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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

EL SALVADOR

PROJECT PAPER

WATER MANAGEMENT

AID/LAC/P-249

Project Number: 519-0303

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT DATA SHEET

1. TRANSACTION CODE
 A = Add
 C = Change
 D = Delete

Amendment Number _____

DOCUMENT CODE
 3

2. COUNTRY/ENTITY
 EL SALVADOR

3. PROJECT NUMBER
 519-0303

4. BUREAU/OFFICE
 LAC 05 WATER MANAGEMENT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)
 MM DD YY
 08 30 90

7. ESTIMATED DATE OF OBLIGATION
 (Under "B." below, enter 1, 2, 3, or 4)
 A. Initial FY 85 B. Quarter 4 C. Final FY 97

8. COSTS (\$000 OR EQUIVALENT \$1 =)

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	()	()	()	(6,814)	(11,930)	(18,744)
(Loan)	()	()	()	()	()	()
Other U.S.						
1.						
2.						
Host Country (PL480 Counterpart)					2,496	2,496
Other Donor(s) (Part. Institutions)					3,910	3,910
TOTALS				6,814	18,336	25,150

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ARDN	140	220				3,500		18,744	
(2)									
(3)									
(4)									
TOTALS						3,500		18,744	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)
 020 032 049 075 140 050

11. SECONDARY PURPOSE CODE
 180

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)
 A. Code DEL BF LAB PVON TECH TNG XII
 B. Amount

13. PROJECT PURPOSE (maximum 480 characters)
 To promote diversified irrigated farming in El Salvador through institution strengthening, technology transfer, training and credit assistance.

14. SCHEDULED EVALUATIONS
 Interim MM YY 08 86 MM YY 01 88 Final MM YY 07 90

15. SOURCE/ORIGIN OF GOODS AND SERVICES (with some limited waivers to 941)
 000 941 Local Other (Specify) CACM

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)

17. APPROVED BY
 Signature: Robin L. Gomez
 Title: Mission Director
 Date Signed: MM DD YY 08 26 85

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
 MM DD YY

1-

AGENCY FOR INTERNATIONAL DEVELOPMENT
UNITED STATES OF AMERICA A. I. D. MISSION
TO EL SALVADOR
C/O AMERICAN EMBASSY,
SAN SALVADOR, EL SALVADOR, C. A.

PROJECT AUTHORIZATION

Name of Country/Entity : El Salvador

Salvadoran Foundation for
Economic and Social
Development (FUSADES)

The Government of El Salvador
(GOES)

Name of Project : Water Management

Number of Project : 519-0303

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Water Management Project for El Salvador, encompassing a grant to the Salvadoran Foundation for Economic and Social Development (FUSADES) and a grant to the Government of El Salvador (GOES), involving planned obligations not to exceed Eighteen Million Seven Hundred Forty Four Thousand United States Dollars in grant funds over a three year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Project is 60 months from the date of initial obligation.
2. The Project consists of technical and financial support to develop the capacity of El Salvador's private and public sectors to provide policy support, technical and credit assistance, technology transfer, and training services to producers, packers and exporters of irrigated, labor-intensive non-traditional agricultural products to extra-regional markets.
3. The Project Agreements, which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following terms and conditions, together with such terms and conditions as A.I.D. may deem appropriate.

a. Source and Origin of Commodities, Nationality of Services

Commodities financed by A.I.D. under the Project shall have their source and origin in the United States or in member countries of the Central American Common Market, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the United States or the member countries of the Central American Common Market as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

b. Conditions Precedent to Disbursement

Except as A.I.D. may otherwise agree in writing:

(1) Prior to initial disbursement of Project funds under the Cooperative Agreement with FUSADES, the Grantee will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) A statement of the name of the person(s) holding office in FUSADES and empowered to act for FUSADES with reference to this Agreement, along with a specimen signature of such person(s);

(b) Evidence that FUSADES has established a separate colon denominated bank account to control the receipt and disbursement of these grant funds, including the complete account number and name; and

(c) A detailed budget and implementation plan for the first year's activities under this Agreement.

(2) Prior to any disbursement under the Cooperative Agreement for the Research and Development Credit Fund, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) Evidence that the Private Sector Irrigation Association has been legally constituted under the laws of El Salvador.

(b) An executed subsidiary agreement between FUSADES and the Private Sector Irrigation Association, whereby the roles and responsibilities of FUSADES and the Irrigation Association for carrying out the Project activities are specified, in accordance with the Project Description. Under the subsidiary agreement, FUSADES will transfer Project implementation responsibilities to the Irrigation Association and retain those responsibilities appropriate for overseeing and coordinating Project implementation.

(c) Evidence that FUSADES has established a trust fund in the Banco Hipotecario for the deposit of the Project funds for the Research and Development Credit Fund element.

(d) An executed agreement between FUSADES, the Irrigation Association, and the trustee Banco Hipotecario, wherein the procedures for disbursement and recovery of the Research and Development Credit Fund will be specified, in accordance with the Project Description and in such a way to ensure, to the maximum extent possible, open and fair competition and avoidance of conflict of interest in the access to credit from the Fund. Beneficiaries selection criteria will be further elaborated upon in Implementation Letter No. 1.

(3) Prior to disbursement of Project Funds, or the issuance of any commitment document under the Grant Agreement with the GOES to finance any activity, the Grantee shall, except as the Parties may otherwise agree in writing, furnish in form and substance satisfactory to A.I.D.:

(a) Evidence that the Grant Agreement has been duly ratified by the Legislative Assembly.

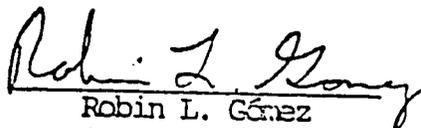
(b) A statement of the name of the person(s) holding office in the GOES and legally empowered to act for the GOES with reference to the Agreement, together with a specimen signature of such person(s).

(c) Covenants

The Cooperating Country and FUSADES shall each covenant that A.I.D. will be able to brief and debrief contractors, participants and invitational travelers financed under the Agreements and will be furnished copies of reports produced by such persons.

(d) Waivers

U.S. source/origin requirements are hereby waived in order to permit the procurement of approximately 50 motorized trail bikes with an estimated value of approximately \$75,000 under A.I.D. Geographic Code No. 935 under the Grant Agreement with the GOES. The bikes will be of Japanese origin since bikes of this size are not manufactured in the U.S.



Robin L. Gómez
Mission Director
USAID/El Salvador

8/26/85

Date

Drafted: PRJ:P Del Bosque, JClc/tier, PRJ

Clearances: RDO: K Ellis (draft)

PRJ: DBcyd (draft)

CO: J McAvoy, JA

CONT: J Davison draft

A/DDIR: R Witherell draft

WATER MANAGEMENT PROJECT PAPER

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*Bulk Annexes

LIST OF ACRONYMS

ARSP	Private Sector Irrigation Association Asociación Para Riego del Sector Privado
ASPENT	Salvadoran Association of Producers and Exporters of Non-Traditional Products Asociación Salvadoreña de Productores y Exportadores de Productos No-Tradicionales
BCR	Banco Central de Reserva de El Salvador Central Reserve Bank
BFA	Banco de Fomento Agropecuario Agricultural Development Bank
BH	Banco Hipotecario Mortgage Bank
CDG	Centro de Desarrollo Ganadero Livestock Development Center
CEL	Comisión Ejecutiva del Río Lempa Lempa River Executive Commission
CENCAP	Centro Nacional de Capacitación National Training Center
CENREN	Centro de Recursos Naturales Natural Resources Center
CENTA	Centro de Tecnología Agrícola Center of Agricultural Technology
DGRD	Dirección General de Riego y Drenaje General Directorate of Irrigation and Drainage
ENA	Escuela Nacional de Agricultura National School of Agriculture
FINATA	Financiera Nacional de Tierras Agrícolas National Land Finance Institution
FUSADES	Fundación Salvadoreña para el Desarrollo Económico y Social Salvadoran Foundation for Economic and Social Development

GOES	Gobierno de El Salvador Government of El Salvador
IGN	Instituto Geográfico Nacional National Geographic Institute
ISTA	Instituto Salvadoreño de Transformación Agraria Salvadoran Institute of Land Reform
MAG	Ministerio de Agricultura y Ganadería Ministry of Agriculture and Livestock
MIPLAN	Ministerio de Planificación Ministry of Planning
MOP	Ministerio de Obras Públicas Ministry of Public Works
OA	Oficina de Agua Office of Water
OCOPROY	Oficina Coordinadora de Proyectos MAG-AID MAG-AID Project Coordinating Office
ORE	Oficina de Recursos Especiales Special Resources Office
OSPA	Oficina Sectorial de Planificación Agropecuaria Agricultural Sector Planning Office
WMS II	Water Management Synthesis II Project

CONTRIBUTIONS TO THE PROJECT PAPER PREPARATION

USAID Project Development Committee

Kenneth C. Ellis, Rural Development Officer
Priscilla Del Bosque, Office of Projects
Luis Carlos Palomo, Rural Development Office

Consultants

Samuel R. Daines, Lawyer, Economist, Water Resource Planner and
Agribusiness Specialist
Stephen Brower, Rural Sociologist and Irrigation
Management Specialist
George H. Hargreaves, Soils and Irrigation Engineering and
Planning
Carlton Infanger, Agricultural Economist
Bruce Brower, Rural Sociologist and Extension Specialist
Wade Andrews, Sociologist and Water Resource Development
Specialist
David Daines, Water Law Expert

USAID Project Review Committee

Bastiaan B. Schouten, Acting Mission Director
Ronald Witherell, Acting Deputy Mission Director
Donald W. Boyd, Project Development Officer
John Cloutier, Office of Projects
David Huezos, Private Enterprise Office
Ernesto Altschul, Private Enterprise Office
Robert J. Anderson, Program Economist
William Naylor, Controller's Office
Roberto Gavidia, Mission Engineer and Environmental Officer
Thomas Miller, TDY Program Officer
Gail Lecce, Regional Legal Officer

I. PROJECT SUMMARY AND RECOMMENDATIONS

A. Recommendations

The Project Development Committee recommends the authorization of an \$18.7 million grant for the support of a program of activities for diversification of agriculture for export through irrigation to be carried out by the private and public sectors of El Salvador.

B. The Problem

Unemployment is the single most pressing problem in rural El Salvador, which has a limited arable land area. It has been estimated that about half of the available labor force in rural areas is unemployed and another third is underemployed. Moreover, the high population growth rate results in a doubling of population every two decades and assures continued severe pressure on rural employment. Related to the problem of rural unemployment is the land use/cropping patterns, general stagnation of the economy and poor export performance. The causes of the economic stagnation and poor export performance are many and include the continued unfavorable markets for El Salvador's traditional export commodities — coffee, cotton and sugar.

The key to solving these major problems lies in diversifying agricultural production into high labor crops which can be exported and generate employment and foreign exchange. Currently, only about one fourth of the cropped land in El Salvador is in what might be termed high labor crops, such as coffee and pineapple, which require in the range of 150-400 person days per hectare. In agriculture there are very few crops with labor demands which meet or exceed the 600 person days per hectare of labor available in El Salvador. The few crops which do have this potential are vegetable, fruit, and specialty crops which require precision irrigation. Precision irrigation implies that the water is available precisely when needed and applied evenly to all plants.

Since these high labor potential export crops require precision irrigation when grown under Salvadoran conditions, the lack of precision irrigation capability in El Salvador is the single most important production constraint. Furthermore, since almost all of these high labor products are highly perishable, the lack of marketing facilities and channels must also be included as an additional major constraint. Investment in production for export, and the irrigation which permits it, will not take place until there is someone willing and able to purchase the product.

These two constraints — the lack of irrigation capability and export marketing channels — are inextricably intertwined. Without the market "pull" of packers and processors ready, willing and able to buy the perishable products, farmers will not likely invest in precision irrigation. On the other hand, without the production security of precision irrigation, packers and processors will not likely make the needed investments in marketing, packing and processing facilities. Thus, irrigation and marketing constraints together create a kind of vicious circle which must be dealt with together.

Behind these two constraints lie corresponding institutional deficiencies in water management and export marketing. The kind of precision irrigation which is required by export fruit and vegetable crops is not common in El Salvador. Both public institutions and private sector firms need technical help to improve their water management capability, if they are to support major development of diversified export crops. The water management technology required is embodied in field application equipment (sprinkle, trickle and drip) and in small pumps and pressurized piped water supplied from rivers, small streams and wells.

There is little research and extension capability in the public sector in this technology, and private sector firms supplying and installing the equipment lack technical and financial capability to adequately support any major irrigation development. The other part of the irrigation problem lies in the lack of export market "pull" in rural areas where irrigation investment could take place. Institutional constraints which limit this market "pull" lie principally in the lack of agility of the financial institutions to support the special credit needs of and adapt to the high risk involved in penetrating competitive export markets in perishable products. Thus, there is an urgent need for improvement in the institutional and technological base for precision irrigation, and complementary institutional changes in export production and marketing R&D finance.

C. Summary Project Strategy and Description

1. Project Strategy

The role of irrigation in El Salvador is not the same as in an arid country where basic production requires irrigation. El Salvador can produce its basic food needs rather easily from its abundant rainfed land resources. Nor is irrigation needed to expand production in traditional export crops such as coffee, cotton and sugar cane. The markets for these products are either relatively stagnant or do not present comparative advantage opportunities.

The need and potential role for irrigation in El Salvador is a narrow, yet very critical one which revolves around the diversification of exports to high-value, labor-intensive crops in order to absorb rural labor productively and generate foreign exchange. Because the development of irrigation and irrigated agriculture in El Salvador has been relatively insignificant and continues at a very slow pace, the strategy of the Project will focus on accelerating the transfer of cost-effective technologies in irrigation and irrigated agriculture, setting up more agile credit mechanisms for the needed investment, and developing export marketing channels to "pull" private sector investment into irrigated production of high-risk, but profitable non-traditional export crops. The Project will address the critical institutional constraints in water management and export marketing in both public and private sectors with an integrated approach. The objective is to loosen constraints on both the market R&D "pull" side, as well as on the irrigation production "push" side.

2. Project Description

The goal of the project is to generate employment, income and foreign exchange for El Salvador. The purpose of the Project is to promote diversified irrigated farming in El Salvador through institution strengthening, technology transfer, training, and credit assistance. Project activities are divided into two segments: a) support of public sector irrigation planning, extension and training institutions to provide improved support to farm-level water management and irrigated agriculture, and b) support of private sector firms engaged in or directly connected to intensive irrigated agriculture and export marketing R&D.

a. Public Sector Irrigation Development

The objective of the public sector component is to strengthen public sector institutions engaged in agriculture extension and training and irrigation planning in order to improve government activities in these areas. The institutions receiving Project assistance will be the Agricultural Technology Center (CENTA), the National School of Agriculture (ENA), the National Training Center (CENCAP), the General Directorate of Irrigation and Drainage (DGRD), the Agricultural Sector Planning Office (OSPA), and the Office of Water (OA).

The extension and training institutions, CENTA and ENA, will be provided long and short term technical assistance, training in and outside of El Salvador, and equipment in order to upgrade their capability to train farmers, agronomists and extensionists in irrigation and irrigated agriculture. CENCAP will be the site of numerous in-country short courses which the Project will support.

The planning institutions — DGRD, OSPA, and OA— who have responsibilities for overall planning and evaluation of public sector irrigation development programs, will receive technical support and training in these areas, as well as in the development of research in irrigation policy.

b. Private Sector Irrigation Development

The objective of the private sector component is to strengthen the technical and financial capability of private sector firms and farms to exploit the abundant water resources which lie in year-round rivers, streams and accessible aquifers for the production and marketing of high-labor, non-traditional export crops.

The Salvadoran Foundation for Economic and Social Development (FUSADES), a local private foundation, will be the grantee for this component and overall coordinator of the component activities. A Private Sector Irrigation Association is currently being organized by private sector firms, including irrigation equipment suppliers, irrigated agriculture consultants, farms, and marketing firms. FUSADES, which assists private sector associations to carry out activities related to non-traditional exports, will assist the Irrigation Association in getting legally constituted and setting up operations. Once this is done, FUSADES will transfer Project implementation responsibilities to the Association and will continue to have oversight responsibilities for the private sector component and the use of Project funds, as well as provide institutional guidance as may be needed by the Irrigation Association.

The Association will receive Project support in the form of two long term advisers and local employees to provide technical and financial assistance to participating farmers, packers/processors and exporters of labor-intensive, non-traditional crops grown under irrigation.

The Association will provide assistance for private sector irrigation using two basic support models. Model A will involve technical and financial support for the purchase and installation of precision irrigation systems on private farms. Under Model B, the Association will select private firms, through an open bidding process, to develop five integrated pilot projects involving precision irrigation in diversified export crops and export marketing. A special R&D Credit Fund will be created in the Banco Hipotecario to finance projects under both models. In addition, irrigation equipment sellers and well drilling firms will be encouraged to expand their field agent staffs through temporary salary support and training to provide technical support to the participating farmers.

The export products to be supported by the R&D Credit Fund are commercial experiments and therefore high-risk ventures. The objective of the Credit Fund and its terms is to shift the R&D effort to the private sector where it will expand automatically, if successful, and to test it as a mechanism for financing this new type of productive investment. Credit interest rates will not be subsidized, but half of the risk element of the production and marketing R&D effort in new export crops will be underwritten by the R&D Credit Fund in order to encourage private investment. The Association will not implement any of the pilots, but will simply provide a mechanism to assist interested private firms in proposal development, and provide ongoing technical support to the firms during the first few years of irrigation development, production and marketing R&D. Specific, short term technical assistance to the production and marketing pilots will be made available under the Project.

The total cost of the Project is \$25.2 million. AID will provide \$5.3 million in Project grant funds for the public sector component, which includes \$0.7 million to finance start-up and evaluation costs of the overall Project. AID will also provide \$13.5 million for the private sector component, of which \$10.0 million will be for the R&D Credit Fund. An additional \$2.5 million in local currency from the PL-480 Program will be made available as counterpart to the Project activities. Participating institutions will provide an estimated \$3.9 million in local currency in the form of in-kind contributions. The life of the Project is five years.

The Mission will sign a Project Agreement with the Government of El Salvador (GOES) and a Cooperative Agreement with FUSADES.

II. PROJECT BACKGROUND AND RATIONALE

A. Economic Background

In 1984, El Salvador's badly shaken economy began to show signs of recovery. After a five-year decline that saw the nation's real GDP fall to only about 77% of its 1978 value, real GDP increased by about 1.5% in 1984. Preliminary estimates indicate that all sectors, except construction, grew during the year. Agricultural output, which had fallen by a cumulative 19% between 1980 and 1983, grew by about 1.2%.

Albeit modest, the growth in the agricultural sector is important, inasmuch as this sector accounts for approximately one-fourth of GDP, employs over one-half of the economically active population, and generates over 60% of the total export earnings.

Agriculture's role as the mainstay of the Salvadoran economy is perhaps best reflected by the fact that historically the country's level of economic activity has been determined primarily by the price fluctuation and production shifts of its traditional commodity exports -- coffee, cotton and sugar. In recent years, these export crops have been adversely affected, inter alia, by the unrest in the country; the agrarian reform and the uncertainties it created; and depressed world prices.

Between 1960 and 1978, El Salvador's GDP expanded by an average 5.4% per year. This growth was based primarily on investment and export of traditional agricultural products to extra-regional markets and of manufactured goods to the Central American Common Market (CACM). After 1978, however, the world-wide recession reduced international prices for agricultural commodities and decreased demand within the CACM, while the civil conflict in El Salvador resulted in the destruction of crops and infrastructure. From 1978 to 1983, El Salvador's per capita GDP and exports both decreased by approximately 35%, unemployment and underemployment rose to nearly 40% and the country experienced significant political and social unrest.

Even in the absence of civil strife, El Salvador's rapid growth during the decade of the 1970's, achieved in great measure by remarkable gains in agriculture and industrial productivity led by a very capable entrepreneurial class, would have of necessity slowed down or even reversed, given the economic problems confronted by its partners in the CACM and other international market conditions that greatly depressed the prices of its primary export crops. The principal problems of El Salvador were present then and remain today: a limited territory and a much more limited natural resource base; a rapidly increasing population with 6.5 times the density of its Central American neighbors; and a very constrained domestic market because of the very low per capita income.

B. El Salvador's Agricultural Sector and the Role of Irrigation

1. Land Use and Cropping Patterns

Approximately one third of El Salvador's land area was in cropped agricultural use in 1984 and another one fourth was in pasture or grazing use. The land use patterns may be seen in Table 1 below.

Table 1
Land Use Patterns in El Salvador
(Hectares)

Land Use Category	1980	1984	Crop Mix %	Land Use %
Annual Crops	557,825	461,600	64%	(22%)
Semi-Permanent Crops	44,376	56,167	8%	(3%)
Permanent Crops	198,182	199,815	28%	(9%)
Total Crop Use	800,383	717,582	100%	34%
Pastures & Grazing Land	522,353	522,353		25%
Total Crop & Pasture Land	1,322,736	1,239,935		
Other Area	781,364	854,165		41%
Total Area	2,104,100	2,104,100		100%

Source: CENFEN and DGEA, San Salvador, 1985

There has been a short term decline in area planted in annual crops which is probably due mostly to two factors, agricultural displacement and insecurity in rural areas and the land reform, though there is little hard data on which to base reliable conclusions.

While land resources in El Salvador are scarce, there is considerable under-utilized arable land. Considerable increases in the production of basic food staples and traditional exports could be obtained through expanded cultivation if the market forces and production incentives favored such expansion.

2. Rural Population and Employment Problems

The rural population of El Salvador is estimated at 2.5 million in 1985. This is an underestimate of the population who depend on agriculture for their employment since it does not include those living in towns and small cities. If the urban populations of the five largest cities in El Salvador are assumed not to depend on agriculture, the total rural laboring population in 1985 is about 3.2 million. If 70% of this population is of working age, the supply of labor for agriculture is about 2.1 million persons, or 670 million person days per year.

Subtracting out the labor used in livestock and pasture land, this implies an average labor supply of 630 person days per crop hectare. The labor demand of crops in El Salvador is outlined in Table 2.

Table 2
El Salvador's Labor Demand by Crop Type, 1983

Crop Type	Labor Req. (Days/Ha.)	Crop Ha. (000)	Employment (%)
Basic Grains	23-70	465	30.3%
Sugar Cane & Cotton	83-125	106	14.2%
Coffee	138-188	266	53.5%
Fruits & Vegetables	80-510	8	1.8%
Irrig. Non-Trad. Crops	400-2000	1	0.2%
Crop Area Weighted Average	89 Days/Ha.		100.0%

Sources: Cropped area from MAG/OSPA, Diagnóstico del Sistema Agropecuario 1978-1983, San Salvador 1984, Annex 2. Labor requirements from MAG, El Empleo en El Salvador, San Salvador 1975, Tables 15-17, and CENTA 1983. Area in fruits and vegetables is an estimate, as are labor requirements for irrigated non-traditional fruits, vegetables and specialty crops such as flowers and ornamental plants.

With a supply of over 600 person days per hectare, El Salvador has a crop pattern which requires only about 90 days per hectare in labor. This implies an under-employment of 85% of the available rural labor. Standard employment studies use a different methodology to reach estimates of open unemployment, and most of these estimates for El Salvador indicate that about half of the "economically active" rural workforce is unemployed.

If the two concepts ("un" and "under" employment) are combined, the conclusion is that about half of the available labor is "unemployed" and another third is "underemployed." For farm families on medium and large farms, unemployment is almost totally a seasonal problem, but for the vast majority of rural farm families on farms under 10 hectares and for landless rural families, most of the unemployment problem is not seasonal but "structural." Structural unemployment is defined as that part of the rural work force which is unemployed even during seasonal peak labor demand periods. For farm families with less than 4 hectares, "structural" unemployment represents 30-63% of their employment problem.

Regardless of which combination of employment concepts is used, the conclusion of the arithmetic is bleak indeed. Coffee is the mainstay of agricultural employment, providing almost half of all employment generated by agriculture.

3. Economic Stagnation and Scarcity of Foreign Exchange

Section II.A above outlined the current economic situation of El Salvador and presents the basic picture of an economic slump of considerable magnitude. Foreign exchange earning commodities have encountered unfavorable prices which seriously affect the balance of payments position of the country. The most promising option for an economic recovery lies in export-led growth, and non-traditional products appear to be the single best possibility. Until foreign exchange earnings can be generated by non-traditional exports, the country will continue to suffer from internal stagnation and external dependence.

4. The Role of Rainfed and Irrigated Agriculture

El Salvador is by no means an arid country. Annual rainfall averages over 60 inches in almost all major agricultural areas, as contrasted with less than 20 inches in most productive areas of the Western U.S. There is a need for irrigation in El Salvador which arises because of the seasonal distribution of rainfall; however, it is important not to mis-characterize or underestimate the need and potential role for irrigated agriculture.

As will be described below, irrigation should not be looked at as a way of increasing the yields of crops, or even as a way of increasing the area cropped in basic food crops during the dry season. Increasing crop yields and production in basic food crops can be accomplished much more cheaply and easily through improving rainfed technology than through irrigation. The role of irrigation is in the relatively narrow, but vital, area of production of fruits, vegetables and specialty crops during the dry season for local consumption, and on a year round basis for export.

5. Overview of Irrigation in El Salvador

Of the 717,582 Ha. of cropped land in El Salvador, approximately 35,000 Ha. or 5% are partially irrigated, and probably only about 10,000 Ha. are currently regularly and securely irrigated. The GOES estimates that 279,351 hectares are potentially irrigable by gravity flow systems. Table 3 below outlines the evolution of irrigation construction, as suggested in the most recent agriculture sector assessment by the MAG.

Table 3
Development of Irrigation, 1978-1983

Period	Public Sector (Hectares)	Private Sector (Hectares)
1978-79	7,500.0	29,500
1980	136.8	—
1981	835.0	—
1982	314.0	—
1983	208.0	—
Total 80-83	1,493.8	—
Average/Year	373.3	—

Source: MAG Diagnóstico, 1984, p. 101

As indicated in Table 3, some three fourths of the total area with some irrigation security is thought to be in the private sector, but there is no accurate information about the construction of private sector irrigation since the 1971 agricultural census. In 1971, there were approximately 2,500 farms with some area irrigated, and there has been irrigation construction in the private sector in recent years, despite the climate of uncertainty that has prevailed in rural areas. Contacts with private sector irrigation firms and banks have indicated that irrigation installations have been made by the private sector. It is probable that private sector development of irrigation has continued to be larger than public construction, though it is impossible to estimate the level with any security.

Estimates of public irrigation capability by project are given in Table 4 below.

Table 4
Public Sector Irrigation Projects

Project Name	Area (Ha.)	Status
Zapotitán/Anticoyo	7,618	Operating
Lempa/Acahuapa	3,910	Feasibility Study
Chalchuapa/Antiguencaya/Omoa	1,956	Feasibility Study
Rio Paz/Fosario	9,433	Feasibility Study
Usulután/San Miguel	24,416	Feasibility Study
Actually Constructed	4,955	
Feasibility Completed	30,704	
Pre-Feasibility	58,057	

Source: GOES, Plan Maestro de Desarrollo y Aprovechamiento de los Recursos Hídricos, 1982, Table 34.

C. Constraints to Irrigation and Irrigated Agriculture

The development of irrigation and irrigated agriculture in El Salvador has been relatively insignificant and continues to evolve at a very slow pace. As outlined above, perhaps as little as 1% of the cropped area in the country is currently being irrigated regularly. It is, therefore, probably more accurate to discuss irrigated agriculture in El Salvador as something that needs to be essentially started from scratch.

The purpose of this section is to explore the factors which are constraining the development of a significant irrigated agriculture subsector in El Salvador. Factors which frequently constraint irrigation development world-wide, grouped into five categories, include: (1) physical constraints, (2) technological constraints, (3) market demand constraints, (4) financial constraints, and (5) institutional constraints. These potential constraints will be examined in the Salvadoran context in the subsections that follow.

1. Physical Constraints: Land and Water Potentials

The surface flow of rivers to the sea during the dry months when irrigation is needed totals approximately 2,800 million cubic meters; 63% of this is accounted for by the Lempa River alone. In addition, existing hydroelectric dams on the Lempa have a dry season storage capacity of about 1,715 million cubic meters. The size of groundwater resources is not known, but there is obviously an immense recharge since rainfall in most areas is above 50 inches per year.

The area this water could irrigate depends upon the type of irrigation system used. If gravity irrigation is the principal system, then the topography of the high quality soils is the critical limiting factor. If higher technology methods of application such as sprinkle and trickle are used, the proximity of the land to water sources, and not the topography, is the limiting physical factor.

Regardless of how the water resource is to be exploited, however, it appears that water is not an important constraint on the development of irrigation in El Salvador for a few decades of serious development. Government sources estimate that more than 250,000 Ha. of suitable soil lie in areas within reach of potential gravity flow systems. Of these areas, it is estimated that about 170,000 Ha. could actually be irrigated by the adjacent rivers. With piped systems and more efficient water application technologies, there are essentially no physical constraints to irrigating almost all currently cropped land, except the higher reaches of coffee plantings.

2. Technological Constraints

This subsection explores the adequacy of existing technology to provide the basis for expanded and improved irrigation and irrigated agriculture in El Salvador. The question of technology transfer is discussed below in the subsection on institutional constraints.

Irrigation technology as it exists in El Salvador is essentially satisfactory to support adequate development of irrigation and irrigated agriculture. This does not mean that the average technological level is adequate, rather that the technology exists in El Salvador and does not require any significant research effort to develop new technology or adapt it to Salvadoran conditions. There is an urgent need for increased technology transfer and extension, and the development of institutional support capabilities in these areas, but there is no real need for new or adapted technology. Excellent applications of sprinkle, trickle and drip irrigation have been visited by the Project design team, and some areas of acceptable surface irrigation have also been seen. The technology that does not already exist in El Salvador does exist elsewhere in a form acceptable without further adaptation to Salvadoran conditions.

3. Market Demand Constraints

The market demand for irrigated products is largely indistinguishable from market demand for rainfed products, except in the case of perishable fresh fruits and vegetables, where market demand during the dry season can only be met with irrigation or by importation. For the purposes of the analysis of market constraints, demand will be divided into four categories: (a) domestic demand for basic non-perishable food staples (i.e., basic grains), (b) domestic demand for perishables, (c) external demand for traditional export crops (coffee, cotton and sugarcane), and (4) external demand for non-traditional irrigated crops.

a. Domestic Demand for Basic Grains

Domestic market demand for basic grains and livestock crops is rather stagnant, as illustrated in Table 5 below.

Table 5
Domestic Market Demand for Basic Grains

Year	Thousands of Quintals
1978	18,612
1979	16,943
1980	16,232
1981	15,667
1982	13,730

Source: MAG Diagnostico, San Salvador 1984.

Table 5 indicates, at best, a very soft market demand picture for basic grains. Most of this decline is likely due to the general economic depression and a consequent lack of purchasing power, which will reverse when economic recovery takes place. Yet even with growing income, basic grains are likely to continue in a relatively stagnant market because of the substantial production response capability of rainfed agriculture.

Irrigation has little to offer in basic grain production, largely because it cannot compete with cheaper rainfed production, even if there were stronger market demand. Nor is irrigation needed to meet future nutritional demands of the population which are not now reflected in the marketplace. Rainfed production of these products could be increased first through some expansion of the cultivated area and, as soon as that possibility is exhausted (perhaps a 30% increase in output over 1982), rainfed yields can be increased much more cheaply through fertilizer and varietal improvements than through irrigation.

In summary, domestic market demand represents an essentially fixed and immovable constraint on the expansion of irrigation for basic grains.

b. Domestic Demand for Fruits and Vegetables

Systematic estimates of the market effective demand for perishable fruits and vegetables in the domestic market were not found. However, the importation of these products from Guatemala is evidence that demand is not being satisfied by domestic production. There appears, therefore, to be some market margin for irrigated production in these products, since an important part of the Guatemalan production is imported during the dry season. Table 6 below outlines the magnitudes of imports from Guatemala for 1984.

