

UNCLASSIFIED

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

PROJECT PAPER

EL SALVADOR

Small Farm Irrigation Systems

AID/LAC/P-001

Project Number: 519-0184

UNCLASSIFIED

I. PROJECT SUMMARY

AGENCY FOR INTERNATIONAL DEVELOPMENT		1. TRANSACTION CODE		PP
A. PROJECT PAPER FACESHEET		A	A = ADD C = CHANGE D = DELETE	2. DOCUMENT CODE 3
3. COUNTRY/ENTITY El Salvador		4. DOCUMENT REVISION NUMBER 1		
5. PROJECT NUMBER (7 digits) 519-0184		6. BUREAU/OFFICE A. SYMBOL LA B. CODE 05		7. PROJECT TITLE (Maximum 40 characters) SMALL FARM IRRIGATION SYSTEMS
8. ESTIMATED FY OF PROJECT COMPLETION FY 83		9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY 78 B. QUARTER 4 C. FINAL FY 78 (Enter 1, 2, 3, or 4)		

10. ESTIMATED 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	665	1,635	2,300	665	1,635	2,300
(GRANT)	()	()	()	()	()	()
(LOAN)	(665)	(1,635)	(2,300)	(665)	(1,635)	(2,300)
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY		2,000	2,000		2,000	2,000
OTHER DONOR(S)		1,200	1,200		1,200	1,200
TOTALS	665	4,835	5,500	665	4,835	5,500

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY <u>78</u>		H. 2ND FY		K. 3RD FY	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN	201		064		2300				
(2)									
(3)									
(4)									
		TOTALS		2,300					

A. APPROPRIATION	N. 4TH FY		O. 5TH FY		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	D. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) FN						2300	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> MM YY 02 80 </div>
(2)							
(3)							
(4)							
		TOTALS				2,300	

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

2 1 = NO
2 = YES

14. ORIGINATING OFFICE CLEARANCE		15. DATE DOCUMENT RECEIVED IN AID/W. OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION	
SIGNATURE 		DATE SIGNED	
TITLE Aldelmo Ruiz Director		MM DD YY 06 13 78	
		MM DD YY 06 15 78	

PROJECT PAPER
SMALL FARM IRRIGATION SYSTEMS
US \$2,300,000
FY 1978

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B. Recommendations

Loan: U.S. \$2,300,000

1. Terms:

Total period	20 years
Grace period	10 years
Amortization period	10 years

Interest rates

2% during grace period
3% during amortization period

2. Disbursement Period:

Five (5) years

3. Obligation Year:

FY 1978

C. Description of the Project

The proposed loan project will expand the capability of the GOES to assist low income small farmers obtain and utilize needed water resources. The project will be implemented throughout the country wherever feasible small scale appropriate technology irrigation projects may be undertaken with the target group and where sufficient community interest exists to provide the necessary self-help local labor and materials for construction.

The project will include the following: (1) establishment of a project office (to be named the Office of Small Scale Irrigation Systems - OSSIS) for implementation control; (2) construction of approximately 5,000 hectares of small scale irrigation systems; (3) training of approximately 100 extension agents in water and land use management; (4) short-term training in irrigation science of approximately 4 engineer-agronomists attached to the OSSIS; (5) approximately 48 person-months of technical assistance in the form of a long term project advisor from the U.S. to assist in the supervision and coordination of all implementation activities; (6) approximately 12 person-months of short-term technical assistance to assist the project advisor in implementation and evaluation of the project; (7) construction materials and equipment; (8) community labor and materials; and (9) GOES salaries and operating expenses applied to the project in the activities of community organization and development, engineering and design work, and construction supervision.

Small farmer groups that participate in the project will not be required to pay costs of the irrigation systems constructed. [The GOES will in effect grant the cost of each system to the community.] [Each community will, however, provide all the required labor for its system construction plus additional local materials.]

[Project implementation will be jointly shared by the Division of Irrigation and Flood Control (DGRD) of the Ministry of Agriculture and Livestock (MAG) and the Community Development Division (DIDECO) of the Ministry of Interior (MOI).]

To effect project implementation a project office will be established. The project office will be named the "Office of Small Scale Irrigation Systems" (OSSIS) and will effectively function as an additional office and be indirectly responsible to the Directors of DGRD and DIDECO and directly responsible to a Project Committee to be formed by representatives of the Mission, DGRD, and DIDECO. The OSSIS will be staffed by personnel from both DGRD and DIDECO and funded by budgetary allocations from each division (see Annex 9 for a delineation of the proposed personnel to be assigned to the OSSIS). The DGRD engineers assigned to the staff of the OSSIS will have the responsibility for drawing up plans and detailed specifications for each subproject. Members of the OSSIS, also detailed from DGRD, will supervise the actual construction of the subprojects and provide subsequent technical assistance to the beneficiaries in the maintenance and operation of their irrigation systems.

DIDECO will provide community organization support services and organize the labor force in each community using its current staff of 62 promoters spread throughout 5 administrative regions and 62 local zones. Each promoter will determine community interest for a small scale irrigation project by developing contacts with the local leadership and then informing the OSSIS of this interest, prompting a feasibility analysis by DGRD's engineers assigned to the OSSIS. Following determination of technical feasibility (principally determining whether there is enough water supplied by the source -- river, stream, reservoir, spring etc. - to irrigate the area of land contemplated and whether the site lends itself to simple and uncomplex construction methods and materials), the OSSIS, in connection with DIDECO and DGRD's economic staffs, will determine the economic feasibility of the subproject. DIDECO's promoters then will organize the local labor force in connection with the community leadership, set up a water user's association and, in general, serve as a link to the OSSIS for the community and the subsequent construction of the irrigation subproject.

Participating in the implementation of the project will be the National Center for Agricultural Research (CENTA) which will provide

approximately 100 extension agents to be trained in water and land use management during the first 3 years of the project. These extension agents will remain under the direction of CENTA and be funded out of CENTA's budget allocation from the GOES.

Additionally, the MAG will have a role in the project by providing market information to the OSSIS on basic grains, fruits and vegetables. A portion of the personnel of the project office will devote time, as needed, to providing subproject beneficiaries, through DIDECO's promoters, advice on marketing problems and general market information on the crops planted in each subproject. The promoters, in their turn, will maintain detailed information on before and after irrigation conditions in their subprojects and provide this information to the relevant personnel in the OSSIS. The promoters also will assist in the evaluations of the project by this provision of data and their contact with the communities and subprojects.

Loan financed technical assistance provided by the project advisor, in addition to the construction materials, equipment and training financed by the loan, together with GOES budget and staff support will strengthen the institutional capacities of DGRD and DIDECO. The training provided to the extension agents of CENTA will add to their capabilities and provide a new facet to that institution's capacity for reaching the small farmer target group.

All project activities will be oriented toward serving the small farmer sector throughout the entire country. This group is almost entirely dependent upon marginal or subsistence agriculture for its livelihood, cultivating for the most part, parcels of land averaging 2 hectares or less and earning per capita yearly incomes of less than \$200. For a very detailed and thorough socio-economic description of the target group please see the USAID/El Salvador, Agricultural Sector Assessment pp. 19-57 (June 1977). Part III.C., "Social Analysis" also contains additional information on the socio-economic conditions of the target group.

D. Summary Findings

The USAID/El Salvador Project Development Committee has reviewed the technical, financial, economic and social aspects of the proposed project. On the basis of this review and the investigations of specialized consultants, the Committee recommends that the proposed loan be authorized. The Committee believes that all technical and administrative barriers to the successful implementation have been addressed.

The project meets all applicable statutory criteria (see Annexes 6 and 7). The Mission Director's 611(e) certification is included as Annex 5. State cable 299091 (12/9/76) stated that the IEF recommendation of the AA/LA was a Negative Determination.

E. Project Issues

1. Expansion of GOES Capability to Address the Need for Small Irrigation Systems.

The Ministry of Interior and the Ministry of Agriculture have indicated their desire to continue to serve the small farm sector's need for appropriate, small scale irrigation systems.

Prior to the development of this project, DIDECO of the Ministry of Interior had undertaken several small scale irrigation projects in different areas of the country. These projects were all quite simple in design and construction and involved a substantial amount of self-help community organization and labor. DIDECO is interested in expanding its capability to serve the small farm sector by providing increased funding for additional small scale irrigation projects. The increased institutional capacity of DIDECO, as a result of its participation in this project, is expected to facilitate AID and other donor follow-on activities in small scale irrigation systems development.

The Ministry of Agriculture, through DGRD, has worked with DIDECO on the design, surveying and construction supervision of six small scale irrigation projects. DGRD has indicated to the USAID a desire to increase its activities in small scale irrigation. This will be evidenced by its participation in the OSSIS to be established.

2. Is DIDECO the Appropriate Institution for this Activity?

DIDECO is directly charged by the GOES through Decree Law 425 with undertaking community development in El Salvador. DIDECO organizes communities and coordinates their activities in diverse types of community development projects. DIDECO has, to date, undertaken six successful small scale irrigation projects and is interested in continuing to develop more small irrigation projects throughout the country.

3. Subproject Financing.

The project as designed proposes that the GOES grant the materials and technical assistance to project beneficiaries. DIDECO and DGRD will, through the OSSIS provide administrative and technical support in addition to logistical support to each subproject that is developed. The beneficiaries will not be expected to pay these costs in the form of amortizations of the total subproject cost. This essentially follows the policy of the GOES Ministry of the Interior and that of DIDECO when it was attached to the Ministry of the Presidency. In subprojects such as those previously carried out by DIDECO and envisioned in this loan, the GOES has always provided approximately 40% of the total subproject cost covering, principally, materials not available at the subproject

site, equipment and technical assistance. The communities have supplied the remaining 60% of the subproject cost through self-help labor and provision of local materials. The 40% provided by the GOES has been treated as a government program for the development of the sector and for the benefit of the area's inhabitants instead of being viewed as investments which had to be repaid by the particular beneficiaries of each subproject.

Both DIDECO and DGRD have given the Mission assurances that sufficient budgetary support will be made available to continue the type of small scale irrigation projects envisioned under the loan. As mentioned previously DIDECO has been engaged in developing small scale irrigation projects for the past several years and has indicated to the Mission a desire to continue and expand this activity.

Maintenance of the physical infrastructure does not depend directly on the charging of water rates. By law, DGRD has the responsibility for maintaining irrigation infrastructure within the country's irrigation districts and for providing technical assistance to the beneficiaries of subprojects that lie outside of the major irrigation districts. DGRD has indicated that no problems exist with regard to providing technical assistance for maintenance to the beneficiaries of the subprojects proposed under the loan.

DGRD will assume responsibility for providing technical assistance in repair work and heavy maintenance chores such as providing for the general upkeep and repair of diversion structures, spillways and main canals. This will be coordinated by the OSSIS. The beneficiary communities will be generally responsible for light maintenance such as minor repairs to canals, removing silt buildups and upkeep of secondary and tertiary canals feeding directly into land being cultivated. It should be kept in mind that every subproject envisioned by the loan will be extremely simple and appropriate in terms of technology used, manner of construction, and resulting upkeep maintenance and repair needs. Much of the probable maintenance will be easily within the ability of the small farmer beneficiaries. Continued maintenance by subproject beneficiaries is not expected to be a problem since each community will have a large stake in the continued, effective operation of its system. The six small scale irrigation subprojects which DIDECO has developed so far have all been reasonably well maintained by the beneficiaries with no undue problems.

4. Compliance with Section 611 of the FAA.

Pursuant to the suggestion made at the DAEC Review of the PRP, DGRD has been treated as an ICI with respect to an analysis of its capability to carryout feasibility studies and designs under the proposed project.

The engineering designs and plans for the irrigation sub-projects planned under the loan are very straightforward and uncomplicated. DGRD has developed experience in small scale irrigation design by

working with DIDECO on six previous small irrigation subprojects and has the plans and blueprints of these designs on file at its central office. Annex 25 contains illustrative irrigation system plans of the type to be developed under the proposed project. Mission project development committee personnel, including the Mission engineer, have interviewed members of the staff of DGRD's engineering department and have determined that the capability for appropriate design and engineering feasibility work on small scale projects already exists.

The Mission contracted the U.S. project advisor currently supervising a similar small scale irrigation loan project in Guatemala to determine, among other things, the engineering design and feasibility determination capacity in DGORD. Upon investigation of DGORD's engineering department, this advisor determined that DGORD had more than sufficient capability to undertake the type of designs proposed. Compliance with Section 611(a)(1) thus represents no problem with regard to the implementation of this project.

No further legislation is required to implement this project. Decree Law Number 153 dated November 1970, is the basic irrigation law of El Salvador and does not require any amendment given the present project design. The project thus complies with section 611(a)(2)

Section 611(b) compliance is demonstrated in Part III.D. "Economic Analysis" and its relevant annexes where benefit-cost ratios for the project are discussed.

Compliance with Section 611(c) and (d) represents no problem since construction of the small scale irrigation systems will be principally undertaken by each local community after presenting an application to DIDECO for which technical and economic feasibility will be established. The project as designed thus complies with Section 611(d).

F. Capital Assistance Committee:
(Alphabetical order)

1. USAID/El Salvador:

Bob Gavidia (Mission Engineer)
Mark Karns (Capital Projects Development Officer - Chairman)
G. Frank Latham (Financial Analyst)
Jesse R. Moffett (Rural Development Officer)
Bill Oglesby (Assistant Program Officer)
Dwight Steen (Agricultural Economist)

2. Project Development Consultants:

Dale Alred, Irrigation Engineer
Samuel Daines, Samuel Daines Assoc.
Bert Embry, Utah St. University

3. Reviewed by:

Larry T. Armstrong, (Capital Resources Development Officer)

4. Approved by:

Aldelmo Ruiz, Director

II. PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Project Background

1. Summary of the Problem.

As pointed out in the Agricultural Sector Assessment, El Salvador's agricultural land base is a severe constraint in an economy and society where the livelihood and standard of living for three of every four people is largely dependent upon agriculturally related activities. It will be an acutely critical constraint by the year 2000 when the population will exceed eight million unless there are revolutionary changes in land use. Land must be farmed intensively utilizing a high value crop mix and irrigation wherever possible and cultivated under strict conservation practices. The urgency of concentrating all possible resources toward achieving optimal land use is clearly demonstrated by the fact that El Salvador's total land area of 2,098,800 hectares represents only about .5 hectare per capita. By the end of the century it will be about .25 hectare per capita. In the Central American context, El Salvador occupies only four percent of the land area but possesses twenty-five percent of the region's population. Table 1 serves to show, also, that El Salvador's population carrying burden per arable hectare is one of the highest in the world, more than double the Latin American average, and higher than such countries as India and Taiwan. The arable hectare in El Salvador must support ten times as many people as an arable hectare in Canada and almost five times as many people as an arable hectare in the U. S..

