funds to the livestock producers and ensure that they are used efficiently.

The following mechanism is used to guarantee the counterpart funds: when 80 percent of producers' investment costs are covered, they are naturally motivated to contribute the remaining 20 per-

The national banking system will disburse the funds to the Project beneficiaries.

Counterpart funds (20 percent) are duly covered.

cent. Even in times of crisis, this mechanism has proven effective. The commercial banks will provide 10 percent of the funds delivered by the central government for program financing; the FNI undertakes to cover the operating costs of the executing unit.

3. Legal Analysis

No change whatsoever is required in the present legal framework in order to implement the Project. Its implementation, in this regard, is thoroughly compatible with the laws currently in force.

4. Financial Feasibility

The Project is financially feasible. The feasibility study produced the following results, at a discount rate of 12 percent:

Model	FIRR (%)	NPV % (US\$ X 000)	B/C
I	29.9	9 089.4	1.38
II	26.5	13 340.5	1.33
III	31.9	26 198.3	1.42
IV	35.4	47 434.6	1.15
V	19.9	63 093.2	1.26
Project total	30.2	20 500.4	1.44

5. Project Impact

In addition to increases in national milk and beef production, the national herd will increase by 33.8 percent.

The Project's most noteworthy results will include: an increase in milk production of 448.4 million liters and 53,550 metric tons of beef over a 15-year period. Where restocking is concerned, the Project will increase the national herd 33.8 percent, by contributing 643,100 head. Likewise, during the investment period, the Project is expected to generate an annual source of employment equivalent to 47,478 worker/months; once stabilized, this will total 32,792 worker/months per year or the equivalent of 2,732 permanent jobs.