Table 6
Imports of Guatemalan Fruits and Vegetables
(1984, in Metric Tons & US\$)

<u>Commodity</u>	<u>Metric Tons</u>	<u>US\$ 000,000</u>
<u>Fruits:</u>		
Bananas	29,878	0.6
Plantains	21,143	0.9
Oranges	6,278	0.2
Pineapple	2,759	0.1
Apples	2,400	0.4
Granadilla	1,497	0.2
Coconut	1,045	0.1
Avocado	3,065	0.3
Other Fruits	3,354	0.6
Total Fruits	71,428	3.3

<u>Vegetables:</u>		
Cabbage	13,318	0.7
Potato	12,893	1.2
Tomato	9,730	1.0
Onion	8,001	1.0
Carrots	5,410	0.5
Cauliflower	2,516	0.2
Lettuce	1,955	0.2
Beets	1,179	0.1
Other Vegetables	3,085	0.4
Total Vegetables	58,088	5.3
All Guatemalan Imports	129,436	8.6

Source: Quantities and values in colones from FUSADES & Fundación Chile, Agriculture Diversification Study, 1985; US\$ at 4:1.

At conservative current yield levels, it would take 2-3 thousand hectares of irrigated land to substitute for imported Guatemalan vegetables and 2-3 thousand to substitute for imported fruits, except for apples which cannot be produced in El Salvador. Altogether, El Salvador would need to have only 4-6 thousand hectares of irrigation to substitute for all imported fruits and vegetables. Official estimates indicate that the Zapotitán irrigation project alone has capacity to irrigate 3,500 Ha., and only about 500 are in fruits and vegetables. If the apparent irrigation capacity of Anticoyo is added, it would appear that these two public sector projects alone have sufficient irrigation capacity to substitute for all Guatemalan imports without even tapping private sector irrigation capacity.

The fact that under-utilized irrigation capacity exists alongside Guatemalan fruit and vegetable imports is reasonably clear evidence that lack of irrigation is not the cause of Guatemalan imports. In any case, even if lack of irrigation is the cause of the imports, there would only be a market need for 3-6 thousand additional hectares of irrigation capacity in El Salvador based on import substitution from Guatemala.

In summary, the domestic market constraint for fruits and vegetables is very tight in terms of the irrigated area it could support. No substantial additional irrigated area could be developed based on either growing internal demand for these products, nor on substitution of existing imports.

c. External Market Demand for Traditional Export Crops

In its 1984 Diagnóstico, the MAG analyzed the market demand prospects for the traditional export crops and concluded: "In general terms ... agricultural exports have demonstrated a declining trend of 15% per year during the period of the study (1977-1983)..."

There is little chance that external demand for these products will improve in the near term to such an extent that El Salvador would find it in its interest to substantially expand production. While irrigation can have an important impact on the yields of cotton and coffee, and perhaps even higher in sugar cane, the stagnant demand for these products would make such an investment in irrigation inadvisable. Again, as in the first three product groups, demand represents a rather fixed and immovable constraint on substantial irrigation development for traditional export crops.

d. External Demand for Fruits and Vegetables

The international demand for fruits and vegetables, particularly in fresh form, is generally good. With some important exceptions, such as potatoes, fresh fruits and vegetables have relatively high income elasticities. This is particularly true of off-season produce in Northern Hemisphere countries.

While there is a strong and growing demand for these products as incomes increase in the developed countries, El Salvador faces two other very difficult problems in accessing that demand. The first is a competitive advantage constraint, and the second is an institutional marketing constraint related to penetrating and defending a market position. The first issue, competitive advantage, is discussed here. The institutional marketing issues will be discussed below along with other institutional constraints.

The competitive advantage of El Salvador vis-a-vis other potential suppliers of the Northern Hemisphere fruit and vegetable markets is a topic beyond the capability of this Project Paper to accurately analyze, yet some preliminary conclusions are required, since this is the only market which could support an important irrigated agricultural sub-sector in El Salvador. This topic will be divided into a discussion of competitive position of El Salvador vis-a-vis four groups of potential suppliers: (1) domestic U.S. producers, (2) Mexico, (3) other CBI countries, and (4) other Southern Hemisphere producers.

In making these preliminary readings on the competitive advantage position of El Salvador, three major factors and factor costs will be considered: (1) wage rate, (2) transport cost, and (3) seasonal position. The experience of Mexico, Chile, and other smaller countries during the last decade illustrates that technology is not a major competitive factor.

With regard to the wage rate, it is important to distinguish between fruit and vegetable products which are essentially mechanized in the U.S. and those which are still largely handled and packed with hand labor. Potatoes and onions are examples of crops which are essentially mechanized and labor cost is therefore not an important factor. The crops listed in Table 7 below appear to have a large enough labor content in major consuming nations that labor is the most important competitive factor.

Table 7
Crops with Favorable Demand and Substantial Labor Content

Tomato	Green Pepper	Cauliflower	Broccoli
Brussels	Strawberries	Blueberries	Blackberries
Pineapple	Bananas	Grapes	Honeydew
Watermelon	Casaba	Cantaloupe	Summer Squash
Cucumber	Asparagus	Green Onions	Garlic
Snow Peas	Green Beans	Sweet Peas	Black-eye Peas
Carnations	Gladiolos	Roses	Crisanthemum
Daffodils	Ornamental Plants		Celery
Lettuce	Spinach	Okra	Beets

Table 8 below presents a preliminary comparative advantage comparison with the four different groups of potential suppliers to the U.S. market.

Table 8
Preliminary Comparison of Comparative Advantage
Among Competitive Potential Suppliers to the U.S. Market

Potential Suppliers	Labor Cost Differential	Transport Differential	Season Position	Import Regulation
U.S. Producer	1.0	1.0	1.0	1.0
Mexico	+3.0	-0.1	+1.5	-0.5
CBI Countries	+12.0	-0.4	+2.0	-0.1
Other LDC's	+12.0	-2.0	+2.0	-0.5
El Salvador	+12.0	-0.4	+2.0	-0.1

From the preliminary comparisons in Table 8 it would appear that El Salvador is in approximately the same relatively strong position as other CBI countries in competing for market position in the list of products outlined in Table 7. The major positive factor appears to be the labor differential, not just between El Salvador and the U.S., but also between El Salvador and the major competitive production areas in Northern Mexico. It is likely that the combination of labor cost advantage, seasonal advantage and CBI advantages could put El Salvador in a strong position to overcome the transport advantage enjoyed by Mexico. Table 8 also illustrates, however, that El Salvador is in no better position than other CBI countries and will have to compete head-on with any of these nations that have already won some small but important market positions.

In summary, it appears that market demand is not a constraint on El Salvador's development of irrigation of a wide variety of irrigated fruit and vegetable crops for export. It further appears that basic comparative advantage considerations also do not constrain such a strategy, though other CBI countries also enjoy a similarly strong position. The factors which constrain this strategy lie in the area of institutional irrigation and export marketing constraints discussed in the following sections.

4. Financial Constraints

A review of the availability of finance for irrigation development indicates that there is no immediately restricting scarcity of finance for public irrigation development, but that serious restrictions of an institutional nature encumber the financial resources which could ostensibly be channeled into private sector irrigation.

The Inter-American Development Bank (IDB) has already committed substantial sums to the construction of public irrigation projects including the Lempa/Acahuapa and a number of smaller systems such as Potrerillos. Discussions with the IDB indicate that the Bank will probably be able to finance the portfolio of public projects which exist in the planning pipeline for at least the coming decade.

As far as private irrigation finance is concerned, the problem is serious, but the constraint is not on the quantity of financial resources which are "available" in some sense of the word. Credit funds exist in the commercial banking sector through Central Bank rediscount lines from the "Fondo de Desarrollo Económico" with interest rates that do not appear to impede irrigation investment. Likewise, fund classification in the Agricultural Development Bank (BFA) would not appear to prevent irrigation from tapping a number of different lines of credit which are not currently exhausted.

During intensive review, the Project design team met with representatives of 12 public, mixed, and private banks and reviewed both actual disbursements of and institutional procedures and restrictions related to credit for irrigation and irrigated agriculture. The conclusion of this review is that while funds are ostensibly "available" for irrigation and irrigated agriculture, the amounts actually disbursed are negligible. The difficulty appears to be a combination of a lack of institutional agility in adapting the terms and conditions of the finance to the realities of irrigation, and particularly irrigated agriculture, and a lack of market security for irrigated products which could pay back the loans.

In summary, on the surface it would appear that there is no de jure or de facto financial constraint on the development of public irrigation. However, the supply of finance actually available for private irrigation investment and for the export crops which can pay for irrigation investment are both severely constrained. The constraint lies in the institutional inflexibility of the system which supplies the finance. Credit availability may be visualized as a sufficient de jure supply at the Central Bank level, but a severely constrained supply at the farmer and marketer level. The institutional constraints which restrict the de facto agility of finance for private sector irrigation and export marketing are summarized in the next section and discussed in more detail in the Institutional Analysis of this Paper.

5. Institutional Constraints

Institutional constraints will be analyzed in two general categories: first, those institutional constraints that directly restrict the development of irrigation and, secondly, those that indirectly restrict irrigation development by restricting production and marketing of irrigated export crops.

a. Institutional Constraints Directly Affecting Irrigation

Institutional constraints directly affecting irrigation development fall into three categories: those affecting public irrigation; those affecting both private and public irrigation; and, those affecting principally private irrigation.

(i) Institutional Constraints on Development of Public Irrigation

The Institutional Analysis indicates that important institutional constraints directly affecting the development of public irrigation exist in: (i) the planning and review of feasibility and design studies, and (ii) the operations and management of irrigation systems.

In the planning area, there appear to be acceptable basic data and institutional capability in the development of hydrological and engineering aspects of irrigation planning. The constraint is in the way in which construction costs, demand considerations, and rainfed production alternatives are entered into the planning process. These constraints are analyzed in more detail in Section VII B.1.

In the area of review of feasibility and design studies, there appear to be more important institutional constraints. There appears to be adequate institutional capability to undertake feasibility and design functions, but there seems to be a lack of capability to properly monitor and evaluate these functions. The same considerations discussed in the planning functions reappear in this category. There is a lack of cost consciousness, analysis of rainfed production alternatives, and of market demand monitoring and evaluation by those conducting feasibility and design studies. There is, additionally, a lack of analysis of alternative system design options at pre-feasibility and feasibility stages.

With regard to the operations and management of irrigation systems, the public sector institutions appear to lack capability in integrating on-farm water management aspects into the irrigation planning and design work. Systems are built and turned over to farmers without the farmers' particular needs having been taken into account. Moreover, because there is a lack of good irrigation extension, government built systems frequently end up underutilized or abandoned. GOES agencies are now aware of this deficiency, but a clear strategy for bringing about effective management of public-funded irrigation projects has not been developed.

(ii) Constraints Directly Affecting Both Public and Private Irrigation

Two important and interrelated institutional constraints affecting both public and private irrigation are the lack of human resources trained in irrigation and irrigated agriculture and inadequate extension services in irrigation.

There is essentially no institutional capability either in the public or in the private sector to conduct serious irrigation extension. In the FAO's Center for Agricultural Technology (CENTA), only one person has any significant irrigation expertise. Private sector irrigation equipment suppliers provide limited design, installation and operation assistance to their limited number of direct clients.

There is no professional degree offered in El Salvador in irrigation or in irrigated agriculture. Without any professional training available in irrigation, both public and private sectors are unable to hire qualified specialists. This exerts a strong constraining influence on the capacity of the country to develop private or public sector irrigation.

(iii) Constraints that Affect Principally Private Sector Irrigation Development

An additional institutional factor which has constrained the development of private sector irrigation has been the non-existence of a private sector organization which brings together private enterprises engaged in irrigated agriculture or in support services for irrigation to seek solutions to the constraints facing irrigation development. Such an organization, the Private Sector Irrigation Association, is now being formed but requires assistance in technical and administrative areas in order to promote and support private sector irrigation efforts.

b. Institutional Constraints Affecting the Export Marketing of Irrigated Products

The strong influence of market "pull" on irrigation development has been noted previously. The principal institutional constraints which limit the export pull on irrigation development in El Salvador include the lack of effective export marketing R&D in either public or private sectors and inadequate export marketing finance. In this subsection these institutional constraints are discussed as they relate to both public and private sectors.

(i) Export Marketing R&D

In two of the five most successful Southern Hemisphere fruit and vegetable exporting countries, public sector marketing boards have played a significant role in the export marketing R&D. These cases are New Zealand and South Africa. The fact that this did not work in the case of Chile, Argentina and Brazil suggests that it would not work in El Salvador either. Given El Salvador's strong entrepreneurial class, it would appear that addressing this institutional constraint successfully holds greater promise if the private sector plays the major role.

For El Salvador's private sector, the R&D constraint lies more in the Development than in the Research. Market development in the export produce trade involves actually placing relatively large quantities of quality produce in various marketing channels to test the viability of every part of the production, packing and marketing chain. Salvadoran firms lack both technical and financial capability to undertake this critical Development part of R&D. The few firms that are engaged in export development appear to be able to do export marketing and field production research reasonably well. In addition, there are institutional structures and resources in place in the private sector through FUSADES — a Trade and Investment Promotion Service — which has recently begun to provide technical support to export market development research. Thus, while firms now have access to technical assistance for production and marketing of non-traditional products, they lack the type of financial support required to undertake such high-risk, commercial-level pilot attempts to penetrate export markets

(ii) Export Marketing Finance

The production and export of perishable export commodities such as those listed in Table 7 require very specialized and agile financial mechanisms. The public sector financial entities which control agricultural credit are insufficiently agile and technically unprepared to finance these crops. Their current institutional formats, terms, conditions, disbursement schedules, security requirements, rules on items which can be financed, etc., are all directed at traditional agricultural products. For example, boxes for shipping agricultural exports often represent more than 60% of the total cost of export production per hectare, yet current production credit restrictions do not permit the finance of boxes. This is but one example in the long and delicate chain from production to final sale and remittance of foreign exchange, each stage having its own finance requirements unique to the fresh produce export trade. Even though the Central Bank is working on improving credit lines, at present the financial system in El Salvador is simply incapable of dealing institutionally with the special needs, risks, and problems related to both the production and export marketing of highly perishable crops.

The second private sector constraint is simply the lack of experienced firms in the export produce trade. There is an urgent need to expand the capability of existing firms in other related areas into production and export of fruits and vegetables. There is considerable nascent entrepreneurial talent in El Salvador, which could be encouraged into this field. The lack of experienced firms is a serious constraint on export market "pull" on irrigated production.

The third major private sector constraint on market "pull" is the lack of private sector refrigerated trucking capacity direct to U.S. markets. Currently, perishables are exported exclusively by truck-sea connections principally through Puerto Barrios on the Atlantic coast of Guatemala. There is an urgent need for direct refrigerated trucking alternatives to the U.S. market through Mexico which would both improve the performance of the existing sea service through open competition and provide quicker direct access to a broader U.S. market.

In summary, the analysis of potential constraints to the development of irrigation and irrigated agriculture in El Salvador indicates that there are no serious physical or technological constraints, there is sufficient land and water, and no new or adapted technology is necessary to permit substantial irrigation development in El Salvador. There are scarcities of human resources with training in irrigation, and there are serious market demand constraints for all possible irrigated crops except for irrigated

fruit and vegetable export crops. Sufficient public finance is available for public irrigation, but there is a serious lack of finance actually available at the farmer/marketer level for private irrigation investment and irrigated export production and marketing. This Project will address the constraints identified in both public and private sectors.

D. Relationship to CDSS and A.I.D. Policies

The U.S. economic assistance strategy for El Salvador places highest priority upon assisting the GOES in re-establishing economic growth with equity. To this end, the assistance program, consistent with the objectives of the Jackson Plan, supports economic, humanitarian, social and democratic institutions and programs which can help bring about a more equitable distribution of the benefits of economic growth and help maintain the social, political and economic environment necessary to a free enterprise economy. The Jackson Plan objectives for the agricultural sector are focused on laying the foundation for accelerated agricultural development and the building of strong and free economies with greater productivity and diversified production for both domestic and external markets.

In the agricultural sector, the U.S. assistance program has been focused on helping the GOES implement the agrarian reform, begun in 1980, and provide credit, technical and other services to the beneficiaries of the reform. Even as the AID program continues to support the agrarian reform sector, it will begin to support other farmers who can effectively participate in efforts to increase production and productivity. Because both reforms and non-reform farmers will be encouraged to participate in the Project's activities, the potential contribution by the reform beneficiaries and other farmers to agricultural productivity increases and diversification will be facilitated, thus helping generate and sustain growth, especially in non-traditional crop production and commodities for agro-industrial exports.

By opening up possibilities for new export crop production, the Project will contribute to the overall CDSS strategy, the Mission's agriculture sector objectives, and the objectives of the Jackson Plan. Training and technical assistance for planners and managers of the GOES's national irrigation program will reinforce other Mission efforts aimed at improving agricultural development policy making. Training, technical and credit assistance to private producers, processors and exporters of non-traditional export crops will promote private investment in El Salvador's rural areas which urgently need new employment and income

opportunities. Furthermore, the strengthening of extension agents and agriculture teachers will provide the means for human resource development and technology transfer in years to come.

E. Relationship to the Mission Program

The Mission is currently supporting, and is planning to assist, various substantial programs aimed at providing credit and support services to the agricultural sector. Briefly, some of the major programs include:

- A \$2.3 million Small Farm Irrigation Systems loan project which, upon termination in September, 1985, will have financed the construction of 47 small-scale irrigation systems covering some 1,650 hectares and benefiting more than 16,000 campesinos.
- An \$81.5 million Agrarian Reform Credit loan project which is making available short, medium and long term credit to agrarian reform cooperatives (Phase I), individual agrarian reform farmers (Phase III), and, from project reflows, credit to non-reform small farmers. A new agriculture credit project is planned for FY 1986 to provide credit to reform and non-reform farmers.
- A \$9.45 million Industrial Stabilization and Recovery grant project which is designed to develop appropriate GOES policies and private sector Trade and Investment Promotion Services (TIPS) through FUSADES. Access to TIPS services including international communications and specific, short term technical assistance required to expand El Salvador's non-traditional industrial and agricultural exports will be made available to the private sector enterprises of this Project.
- A \$1.0 million grant to FUSADES for its Agricultural Diversification Program (ADP) and a \$500,000 Rural Enterprise Development (REDO) activity managed by the MAG include assistance to producers for feasibility studies. ADP and REDO assistance and activities will complement the private sector activities in this Project.
- Balance of payments support (ESF, FY 1985: \$195 million, FY 1986: \$202 million; P.L. 480, FY 1985: \$51 million, FY 1986: \$64 million) which finances vital import needs and generates local currency resources which are invested in credit lines and priority development activities.

III. PROJECT DESCRIPTION

A. Goal and Purpose

The goal of the Project is to increase employment, income and foreign exchange for El Salvador.

The purpose of the Project is to promote diversified irrigated farming in El Salvador through institution strengthening, technology transfer, training and credit assistance.

B. Project Strategy

As pointed out in the Background Section of this Project Paper, El Salvador is not an arid country by almost any measure. Its need for irrigation includes only a small subset of existing agriculture. Market demand for basic food and fiber staples and traditional export crops can be met most economically without irrigation. This implies that the role of irrigation is a very narrow, albeit vital one for El Salvador. That role lies in the diversification of export crops to include irrigated fruits, vegetables and specialty crops. Irrigation is critical to the future of El Salvador in that it can unlock employment opportunities for the massive unemployed rural labor pool and is perhaps the best single opportunity to generate the badly needed foreign exchange to fuel the development of the agricultural sector.

Yet irrigation itself is constrained by the lack of market penetration of non-traditional crops in foreign markets. Since investment in irrigation is only vital in diversified crops for export, the demand for irrigation is directly constrained by the market for those crops. In recognition of this important "demand pull" relationship between irrigation and export demand, Project activities in the private sector will be focused on supporting private sector capabilities to open and expand exports of irrigated crops. The strategy of the Project will thus include setting up more agile credit mechanisms for the needed investment and developing export marketing channels to "pull" private sector investment into irrigated production of high-risk and profitable non-traditional export crops. In addition, the Project will address the critical human resource and institutional constraints identified in Section II related to water management and irrigated agriculture in both public and private sectors with an integrated approach. The intent is to loosen constraints on both the market R&D "pull" side, as well as on the irrigated production "push" side.

In El Salvador, more than three fourths of the area included in irrigation systems were designed and constructed by the private sector. The Project roughly follows this proportional distribution in the distribution of its funds and efforts between the public and private sectors.

Because the development of irrigation and irrigated agriculture in El Salvador has been relatively insignificant and continues at a slow pace, the strategy of the Project will focus on accelerating the transfer of cost-effective technologies in irrigation: pump-based sprinkle/trickle systems using water from perennial rivers and streams, and the development of wells to tap the available groundwater resources will be financed. River-based pumps and wells are both very rapid systems to install and can create employment, income, and foreign exchange within a few short months. Both of these types of irrigation are the traditional province of the private sector, while public sector-funded irrigation projects are focused on developing canal-based gravity flow systems from diversions or storage works. Besides being more costly, the latter systems usually take years from initial identification before crops are actually irrigated.

Activities in the private sector will focus on strengthening the ability of firms to design, supply, install, and service irrigation equipment such as pumps, sprinkle, and trickle systems. In addition, five integrated commercial scale pilot projects will be supported through the coordinated efforts of FUSADES and the Private Sector Irrigation Association to expand the capability of packing/processing firms and irrigated farms in integrated irrigation development.

Project activities in the public sector will focus on strengthening irrigation planning, extension and training institutions with the anticipated result that existing and future public and private sector irrigation projects will be designed, constructed, and managed more effectively and that training of farmers in water management will be expanded and improved.

The public and private sector components of the Project are linked in two major areas: (a) water policy/regulatory environment and (b) human resources. The private sector activities will be regulated by the general policies, laws, and regulations developed by the OA at the national water resource management level and by the DGRD at the sectoral level. Project assistance (technical assistance and training) to the OA and DGRD will help develop policies and regulations consistent with rational exploitation of water resources for irrigated agriculture.

A large proportion of extension personnel, both private and public sector, begin their careers at ENA or at CENIA. By providing TA, training, and research equipment to these two institutions and by developing a Water Management curriculum at ENA the Project will forge a stronger link between the two sectors in the area of irrigated agriculture.

Most Project activities will commence with the arrival in country of the long term technical advisers. Since the procurement of this technical support will take months to effect, the Project will provide for start-up activities through buy-in arrangements with AID/W's Water Management Synthesis II project. This assistance will make possible the carrying out of initial studies required for improved planning for irrigation development, as well as assist in the preparation of documentation for procurement of the long term technical assistance and commodities for the Project. The WMS II technical support will also assist in long term training placements and, later on, in Project evaluation. This element will make possible accelerated initiation of Project activities.

C. Participating Institutions

Project institutional support in the public sector will be provided to the cluster of extension and training institutions -- CENIA, ENA, and CENCAP -- and to the irrigation planning agencies -- OSPA and OA. Project support in the private sector will be provided through FUSADES and the Private Sector Irrigation Association to many private sector irrigation firms, farms and export marketers.

D. Inputs and Outputs

The Project consists of three components: (1) WMS II Project Support Activities, (2) Private Sector Irrigation Development, and (3) Public Sector Irrigation Development.

In the public sector, the Project will provide the three public institutions with major roles in the Project activities -- CENIA, ENA, and DGRD -- with a team of five advisers for two and a half years, along with 50 person months of short term technical support. In addition, the Project will fund 4 person months of short term technical assistance to OSPA and OA; 51 person months of short term international training for CENIA, ENA, DGRD, OSPA and OA; four Masters degrees for ENA professors; and in-country training for policy makers, extensionists, farmers and other groups through CENCAP's facilities.

In the private sector, the Project will provide funds to enable FUSADES to help the Private Sector Irrigation Association get legally and operationally established in order that the latter can assume responsibilities for implementing the private sector component of the Project with FUSADES' oversight. The Project will fund a three-year team of two long term advisers to work for the Irrigation Association in its implementation functions. In addition, Project funds will be made available for financing 20 person months of short term international training for private sector individuals engaged or interested in participating in the Project assisted activities and up to 29 person months of short term TIPS technical assistance to participating farmers and processor/exporters. An R&D Credit Fund of \$10.0 million dollars to support irrigation and export of irrigated crops will be established through FUSADES in the Banco Hipotecario. As trustee of the funds, the Banco Hipotecario will receive guidance on the allocations of the credit funds from the Board of Directors of the Irrigation Association, which will include a FUSADES representative.

To support overall implementation, the Project will provide 16.5 person months of WMS II short term technical assistance for special preliminary studies, 12 person months of additional short term technical assistance for other start-up activities, 20 person months of international training not programmable at this stage, and three Project evaluations.

It is anticipated that at completion, the Project will leave behind public institutions, private firms and a Private Sector Irrigation Association with substantially expanded capability to develop and give direction to the development of irrigation and export-oriented irrigated agriculture. Other anticipated major outputs of the Project include:

- Approximately 136 CENPA extensionists trained and at least 50 providing on-farm services to farmers in water management and irrigated agriculture.
- Over 1,000 selected innovative farmers trained in on-farm water management and irrigated agriculture.
- Approximately 40 agriculture researchers at CENPA trained and utilizing new skills within CENPA's research unit.
- Approximately 34 ENA staff trained and a curriculum for a B.S. degree in irrigated agriculture developed for ENA.
- Approximately 68 planners, technicians and policy makers within the DGRD, OSPA and OA trained in areas related to irrigation development.

- Approximately 60 private sector field agents trained and providing technical support to farmers in irrigation and irrigated agriculture.

- Approximately 2,500 hectares of land brought under precision irrigation.

- Five integrated irrigated agriculture pilot projects producing high labor, high value crops for export.

1. Water Management Synthesis II Project Support Activities

WMS II, a central AID project which provides quick access to expertise in irrigation development will provide start-up assistance to the Project. WMS II consultants will carry out five preliminary studies, involving 16.5 person months of professional time during the six month period before the long term advisory teams arrive in country. This assistance will provide a preliminary analytical base for the Project. An additional 12 person months of WMS II short term assistance will assist in accelerating procurement of the long term technical services and equipment for the Project and contribute to the development of operational guidelines and procedures for the Irrigation Association. WMS II will also provide 13.5 person months of service in conducting three evaluations over the life of the Project and 20 person months of international short term training. The GOES will be the recipient of the Project funds for this component, and AID will implement the procurement.

a. Required Studies

A series of five studies are required to provide a preliminary analytical base for the Project. These studies will be undertaken by WMS II during the period October 1985 through March 1986 before the arrival of the long term technical assistance teams. The five studies are:

- (1) Evaluation of Existing Irrigation Systems (3.5 P/M)
- (2) Examination of Alternative Extension Approaches (1 P/M)
- (3) Farmer Attitudes and Irrigation Needs (1.5 P/M)
- (4) Groundwater Survey (9 P/M)
- (5) Role of Women in Irrigated Agriculture (1.5 P/M)

b. Project Start-up Support

WMS II short term consultants will also assist the implementing agencies in the private and public sectors to procure the technical assistance and equipment required by the Project and, in general, provide technical orientation through two short courses in El Salvador. The specific start-up activities are as follows:

- (1) Preparation of Public and Private Sectors RFP's for the Long Term Technical Assistance (2 P/M)
- (2) Assistance to the Irrigation Association in Pilot Design and Proposal Development (3.5 P/M)
- (3) Master Degree Placement and Equipment Procurement (3 P/M)
- (4) Irrigation Policy Seminar and Technical Short Courses (3.5 P/M)

c. Project Evaluation

WMS II consultants will conduct three Project evaluations during the life of the Project. These Project evaluations will involve baseline and follow-up farmer impact surveys on approximately 240 farms and in-depth evaluation of training and institutional development activities of the Project. The three evaluations are tentatively scheduled as follows:

- | | | |
|---------------------------|--------------|---------|
| (1) Baseline Evaluation | August 1986 | 3.5 P/M |
| (2) Mid Course Evaluation | January 1988 | 5.0 P/M |
| (30) Final Evaluation | July 1990 | 5.0 P/M |

d. International Training

Over the life of the Project, WMS II will provide 20 person months of international short term training and site visits for selected officials from both private and public sectors. This training fund will provide flexibility to the resident technical assistance teams, participating entities, and the WMS II evaluation teams to select and send key individuals for short term training and site visits abroad which are difficult to anticipate and program into the individual institutional training budgets.

e. WMS II Summary

The WMS II component inputs and outputs are the following:

<u>Activity</u>	<u>Person Months</u>	<u>Cost (\$000)</u>
1. Required Studies	16.5	247.5
2. Project Start-up Support	12.0	180.0
3. Project Evaluations	13.5	202.5
4. International Training	20.0	100.0
Total WMSII	62.0	730.0

2. Private Sector Irrigation Development

The objective of this component is to strengthen the technical and financial capability of private sector firms and farms to exploit the abundant water resources which lie in year-round rivers and accessible aquifers for the production and marketing of high-labor, non-traditional crops.

a. The Private Sector Irrigation Association

The two principal implementing entities for the Private Sector Irrigation Development component will be FUSADES and the Private Sector Irrigation Association. The Association has been informally meeting during the months of June and July 1985. The intent of the firms who have been represented at the organization meetings is to constitute a formal non-profit Association under Salvadoran law to promote diversified irrigated farming. FUSADES will be the recipient of Project funds for the component and will transfer Project implementation responsibility to the Association, once the latter is established, through means of a subsidiary agreement between the two. FUSADES will continue to monitor and evaluate compliance of the Association with Project objectives and activities as outlined in this Paper and any sub-agreements which are executed under it.

The Association organizers are elected representatives of firms and individuals in the following categories. Each of these categories will be considered as a "sub-group" inside the Association and will elect one member of that "sub-group" to serve as a voting member of the Board of Directors of the Association. The sub-groups are as follows:

- (1) Irrigation Equipment Sellers
- (2) Well Drillers and Well Equipment Installers
- (3) Irrigation and Irrigated Agriculture Consultants
- (4) Agricultural Input Suppliers (Asociación de Proveedores)
- (5) Export Processing Firms
- (6) Fresh Export Packers and Exporters
- (7) Producers and Exporters of Non Traditional Crops (the Asociación Salvadoreña de Productores y Exportadores de Productos No-Tradicionales - ASPENT)
- (8) Reirigerated Export Transport Firms

In addition to these eight members, the Association board will also include (9) a representative of FUSADES as a voting member. The Executive Secretary of the Association, a representative of the Trustee Banco Hipotecario (TEH), and a representative of AID would be ex-officio members of the Board, without vote. The President of the Board would be elected by vote of the Board. The Board members would be appointed for two-year terms, and all decisions of the Board would be taken by majority vote of the same.

(i) Operational Assistance to the Association

Under its Association Strengthening Activity (ASA) program, FUSADES will assist the Association organizers in obtaining formal legal registration. As soon as that registration is complete, the Project will make funds available to the Association for operational expenses of a small office and the hiring of three staff members and related technical assistance. This operational assistance will carry over during the life of the Project. Thereafter, the Association will finance its costs from member dues, consulting fees for its services, and interest on the R&D Credit Fund, described below.

(ii) Technical Assistance to the Association

Under the Project, the Association will be provided with two expatriate advisers for a period of three years. One of these contractors will serve as adviser to the Executive Director of the Association, and both of them will function under the direction of the Board to implement its programs and activities. This contractor should be a specialist in export marketing development with familiarity with irrigation and irrigated agriculture. This person will assist the Executive Director in reviewing short term technical assistance requests from participating firms and in recommending Board action on these requests. The adviser will also assist the Executive Director in making recommendations to the Board on requests for short term international training and site visits in connection with the

development of irrigation, irrigated production and/or export markets. The adviser will participate in the review of proposals for loans from the R&D Credit Fund, and in the evaluation and ranking of these proposals, as well as prepare proposal review reports for submission to the Board and recommend bidder selection.

The second expatriate contractor will be a CPA with business experience in Latin America. He will serve as auditor and accountant for the Association to administer the funds provided under the Project for the Private Sector Field Agent program described below, and to monitor and evaluate the disposition of funds under the R&D Credit Fund managed by the TRH. Beginning in year one, the Project will fund a local employee as full time counterpart to the Accountant/Auditor adviser for the Association.

The Project will also finance the hiring of a local Training Coordinator for the Association for the full five year period. The functions of this person are described in the next section.

To enable the two expatriate and the local contractors to carry out their work, the Project will finance the purchase of three vehicles.

During the period of time between the obligation of Project funds and the time of the arrival in San Salvador of the two-person technical assistance team, the Association will receive start-up support from short term consultants under the WMS II contract described above. The objective of this support is to assist FUSADES and the Association in drafting the RFP for the long term technical assistance which FUSADES will procure for the Association. This start-up help will also assist the Association in developing terms of reference for requesting proposals from private firms and farms interested in financial and technical support available under the Project. The WMS II consultants will assist in publishing these terms of reference, as well as help interested firms in preparing responsive proposals. This start-up assistance will allow the proposal submission process to begin before the long term contractor team for this component arrives (estimated April 1986). By that time, some proposals should be ready for the team to begin to review without further delay.