Table 1
Comparisons of Population Carrying Burden of Agricultural
Land for Selected Countries in 1970
(Population per Arable Hectare)

Japan	7.78
Israel	6.68
El Salvador	4.98
Taiwan	4.96
Guatemala	3.25
India	3.20
Latin Amerca Ave.	2.19
Mexico	1.98
United States	1.09
Argentina	0.72
Canada	0.48

SOURCE: Calculations based on FAO Production Yearbook Vol. 23, Rome, 1970

The rate of growth of population since 1970 has been significantly higher than Japan and Israel with the result that El Salvador today is even closer to their population densities and will in the near future pass these countries in population density if its population growth rate remains unchecked.

El Salvador's human resources can be a key element in helping the country to deal with severe land and climatic constraints. It is true that the long (6 month) dry season limits year around production of annual crops, but institution of irrigation, drainage and land reclamation projects can utilize a high amount of human labor and lead toward eventual increased productivity of labor.

In El Salvador, the major portion of land suitable for cultivation is now in production. Output increases brought about by improved yields (i.e. new seeds, more fertilizer, pesticides, etc.) will not be sufficient to provide both the necessary food for a rapidly growing population and have a desirable impact on the badly distorted income distribution. This is not to say that increases of this nature, including multi-cropping, will not have impacts, for they will, however, to meet the stated objectives of increased productivity and productivity, and to make yield increasing and multi-cropping more effective, El Salvador must expand the land area under cultivation, permitting a second and even third crop per year where conditions are possible.

Since the major portion of the land suitable for cultivation is now in production, output increases brought about by improved yields (i.e. new seeds, more fertilizer, better pesticides, etc.) will not be sufficient to provide both the necessary food for a rapidly growing population and have a desirable impact on the badly distorted income distribution. This is not to say that increases of this nature, including multi-cropping, will not have impacts, for they will, however, to meet the stated objectives of increased productivity and productivity, and to make yield increasing and multi-cropping more effective, El Salvador must expand the land area under cultivation, permitting a second and even third crop per year where conditions are possible.

Of the approximately 17,000 hectares of irrigated land in El Salvador (1971 Agricultural Census), only about 10,000 are irrigated. The Instituto Agrario reports that there is only sufficient water to irrigate 94,000 hectares. It further reports that 10,000 of these hectares are located on small scale farms and that only 10,000 of these themselves only to small scale farms of the type to be developed in this proposed project.

The need to expand land use to the small scale farms equally dictates the need to develop the proposed irrigation project. There is, at present, only an estimated 10,000 hectares of irrigated land in the small scale farms. The proposed project would

double that amount, permitting increased numbers of small farmers to diversify their output, increase their yields and produce a second and third crop per year.

As stated in the DAP and the Agriculture Sector Assessment, the Mission's overall objectives are to: 1) provide for more rapid growth of gross national product, and 2) raise incomes of lower income earners. For the agriculture sector, this will require increases in production, productivity, and income of the small farm sub-sector. This project will contribute to the agriculture sector goal by helping small farmers obtain and effectively use additional water resources.

2. Development of the Project.

The Mission first identified this project in early 1976 during a number of project identification meetings held with a wide range of GOES officials. The Mission submitted a PID with the FY 78 ABE. Upon approval of the PID the Mission presented the PRP in November 1976 which also was approved for intensive review.

In order to proceed with the development of the project, it was decided that a survey would be conducted to estimate the total area which could be irrigated using the small-scale systems contemplated. A description of the survey and its findings are contained in Annex 16.

In late 1977, the Mission was informed by the GOES that one of the proposed implementing agencies, Dirección General de Fomento y Cooperación Comunal (FOCCO) was to be moved from the Ministry of the Presidency to the Ministry of the Interior. Consequently, discussions with FOCCO on development of the project were delayed until early 1978 when the move was completed. FOCCO is now known as the Dirección General de Desarrollo Comunal (DIDECO). Once DIDECO was organized, discussions continued with its personnel as well as with the Dirección General de Asesoría Técnica (DGAT). These discussions culminated in the development of this project paper.

B. Detailed Description

1. Logical Framework Matrix

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

Life of Project: From FY 1978 to FY 1983
Total U.S. Funding \$2.3 million
Date Prepared: June 27, 1978

Project Title & Number: Small Farm Irrigation Systems 519-0184

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS	PAGE 1
<p>Program or Sector Goal: The broader objective to which this project contributes: (A-1)</p> <p>To increase production, productivity, and income of the small farm sub-sector.</p>	<p>Measures of Goal Achievement: (A-2)</p> <ol style="list-style-type: none"> 1. Increases in crop yields over base yr. 2. Crop mix changes. 3. Changes in livestock held due to increased irrigated pasture area. 4. Increased income: <ol style="list-style-type: none"> a) income impacts for small farms (i.e. those of 2 hectares or less) ranging from 24% to 53% increases over non-irrigated farms of similar size. b) larger farms (2-10 hectares) obtaining increases in income ranging from 13% to 27%. 	<p>(A-3)</p> <p>Using Ministry of Agriculture Survey as baseline - and post-project survey - directly measure change in production, productivity, and income of small farm sub-sector.</p>	<p>Assumptions for achieving goal targets: (A-4)</p> <ol style="list-style-type: none"> 1. Small farmer and food production remain GOES priority. 2. No natural disaster occurs. 3. Other GOES programs aimed at small farmer are successful. 4. Price structure of products remains favorable. 5. Small farmers have access to markets. 	

PROJECT DESIGN SUMMARY
 LOGICAL FRAMEWORK

Life of Project: From FY 1978 to FY 1983
 Total U.S. Funding \$2.3 million
 Date Prepared: June 27, 1978

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose: (B-1)</p> <p>To expand the capability of the GOES to assist low income small farmers obtain and utilize needed water resources.</p>	<p>Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)</p> <ol style="list-style-type: none"> 1. Small-scale irrigation project development capability institutionalized in DIDECO/DGRD and evidenced by a functioning office, with continuing budgetary support: <ol style="list-style-type: none"> a) performing technical and economic feasibility studies of sub-projects; b) supervising construction and providing technical assistance to beneficiaries in the maintenance and operation of irrigation systems; c) providing beneficiaries with market information on basic grains, fruits and vegetables; d) collecting information on "before" and "after" irrigation conditions in sub-projects. 2. CENTA extension agents providing agronomic and water use extension services to sub-project beneficiaries on regular basis. 3. Annual increases in the number of hectares served by small-scale irrigation projects. 	<p>(B-3)</p> <p>Post Project Survey Observation Project Records</p>	<p>Assumptions for achieving purpose: (B-4)</p> <p>GOES continues to give priority to the development of small scale irrigation systems serving the small farmer.</p>

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1978 to FY 1983
Total U.S. Funding \$2.3 million
Date Prepared: June 27, 1978

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NARRATIVE SUMMARY	OBJECTIVELY MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Outputs: (C-1)</p> <ol style="list-style-type: none"> 1. Land irrigated 2. Water-use extensionists trained 3. Project office engineering personnel trained. 	<p>Magnitud. of Outputs: (C-2)</p> <ol style="list-style-type: none"> 1. Approximately 5,000 hectares of land irrigated affecting 6,000 small farmer families. 2. Approximately 100 extension agents trained in irrigation water and land use. 3. 4 engineer-agronomists trained in Irrigation Science. 	<p>(C-3)</p> <p>Project Records A.I.D. Records Observation Post Project Survey</p>	<p>Assumptions for achieving outputs: (C-4)</p> <ol style="list-style-type: none"> 1. Persons available to be trained in water use extension. 2. Continuing commitment on part DIDECO/DCRD.

2. Description of the Activity

a. Objectives

(1) Goal

The goal of El Salvador's agricultural sector is to increase the food production, productivity and income of the small farmer. This project contributes to the goal by providing the small farmer with the means to increase productivity of land and labor through the increased availability and use of irrigation water on farms which have always been dependent upon rainfall or inadequate, rudimentary irrigation for their water needs.

It is expected that the overall crop production of participating small farmers will rise dramatically with the introduction of irrigation. Two or more crops per year can be grown with irrigation where only one could be grown previously. Incomes should rise significantly for project beneficiaries given the higher production. Productivity, in general, should increase since farmers will be productively employed for most of the year. During the dry season, for most small farmers, there is little to do since they cannot grow crops without steady rainfall. The enormous unemployment and underemployment that plagues the small farmer in El Salvador thus will be mitigated to a large extent for those small farmers who participate in the project.

Sample surveys will be taken periodically by the project advisor using DIDECO's promoters and based on a before/after evaluation of the effect of irrigation to observe and measure these expected results.

Basic assumptions for achieving the goal targets are that the GOES continues to place emphasis on the development of the small farm sector and that the price structure for the increased output remains favorable.

The new Five-Year Plan of the GOES places great emphasis on the development of the small farmer. The GOES is currently developing several large programs to address the problems of this sector. For example, the GOES is currently in the process of developing a land purchase financing scheme to assist small farmers in obtaining land. Projected funding for this program is proposed to be substantial. Thus, during the disbursement of the project, it is expected that the GOES will continue to place a high degree of emphasis on the small farmer through numerous development programs.

Adverse changes in the price structure are not expected for the increased output. El Salvador is presently a substantial

net importer of both basic grains and fruits and vegetables. These crops will be produced in greater quantities by the small farmer given access to irrigation. It is expected that this additional production will substitute for a portion of current imports. No major and unfavorable price swings are expected given that imports of fruits and vegetables represent 60-90% of domestic consumption and a good deal of supply slack exists in the market. For example, using current estimated average yield figures for 19 different vegetable crops and weighting them according to their import volume in 1976, an estimated total of 126,000 hectares would be required to produce the quantity imported. The area to be irrigated in the proposed project would produce less than 4% of the quantity imported in 1976. This would appear not to be a significant enough volume to create much, if any, downward pressure on related prices.

(2) Purpose

The project will help to expand the capability of the GOES to assist low income farmers obtain and utilize needed water resources through the development and construction of appropriate technology irrigation systems.

This purpose will be accomplished by (1) the establishment of the OSSIS undertaking continuous community development, engineering, construction and marketing support activities and enjoying continuing budget support from the GOES, (2) annual increases in the number of hectares served by small scale irrigation projects, and (3) annual increases in production in subproject areas. For a complete description of the OSSIS to be established under the loan, see Part IV.A.1. and Annex 9.

(3) Outputs

Approximately 5,000 hectares of small scale irrigation subprojects are expected to be constructed and improved under the project. In addition, approximately 100 extension agents will be trained in water use and 4 engineer agronomists will be trained in irrigation systems development and management. A standard design for a typical irrigation subproject is included in Annex 24. A description of the training to be received by the extension agents is shown in Annex 23.

The number of irrigation subprojects undertaken could vary since each subproject will be unique with respect to physical conditions, type and size of community and location. DIDECO's policy has been, and continues to be, to develop and improve feasible irrigation sub-projects regardless of size. Annex 12 shows this variance in sub-project size. The project development committee, DGRD and DIDECO

officials believe that for purposes of initial planning a minimum number of 50 subprojects is expected to be built. The majority of the subprojects will more than likely serve small sized areas but with a range anywhere from 5 to over 100 hectares.

Annex 13 presents information concerning the pending subproject applications which DIDECO has on file. These proposed subprojects are representative of the types to be financed under the loan. All are of an intermediate technology and will utilize local labor for their construction.

The extension agents to be trained in water use will assist the small farmer beneficiaries of the project to effectively utilize their water resources. The training to be provided by the project advisor will be short-term (perhaps 2 weeks duration) and will concentrate on basic practical aspects of irrigation water application and use.

Training courses of six to eight months for 4 engineer agronomists will concentrate on both theoretical and practical aspects of small scale irrigation, including design, construction and management of small scale systems. Opportunities for this training are now being investigated in the U.S. and third countries. This training is expected to increase the OSSIS's capability to design more appropriate irrigation systems for the small farmer as well as provide guidance in their management and maintenance.

Achievement of the foregoing outputs rests upon several assumptions which the project development committee believes will present little problem to the implementation of the project.

There is no question that demand among small farmers for appropriate small scale irrigation systems exists. Less than 1% of all farms in the country as of the 1971 Agricultural Census had any type of fixed irrigation system installed on the farm. Throughout the entire country, only approximately 26,000 hectares were served by irrigation. Almost all of the land that small farmers operate in El Salvador is located on marginal land on hillsides and in isolated little valleys. Very little of this land is presently under irrigation but given organization of the community labor force by DIDECO's promoters and development of an application to DIDECO proposing a technically feasible subproject, this latent demand for irrigation could be transformed into effective demand.

Thus far, both DIDECO and DGRD have demonstrated a high degree of commitment to the project and to the general concept of providing increasing irrigation services to small farmers. This commitment is important if the small farm sector is to receive irrigation re-

sources apart from the loan project and on a continuing basis after the loan.

(4) Project Inputs

(a) A.I.D.

A.I.D. loan funds totalling \$2.3 million are allocated for three purposes. \$1.25 million will be used for the purchase of construction materials and equipment. Approximately \$390,000 will be available to pay the costs of a U.S. project advisor, resident in El Salvador for most of the 5 year disbursement period of the project, and additional short term technical assistance as needed. Vehicles, and light equipment will be purchased for the project amounting to approximately \$275,000 (See Annex 22). The A.I.D. loan also contains provisions for contingencies and an inflation reserve.

(b) GOES and Communities

The GOES will provide \$2.0 million to the project. This contribution will be made in the form of salaries, operating expenses, vehicles and general project support costs.

The communities which provide self-help labor for subprojects in their areas will contribute an estimated \$1.2 million composed of in-kind labor, community effort, local materials and minor tools.

(c) Total Project Cost

The total project cost will be \$5.5 million. AID will provide 41% of the total cost. The GOES and the participating communities will provide 37% and 22%, respectively. See Part III.B. "Summary Cost Estimate and Financial Plan" for a detailed breakdown of the proposed loan, GOES and community contributions.

3. Project Beneficiaries

The primary beneficiaries of this project will be that subset of the AID rural poor target group who own and operate small farms. Table 2 indicates that over 90,000 farmers fall in that group representing 33% of all farms in El Salvador and totaling nearly 200,000 hectares of land.

Table 2

	<u>No. of Farms</u>	<u>%</u>	<u>No. of Farms Owned</u>	<u>(%)</u>	<u>Land Area Worked in Owned Farms</u>	<u>(%)</u>
Less than 10 Ha.*	250,539	(92.4)	90,745	(84.0)	196,961.0	(17.8)
More than 10 Ha.	<u>20,329</u>	(7.6)	<u>17,269</u>	(16.0)	<u>908,433.5</u>	(82.2)
Total	270,868	(100.0)	108,014	(100.0)	1,105,394.5	(100.0)

Source: 1971 Census of Agriculture

*Note: Census does not permit breakdown between farms from 5-10 Ha.

The typical small farmer cultivates 2 or less hectares of land on which he now produces basic grains of relay interplanted corn and beans or corn and sorghum. He has a wife, five children, and possibly one or more members of the extended family living with him. He supplements his farm income by selling his and his family's labor off the farm on a seasonal basis. His family cash income averages about \$1,000 per year or about \$125 per capita.

The effect of this project will be to permit the beneficiary to produce an additional crop or more on a portion of his land (eventually shifting to higher value crops) and to avoid yield loss by being able to irrigate during short dry periods which occur during the rainy season. Changes in crop mix will be the major source of increased income from irrigation according to the analysis of census data comparing irrigated with non-irrigated small farms and discussed in the Economic Analysis, Part III.D..

The magnitude of this project is such that an estimated 5,000 hectares will be irrigated. Again, using the 1971 Census as a base (the average small irrigated farm had 0.82 hectares under irrigation) we would expect 6,000 small farm families or 36,000 people to benefit from this project. Excluding the community labor, the total project cost is approximately \$708 per family or \$118 per capita representing very cost effective figures on both a per family and per hectare basis.

The benefits to accrue to the target group will be substantial. For example, using current average yield data, the 5,000 hectares to be irrigated could produce 8,000 additional metric tons of corn. At current farm gate prices, that corn would be valued at \$1.4 million. Vegetables and fruits produced also will increase dramatically the benefits since their per unit of production value is much higher than corn or beans.

C. Relationship of the Proposed Project to Related GOES, Other Donor and Mission Activities

1. GOES Irrigation Activities

The GOES has become increasingly interested in the area of irrigation/water resources development in the past several years and is interested in devoting increasing attention to small scale systems development.

In the area of large projects, the GOES has totally financed with its own resources the development of a large-scale water resource development project and has obtained partial financing and technical assistance from sources outside the country for another such project.

In February 1969, DGRD started the implementation of the Zapotitán Valley Project, the first large-scale irrigation and drainage project built in El Salvador. It is a multiple-purpose irrigation, drainage, and flood control project designed to promote cultivation of about 4,230 hectares and to provide a network of access roads within the area. The irrigation plan consists of an integrated system of surface and subterranean water management. Some 2,090 hectares will be irrigated by means of surface water and 2,140 by means of deep wells. The financing for this project has been entirely from GOES funding. It is estimated that the amount spent so far is equivalent to approximately US\$14 million or about US\$3,300 per hectare and US\$12,700 per family benefited.

Besides these larger-scale projects, DIDECO, one of the intended executing agencies for this loan, has coordinated with DGRD in the execution of several small, self-help irrigation projects. In the past four years, 6 subprojects have been completed comprising a total irrigated area of about 540 hectares, benefiting 212 families with an average materials cost of about US \$250 per hectare (at 1978 prices) or about US\$415 per beneficiary family. These figures per family and per hectare compare very favorably with those of the Zapotitan and Atiocoyo projects.

Recently the GOES has become aware of the fact that much of the potentially irrigable land does not lend itself to large-scale projects. It has also become increasingly concerned about the rather high cost per hectare and per beneficiary of the larger-scale projects. The GOES intends to focus increasing attention to the development of small-scale community irrigation systems throughout the country through projects such as the proposed loan.

2. Other Donor Activities

The GOES with IDB financing is developing a second large-scale irrigation project at Atiocoyo. The Atiocoyo project involves an estimated area of 3,415 hectares and serves approximately 1,300 rural families. The project involves the construction of a diversion dam, some 30 kms. of primary canals and roads, and another 32 kms. of secondary canals and roads. The civil works were initiated in January 1975 and are scheduled to be completed by mid to late 1978. The total cost of this project is estimated at US\$14 million with the GOES providing approximately US\$6 million and the IDB providing US\$8 million through a loan to the GOES. These figures translate into a cost of US\$4,100 per hectare and US\$10,700 per family benefited.

Recently, in support of the Atiocoyo project, the Federal Republic of West Germany granted the equivalent of US\$1.4 million to provide DGRD with technical assistance in the areas of appropriate machinery research and the marketing of crops. Also the governments of Israel and the Peoples Republic of China (Taiwan) have provided technical assistance in water use in both this project as well as in the Zapotitán Project.

The IDB also has financed a second-phase feasibility study which would involve about 26,000 additional hectares for irrigation in El Salvador. Early indications are that IDB will not loan finance the development of this irrigation project in the near future.

There has been one IBRD team in El Salvador recently, looking at possible irrigation projects. There have been however, no concrete signs that projects will be developed in the short-term.

3. Relationship to Mission Programs.

The Mission's Intensive Small Farm Management Project (519-0174; FY 76) is being carried out with the agricultural research and extension organization (CENTA) and will continue into FY 79. It provides training grants and advisory personnel under university contracts for the development of intensive cropping systems and a national demonstration/extension program to encourage adoption of multiple cropping systems by large numbers of small farmers. The systems developed are highly labor and land intensive. They emphasize basic food crops and are designed to maximize production and income from small plots.

This project is highly complementary to the proposed irrigation effort, in that the irrigation beneficiaries will be in a position to make excellent use of the intensive cropping technology being developed.

The Grain Marketing Loan (T-019) implemented by the GOES' Price Stabilization Institute (IRA), is currently in the final stages of implementation and essentially will be terminated by the time the proposed project begins. The project has provided for a nationwide network of 12 grain storage facilities and improvement in the basic grains price stabilization efforts. It is expected that the small farmer beneficiaries under the proposed irrigation project will continue to produce basic grains during the rainy season and as such, they would then continue to benefit from the Grain Marketing Loan project developed with IRA.

In addition to the above ongoing projects, the proposed loan is strongly linked to further proposals currently being incorporated into the Mission's FY 1980 ABS. A proposed FY-80 Farm-to-Market Access Roads loan (519-0204) will make input and product markets more accessible to many of the country's more isolated small farmer communities in which many of the irrigation sub-projects are expected to be located. This project will also facilitate a shift into the more perishable and higher value crops that the potential of irrigation offers. Another FY 1980 proposal, the Small Farm Technology and Credit project (519-0200), will expand applied research and extension activities into a broader range of horticultural and fruit crops (particularly responsive to irrigation) as well as increase production credit resources for the small farm sector. Similarly, the Mission is also anticipating a FY-78 loan project (Small Farm Development, 519-0192) which will increase the availability of long term land purchase financing for small farmers, and to the extent that clientele can move into irrigation their ability to amortize their loans will be greatly enhanced. A proposed FY 1979 pilot project in Small Farm Natural Resource Management (519-0217), focused on identifying the appropriate characteristics of a broader national program on soil conservation and resource protection in the small farm sector, is also directed, as is this irrigation project, toward improved management of the limited land base, and principal productive asset, of the rural poor farmer.

III. PROJECT ANALYSES

A. Technical Analysis

1. Technical Feasibility

The Mission, with the assistance of an irrigation engineering consultant and an economic consultant, designed and conducted a small farmer irrigation survey during the months of June and July 1977.^{1/}

The objective of the survey was to estimate the potentially irrigable area in small farms in El Salvador. Since the project contemplates small scale irrigation systems without any storage facilities, the survey was geared to estimating the land potentially irrigable from small scale gravity flow systems.

The sample was based on the existing national area sample frame of the Ministry of Agriculture (MAG). Forty segments randomly distributed in all regions of the country were selected. The area in each of these segments varied from 19-113 Ha.. During the months of June and July the Irrigation Engineer made field visits to each of these segments to identify possible water sources and conveyance courses for gravity flow small scale irrigation. Using the aerial photographs and field reconnaissance he estimated the area in each segment that could be irrigated from an available stream source by gravity flow. The stream flow of the water source was also measured.

The stream flow data was seasonally adjusted by comparing the seasonal stream flow observation with the year round seasonal patterns of the nearest rivers for which annual measurements were available.

The individual segment estimates included 697 total farms. When these results are expanded to the national level using the expansion factors from the MAG, the results provide estimates of the overall potential of small farm irrigation from small stream gravity fed systems.

Table 3 indicates the principal statistical results of the Small Farm Irrigation Survey. The survey must be considered inadequate from a rigorous statistical point of view and expansion of results to the national level probably exhibit a high degree of variance. Significant care was taken, however, given the time and resources available to make certain that systematic procedures were followed in choosing segments randomly and collecting sample data.

^{1/} Engineering aspects, stream flow measurement, seasonal adjustment and field notes of the Irrigation Engineer Consultant are contained in Annex 15.

Investigation Site	1977	1978	1979	1980	1981
Site 1: [Illegible]	1.2	1.5	1.8	2.1	2.4
Site 2: [Illegible]	0.8	1.0	1.2	1.4	1.6
Site 3: [Illegible]	1.5	1.8	2.1	2.4	2.7
Site 4: [Illegible]	1.0	1.2	1.4	1.6	1.8
Site 5: [Illegible]	1.3	1.6	1.9	2.2	2.5
Site 6: [Illegible]	1.1	1.3	1.5	1.7	1.9
Site 7: [Illegible]	1.4	1.7	2.0	2.3	2.6
Site 8: [Illegible]	1.2	1.4	1.6	1.8	2.0
Site 9: [Illegible]	1.6	1.9	2.2	2.5	2.8
Site 10: [Illegible]	1.0	1.2	1.4	1.6	1.8

SOURCE: Small Farm Investigation Survey, 1977-81, Salvador

* For these areas to be investigated some storage facilities would be required. While they are physically investigate (sites do they do have possible water sources and are flat enough for gravity irrigation) there is not sufficient water in the drought season to support irrigation.

The total area which would be suitable for small scale irrigation systems without storage of any kind in El Salvador would be 12,292 Ha. If subtracted from this Small Farm Irrigation Survey (The Department of Agriculture Sector Study estimated between 20,000 Ha. and 30,000 Ha.). Of the 12,292 total potential area estimated from the survey, 2,573 Ha. would appear from calculations based on the 1971 census to be already under irrigation. This leaves a potential for small scale systems of 9,719 or not to exaggerate the precision of the estimate, approximately 8,000-12,000.

2. Agronomic Feasibility

The data which demonstrates the agronomic feasibility of this project is best reflected in the Economic Analysis (Part III.D.). Highlights of that data are that all farms under 10 Ha. with some irrigation showed increased net income by an average of 30%; but more importantly, the 0.5 to 1 Ha. group reflected increased net income by 53% where irrigation was involved. A tendency to grow more vegetable crops under irrigation was also noted.

In summary, the general agronomic feasibility of irrigation in El Salvador small farms is without question. Water is at times a limiting factor to increasing yields during the rainy season and is the limiting factor which does not allow small farmers to produce crops during the dry season.

3. Engineering Analysis

4. General Description

The engineering phase of the project comprises the design, construction and supervision of small scale irrigation projects aimed at small farmers. The basic design of the irrigation projects will be developed by the engineering office of DGRD. The construction will be carried out by the community under the self help concept. The committees will be organized by DIDECO. The supervision of the actual construction will be carried out by DGRD. The small irrigation projects will be built with locally made materials such as brick rock, sand, cement.

The design itself is very basic and follows the same standards used by FORD and DIDECO on prior projects carried out by both organizations. The structures built in the past have proven to be inexpensive.

Technical assistance will be provided under the loan to ensure the provision for the development of a permanent and long term small scale irrigation capability within the GOES.

All projects will be of the gravity type. Two main designs are expected to be used frequently:

(1) a simple diversion facility to direct the streams/rivers, into shallow channels, lined with brick or rock to carry the water downstream and then distribute the water into secondary channels for irrigation of the land parcels; and

(2) when the difference in elevation is sufficient, the possibility of designing simple, gravity fed sprinkler systems will be investigated.

In both cases DGRD will do the design. The Mission believes that, with the additional personnel and the technical assistance for the design and construction of these small-scale irrigation projects both DIDECO and DGRD are capable of executing the proposed project.

Cost estimates of the proposed project were based on data developed by DGRD from earlier projects and updated cost figures taking into consideration the past two years' inflation.

DGRD has indicated that the probable average cost of materials per Ha. of irrigated land using small scale, appropriate technology systems is \$250. A 7% inflation cost has been provided to account for increases in material costs. This inflation figure is deemed adequate since all material (e.g., clay brick, concrete block, cement, rock, reinforcement steel, etc.) will be purchased locally and inflation in these items has not exceeded 7% per year on the average in the past 5 years in El Salvador.

b. Engineering Implementation Plan.

(1) Sites

The irrigation project sites will be identified by DIDECO. DIDECO has a list of possible subproject that are currently under study (See Annex 21 for a map showing these proposed subproject sites).

(2) Design and Engineering

DGRD will be in charge of the final design and supervision of construction for the irrigation projects. The designs are not new; they follow the same design and construction standards used in prior GOES funded small irrigation projects and represent the most

appropriate technology available. The design has proven to be inexpensive, efficient, and has met the irrigation needs of the communities served to-date. The basic design is shown in Annex 24.

(3) Construction

Construction of the projects will be the responsibility of the communities under the self-help concept with the organization of labor provided by DIDECO and construction supervision provided by DGRD. It is expected that few if any of the subprojects will cost in excess of \$30,000 in materials and equipment. See Annex 26 for a detailed cost breakdown of an illustrative subproject. Construction for the projects will be started as the design stage is completed.

It is anticipated that the first three years of the loan will be used principally to promote and design actual projects. However, as the design is completed on a project, construction will be started. It is expected that in the second to the fourth year there will be an overlap of the design and construction activities.

The project development committee has proposed a 5 year disbursement period for the loan. This disbursement length is considered necessary since it is expected that the construction activities for the typical subproject will take an average of 2 dry seasons to complete. In addition, DIDECO's promoters will be uncovering and generating community interest for the first 3 years of the disbursement period, leaving approximately 2 years or 2 dry seasons for construction of the last communities which undertake subprojects. Throughout the second to fourth years there will be a mix of both promotion, design and construction of subprojects. During the first year, project activities will be mostly comprised of promotion and design while in the last or fifth year of the project, it is expected that only construction activities will be taking place.

Given the fact however, that the GOES is interested in further development of small scale irrigation projects, it is likely that in the fifth year of the project the GOES will undertake additional subprojects using its own funds and engage in further promotion and design work leading to construction.

B. Financial Analysis

1. Total Project Financial Requirements

The total financial investment to be provided by the proposed AID loan and the Host Country contribution is equivalent to \$5.5 million and broken down as follows:

(In U.S. \$000 or equivalent)

	<u>U.S. Dollars</u>	<u>Local Currency</u>	<u>Total</u>
<u>AID Loan</u>	665	1,635	2,300
<u>Host Country</u> (Government)	--	2,000	2,000
<u>Host Country</u> (Private)	--	<u>1,200</u>	<u>1,200</u>
	<u>665</u>	<u>4,835</u>	<u>5,500</u>

The AID loan amounts to 41% of the total project cost with the Host Country contributing 59% of total project costs, thus meeting the requirements of FAA Section 110 (A).