(iii) Assistance to the Association Summary

The inputs and outputs of the Assistance to the Association sub-component may be summarized as follows:

<u>Activity</u>	<u>P/M</u>	<u>Cost (\$000)</u>
Operational Support		142
U.S. Long Term TA	72 P/M	1,080
Local Staff	169 P/M	507
3 Vehicles		45
Total		<u>1,375</u>

b. Technical Assistance to the Private Sector

The private sector component of the Project will provide channels to access technical assistance in the form of short term consultants to assist private sector firms in designing and managing irrigation and irrigated agriculture systems and enterprises. Approximately 80 person months of specific, short term technical assistance will be funded at an estimated cost of \$500,000. The Association may procure this technical assistance or request that FUSADES procure it through its TIPS or Agricultural Diversification Program (ADP).

c. Private Sector Field Agents

Private sector businesses related to irrigated agriculture play an important technical and financial role in disseminating technology and training farmers. Many of the businesses employ field agents for this purpose. The Project will expand the capability of private firms to reach farmers with effective services through a better trained and expanded pool of private sector field agents. The Project will provide short course training opportunities for these agents and will contribute fifty percent of the salary cost of additional hirings of field agents for the first two years of their employment.

The intent of this support is to substantially increase the number of these field agents in the short run to rapidly disseminate irrigation and irrigated agriculture technology in El Salvador. By supporting the initial training and internships of these field agents, it is anticipated that they will become self sustaining elements in the private sector enterprises by the time they must bear their own financial load inside the firms.

Under the Project, a full time local adviser will be provided to the Association to coordinate private sector training, including the training of field agents. This Training Coordinator will concentrate on apprentice types of on-the-job

training and supervision for new field agents and field agents' assistants. The field agent assistants will be extra employees hired to help speed up commercial promotions, sales, and production supervision. Project funds will cover 50% of the cost to the employer of their employment during the first two years of the Project. Thus, a pool of field agents or private sector "extenders" will be trained to meet the future needs as the irrigated agriculture grows.

The private sector Training Coordinator will also make arrangements with the CENIA/ENVA technical assistance team, discussed below, to include the private sector field agents and assistants in the basic "Extender" courses to be provided to public sector extension agents and farmers working in the same geographic areas. The Training Coordinator will facilitate and monitor the external and in-country training, observational travel, and technical assistance access needed by the persons in the private sector enterprises.

The deadline ending the salary support for field agents in the third year of the Project will be announced to encourage early entrance of firms into the program. This will result in some agents being subsidized less than two full years, though training courses will continue through and beyond the end of the Project. A description of the details of the management of the field agent program is given in Annex 5, Note A. Field agent support may be summarized as follows:

No. of Field Agents Subsidized	60
Person Months of Salary Subsidy	480
Project Cost of Subsidy	\$336,000

d. The Irrigation and Export Marketing R&D Credit Fund

The Project will create through FUSADES, an Irrigation and Export Marketing R&D Credit Fund, managed by the Banco Hipotecario as Trustee for FUSADES and the Association. The Fund will be used for loans to firms and farmers qualifying under Association support Models A and B described below. The objective of the Fund is to support development of private sector irrigation and export of irrigated crops through appropriate and agile financing mechanisms appropriate for long term and high risk R&D investment.

The Banco Hipotecario is selected as the Trustee to manage the Fund because of its experience in agriculture mortgage lending in El Salvador and its direct experience and involvement in the development of new potential export crops for El Salvador. Unique among Salvadoran banks, the Banco Hipotecario owns and operates an R&D orchard experimenting with production and marketing technology in grapes.

The management of the Fund would be as follows. The Trustee Banco Hipotecario (TBH) would receive the funds from FUSADES in "fideicomiso" and manage the disposition and recuperation of the funds under the direction of the Board of Directors of the Association, in which FUSADES will have representation. The basic operating procedures, terms and conditions of the disposition of funds is summarized below. More detail is provided in Annex 5. The Association Board will review and determine which borrowers are qualified for R&D support from the Fund. The TBH would administer these loans and guarantees as outlined below, and account to the Association and FUSADES for its trusteeship on a quarterly basis. Changes in the basic procedures outlined below, or reassignment of trustee would require a written request from FUSADES and the Association to AID and written approval by AID.

The interest charged to final borrowers under the Fund will be in accordance with Central Bank guidelines for similar lines of credit at the time such credits are approved. The TBH may be paid a small percent, to be negotiated between it and FUSADES, as a fee for Fund administration. The disposition of interest paid by final borrowers as they are paid to the TBH would be as follows: 50% returned to the Fund, 30% to FUSADES for capitalization purposes, and 20% to the Association to be applied to operating expenses.

A summary of estimated uses of the R&D Fund is as follows:

<u>Destination</u>	<u>Ha. Financed</u>	<u>Cost</u> <u>(\$000)</u>
1. On-Farm Irrigation Equipment	2,500	3,750
2. Packing/Processing Facilities	1,500	1,750
3. Irrigated Production Credit	1,500	1,500
4. Marketing Credit	1,500	3,000
Total Fund		10,000

(i) Financial Support of Private Sector
Irrigation Development: Model A

The Project will provide a package of technical support and agile financial mechanisms for private farms and the firms that supply irrigation equipment to them. The Project will support the development of 1,000 hectares of private sector precision irrigation through supplier firms, or "Model A," discussed in this section, and 1,500 hectares inside five pilot export project areas, or "Model B," described below. The equipment financed will be for on-farm installation at an estimated average cost of US\$1,500 per hectare.

The technical assistance and financial package will assist firms to design, sell, install, and operate pumps and sprinkle/trickle systems on rivers and wells. Technical assistance to this process will be provided through the expansion and subsidization of the private sector field agent program explained above.

The Project will also pilot the operation of agile finance mechanisms with terms appropriate to risks and lead times involved in private sector irrigation investment. The irrigation equipment supply and advisory firms that qualify for participation in this Project activity will be provided a line of credit to extend to client farmers for the finance of purchase of qualifying irrigation equipment. The qualifying equipment includes pumps, plastic and aluminum pipe, sprinkle/trickle and drip equipment, well drilling costs and casings. The Board of the Association will review applications for the lines of credit and approve qualified firms for participation in the program. The firms selected will act as credit retailers to their clients, using lines of credit from the Irrigation Fund created by the Project through FUSADES with the TBH. FUSADES will participate in final approval of the credits extended by the qualified firms. The TBH would disburse funds to the final borrower (farmer) upon submission of the necessary loan documents approved by the Association Board and FUSADES.

Upon approval, full value of the credit would be disbursed jointly to the farmer and the supplier to cover the costs of the equipment. The supplier would receive full payment at that time, but would have 20% of the money received at risk until final payment in 10 years.

Credit disbursement and recovery would be the responsibility of the Banco Hipotecario. The supplier in Model A would have the responsibility for identifying potential borrowers, assisting them in preparation of the necessary credit forms, and would have a secondary responsibility for loan collection because of their 20% guarantee. The actual loan agreements would be between the borrowing farmer and the Banco Hipotecario, with an Aval by the supplier for 20% of the loan.

The terms of the irrigation equipment credit would be adapted to fit the realities of risk and expected payback period of irrigated agriculture. There would be no subsidy on interest rates which would follow the Central Bank guidelines for similar credit through the BFA or commercial banks. The irrigation credit would be extended for 10 years with four years principal grace with first payment due 24 months after disbursement. In cases where the irrigation equipment is for use on crops with more than four years of gestation before commercial production, the first payment period will be correspondingly extended until the first commercial crop year. In the event the farmer elects to use part or all of the irrigation financed to cultivate the "new" crops listed in the approved Association list (see Annex 5), the farmer will be provided a 50% Export Risk Guarantee for the investment as described below.

Farmers qualifying under Model A described above, or Model B described below, and who commit to use part or all of their financed irrigation to cultivate the Association approved R&D export crops qualify for the Export Marketing Risk Guarantee (EMRG). Under the EMRG, the Association guarantees 50% of the credit against failure of export markets. The detailed procedures and terms of the risk guarantee fund are outlined beginning in Note B of Annex 5. The net result of the details of the guarantee process is to shift half of the export market risk of irrigation investment in new crops to the borrower and half to be borne by the Project's R&D Credit Fund.

(ii) Financial Support for Integrated Irrigated
Export Diversification Pilots: Model B

The second private sector irrigation model, "Model B," which the Project will support is one in which irrigation is "pulled" by export markets exploited by private packing and processing firms. This irrigation model is organized around a packing or processing plant. The idea of these pilots, and the technical, financial and guarantee mechanisms which support them, is to engage the private sector in a substantial export development venture in which the R&D Credit Fund would underwrite up to 50% of the R&D risk.

The Project will provide technical and financial support for the development of five of these pilots during the first three years of the Project. The first Project evaluation is scheduled for August 1986, two months after the selection of the firms for the first pilots. If at that time there appears to be many more viable proposals presented than the Project can fund, additional financing through Project amendment, from the BCR's Fondo de Desarrollo, or other sources will be seriously studied.

Rather than to embark on a large public sector funded R&D activity, the intent of the Project supported commercial pilots is to get the private sector to undertake the effort and bear a large share of its risk. If the pilots succeed, the technology to replicate and expand upon the successes will rest where it is usable — in the private sector. Were these commercial R&D efforts to be undertaken by public research, extension or other institutions, even if successful, the treasury would have to bear the full cost of development and of transferring the technology to the private sector.

The integrated pilot project model requires the involvement not just of irrigation firms, but also of other related sectors, hence the inclusion of these related firms in the Private Sector Irrigation Association. The firms that are eligible for support under the Pilot Model B are the various categories outlined above, including those engaged in refrigerated truck transport.

The crops and products which are eligible for support under Model B were selected according to three criteria (a) economic potential, (b) labor requirements, and (c) market potential. The three criteria and the selected crops are described in Note C of Annex 5.

The Association will openly and extensively publish, in El Salvador and abroad, the eligible products and the terms, requirements and conditions for financing and technical assistance for the pilots. Proposals will be invited from private firms and joint ventures including companies registered in El Salvador, the U.S., Latin America and other Code 935 countries. The selection of firms and pilots to be financed will be based on open and competitive bidding among interested firms according to criteria and procedures outlined in Note D of Annex 5. FUSADES will participate in the review, evaluation and ranking of the proposals.

The irrigated area and size of the plants financed will be at least the minimum size required to permit the development of a viable and commercial exporting unit. Up to two pilot plants will be approved for each crop or group of crops in order to promote healthy and efficient competition.

The total cost of the Private Sector Irrigation Development component is estimated at \$16.5 million. The \$13.5 million Project grant will finance operational support and long term technical assistance to the Association, vehicles, local staff of the Association, salary support for private sector field agents, short term technical assistance to participating farmers and entrepreneurs and the R&D Credit Fund. Counterpart in-kind contributions by participating institutions and beneficiary enterprises and farms is estimated at \$5.0 million in local currency equivalent.

3. Public Sector Irrigation Development

The Project will provide training at professional, extensionist and farmer levels to strengthen the capability of public sector irrigation institutions to support irrigated agriculture. Given its strong training focus, the Project will concentrate support on the two major training institutions, CENTA and ENA. In addition, training and technical assistance will be provided in irrigation planning and policy development and in evaluation and monitoring of system construction, operation and maintenance. The planning assistance will focus on DGRD, OSPA and OA. The sections which follow outline in more detail Project activities inside the "extension-training" cluster of institutions and the "planning" cluster.

a. Extension and Training: CENTA, ENA, and CENCAP

Under the Project, a long term team of four U.S. advisers will be provided jointly to ENA and CENTA for two and one half years. Their time will be split between these two institutions such that CENTA will receive approximately 72 person months of services and ENA 48 person months. The team will develop and teach the basic courses for a B.S. degree in Irrigated Agriculture at ENA and train extension and research personnel in CENTA. Four ENA professors will be sent to the U.S. for Masters Degree training and return to replace the advisers in their teaching responsibilities.

In addition to the support of the long term team, CENTA will receive 34 person months of short term technical assistance to provide extension and research training. CENTA and ENA together will receive 30 person months of international short course training for their extension and research personnel.

Both CENTA and ENA will receive irrigation demonstration equipment to be installed on their central and regional experimental farms. Micro computers and video training equipment will also be purchased for CENTA and ENA with Project funds to upgrade the skills of their research and training personnel and for use in farmer training.

The ENA technical assistance team will provide technical assistance in the development of a B.S. degree in Irrigated Export Crop Agriculture in support of ENA becoming the National Agricultural University. Four ENA professors will be funded to obtain M.S. or M.B.A. degrees in fields essential to ENA's new degree program: (1) Irrigation Agriculture, (2) Plant Pathology and Entomology, (3) Rural Organization and Extension, and (4) Agro-Business Management (MBA). One additional ENA professor, who has an M.S. degree, will receive short term post-graduate, specialized training and experience in export crop post-harvest technology.

CENCAP facilities will be upgraded with the addition of training equipment to improve its capability to provide logistical support to professional and farmer in-country training courses. A more detailed outline of professional and farmer training processes and short courses to be developed at CENITA and ENA and given at CENCAP are described below.

b. Irrigation Planning: DGRD, OSPA and OA

The "planning" cluster of institutions includes DGRD, OSPA, and OA. The Project will provide these institutions with training, technical assistance and equipment to improve the irrigation planning, monitoring and evaluation functions of these institutions.

Long term technical assistance in the form of an irrigation engineer specialized in planning will be provided under the Project for two years to DGRD to coordinate a policy research activity and to provide in-service training to DGRD personnel in planning, monitoring and evaluation of irrigation design, construction, and operations and management of public sector irrigation projects. The most important function of this adviser will be to assist the DGRD in the examination of alternative systems design and irrigation methods to be considered prior to the contracting for feasibility studies. The idea is to channel feasibility studies to more effective designs in support of the production of high value crops and appropriate irrigation methods for these crops. The adviser will assist in identifying specific analyses or studies that need to be carried out to improve policy making in irrigation development.

Short term technical assistance will be provided to policy makers and key planners in DGRD, OSPA and OA. The short term T.A. will focus on assisting with specific studies or analyses to improve planning and management of public irrigation projects. A portion of this T.A. will be for assisting with the development of the "reglamento" needed for implementing a new Water Law (for more discussion on the legal framework for irrigation, see Section VII.B). DGRD will receive 16 P/M of short term technical assistance, and OSPA and OA will each receive 2 P/M of short term T.A.

Short term international training will also be provided to these planning institutions. DGRD will receive 15 P/M and OSPA and OA will each receive 3 P/M of such training. Where possible, policy level personnel from these institutions and private sector persons with direct responsibilities related to diversified irrigated export crop agriculture will travel together on well planned observation trips abroad to visit model diversified export crop irrigation systems and export crop marketing systems. Travel costs of private sector participants will be covered under the Private Irrigation Development component or the WMS II component.

The management and planning systems of these institutions will be upgraded by the installation of micro-computers and improved planning methodologies and software. In addition, DGRD will be provided specialized equipment (e.g., theodoliter, engineering levels, hand levels, brunton compasses, altimeters, plane tables, and assorted soils laboratory equipment) and a reference library to support its functions.

(i) Summary T.A. and Other Institutional Support to Extension, Training, and Planning Agencies

The technical assistance, international training and other logistical support to be provided to the public sector institutions may be summarized as follows (greater detail is given in the financial tables in Annex 10):

<u>Summary Inputs</u>	<u>Person Months or Number</u>	<u>Cost (\$000)</u>
1. Long Term TA	144 P/M	2,160
2. Short Term TA	54 P/M	810
3. Int. Short Term Training	51 P/M	255
4. M. S. Degree Training	96 P/M	192
5. Demonstration Irrigation Equip.	150 Ha.	340
6. Micro Computers	43	131
7. Portable Videos & Training Equip.	33	152
8. Vehicles and Trail Bikes	58	195
9. Other materials		76
10. Contingency		252
 Total		 <u>4,563</u>

c. In-Country Training and Technology Transfer

(i) Professional Training and Seminars

At the policy level, key public sector executives who influence irrigation agriculture policy and implement the policies will be invited to participate in six policy seminars. These short, one week or less, seminars will aim to: (1) develop superordinate goals for irrigated agriculture which each institution will support, (2) set priorities on resource allocations, (3) agree on institutional roles and functions, and (4) establish communication processes. The training content of the seminars will be the assumption, data, and rationale upon which this Project Paper is based. As a minimum, key executives from OA, MAG, OSPA, DGRD, ENA, CENPA, and key executives from the private sector institutions represented in the Association for Private Sector Irrigation will participate. It is anticipated that some 68 persons will benefit from the seminars.

An intensive technical irrigation course will also be developed and offered six times during the life of Project. This training will be provided to technical and professional personnel in the public sector, particularly from ENA and CENPA, and will also be made available to private sector individuals engaged in diversified, irrigated export crop production and marketing. Selected persons from DGRD, OSPA, OA, and the banks will also be invited.

The course will be an adaptation of the content of the first of the three basic, generic "Extender" courses, described in Annex 14. As will be the case for the "extender" courses, CENCAP will be contracted with to provide facilities, housing, meals and transportation as needed. The purpose of this course will be to provide a shared information, knowledge and field

experience base for those who share responsibility for various aspects of facilitating the production, handling and marketing of diversified, irrigated export crops. An experiential learning model will be utilized to optimize hands-on experience and practical applications of the course subject matter content. Additional intended outcomes for this basic short course are to: (1) connect private sector personnel with counterparts in the public sector, (2) facilitate supportive relationships, and (3) enable ready access, in both sectors, to technical assistance resources available in each sector.

Other types of in-country professional development programs for selected persons will be worked out and facilitated by the Training Coordinator in the Irrigation Association and the technical assistance team in the public sector. When possible, groups of individuals from the public and private sectors will be identified to share in a given training experience.

The in-country seminars and technical courses will be developed by the the Project's technical assistance team to the public sector. (The first policy seminar will be developed by the WMS II start-up team.) A professional development needs inventory will be made by a joint committee from the public and private sector teams. Special attention will be given to upgrade professional and technical competency, as needed in each institution in such areas as: (1) irrigated agriculture, ground water survey, sprinkle, drip and surface irrigation systems design and use; (2) tropical export crops production, disease and insect control, fertilizer and water requirements; (3) post harvest technology; (4) export marketing and management processes; (5) farmer commodity associations, cooperative organization and management; and (6) export crop farm management.

The core committee will be made up of two members of the public sector long term technical assistance team, the private sector Training Coordinator, and two from CENTA. When professional development applications are being considered from each institution, a representative from that agency will be included as a committee member.

(ii) Training Extenders

In El Salvador, there has not been what has been called an irrigated agriculture culture. However, the efficiency and adaptability of the small Salvadoran farmer suggests that when the irrigation alternative is available in a context that presents a realistic opportunity for increasing income, he will adopt the appropriate changes.

The objective of this activity is to develop a cadre of individuals who can effectively extend knowledge of irrigated agriculture to farmers. There are a number of persons in the public and private sectors who are extending knowledge to farmers. However, the current approach is staccato in that programs are sporadic or localized and, generally, no single individual or organization the farmer deals with can relate to the full range of issues he faces from seed selection through marketing.

In order to provide extenders with a view of the whole picture of irrigated agriculture, short courses in-country will be provided to groups which include a cross section of individuals who interact with farmers. The courses will be organized and started by the CENFA/ENA technical assistance team and, as time passes, Salvadoran counterparts will take over in the teaching. The courses will be given at CENCAP facilities.

It is anticipated that several hundred individuals from both the public and private sectors will participate in these courses which will be given throughout the life of the Project. The topics covered in the presentation will include an overview of the diversified irrigated agriculture potential in El Salvador. They will be exposed to the variety of irrigation technologies and their appropriate applications in the Salvadoran context. Crop selection, fertilization and cultivation practices will be discussed, as will be pest management and disease control. Concepts will be taught regarding harvest management and processing facilities. The issue of credit acquisition, risk minimization, marketing strategies, and transportation will be covered. Finally, appropriate organizing strategies will be considered which allow natural groupings of farmers to economically adopt irrigation which may be prohibitive on an individual basis. All this will be done in an environment of cross fertilization between public and private sector employees.

The training will be organized so that participants spend an early portion of their training at the functioning irrigated farms or Model B pilot production sites once these get going. Subsequent classroom sessions will use the field experience for reference and build upon it. In some instances, extenders will again have field experience before returning to their regular employment.

There will be three courses offered to extenders. Annex 14 provides greater detail on these courses. The first course will be a general overview of irrigated agriculture in El Salvador. Principles of irrigation will be discussed in the Salvadoran context, including the potential for surface, sprinkler,

and drip irrigation. Plant groups, climatic areas, soil types, pest and pathogen problems, credit acquisition, and marketing strategies will all be covered.

The second course will be a closer consideration of irrigation engineering problems and possibilities in El Salvador. Students will be given experience and instruction in the sizing, selection and implementation of various irrigation strategies. Importantly, as with the first course, the emphasis of the course will be to portray irrigation system design within the entire context of diversified irrigated agriculture in El Salvador.

The third course will be particularly targeted to those individuals who will be interacting directly with farmers in the "farmer maestro" program, described below, or whose responsibilities will involve conveying information to farmers who may have interest in adopting irrigation. The focus will be on training techniques and instruction on the curricula and training materials prepared for their use.

All of these courses will have at their heart the recognition that irrigation is employed to improve annual agricultural output, which is in turn desirable because it augments income to farmers and enriches the whole economic climate. These courses will strive to instill in extenders a recognition that irrigated agriculture is a mechanism for increasing agricultural productivity in crops with high potential for increasing farmer and national income. These individuals must realize that the process of extension is successful only when the farmer is successful; that is, when the farmer realizes income improvement.

(ii) Training Farmers

Following the first basic irrigation agriculture course for extenders, a "farmer maestro" program will begin, led by the CENPA/ENA technical assistance team. As time passes they will transfer their responsibilities to Salvadoran counterparts, and by the end of the team's stay, all the training will be assumed by CENPA staff.

This series of short courses, which will be offered throughout the life of the Project, will focus on reaching key farmers who: a) are recognized and respected by neighboring farmers; b) are either extremely interested in adopting irrigated agriculture, or who have committed themselves to buy into an irrigation system, or who are already participating in an irrigation system but see an opportunity to improve their operation; and c) are leaders of farmer groups, cooperatives or "grupos solidarios."

These farmers will be identified by CENIA extension agents, by representatives of private companies, or by farmer associations. The groups should generally be from the same locality for two reasons. One, so that the CENIA extension agents who will be closely involved in the training will be the same individuals who will later on be in contact with and support these farmers. Secondly, so that the course can focus on a narrow range of crops appropriate to the area and for which the marketing potential is greatest. The intention is that a number of these farmers will embark upon a program of irrigated agriculture which can then serve as a demonstration to other local farmers of the feasibility and benefits of irrigation.

Farmers trained through this program will be known as "agricultores maestros." These farmers will be instructed during a week long course which will cover the entire spectrum of irrigated agriculture issues including: a) credit acquisition; b) plant, soil, and water relationships; c) irrigation structures and alternatives; d) crop selection; e) changes in cultivation patterns such as fertilizer applications, sowing and harvesting schedules, use of chemicals, and labor requirements; f) determination of water application; g) harvesting, packing and processing requirements; and h) marketing opportunities.

During the course of the instruction, private sector extenders will be invited in as frequently as possible to outline their services. At the conclusion of the course, every farmer will leave with a comprehensive list of all the agricultural resource companies and agencies in El Salvador categorized according to the service they offer and listing names, addresses, and phone numbers of contact people.

Various incentives will be provided the farmers for attending the course and then recognizing their participation. At the conclusion of the course, they will be given a diploma and other rewards, including a packet of seeds and fertilizer. Following the course, these farmer scholars will become focal points of information transfer through:

- Their personal, informal communications with other farmers.
- Their farms will become local demonstrations of irrigated agricultural practices.
- CENIA extension agents and private sector extenders will point out farmer "maestros" by name and location to other farmers in the vicinity with whom they work.

- Extenders will occasionally arrange field visits by other interested farmers, or by farmers in training to see the farmer "maestro's" operation.

Approximately 1,085 farmers will participate in this training.

The estimated cost of the In-Country Training and Technology Transfer element is \$170,000. Funding will be provided from PL 480-derived local currencies. These funds will cover the costs of meals, transportation and, at times, lodging for the participants, as well as various materials and the farmer "maestro" recognition rewards.

The total estimated cost of the Public Sector Irrigation Development component is \$8.7 million. AID will contribute \$5.3 million to finance the activities described in the foregoing sections. The GOES counterpart totals \$3.4 million, of which \$2.5 million will come from PL 430 local currencies and approximately \$0.9 will be in-kind contributions, primarily salaries of counterparts to the long term technical assistance and of training participants.

VI. COST ESTIMATES AND FINANCIAL PLAN

This Project will total \$25.2 million, of which \$18.7 million (75%) will be an A.I.D. DA grant, with the remaining coming from PL 480 local currency and participating institutions' counterpart contributions.

The life of the Project is five years, from FY 1985 through FY 1990. A.I.D. funding will be obligated in FY's 1985, 1986, and 1987. Annex 10 contains the financial tables: A) Summary Cost Estimate and Financial Plan, B) Summary Costing of Project Inputs and Outputs, and C) Projection of Expenditures by Fiscal Year. These tables reflect projected costs by inputs, by cost elements within those inputs, and by foreign exchange and local currency.

The largest category, totalling \$10.0 million, or 53% of total Project grant funds, is for R & D credit for the private sector irrigation and pilot commercial export projects. The second largest category, totalling \$5.1 million, or 27% of total Project costs, is for technical assistance. Of this amount, 30% is allocated to the Private Sector Irrigation Development component and 70% is for the Public Sector Irrigation Development component. The technical assistance financed under the private sector component will consist of long term technical assistance to the Irrigation Association. Specific short term technical assistance needs of exporters or potential exporters of diversified irrigated agricultural products will be provided by FUSADES through its TIPS program. The technical assistance for the public sector component will be concentrated on the development of a capability for training and extension in irrigated agriculture and for irrigation planning. In the public sector component, policy and technical studies will be implemented by GOES entities, as well as by AID. The amount of \$730,000 has been earmarked for AID to procure short term technical services made accessible by AID/Washington's Water Management Synthesis II (WMS II) project. The technical assistance through WMS II will allow for accelerated Project start-up and lay the analytical base for subsequent Project activities, including Project evaluations.

The following is a summary breakdown of contributions to the Project, and the specific inputs to which contributions will be made:

SUMMARY FINANCIAL PLAN
(US\$000)

<u>SPECIFIC INPUTS</u>	<u>A. I. D.</u>		<u>LC HOST COUNTRY</u>		<u>PROJECT TOTAL</u>
	<u>FX</u>	<u>LC</u>	<u>PART INST</u>	<u>PL480</u>	
WSM II Support (AID)	730	—	—	—	730
Irrig. Assoc. Office Exp.	—	142	—	—	142
Tech. Assistance	4,350	300	1,000	—	5,650
Training/Inv. Travel	547	—	810	291	1,648
Vehicles & Equip.	836	—	—	—	863
Mat's & Supplies	—	76	—	421	497
Personnel	—	843	1,477	1,665	3,985
Credit Fund/Pilots	—	<u>10,000</u>	<u>438</u>	—	<u>10,438</u>
Contingency	324	569	185	119	1,197
TOTAL	<u>6,814</u>	<u>11,930</u>	<u>3,910</u>	<u>2,496</u>	<u>25,150</u>

The Assistance to Association budget line item will finance FUSADES' support to the Irrigation Association's operational expenses within FUSADES' Association Strengthening Activity (ASA). Three Project evaluations have been scheduled. The cost of the evaluations, estimated at \$202,500, is included in the WMS II line item earmarked for AID implementation.

No specific budget line item for inflation has been included, because it has been taken into account in the cost estimates of most Project elements.

Expenditures under this Project are expected to occur in the following manner:

SUMMARY PROJECTIONS OF EXPENDITURES BY FISCAL YEARS
(IN US \$000)

<u>YEAR</u>	<u>AID</u>	<u>HOST COUNTRY (LC)</u>		<u>TOTAL</u>	<u>\$</u>
		<u>PART. INST.</u>	<u>PL-30</u>		
1985	464	—	—	454	2
1986	6,095	668	249	7,012	28
1987	6,654	849	550	8,053	32
1988	4,371	723	542	5,636	22
1989	723	794	520	2,037	8
1990	<u>437</u>	<u>876</u>	<u>635</u>	<u>1,948</u>	<u>8</u>
TOTAL	<u>18,744</u>	<u>3,910</u>	<u>2,496</u>	<u>25,150</u>	<u>100</u>

The Methods of Implementation and Financing for this Project as currently envisioned by the Mission are shown in Table D in Annex 10. As shown in that table, the Mission proposes to utilize direct payment and direct reimbursement methods of financing for all Project inputs. The WMS II start-up technical assistance will include the preparation of PIO/C's for AID procurement of commodities. This method will allow accelerated Project start-up, without having to wait for the long-term technical assistance teams to arrive in-country, estimated to occur 6-11 months after obligation of funds, to get the procurement initiated.

All AID appropriated funds for foreign exchange costs of the private sector component will be managed directly by AID. FUSADES will be charged with the responsibility of reviewing the Irrigation Association's cash management and fiscal control of all Project funds made available to the Association, including the detailed accounting and reporting on cash receipts, cash outlays and expenditures by obligating documents (any contract to which the Association is a party).

Counterpart contributions by private sector participating firms, groups or individuals are all estimated to be in-kind. Examples are farmers and suppliers time for installing irrigation equipment, the firm's complementary payment of field agents, professional time for working with short-term technical consultants, salaries of international training participants, the value of the land on which pilot plants are located, etc. When the Project funded services are completed, the irrigation Association will obtain information from the beneficiary on the type and amount of

in-kind contribution. This counterpart information will be supplied by the Association to AID on an annual basis.

The financial projections of the project were made assuming an approximate inflation factor of 5%. The estimates of costs were made based on an estimate of the mid-point or median date of disbursement for each cost type. A cost per unit was then estimated for that mid point for each input. For example, it appears that the mid point for disbursement of expatriate technical assistance will be in about the 24th month. Using approximately 5% inflation rate a project cost of TA at that point was estimated at \$15,000 per person month. Equipment costs occur essentially in the first year and little inflation adjustment was needed. In addition to the inflation adjustment imbedded in the projections, an explicit line item was created for a 5% contingency.

To provide senior responsible officials of FUSADES and AID with assurance that adequate financial management practices are exercised in handling resources provided under the Project, an independent financial reviews of the Project will be carried out as needed. The cost of these reviews will be funded under the financial review line item of the Association's budget.

All AID appropriated funds for foreign exchange and local currency costs of the GOES component will also be subject to financial reviews arranged by AID. Such reviews will be funded out of the short term technical assistance line item.

All direct AID procurements funded under this grant will be handled by the Mission directly in the form and manner established by AID for such purposes.

With regard to the Project's recurring costs, the burden on the GOES will be minimal, since the major portion of the GOES' contribution will be for salaries of existing personnel. New personnel positions are planned for five professors (four of whom will be trained at the M.S. level under the Project) and five teaching assistants for ENA. Recurring costs to FUSADES and the Irrigation Association will be met by a portion of the reflows from the R&D Credit Fund: 30% of the interest paid by final borrowers will go to FUSADES for capitalization purposes and 20% will go to the Irrigation Association to cover future recurring costs (the remaining 50% will revert to the Fund).

V. . IMPLEMENTATION PLAN

A. Implementation Responsibilities and Administrative Arrangements

The Project's grant funds will be obligated by means of two Grant Agreements. One Agreement will be signed with the Ministry of Planning, which will be the primary GOES coordinating entity, and co-signed by the Ministry of Agriculture, which will be the principal implementing agency for the GOES component. The second Project Agreement, a Cooperative Agreement, will be signed with FUSADES, which will have overall coordination responsibilities for the private sector component of the Project.

1. GOES

Detailed budgets and implementation plans for activities to be implemented under GOES Ministries/Agencies will be approved by AID and the authorized representative(s) of the implementing entities. Such approval may be made by way of countersigned Implementation Letters, or by AID and the GOES signing PIO/T's, PIO/C's or PIO/P's for the activity.