2. Host Country Financial Capability

The GOES (Government) contribution totals \$2.0 million for the life of the project. The disbursement rate averages approximately \$0.4 million per annum which amounts to less than 1% of the Host Country CY 1978 National Budget. Furthermore, the participants communities will furnish the local labor and material which has a conservatively imputed cost of approximately \$1.2 million.

DIDECO for the past five years has operated with a budget averaging \$0.9 million per year. For the current year it was allotted \$1.2 million, which is sufficient to carry out its programs.

DGRD's CY 1978 budget totals \$2.4 million and this amount is considered adequate for its programs.

The question of recurring costs to the GOES for this program after termination of the A.I.D. loan is covered under Covenant No. 4 in the Draft Loan Authorization in Annex 4.

The table "Projection of Expenditures by Fiscal Year" on page 34 shows that the combined A.I.D. and Host Country-Government contributions for FY-83 amount to slightly over \$900,000. This amount plus inflation for FY 83 would have to be funded by the GOES if the same approximate level of activity in small scale irrigation were to be undertaken.

The combined CY 1978 budgets for both DGRD and DIDECO amount to approximately \$3.6 million. The Host Country-Government contribution for FY 1979 amounts to slightly over \$230,000 or approximately 6.5% of the combined budget. For this level of contribution to be maintained after FY 83, the combined budgets of DGRD and DIDECO would have to amount to slightly over \$6.0 million in CY 1984. An annual percentage increase in the combined budgets of approximately 11% would be required to reach a \$6.0 million level by CY 1984. Budget increases for the last five years have averaged slightly over 10% for both DIDECO and DGRD. In recent years, DGRD's budget increases have exceeded 10% annually since the GOES has been devoting increased funding and attention to the agricultural sector. Recurrent costs, not including the A.I.D. loan, thus should be covered by the annual budget increases of DIDECO and DGRD.

With regard to the annual contribution supplied by the A.I.D. loan, the GOES will covenant to provide for the continuing functioning of the OSSIS after termination of loan disbursement.

As illustrated in the Table Projection of Expenditures per Year, the AID loan will be used primarily to purchase construction materials and light equipment, vehicles, technical assistance and training.

Inflation was estimated at 7% per year on a compounded basis. This factor is considered adequate in view of El Salvador's most recent economic trends. Contingency funds of \$145,000 were provided to cover any program design alterations that might result during the project's implementation.

3. Financial Plan/Budget Tables

As illustrated in the table Projection of Expenditures per Year the AID loan will be used primarily to purchase construction materials and light equipment, vehicles, technical assistance and training.

Inflation was estimated at 7% per year on a compounded basis. This factor is considered adequate in view of El Salvador's most recent economic trends. Contingency funds of \$145,000 were provided to cover any program design alterations that might result during the projects' implementation.

4. Host Country Repayment Capability

El Salvador's external public debt increased steadily in recent years from \$90 million in 1968 to \$375 million in 1976 (see Annex 18). Consequently the annual debt service payments have increased

from \$6.1 million in 1968 to \$24.7 million in 1974. However, in 1975 El Salvador made a payment of \$55 million, including a large principal prepayment of \$48 million on a loan contracted in 1974 which will have the effect of lowering post 1975 debt service payments.

Table 4 shows the burden of debt repayments as a percent of total export earnings. The debt service burden increased from 2.9% in 1968 to 5.3% in 1974 and jumped to 10.7% in 1975. Except for 1975, the debt repayments burden has been low compared to other countries at the same stage of development. In fact the latest World Bank publication, Economic Memorandum on El Salvador, states that higher levels of external borrowing can be absorbed without endangering the country's credit worthiness.

Table 4
EL SALVADOR: Service Payment of External Public Debt
1968-75
(In Millions of U.S. Dollars)

	Service Payment	Exports	S.P. as percent of Exports
1968	6.1	211.7	
1969	6.3	202.1	2.9
1970	9.4	236.2	3.1
1971	15.6	243.2	4.0
1972	10.4	301.7	6.4
1973	21.2	358.4	3.5
1974	24.7	462.5	5.9
1975	55.0	512.6	5.3
			10.7

SOURCES: World Bank, Economic Memorandum on El Salvador, and the Monthly Review published by the Central Bank of El Salvador.

The World Bank publication also provides the debt repayment schedule during the 1976-95 period. It shows that, assuming the contracting of no new debt, total annual debt service (i.e., principal plus interest) will decline from the high of \$38.3 million in 1978 to \$11 million in 1995. The debt service payment in 1987, the year El Salvador will begin to make principal payments of the proposed loan, is \$18 million which is estimated by the IBRD to be less than 1% of expected exports in that year.

Table 5 below indicates that the external debt burden will decrease steadily from 5.2% in 1977 to less than 1% in 1987 in the absence of more external borrowing.

Table 5
EL SALVADOR: Schedule of Service Payments of External
Public Debt 1975-1987
(in Millions of U.S. Dollars)

	Schedule of Service Payments	Exports*	S.P. as Percent of Exports
1975	55.0	512.6	10.7
1977	34.2	654.5	5.2
1979	37.0	835.8	4.4
1981	27.3	1067.2	2.6
1983	23.2	1362.7	1.7
1985	18.6	1740.1	1.1
1987	18.1	2221.9	0.8

SOURCE: World Bank, Economic Memorandum on El Salvador, January 1977.

* USAID/ES projection: total exports are extrapolated from the 1968-75 performance. The average annual growth rate during the period was 13%. Note that 1976 exports were excluded from the table because of the unusually high world coffee price.

It should be noted that the IBRD Economic Memorandum covers total external debts incurred before December 31, 1975. Since then, El Salvador has acquired additional official loans of \$69.5 million in 1976, \$19.1 million in 1977, and \$118 million so far in 1978. In addition two loans worth about \$20 million are expected to be finalized by the middle of 1978, giving total additional loans of \$226.6 million. In the absence of more external borrowing, the additional yearly debt service repayments, both principal and interest, required on the additional \$226.6 million will be approximately \$22.7 million beginning in 1987 (assuming a 20 year repayment period for the principal and an average interest rate of 5% per year). The total required debt service repayment burden in 1987 will be \$40.8 million (18.1 million + \$22.6 million), which will be about 2% of the value of expected exports in that year.

Thus, El Salvador's external debt service burden for the next 10 years is moderate; and, therefore, the country is not likely to encounter repayment problems as a result of the proposed loan.

5. Conclusion

The five year loan implementation plan is realistic and acceptable to the GOES. Summary Tables compiled for use in this project and resulting from the financial analysis follow in sections 6, 7 and 8.

6. SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US \$000)

PROJECT PAPER

<u>Source</u>	<u>AID</u>		<u>Host Country (Government)</u>		<u>Host Country (Private)</u>		<u>Total</u>
	FX	IC	FX	IC	FX	IC	
Construction Mtrls. & Equipment		1,250					1,250
Vehicles	275						275
Technical Assistance	320						320
Participant Training	70						70
Administration				1,322			1,322
Fuel, Lubricants & Maintenance				245			245
Overhead				165			165
Local Labor						980	980
Inflation factor		240		268		220	728
Contingency		145					145
<u>TOTAL</u>	665	1,635		2,000		1,200	5,500
<u>GRAND TOTAL</u>	2,300	(41%)	2,000	(37%)	1,200	(22%)	5,500

7. COSTING OF PROJECT OUTPUTS/INPUTS
(In \$000 or Equivalent)

PROJECT PAPER

Project #519-0184

Title: Small Farm Irrigation Systems

<u>Project Inputs</u>	<u>Project Outputs</u>			<u>TOTAL</u>
	<u>#1</u>	<u>#2</u>	<u>#3</u>	
AID Appropriated				
Construction Materials & Equip.	1,250			1,250
Vehicles	275			275
Technical Assistance	250	70		320
Participant Training			70	70
Inflation Factor	240			240
Contingency	145			145
<u>TOTAL</u>	2,160	70	70	2,300
Host Country: Government				
Administration	1,322			1,322
Fuel, Lubricants & Maintenance				
Vehicles	245			245
Overhead	165			165
Inflation Factor	268			268
<u>SUB TOTAL</u>	2,000	-	-	2,000
Host Country: Private				
Local Labor by Community	980			980
Inflation Factor	220			220
<u>SUB TOTAL</u>	1,200	-	-	1,200
<u>TOTAL HOST COUNTRY</u>	3,200	-	-	3,200
<u>GRAND TOTAL</u>	5,360	70	70	5,500

8. PROJECTION OF EXPENDITURES BY FISCAL YEAR
(U.S. Dollars)

PROJECT PAPER

	<u>FY-79</u>	<u>FY-80</u>	<u>FY-81</u>	<u>FY-82</u>	<u>FY-83</u>	<u>Total</u>
<u>AID</u>						
Construction Materials & Equipment	62,500	187,500	312,500	375,000	312,500	1,250,000
Vehicles	275,000	-	-	-	-	275,000
Technical Assistance	30,000	70,000	80,000	80,000	60,000	350,000
Participant Training	15,000	35,000	20,000	-	-	70,000
Inflation Factor	-	13,125	45,312	84,375	97,188	240,000
Contingency	7,250	21,750	36,250	43,500	36,250	145,000
<u>Total AID</u>	<u>389,750</u>	<u>327,375</u>	<u>494,062</u>	<u>582,875</u>	<u>505,938</u>	<u>2,300,000</u>
<u>HOST COUNTRY-GOVERNMENT</u>						
Administrative Expenses	180,279	300,465	300,465	300,465	240,372	1,322,046
Fuel, Lubricants and Maintenance Vehicles	30,000	43,750	43,750	43,750	43,750	245,000
Overhead	22,492	37,484	37,484	37,484	29,988	164,932
Inflation Factor	-	26,898	55,718	86,459	98,947	268,022
<u>Total Host Country-Govt.</u>	<u>232,771</u>	<u>418,597</u>	<u>447,417</u>	<u>478,158</u>	<u>423,057</u>	<u>2,000,000</u>
<u>HOST COUNTRY-PRIVATE</u>						
Community Local Labor	49,000	147,000	245,000	294,000	245,000	980,000
Inflation Factor	-	10,290	35,525	88,650	76,195	210,660
<u>Total Host Country-Private</u>	<u>49,000</u>	<u>157,290</u>	<u>280,525</u>	<u>382,650</u>	<u>321,195</u>	<u>1,190,660</u>
<u>GRAND TOTAL</u>	<u>671,521</u>	<u>905,262</u>	<u>1,222,004</u>	<u>1,443,683</u>	<u>1,250,190</u>	<u>5,490,660</u>

C. Social Soundness

Over the past several years USAID/El Salvador has financed a number of analytical studies and field surveys that indicate that there are no socio-cultural obstacles to the success of this project. These studies also give strong reason to believe that the spread effects and over-all social consequences of the loan will be positive.

1. Socio-Cultural Profile

Salvadoran society is basically a highly homogeneous one. Of note is the virtual absence, even in rural areas, of linguistically and culturally distinct subgroups of the population. Spanish is the common language embracing all socio-economic levels and all areas of the country. Unlike the majority of Latin American countries in which dual societies of persons of European and Indian heritage coexist, often with little integration, the population of El Salvador is almost totally ladino, or racially mixed.

Throughout the country one can see the peasant working the fields with bullocks and plows, or in many cases without plowing, simply penetrating the ground with a digging stick and dropping seeds into the hole. One can also see the peasant family living in extremely primitive and crumbling housing. However, these suggestions of traditionalism and primitivism, so striking in their visible characteristics, belie the true condition of life in the rural areas. Compared to other peasants, the Salvadoran rural culture should be understood as a traditional peasantry, one with very few remaining traditional institutions and values.

Although the Salvadoran small farmer may not be bound by deep rooted traditions and tribal culture, he nevertheless is in the paradoxical situation of farming his land in about the same way his Mayan predecessors did centuries ago, living in the same type of home, and eating the same type of foods. The irony of this situation has had important social and psychological consequences for Salvadoran society and is important for understanding the basis of the successful implementation of the loan. For essentially the small farmer is very much aware of modern technology and the benefits it could bring him and his family. He is not ignorant; he uses fertilizers, insecticides, and machinery when he can afford them. He understands the market and the money economy. Only his limited resources, land and capital, hold him back from better life.

The world of the small farmer in El Salvador is quite unique in its lack of social integration. The target group farmer lives

in a nuclear family and is highly independent. He has almost no external family ties, no functional godparent obligations, and receives little if any help from friends and distant relatives. From an early age the rural Salvadoran learns to be autonomous, self-reliant, and industrious. The wearing of the machete or side arm are understood as symbolic of personal autonomy and self mastery.

The family unit is also the basic social and economic unit. Beyond this there is relatively little social, economic, political, or religious structuring. Even soccer, so important throughout Latin America in promoting community spirit and social integration, lacks the force to contribute much to a broad sense of community. There is little concern with official community affairs; in fact there are few community affairs with which to be concerned. Contrary to most peasantries, fiestas (religious or secular) are few and arouse only casual interest and involvement. There are few social or recreational clubs and near zero participation in traditional politics at any level.

In spite of this rather austere picture it should be understood that the small farmer does often depart from this pattern of life to join with others to solve specific economic problems. Credit and marketing cooperatives have been successful in a significant number of cases. Even people not formally joined to a cooperative often form solidarity groups in order to qualify for credit from the Agricultural Development Bank (BFA).

Although the nuclear family is the rule in rural El Salvador, it can be extended somewhat to include single daughters who have children or who are pregnant. In many cases in the rural areas, a man may live with the daughter and attach himself permanently to his father-in-law's household. Thus the household unit in many instances may easily become a "house of mothers" and exhibit many features of a matricentric family.

While there are certainly legitimate, legal, and religious marriages in the rural areas, marriage is somewhat unusual. People say they respect matrimony in the traditional sense, but they do not practice it. The relationship between a man and a woman is a "companionship." The resulting family structure when it becomes stabilized, is called an "accompanied family." Most males frankly and openly admit they do not want to get married because they don't want to be bound or because marriage is too expensive. When and if a man becomes more prosperous, he may have more than one companion or "wife." While many such arrangements are temporary, some develop a degree of stability and in effect form a pattern of plural wives and plural households with the attendant children.

To an observer from another culture or even from another social class within Salvadoran society, it might seem that the rural poor family is chaotic or loosely structured. This is not so. Certainly there are many failures, but in time the family unit which stabilizes becomes a strong unit of economic and psychological security. There is little else in the contemporary rural society and culture for the poor. The family is a tightly structured economic operation. Male-female division of labor is well defined and complementary. Every child and every adult has specific responsibilities and everyday work activity proceeds more or less in an orderly and effective way. The mother often is the anchor point of the family; she is responsible, hard working, and a symbol of stability and security. Among the poorest of the poor this is especially typical. The father while hard working and fond of his children seems to feel less responsible and often has sexual affairs, and children, with other women.