\$730,000 of the Project's activities (the WMS II start-up technical support, a portion of international training, and Project evaluations) will be implemented directly by A.I.D. under authority to be included in the Grant Agreement with the GOES. In these cases, sub-obligating documentation need not be countersigned by the GOES; however, in such cases, the specific objectives, budget, implementation requirements and responsibilities for each activity will be specified in the approval documentation related to that activity.

A USAID Project Review Committee will (a) periodically review existing and proposed allocations under the Project, including any need to make major changes in it; (b) review obligating documents, and clear and/or make recommendations to the Mission Director according to normal Mission procedures.

2. FUSADES

FUSADES will assist the Irrigation Association in the latter's organization and legal registration. Once the ARSP is legally formalized and operational, FUSADES will transfer Project implementation responsibilities to the ARSP by means of a subsidiary assistance agreement approved by AID. The roles and responsibilities of FUSADES and ARSP will be specified in the subsidiary agreement. With the exception of the R & D Credit Fund, Project Funded activities implemented by the Association will require AID approval when the cost of an activity exceeds \$50,000.

Contracts for long term technical assistance required by the private sector component of the Project will be made by FUSADES, with approval by ARSP and USAID, in accordance with AID regulations.

FUSADES will establish, through "fideicomiso" in the Banco Hipotecario, an R & D Credit Fund. The disposition of the credit funds will be detailed in the FUSADES/ARSP subsidiary agreement in accordance with the processes described in this Paper unless AID agrees otherwise.

FUSADES, through its professional staff, will maintain constant liaison with the ARSP. The principal liaison between FUSADES and USAID will be performed by the FUSADES Executive Director and the USAID Project Manager.

B. Disbursement Procedures

A variety of standard AID disbursement procedures will be employed, depending upon the complexity of each of the approved activities. AID direct disbursement mechanisms will be normal under the Project for financing most inputs and controlled at the Mission level.

C. Procurement Procedures

The selection of consultants and contractors, procurement of equipment and materials, shipping and insurance will be done in accordance with standard AID procedures. Project funded procurements for the GOES component will, in accordance with the Project Agreement, be done by the Mission or AID/W, except on an exceptional basis where it is determined that sufficient capability exists for a particular host country contracting action.

USAID/ES will, with the assistance of the Board for International Food and Agricultural Development (BIFAD), contract directly with a U.S. Land Grant University or consortium of Universities to provide the long and short term technical assistance and international training requirements for the public sector component of the Project. In addition, USAID/ES will provide \$730,000 of Project funds to the WMS II project to conduct start-up activities and studies, a portion of international training, and Project evaluations.

Gray Amendment: The procurement of goods and services will be done on a competitive basis. Whenever there are opportunities to set aside procurements that can be adequately supplied by minority firms, the Mission will proceed with such set-asides.

D. Schedule of Major Events

Disbursement of funds is scheduled over a period of five fiscal years. The Project Assistance Completion Date (PACD) will be 60 months from the date of signing the Grant Agreements (planned for August 1985). Ratification by the El Salvador Legislative Assembly will be required for the GOES Project Agreement.

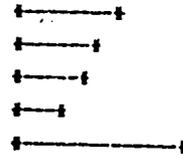
For the GOES component, an initial group of activities to be carried out by WMS II under the Project will begin upon ratification of the Project Agreement and completion of sub-obligating documents as specified in Section V.A.1 above. Non-WMS II activities funded under the Project will initiate as soon as conditions precedent to disbursement are met. Activities such as short term technical assistance and training will be started up and continued until shortly before the PACD, while the long term technical assistance started earlier will terminate mid-way through the Project. Each activity will have its own implementation schedule which will be detailed in the annual action plans of each participating entity.

The schedule of major implementation events is as follows:

WMSII REQUIRED STUDIES, STARTUP SUPPORT & EVALUATIONS

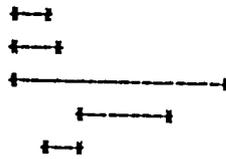
Required Studies Commenced during Intensive Review Period

- 1. Evaluation of Appropriateness of Existing Systems
- 2. Examination of Alternative Extension Approaches
- 3. Farmer Attitude and Need Survey
- 4. The Role of Women in Irrigated Agriculture
- 5. Groundwater Study



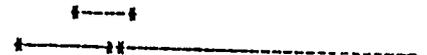
Project Startup Assistance

- 3. Preparation of Public Sector RFP
- 4. Prep. Private Sect. RFP w/ FUSADES & Assoc.
- 5. Assistance to Assoc. in Pilot Design & Proposal Dev.
- 6. Assist Masters Degree Placement & Equip. Procurement
- 7. Policy Seminar & Irrig. short Course (in country)



Project Evaluations

International Training (short term)



PUBLIC SECTOR COMPONENT

Selection of Public Sector Univ. Contractor



CENIA

Expatriate TA Long Term (4 person part time in CENIA)

Expatriate Short Term TA

International Prof. Dev.

ENH

Expatriate TA Long Term (1/2 of 4LT)

Masters Degree Training

International Prof. Dev.

DGRD

Expatriate TA Long Term

Expatriate Short Term TA

International Prof. Dev.

OSAN/MKS

International Prof. Dev.

Expatriate Short Term TA

Oficina de Aguas MIPLAN

International Prof. Dev.

Expatriate Short Term TA

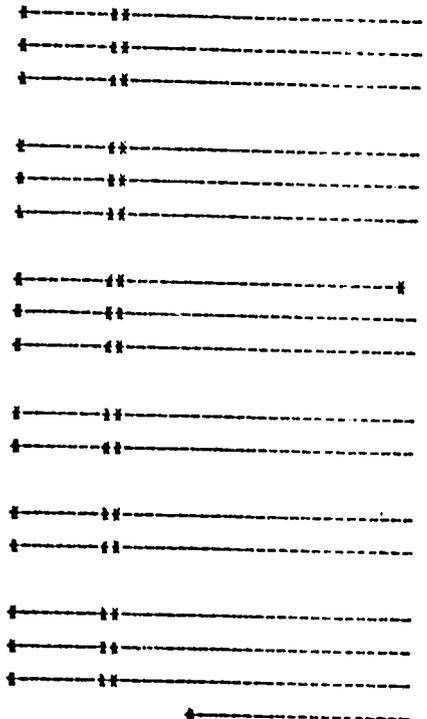
CENICAP (In country short courses)

Extender Short Courses

Technical Irrigation Short Courses

Irrigation Policy & Planning seminars

Irrigation Scholar Training Courses



PRIVATE SECTOR COMPONENT

Selection of Private sector Contractor



Irrigation Association Formation

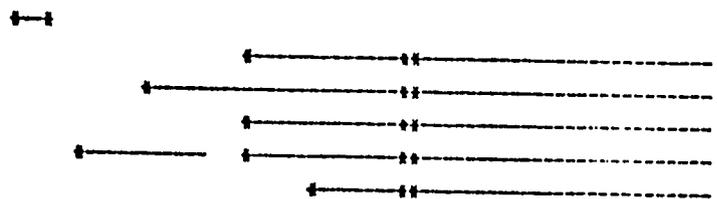
Expatriate TA Long Term

Short Term TA (Tech & Fin. Review)

International Prof. Dev.

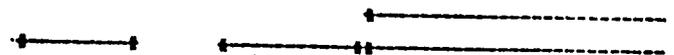
Local Staff (1 first then 2 additional)

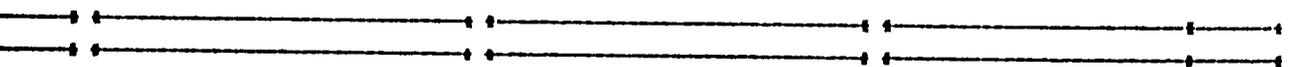
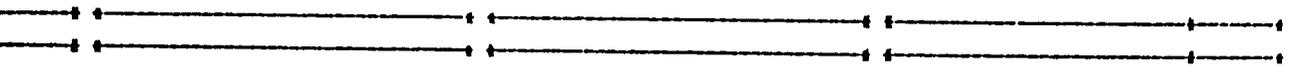
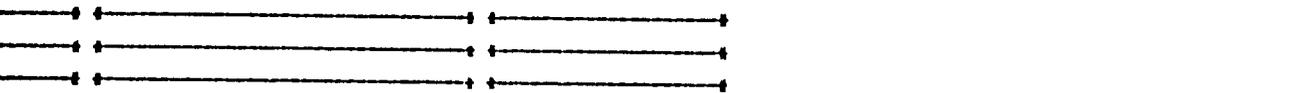
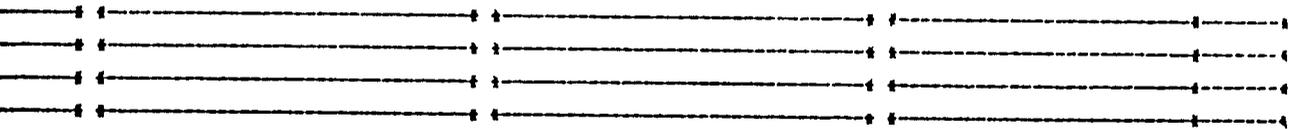
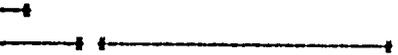
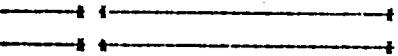
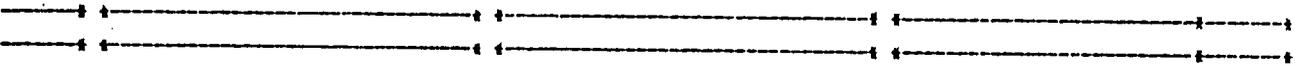
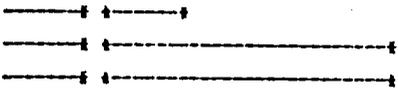
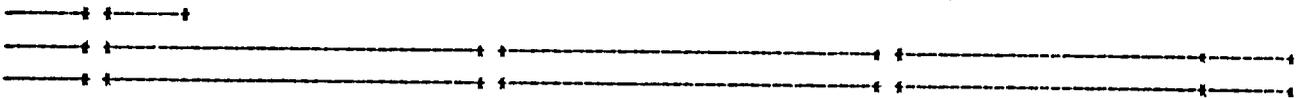
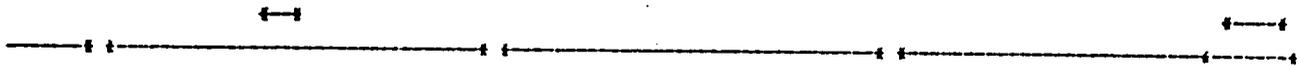
Field Agents (50x)



Model A Farm Level Irrig. Credit & Ma.

Model B integrated irrig/mkt. pilots





VI. MONITORING PLAN

A. AID Project Monitoring Arrangements

Project monitoring will be exercised by a Project Manager assigned from the USAID's Rural Development Office (RDO). The RDO Project Manager will work closely with FUSADES, the ARSP and GOES implementing entities to assure that Project implementation plans and objectives are met.

In accordance with Mission policy, monthly Project review meetings will be held to review and direct Project implementation; the Associate Director will chair the meetings. Representatives from the Offices of Rural Development, Private Enterprise, Projects Programming, and the Controller will participate in the reviews.

The RDO Project Manager will also call upon other Mission Offices as needed. These will include:

1. The Projects Office (PRJ), which will monitor Project implementation to assure that the terms and conditions of the Project Agreements are met.
2. The Mission Controller (CONT), who will review disbursement and reimbursement requests for conformity with AID regulations and will ensure that adequate financial controls are exercised.
3. The Program Office (DPP), which will assist in carrying out AID Project reviews and evaluations.
4. The Training Unit within the Office of Education, which will assist the various implementing entities in certain AID administrative requirements for participants in U.S. training.
5. The Management Office (MO), which will assist in contracting personnel and procurement of commodities.

B. Assessment of A.I.D. Monitoring Capability

It is expected that given the level of Mission staff, on-board and planned, there will be no difficulty in carrying out Project monitoring responsibilities.

VII. SUMMARIES OF PROJECT ANALYSES

A. Economic Analysis

The Project is economically and financially feasible. The benefits it will generate appear to more than justify the costs of the proposed assistance. The financial internal rate of return (IRR) on the credit component of the Project alone is 28.6%, and only drops to 26.9% when the costs of the technical assistance component are added. The economic rate of return (ERR) is 30.8%, indicating some additional benefit from shadow-priced farm production labor at 10% as an estimate of the opportunity cost of rural employment. This benefit would be considerably higher if the labor in packing, processing and marketing were separately identifiable, but the marketing data base did not permit such a computation.

Sensitivity analysis indicates that the basic ratios are acceptably stable within reasonable ranges of price and cost variation. The Project is most sensitive to overvaluation of the colón. To guard against this sensitivity, the benefit cost analysis has taken a very conservative exchange rate (2.65) as its computation base for the period in which the cost data were gathered. Even assuming considerable cost inflation to bring this exchange rate current would leave project benefit cost ratios at or near the rates computed. This very conservative exchange rate position gives a substantial margin for probable improvement in the B/C ratios, with little risk of deterioration.

The benefit/cost analysis, summarized in this section, is detailed in Annex 6. The sample pilot irrigation/marketing pilot used for the benefit cost analysis was assumed to consist of 300 hectares of irrigated horticultural crops for export to the U.S. market. The pattern of crops and distribution of costs and revenues with and without the pilot irrigation/marketing pilot are given in Tables VII.A.1 and VII.A.2. The data for the "with project" estimates are drawn from a study by Fundación Chile on export horticulture production, marketing and transport costs, and prices in the New York market.

Table VII.A.1

Benefit Cost Analysis
Crop Production and Marketing Costs and Revenues
With Pilot Projects

Cost/Revenue Item	Honeydew	Watermln	Cucumbr	Squash	Grnbean
Hectares Irrig.	75 ha	50 ha	50 ha	100 ha	25 ha
MT/Ha Yield	29.1	42.9	28.6	30.0	7.9
% Exportable	57.2%	70.0%	85.0%	76.2%	80.0%

(Costs per Pilot in 000,000 of colones at 2.65:\$1.00)

Costs/Pilot					
Production Labor	.4	.7	1.6	.9	.9
Chem, Mach, Seeds	2.9	2.7	3.0	2.3	5.0
Packing Mats & Cost	8.6	9.0	10.9	11.4	4.5
Transport	11.2	19.8	16.5	15.5	4.3
Ins. & Exp/Imp Fees	6.1	6.1	7.4	10.4	3.4
Total Costs	29.3	38.3	39.4	40.7	18.1

(Revenues per Pilot in 000,000 of Colones at 2.65:\$1.00)

Local & Export Sales	43.9	45.4	51.2	74.9	23.6
Net Cash Flow	14.6	7.2	11.7	34.2	5.5

Table II.A.2

Cost Benefit Estimates Without Pilot Projects

Crop Mix without	Corn	Watermln	Cotton	Sugarcane	Rice
Rainfed Area Ha	100	25	50	75	50
Net Income/Ha(Col)	858	1,882	951	1,084	929
Inc.on 300Ha(C000)	85.8	47.1	47.6	81.3	46.5

The without project data are based on farms in the Iempa Cauhapa area without irrigation.

1. The Sensitivity of the Project to Risk

The principal problem with benefit cost analysis of high risk activities is that the ratios fail to account for the level of probability that a particular outcome will occur. The export fruit and vegetable trade is notorious for its market risks. Risks should be particularly likely in the pilots which this project is supporting, since they deal with new products and untested producers in new markets. In fact, were there no risks involved in developing new markets, there would be little justification for the need for a guarantee mechanism.

This risk factor has been accounted for in the benefit cost analysis by assuming that half of the pilots will totally fail, and that in spite of bank efforts to recover 50% of the costs through repossession and foreclosure, there is no recuperation at all. This assumption of 50% failure rate implies that each successful pilot must be charged with double its apparent costs in the benefit cost analysis. The IRR's and ERR given above were computed under this assumption of 50% failure rate of the pilot R&D marketing efforts.

To further examine the implications of risk for the benefit cost analysis of the Project, a reverse kind of analysis was conducted which estimated the rate of failure at which the Project would just break-even in benefit cost terms at a discount rate of 15%. Stated simply, this is the percentage of pilots that could totally fail and the Project would still be financially advisable. It would appear that three of the five pilot projects could totally fail before the Project would near its break-even point.

2. Benefit Cost Analysis of the Technical Assistance Component

The benefit cost analysis of the technical assistance component of the Project was conducted by assuming conservatively that each pilot activity should bear approximately one-tenth of the total cost of technical assistance (public and private sector) paid for by the Project. This appears to shift more than a reasonable burden of technical assistance cost onto each pilot, yet the change in IRR caused by including those pro-rated TA costs was only two points, from 28.6% to 26.9%. This indicates two things: first

of all, that technical assistance investment in opening export markets for El Salvador has a very high potential return and, secondly, that the Project will easily bear the technical assistance burden planned for it.

3. Economic Benefit Cost Analysis & Exchange Rate Risk

Costing factors, such as labor and foreign exchange at their equilibrium or "shadow" priced levels, instead of at official rates, constitutes the principal difference between financial benefit cost analysis and "economic" benefit cost analysis and results in an ERR rather than an IRR.

The ERR of the Project when production labor is given a shadow price at 10% of its nominal average wage is 30.8%, or about 2 points above the IRR. This is an important, but not surprising, shift. On the other hand, when foreign exchange is priced at what is estimated to be a reasonable opportunity cost or equilibrium price (C4.0:\$1.0 in 1984), as contrasted with the nominal average exporters exchange rate (2.65:1.00), the IRR of 28.6% leaps to 81%.

This simply underscores the very substantial economic cost in the profitability of export activities of officially overvaluing local currencies vis a vis importing country currencies. Since the apparent government policy is to bring the official rate into a closer parity with the apparent equilibrium rate, this Project is likely to enjoy a much more favorable climate during its implementation phase than has existed in the past.

In summary, the Project appears to be satisfactorily feasible from both economic and financial points of view.

B. Institutional Analysis

The institutional development strategy of this Project is feasible inside the existing institutional structures of both public and private sectors in El Salvador. There are deficiencies in these institutions, some of which this Project is capable of changing, but none appear to present a barrier to the achievement of Project objectives.

The institutional analysis, which is summarized here, is detailed in Annex 7. That analysis explores institutional capabilities and needs in three basic institutional clusters. The first cluster are those institutions in the public sector which are

responsible for irrigation planning and policy and for monitoring and evaluating public sector irrigation projects. This group, including DGRD, OSPA, and OA is called the "planning" cluster. The second group are those institutions responsible for training and extension. The "training" cluster is composed of CENTA, ENA and CENCAP. The third group analyzed are private sector irrigation and irrigated crop marketing firms.

1. Planning, Policy and Legal Framework

Roughly three fourths of the existing irrigation in El Salvador was designed and constructed by private farmers with little or no support from the public sector. In recent years there has been some government activity in planning and construction of systems, but irrigation remains in El Salvador essentially a private undertaking.

A recent effort has been made by the public sector to plan and coordinate the exploitation of water resources under the general supervision of the OA in MIPLAN. A public structure for the regulation and planning of water use for irrigation is outlined in the existing water law which involves the MAG and its DGRD in the analysis and granting of water rights to individuals. OSPA, within the MAG, also plays an important role in irrigation planning. Together, these three institutions form the core of what is intended to be a water planning and coordinating system.

a. Planning and Irrigation Policy

In the early 1980's, the GOES laid the basis for a national water plan with a major study of water resources. This study resulted in a "Master Plan" for water development which examines what is known about land and water resources and their potential development. The master plan itself is a mirror of the strengths and weaknesses in the planning and development structure for irrigation which exists in El Salvador.

The strengths in the plan lie in its systematic approach to dealing with the supply and demand for irrigation resources. On the supply side, acceptably accurate data is presented for the availability of surface waters from some forty stream gauging stations. The weakness of the supply estimates lie in the lack of information on the existence and accessibility of groundwater resources.

The major difficulties with the plan, and planning approach, however, do not lie in its approach to supply, but rather in an inadequate approach to demand for irrigation. The Master Plan

is an overall "water" document which deals with the three major demands for water in El Salvador: (1) urban use, (2) hydroelectric use, and (3) irrigation. The plan and planning structure have developed what appear to be accurate and reasonably reliable methods for estimating demand in the first two categories, but there are some critical problems with the approach to irrigation demand.

The largest planning problem with irrigation in El Salvador appears to be the lack of a methodological and conceptual framework for establishing the demand for irrigation and an unclear definition of role differentiation between irrigated and rainfed agriculture under El Salvadoran conditions.

A second level difficulty in irrigation planning relates to a lack of cost consciousness about irrigation alternatives. The planning process appears to be concentrated in rather high-cost irrigation options involving relatively large structures, lengthy lined canals, and relatively high-cost land leveling.

Hardgraaves estimates that 65-80 thousand hectares of river bottom land in the country could be irrigated with the simplest and lowest cost kind of irrigation systems for around \$1,000/Ha. These systems would involve small pumps placed directly in perennial streams and rivers with sprinkle or trickle application equipment. Current public irrigation systems are designed at costs which range from \$3,000-5,000/Ha. Actual performance of these systems indicate that they historically irrigate less than half of the design area. While this may appear disappointing, it is consistent with the performance of public systems in other developing countries and should not be seen as indicative of poor public management by international standards. The cost implication, however, of this design/performance shortfall is that the actual cost per hectare irrigated on these systems is really in the range of \$6,000-\$10,000 per hectare. Methodological and conceptual planning and design criteria should be sought which would make these processes more cost effective in El Salvador.

b. Legal Framework

The legal framework for irrigation and water rights in El Salvador may be characterized as a modified "appropriative and beneficial use" system. Under the existing "Reglamento General de la Ley de Riego y Avenamiento," farmers may obtain the right to beneficial use of water in a three tiered system of concessions. The underlying concept is based on public ownership of all water resources and a systematic civil law concept of providing individual rights to its use.

The Ministry of Agriculture, and its Directorate for Irrigation and Drainage, are appointed by the law as the administrative and regulatory bodies with responsibility for determining the use to which water should be put and for delivering the necessary recorded water rights to individuals.

Under Article 13, a farmer may get a temporary, season to season right to use water which the MAG processes based on a determination of the priority use it wishes to have made of the water.

Under Article 14, a temporary permit may be given to a farmer for up to five years, while the Ministry and the farmer conduct the studies necessary for a longer concession. These studies involve hydrological studies of the water supply by the Ministry and economic use studies by the farmer which demonstrate the profitability of his proposed use.

Under Article 15, a farmer may obtain a concession of no more than 50 years and no less than 5 for the use of irrigation water. To qualify under this article, the studies mentioned in Article 14 must be completed, and he must have completed the irrigation works upon which the application for long term concession is based, and these works must have been reviewed in the field and approved by the government. This article implies that the farmer must make his investment in irrigation before he has final long term legal security in the water itself. While it may be unlikely that the government would withhold such a long term concession after the farmer has made his investment, such uncertainty in other countries has given rise to a lack of private investment, on the one hand, and has opened the door to uneven administration in the field.

The water law of the country is under study and may soon be changed. The Ministry's proposed changes, as of April 1985, have been reviewed by the team, as well as by a leading water law expert. The draft law is a framework for new regulations, which would be formulated subsequent to the adoption of the law by the Legislative Assembly. While it does not contain the regulations that would be adopted later, the draft language would provide for adoption of necessary incentives and protection for private sector investment in irrigation. In general, the draft law would provide the legal framework for planning irrigation development within the context of water resource planning and use and as such would be an improvement over the existing law and regulation.

With regard to the issue of whether conditionality should be included in the Project Agreement with the GOES which would call for legislative action on the draft law, the opinion of the water law expert is that such conditionality not be included. The expert's report is shown in Annex 16. The reason for this is that the existing regulation, while not the ideal, has not really hampered private irrigation of the type supported by this Project. A new law would lay the basis for improvements; however, the critical part will be the formulation of the subsequent regulation. In this area, the Project can make an important contribution, by providing short term technical assistance in the development of any new regulation.

2. Institutional Analysis of Training Institutions

The irrigation needs and capabilities of CENIA and ENA are easily analyzed, since they essentially have no irrigation capability and yet have great needs. Both institutions have considerable capability to do training, but lack the technical expertise to do that training in irrigated agriculture. Since the training provided by this Project is its principal instrument, the analysis of training, and the institutions that undertake it, is contained in the Technical Analysis section below rather than in this institutional analysis.

3. Institutional Analysis of Private Sector Institutions

The major private sector institutions with which this Project deals with may be grouped into five categories: (1) farmers, (2) irrigation equipment suppliers, (3) banks, (4) marketing/processing firms, and (5) associations. The analysis which follows reaches the conclusion that these institutions have critical needs which must be dealt with in order to develop a viable irrigation sub-sector in El Salvador. The analysis indicates that the Project's proposed interventions are feasible, and that there is considerable interest and demand in the private sector for the Project's proposed technical and financial support.

a. FUSADES

FUSADES is a private foundation organized around the objective of economic and social development for El Salvador. Among FUSADES' interests and capabilities is the formation of private sector associations to foster agricultural diversification and exports. FUSADES is a recognized leader in organizing private sector groups for economic and social development aims. It has legal and accounting capability to handle and manage grant funds, such as those included in the private sector component of this Project, and has technical staff capable of monitoring and evaluating the ongoing progress of the Project.

The analysis of FUSADES' capabilities indicates that it has both administrative and technical staff and facilities adequate to organize the Private Sector Irrigation Association and to provide AID with broad oversight of the private sector component of the Project. It also has the necessary financial infrastructure to monitor and evaluate the management of Project funds by the Association and the Trustee Banco Hipotecario.

b. The Private Sector Irrigation Association

During intensive review, numerous meetings were held with private sector firms related to irrigation which led to the informal organization of representatives of these firms in a working group with the intent of formally constituting a Private Sector Irrigation Association. There appears to be considerable interest and capability in both the firms that constitute the broader potential membership of the Association, and particularly in the elected working group of eight representatives.

The informal leader of the Association organizing group is the current president of the Association of Agricultural Input Supply Firms in El Salvador and is a well known and respected private sector leader. The meetings held in June and July which were attended by members of the Project design team suggested that the Association board and its member firms have considerable administrative and technical capability. With the planned technical assistance of the VMS II start-up support and a short but critical period of legal and administrative assistance from FUSADES to get itself officially constituted, the Association will be able to assume the implementation role planned for it in this Project.

c. Banks

The banking sector in El Salvador has been traditionally unable to provide the terms and conditions of credit needed to finance irrigated export agriculture. One of the major bottlenecks lies in the understandable reticence that bankers have when entering new and obviously risky business terrain such as the opening of new markets for perishable crops. Even when banks are willing to run risks, there are a number of banking regulations and norms which are designed for production and marketing of food staples which are inappropriate and unworkable for irrigated export crops. Packaging, transportation, packing labor, export fees, letter credit remissions of foreign exchange, and many other standard features of the export fruit and vegetable trade are difficult with existing financial procedures.

Two banks in particular appear to have special interest in and capability for the kind of financial procedures which the Project proposes to pilot. These two are the Banco Hipotecario and Banco Salvadoreño. The Banco Hipotecario, in particular, has for some years demonstrated interest in horticultural products. It has developed, with its own funds, an R&D experimental orchard where it is exploring the possibilities for a future potential grape industry in El Salvador. The Banco Hipotecario also has a long history of agricultural finance and has the necessary administrative and technical staff and infrastructure to manage rural mortgage lending and security interests such as those outlined for the Project's R & D Credit Fund.

d. Private Irrigation Equipment and Input Supply Firms

There are few irrigation equipment supply firms in El Salvador, but the few that do exist appear to be capable of expansion and technical improvement. The firms are interested and apparently able to expand their field agent staffs to reach more farmers with better technical advice. In addition to the three major equipment suppliers, there are a handful of agricultural technical assistance firms that have agronomist staffs with some irrigation experience and considerable interest. These firms would form the core of the field agent outreach program, but additional firms now involved in supplying agricultural inputs are interested in taking a more direct and active role in supplying irrigated agriculture and would also be involved.

Together, the existing irrigation equipment suppliers and the broader range of firms which supply technical services and other agricultural inputs, are capable of and interested in undertaking the roles and tasks outlined for them in the Project Description.

e. Export Packing and Processing Firms

Salvadoran packers, exporters and processors have made a few limited, but important, penetrations into the U.S. fruit and vegetable market. The major successes have been in melons and frozen okra, but a number of other attempts are in field production and experimentation stage. The firms that have been involved have gained important, if sometimes painful, entrepreneurial experience which will provide a valuable base for Project activities. The important need is to expand existing capability and foster the development of new firms with parallel interests and experience. The core that exists is more than sufficient to support the modest level of pilot effort proposed by this Project to test the models. As these pilots are developed, it is expected that local entrepreneurial talent, some of which is only recently returning to El Salvador, can be attracted to these new ventures.

C. Technical Analysis

1. Technical Analysis of the Training Process

a. Major Areas of Training and Extension Needs

The needs of Salvadoran farmers and, therefore, the training needs of individuals engaged in the extension of agricultural support was well stated by Angel Mario Paz, Assistant Chief of CENFA's Agricultural Extension Division. He listed the four major needs as: 1) marketing, 2) credit acquisition, 3) technical knowledge transfer, and 4) farmer organization, to which we add a fifth: crop diversification. These are particularly appropriate for irrigated agriculture since the initial capital investment required to engage in this type of production is greater than for rainfed agriculture. The farmer must protect himself against the greater initial risk by being better prepared in the areas listed above.

b. The Extension Model

The term "extension" in this Project refers to the process of conveying information or assistance to farmers and can be applied to activities by both public and private sector organizations. The term "extender" is used to describe the various individuals in the public and private sector who engage in direct interaction with farmers and who either currently pass information or support to the farmer or who could easily engage in the extension of information or support in their current role.

Though there are substantial segments of training associated with the Project, the portions discussed here have to do with those individuals who have direct contact with farmers, that is, the extenders. It will also deal with the training of the farmers themselves, or at least those farmers who will form the hub of a knowledge transfer process.

The core of the training will be to provide extenders and farmers with current information on diversified irrigated agriculture. This training will be specific to the El Salvador situation. It will also be designed to teach about and facilitate the adoption of irrigated agriculture opportunities offered through the Project.

The method to be employed will be to give trainees first hand experiences with operating irrigation projects on operating farms. These experiences will then be used as touchstones for the classroom instruction. The underlying principle is that doing and seeing are powerful teaching tools that multiply the transfer of understanding over listening alone.

The general plan for training extenders and farmers will involve combining the skills of the Project's technical assistance team with those of CENFA staff to implement the training. Together, they will conduct the training of the public and private sector extenders. Subsequently, they will oversee the training of farmer maestros. Previously trained extenders, particularly CENFA extension agents, will assist. Eventually, the role of the technical assistance team will be replaced entirely by the CENFA staff.

c. Organization of the Training Scheme

The training will be comprised of portions directed at extenders and portions directed at key farmers. Extender training will include three short courses. One will be a general overview of irrigated agriculture and the opportunities presented by this Project. A second course will cover technical aspects of irrigation in the El Salvador context. The third course will center on training extenders to enhance their skills for bringing the benefits of this Project to farmers.

Once a cadre of extenders has been through the initial courses, farmer training will be undertaken. Individual farmers or representatives of farmer associations or cooperatives who are identified as leaders or innovators will be invited to participate in farmer "maestro" training courses in which irrigated agriculture will be taught. In particular, these farmers will be taught the opportunities afforded by this Project and the mechanisms through which they can take advantage of them. Furthermore, those farmers who are engaged in irrigation, or who subsequently adopt irrigation, will be given incentives to allow their operations to be used as knowledge transfer sites. Extenders could use these farms as demonstrations for other local farmers. Apart from formal teaching opportunities and site visits, the normal interaction of these farmers with their friends, relatives, and neighbors will form the base level for knowledge transfer regarding irrigated agriculture.

d. Training the Extenders

The proposed training will have two fundamental objectives: first, to encourage increased productivity of currently irrigated lands immediately, and secondly, to institutionalize processes which will effectively extend knowledge and support to the Salvadoran farmer into the long range future.

In the first instance, there are thirteen existing DGRD constructed irrigation projects in the agrarian reform sector which will be targeted for training and extension support in order to realize more of the potential for which the projects were designed. In addition, there are small irrigation associations comprised of farmers who are not part of the agrarian reform, but who are irrigating and have formed cooperatives to facilitate their efforts. These too will receive special attention for immediate training and support. Furthermore, farmers or farmer associations with interest in committing themselves to irrigation will be sought for inclusion in this effort to raise the output of irrigated agriculture in El Salvador.