All those who have studied rural Salvadoran society agree that religion is of minor significance in the culture of the small farmer. His attitudes and perspectives are highly secularized and pragmatic. While perhaps most people attend church, organized religion is of little relevance as an integrative institution either structurally or ideologically. Compared to most peasant societies, the Salvadoran is not constrained by traditional religious beliefs, either Indian or Christian, which often impede technological change. Over-all, the world view of the Salvadoran small farmer is rational, utilitarian, non-mystical and pragmatic.

Four things stand out strongly in the value system of the Salvadoran small farmer. These are the desire for his own piece of land, desire for education, an all embracing concern for subsistence security and an attachment to a rural versus an urban environment. The first thing any farmer, day worker, or squatter wants is land. When asked what else he wants it is more land, for cash crops and thus self-improvement. Although fifty percent of the small farmers rent the land they are working, considerably more people have no land at all and simply scratch out a living along the side of the road or are employed on a part time basis by those who own land outright or by those who rent.

Although illiteracy is high, up to 75% in many rural areas, people generally see education, formal and technical, as a means to improve their lot in life. Parents see to it that children take advantage of all educational opportunities, meager as they may be. The only compromise with this high regard for education appears at peak work periods when all members of the family must join together in common effort.

constructing projects in their areas, and to the extent engineering feasibility and financing permit, the GOES will increasingly find that this type of program effectively reaches small farmers and involves them directly in the activity.

In summary, therefore, it may be said that the constraints on the development of small scale irrigation projects throughout the country are not related to the socio-cultural make-up of the target group beneficiaries. For a more detailed look at the nature of the target group for the loan see the USAID/El Salvador Agricultural Sector Assessment, pp. 27-37.

3. Social Consequences and Benefit Incidence

The primary long run beneficiaries of this project will be those small farmers who participate directly in the project's activities. However, even though strict small farmer eligibility criteria will be incorporated into the use of funds under this loan, we must assume a certain number of people above AID's target group limitation will benefit to some extent from any given irrigation project. In order for water to reach small farmers in a community, it may be necessary to pass it through and divert a portion to farms of those holding more than the minimum acreage allowed. However, this will be kept to a minimum by the allocation criteria and should not prove a serious problem for the implementation of the project.

In the final analysis this project will be free of the constraints of Pareto Optimality in that the small farmers and the rural poor will benefit from increased access to resources and greater employment opportunities without taking the resources and opportunities of other members of the community. This project will in no way push people off land or otherwise contribute to pressures for urban migration. On the contrary, the increased productivity of the land under this project will significantly improve the employment opportunities for farm laborers of all kinds, in addition to increasing the potential for improving the general standard of living of the project beneficiaries.

4. Role of Women

The project will improve the quality of life for rural women by increasing the overall family disposable income. Greater disposable income for anyone in most societies means greater freedom to pursue opportunities available for self betterment.

In fact, in some cases it is expected that women will not only share the benefits, but they will participate directly in the project activities and subsequent extended farming cycle. Many observers note that few agricultural activities are done strictly by men. Women,

for example, in many areas traditionally take charge of poultry and dairy production, gardening, and small livestock care. Although few women are heads of households and consequently potential members of users committees, they will be in a position to benefit and directly participate in the increased economic activity resulting from the implementation of this loan program. For more detailed information regarding the role of women in the agricultural sector please see the USAID/El Salvador Agricultural Sector Assessment pp 27-29.

D. Economic Analysis

1. Income Impact: Analysis of Project Potential for Small Farm Income.

a. Systems Approach to Estimating the Income Impact of Irrigation.

Instead of starting with dryland farms, introducing irrigation and measuring the impact, a sample of small irrigated farms was drawn and matched to farms of similar size in the same census district. The assumption upon which the results are based is that if the dryland farms were to irrigate, they would become over time like the small farms in the same area that are already irrigating. This method avoids imagining what irrigation will do, since the differences between irrigated small farms and similarly situated dryland farms are measured directly with the differences associated with irrigation noted. Annex 19 describes in detail the methodology used in the project economic analysis.

Since even small farms have a wide variety of land qualities inside their plots, and since there are three possible planting cycles, many changes besides increased yields and dry season planting may, and in fact do result from irrigation. An example of this is the "system" change which sometimes occurs with corn when land is irrigated. Only a portion of land in irrigated small farms is usually under irrigation. One of the impacts can be to shift corn (a relatively low value crop) to poorer quality, unirrigated land in the second cropping cycle to make room for tomatoes and other high value vegetable and fruit crops. Thus if we look at corn yields for irrigated farms, we find they could be actually lower in the second cropping cycle than on dryland farms. Simple engineering estimates of yield increases would have missed this indirect or "systems" impact.

b. Summary of the Income Potential of Irrigation on Small Farms.

Irrigated small farms earn approximately 30% more net income than do comparable dryland farms as is illustrated in Table 6.

Table 6
El Salvador
Net Farm Income Impact of Irrigation

Farm Size	US\$ of Added Income	Percent Increase in Net Farm Income on Irrigated Farms
0 - 5 Ha.	\$ 51	34%
.5 - 1 Ha.	149	53
1-2 Ha.	120	24
2-3 Ha.	212	26
3-4 Ha.	149	13
4-5 Ha.	215	15
5-10 Ha.	555	27
All Small Farms	178	30

While the average difference is substantial, it can be seen to vary significantly by farm size, the farm from 3-5 Ha. obtained the least proportional benefits from irrigation, while the farms under 1 Ha. obtained the largest. These results would support an emphasis of the smallest farms in the project wherever such is possible. The importance of the finding that the smallest farms reap the largest irrigation benefit can be underscored when it is observed that 71 percent of all farms in El Salvador are under 2 Ha.

The income impact of irrigation comes from many changes in the small farm. Table 7 separates the total percent income increase into its component sources. For all small farms changes in the types of crops and acreages cultivated accounts for 25% out of the 30% total income increase. Small irrigated farmers rearranged the selection of crops they grew, increasing heavily the areas cultivated in intensive annual vegetable crops. These intensive crops plus the addition of significant areas in improved pasture overcame a decrease in average crop yields. Yields on irrigated small farms were on average lower than those on dry farms for specific crops. This result was caused in large part by vegetable crops grown in the dry season. Dry farms cultivate far less vegetable crops since they are limited to the crop cycle when water is available, yet their yields per Ha. are higher than the irrigated farms where larger volumes are grown during the dry season but at lower yields. The lower yields may be due in part to insufficient security of water availability on the irrigated farms and land use decisions involving interplanted cereal crops and the establishment of permanent tree crops.

Table 7
El Salvador
Sources of Added Income from Irrigation

Percent Income Added From the Following Sources

<u>Farm Size</u>	<u>Crop Mix Differences</u>	<u>Crop Yields Differences</u>	<u>Livestock Difference</u>	<u>Total Income Differences</u>
0. - 5 Ha.	41%	0%	-7%	34%
.5 - 1 Ha.	31	20	2	53
1 - 2 Ha.	18	4	2	24
3 - 4 Ha.	1	4	8	13
4 - 5 Ha.	0	1	14	15
5 -10 Ha.	24	-6	9	27
All Small Farms	25%	-4%	9	30%

The overall small farm averages fail to reveal adequately the situation of most small farms since they weight heavily the 5-10 Ha. farms with a larger than proportional share of production. Yields are higher on all irrigated farms except the 5-10 Ha. group, with a significant yield improvement (20%) in the farm size with the largest (53%) total income increase. Except for the .5-1 Ha. farms, however, yields are of little importance as a source of increased income associated with irrigation with crop mix differences providing the larger shares of increased income.

2. Cost Benefit Analysis of the Project

To estimate benefit/cost ratios it was impossible to draw on data from the Census since no irrigation costs were gathered. The costs of irrigation were drawn from existing DIDECO projects and the cost is therefore larger than the actual cost incurred by the random farmer with some irrigation facility. The net result is that the benefit/cost ratios presented in this section have deflated benefits and inflated costs and are therefore doubly conservative.

Using the minimal impact estimates, the benefit/cost ratio for small scale irrigation on all farms under 10 Ha. is 1.06 as is indicated in Table 8.

Table 8
El Salvador
Benefit/Cost Ratios for Small Farm Irrigation Project*

Farm Size	Benefits/Costs Discount rate 15%	Internal Rate of Return
All Small Farms	1.06	16.17%
0 - .5 Ha.	1.14	17.50
1 - 2 Ha.	1.72	22.19
2 - 3 Ha.	0.90	14.53
3 - 4 Ha.	0.71	13.79
4 - 5 Ha.	0.67	8.78
5 - 10 Ha.	1.29	19.28

* Benefits based on observed differences between irrigated and non-irrigated farms from Census of Agriculture 1971. Assumes 5 years for newly irrigated small farmers to make changes similar to existing small irrigated farms. Costs based on survey of existing DIDECO small farm irrigation projects.

Crop mix and yield changes have been assumed to take place during the 5 year life of the project. The discount rate was assumed to be 15% approximating the opportunity cost of capital in El Salvador net of inflation. Since this rate is also commonly used in AID to evaluate irrigation projects, it has the advantage of providing some rough comparison with projects in other countries.

The ratios in Table 8 reveal a significant difference inside small farm groups. The smallest farms under 2 Ha. which includes 71% of all farms and three fourths of all small farms, have benefit/cost ratios of 1.14 and 1.74. These smallest farmers are easily the poorest group of farmers. Their per capita net income averages from US \$95 in the East region to a high of US\$129 in the West. It is evident from this study that the poorest are also those whose improvement is the most marked with irrigation. This finding is of considerable importance since it runs counter to a common attitude that the farmers with the most potential for improvement in the target group are those over 2 Ha. in size. It appears that irrigation benefits have the largest potential in the 71% of farms which have less than 2 Ha. of land.

Table 9
Sensitivity Analysis Summary of Benefit
Cost Ratios

<u>Assumption</u>	<u>Benefit/Cost</u> <u>Ratio</u>
1. Minimum Impact Assumption	1.06
2. Shadow Priced Project Unskilled Labor	
a. Shadow Priced at 25% Market Rate	1.57
b. Shadow Price at Zero	1.89
3. Increased Technical Assistance	0.9231/
4. Increased Engineering, Design, and Admin.	0.9021/
5. Indirect Project Impact	
a. Including only Indirect Benefits to Poor Household	1.63
b. Including Indirect Benefits to all	2.70
6. Social Discount Rate of 3%	2.54
7. Project Useful Life at 40 Years	1.12

1/ These added expenses are budgeted as costs but no added benefits are assumed. Please refer to Annex 20 for a discussion of these ratios.

3. Benefit Cost Analysis of Subprojects

3. Benefit Cost Analysis of Subprojects

Benefit cost analysis of subprojects will utilize the data generated from the cross sectional project economic analysis. Benefits for each subproject will be estimated according to farm size from the average benefits derived from the matching process of irrigated with similar nonirrigated farms as shown by the 1971 Census. These benefits are stated in terms of absolute amounts of incremental income change resulting from irrigation in 1971 prices. The Mission has this information on computer tapes for all of the 2450 farms found to be irrigated in 1971 and which were then matched with similar nonirrigated farms. These data are arranged on the tapes in farm size ranges as shown in Tables 3 and 4 in Annex 20. Costs will be estimated for each subproject from the actual initial construction requirements and from the estimated annual maintenance costs over a 25 year period. Since costs for each subproject will be actual estimates reflecting the price level of the year in which construction takes place, they will be deflated to 1971 dollars, the price level in which the benefits were valued in the project economic analysis.

DIDECO promoters will gather information on the farm size distribution for subprojects under consideration and provide this information to DIDECO's economists. Using a simple form to be developed by the Mission, DIDECO's economists will then calculate the benefit cost ratio for each subproject.

Any subproject which has a benefit cost ratio of 1 or greater will be judged economically feasible.

IV. Project Implementation

A. Administrative Arrangements

Administration of project activities will be undertaken by the Community Development Division (DIDECO) of the Ministry of Interior and by the Division of Irrigation and Flood Control (DGRD) of the Ministry of Agriculture. Both divisions have regional organizations with good technical and outreach capacity.

The OSSIS, jointly staffed by DIDECO and DGRD, will serve as the focal point for project implementation and play a key role in coordinating the functions of both divisions for the project.

CENTA will play a complementary role in the project by providing approximately 100 extension agents to receive short-term training by the project advisor. These extension agents will then provide extension services to the small farmer beneficiaries of the project in improved water and land use as well as those of their regular programs.

CENTA, through the mechanism of the project office will enter into a written agreement with DGRD and DIDECO whereby CENTA will provide the extension agents over a three year period to service the irrigation subprojects constructed. This written agreement will be one of the conditions precedent to disbursement of the loan.

The organizational structure of the overall management of the irrigation systems will be a water user's association formed at the community level (See Annex 14 for a general example of the nature of such an association). DIDECO's promoters will help the community to establish the user's association with assistance from members of the OSSIS.

Essentially, the users association will provide each community with a framework for management of its irrigation system. A "water judge" will be elected by the community or named from the community leadership. This person has generally been an older and respected person, usually a successful small farmer, and a long-time resident in the community. His function is to ration and allocate as equitably as possible the water flowing through the irrigation system. Each water judge has his own method of operation but, in general, informal and as needed community meetings are held to discuss the apportionment of water and time schedule for use by each subproject participant. Voting rights will be held by the subproject participants in a manner acceptable to the community. However, in the six subprojects completed to-date, the farmers involved have not had to resort to vote counts since the major issues of water allocation, time of use, and repair responsibilities have always been resolved by discussion and mutual agreement.

The loan financed long term project advisor, complemented by specified technical assistance, will assist these comparatively informal water users associations to become stronger in terms of their capability to serve their members. Initial guidelines for the establishment of water users associations will be required as a condition precedent to disbursement. During project implementation, these guidelines will be refined and strengthened where needed so that each association established provides an effective overall irrigation management system for its particular subproject site and group of beneficiaries. The guidelines developed during early project implementation by the project advisor and through other technical assistance inputs will help to reinforce the protection granted to association members by Decree Law 153. This law prohibits non-members from utilizing water flowing through the system and ensures that easement rights from the water source to subproject sites are vested in the water users associations.

The following sections describe the implementing agencies in terms of their roles, organization and institutional capacities.

1. Participating Agencies

a. DIDECO

(1) Brief History of DIDECO

The Dirección de Desarrollo de la Comunidad (DIDECO) formerly known as FOCCO, is located in the Ministry of the Interior. Its functions are governed by Decree Law 425 which provides DIDECO its mandate for community development in El Salvador.

DIDECO developed as an institution from incipient community development efforts undertaken by both the ministries of Health and Education starting in 1964. These activities were targeted toward health, home-improvement, agriculture, education, and recreation (e.g. vaccination campaigns, improvement of home-kitchens, and irrigation, etc.). These activities were referred to by the GOES as "Small Projects For Community Development." In 1968 these activities were incorporated into the Ministry of Education. The following year, 1969, they were brought to the Department of Program Development of Social Sectors of CONAPLAN, (now the Ministry of Planning) under the name of Fomento y Cooperación Comunal (FOCCO).

In 1976, FOCCO was moved to the Ministry of the Presidency and subsequently in 1978 to the Ministry of the Interior. During this latest move the agency's name was changed to DIDECO.

(2) DIDECO's Objectives

are: DIDECO's main community development objectives

(a) contribution to the development of each community by eliminating the causes of poverty at the local community level;

(b) participation in the development process to attain a better standard of living for the communities;

(c) formation of community organizations and coordination of their activities through participation in the planning and execution of local and regional development projects;

(d) stimulating the creative capacity of local communities for addressing local development problems; promotion of mutual help and self effort with the participation of government agencies, municipalities, and private utilities.

(3) Description of DIDECO

Up to December 1977 (FOCCO) DIDECO was an autonomous entity reporting directly to the president of the country. In January 1978, it became a division of the Ministry of the Interior, maintaining its original goals and objectives through the promulgation of Decree Law Number 425, published on December 22, 1977.

DIDECO's main goal is to facilitate community development by offering the following services, which form its working strategy:

- projects for community development through cooperatives
- projects for coordination of community development
- assistance in the promotional activities of the communities of the country, and training community leaders and local authorities.

DIDECO has trained numerous community leaders and local authorities in support of its activities. In the period July 1976-June 1977 DIDECO undertook over 137 diverse educational activities in which 3,613 persons participated, providing for a total of 906 educational programs in community development since July 1972 with a total of 37,483 participants. DIDECO provides on-the-job training in the area of

construction including use of materials, tools, construction principles and maintenance. Three days basic training plus the time of duration of the particular subproject is the usual course length. In addition, in-house short-term seminars lasting up to six days are organized in areas such as human relations, group dynamics, group organization, community development, and home education with basic emphasis on nutrition.

DIDECO, on an as-needed basis, can draw upon human resources from other GOES agencies such as CENTA and the Ministry of Health to provide short-term training in usage of pesticides, fertilizers, new seeds, and use of latrines and potable water systems, for example.

Since its inception, DIDECO, has been involved in the development of numerous subprojects that attempt to resolve different types of problems within El Salvador's communities. As of June 1977 DIDECO had completed over 5,000 projects including community roads and bridges, schools, water supply systems, health related projects, and community centers. The experience gained by DIDECO in the promotion, organization and execution of these small community projects has been considerable. In the most recent period, July 1976 to June 1977, DIDECO had completed 788 different projects.

With regard to small scale irrigation, DIDECO has undertaken the development of six subprojects involving approximately 542 hectares of irrigated land. DIDECO has coordinated with DGRD in the execution of these small, self help irrigation projects. Currently DIDECO has 10 additional requests from communities for which DIDECO does not have financing (see Annex 13).

DIDECO also manages the channelling of GOES and international donor funds to help in the development of communities by providing for the necessary community organization for their project proposals.

Of the projects developed jointly by DIDECO and the participating community, 40% of the subproject cost is financed by DIDECO, and 60% is financed by the community, usually in the form of in-kind labor, material and other resources.

(4) Organization Structure

DIDECO is a division of the Ministry of the Interior, headed by a Director and supported by an assistant. DIDECO has 3 principal separate subdivisions undertaking projects. One division is responsible for a community level food help program directed toward low income groups as an incentive for their participation in community

development activities. The remaining two divisions are charged with the responsibilities of (1) administrating the activities that take place in all community-level subprojects, and (2) planning, coordinating, and executing subprojects.

Under these sub-divisions are 5 regional subdivisions with a great deal of functional autonomy for operations. These five operating subdivisions cover the entire country. Four have their regional head office geographically separated from the central offices. It is at the subregional level that direct contact with the communities takes place through DIDECO's 62 promoters. (see annex 10 for DIDECO's organizational chart).

At present DIDECO has a total of 495 full time, permanent staff members allocated at both the central and regional level.

(5) DIDECO's Responsibilities in the Project

DIDECO will be responsible for (1) generating requests for the irrigation sub-projects, (2) community labor organization, and (3) obtaining and delivering to the subproject site the necessary materials such as cement, stones, bricks, shovels, and other construction materials and equipment. In addition, it will gather pre and post subproject data on crops grown, yields and other information for the periodic evaluation of the project (see Part IV.C.).

(6) Summary

In summary, DIDECO has had considerable experience in the promotion of small community projects, community organization, and implementation of community development type activities as evidenced by the number of different types of subprojects undertaken over the last five years and the comparatively high degree of success these subprojects have had. The six irrigation subprojects DIDECO has helped to develop and construct are all successful and achieving the objectives of increasing small farmer employment and income. The project development committee thus believes that DIDECO has more than adequate capability to undertake the proposed project.

b. DGRD

The Dirección General de Riego y Drenaje (DGRD) is the branch of the Ministry of Agriculture responsible for all GOES sponsored activities in irrigation and flood control. The tasks of DGRD include conducting feasibility studies throughout the country; and within the two officially constituted irrigation districts, actually carrying through with the design and installation of irrigation infra-

structure. To date DGRD has carried out studies, and in two cases of large scale irrigation, the actual construction, bringing 22,000 hectares of land under irrigation. This includes feasibility studies and design work for the six existing DIDECO small irrigation projects totalling 540 hectares. In addition DGRD has produced plans and designs for projects that control the flooding of more than 3800 hectares.

As the organization chart in Annex 11 indicates, DGRD offices are set up by function and geographical areas on the "line" side and by the administrative and planning functions on the "staff" side. DGRD employs approximately 120 people in all categories including 48 professionals who have various backgrounds in civil engineering, surveying, and hydraulic engineering who provide the technical support to all irrigation activities and subprojects.

As the principal support institution for DIDECO's irrigation activities, DGRD has proven very competent in its past undertakings and is expected to provide continued excellent support to DIDECO in the implementation of the loan.

c. CENTA

The Centro Nacional de Tecnología Agropecuaria (CENTA) has the responsibility for carrying out the objectives of the GOES in the areas of agricultural research and extension. These stated objectives are increased agricultural production, greater participation of the small farmer in the rural development process, and increased employment in the agricultural sector.

CENTA, as a combined research and extension operation was created as an "autonomous" agency of the Ministry of Agriculture (MAG) in December 1971. CENTA has autonomy in scientific, technological and internal administrative affairs and obtains funding through the normal budgeting process of the Ministry of Agriculture. The Director General of CENTA is appointed by the Minister of Agriculture and the Director General's administrative staff includes an administrative office, an office for the coordination of foreign advisors, an audit office, an information and editorial office, and a research and education library.

CENTA operations are divided between three functional divisions: Agricultural Research, Extension, and Seed Technology. Only the first two divisions are of direct concern to the implementation of this loan, the Seed Technology division being more of a commercial sale operation.

The Research Institute is made up of the following departments: agronomy, soils, parasitology, animal husbandry, entomology, agricultural engineering, agricultural economics, and statistics.

The Institute's program is divided into activities covering well defined geographical areas. There is a close relationship between the research and extension functions in the same area and countries in Latin America; however, some areas are particularly well brought together under one roof such as the one in Chile. International cooperation has been made and IRI's management is very interested in promoting to make further progress in these areas.

One of the primary objectives of IRI's has been to identify through research the most viable agricultural crops that are locally feasible for production in the tropics, to identify the technological and human skills requirements, and to determine technologies and techniques that can be transferred to the small farmer community. In addition, IRI's research and extension work is directed to develop studies of traditional basic crops such as corn and beans to be able to utilize them to be used for new, better productive purposes which require the ability of the country to produce better yields and productivity. IRI's also is extremely interested in soil erosion management and erosion control to increase small farmer output on the existing limited land base.

4. The Office of Small Farm Programs, IRI, Chile

Annex 2 includes a complete description of the proposed personnel complement of the office and the estimated salary schedules and proposed expenditures. These personnel will be funded out of increased budgetary expenditures in 1973 and 1974, and except for the 1974 estimated amount, will be covered by regular science and IRI's resources, with long term contracts and permanent staff. This budgetary allocation will be requested as a separate item in the initial distribution. The office will be administered by a director from IRI and 10-12 staff persons from IRI.

A project director will be hired from the IRI to supervise the overall management of the project. The project will be funded in 1973 through the IRI's budget and in 1974 through the loan. Additional expenditures are estimated to be \$1.5 million in 1974, in addition to the \$1.5 million in 1973. It is estimated that this additional expenditure will be covered by the IRI's resources and the loan. The project will be administered by a project director from IRI and 10-12 staff persons from IRI. The project will be administered by a project director from IRI and 10-12 staff persons from IRI. The project will be administered by a project director from IRI and 10-12 staff persons from IRI.

assistance to DGRD and DIDECO on the development of these water users associations. This will be provided during the early stages of project implementation and focus specifically on the development of by-laws, operating procedures for water allocation and possible additional protective measures for the target group against non-association members.

The main functions of the OSSIS will be to centralize project implementation responsibility, provide a sub-organizational unit for the additional staff needed to undertake the project and to serve as a mechanism to join and coordinate the efforts of DGRD and DIDECO.

Personnel of the OSSIS will be primarily responsible for making and adapting appropriate designs for small scale irrigation systems, determining the feasibility of irrigating a subproject site, supervising construction activities, providing initial technical assistance to subproject beneficiaries on the general maintenance of their systems and assisting the DIDECO promoters in organizing the water user associations in each community.

DIDECO's promoters will serve as the OSSIS link to the subprojects and their respective communities. Currently, DIDECO has a full time staff of 62 promoters trained in community development and organization. These promoters are scattered throughout the country in 5 regional divisions and 61 zones, one for each promoter. Each promoter is trained by DIDECO staff on different techniques of community development in 2 or 3 different community development courses held each year at the Ministry of Interior. Throughout the year, therefore, DIDECO's promoters continuously receive further training and upgrading of skills. In recent years, DGRD has experienced relatively little turnover of its promoters, a well-trained and established cadre of community development specialists thus exists for this project.

Institutional Development

The institutional development aspect of the project is aimed at: (1) the gain of accumulated experience (loan disbursement period) in developing small scale irrigation projects; (2) the addition to the staff of DGRD of engineers-agronomists trained in irrigation systems, in extension training to approximately 100 CENTA extension agents in irrigation water and land use; and (3) a basic inculcation of the Association and community of small scale irrigation systems to serve small farmers among the personnel of both the DGRD and DIDECO.

It is expected that the OSSIS will remain in some form in the organizational structure of DGRD after the 5 year disbursement period of the loan. This expectation is reinforced by the fact that the majority of the personnel of the project office will be trained during the life of the project and more than likely will become

institutionalized in DGRD. The Director of DGRD has indicated to the Mission project development committee his belief in this regard. The training for the 4 engineer agronomists is expected to provide professional personnel with a working knowledge of and an inclination toward the development of small scale irrigation systems that should remain beyond the life of the project. The short term training will provide a relatively large number of extension agents with practical training in water and land use management which they presently do not have and do not receive at the national agricultural school.

DIDECO's promoters will gain abundant experience during the life of the project through the community development tasks required for the organization of each subproject for each community. The experience will complement their in-house training and provide them with a fund of knowledge which cannot be gained in the classroom. Since DIDECO was founded there has been relatively little turnover among promoter personnel so this experience is expected to largely remain in DIDECO.

Increased capacity for inter-ministerial coordination is expected to result from the project. DIDECO and DGRD will be functioning for 5 years in a complementary manner to develop and construct irrigation subprojects amounting to approximately 5000 hectares.

3. Selection Criteria for Subprojects

a. General Aspects

The project development committee considered numerous types of selection criteria during the course of development of the project. A number of discussions were held with officials of DIDECO and DGRD on different criteria and the effects they would have on project implementation. The subject of selection criteria is a difficult one to address in a completely quantitative manner whereby if a subproject were to comply with the elements of a "list" of criteria then that subproject would be eligible for financing.

In El Salvador, selection criteria for the project must take into consideration diverse aspects of a small farm or subproject site composed of small farms, including (1) size of farm, (2) class of soil, (3) topography, (4) ownership of land, and (5) overall productive potential of land as determined from historical data. Combining these aspects into a workable set of criteria that would serve to rationally discriminate among competing projects was undertaken by the project development committee.

The overriding aspect of any set of criteria and especially so in El Salvador given the extreme variation in land productivity potential, should be flexibility to respond to the differing situations of the small farm sector. In addition, the question of ownership of land is important for equity reasons. The major portion of project benefits should accrue to members of the small farm target group.

In order to consider these important points, the project committee, endorsed by DGRD and DIDECO, decided that, among others, a flat average farm size ceiling for determining eligibility of participants for each subproject site would be required. Given the diverse soil classes in El Salvador it is conceivable that the average farm size for a subproject site in the western part of the country could be 3 hectares while in the dry Northeast the average size could be 10 hectares. For any given subproject, however, the average size ceiling would probably vary within a range of from 1 to 5 hectares with 10 being the maximum average size to be permitted for any subproject site. The average estimated size of the irrigated portion of these holdings, however, is projected to be one hectare or less.

In addition to meeting the average size criterion for the total farms in this subproject, the beneficiaries of each subproject would have to demonstrate to the DIDECO promotor organizing the community and labor force that they would be able to profitably utilize the irrigation water by planting a second crop, diversifying production or intensifying present cropping patterns.

b. Technical Criteria for Site Selection

Selection criteria for selecting eligible sites will include the following technical criteria:

- stream proximity and physical potential for stream diversion and conveyance to project areas;
- dry season availability of water supply for the intended area to be irrigated, rights to appropriate water for intended use;
- irrigation potential of the intended acreage without substantial leveling of fields; and
- general agronomic potential of the land to be irrigated.
- determination of low flow of stream water by direct measurements during the dry season by DGRD engineers.

The eligibility of any possible project site will be determined by DGRD engineers and economists from the OSSIS using professional methods appropriate to each site.

c. Target Group Incidence

An issue of importance to AID is the degree to which small-scale irrigation projects aimed at small farmers incidently benefit large farmers inside the irrigation area served by the installation.