In the second effort, training mechanisms will be employed which develop curricula that can be used by the extenders. Organizational linkages and personal acquaintances will be fostered in training environments geared for the network organizations extending support to Salvadoran agriculture. Training equipment and support materials will be made available to those who have participated in the training for their subsequent use in extending knowledge to farmers.

The sequencing of training efforts for farmers and extenders will be to first initiate training for extenders. This training will be in the form of short courses that are repeated throughout the period of the Project. As soon as a few extenders have been trained, then farmer training will begin. The importance of training extenders first is that they will then be used in the process of training the farmers. A brief summary description of the extender courses is presented below. More detail is provided in Annex 8.

Extender Course One: The training programs for extenders will be of several types. First there will be one week general courses which will discuss the issues related to irrigated agriculture in El Salvador. Instruction will consider all of the four problem areas enumerated by Ing. Paz: marketing, credit acquisition, technical knowledge transfer, and farmer organization as well as crop diversification. This general course will also provide an overview of the network of public and private organizations which support Salvadoran agriculture.

All of the professionals in CENPA who deal directly with farmers or agricultural research will be encouraged to attend this course during one of its offerings. Enrollment will also be open to other employees in the Ministry of Agriculture.

Private sector involvement will be encouraged from all companies with any direct connection to Salvadoran agriculture. In this way, the participants not only learn the functions and resources of the various support sectors, but they also make personal acquaintances and contacts for later use.

The emphasis of this course will be to instill in participants an overview of what it takes to support irrigated agriculture from planning to final product sale. They should leave with a clear view of their role in the entire process and a clear view of where to go, what to do, or who to see to bring the necessary resources to bear in support of the farmer and the process. Field visits will be used to illustrate the integrated nature of diversified irrigated agriculture and give students concrete experience to which they can later relate classroom work.

Extender Course Two: A second course of two weeks duration will be taught emphasizing greater detail regarding the technical instruction on the various structural alternatives for irrigation in El Salvador along with their potential applications in regions of the country, in different types of soils, and among various crops. Specific crops will be discussed which illustrate the range of demands on irrigation designs.

An important aspect of this course will be to emphasize that irrigated agriculture is a complex system. Students will leave with an understanding that the goal of irrigated agriculture is to maximize the system's output, which in some instances may not mean maximum efficiency in particular portions of the system. As with course one, field visits will be used to illustrate and solidify understanding.

The primary audiences sought for this course from the public sector will include professionals from CENFA research, CENFA extension, ENA, and DGRD. In addition, appropriate administrators in MAG and the OA will be encouraged to attend the course in one of its offerings. Participants will be sought from the private sector firms offering irrigation engineering services, who engage in, or could engage in, the construction of irrigation facilities, or businesses that are interested in having someone trained in these more technical aspects of irrigation engineering.

Extender Course Three: This course will be a one week program aimed at those individuals and organizations which train or organize farmers. The primary audience for these sessions will be CENFA extension agents, individuals engaged in the organization of farmer cooperatives, and field supervisors working for private businesses.

The curriculum will center how to effectively provide knowledge and resources to the farmer. Students will be required to have taken the general course to ensure that they have a grasp of the resources currently available to irrigated agriculture, as well as those being fostered by the private sector portion of this Project. They will be instructed in the use of teaching materials prepared for use with farmer groups and in the concept and application of a "farmer maestro" program. A major emphasis of this course will be to instill in the participants that effective extension requires continuity, timely follow-through, and that the extender has succeeded in his responsibilities only when the farmer has succeeded.

e. Training Farmers

The old saying, "Nothing breeds success like success," is at the core of the training of farmers. The goal is to salt the countryside with farmers who are known and respected by their peers and who are succeeding with diversified irrigated agriculture.

Extenders who have been through the training courses will be employed to identify farmers who are either now engaged in irrigation, or who are likely prospects to adopt irrigation technology. These farmers might include leaders from CENTA's grupos solidarios, leaders of farmer associations, leaders of cooperatives, or prominent, respected farmers interested in irrigation. These farmers will be invited to one week of training in a "Farmer Maestro" program. Their transportation to and from the training will be provided using CENCAP buses. They will be given tokens of participation, such as framed diplomas, stensiled hats, a sack of fertilizer, and a list of contact people who are available for consultation or hire in irrigated agriculture.

Both CENTA extension agents as well as extendors from the private sector, will be aware of these farmer maestros. They will receive particular attention as individuals who are primed to take advantage of irrigation opportunities. As they adopt irrigation, they will also be of particular interest in continuing extension activities in which their neighbors can be instructed using a local, functioning farm.

2. Technical Engineering Analysis

a. Technical Assistance Needs

The study of the natural resources and data collection in El Salvador has been superior to that of most developing nations. There is a need, however, to summarize, analyze and make the data and studies available for use in irrigation development. Probability analyses need to be made to define assured amounts of rainfall and streamflow at various probability levels. Soils and water studies need to be combined, interpreted and made more useful.

About five ground water studies have been made and ground water depths recorded in preliminary form. These are inadequate for planning a major irrigation development program. Assistance is required in first reviewing the available information, inspecting the geologic conditions and developing preliminary recommendations, including a country-wide program of ground water investigations that will involve test wells to evaluate the various aquifers.

The relationships between the interactions of water and fertility on yields have not been adequately defined for conditions in El Salvador. Training assistance is needed in the optimization of profits from irrigation and in the use of resource data to evaluate the development potential. The irrigation engineer and the irrigation agronomist proposed for two year technical assistance assignments under the Project should accomplish this training.

The existing geologic, soils and soil fertility data and information can be combined to provide an improved evaluation of the agricultural potential and the needs and requirements for various fertilizer elements. Such an analysis should be accomplished as soon as possible to assist irrigation planning and development. The WMS II element of the Project includes the carrying out of this analysis.

The AID Bureau of Science and Technology is sponsoring a world-wide project for agrotechnology transfer known as the International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT). The activities include applied and adaptive research trials and efforts to modify the existing crop growth models for use with monthly climatic data. The Project should provide liaison with the IBSNAT project so that CENFA can both benefit from and contribute to the process of world-wide agrotechnology transfer.

b. Environmental Concerns

The soils of El Salvador are deep, volcanic and absorptive. They are the basis of the important renewable natural resource, groundwater. The annual groundwater aquifer recharge rates are very high, since a preponderance of the annual rainfall is quickly absorbed by the soils. Virtually the whole country has the potential of employing groundwater for irrigation without exceeding the aquifer recharge rates.

In El Salvador, some very steep slopes are being farmed, resulting in significant erosion. Over time, the development of high-value, labor-intensive crops under irrigation will decrease the economic and population pressures on these steep slopes. Left uncultivated, permanent vegetation will rapidly be reestablished, thereby improving the distribution and quality of the surface runoff and protecting the soil resources for possible use under conditions of permanent vegetation by future generations.

There are no obvious negative effects on the environment but rather several very positive considerations. This conclusion is based on the history of similar developments elsewhere. For example, developments in Greece of a similar nature to those proposed in this Project resulted in decreased flooding, decreased soil erosion, restoration of native forests, a cleaner and more sanitary and more dependable water supply, and a significantly improved environment for both wildlife and native vegetation. The areas where irrigation will likely take place consist of porous soil where there is little runoff. Therefore, there will be little impact of leachates on downstream uses of water. The training and technical assistance provided under the Project will create an awareness of and develop the institutional capability to address future issues related to irrigation and its potential impact on the environment.

VII. C. SOCIAL ANALYSIS

The social context within which the Project will be implemented is one which is characterized by a highly entrepreneurial private sector, an industrious, albeit under employed, low-income agricultural sector, and an inadequately trained but enthusiastic public sector.

GOES data show a chronic problem of very high rural under- and unemployment. A 1977 study by Daines reported that at 47% El Salvador had the highest agricultural underemployment rate in Latin America. It is expected that some improvement will occur with the termination of the civil conflict, but the acute problems of rural

employment require major improvements in the economy in all sectors. Diversification into high-labor, high-value, irrigated crops will help to alleviate the problems of acute chronic under- and unemployment in the rural sector.

In 1978, half of the rural poor families earned less than \$647. The situation is believed to be worse today because of the general economic slump and the disruption caused by the civil conflict.

In addition to the two major problems cited above, the social analysis identified a need to reorient production practices of farmers, public sector agencies' staffs and private business people that deal with irrigated farming. The analysis identifies training, technical assistance, improved communication methods and provision of incentives as means to bring about behavioral changes. The technical design of the Project has incorporated the majority of these suggestions, either as direct inputs (training, TA, credit) or as start-up studies to guide the process of change (Role of Women, Farmer Attitudes and Needs, Alternative Extension Approaches).

The Project is both feasible and consistent with the social environment in which it will operate. The Project provides needed services to several groups within the private and public sectors such as irrigation and agricultural input suppliers, produce packers and marketers, well diggers, farmers, and public sector technicians and educators directly or indirectly involved with irrigated agriculture. The increased production of high-value export crops grown under irrigation will have a positive impact on the employment and income of rural inhabitants which is expected to be translated into an improved standard of living.

VIII. CONDITIONS AND COVENANTS

Two separate agreements will be signed to obligate the Project's funds. A Cooperative Agreement will be signed with FUSADES for the Private Sector Irrigation Development component. A Grant Agreement will be signed with the GOES for obligating Project funds for the Public Sector Irrigation Development component. The conditions and covenants to be included in each of the two obligating instruments are as follows:

A. Cooperative Agreement

1. Conditions Precedent to Initial Disbursement

Prior to initial disbursement of Project funds under the Cooperative Agreement, or the issuance by AID of documentation pursuant to which disbursement will be made for all Project activities, the Grantee will, except as the Parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

a. Evidence that the Private Sector Irrigation Association has been legally constituted under the laws of El Salvador.

b. A statement of the name of the person(s) holding office in FUSADES and empowered to act for FUSADES with reference to the Cooperative Agreement.

2. Conditions Precedent to Subsequent Disbursements

Prior to any disbursement under the Cooperative Agreement for the R & D Credit Fund, or to the issuance by AID of documentation pursuant to which disbursement will be made, the Grantee will, except as the Parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

a. An executed subsidiary agreement between FUSADES and the Private Sector Irrigation Association, which has prior written approval of AID, whereby the roles and responsibilities of FUSADES and the Irrigation Association for carrying out the Project activities are specified, in accordance with the Project Description. Under the subsidiary agreement, FUSADES will transfer Project implementation responsibilities to the Irrigation Association and retain those responsibilities appropriate for overseeing and coordinating Project implementation.

b. Evidence that FUSADES has established a trust fund in the Banco Hipotecario for the deposit of the Project funds for the R & D Credit Fund element.

c. An executed agreement between FUSADES, the Irrigation Association, and the trustee Banco Hipotecario, which has prior written approval of AID, wherein the procedures for disbursement and recovery of the R & D Credit Fund will be specified, in accordance with the Project Description and in such a way to ensure, to the maximum extent possible, open and fair competition and avoidance of conflict of interest in the access to loans from the Fund.

3. Covenants

a. FUSADES shall covenant to make every effort possible to assist the Irrigation Association in obtaining its formal legal status.

b. FUSADES shall agree that no more than reasonable prices for any goods and services financed in whole or in part under the Cooperative Agreement will be paid. Such items will be procured by employing fair and good commercial practices to assure the most effective use of the funds provided.

c. FUSADES shall covenant to make available short term technical services from its Trade and Investment Promotion Service (TIPS) in an amount not less than \$435,000 over the Life of the Project to farmers, processors, packers and exporters participating in the Project.

d. FUSADES shall covenant that AID will be able to brief and debrief contractors, participants and invitational travelers financed under the Cooperative Agreement and will be furnished copies of reports produced by such persons.

4. Waivers

The Mission foresees the occasional need to grant a waiver from AID Geographic Code 000 eligibility for the procurement of technical assistance or training services, including observation trips, to facilitate the achievement of the Project's purpose. It is thus proposed that such waivers be granted to allow for services from AID Geographic Code 941 on a limited case by case basis.

B. GOES Grant Agreement

1. Conditions Precedent to Disbursement

Prior to disbursement of Project funds, or the issuance of any commitment document under the Grant Agreement to finance any activity, the Grantee shall, except as the Parties may otherwise agree in writing, furnish in form and substance satisfactory to AID:

a. Evidence that the Grant Agreement has been duly ratified.

b. A statement of the name of the person(s) holding office in the GOES and legally empowered to act for the GOES with reference to the Agreement.

2. Covenants

a. The Grantee shall covenant to furnish in form and substance satisfactory to AID, annual implementation plans and budgets for each GOES entity participating under the Project.

b. The Grantee shall covenant that AID will, upon request, be able to brief and debrief any contractors, participants and invitational travelers financed under the Project and will be furnished copies of all reports produced by such persons.

c. The Grantee shall covenant to release public sector employees for international training funded under the Project, to pay their salaries while they are in such training, and to reinstate them into the jobs for which they were trained upon their return from the training.

3. Waivers

Approximately 50 motorcycles will be needed for CEMTA extension personned in carrying out activities under the Project. A waiver from AID Geographic Code 000 eligibility for the procurement of the motorcycles is needed and should be granted.

In addition, the Mission foresees the occasional need to grant a waiver from AID Geographic Code 000 eligibility for the procurement of technical assistance or training services, including observation trips, to facilitate the achievement of the Project's purpose. It is proposed that such waivers be granted to allow for such services from AID Geographic Code 941 on a limited case by case basis.

IX. PROJECT EVALUATION

The Project will undergo formal evaluation three times during its life. The evaluation of Project start-up activities will occur approximately one year after obligation of funds, the mid-course evaluation will take place in Jan.-Feb. 1988, and the final evaluation in July-Aug. 1990. Short term consultants with WMS II will conduct the evaluations. It is estimated that three consultants will be required for each evaluation effort: a water resource planner with either economics or agribusiness experience, an irrigation engineer with farm level experience, and a survey/data processing specialist. A description of the intent of each of these evaluations is given below.

A. Evaluation of Project Start-up Activities

The first evaluation will take place one year after obligation of funds and will evaluate the start-up phase of the Project. According to the Project calendar, the activities which should have been completed by the time of the first evaluation include a short duration sample of almost all types of project Activities. The "start-up" evaluation will provide a useful preliminary view of the various activities and suggest early corrections. Certain activities will have concluded by this time, such as the five required studies and private sector bidding processes. The evaluation should therefore be able to reach some judgements about the efficacy of these activities.

In addition to evaluating the start-up of the institutional elements of the Project, the initial evaluation team will conduct a baseline survey of a sample of farms that are receiving assistance which would include extension farms, pilot farms and irrigation credit farms, and a matched sample of farms not receiving assistance. This survey will provide a baseline and cross sectional control group for use in follow-up evaluation surveys.

B. Mid-Course Evaluation

The mid-course evaluation should assess Project progress and impact in all of its various activities. The credit activity in the private sector will have matured sufficiently to allow for a fairly good assessment. An important issue for the mid-course evaluation will be the possible need for additional funding of the credit component in the event that disbursements have proceeded on schedule and impacts appear favorable. The formal field survey will be repeated and preliminary impact analysis will be conducted.

The mid-course evaluation should make a complete review of the impact and processes of the long term technical assistance and make mid-course recommendations, as appropriate, for implementation of the ENA B.S. program and CENPA training programs.

C. Final Evaluation

During the last three months of the Project life, a final evaluation will be conducted. This evaluation will cover all elements of the Project, and will include a final repeat of the formal field survey.

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SUBJECT: GUIDANCE FOR DESIGN OF WATER MANAGEMENT (519-0303) PROJECT

1. THE DABC REVIEWED AND APPROVED SUBJECT PID ON MARCH 14, 1985. HOWEVER, THE DABC DID NOT AGREE WITH THE TRADITIONAL, PUBLIC SECTOR-ORIENTED APPROACH TO IRRIGATION SYSTEMS MANAGEMENT PROPOSED IN THE PID. THEREFORE, GUIDANCE IS GIVEN BELOW FOR DESIGN OF A PROJECT WHICH WILL CONCENTRATE ON: (1) TRAINING OF FARMERS AND FIELD AGENTS AND (2) STRENGTHENING OF IRRIGATION EXTENSION SERVICES. MISSION IS DELEGATED AUTHORITY TO APPROVE THE PP IN THE FIELD. SPECIFIC GUIDANCE FOR PP PREPARATION IS AS FOLLOWS:

2. PRIVATE SECTOR INVOLVEMENT. BECAUSE OF THE SERIOUS PROBLEMS AFFECTING IRRIGATION SYSTEMS MANAGEMENT IN EL SALVADOR, AND THE EXPERIENCE UNDER THE SMALL FARM IRRIGATION PROJECT (519-0184), THE PROPOSED WATER MANAGEMENT PROJECT SHOULD TAKE AN INNOVATIVE APPROACH TO IMPROVING IRRIGATION SYSTEMS PERFORMANCE.

FACTORS WHICH ARGUE FOR A NEW PROJECT APPROACH TO IRRIGATION INCLUDE: (1) THE WEAKNESSES OF PUBLIC SECTOR ORGANIZATIONS, (2) THE ORIENTATION OF DGRD AND OPOR TOWARD PHYSICAL INFRASTRUCTURE DEVELOPMENT AND (3) THE LACK OF COMMUNICATION BETWEEN THE PUBLIC INSTITUTIONS RESPONSIBLE FOR IRRIGATION AND THE COMMUNITIES THEY PURPORT TO SERVE. PROJECT DESIGN SHOULD, THEREFORE, MAXIMIZE THE INVOLVEMENT OF PRIVATE SECTOR FIRMS AND AGENCIES (INCLUDING COMMODITY SUPPLIERS) TO PROVIDE EXTENSION, COMMUNITY ORGANIZATION, TRAINING, AND RELATED GOODS AND SERVICES.

3. RESEARCH REQUIREMENTS. SERIOUS CONSIDERATION SHOULD BE GIVEN TO THE INCORPORATION OF A RESEARCH COMPONENT TO DETERMINE THE REASONS FOR THE POOR MAINTENANCE AND INEFFICIENT USE OF EXISTING IRRIGATION SYSTEMS AND TO MAKE RECOMMENDATIONS ON HOW TO IMPROVE THESE ELEMENTS. REGARDLESS, THE FOLLOWING RESEARCH ACTIVITIES ARE REQUIRED, AND SHOULD COMMENCE DURING INTENSIVE REVIEW AND BE CONTINUED, OR THE RESULTS SUBSTANTIATED, DURING THE

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LOP: (A) CASE STUDIES AND SURVEYS OF FARMER ATTITUDES AND NEEDS; (B) AN EXAMINATION OF POSSIBLE ALTERNATIVES TO THE EXISTING IRRIGATION EXTENSION SYSTEM, WHICH SHOULD INCLUDE A LOOK AT THE ROLE OF CENTA IN PROVIDING EXTENSION SERVICES; (C) AN EVALUATION OF THE APPROPRIATENESS OF THE DESIGN OF EXISTING IRRIGATION SYSTEMS; AND (D) COLLECTION OF GENDER-DISAGGREGATED DATA TO ACCURATELY PREDICT THE EFFECTS OF THE PROJECT ON WOMEN.

4. IRRIGATION SYSTEMS EXPERIENCE. IN ADDITION TO AN EXAMINATION OF THE INFORMATION PROVIDED THROUGH THE WATER MANAGEMENT SYNTHESIS II PROJECT, THE MISSION SHOULD DRAW ON EXPERIENCES IN IRRIGATION SYSTEMS DEVELOPMENT AND MANAGEMENT UNDER PROJECT 519-0184, OTHER AID PROJECTS, AND IN OTHER DEVELOPING COUNTRIES IN GENERAL. AN EXAMINATION OF A CROSS SECTION OF THIS EXPERIENCE COULD BE USEFUL NOT ONLY FOR THE DESIGN OF THIS PROJECT BUT TO AID THE MISSION IN ESTABLISHING PROGRAM OBJECTIVES FOR POSSIBLE CONTINUING INVOLVEMENT IN THE IRRIGATION SECTOR IN EL SALVADOR. LAC/DR IS OBTAINING COPIES OF RELEVANT EVALUATIONS AND CASE STUDIES AND WILL BE FORWARDING THEM TO USAID/ES SHORTLY. AS FAR AS TRAINING OF GOES DECISION-MAKERS AND SYSTEMS DESIGNERS IS CONTEMPLATED UNDER THE PROJECT, OBSERVATIONAL TRAVEL TO THE U.S. AND THIRD COUNTRIES SHOULD BE FUNDED TO ALLOW FOR VISITS TO IRRIGATION SYSTEMS AND RELATED SITES.

5. INSTITUTIONAL RELATIONSHIPS. THE NUMBER OF GOES INSTITUTIONS INVOLVED IN THE PROJECT AND THE INTERDEPENDENCIES BETWEEN INSTITUTIONS SHOULD BE HELD TO AN ABSOLUTE MINIMUM. THE PP PROJECT DESCRIPTION SHOULD CLEARLY DEFINE RESPONSIBILITIES AND RELATIONSHIPS. THE INSTITUTIONAL ANALYSIS SHOULD PROVIDE SUFFICIENT EVIDENCE THAT THE CAPABILITIES OF THE IMPLEMENTING INSTITUTIONS, AND THEIR ROLES UNDER THE PROJECT, ARE SUCH THAT ACHIEVEMENT OF THE PROJECT OUTPUTS CAN BE REASONABLY ASSURED. THE IMPLEMENTATION ARRANGEMENTS SECTIONS SHOULD PROVIDE FOR CAREFUL MONITORING OF THE EVOLUTION OF INSTITUTIONAL RELATIONSHIPS.

6. POLICY FRAMEWORK. GOES POLICIES AND LAWS WHICH REGULATE IRRIGATION SHOULD BE THOROUGHLY EXAMINED DURING INTENSIVE REVIEW. AGREEMENT IN PRINCIPLE SHOULD BE REACHED WITH THE GOES PRIOR TO COMMENCEMENT OF THE PROJECT ON WHAT MODIFICATIONS ARE REQUIRED TO THESE POLICIES, TO MAKE THE SECTOR FUNCTION MORE EFFICIENTLY. AGREEMENT SHOULD BE REACHED, FOR INSTANCE, ON MODIFICATIONS REQUIRED TO LAWS AFFECTING THE ESTABLISHMENT AND OPERATION OF WATER USERS ASSOCIATIONS. THE MORE CRITICAL LEGISLATIVE OR REGULATORY CHANGES REQUIRED SHOULD BE THE SUBJECT OF CONDITIONS PRECEDENT TO THE DISBURSEMENT OF ASSISTANCE, OR COVENANTS UNDER THE

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PROJECT. AS REGARDS THE PROPOSED GENERAL WATER LAW, THE PP SHOULD THOROUGHLY DISCUSS ITS VARIOUS PROVISIONS AND THE POSSIBLE RAMIFICATIONS OF ITS ENACTMENT ON THE PROJECT AND THE PROJECT BENEFICIARIES. THIS ASSUMES THAT A DECISION WILL NOT BE TAKEN BY THE GOES, DURING THE PERIOD OF INTENSIVE REVIEW FOR THIS PP, TO REJECT THE NEW LAW IN ITS ENTIRETY.

7. AGRICULTURAL REFORM BENEFICIARIES. IT IS EXPECTED THAT AG REFORM COOPERATIVE MEMBERS WILL RECEIVE SUBSTANTIAL BENEFITS FROM THE PROJECT. THE PP DESIGN SHOULD DRAW SPECIFIC PARALLELS BETWEEN THE NUMBER OF THESE BENEFICIARIES, TRAINING TO BE PROVIDED THEM, AND THE HECTARES OF IRRIGATED LAND FARMED BY THE COOPERATIVES AND AFFECTED BY THE PROJECT. THE DAEC EXPRESSED CONCERN THAT A SIGNIFICANT NUMBER OF THE AGRICULTURAL REFORM COOPERATIVES CONTINUE TO EXPERIENCE FINANCIAL AND OTHER PROBLEMS IMPINGING ON THEIR ORGANIZATIONAL VIABILITY. THE MISSION REPRESENTATIVE NOTED FOR THE RECORD THAT MEASURES TO STRENGTHEN THE COOPERATIVES ARE ON THE NEGOTIATING AGENDA WITH THE GOES FOR CONTINUED ESF ASSISTANCE.

8. ECONOMIC ANALYSIS. THE PP ECONOMIC ANALYSIS SHOULD FIRST EXAMINE THE ALTERNATIVE APPROACHES FOR ACHIEVING INCREASED WATER MANAGEMENT SKILLS AND DEMONSTRATE THAT THE APPROACH CHOSEN IS THE MOST COST-EFFECTIVE. SECOND, THE PP SHOULD DEMONSTRATE THAT IRRIGATION OF AN ILLUSTRATIVE LIST OF CROPS IS FINANCIALLY PROFITABLE FOR THE FARMERS IN THE AREA. FINALLY, TO OBTAIN AN ESTIMATE OF THE ECONOMIC RATE OF RETURN FOR THE PROJECT, THE ANALYSIS SHOULD ESTIMATE THE ANTICIPATED CHANGE IN PRODUCTION AS A RESULT OF THE BETTER MAINTENANCE AND MORE EFFICIENT USE OF THE EXISTING IRRIGATION SYSTEMS. THIS CAN BE ACCOMPLISHED BY ESTABLISHING THE CASE FOR WHAT WOULD HAPPEN WITHOUT THE PROJECT AND THE CASE FOR WHAT BENEFITS ARE EXPECTED TO ACCRUE AS A RESULT OF THE PROJECT.

9. CONTRACTING AND TECHNICAL ASSISTANCE. A VARIETY OF CONTRACTING OPTIONS FOR THE PROJECT SHOULD BE EXPLORED, IN ADDITION TO THE POSSIBLE AGREEMENT WITH A TITLE XII UNIVERSITY PROPOSED IN THE PID. THE TERMS OF THE GRAY AMENDMENT SHOULD ALSO BE CONSIDERED. THE FULL RANGE OF TECHNICAL ASSISTANCE NEEDS UNDER THE PROJECT SHOULD BE CAREFULLY ESTIMATED DURING INTENSIVE REVIEW AND WELL-DOCUMENTED IN THE PP.

10. CENTRAL AMERICA PEACE SCHOLARSHIPS (CAPS). ALL SCHOLARSHIPS FUNDED UNDER THE CAPS PROGRAM MUST BE ADDITIVE TO PROJECT TRAINING REQUIREMENTS. TRAINING FOR COUNTERPART AND OTHER PERSONNEL WHO ARE WORKING, OR WHO WILL WORK ON PROJECT ACTIVITIES MUST BE FUNDED THROUGH PROJECT RESOURCES PER SE.

11. RESTRICTIONS ON AID-FINANCING OF AGRICULTURAL

COMMODITIES. AID POLICY DETERMINATION 71 RESTRICTS AID FUNDED ASSISTANCE FOR THE PRODUCTION, PROCESSING OR MARKETING OF PALM OIL, CITRUS, SUGAR AND RELATED PRODUCTS. IF ANY SUCH ASSISTANCE IS CONTEMPLATED UNDER THE PROJECT, A WAIVER OF THESE RESTRICTIONS IS REQUIRED AND MUST BE APPROVED BY THE AA/LAC AND AA/PPC FOLLOWING AID/W REVIEW.

12. ENVIRONMENTAL CONCERNS. SUCCESSFUL MANAGEMENT OF IRRIGATION SCHEMES REQUIRES AN UNDERSTANDING OF NOT ONLY THE DELIVERY OF WATER TO CROPS BUT EQUALLY IMPORTANT ANCILLARY PROBLEMS. AMONG THESE ARE WATERSHED MANAGEMENT AND OTHER ENVIRONMENT IMPACT-RELATED CONCERNS. TRAINING IN THESE AREAS SHOULD THEREFORE BE PROVIDED THROUGH THE PROJECT TO BOTH FARMERS AND GOES PERSONNEL.

THE PP DESIGN SHOULD ALSO GIVE ATTENTION TO THE LARGER ISSUES PERTAINING TO WATERSHED MANAGEMENT, POLLUTION OF IRRIGATION RUNOFF BY LEACHATES AND PESTICIDES AND THEIR IMPACTS ON DOWNSTREAM USES OF WATER, INCLUDING THE POTENTIAL HEALTH IMPACTS. THE MISSION HAS BEEN PROVIDED A COPY OF AID ENVIRONMENTAL GUIDELINES FOR IRRIGATION FOR REFERENCE.

13. PROJECT AGREEMENT. THE PROJECT AGREEMENT SHOULD INCLUDE A COVENANT OR OTHER PROVISION REQUIRING THE GOES TO APPOINT RETURNING PARTICIPANT TRAINEES TO POSITIONS WHICH TAKE MAXIMUM ADVANTAGE OF THEIR NEWLY ACQUIRED SKILLS. THIS SHOULD NOT PRECLUDE ANY OF THESE RETURNEES FROM SEEKING EMPLOYMENT IN THE PRIVATE SECTOR, ASSUMING APPROPRIATE COMPENSATION TO THE GOES DEPENDING ON THE CIRCUMSTANCES AND GOES POLICY.

14. EVALUATION. THE FIRST PROJECT EVALUATION SHOULD BE HELD APPROXIMATELY ONE YEAR AFTER INITIAL OBLIGATION OF FUNDS TO EXAMINE EARLY PROJECT PROGRESS.

15. LOGFRAME. THE PP LOGFRAME SHOULD IDENTIFY AND QUANTIFY EXPECTED PROJECT OUTPUTS AS SPECIFICALLY AS POSSIBLE.

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16. PROJECT MANAGEMENT. THE DAEC NOTED FOR THE RECORD THAT CONTINUING MISSION STAFF SHORTAGES AND RECRUITMENT PROBLEMS MUST BE OVERCOME TO ALLOW FOR EFFICIENT MANAGEMENT OF THIS PROJECT. LAC WILL INTENSIFY ITS SEARCH FOR QUALIFIED RURAL DEVELOPMENT EXPERTISE.

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LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
<u>Goal</u>			
To generate employment, income and foreign exchange for El Salvador	<ol style="list-style-type: none"> 1. Increased exports of non-traditional agricultural and/or agro-industrial products. 2. Increased production and productivity in farms with irrigation systems. 3. Increased employment in the agricultural sector. 	<ol style="list-style-type: none"> 1. GOES data and statistics. 2. Project reports and evaluations. 	<ol style="list-style-type: none"> 1. Political, economic and security situation does not deteriorate any further. 2. GOES formulates and implements appropriate policies for encouraging non-traditional exports.
<u>Purpose</u>			
To promote diversified irrigated farming in El Salvador through institution strengthening, technology transfer, training and credit assistance.	<ol style="list-style-type: none"> 1. Salvadoran farmers adopt precision irrigation on approximately 2,500 Has. for production of high labor, high value, non-traditional export crops. 	<ol style="list-style-type: none"> 1. Mission, implementing entities, and other contractor records, reports, and evaluations of Project. 	<ol style="list-style-type: none"> 1. Salvadoran farmers and businesses maintain interest in precision irrigation.

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LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
	<p>2. Salvadoran enterprises are utilizing FUSADES and Irrig. Association services to engage in exporting non-traditional agric. products to extra-regional markets.</p> <p>3. Approximately 60 private sector field agents trained and providing support services to farmers in precision irrigation technologies.</p> <p>4. CENIA's managers, technicians and extension agents trained and applying new skills in on-farm water management and irrigated farming technologies.</p>		<p>2. The GOES continues to give high priority to irrigation development.</p>

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LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
	5. CENTA's agricultural researchers receive training and logistical support for conducting research on irrigation technologies in El Salvador.		
	6. ENA's faculty trained in and teaching agronomy students on-farm water management and irrigated agriculture.		
	7. Farmers with irrigation systems or interested in adopting irrigation provided with training on irrigated agriculture		
	8. Farmers with irrigation systems trained and applying new skills in on-farm water management and irrigated farming.		

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
	<p>9. DGRD planners, managers and technicians trained and applying new skills and knowledge in agriculture water use planning and management.</p> <p>10. OA and OSPA planners, managers, and technicians trained and applying new skills or knowledge in national water use policy formulation and planning.</p>		
<u>Outputs</u>			
<p>• 1. <u>Private Sector Irrigation Development</u></p>	<p>1. a. The Irrigation Association established and functioning in support of diversified, irrigated farming.</p> <p>b. Aprox. 60 field agents employed by private sector firms.</p>	<p>1. a. Periodic Project reports and Project evaluations.</p>	<p>1. a. High caliber technical assistance is recruited to work with Association for the three years.</p>

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LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
2. <u>Public Sector Irrigation Development</u>	<p>c. Approx. 1,000 Ha of precision irrigation developed on "Model A" farms.</p> <p>d. 5 integrated irrigated agriculture pilot projects ("Model B") developed with approx. 1,500 Ha. of precision irrigation.</p>		<p>b. Suppliers have adequate access to foreign exchange to import required equipment.</p> <p>c. Credit mechanism offers sufficient agility to finance the pilots.</p>
	<p>2. a. Approx. 136 CENFA extensionists trained and at least 50 engaged in providing on-farm services to farmers in on-farm water management and irrigated agriculture.</p>		<p>2a. MAG and CENFA maintain interest in this area.</p>
	<p>b. Approx. 1,085 "farmer maestros" trained in on-farm water management and irrigated agriculture.</p>		

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
	c. Approx. 40 CENTA researchers trained and incorporating irrigated agriculture into CENTA's research work.		
	d. Curriculum for B.S. degree in Irrigated Agriculture developed at ENA.		2b. MAG and ENA maintain interest in this area.
	e. 4 ENA professors trained at M.S. degree level and return to teach Irrigated Agriculture at ENA.		
	f. DGRD planners and technicians trained and carrying out more cost-effective irrigation project planning and contracting and supervision of public irrigation construction.		2c. MAG and DGRD maintain interest in these areas.

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LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
	g. OA and OSPA planners trained and carrying out more balanced planning of water resource use for agriculture.		2d. MIPLAN and MAG maintain interest in this area.
<u>Inputs</u>	<u>LOP (\$000)</u>		
1. <u>A.I.D.</u>			
a. A.I.D. Grant to FUSADES	13,540	1. A.I.D. Records	1. A.I.D. makes available sufficient funds in FY 1985, 1986 and 1987.
b. A.I.D. Grant to GOES	5,293		
2. <u>El Salvador</u>			
a. PL 480 Local Currency	2,496	2 Implementing agency records, reports and audits.	2. GOES makes available sufficient counterpart resources.
b. Participating Entities Counterpart Contribution	3,911		3. Financial situation of participating entities permits them to make their counterpart contribution.

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only: B.1. applies to all projects funded with Development Assistance Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESP.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 1992 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project;
 (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that amount)?

A Congressional Notification is being issued.

The Project is included within the OYB.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,00, will there be

Yes.

(a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

Legislative action will be required for the public sector component of the Project. Such action normally takes 2-3 weeks, and no difficulties are foreseen for its occurrence.

4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.)

N/A

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

N/A

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| <p>6. <u>FAA Sec. 209.</u> Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.</p> | <p>No.</p> |
| <p>7. <u>FAA Sec. 601(a).</u> Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.</p> | <p>The Project is specifically designed to increase the flow of international trade, foster private initiative and competition, and improve the technical efficiency of the non-traditional agricultural sector.</p> |
| <p>8. <u>FAA Sec. 601(b).</u> Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).</p> | <p>The Project aims to promote diversified, irrigated production for export, particularly to the U.S. Trade linkages with the U.S. will be developed for the marketing of the products. Additionally, five integrated production/marketing pilot will be developed, in which U.S. investors will be eligible for presenting proposals.</p> |

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9. FAA Sec. 612(b), 636(h);
FY 1982 Appropriation
Act Sec. 207. Describe
steps taken to assure
that, to the maximum
extent possible, the
country is contributing
local currencies to meet
the cost of contractual
and other services, and
foreign currencies owned
by the U.S. are utilized
in lieu of dollars. The Project will primarily fund
foreign exchange costs. Most
requirements for local currency
will be met through host country
contributions.
10. FAA Sec. 612(d). Does
the U.S. own excess
foreign currency of the
country and, if so, what
arrangements have been
made for its release? No.
11. FAA Sec. 601(e). Will
the project utilize
competitive selection
procedures for the
awarding of contracts,
except where applicable
procurement rules allow
otherwise? Yes.
12. FY 1982 Appropriation Act
Sec. 521. If assistance
is for the production of
any commodity for export,
is the commodity likely
to be in surplus on world
markets at the time the
resulting productive
capacity becomes
operative, and is such
assistance likely to
cause substantial injury
to U.S. producers of the
same, similar or
competing commodity? No.
13. FAA 118(c) and (d).
Does the project comply
with the environmental
procedures set forth in
AID Regulation 16? Does Yes.

the project or program take into consideration the problem of the destruction of tropical forests?

- 14. FAA 101(c). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)? N/A

B. FUNDING CRITERIA FOR PROVINCE

1. Development Assistance Project Criteria

a. FAA Sec. 102(b), 111, 113, 281(e). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and

The Project is aimed at supporting the production and marketing of labor-intensive, high value crops for export. This focus will generate employment for El Salvador's unemployed rural population. Pilot projects in rural areas will bring new investment into those areas. Extensive training of small farmers throughout the country in irrigation technologies and irrigated agriculture will be provided and leading farmers will be given recognition as "farmer teachers". The Project will fund research on how it can better impact favorably on the role of women in agriculture.

otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?

Yes.

c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?

Yes.

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?

Yes.

e. FAA Sec. 110(b).
Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than \$100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character.

No.

f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

Yes.

g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage

The Project will support the formation and development of a Private Sector Irrigation Association to promote export-oriented irrigated farming. The Association is made up of local producers, farm suppliers, marketers and other groups. Small farmers will be provided training and recognition as innovative farmers who can help extend new technologies.

institutional development;
and supports civil
education and training in
skills required for
effective participation in
governmental processes
essential to self-government.

2. Development Assistance Project
Criteria (Loans Only)

- a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest. N/A
- b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan? N/A
- c. ISDCA of 1981, Sec. 724 (c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)? N/A

3. Economic Support Fund
Project Criteria

- a. FAA Sec. 531(a). Will this assistance promote economic or political N/A

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ANNEX 3
Page 9 of 9

stability? To the extent possible, does it reflect the policy directions of FAA Section 102?

- b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities? N/A
- c. FAA Sec. 534. Will ESP funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives? N/A
- d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? N/A

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MINISTERIO DE PLANIFICACION
Y COORDINACION DEL DESARROLLO
ECONOMICO Y SOCIAL
SETENE-892/85

ACCION TO: <u>ADO</u>		
ACCION DE: <u>9/12</u>		
Inf:	AD	OP/SA
DE	RD	PER
DE	FR/M	ODI
M	CON	ODI
DIP	OET	PRE
PRJ	ODS	ECON
Subject: <u>Requesting Financial support</u>		
ACT: <u>PROJECT</u>		
<u>PAPER, GRANT</u>		
<u>AGREEMENT</u>		
DATE: <u>9-05-85</u>		
BY: <u>L. Palomo</u>		

ACTION COPY

San Salvador, 30 de Agosto de 1985

SUNTO: Solicitud de Donación por \$1.0 millones de dólares para el Proyecto "Manejo de Aguas"

Señor
Robin Gómez
Director
USAID/El Salvador
Presente

USAID / SAN SALVADOR
C & R
008034

Estimado Señor Gómez:

En nombre del Gobierno de El Salvador por este medio me permito solicitarle formalmente asistencia financiera, en concepto de donación, hasta por la suma de aproximadamente US\$ 5.000.000 (Cinco Millones de US Dólares) durante los próximos cinco años para el Proyecto "Manejo de Aguas", cuyo objetivo es promover la agricultura diversificada bajo riego en El Salvador, por medio del fortalecimiento institucional, transferencia de tecnología y capacitación a las instituciones del GOES, involucradas en extensión y capacitación agrícola y planificación de riego.

Las instituciones a recibir asistencia del Proyecto serían: Centro de Tecnología Agrícola (CENTA), Escuela Nacional de Agricultura (ENA), Centro de Capacitación Agropecuaria (CENCAP), Dirección General de Riego y Drenaje (DGRD), Oficina Sectorial de Planificación Agrícola (OSPA) y Oficina de Aguas (OA).

Las necesidades requeridas a aportar por el GOES en concepto de contrapartida son del equivalente a una suma de \$ 2.400.000 a ser generadas con fondos de PL-480.

Esperando contar con su valioso apoyo y cooperación a la presente solicitud, me es grato reiterarle las muestras de mi distinguido aprecio y consideración.

RECEIVED BY
RURAL DEVELOPMENT OFFICE

105 AUG 4 PM 2 57

COMM. & RECORDS

105 SEP 3 PM 5 02

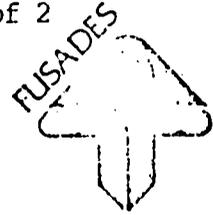
USAID EL SALVADOR



Oscar Reyes-C

ARQ. OSCAR REYES C.
VICEMINISTRO

FUNDACION SALVADOREÑA
PARA EL DESARROLLO ECONOMICO Y SOCIAL



San Salvador,
20 de agosto de 1985

Señor
Robin Gómez
Director
USAID/El Salvador
Presente

Estimado Sr. Gómez:

El propósito de esta carta es el de solicitar a la AID un donativo por la cantidad de US\$13.5 millones para establecer un Programa de Desarrollo del Riego en el Sector Privado que comprenda:

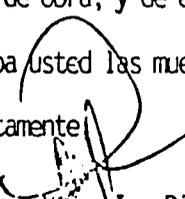
1. El establecimiento de una Asociación de Riego del Sector Privado, la cual recibiría apoyo presupuestario y asistencia técnica a fin de que pueda asumir la responsabilidad de implementar actividades dirigidas a la promoción de la agricultura bajo riego para la producción de productos no tradicionales, exportables;
2. Un Servicio de Asistencia Técnica para el Sector Privado, el cual provea asistencia técnica específica a empresarios y agricultores en El Salvador en áreas como el diseño y manejo de sistemas de riego y empresas para la exportación;
3. Una Actividad de Agentes de Campo del Sector Privado, el cual estaría dirigido a incrementar la capacidad de las firmas privadas en El Salvador para llegar a los agricultores que adopten sistemas de riego con servicios efectivos; y
4. El establecimiento de un Fondo de Crédito R & D para Riego y Comercialización de Productos Exportables, el cual sería utilizado para apoyar el desarrollo del riego y la exportación de productos cosechados bajo riego de alto valor e intensivos en mano de obra en el sector privado, por medio de mecanismos de financiamiento adecuados y ágiles para la inversión de tipo R & D de largo plazo y de alto riesgo.

De acuerdo a conversaciones sostenidas con ustedes y en base a documentos suministrados, entendemos que la meta del Proyecto consiste en incrementar empleo, ingresos y divisas para El Salvador. El propósito del mismo es el de promover la agricultura diversificada bajo riego en El Salvador, a través del fortalecimiento institucional, la transferencia de tecnología, capacitación y asistencia crediticia.

Esperamos que nuestra solicitud reciba una respuesta positiva a manera de incrementar las exportaciones de cultivos o productos agrícolas de alto valor e intensivos en requerimiento de mano de obra, y de esta manera, coadyuvar a la recuperación de la economía de El Salvador.

Reciba usted las muestras de mi más alta consideración y estima.

Atentamente


Eduardo Escobar, Director Ejecutivo

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IRRIGATION ASSOCIATION PROCEDURES AND POLICIES

Note A: Field Agent Program

The program will be administered by the Association as follows. A request for proposals and terms of reference for the Field Agent Program will be published widely by the Association (the chronogram in Section V estimates this publication date as early as December 1985). Interested firms will submit qualifying proposals for inclusion in the Program by April 1985. The Association staff will review the proposals and recommend the firms to be included to the Board by June 1985.

Those firms included would be paid the colon equivalent of 50% of US\$700 per month for a period of up to two years for each additional field agent who will be providing direct technical assistance to farmers in design, installation, operation, maintenance, credit, and marketing of irrigation equipment and/or irrigated produce. The qualifying firms will submit curriculum vitae of proposed field agents to the Association for approval. Upon approval by the Association, the field agents will participate in regular training and monitoring activities as determined by the Association.

Payment of the salary support will be made by the Association to the approved firms upon submission and approval of a voucher certifying the extent and nature of services performed by the field agents. The Association reserves the right to cancel the salary support upon thirty days written notice to the firm, based on a finding by the Association staff approved by the Board, that the field agent in question is not substantially engaged in providing adequate technical assistance to farmers.

Note B: Operating Policies, Procedures and Terms of the Export Market Risk Guarantee Fund (EMRG)

The EMRG will operate as follows. The farmer receiving the guarantee will execute a promissory note to the TBH secured by a "prenda sobre el equipo" financed upon the "terminos y plazos" outlined in Note F below. The farmer will also execute an agreement (Crop Cultivation Agreement CCA) to the TBH whereby he agrees to plant the dedicated area to one or more named crops, by a "prenda agraria" covering any and all products (inside or outside the list) produced on land irrigated with the financed equipment. The guarantee will be cancelled if the farmer fails, in the judgement of the Association staff, approved by the Board, to use the equipment as agreed.

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The terms of the guarantee will be inserted in the credit documents, both "prendas" and in the CC. The EMRG terms are as follows: The TBH fund agrees to hold the farmer responsible for only 50% of the principal and interest due under the credit agreements, notes and "prendas", in the event, and to the extent that export markets "fail" and thereby prevent the farmer from realizing the anticipated incomes from the crop. The farmer will submit yearly documents establishing the physical yields and sales prices received for the production from the financed areas. At the time that any EMRG borrower is behind on interest or principal payments by more than 90 days, the borrower will declare whether or not he claims that failure to pay is due to export market "failure" under the terms of the EMRG.

Upon a claim for protection under the EMRG, the Association staff will make a preliminary finding of "failure" or "no failure" of the Salvadoran export market for the product, or products in question. This determination must be approved by the Association Board. The preliminary determination of "failure" or "no failure" will be based on a staff review of exports from El Salvador of these particular products, prices received by producers and marketers, and estimates of costs of production.

If the preliminary determination is of "no failure," the borrower may submit in writing or orally within 60 days, a claim either that the general conditions are not the ones he faces personally, or that the general conditions as presented in the Association determination are inaccurate or inappropriate. Within 60 days of such a claim, the Association Board will make a final determination.

In the event that the export market is determined to have "failed" inside the terms of the EMRG, the borrower can elect to proceed in any of the following options: (1) he may elect to extend the period of principal grace and final payment for up to two years in order to dedicate the irrigation equipment to non-guaranteed crops, in which case the future repayment would not be guaranteed against export market risk; or (2) to reschedule the delinquent payments "pagos morosos" upon terms acceptable to the TBH; or (3) the TBH will proceed against the borrower under the promissory note, and the two security instruments "prenda sobre el equipo", and "prenda agraria" as provided by law. If the farmer fails to make an election within 30 days, the TBH will proceed under option (3). The effect of option (3) will be to repossess the equipment and attach crop proceeds.

The net proceeds of liquidation of the equipment and attachment of crop revenues would be applied to the outstanding obligation, and the TBH would proceed to recover balances due from the borrower under the promissory note.

In the event that a claim of "failure" is made and approved by preliminary determination, as provided above, the farmer will elect to proceed under the same three options as in the case of a "non failure" determination. In the case of election of option (3) the TBH would proceed under both "prendas" in the same manner as above, applying these proceeds to the outstanding balance in the following fashion. The total outstanding would be divided in half, 50% to continue to be due from the borrower, secured by his promissory note, 50% borne by the Fund secured by the "prendas." Upon repossession and liquidation of the equipment, and attachment of crop proceeds under the "prendas", these proceeds would be applied first to replenish the 50% guaranteed by the Fund, and any "excedentes" would be applied to the 50% which would continue to be due from the borrower. The TBH would then proceed as provided by law to collect the balance due from the borrower under the promissory note.

NOTE C: Crop Selection Criteria and Approved Crop List

a- Economic Potential: Crops of high potential per hectare profit that would enable the amortization of investment in advanced irrigation technology shall be included. As a general guide the crops should have the potential for producing a return of more than U.S \$ 2,000 per hectare to the basic factors of production (land, labor and capital).

b- Labor: Those crops with high labor requirements per hectare produced with advanced technology that indicate a competitive advantage in comparison with developed countries shall be included. Those crops that can easily be mechanized and are so in the U.S. are excluded because of the small chance of competitive advantage, except in the case where the season of fresh production opens a window in the market. As a general guide, the products must have a high labor requirement for production and packing equivalent to at least 100 person days per hectare. The project will give preference to the crops that require more than 500 man days per hectare. Although the labor factor improves the benefits from employment and economic and social development, the basic reason for the preference for these products is derived from their comparative advantage.

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c- Market: The crops with demand throughout the OECD countries will be included because it is indicated that the market will be vary large. Those products of only ethnic consumption and very special crops shall be excluded. This criteria will insure that the limited funds for guarantees shall be channeled for products of large potential and that the pilot projects so guaranteed will, if succesful, benefit not only the firms receiving the guarantees but also a real industry. The objective of the Project is not only to create succesful firms in limited markets but to establish industries with various firms in open competition.

d- List of Eligible Products: This list is made up of products from an analysis that indicates they meet the three above mentioned characteristics. The list can be enumerated by more in depth analysis by the Association and others that make a quantitative analysis using the three characteristics. Changes in the list can only be made with the written formal approval of the Board of Directors and A.I.D.

* Solanaceas:	Tomato	Sweet Pepper	
* Crucifers:	Cauliflower	Broccoli	Brussel Sprouts
* Berries:	Strawberries	Blueberries	Blackberries
* Fruits:	Pineapple	Citrus*	Bananas
	Grapes		
* Cucurbitaceas:	Honeydew	Watermelon	Caşaba
	Cantaloupe	Squash	Cucumber
* Liliaceas:	Asparragus	Green Onion	Garlic
* Legumes:	Snow Peas	Green Beans	Sweet Peas
	Blackeye Peas		
* Flowers	Carnation	Gladiolas	Roses
	Crisanthemums	Daffodils	
* Ornamentals	Ficus Benj.	Sheffleras	Pine
	Norkolk	Ferns	Masangeana
* Others	Celery	Lettuce	Spinach
	Okra	Beets	

NOTE D: Special Consideration for Refrigerated Transport Investment

Marketing finance under Model B will include special financing for transport companies under the condition summarized below. Because of the importance of the transportation factor for the future of those crops that are capable of repaying irrigation investment, the Project will give special attention to transport finance. Private transport firms will be eligible for tecinical assistance and finance in order to establish new channels for export

*Project assistance for citrus crops will require an AID waiver.

of products in the list. Preference will be given to those companies offering "common carrier" type service with refrigerated trailers or containers by surface through Mexico to the United States. The Project may finance up to \$500,000.00 for up to two or three firms for refrigerated transport.

NOTE E: Selection Criteria for Scoring Proposals

The scoring of bids in the category "marketing", will be conducted keeping in mind the following considerations. No more than 200 points will be given for marketing even though it is the most important of the scored factors. The reason for this is that it is not generally possible to secure a market for a new product without having on hand commercial quantities to place in the market. If market security is overemphasized in the scoring, the selection process will correspondingly give undue preference to companies that have established sales in other products. These companies would be able to obtain letters of intent or other appearances of market security without the substance of security.

Nevertheless, those proposals that present feasible possibilities for channeling products directly to large supermarket chains in the U.S. which avoid wholesale markets or brokers will be given strong preferences in scoring. The grand majority of the products in the list are currently channeled through direct purchase from packers to supermarkets without passing through wholesale markets such as Hunts Point (NY) or Miami. The prices in wholesale markets are relatively unstable and subject to large fluctuations when even minor changes occur in quantities placed in the market. Therefore it is of considerable importance Salvadoran products are channeled around rather than through the restrictive and destabilizing wholesale markets. Developing supermarket confidence is difficult, and preference should therefore be given to those firms that demonstrate capability in creating these vital marketing links. In this way, the project will favor proposals which access direct markets with year round produce, with more stable, albeit lower prices than those which tempt exporters in the volatile but narrow seasonal windows of wholesale markets. With El Salvador's abundant labor supply and consequence low wage rate it should be possible to compete in labor intensive crops even during the U.S. production season.

NOTE F: Bidding and Credit Terms

The selection of the companies and the pilot projects will be in accordance with a system of points. Out of a maximum total of 1,000 points, up to 300 points will be based on the quality of the

proposal as follows: technical feasibility (100), administration (100), and financing (100); 200 points will be based on the certainty of collaboration and the capabilities of the associated farmers; 200 points will be based on the certainty and viability of the market channel in the United States; 200 points for the technical and administrative capacity of the firm; and 100 points for the financial condition and the guarantees offered by the company. Note E contains a more detailed description of criteria for scoring the proposals.

Up to four firms in a single product or product group will be pre-selected and qualified based on the point system. Selection of two final winners among the four will be based on a following competition in the proportion of guaranteed finance each firm requires. The competition will be in the proportion and not the amount to avoid favoring firms simply because they propose small projects which is not in the interest of the Project. In order to make bids in the guarantee competition, firms will have to present letters of intent from competent banks or proof of funds available from other sources certifying the availability of complementary non-guaranteed funds. The idea is that the firm that can and will complement guaranteed financing with normal financing to the largest degree would be the winner.

The guarantee finance competition would take place in two rounds. In the first round, the envelopes containing the proposals will be opened and the contents made known to all the competitors. In the second round, the firms will present new proposals, but these will be restricted to a maximum difference of 10% from the values given in the first round.

As guiding norms, it is estimated that financing will be up to 2.0 million U.S. dollars for each pilot project, comprising U.S. \$ 100-500 thousand in plant, U.S.\$ 500-900 thousand in irrigation installations, and U.S.\$ 400-700 thousand in production credit and marketing. The norm for installation of irrigation systems for pumping from rivers and streams will be U.S.\$ 1.0-2.0 thousand per hectare and for systems using wells U.S.\$ 1.5-2.5 thousand per hectare.

The conditions, period and terms of the financing shall be as follows: (1) Financing for plant at 10% for 15 years, with a six year principal grace period and first payment due 24 months after disbursement of credit; (2) Financing of irrigation systems at 10% for 10 years with a four year principal grace period, first payment due 24 months after disbursement of credit; (3) Production credit

will be for the normal crop gestation period plus 12 months. Grace and first payment period will be for the same period as the loan; that is, the production loans are balloon payment loans normally of one year's duration but longer in the case of crops with longer growing cycle gestation periods. (4) Marketing and transport credit is to be at 10% for one year.

The detailed terms of the guarantee provisions for the irrigation credit are outlined in Note B above.

The guarantee provisions for the plant credit (1) are similar in all respects as to determination of "failure" or "non-failure" but differs in the kind of security instruments required. In the case of packing plant credit, the borrower would execute a note, secured by "hipoteca" on the land and plant, and a "prenda" on equipment and movables financed. Marketing credit would be extended to the packer/processor/exporter in the nature of "pre-embarque" credit with a "prenda" on the produce. Guarantee provisions are the same as described for irrigation credit.

Production credit would be extended to the producers associated with a particular packer/processor/exporter. The packer would present the Association with a list of associated producers who would receive the production credit. The packer would execute a "carta pagadera" to the TBH on behalf of each producer he proposes. The producer (final borrower) would execute a note and a "prenda agraria" as security for the production credit, and the guarantee provisions would be the same as for irrigation credit.

TABLE A
SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US\$000)

PROJECT ELEMENTS	A.I.D.		LC HOST COUNTRY		PROJECT TOTAL
	FX	LC	PART INST	PL480	
<u>I. Public Sector Irrigation Development</u>					
A. Water Mgt. Synthesis II Support (AID)	730.0	—	—	—	730.0
B. Technical Assistance					
- Long Term	2,160.0	—	—	—	2,160.0
- Short Term	810.0	—	88.4	—	898.4
C. Training/Inv. Travel					
- LT & ST International Training	447.0	—	67.3	126.7	641.0
- In-Country Training	—	—	572.4	164.7	737.1
D. Personnel	—	—	133.0	1,664.9	1,797.9
E. Vehicles & Equipment	818.0	—	—	—	818.0
F. Materials & Supplies	—	76.0	—	420.6	496.6
G. Contingency (5%)	248.0	4.1	43.0	119.0	414.1
Total Public Sector Irrigation Dev.	<u>5,213.0</u>	<u>80.1</u>	<u>904.1</u>	<u>2,495.9</u>	<u>8,693.1</u>
<u>II. Private Sector Irrigation Development</u>					
A. Irrigation Assoc. Office Exp.	—	142.0	—	—	142.0
B. Technical Assistance					
- Long Term	1,080.0	—	432.0	—	1,512.0
- Short Term	300.0	300.0	480.0	—	1,080.0
C. Training/Inv. Travel	100.0	—	170.0	—	270.0
D. Vehicles	45.0	—	—	—	45.0
E. Personnel	—	843.0	1,344.0	—	2,187.0
F. Credit Fund/Pilot Projects	—	10,000.0	437.5	—	10,437.5
G. Contingency (5%)	76.0	564.5	143.0	—	783.5
Total Private Sector Irrigation Dev.	<u>1,601.0</u>	<u>11,849.5</u>	<u>3,006.5</u>	<u>—</u>	<u>16,457.0</u>
PROJECT TOTAL	<u>6,814.0</u>	<u>11,929.6</u>	<u>3,910.6</u>	<u>2,495.9</u>	<u>25,150.1</u>

Percent of Total

(75)

(25)

TABLE B
SUMMARY COST ESTIMATE AND FINANCIAL PLAN

INPUTS/ELEMENTS	OUTPUTS	COST						PROJECT TOTAL
		A.I.D.			LC HOST COUNTRY			
		FX	LC	TOTAL	PART	INST	PL-490	TOTAL
I. <u>Public Sector Irrigation Development</u>								
A. <u>WMS II Start-Up Studies, T.A. & Proj. Evaluations</u>								
- Short Term T.A. for Studies	16.5 P/mos.; 5 studies	247.5	—	247.5	—	—	—	247.5
- Other Short Term T.A.	12 person months	180.0	—	180.0	—	—	—	180.0
- Project Evaluations	3 evaluations	202.5	—	202.5	—	—	—	202.5
- Short Term Int'l Training & Inv. Travel	20 person months	100.0	—	100.0	—	—	—	100.0
Total WMS II (AID)		730.0	—	730.0	—	—	—	730.0
B. <u>CENTA</u>								
- Long Term T.A.	71.6 person months	1,074.0	—	1,074.0	—	—	—	1,074.0
- Short Term T.A.	34 person months	510.0	—	510.0	88.4	—	88.4	598.4
- Short Term Int'l Training	24 person months	120.0	—	120.0	31.6	—	31.6	151.6
- Personnel	50 irrigation extensionists	—	—	—	79.0	1,040.0	1,119.0	1,119.0
- Vehicles & Equipment	50 motorcycles, 4 vehicles, irrigation & well drilling equipment,	474.0	—	474.0	—	—	—	474.0
- Materials & Supplies	ADP and video equipment Various	—	76.0	76.0	—	325.3	325.3	401.3
Total CENTA		2,178.0	76.0	2,254.0	199.0	1,365.3	1,564.3	3,818.3

INPUTS/ELEMENTS	OUTPUTS	COST						
		A.I.D.			LC HOST COUNTRY			PROJECT TOTAL
		FX	LC	TOTAL	PART INST	PLABO	TOTAL	
C. ENA								
- Long Term T.A.	48.4 person months	726.0	—	726.0	—	—	—	726.0
- Long Term Training	8 person years	192.0	—	192.0	—	126.7	126.7	318.7
- Short Term Int'l Training	6 person months	30.0	—	30.0	7.9	—	7.9	37.9
- Personnel	5 teaching assistants, 1 MS teacher, 4 returned trained faculty	—	—	—	2.0	468.9	470.9	470.9
- Equipment	Irrigation equipment, ADP, video & teaching labs	194.0	—	194.0	—	—	—	194.0
- Materials & Supplies	Various	—	—	—	—	36.7	36.7	36.7
Total ENA		1,142.0	—	1,142.0	9.9	632.3	642.2	1,784.2
D. DGRD								
- Long Term T.A.	24 person months	360.0	—	360.0	—	—	—	360.0
- Short Term T.A.	16 person months	240.0	—	240.0	—	—	—	240.0
- Short Term Int'l Training	15 person months	75.0	—	75.0	19.8	—	19.8	94.8
- Personnel	4 professional counterparts to long term T.A. (20 p/yrs); 4 professional counterparts to short term T.A. (16 p/mos.)	—	—	—	41.6	156.0	197.6	197.6
- Vehicles & Equipment	4 vehicles, technical equipment, ADP, lab & library	104.0	—	104.0	—	—	—	104.0
- Materials & Supplies	Various	—	—	—	—	48.5	48.5	48.5
Total DGRD		779.0	—	779.0	61.4	204.5	265.9	1,044.9

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INPUTS/ELEMENTS	OUTPUTS	COST						PROJECT TOTAL
		A.I.D.			LC HOST COUNTRY			
		FX	LC	TOTAL	PART INST	PL480	TOTAL	
E. OPSA/MAG								
- Short Term T.A.	2 person months	30.0	--	30.0	--	--	--	30.0
- Short Term Int'l Training	3 person months	15.0	--	15.0	4.0	--	4.0	19.0
- Personnel	8 p/mos. prof counterparts to short term T.A.	--	--	--	5.2	--	5.2	5.2
- Equipment	2 microcomputers	6.0	--	6.0	--	--	--	6.0
- Materials & Supplies	Various	--	--	--	--	2.5	2.5	2.5
Total OPSA/MAG		51.0	--	51.0	9.2	2.5	11.7	62.7
F. OA/MIPLAN								
- Short Term T.A.	2 person months	30.0	--	30.0	--	--	--	30.0
- Short Term Int'l Training	3 person months	15.0	--	15.0	4.0	--	4.0	19.0
- Personnel	8 p/mos. prof counterparts to short term T.A.	--	--	--	5.2	--	5.2	5.2
- Equipment	1 microcomputer	5.0	--	5.0	--	--	--	5.0
- Materials & Supplies	Various	--	--	--	--	1.6	1.6	1.6
Total OA/MIPLAN		50.0	--	50.0	9.2	1.6	10.8	60.8
G. CENCAP								
- Short Term In-Country Training								
- Extender Courses	78 courses	--	--	--	312.0	39.7	401.7	401.7
- Technical Irrigation Courses	6 courses	--	--	--	102.0	12.0	114.0	114.0
- Policy & Planning Seminars	6 seminars	--	--	--	158.4	3.0	161.4	161.4
- Farmer Courses	40 courses	--	--	--	--	60.0	60.0	60.0
- Equipment	Teaching aids	35.0	--	35.0	--	--	--	35.0
- Materials & Supplies	Various	--	--	--	--	6.0	6.0	6.0
Total CENCAP		35.0	--	35.0	572.4	170.7	743.1	778.1

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INPUTS/ELEMENTS	OUTPUTS	COST						PROJECT TOTAL
		A.I.D.			LC HOST COUNTRY			
		FX	LC	TOTAL	PART INST	FL490	TOTAL	
<u>Sub-Total Public Sector (A-G)</u>		4,965.0	76.0	5,041.0	851.1	2,376.9	3,233.0	8,279.0
Public Sector Contingency 5%		248.0	4.1	252.1	43.0	119.0	162.0	414.1
<u>Total Public Sector Irrig. Dev.</u>		5,213.0	80.1	5,293.1	904.1	2,495.9	3,400.0	8,693.1
II. Private Sector Irrigation Development								
- Assist. to Irrigation Association	Functioning Irrigation Association	—	142.0	142.0	—	—	—	142.0
- Long Term T.A. to Irrigation Assoc.	72 person months	1,080.0	—	1,080.0	432.0	—	432.0	1,512.0
- Short Term T.A. (Plus-Tech & Finan. Reviews)	80 person months	300.0	300.0	600.0	480.0	—	480.0	1,060.0
- Short Term Int'l Training	20 person months	100.0	—	100.0	170.0	—	170.0	270.0
- Vehicles	3 vehicles	45.0	—	45.0	—	—	—	45.0
- Personnel								
- Assoc. Staff	3 prof. 169 p/m.	—	108.0	108.0	—	—	—	108.0
- Field Agents	Approx. 60 agents (480 p/yr subsidized)	—	336.0	336.0	1,344.0	—	1,344.0	1,680.0
- Credit Fund/Pilot Projects	Irrigation systems for 2,500 has., 5 production/marketing pilot projects	—	10,000.0	10,000.0	437.5	—	437.5	10,437.5
- Contingency		76.0	564.5	640.5	143.0	—	143.0	783.5
<u>Total Private Sector Irrigation Development</u>		1,601.0	11,849.5	13,450.5	3,006.5	—	3,006.5	16,457.0
<u>Project Total</u>		6,814.0	11,929.6	18,743.6	3,910.6	2,495.9	6,406.5	25,150.1