Using the information gathered in the Technical Analysis (See Annex 15), this estimate may be approached in two ways. First, we might assume that there will be no site selection criterion which favors sites with a certain proportion of large farmers in the irrigated area. Secondly, we might estimate the proportion of benefits going to large farms assuming that site selection criteria were used. In this second alternative we would be exploring the degree to which those sites appropriate for small-scale projects vary on the farm size variable. If site selection criteria were not used, 59% of the area in randomly selected sites would be in small farm irrigation, and 41% would be in larger farms. However, since the proposed project funds would only cover a portion of the potential gravity fed small scale sites in the country, it could be possible to select only those sites with "higher" small farm ownership concentrations for inclusion in the project given that the main purpose of the site selection criteria is to increase, to the extent possible, small farmer impacts.

The Mission used the segments in the Small Farm Irrigation Survey to test alternative selection criteria. If the mix of large and small farms is more or less the same in most irrigable segments (i.e. they are randomly distributed), there would be little sense in utilizing a selection system since any "randomly selected sites" would contain a very high concentration of small farms.

To inquire into this possibility, however, the project development committee first explored the variation of farm size concentration in the irrigable segments identified in the survey. Of the 40 segments sampled (including 697 farms and 2,243 Ha.), 12 included lands appropriate for irrigation by small scale gravity flow systems. By reviewing these 12 irrigable segments we find that 3 have more than 75% of the irrigable land owned by small farmers, 4 segments have less than 25% in small farms, 4 have between 25-50% in small farms and only one has between 50-75% in small farms. There is, therefore, considerable spread in the small farm concentration characteristics of the irrigable areas sampled and a high degree of variance in the farm size criterion. A "farm size concentration" site selection criterion appears, therefore, to make sense.

To explore what the actual criterion should be, the project development committee looked to the sample and determined how restrictive the criterion could be (i.e., how high could we require the small farm proportion of land in any given subproject site to be) without eliminating too many potential subproject areas from inclusion in the

project. Another way of stating this would be that if we start by selecting the segment with the highest small farm concentration, how far down the concentration scale would we need to come before exhausting the approximate magnitudes of project funds? Using the previously mentioned limited sample it would appear that if we were to restrict site selection to those sites whose irrigable area was 75% or more in small farms, we would reject three-fourths of the potential subproject sites but would reach 43% of all potential small farm irrigable land according to amount of small farmer land area owned. That is, from only 25% of the sites we would cover 43% of the small farm irrigable land based on the total amount of potentially irrigable land estimated from the sample. By lowering the site selection criterion to those sites with more than one-half of the land irrigable in small farms, the proportion of sites rejected would drop to 66% and the percentage of small farm area captured would rise to 53%.

At this stage the restrictiveness of the site selection criteria must be considered in order to concentrate benefits as much as possible in small farms, yet allow enough subproject sites to be selected to encompass the 5,000 hectares contemplated in this project. From the sample drawn, it would appear that 5,000 hectares could be irrigated by requiring that 75% of the land to be irrigated be target-group owned farms defined as 0-10 hectares.

This figure of 5,000 hectares is arrived by using the data from the previously mentioned 40 segment sample. In the sample there were 12 segments which contained potentially irrigable land. In 3 of these 12 segments small farmers owned 75% or more of the potentially irrigable land. (In these 3 segments, small farmers actually owned 90% of the potentially irrigable area.) These concentrations of small farmer owned irrigable land in the 3 segments represented 43% of the total amount of small farmer owned irrigable land in the 12 segments. This percentage when multiplied by the 12,000 small farmer owned irrigable hectares estimated from the 40 segment sample, yields slightly over 5000 hectares that could be irrigated under the project.

The Mission considers this to be a conservative amount of small farmer owned irrigable area for several reasons. The sample was taken using the sample frame of the Ministry of Agriculture which is composed of "open" segments. Open segments vary in size, are irregular in shape, and contain an inherent bias towards larger farms. This bias is caused by the fact that open segments are not all of equal size and do not cut across boundary lines of farms, but rather recognize all farm boundary lines. These boundary lines thus become the borders of each segment, hence the irregular shape and variance in size of the segments. Thus the sample results are probably quite conservative since the amount of small farmer owned irrigable land could be as much as 50% greater given this built-in bias towards larger farmers which in terms of average area owned are many times larger than the average small farmer.

Other studies in El Salvador have been made to estimate the amount of small farmer owned irrigable land in the country. The Tripartite Study estimated between 20,000 and 30,000 hectares of potentially irrigable small farmer owned land in El Salvador, also utilizing sample estimates and expanding them to national levels. Further, the GOES, in the 1971 Agriculture Census, estimated that over 300,000 hectares of land were potentially irrigable of which the MAG believed that 25,000 to 30,000 hectares could be small farmer owned land.

Using the previously mentioned Mission sample results of 43% small farmer owned irrigable land, a sensitivity analysis can be made on the estimate utilizing the Tripartite and GOES studies. Under the assumption that the Tripartite Study accurately represents the total potentially irrigable small farmer land in El Salvador, the estimate would vary between 8,600 to 12,900 hectares. Utilizing the GOES estimates of the 1971 Census would yield an estimate than would fall between 10,750 to 12,900.

Further, it should be mentioned that some sampling error exists in the 43% sample figure which represents the small farmer owned irrigable land using the Mission criteria. If the percentage concentration of small farmers were more on the order of 25%, then the total amount of small farmer owned irrigable land would approximate 5,000 hectares based upon an average of the three studies.

Thus, it appears that the Mission's demand estimate of potentially irrigable small farmer owned land in subproject sites which comply with the minimum 75% ownership criterion appears to be a conservative estimate.

Table 10

	Number of Farms	%	Number of Farms Owned	%	Land area worked in Owned farms	%
Less than 10 hectares	250,539	(92.4)	90,745	(84.4)	196,961.0	(17.8)
More than 10 hectares	<u>20,329</u>	(7.6)	<u>17,269</u>	(16.0)	<u>908,433.5</u>	(82.2)
	279,868	(100.0)	108,014	(100.0)	1,105,394.5	(100.0)

SOURCE: USAID/El Salvador Agricultural Sector Assessment, June 1977.

Table 10 shows the distribution of owned land by target group (less than 10 hectares) and non-target group (more than 10 hectares) farmers. Approximately 76% of all farms were owned by their operators in 1971. Assuming a normal distribution, any given land area randomly selected for a subproject would have 76% of the land privately owned and of that about 18% would be owned by target group farmers and 82% by non-target group farmers. Most likely, however, as demonstrated by the data from the sample segments, the distribution is quite skewed, that is, there are areas with high concentrations of target group farms and other areas with high concentrations of larger farms. It can probably be assumed that the concentrations of target group farms would be found, by and large, in small and relatively isolated valleys, areas which would be proposed for irrigation subprojects under the loan.

Given the fact that small farmer concentrations probably do exist, the rather large disparity between target and non-target group farmers in terms of the quantities of land owned by each group becomes crucial. It would appear that any site selection criteria which would require a major difference from the census in the quantities of land owned by non-target farmers would severely limit the number of subproject sites available for selection for the total project. Even through the concentration of target group farms is not quantifiable given current available data, the fact that only 18% of the land farmed is owned by target group farmers, an ownership criterion imposed which did not closely reflect the ownership patterns shown by the census data could drastically reduce the number of subproject sites available for selection, potentially rendering the project unfeasible.

The project development committee, with the foregoing information in mind, has developed criteria which reflect the inherent trade off between sharpness of target group incidence and feasibility of project implementation. These criteria are summarized in the following section.

d. Summary of Selection Criteria

Delineated in a stepwise manner, the project site selection procedure and illustrative implementation plan for the typical subproject would be as follows:

Step 1. DIDECO promoters will determine community interest.

Step 2. DGRD Engineers will conduct feasibility studies to determine availability of water and whether plot topography will permit gravity irrigation. Determination will be made of the estimated length of primary canal needed to service the site. The engineers will also make a determination regarding the possible environmental impacts using the Impact Identification and Evaluation Form. This form will be submitted to the project advisor and reviewed, if need be, by the project committee to be formed.

Step 3. If the subproject has been determined technically feasible and community interest is strong, DIDECO Promotors will gather information from the potential project participants including land tenure patterns, farm size, and potential income which could be derived from an irrigation subproject. This information will be gathered in a group meeting using a simple survey form to be developed. These data will then be analyzed by the project advisor, DIDECO and DGRD economists.

Each feasible subproject must meet the following criteria:

- Based on the total amount of land to be irrigated within each subproject site, not less than 75% must be owned by target group farmers.
- At least 80% of the subproject participants must be target group farmers;
- The average size farm for each subproject site must not exceed 10 hectares.
- Based on the promotor's data collection and the observations and analysis of the OSSIS with assistance from DIDECO's and DGRD's economists, the estimated total discounted yearly income flows for the entire subproject (over a 25 year period) must exceed the estimated initial total investment and any other additional costs.

Step 4. Given sufficient community interest, demonstrated technical and economic feasibility, and compliance with the criteria noted in Step 3, the project committee along with the project advisor, will approve the subproject for construction.

- Step 5. DGRD will complete final engineering designs for the subproject, approve the subproject to utilize the water source for irrigation and grant the subproject whatever easement rights are required for construction of the main canal. DIDECO will organize the water users association to the extent necessary to regulate and allocate the flow of water among all subproject beneficiaries, and also will organize the community labor force for construction.
- Step 6. DIDECO will obtain and deliver to the site all the necessary building materials and commence construction. DGRD personnel assigned to the project office will supervise construction activities.
- Step 7. The water users association will be given technical assistance by DGRD on operation and maintenance of the irrigation system. CENTA will provide water use and agronomic assistance.
- Step 8. DIDECO promoters will obtain post data on subproject performance after one complete wet and dry season following completion of construction and provide this data to the project advisor for use in evaluations.

The criteria in Step 3, except for the average farm size criterion, will be applied on an average basis for the total project implementation. That is, throughout the implementation of the project and for the average of all subproject sites selected as an aggregate, the criteria in Step 3 will be enforced. Given sufficiently high moving averages, a particular subproject could be selected which did not meet all of the Step 3 criteria, but which nonetheless served at least 50% of the small farmer target group based on amount of land owned. The average farm size criterion would always have to be met, however, to insure that every subproject benefitted principally small farmers.

The selection criteria proposed by the Mission require that small farmers own their land. Tenant farmers will not be eligible to participate in a subproject under the present design. Future Mission projects in small scale irrigation could include tenant farmers as project beneficiaries, however, since the GOES has become aware of the distribution of equity problem between landlords and tenants. The GOES recently passed a law of land rents which requires that landlords essentially provide 3 year rental terms at the same level of rental

payment to all tenants. The present law does not, however, provide sufficient real tenancy protection for renting farmers. Therefore the Mission's selection criteria impose the requirement of ownership in all proposed subproject beneficiaries. The selection criteria also will require that all farmers, both target group and nontarget group, who benefit from the irrigation system installation, be members of the subproject site users association.

e. Attention to Critical Areas

The current GOES 5-Year Plan (1978-1982) has designated certain parts of the country as "critical areas." These critical areas are comparatively underdeveloped vis-a-vis the rest of the country and generally lack resources, infrastructure and prior GOES attention. The 5 year plan states that the GOES will attempt to emphasize development of these critical areas by inclining the 53 planned public sector programs contained in the plan toward these areas whenever and wherever possible.

DIDECO's promoters are aware of this policy decision of the GOES and will attempt to locate and organize communities having interest in developing subprojects that are located in the critical areas. Generally, both the northern frontier and then southern pacific coast of El Salvador are considered by the GOES to be critical areas in need of additional government attention.

B. Implementation Plan

1. Schedule of Project Activities

As shown in the project CPI network flow chart (Annex 8), the initial activities of the project will center around meeting conditions precedent, contracting for technical assistance (the project advisor), and completion of the extension agent training plan. In addition, construction on the first 500 hectares should begin approximately six months after loan signature. This initial construction will start at a propitious time since the dry season will be starting.

The Mission plans for loan signature in late August. Initial construction would therefore, start in January 1979 if no problems are encountered in meeting conditions precedent or obtaining a suitable project advisor.

Beyond meeting conditions precedent and acquiring a project advisor, project activities will be, for the most part the promotion, design and construction of the actual subprojects. The

project development committee in conjunction with officials of both DGRD and DIDECO believe that up to 5,000 hectares can be brought under irrigation over the five year life of the project through some 50 or more subprojects.

It is expected that construction on an additional 1,000 hectares could begin approximately 12 months after loan signature. Construction on the remaining 3,500 hectares is expected to be fully underway approximately 36 months after loan signing. Time for construction will vary according to each subproject. Most subprojects should not take longer than one or two dry seasons (each dry season lasts approximately six months) to complete construction of major canals and other infrastructure needed. Secondary and tertiary canals actually providing the irrigation water to crops can be dug at any time during the year and do not require long dry periods for their completion.

Throughout the loan disbursement period, the project advisor will continuously evaluate project progress, with the assistance of short term consultants, if needed. Evaluations of each group of subprojects with construction completed will be undertaken on a sample basis. A final evaluation will be undertaken after disbursements have terminated (See Part IV.C. Evaluation Plan).

2. Supervision and Monitoring

Daily supervision and monitoring of project progress will be the responsibility of the loan financed project advisor. The Mission engineer will maintain close contact with the project advisor and continue his close contact with the officials of DGRD and DIDECO. OSSIS personnel from DGRD will supervise the actual construction of the subprojects. The project advisor will ensure that sound construction practices are followed and that work conforms to required specifications.

To facilitate project implementation, a project committee will be formed composed of personnel from the Ministry of Interior (DIDECO), the Ministry of Agriculture (DGRD), and the USAID. Membership on the committee is expected to number 7 persons. The Ministry of Interior would be represented by the Director of DIDECO and an assistant who would have delegation of authority power in the Director's absence. The Ministry of Agriculture would be represented by the Director of DGRD and his assistant. The USAID would be represented by the project manager who would be a member of the Rural Development Division, the loan officer and the Mission engineer. This committee would meet regularly and on an ad-hoc basis to resolve any special problems or make any policy decisions with regard to the project's implementation. The Mission has had successful experience working with this type of inter-agency committee approach to project implementation under the IRA loan 519-T-019 and expects this type of arrangement will work well for the proposed loan.

The overall Mission role in project monitoring and supervision will be limited to review and joint approval of subprojects through the project committee. The Mission engineer will review all subproject plans to check for technical feasibility and also make periodic inspection trips to review construction progress. The Rural Development Division of the Mission will be responsible for overall project implementation and will assist DIDECO/DGRD in contracting for the project advisor and any other technical assistance needed. The Capital Development Office will contribute to the implementation effort as required and support the Mission engineer (the Mission engineer is attached to the Capital Development Office) as necessary. The Controller's Office will also contribute to implementation as required and also process all reimbursement requests.

The periodic evaluations to take place in addition to the continuous supervision of the project by the project advisor will act to coordinate and focus both routine and nonroutine implementation problems and assist in their resolution.