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TABLE C
PROJECTION OF EXPENDITURES BY FISCAL YEAR
(US \$000)

SOURCE/US	1985	1986	1987	1988	1989	1990	TOTAL
A.I.D.							
A. Public Sector Irrigation Development							
WMS II Support to Project							
- Short Term T.A.	427.5	—	—	—	—	—	427.5
- Project Evaluation	—	52.5	—	75.0	—	75.0	202.5
- Int'l Training	—	20.0	30.0	20.0	20.0	10.0	100.0
Long Term T.A.	—	300.0	900.0	840.0	120.0	—	2,160.0
Short Term T.A.	—	105.0	375.0	150.0	90.0	90.0	810.0
Long Term Training in U.S.	—	32.0	96.0	64.0	—	—	192.0
Short Term Int'l Training	—	45.0	120.0	50.0	20.0	20.0	255.0
Vehicles and Equipment	—	818.0	—	—	—	—	818.0
Materials and Supplies	—	11.4	19.0	15.2	15.2	15.2	76.0
Contingency (5%)	—	90.6	77.0	60.7	13.3	10.5	252.1
Total A.I.D., Public Sector Irrigation Development	427.5	1,474.5	1,617.0	1,274.9	278.5	220.7	5,293.1
B. Private Sector Irrigation Development							
Irrigation Assn. Office Exp.	25.0	25.0	23.0	23.0	23.0	23.0	142.0
Long Term T.A.	—	180.0	360.0	360.0	180.0	—	1,080.0
Short Term T.A.	—	150.0	150.0	112.5	112.5	75.0	600.0
Short Term Int'l Training	—	50.0	30.0	20.0	—	—	100.0
Vehicles	—	45.0	—	—	—	—	45.0
Personal							
- Irrigation Assoc. Staff	10.0	65.0	108.0	108.0	108.0	108.0	507.0
- Private Sector Field Agts.	—	35.0	126.0	175.0	—	—	336.0
R & D Credit Fund							
- Farm Level Irrigation Credit	—	450.0	600.0	450.0	—	—	1,500.0
- Integrated Irrig./Marketing Pilots	—	3,400.0	3,400.0	1,700.0	—	—	8,500.0
Contingency	1.2	220.0	239.9	147.4	21.2	10.3	640.5
Total A.I.D., Private Sector Irrigation Development	36.8	4,620.0	5,036.9	3,095.9	444.7	216.3	13,450.5
Total A.I.D. (I. A+B)	464.3	6,094.5	6,653.9	4,370.8	723.1	437.0	18,743.6

TABLE C
PROJECTION OF EXPENDITURES BY FISCAL YEAR
(US \$000)

SOURCE/US	1985	1986	1987	1988	1989	1990	TOTAL
II. Host Country (LC)							
A. PL-480 (LC)							
Personnel	—	120.7	364.1	357.4	339.2	336.4	1,517.7
Int'l Training	—	26.4	79.2	79.2	79.2	79.2	343.2
In-Country Training	—	31.3	36.7	34.9	30.9	30.9	164.7
Materials & Supplies	—	70.3	70.3	70.3	70.3	70.3	351.3
Total PL-480 (LC)	—	248.6	550.3	541.8	519.6	516.8	2,376.9
B. Participating Institutions							
In-Kind Contributions	—	667.6	849.3	722.8	793.5	691.5	3,724.6
Total Host Country (II A+B)	—	916.1	1,399.5	1,264.6	1,313.0	1,208.2	6,101.5
Host Country Contingency	—	46.0	71.0	63.0	65.0	60.0	305.0
TOTAL PROJECT	464.3	7,056.6	8,124.4	5,698.4	2,101.2	1,705.3	25,150.1

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TABLE D

METHODS OF IMPLEMENTATION AND FINANCE
(US \$000)

<u>INPUTS</u>	<u>IMPLEMENTATION</u>	<u>METHOD</u>	<u>FINANCING</u>	<u>APPROX. AMOUNT</u>
I. <u>A.I.D. Grant</u>				
A. <u>GOES</u>				
Short Term T.A. Start-up And Project Evaluation	Work Order to WSM II Project		Direct Pay	630.0
Long-Term T.A.	Contract with Title XII Univ.		Direct Pay	2,160.0
Short-Term T.A.	Contract with Title XII Univ.		Direct Pay	810.0
Commodities	Contract for Commodities		Direct Pay/Reimb.	894.0
Training/Invit. Travel	Direct Placement		Direct Pay	547.0
Contingency				252.1
Total A.I.D. Grant to GOES				<u>5,293.1</u>
B. <u>FUSADES</u>				
Irrigation Association				
Office Expenses	Non Profit		Direct Reimbursement	142.0
Long Term T.A.	Profit Making Contractor		Direct Pay	1,080.0
Short Term T.A.	Profit Making Contractor		Direct Pay	600.0
Short Term Int'l Training	Direct Placement		Direct Pay	100.0
Personnel	PSC		Direct Reimbursement	843.0
Commodities	Contract For Commodities		Direct Pay/Reimb.	45.0
R & D Credit Fund	Contract		Direct Pay	10,000.0
Contingency				640.5
Total A.I.D. Grant to FUSADES				<u>13,450.5</u>
II. <u>Host Country Counterpart</u>				
GOES Counterpart (PL 480-LC)				2,495.9
Participating Inst's. (In-Kind)				3,910.6
Total Host Country Counterpart				<u>6,406.5</u>
TOTAL PROJECT				<u>25,150.1</u>

FINANCIAL PLAN (FY Oct1-Sep20)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total	Cost/Unit	----- AID TOTALS-----		
WATER MANAGEMENT PROJECT (In U.S. \$000)	Person months or number of Units					PM/Units	US\$	US\$000		
						PM EXPLT	15000	(FX+LC)	(FX)	(LC)
						PM EXPST	15000			
						PM LOCAL	700			
						Tot PM/No	\$/Unit			
MMSII STUDIES, STARTUP & EVALUATIONS										
Required Studies	16.5		0			0	16.5	15000	247.5	247.5
Project Start-up Support	12						12	15000	160	160
Project Evaluations	3.5		5			5	13.5	15000	202.5	202.5
International Training	4	6	4	4		2	20	5000	100	100
							0			0
PUBLIC SECTOR COMPONENT *****										
CENIA										
							0			0
Expatriate TA Long Term (1/2 of 4LT)	12.8	21.6	33.2	4			71.6	15000	1074	1074
Expatriate Short Term TA	3	15	8	4		4	34	15000	510	510
International Prof. Dev.	3	13	4	2		2	24	5000	120	120
Extension Motorcycles	50						50	1500	75	75
Vehicles (All Team vehicles)	4						4	15000	60	60
Irrig Equipment & Supplies (na.)	100						100	1800	180	180
Demonstration well Drilling Equip	1						1	70000	70	70
Micro-Computing Equip	15						15	3000	45	45
Video Extension Equip & Supp.	22						22	2000	44	44
Farmer Scholar Recognition	150	250	200	200	200		1000	76	76	0
							0		0	0
EWA										
							0		0	0
Expatriate TA Long Term (1/2 of 4LT)	3.2	26.4	14.8	4			48.4	15000	726	726
Masters Degree Training	16	48	32				96	2000	192	192
International Prof. Dev.	2	2	2				6	5000	30	30
Irrig Equipment & Supplies (na.)	50						50	1800	90	90
Micro-Computing Equip	20						20	3000	60	60
Video Extension Equip & Supp.	2						2	2000	4	4
Teaching Labs	2						2	20000	40	40
							0		0	0
DSRU										
							0		0	0
Expatriate TA Long Term	4	12	8				24	15000	360	360
Expatriate Short Term TA	2	8	2	2		2	16	15000	240	240
International Prof. Dev.	2	7	2	2		2	15	5000	75	75
Vehicles	4						4	15000	60	60
Equipment Backup for Technicians	3						3	3000	9	9
Micro-Computing Equip	5						5	3000	15	15
Laboratory & Library	2						2	10000	20	20
							0		0	0
USPR/MIG										
							0		0	0
International Prof. Dev.	1	1	1				3	5000	15	15
Expatriate Short Term TA	1	1					2	15000	30	30
Micro-Computing Equipment	2						2	3000	6	6
							0		0	0
Oficina de Aguas MIPUNA										
							0		0	0
International Prof. Dev.	1	1	1				3	5000	15	15
Expatriate Short Term TA	1	1					2	15000	30	30
Micro-Computing Equipment	1						1	5000	5	5
							0		0	0
CENCAP										
							0		0	0
Extender Short Courses	15	15	16	16	16		78	1150		
Technical Irrigation Short Courses	2	2	2				6	2000		
Irrigation Policy & Planning Seminar	2	1	1	1	1		6	500		
Irrigation Scholar Training Courses	6	10	8	8	8		40	1500		
Training Support Equipment	5						5	7000	35	35

FINANCIAL PLAN (FY Oct1-Sep30) WATER MANAGEMENT PROJECT (In U.S. \$000)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total PM/Units	Cost/Unit US\$	----- AID TOTALS-----		
								US\$000		
	Person Months or Number of Units					PM EXPLT	15000	(FX+LC)	(FX)	(LC)
						PM EXPST	15000			
						PM LOCAL	700			
PRIVATE SECTOR COMPONENT *****						0		0	0	
Association Office (Operating Budget)	50	23	23	23	23	142	1000	142	0	142
Expatriate TA Long Term	12	24	24	12		72	15000	1080	1080	
Short term TA (Fin. Review & Tech)	20	20	15	15	10	80	7500	600	300	300
International Prof. Dev.	10	6	4			20	5000	100	100	
Vehicles	3					3	15000	45	45	
Local Staff (3)	25	36	36	36	36	169	3000	507	0	507
Field Agents (50%)	50	180	250			480	700	336	0	336
R&D CREDIT FUND COMPONENT						0		0	0	
Model A Farm Level Irrig. Credit # H	300	400	300	0		1000	1500	1500	0	1500
Model B Integrated Irrig/mkt. Pilots						0		0	0	0
Irrigation Credit # Ha.	600	600	300			1500	1500	2250	0	2250
Packing Plant Credit # Pilots	2	2	1			5	350000	1750	0	1750
Production Credit # Ha.	600	600	300			1500	1000	1500	0	1500
Marketing & Trans. Credit # Ha.	600	600	300			1500	2000	3000	0	3000
Project Funds by Category									0	
WMSII Studies, Startup & Eval.								730	730	0
Public Sector Institutional Dev.								4311	4235	76
Private Sector Institutional Dev.								2810	1525	1285
Irrigation Pilot R&D Credit Fund								10000	0	10000
Project Total								17851	6490	11361
Project Funds by Grantee										
GOES										
Public Sector Inst. Dev. & WMSII								5041	4955	76
Contingency (5% of Public Inst. Dev.)								252	243	4
GOES TOTAL Project Agreement								5293	5213	80
FUSADES										
Private Sector Inst. Dev. & R&D Credit								12810	1525	11285
Contingency (5% of Private Inst. Dev.)								641	76	564
FUSADES TOTAL Project Agreement								13451	1601	11849
GRAND TOTAL AID PROJECT								18744	6815	11929
Irrigation Association Office Expenses										
Office Rental	12000	12000	12000	12000	12000					
MicroComputers	20000									
Office Furniture & Typewriters	7000									
Utilities, Gas, Maintenance	6000	6000	6000	6000	6000					
Office Supplies, Disks & Misc.	5000	5000	5000	5000	5000					
Total Assoc Office Budget	50000	23000	23000	23000	23000					

TABLE C

FINANCIAL PLAN (FY Oct1-Sep30) WATER MANAGEMENT PROJECT (In U.S. \$000)	GRAND TOTAL AID + HOST ***** *****	--HOST COUNTRY--		
		PL 480	Inst. Part.	TOT HC
MSII STUDIES, STARTUP & EVALUATIONS				
Required Studies	247.5			
Project Start-up Support	180			
Project Evaluations	202.5			
International Training	100			
	0			
PUBLIC SECTOR COMPONENT *****	0			
CENTA	0			
Expatriate TA Long Term (1/2 of 4LT)	2139.06	1065.06	0	1065.06
Expatriate Short Term TA	610.3	11.9	88.4	100.3
International Prof. Dev.	151.68	0	31.68	31.68
Extension Motorcycles	300	225	0	225
Vehicles (Li Team vehicles)	90	30	0	30
Irrig Equipment & Supplies (ha.)	184	0	4	4
Demonstration well Drilling Equip	145	0	75	75
Micro-Computing Equip	58.5	13.5	0	13.5
Video Extension Equip & Supp.	63.8	19.8	0	19.8
Farmer Scholar Recognition	76	0	0	0
	0	0	0	0
ENA	0	0	0	0
Expatriate TA Long Term (1/2 of 4LT)	995.34	269.34	0	269.34
Masters Degree Training	535.2	343.2	0	343.2
International Prof. Dev.	37.92	0	7.92	7.92
Irrig Equipment & Supplies (ha.)	92	0	2	2
Micro-Computing Equip	78	18	0	18
Video Extension Equip & Supp.	5.8	1.8	0	1.8
Teaching Laos	40	0	0	0
	0	0	0	0
DGRD	0	0	0	0
Expatriate TA Long Term	524.4	164.4	0	164.4
Expatriate Short Term TA	287.2	5.6	41.6	47.2
International Prof. Dev.	94.8	0	19.8	19.8
Vehicles	90	30	0	30
Equipment Backup for Technicians	9	0	0	0
Micro-Computing Equip	19.5	4.5	0	4.5
Laboratory & Library	20	0	0	0
	0	0	0	0
OSPA/MAG	0	0	0	0
International Prof. Dev.	18.96	0	3.96	3.96
Expatriate Short Term TA	35.9	0.7	5.2	5.9
Micro-Computing Equipment	7.8	1.8	0	1.8
	0	0	0	0
Oficina de Aguas MIPLAN	0	0	0	0
International Prof. Dev.	18.96	0	3.96	3.96
Expatriate Short Term TA	35.9	0.7	5.2	5.9
Micro-Computing Equipment	5.9	0.9	0	0.9
	0	0	0	0
CENCAP	0	0	0	0
Extender Short Courses	401.7	89.7	312	401.7
Technical Irrigation Short Courses	114	12	102	114
Irrigation Policy & Planning Seminars	161.4	3	158.4	161.4
Irrigation Scholar Training Courses	60	60	0	60
Training Support Equipment	41	6	0	6

FINANCIAL PLAN (FY Oct1-Sep30) WATER MANAGEMENT PROJECT (In U.S. \$000)	GRAND TOTAL AID + HOST ***** *****	---HOST COUNTRY---								
		PL 480	Inst.	TOT HC						
					Part.					
PRIVATE SECTOR COMPONENT *****	0	0	0	0	0					
Irrigation Association Office Budget	142	0	0	0	0					
Expatriate TA Long Term	1512	0	432	432						
Short Term TA (Fin Review & Tech)	1080	0	480	480						
International Prof. Dev.	270	0	170	170						
Vehicles	45	0	0	0						
Local Staff (3)	507	0	0	0						
Field Agents (50X)	1680	0	1344	1344						
R&D CREDIT FUND COMPONENT	0	0	0	0						
Model A Farm Level Irrig. Credit # ha.	1625	0	125	125						
Model B Integrated Irrig/Pkt. Pilots	0	0	0	0						
Irrigation Credit # ha.	2437.5	0	187.5	187.5						
Packing Plant Credit # Pilots	1875	0	125	125						
Production Credit # ha.	1500	0	0	0						
Marketing & Trans. Credit # ha.	3000	0	0	0						
0	0	0	0	0						
Project Funds by Category	0	0	0	0						
WMSII Studies, Startup & Eval.	730	0	0	0	0	0	0	0	0	
Public Sector Institutional Dev.	7549.02	0	2376.9	861.12	3238.02	0	0	0	0	
Private Sector Institutional Dev.	5236	0	0	2426	2426	0	0	0	0	
Irrigation Pilot R&D Credit Fund	10437.5	0	0	437.5	437.5	0	0	0	0	
Project Total	23952.52	0	2376.9	3724.62	6101.52	0	0	0	0	
Project Funds by Grantee										
GOES										
Public Sector Inst. Dev. & WMSII	8279.02	0	2376.9	861.12	3238.02	0	0	0	0	
Contingency (5% of Public Inst. Dev.)	414	0	119	43	162	0	0	0	0	
GOES TOTAL Project Agreement	8693	0	2496	904	3400	0	0	0	0	
FUSADES										
Private Sector Inst. Dev. & R&D Credit	15674	0	0	2854	2864	0	0	0	0	
Contingency (5% of Private Inst. Dev.)	784	0	0	143	143	0	0	0	0	
FUSADES TOTAL Project Agreement	16457	0	0	3007	3007	0	0	0	0	
GRAND TOTAL AID PROJECT	25150	0	2496	3911	6407	0	0	0	0	

FINANCIAL PLAN (FY Oct1-Sep30)
 WATER MANAGEMENT PROJECT
 (In U.S. \$000)

Host Country Contribution Distributed by Fiscal Years
 Local Currency Provided from Fresh PL480
 Participating Institution Contribution

	FY 86	FY 87	FY 88	FY 89	FY 90	FY 86	FY 87	FY 88	FY 89	FY 90
M&SI STUDIES, STARTUP & EVALUATIONS										
Required Studies										
Project Start-up Support										
Project Evaluations										
International Training										
PUBLIC SECTOR COMPONENT *****										
CEMIA										
Expatriate TA Long Term (1/2 of ALT)	84.48	247.56	251.62	241.4	240	0	0	0	0	0
Expatriate Short Term TA	1.05	5.25	2.8	1.4	1.4	7.8	39	20.8	10.4	10.4
International Prof. Dev.						3.96	17.16	5.28	2.64	2.64
Extension Motorcycles	45	45	45	45	45	0	0	0	0	0
Vehicles (LT Team Vehicles)	6	6	6	6	6	0	0	0	0	0
Irrig Equipment & Supplies (ha.)						0.8	0.8	0.8	0.8	0.8
Demonstration well Drilling Equip						15	15	15	15	15
Micro-Computing Equip	2.7	2.7	2.7	2.7	2.7					
Video Extension Equip & Supp.	3.96	3.96	3.96	3.96	3.96					
Farmer Scholar Recognition										
ENR										
Expatriate TA Long Term (1/2 of ALT)	1.12	72.34	68.28	64.5	63.1					
Masters Degree Training	26.4	79.2	79.2	79.2	79.2					
International Prof. Dev.						2.64	2.64	2.64	0	0
Irrig Equipment & Supplies (ha.)						0.4	0.4	0.4	0.4	0.4
Micro-Computing Equip	3.6	3.6	3.6	3.6	3.6					
Video Extension Equip & Supp.	0.36	0.36	0.36	0.36	0.36					
Teaching Labs										
DSRD										
Expatriate TA Long Term	32.6	35.4	34	31.2	31.2	0	0	0	0	0
Expatriate Short Term TA	0.7	2.8	0.7	0.7	0.7	5.2	20.8	5.2	5.2	5.2
International Prof. Dev.						2.64	9.24	2.64	2.64	2.64
Vehicles	6	6	6	6	6	0	0	0	0	0
Equipment Backup for Technicians										
Micro-Computing Equip	0.9	0.9	0.9	0.9	0.9					
Laboratory & Library										
DSRA/MAG										
International Prof. Dev.						1.32	1.32	1.32	0	0
Expatriate Short Term TA	0.35	0.35	0	0	0	2.6	2.6	0	0	0
Micro-Computing Equipment	0.36	0.36	0.36	0.36	0.36					
Oficina de Aguas MIPLAN										
International Prof. Dev.						1.32	1.32	1.32	0	0
Expatriate Short Term TA	0.35	0.35	0	0	0	2.6	2.6	0	0	0
Micro-Computing Equipment	0.18	0.18	0.18	0.18	0.18					
DENCAP										
Extender Short Courses	17.25	17.25	18.4	18.4	18.4	60	60	64	64	64
Technical Irrigation Short Courses	4	4	4	0	0	34	34	34	0	0
Irrigation Policy & Planning Seminar	1	0.5	0.5	0.5	0.5	52.8	26.4	26.4	26.4	26.4
Irrigation Scholar Training Courses	9	15	12	12	12					
Training Support Equipment	1.2	1.2	1.2	1.2	1.2					

FINANCIAL PLAN (FY Oct1-Sep30)
 WATER MANAGEMENT PROJECT
 (In U.S. \$000)

Host Country Contribution Distributed by Fiscal Years
 Local Currency Provided from Fresh IL480 Participating Institution Contribution
 FY 86 FY 87 FY 88 FY 89 FY 90 FY 86 FY 87 FY 88 FY 89 FY 90

PRIVATE SECTOR COMPONENT *****

	FY 86	FY 87	FY 88	FY 89	FY 90	FY 86	FY 87	FY 88	FY 89	FY 90
Irrigation Association Office Budget										
Expatriate TA Long Term						72	144	144	72	0
Short Term TA (Fin Review & Tech)						120	120	90	90	60
International Prof. Dev.						65	51	34	0	0
Vehicles						0	0	0	0	0
Local Staff (3)										
Field Agents (50%)						35	186	175	504	504
R&D CREDIT FUND COMPONENT										
Model A Farm Level Irrig. Credit # Ha.						37.5	50	37.5	0	0
Model B Integrated Irrig/Wkt. Pilots										
Irrigation Credit # Ha.						75	75	37.5	0	0
Packing Plant Credit # Pilots						50	50	25	0	0
Production Credit # Ha.										
Marketing & Trans. Credit # Ha.										

Project Funds by Category

	FY 86	FY 87	FY 88	FY 89	FY 90	FY 86	FY 87	FY 88	FY 89	FY 90
WMSII Studies, Startup & Eval.	0	0	0	0	0	0	0	0	0	0
Public Sector Institutional Dev.	248.56	550.26	541.76	519.56	516.76	193.08	233.28	179.8	127.48	127.48
Private Sector Institutional Dev.	0	0	0	0	0	312	441	443	666	564
Irrigation Pilot Credit Fund	0	0	0	0	0	162.5	175	100	0	0
Project Total	248.56	550.26	541.76	519.56	516.76	667.58	849.28	722.8	793.48	691.48

Project Funds by Grantee

GOES

Public Sector Inst. Dev. & WMSI	248.56	550.26	541.76	519.56	516.76	193.08	233.28	179.8	127.48	127.48
Contingency (5% of Public Inst.)	12	28	27	26	26	10	12	9	6	6
GOES TOTAL Project Agreement	261	578	569	546	543	203	245	189	134	134

FUSADES

Private Sector Inst. Dev. & R&D	0	0	0	0	0	475	616	543	666	564
Contingency (5% of Private Inst)	0	0	0	0	0	24	31	27	33	28
FUSADES TOTAL Project Agreement	0	0	0	0	0	498	647	570	699	592

GRAND TOTAL AID PROJECT

	261	578	569	546	543	701	892	759	833	726
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Just Contribution Notes

This assumes 50 irrigation extension agents paid with PL480 + \$350/EXP mo for supplementing materials & services needed in ex
This has the same \$350/EXP mo for extra support of the 4 persons he is assumed to work with out of PL 480. Also assumes 4 sal
This assumes that the part. inst. pays the salaries of those who go out for training, & that they are at the higher end of the
This is for motorcycle maintenance and gas & oil at \$75/mo/cycle
This is for maint, repair & fuel for team vehicles at \$125/mo (vehicles to CENTA when team leaves)
This is for one technician two months each year to repair the irrig equip.
This is for three operating & maintenance technicians and \$50 fuel/mo.
This is for \$10/mo/micro for disks, paper, printers & software
Assumes \$15/mo/videos for tapes parts maint etc.

ENA hires 5 assistants for the five MS profs who are coming back + the standard \$350/EXP mo. supplemental
ENA will pay the 4 MS students salaries while away at \$1320/mo + the 5th MS woman who can start teaching now she already has a
same as int above
One month technician to repair equipment
same as micros above
Same as videos above

The standard \$350 + four counterparts at \$650/mo.
The \$350 PL 480, part inst is 4 counterparts for each mo. of EXP ST
same as int above
same as vehicles above
Same as micros above

Direct costs of meals etc for courses is out of 480, salaries of participants out of part. inst. contribution
same
same
Same, but no part for farmer time
\$20/mo per teaching machine to account for high cost of Xerox machine paper repairs etc.

Host Contribution Notes

Assumes 4 salaries of the private firm people the long term team works with at 1500/mo
Assumes the salaries of four businessmen the SI consultant works with at 1500/mo.
Assumes higher level salary (2500/mo) for businessmen sent out + 4 mo. of involvement on return

Assumes the 50% of additional field agents during subsidy period, and assumes the firms will pick up all costs thereafter for

Assumes the farmer out in 25 days installing the equip/na at \$5/day.

Same as irrigation above
Assumes a \$25,000 investment in site.

125

ess of CENTA budget
aried persons will be trained & their salaries will be met as part. inst. contribution.
salary scale at US\$1320/mo.

er MS

FINANCIAL PLAN (Disbursements FY) Annual Disbursement Estimates
 WATER MANAGEMENT PROJECT Yr 1 Yr 2 Yr 3 Yr 4 Yr 5 Total Pro
 (In U.S. \$000)

WMSII STUDIES, STARTUP & EVALUATIONS

Expatriated Studies	247.5	0	0	0	0	247.5
Project Start-up Support	180	0	0	0	0	180
Project Evaluations	52.5	0	75	0	75	202.5
International Training	20	30	20	20	10	100

	0					0
	0					0

CENYA

Expatriate TA Long Term (1/2 of 4LT)	192	324	498	60	0	1074
Expatriate Short Term TA	45	225	120	60	60	510
International Prof. Dev.	15	65	20	10	10	120
Extension Motorcycles	75	0	0	0	0	75
Vehicles (LT Team Vehicles)	60	0	0	0	0	60
Irrig Equipment & Supplies (ma.)	180	0	0	0	0	180
Demonstration Well Drilling Equip	70	0	0	0	0	70
Micro-Computing Equip	45	0	0	0	0	45
Video Extension Equip & Supp.	44	0	0	0	0	44
Farmer Scholar Recognition	11.4	19	15.2	15.2	15.2	76

	0	0	0	0	0	0
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ENA

Expatriate TA Long Term (1/2 of 4LT)	48	396	222	60	0	726
Masters Degree Training	32	96	64	0	0	192
International Prof. Dev.	10	10	10	0	0	30
Irrig Equipment & Supplies (ma.)	90	0	0	0	0	90
Micro-Computing Equip	60	0	0	0	0	60
Video Extension Equip & Supp.	4	0	0	0	0	4
Teaching Labs	40	0	0	0	0	40

	0	0	0	0	0	0
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DGRD

Expatriate TA Long Term	60	180	120	0	0	360
Expatriate Short Term TA	30	120	30	30	30	240
International Prof. Dev.	10	35	10	10	10	75
Vehicles	60	0	0	0	0	60
Equipment Backup for Technicians	9	0	0	0	0	9
Micro-Computing Equip	15	0	0	0	0	15
Laboratory & Library Support	20	0	0	0	0	20

	0					0
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OSPAN/MAG

International Prof. Dev.	5	5	5	0	0	15
Expatriate Short Term TA	15	15	0	0	0	30
Micro-Computing Equipment	6	0	0	0	0	6

	0	0	0	0	0	0
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Oficina de Aguas MIPLAN

International Prof. Dev.	5	5	5	0	0	15
Expatriate Short Term TA	15	15	0	0	0	30
Micro-Computing Equipment	5	0	0	0	0	5

	0					0
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CENCAP

Extender Short Courses						0
Technical Irrigation Short Courses						0
Irrigation Policy & Planning Seminars						0
Irrigation Scholar Training Courses						0
Training Support Equipment	35	0	0	0	0	35

FINANCIAL PLAN (Disbursements FY) Annual Disbursement Estimates
 WATER MANAGEMENT PROJECT Yr 1 Yr 2 Yr 3 Yr 4 Yr 5 Total Pro
 (In U.S. \$000)

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total Pro
Private Sector Irrigation Association						0
Irrigation Association Office Budget	50	23	23	23	23	142
Expatriate TA Long Term	180	350	360	180	0	1080
Short Term TA (Tech and Fin. Review)	150	150	112.5	112.5	75	600
International Prof. Dev.	50	30	20	0	0	100
Vehicles	45	0	0	0	0	45
Local Staff (3)	75	108	108	108	108	507
Field Agents (50%)	35	126	175	0	0	336
	0	0	0	0	0	0
Model A Farm Level Irrig. Credit # Ha	450	600	450	0	0	1500
Model B Integrated Irrig/Mkt. Pilots	0	0	0	0	0	0
Irrigation Credit # Ha.	900	900	450	0	0	2250
Packing Plant Credit # Pilots	700	700	350	0	0	1750
Production Credit # Ha.	600	600	300			1500
Marketing & Trans. Credit # Ha.	1200	1200	600			3000
						0
						0
	500	30	95	20	0	730
	1311.4	1510	1119.2	245.2	125.2	4311
	585	797	798.5	423.5	106	2810
	3850	4000	2150	0	0	10000
	6246.4	6337	4162.7	688.7	416.2	17851

Project Funds by Grantee

GOES

0	Public Sector Inst. Dev. & WMSI	1811.4	1540	1214.2	265.2	210.2	5041
0	Contingency (5% of Public Inst.)	91	77	61	13	11	252
0	GOES TOTAL Project Agreement	1902	1617	1275	278	221	5293

FUSADES

0	Private Sector Inst. Dev. & R&D	4435	4797	2949	424	206	12810
0	Contingency (5% of Private Inst.)	222	240	147	21	10	641
0	FUSADES TOTAL Project Agreement	4657	5037	3096	445	216	13451
0	GRAND TOTAL AID PROJECT	6559	6654	4371	723	437	18744

ENVIRONMENTAL THRESHOLD DECISION

Project Location : El Salvador

Project Title and Number : Water Management
: 519-0303

Funding : \$8,700,000 (G)

Life of Project : 5 years

IEE Prepared by : C. Roberto Gavidia
USAID/El Salvador

Recommended Threshold Decision : Negative Determination

Bureau Threshold Decision : Concur with Recommendation

Comments : PP design will consider watershed management, pollution of irrigation runoff by leachates and pesticides and their impacts on downstream uses of water, and potential health impacts. PP design team will use AID Environmental Guidelines for Irrigation manual as a reference.

Copy to : Bastiaan B. Schouten,
Acting Director
USAID/El Salvador

Copy to : C. Roberto Gavidia,
USAID/El Salvador

Copy to : Lars Klassen, LAC/DR/CEN

Copy to : IEE File

James S. Hester Date MAR 13 1985

James S. Hester
Chief Environmental Officer
Bureau for Latin America
and the Caribbean

I. BASIC PROJECT DATA

Project Location : El Salvador
Project Title : Water Management
Project Number : 519-0303
Funding : FY-85 - \$3,500,000
: FY-86 - \$5,200,000
Life of Project : 5 years
IEE Prepared by : C. Roberto Gavidia
Environmental Officer
USAID/El Salvador
Date : February 27, 1985
Action Recommended: Negative Determination

II. DESCRIPTION OF THE PROJECT

The purpose of the proposed project is to promote irrigated farming in El Salvador through institution strengthening, technology transfer, farmer training, and an improved policy framework. It will accomplish this through the provision of technical assistance, training, equipment and materials for participating institutions engaged in resource planning, water management, agricultural extension and education. In the long term, the project is expected to stimulate economic recovery by increasing agricultural production and productivity.

In the Office of Water (OA) there will be a need for effective policy formulation on and planning for the uses of the country's water resources to meet the needs of power generation, potable water and sewerage systems, and irrigation systems. The General Directorate for Irrigation and Drainage (DGRD) in the Ministry of Agriculture (MAG) needs to upgrade personnel for developing sound national plans for agricultural water use and for compiling and/or clarifying laws and regulations on water use. The Center for Agricultural Research and Extension (CENEA) needs to develop its investigation and extension capabilities to promote proper on-farm water management and to provide farmers with the necessary services and technology required for successful irrigated farming. The National Agricultural School (ENSA) needs to develop its teaching capability in the irrigation areas in order to help assure a future supply of needed and qualified technicians, extensionists and agronomists with knowledge of irrigation technology.

The institutional development and technology transfer nature of the project requires that funds be provided for long and short term technical assistance and training. The project will fund a contract with a U.S. university for the provision of these inputs, excluding a portion of the short term training to take place in third countries. A major portion of the U.S. training costs will be financed under the Central American Peace Scholarships (CAPS) project. Project funds will also be provided for vehicles, equipment, and materials required by the participating institutions to implement the project.

The MAG will be the primary implementing entity, and the units or agencies that are under its authority -- the DGRD, CENTA, and ENA -- will be responsible for carrying out their respective project components. The DGRD will take the lead role in inter-agency technical coordination for the project implementation, and will establish liaison with the OA.

The total cost of the project is estimated to be \$11.6 million (excluding a grant contribution of \$1.0 million from the CAPS project). AID will provide an \$8.7 million grant in FY 1985-1986 to finance the costs of the technical assistance, a portion of the training, vehicles and equipment, and materials. The Government of El Salvador (GOES) will provide the equivalent of \$2.9 million in local currency to cover costs such as counterpart personnel salaries, salaries of trainees, and materials. The GOES' cash contributions will be covered by P.L. 480 local currency resources. The estimated life of this project is five years.

III. IMPACT AND EVALUATION

Project resources will be made available in the form of technical cooperation and training, in preparing an effective policy formulation on and planning for the uses of the country's water resources to meet the needs of power generation, potable water and sewerage systems, and irrigation systems. As mentioned above, project funds will also be provided for the procurement of vehicles, equipment and materials required by these participating institutions to implement the project. None of the above will have an adverse effect on the environment. On the contrary, it is expected that the project will have a number of positive results.

IV. ENVIRONMENTAL DETERMINATION

The proposed action is not an action which will have a significant effect on the human environment and is, therefore, an action for which an Environmental Impact Statement or Environmental Assessment will not be required. A negative determination is recommended.



Bastiaan B. Schouten
Acting Director
USAID/El Salvador

IMPACT IDENTIFICATION AND EVALUATION

Impact Areas and Sub-Areas Impact Identification and Evaluation¹

¹ The following symbols have been used:

N	<u>No</u> environmental impact	U	<u>Unknown</u> environmental impact
L	<u>Little</u> environmental impact	+	<u>Beneficial</u> impact
M	<u>Moderate</u> environmental impact	-	<u>Negative</u> impact
H	<u>High</u> environmental impact		

A. LAND USE

1. Changing the character of the land through:

- a. Increasing the population N
- b. Extracting natural resources N
- c. Land clearing N
- d. Changing soil character N

- 2. Altering natural defenses N
- 3. Foreclosing important uses N
- 4. Jeopardizing man or his work N
- 5. Other factors N

B. WATER QUALITY

- 1. Physical state of water N
- 2. Chemical and biological states N
- 3. Ecological balance N
- 4. Other factors N

C. ATMOSPHERIC

- 1. Air additives N
- 2. Air pollution N
- 3. Noise pollution N
- 4. Other factors N

D. NATURAL RESOURCES

- 1. Diversion, altered use of water N
- 2. Irreversible, inefficient commitments N
- 3. Other factors N

E. CULTURAL

- 1. Altering physical symbols N
- 2. Dilution of cultural traditions N
- 3. Other factors N

F. SOCIOECONOMIC

1. Changes in economic/employment patterns $\frac{M+}{N}$
2. Changes in population $\frac{N}{N}$
3. Changes in cultural patterns $\frac{M+}{N}$
4. Other factors $\frac{N}{N}$

G. HEALTH

1. Changing a natural environment $\frac{N}{N}$
2. Eliminating an ecosystem $\frac{N}{N}$
3. Other factors $\frac{N}{N}$

H. GENERAL

1. International impacts $\frac{N}{N}$
2. Controversial impacts $\frac{N}{N}$
3. Larger program impacts $\frac{N}{N}$
4. Other factors $\frac{N}{N}$

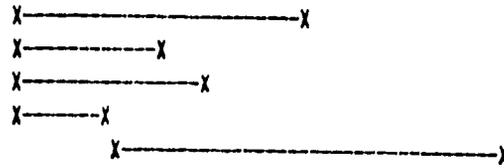
I. OTHER POSSIBLE IMPACTS
(Not listed above)

1. Introduction of new plant species $\frac{N}{N}$
2. Agricultural chemicals $\frac{N}{N}$
3. Other factors $\frac{N}{N}$

MSII REQUIRED STUDIES, STARTUP SUPPORT & EVALUATIONS

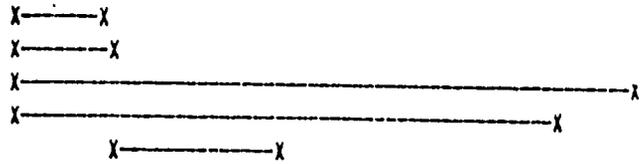
Required Studies Commenced during Intensive Review Period

- 1. Evaluation of Appropriateness of Existing Systems
- 2. Examination of Alternative Extension Approaches
- 3. Farmer Attitude and Need Survey
- 4. The Role of Women in Irrigated Agriculture
- 5. Groundwater Study



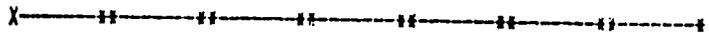
Project Startup Assistance

- 3. Preparation of Public Sector RFP
- 4. Prep. Private Sect. RFP w/ FUSALES & Assoc.
- 5. Assistance to Assoc. in Pilot Design & Proposal Dev.
- 6. Assist Masters Degree Placement & Equip. Procurement
- 7. Policy Seminar & irrig. Short Course (in country)



Project Evaluations

International Training (Short Term)



PUBLIC SECTOR COMPONENT

Selection of Public Sector Univ. Contractor



CENTA

- Expatriate TA Long Term (4 person part time in CENTA)
- Expatriate Short Term TA
- International Prof. Dev.

EMA

- Expatriate TA Long Term (1/2 of 4LT)
- Masters Degree Training
- International Prof. Dev.

DSRD

- Expatriate TA Long Term
- Expatriate Short Term TA
- International Prof. Dev.

DSFA/MAG

- International Prof. Dev.
- Expatriate Short Term TA

Oficina de Aguas MIPLAN

- International Prof. Dev.
- Expatriate Short Term TA

CENCAP (In country short courses)

- Extender Short Courses
- Technical Irrigation Short Courses
- Irrigation Policy & Planning Seminars
- Irrigation Scholar Training Courses

PRIVATE SECTOR COMPONENT

Selection of Private Sector Contractor



Irrigation Assoc. Formation



Expatriate TA Long Term

Short Term TA (Tech & Fin Review)

International Prof. Dev.

Local Staff (3)

Field Agents (50%)



Model A Farm Level Irrig. Credit & Ma.

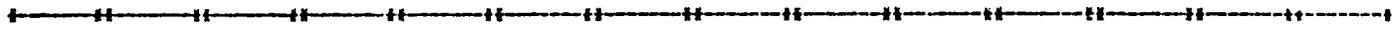
Model B Integrated Irrig/Akt. Pilots



X-Select
X-Select

174

X-Evaluation-X



X- LT Team in CENTA 4/5 time -----XX-----LT Team 1/3 Time in CENTA-----
 X- Short Term Expatriate Assistance Commences - -----
 X- International Professional Short Courses & Site Visits Commence -----

x- Arrival of Long Term Team, Curriculum Design 1 day/wk -----X-----First B.S. Course Yr with Expatriate Tea
 x- English Training-X x- MS Degree Training 1st Yr-----X
 X- International Professional Short Courses & Site Visits Commence -----

X- LT Advisor Arrives-----X
 X- Short Term Expatriate Assistance Commences -----
 X- International Professional Short Courses & Site Visits Commence -----

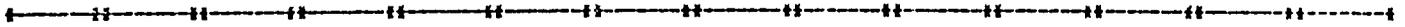
X- International Professional Short Courses & Site Visits Commence -----
 X- Short Term Expatriate Assistance Commences -----

X- International Professional Short Courses & Site Visits Commence -----
 X- Short Term Expatriate Assistance Commences -----

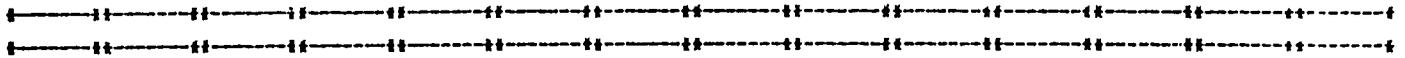
X-Prep-X X-Course-X X- Continuous Series of Courses-----
 X-Course-X X-Course-X X-Course-X
 X-Prep-X X-Seminar-X
 X-Prep-X X-Continuous Series of Courses Commences-----

Arrives and commences work -----
 Pilot Proposals -----
 Commence international Site Visits and Short Courses for Private Sector -----
 Local Staff hired -----
 X-Course-X X-Training Courses-X X-Course-X
 Firms-X X-Irrigation Credit Disbursement -----

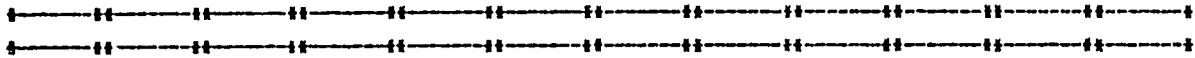
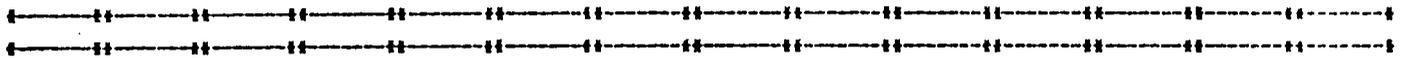
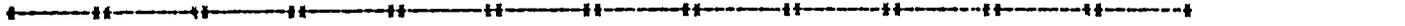
X-Evaluation-X



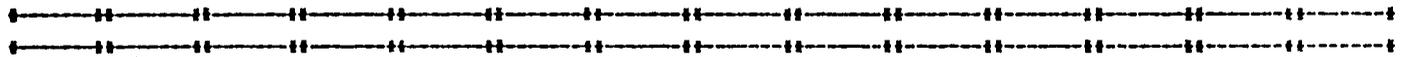
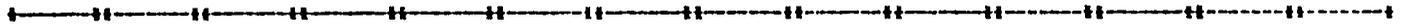
XX-Full Time CETA-XX-1/2 Time CETA



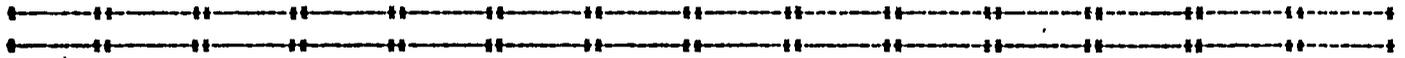
■ -2/3 time in ENA teaching in ENA X X Masters Degree Training 2nd Year X X 2nd Yr B.S. Course LT Team 1/2 Time in Team Teach



X-Seminar-X X-Course-X X-Course-X X-Seminar



X-Seminar-X X-Course-X X-Course-X X- 2 Additional Local Staff Hired X-Seminar



FUSADES INSTITUTIONAL BACKGROUND

In April 1983, as a response to the economic, political and social crisis of El Salvador, a group of more than one hundred Salvadoran businessmen established the Salvadoran Foundation for Economic and Social Development (FUSADES).

FUSADES is a private, non-profit and non-partisan organization. Its activities are financed by contributions of its own members and private corporations and institutions, both local and international.

FUSADES' strategy, based on free enterprise philosophy, is to bring the best values of the private sector into an independent institution with ample credibility and technical capacity, to contribute to the solution of the most important economic and social problems of the country, to benefit all Salvadorans.

The foundation has a staff of professionals in key fields. Its members volunteer their services in commissions which provide guidance to its programs and activities. In its effort to unite the private sector, to promote and strengthen the free enterprise system and to propose solutions to the socio-economic problems El Salvador faces. FUSADES has developed a set of programs which include.

* Economic and Social Research

This Program has been designed to analyze the macro-economic and social situation of El Salvador, so that the interactions within the different sectors of the economy can be studied, and solutions can be offered to major problems. This Program also supports the other Programs by contracting research studies they require on specific matters.

* Trade and Investment Promotion Services (TIPS)

This Program functions as a network of information and promotion for export trade and investment in El Salvador. It is establishing an office in the United States to develop contacts with buyers and investors. The Program contributes funding for most of the costs of technical assistance, feasibility and market studies on viable opportunities for exportation.

* Agricultural Diversification Program

Its goal is to promote exports of agricultural products and to substitute the importation of agricultural goods, encouraging the production of the same in the country.

* Association Strengthening Activities (ASA)

The objective of this Program is to enhance the internal organization of business associations in El Salvador, to improve the effectiveness of their services to their members, and to foster production for exportation.

* Small and Micro Enterprise Promotion (PROPEMI)

The purpose of this Program is to promote the development of small scale businesses through a package of technical assistance, training and credit in order to give them the opportunity to attain financial stability and generate new employment.

TRAINING AND TECHNICAL ASSISTANCE PLAN

<u>Institution/ T.A., Training</u>	<u>P/M of T.A. No. of P. Trained</u>	<u>Description</u>
<u>Public Sector</u>		
<u>CENTA:</u>		
Long Term TA	72 PM	60% of the time of the 4 team members is to be spent in support of CENTA to develop, coordinate and conduct the series of extender courses and policy level basic irrigation agriculture short courses. The expatriate technical assistance team will be made up of professionals with practical field experience with practical field experience in: Irrigation Agriculture, Tropical Export Crop Pathology and Entomology, Rural Organization and Extension, and Export Crop Agro-Business Management.
Short Term TA	34 PM	Various specialists to consult on research and special field problems, help with teaching of extender courses, and provide specialty resource assistance to research and extension.
Short Term International Training	24 PM	Technical courses for research and extension specialists related to export irrigated crops. Site visits and short courses including: 1) Tropical Export Crop Irrigated Agriculture and 2) On-Farm Water Management.

ENA:

Long Term TA	48 PM	40% of the time of the 4 long term technical assistance team members support ENA in establishing an Irrigated Agriculture B.S. degree curriculum, develop and teach courses. The team composition will be the same as listed under CENYA.
Long Term M.S. Training	48 PM 4 P	M.S. Irrigation Agriculture M.S. Tropical Plant Pathology and Entomology. M.S. Rural Organizations and Extension M.S. Agro-Business Management
Short Term International Training	6 PM	ENA faculty will be selected to attend specialty professional development short courses in fields related to irrigated export crop agriculture including: 1) Tropical Export Crop Irrigated Agriculture and 2) On-Farm Water Management.

DGRD:

Long Term TA	24 PM	Irrigation Engineer with broad professional and practical experience in design, contract supervision, operating maintenance and management of systems. He/she will consult on planning and policy issues with OSPA and OA and coordinate needed training and research.
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Short Term TA	16 PM	Ground water Hydrologist to set up national data base and drill test wells, especially in pilot projects. Other consultants will be used for specific development needs in DGRD.
Short Term International Training	15 PM	Site visits and short courses dealing with tropical irrigation project design, development and management including: 1) Tropical Export Crop Irrigation Agriculture, 2) Waterlogging, Drainage, and Salinity Control, 3) Irrigation Design, Evaluation and Scheduling, and 4) Operation and Management of Irrigation Districts.
<u>OSPA:</u>		
Short Term TA	2 PM	Help design and computerize irrigation water planning data bases and develop related irrigation water policy.
Short Term International Training	1 PM	Site visits and short course including: Workshop on Planning and Policy Strategies for Improving Irrigation Agriculture.
<u>QA</u>		
Short Term TA	2 PM	Help design and computerize irrigation water use planning standardized data bases and develop related policy.
Short Term International Training	1 PM	Workshop on Planning and Policy Strategies For Improving Irrigation Agriculture.

Private Sector

ARSP (Via FUSADES)

Long Term TA	72 PM	Two full-time professionals: one high level export crop marketer with commercial experience and contacts and one program coordinator and business manager who will also supervise the Project fund distribution and accounting functions.
Short Term TA	29 PM	Consultant and technical resource help needed to facilitate all stages in the irrigated export crop production, processing and marketing pilots.
Short Term International Training	20 PM	On site visits to operating export crop production processing, research, and marketing facilities.

WMS II START-UP ASSISTANCE PLAN

A. Required Studies

The Project will support a long term research component focused on irrigation policy. This research effort will be supported by the long term advisor to be housed in DGRD. Short term advisers and international training resources will also provide support for the ongoing policy research component.

In addition to the long term policy research component, five specific studies are to be undertaken immediately by WMSII as follow-up on analysis already begun by the Project design team during the development of the Project. These studies are to be completed before the long term technical assistance team arrives on site, and will provide a base line of information and analysis which will help to give direction to Project training activities.

Four of these studies were noted as necessary by the DAEC Guidance cable, presented in Annex 1, and an additional study on groundwater was added by the Project design team.

1. Evaluation of the Appropriateness of Existing Irrigation System Designs

There is considerable under-utilization of existing irrigation systems in El Salvador. The purpose of this study is to examine possible reasons for this under-utilization, and in particular, analyze the appropriateness of the designs utilized for Salvadoran conditions. The study should commence in October 1985 and complete in January 1986. The preliminary findings of the study should be presented at an irrigation policy seminar scheduled under the Project for December 1985. The seminar would be used in part to obtain reactions and ideas on preliminary study data and conclusions and to suggest additional areas needing fuller exploration.

The study will require 3.5 person months of technical services, including an irrigation engineer, a water resource planner, and an irrigation economist.

2. Examination of Alternative Extension Approaches

The extension alternatives study should examine existing public and private sector activities which are related to extending irrigation technology and/or training of farmers in

irrigated agriculture. The purpose of this study would be to test the appropriateness of the extension design elaborated by the Project design team against field more extensive data than available to the team. Modifications in the proposed extension model could be made based on the study at the time the long term team arrives in El Salvador. The study should be conducted during the months of October-December 1985 and will require one person month of an extension specialist.

3. Farmer Attitudes and Irrigation Needs

Farmer involvement in the design, construction, operation and maintenance of irrigation systems are widely believed to be keys in the success of irrigation. Farmer attitudes with regard to irrigation are not well documented in El Salvador, and there is considerable evidence that their expanded involvement is badly needed, particularly in the operation and maintenance of public systems such as Zapotitlan and Anticoyo. This study should conduct a field sample survey of farmer attitudes, needs and benefits from irrigation, and elicit farmer perspectives on possible improvements in the irrigation process from system design all the way to marketing of irrigated produce.

The study should be conducted during the months of October and November 1985 and will involve 1.5 person months of a irrigation sociologist and rural survey specialist.

4. The Role of Women in Irrigated Agriculture

A 1978 study of the role of women in rural enterprises in El Salvador indicated that 38% of these enterprises had women as owners/operators. Many of these businesses were marketing activities which included fruit, vegetable and specialty crops such as those which are the focus of this Project. This study will explore the current and potential role of women in irrigation and irrigated agriculture. The study will make recommendations on how the Project might increase positive impacts on the status and welfare of women.

The study should commence in October-November 1985 and will require one month's services of a rural sociologist.

5. Groundwater Study

Surface water in perennial streams and rivers is generally the easiest and cheapest water resource to harness using pumps or low cost diversions. There are, however, many situations

in El Salvador where highly profitable irrigated crops could be grown where there is no immediate access to surface water. In these situations, groundwater is an obvious choice if an accessible aquifer can be found. There is a serious lack of hydro-geological information on El Salvador which could provide guidance for the exploitation of groundwater. This study should undertake a test exploration and analysis of groundwater resources in various locations throughout the country.

The study should commence by November 1985 and conclude by March 1986. The study will require 9 person months of professional services including specialists from the following fields: hydrology, geology, soils science, agro-meteorology and irrigation engineering.

B. Start-up Support

WMS II will provide technical assistance in five areas to assist the Project during the start-up months before the arrival of the long term technical assistance contractor team. The areas in which assistance is required include the development of the public and private sector RFP's for the long term technical assistance, assistance to the Private Sector Irrigation Association in design and proposal development for pilot projects, irrigation equipment specification and procurement, graduate student placement, and two irrigation short courses in El Salvador.

These activities should commence in October 1985 and be completed by June 1986 when the long term contractor team is projected to arrive. The services will require twelve person months distributed among the following specialties: water resource planner, irrigation engineers, irrigation technician, and a marketing specialist.

Table 1 below outlines the specialists and required person months for each of the studies and start-up support activities. Scopes of work for each of the specialists are also presented below.

1. Water Resources Planner

The expert serving in this position will be responsible for supervising the evaluation of appropriateness of existing irrigation system designs as described above. He will participate in the irrigation policy and planning seminar to be given in El Salvador and present the preliminary results of the study.

The water resource planner will supervise assistance to the Private Sector Irrigation Association in designing and developing proposals for the pilot projects, as described in more detail in Section III. This will involve interaction with the Association officers in El Salvador and with the marketing expert, referred to below, in the U.S.

The Water Resources Planner will be the team leader and direct and coordinate the activities of the other WMSII team members in the various studies and start-up support activities. It is estimated that four person months will be required.

2. Irrigation Engineers

Two experts in irrigation engineering training will be responsible for course preparation and for presenting a three to four weeks course in El Salvador on irrigation water production functions, irrigation scheduling and on-farm water management. These two engineers will advise and assist the other team members and will be assisted by them in presenting the course. They will also work closely with the irrigation technicians.

The irrigation engineers will also be involved in the system evaluation study, the preparation of the RFP's, graduate student placement, and the policy seminar. A total of six person months are required.

3. Hydrologist

The expert serving in this position will be responsible for an in-depth analysis of available information on groundwater in El Salvador. Among other things the expert will indicate areas that appear more favorable for the development of wells for irrigation and/or domestic water supplies and will develop a proposal for drilling test wells to more clearly define the groundwater potential. Requirements for equipment, personnel, supplies and financing are to be developed in sufficient detail that a contract for these services can be negotiated. It is estimated that two months of in-country services will be required.

4. Geologist

The geologist should have a knowledge of soils, geomorphology and the soil forming processes. He will be responsible for correlating geology with soil characteristics, including soil geologic mapping and the geologic origin of the major

alluvial soils areas. The geologist will work closely with an expert serving in the evaluation of the soil characteristics. A total of three weeks will be required.

5. Marketing Specialist

The marketing expert will review the market demands and potential marketing channels in the U.S. and elsewhere for the crops selected for consideration for export in connection with the integrated irrigation pilot projects to be supported by the Private Sector Irrigation Association. The marketing specialist will work closely with the water resources planner. It is estimated that two person months will be required.

6. Extension Specialist

The expert in this position will be responsible for conducting the study examining alternative extension approaches for irrigation in El Salvador, as outlined above. It is estimated that this will require one person month of services.

7. Irrigation Technician

This specialist will work with OA, OSPA, and the Offices for Hydrology and Meteorology in order to develop and establish procedures for managing a meteorological and hydrological data base suitable for supporting the various studies. He/she will develop procedures, computer models and formats for making available information from the data base for use in the groundwater study and in the development and design of pilot areas.

The irrigation technician will also take operating responsibility for the specification and procurement of the equipment required by the Project. It is estimated that four person months will be required.

8. Soils Scientist

The expert in soils will be experienced in soil fertility, have a good understanding of geology, and be familiar with soil survey and land classification procedures. He will evaluate all available results of fertilizer trials, soil testing and results from various field practices. These results are to be related to the geology of the various formations. Recommendations are to be prepared for further programs of soil testing and for applied fertilizer research. It is estimated that one person month of services will be required.

9. Agrometereologic Engineer

An expert in hydrology, meteorology and agrotechnology transfer will be required to prepare rainfall and stream flow monthly probabilities of occurrence at the 5, 50, 75, and 95 percent assured levels. The maximum mean and minimum assured steam flow probabilities are to be shown. For four locations, the daily rainfall records are to be used in order to compare weekly and ten day probabilities with the monthly values.

It is estimated that two weeks in El Salvador will be required to assemble the data required for the studies, and two weeks preparing the report. Computer graphics are to be prepared for the range of probabilities from 5 to 95 percent for the rainfall probabilities for the transition months and those months of significant water deficits due to the "canicula". Graphics are also to be prepared and published. One hundred copies of the rainfall analysis and 100 of the stream flow analysis are to be made available.

10. Irrigation Economist

The economist will be involved in the evaluation of the appropriateness of the design of existing systems and will conduct retrospective cost benefit analysis in order to determine the economic viability of the existing projects and alternative designs. The central responsibility of the economist will be to concentrate on cost considerations in alternative sytems and on marketing constraints as they relate to system design.

11. Survey and Data Processing/Micro Computer Specialist

The data/computer specialist will supervise field data gathering and processing for all of the studies, and will work closely with the irrigation technician on the hydro-meterology data base. 1.5 person months will be required.

Table 1

Specialists Required for Studies and Start-up Support

<u>Column</u>	<u>Study/Start-Up Activity</u>									
(1)	Evaluation of the Appropriateness of Existing Irrigation Systems									
(2)	Examination of Alternative Extension Approaches									
(3)	Farmer Attitudes and Needs Survey									
(4)	The Role of Women in Irrigated Agriculture									
(5)	Groundwater Study									
(6)	Preparation of Public and Private Sector RFP's									
(7)	Assistance to the Irrigation Association on Pilot Projects									
(8)	Graduate Student Placement & Equipment Procurement									
(9)	Irrigation Short Course and Policy Seminar									
	<u>Study/Activity Number</u>									
<u>Person Months</u>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	<u>Total</u>
Water Res. Planner	1.0					1.0	1.0	.5	.5	4.0
Irrig. Engineers	1.0					1.0	.5	.5	3.0	6.0
Irrig. Techn					2.0			2.0		4.0
Hydrologist					2.0					2.0
Geologist					3.0					3.0
Soil Scientist					1.0					1.0
Agro-Meteorologist					1.0					1.0
Irrig. Sociologist			1.0	1.0						2.0
Exten. Specialist		1.0								1.0
Marketing Spec.							2.0			2.0
Irrig. Economist	1.0									1.0
Survey/Data Spec.	.5		.5	.5						1.5
Totals	3.5	1.0	1.5	1.5	9.0	2.0	3.5	3.0	3.5	28.5

C. International Training

WMS II will be responsible for providing guidance and support for international training and site visits for both public and private sector officials, as requested by AID and the involved institutions. A total of 20 person months of international training will be provided through WMS II over the LOP.

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REVIEW OF DRAFT WATER LAW

(The following is an opinion by David Rainey Daines, as an expert consultant on comparative water legislation, regarding the adequacy, sufficiency, advisability and effect of enactment of a document entitled, "Proyecto de Ley Especial de Aguas", dated April 1985, of the Government of El Salvador. The documents examined as the basis for this review and legal opinion are: (1) the DAEC guidance cable on the subject, "Guidance for Design of Water Management Project," from AID/W to USAID/El Salvador; (2) "Decreto No. 153," dated November 11, 1970, consisting of 34 pages and 109 articles, with references herein preceded by "L"; (3) "Reglamento General de la Ley de Riego y Avenamiento," (or, "Decreto No. 17"), dated March 9, 1973, consisting of 39 pages and 141 articles, with references herein preceded by "R"; and (4) "Proyecto de Ley Especial de Aguas," dated April, 1985, consisting of 101 pages and 199 articles, with references herein preceded by "D".)

Overview of Effect of Draft Law

If enacted, the draft law would not totally void either the law of 1970 or its regulation and would only do so to the extent that the present law and regulations affirmatively conflict with specific objectives of the new law (D 198). A key example of the importance of the practical effect of this principle is found in the analysis of whether and how much the government entity must compensate a private user when his use right is "expropriated" by the state entity. The draft law outlines a process and grounds for the expropriation but is silent as to whether or not there is to be compensation. It is my opinion that the provisions of the law and regulations which affirmatively provide for compensation would basically remain in effect if the draft were adopted. Many provisions of the draft make express references and incorporations of the law and regulations.

To the extent that the new law conflicts with the effect of the present regulation but is in harmony with the framework of the 1970 law, then the draft would have the effect of amending the 1973 regulation but not the 1970 law. New principles found in the draft which are clearly in conflict with the 1970 law and its regulations will generally be molded into important central principles of application not in the draft law itself but in the regulations which must be in general harmony with the broad policy principles set forth in the new law.

It should be noted that the above is a technical legal analysis of legislation and regulatory principles applied to "Roman Civil Law" systems found in Latin America but in practice there is a strong tendency for legislation and regulations to be interpreted on the basis of shifting political exigencies and not on the basis of these recognized Latin law principles stated in the previous paragraphs.

The draft is designed as a framework for an integrated policy for multiple uses of water, whereas L 70 and R 73 are directed only to irrigation and drainage. The draft does not materially alter the basic water allocation principles found in the 1970 and 1973 enactments. One notable exception is the provision of the draft which incorporates private works into the public domain without compensation when the concessions terminate and a marked tendency to incorporate other property such as beds and banks of streams into the public domain which were likely private property under the provisions of the civil code.

The Effect of the Draft on Private Pump and Sprinkle Systems

I am advised that the basic purpose of this opinion is to evaluate the impact of the law and the draft upon the legal feasibility of the Project which would, as part of its overall objectives, promote private pump and sprinkle irrigation activities from wells and surface sources to support export food production. The key elements examined in the draft which bear upon this feasibility relate to security and dependability of the associated water right and freedom from unreasonable expropriation and loss of water rights and investments in infrastructure without compensation.

The principal elements of insecurity of water rights is in the fact that concessions are granted for discretionary periods of from 5 to 50 years. This is found in the 70 law and 73 regulations and is unchanged in the draft. However, the user has a strong preference on renewal where the only substantial risk of non-renewal appears to be whether the lapsing concession has been reasonably used in the past and that the need continues into the future. It is my opinion that the risk of non-renewal does not insert such an element of risk as to render the subject Project infeasible for this reason.

The draft introduces the reversion of private "works" or real property attachments to the state when a concession terminates without compensation. Provided that the equipment (pumps, pipes and

sprinklers) which constitutes the principal capital investment for the proposed Project are not fixed to the real property ("muebles") this risk element in my opinion does not render the subject Project infeasible. This problem may have a much more deleterious effect on providing incentives for other types of projects.

Commentaries

I would not anticipate that regulations of the draft as they relate to irrigation would be very extensive since the 70 law and regulations are expressly incorporated to the extent not in conflict, but would be more extensive as they relate to other uses.

Users are compelled to associate together in associations and receive an aggregate concession from the water authority. The basis upon which the users individually receive their water is not specified and there may be considerable latitude in the majority rule as to whether it may be taken in continuous flow, turns and turn intervals.

The draft and law also appear to create an incredible bureaucratic overload and complexity for a country the size of El Salvador, in my opinion.

The structure of the water allocation administrative authority under the draft is cumbersome. The granting of concessions and permits to use water from a single water source is fractured out and resides in as many ministries and agencies as there are uses. This is in fact the opposite of coordination. This element in the law also creates direct conflicts in the important administrative-judicial function of water allocation under the law since the concession granting agencies are also primary users of water for those uses in direct competition with private users who may apply for or oppose concessions.

I have conducted extensive empirical studies comparing actual practices in water allocation in the field in Andean Countries which strongly indicate that in private and public irrigation sectors reality bears little or no resemblance to formal legal and regulatory pronouncements. I doubt that the principles found in the 70 law or its 73 regulations have ever had any measurable impact on altering the customary practices in any water source in El Salvador. I have even more serious doubts that the 85 draft, even if adopted, will ever be implemented in a meaningful way so as to alter existing customary practices. The continuation of customary

allocation is probably more favorable to Project implementation than the implementation of the formal draft law. I believe that the structure of the water allocation authority under the draft is the result of a ministerial-level power, budgetary and turf wars which commonly occur at this stage of legislation drafting and that a truly workable administrative water authority is and will continue to be of very low political priority in El Salvador.

Conclusion

It is my opinion that the present and proposed water legislation and regulation in El Salvador would not render infeasible a Project which in part depended upon private pump irrigation from surface and subsurface water sources. If the law, regulation and draft principles were to be substantially and oppressively implemented, the major Project investments in pumps, pipes and works could be substantially salvaged as personal property even if arbitrary administrative authority were to be exercised in derogation of basic project water rights. It is my opinion, at the level of a reasonable professional probability, that the potentially constraining provisions previously detailed will not be sufficiently implemented in the sources from which projects will obtain their water so as to materially alter the customary practices of water allocation which have traditionally prevailed. Project participants should nevertheless comply with the concession acquisitions requirements of the law even if it is never effectively implemented but should pay careful attention to a recognition by other competitive users in the water source that their proposed uses will also be recognized under common practices in that particular water source or that they will not be actively opposed in the new project use initiative.

It is my opinion that the legal and institutional reality regarding water rights in El Salvador is not materially different from the situation in most other developing countries where international donors support irrigation projects with loan or grant funds.

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