3. Procurement

Goods and services procured under the loan will have their source and origin in El Salvador and in countries included in Code 941 of the A.I.D. Geographic Code Book.

The Mission has estimated that approximately \$275,000 of loan funds will be used to acquire vehicles and transport equipment. Loan funds amounting to \$340,00 have been set aside to pay for the project advisor, short-term technical assistance and training. It is not expected that any construction materials or equipment will be required from the U.S.. Construction will be uncomplicated, of an appropriate technology nature, and will not require any sophisticated equipment beyond such items as surveying instruments, altimeters and certain water measuring devices which can be purchased locally. The procurement of these goods, to the extent undertaken, will conform to A.I.D. requirements.

The remainder of loan provided funds will be applied to the local currency costs for construction materials such as cement, bricks, plastic and metal piping, small pumps, steel reinforcing rods, metal outlet doors for canals and minor tools, etc..

4. Disbursement Procedures

The project development committee has negotiated with DIDECO and DGRD on the disbursement procedures to be followed for the loan. The Directors of both DIDECO and DGRD have indicated that a simple cost/reimbursement method for each subproject or group of subproject completed would be sufficient. This proposed method was judged feasible because both divisions, especially DIDECO have strong budget support from the GOES and sufficient latitude in internal budget management to shift funds from one activity to another when needed. In addition, the expected moderate construction time (2 dry seasons or less) for most projects will not place DIDECO in cash flow binds due to this flexibility. The Mission remains flexible on disbursement procedures, however. If during project implementation, cash flow binds do occur, the Mission would propose a more flexible arrangement whereby a procedure of periodic disbursements, based on actual costs incurred, would be made to DIDECO.

Other local currency disbursements of loan funds will be made according to A.I.D. procedures.

The project development committee considered the possibility of using the fixed amount reimbursement (FAR) procedure so as to encourage quality construction and streamlining of designs. The use of the subproject FAR method was rejected, however, due to the innovative nature of the project and the high degree of variance that exists in the types of subprojects to be undertaken. Topography, altitude, characteristics of the land sites and the diverse nature of water sources all made the use of FAR cumbersome since standard cost units cannot be developed.

C. Evaluation Plan

Project evaluation will focus on two objectives: (1) evaluation on a continuing basis to provide information on the operation of the OSSIS so that any aspects of the project's operation which detract from effective implementation are quickly noted, understood and corrected; and (2) to review the project in terms of the success it achieves in meeting its purpose, sector goal and end-of-project-status indicators.

The project as conceived thus has two complementary evaluation components. Each component is integrally related given that success in one implies a high correlation for success in the other.

In order to evaluate the operation of the OSSIS so as to obtain information on the administration, monitoring, and effective development of subprojects at the community level, the Mission plans to require monthly progress reports from the project advisor, quarterly reports from the borrower (OSSIS), and semi-annual joint reviews with

the project efforts are concentrated on the field level and focus upon such activities as the training of personnel by the personnel of the project, the provision of engineering designs, the provision of technical assistance and extension services to the farmers, the provision of irrigation system construction, the provision of equipment and the general advisory and technical assistance to the farmers of each subproject.

Much of this information will be reported to the project through out in the field and by the project personnel through reports, ad-hoc field trips, teleconferencing of project personnel and the observation of the field activities.

In order to help the farmers of the project to achieve the objectives as stated in the project framework, the project will provide financing for short term technical assistance and extension services to be undertaken by contracted personnel from other countries having technical experience in water use management in small scale systems.

In general terms, the progress evaluation of the project will concentrate upon three main areas which directly demonstrate the production and productivity of the water farmer beneficiaries as a result of their participation in a small scale irrigation project. Production and productivity impacts can be measured by the following standard variables:

- The additional land brought under production as a result of the irrigation subprojects
- Crop yield increases
- Evidence of multiple cropping or general diversification of cropping patterns (i.e. a shift from traditional paddy basin grains production to a range of high value crops)
- Erosion control
- Time during year which land is owned and cultivated
- Amount of pasture land maintained
- Amount of labor required per unit of crop production

Income and employment changes as a result of the project will also be measured in the evaluations. Increases in farm gate income as a result of irrigation represent the main variable to be measured to determine the income impact of the project. Other peripheral impacts may also be viewed such as increased home consumption of production and resulting higher nutritional intake.

Employment impacts can be readily measured by DIDECO's promoters by keeping before and after data on the number of man-days of on-farm labor required for the subproject as a result of irrigation. Non-family and off-farm workers hired as a result of each irrigation subproject in addition to the increased use of family labor will help to show the general employment effect of the project. Other indicators as appropriate to each subproject will also be developed and used if they are subject to measurement and deemed important by the project advisor and the OSSIS.

The measurement of the previously mentioned indicators on a before and after basis will enable both the USAID and the GOES to review the effectiveness of the project. Evaluation of the OSSIS will permit the GOES to see if the administrative structure created for the project's implementation has been effective. Subsequent continuing budgetary allocations after the disbursement period could be made by the GOES based on demonstrated performance and potential for replication.

The cost effectiveness of the project will be determined by measuring over a series of subprojects, the average cost per hectare per farm family benefitted, and by using the average total cost per subproject undertaken during the life of the project and comparing these figures to other irrigation subprojects undertaken in the country on a per hectare basis.

One of the functions of the loan financed project advisor will be to further refine and specify the previously mentioned indicators and develop additional indicators as required. The project advisor will maintain close contact with all personnel in the project office in addition to meeting with DIDECO's promoters in the field. High level contacts with officials of both the Ministry of Agriculture and the Ministry of Interior will also be maintained to make sure that these officials will have the necessary access to project information.

The project advisor will arrange for evaluations in a representative sample of the subprojects whose construction has been completed and which have had one complete rainy and dry season after construction. The evaluations will measure the previously mentioned variables and indicators against baseline data gathered by DIDECO's promoters prior to the initiation of construction of the project. Included in the evaluations of each subproject site will be numerous interviews with small farmers in order to provide additional detail to round out the financial data to be gathered.

Subsequent evaluations will take place in a similar manner. Out of the second group of subprojects with construction completed, the project advisor also will select a representative sample for measurement of post irrigation results.

The final evaluation will be arranged by the Mission and the project advisor in concert with the Directors of both DGRD and DIDECO. This evaluation will be based on a sample of all the subprojects completed during the five year disbursement period of the loan using pre-irrigation baseline data and comparing this with post irrigation information collected by the promoters. The final evaluation will be followed by a loan completion report prepared by the Capital Development Office of the Mission.

Both Directors of DGRD and DIDECO have indicated to the USAID enthusiasm for the evaluation aspect of the project. They have agreed to contribute manpower and resources in addition to those of the OSSIS, if needed.

D. Conditions, Covenants and Negotiating Status

1. Conditions Precedent and Covenants

Conditions precedent to disbursement and covenants additional to the standard conditions and covenants A.I.D. requires are included in the Draft Loan Authorization located in Annex 4.

2. Negotiating Status

The Small Farm Irrigation Systems Loan was developed by the USAID/El Salvador Capital Assistance Committee working closely with both DGRD and DIDECO. These two agencies are familiar with all details contained in this Project Paper. The Directors of the two divisions and appropriate staff members have seen translations of parts I.C. (Project Description) and part IV (Project Implementation). The conditions and covenants in the Draft Authorization were fully discussed with DGRD and DIDECO. All key aspects of the project have been discussed and complete mutual agreement has been reached.

In summary, all parties are familiar with the contents of the paper and no unusual problems are foreseen in negotiating the loan agreement.

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ECON
POL
POLRA
USIS
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ADMIN
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INCOMING SAN SALVADOR

REPUBLIC OF SALVADOR
CONTROL: 1150
DEC - 9 1976 DATE
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TO

DE RUEHC #9091/1 3440707
ZNR UUUUU ZZH
R 090025Z DEC 76
FM SECSTATE WASHDC
TO AMEMBASSY SAN SALVADOR 7713
BT
UNCLAS STATE 299091

DEC 09

AIDAC

E.O. 11652: N/A

ANNEX 1

TAGS:

SUBJECT: SMALL FARM IRRIGATION SYSTEMS PRP

INFORMATION COPY

1. THE DAEC REVIEWED AND APPROVED THE SUBJECT PRP ON NOVEMBER 10, 1976. THE FOLLOWING POINTS SHOULD BE TAKEN INTO ACCOUNT--IN DEVELOPING THE PROJECT.

. PROJECT PURPOSE. THE DAEC FELT THAT THE PROJECT PURPOSE SHOULD EMPHASIZE DEVELOPING AN EXPANDED GOES CAPABILITY TO ADDRESS THE BROAD NEED FOR SMALL FARM IRRIGATION SYSTEMS, RATHER THAN FOCUSING ONLY ON THE 10,000 HECTARES TO BE IRRIGATED THROUGH THE PROPOSED PROJECT. THE PP SHOULD DEFINE MORE PRECISELY THE UNIVER OF OWNER-OCCUPIED SMALL FARMS (NUMBER, AREA, AND LAND TENURE) FOR WHICH CONSTRUCTION OF SMALL IRRIGATION SYSTEMS MIGHT BE FEASIBLE. ASSUMING THAT THIS NUMBER IS SIGNIFICANTLY HIGHER THAN THE 10,000 HECTARES THAT WILL BE ADDRESSED THROUGH THE PROJECT, THE PP SHOULD DISCUSS THE MANNER IN WHICH THE PROJECT WILL BE REPLICATED. CONSIDERATION SHOULD BE GIVEN TO INCORPORATING INTO THE PROJECT DESIGN: DEMONSTRATION PROJECTS; PUBLICITY CAMPAIGNS TO DISSEMINATE INFORMATION ON SUCCESSFUL PROJECTS TO OTHER SMALL FARMERS; AND A CONTINUING GOES COMMITNT

TO PROVIDE FUNDING FOR CONSTRUCTION MATERIALS, TECHNICAL ASSISTANCE AND SUPPORTING SERVICES (INCLUDING ASSISTANCE IN SECURING FARM OWNERSHIP) TO SMALL FARMERS.

3. SUBPROJECT SELECTION CRITERIA. A DETAILED BREAK-DOWN OF THE CRITERIA TO BE APPLIED IN SUBPROJECT SELECTION SHOULD BE INCLUDED IN THE PP. CONSIDERATION SHOULD BE GIVEN TO INCLUDING OVERALL AGRICULTURAL SECTOR PLANS, MARKETABILITY OF INCREASED PRODUCTION, AND ENVIRONMENTAL EFFECTS IN THE SELECTION CRITERIA. A MINIMUM BENEFIT/COST RATIO SHOULD BE ESTABLISHED. AS SMALL FARMER OWNERSHIP OF ALL LANDS TO BE BENEFITTED UNDER EACH SUBPROJECT WILL BE A GENERAL REQUIREMENT, THE CRITERIA SHOULD SPECIFY THE CIRCUMSTANCES UNDER WHICH EXCEPTIONS MAY BE MADE.

UNCLASSIFIED

4. BENEFIT INCIDENCE. THE DAEC WAS VERY CONCERNED ABOUT THE BENEFIT INCIDENCE OF THE PROJECT. THE PP SHOULD DESCRIBE IN DETAIL THE MEASURES (IN ADDITION TO THOSE INCLUDED IN SUBPROJECT ELIGIBILITY CRITERIA) THAT WILL BE TAKEN TO ENSURE THAT PRIMARILY SMALL FARM-OWNER OCCUPIERS BENEFIT FROM THE PROJECT. THE PP SHOULD ANALYZE THE EXTENT TO WHICH LANDLORDS AND OWNER OCCUPIERS OF LARGER FARMS MAY BENEFIT, INCLUDING A DESCRIPTION OF THE SPECIFIC MEASURES THAT WILL BE TAKEN TO PROTECT RENTERS FROM BEING ABUSED OR DISPLACED BY LANDLORDS.

5. REPLICABILITY. THE DAEC AGREED THAT SUBLOAN FINANCING OF CONSTRUCTION MATERIALS TO THE SMALL FARMERS WOULD NOT BE NECESSARY AS LONG AS THE GOES COMMITS ITSELF TO PROVIDE ADDITIONAL FINANCING FOR FEASIBLE SUBPROJECTS AFTER THE PROJECT COMPLETION DATE OR MAKES OTHER PROVISIONS TO ENSURE REPLICABILITY OF THE PROJECT ONCE AID INVOLVEMENT TERMINATES. THE DAEC SUGGESTS THAT THE MISSION CONSIDER THE ALTERNATIVE OF INSTITUTING A SUB-LOAN FINANCING MECHANISM THROUGH THE PROJECT, ESPECIALLY IF THE COST/BENEFIT ANALYSES CLEARLY DEMONSTRATE SMALL FARMER REPAYMENT CAPACITY.

6. TRAINING AND TECHNICAL ASSISTANCE. THE PP WILL REVIEW THE TOTAL TRAINING AND TECHNICAL ASSISTANCE NEEDS OF SMALL FARMERS AND GOES IMPLEMENTING AGENCIES. THE TRAINING NEEDS ANALYSIS SHOULD COVER, AT A MINIMUM: INTRODUCTION OF APPROPRIATE PRODUCTION TECHNOLOGY (INCLUDING SHIFT TO HIGHER VALUE CROPS), AND LAND CONSERVATION PRACTICES TO BE USED ON IRRIGATED LANDS; WATER

USE; IRRIGATION SYSTEM MAINTENANCE; AND, TRAINING OF TRAINERS IN ALL THESE AREAS. TRAINING OF FOCCO/DGORD PERSONNEL IN SUBPROJECT COST/BENEFIT ANALYSES MAY BE NECESSARY.

7. SUPPORTING SERVICES. THE PP SHOULD ANALYZE HOW PRODUCTION INPUTS (SUCH AS CREDIT; RESEARCH RESULTS; FERTILIZERS, TILLAGE EQUIPMENT, AND OTHER AGRICULTURAL INPUTS; AND TECHNICAL ASSISTANCE) WILL BE SUPPLIED TO THE BENEFITTING FARMERS TO ENABLE THEM TO MAKE EFFICIENT USE OF THE IRRIGATED LANDS. PERHAPS AGREEMENTS WITH THE AGRICULTURAL BANK AND CENTA SHOULD BE CONSIDERED TO ENSURE CREDIT AND TECHNICAL ASSISTANCE, RESPECTIVELY. THE SMALL FARM CREDIT PROJECT, IF APPROVED, MAY ALSO BE A POSSIBLE SOURCE FOR THE OTHER INPUTS.

8. SUBPROJECT MAINTENANCE. THE PP SHOULD DISCUSS HOW SUBPROJECT MAINTENANCE WILL BE ENSURED. AN EXAMPLE OF A WATER USERS ASSOCIATION CHARTER AND BY-LAWS SHOULD BE INCLUDED AS A PP ANNEX, AND THE LEGAL AND OPERATIONAL RESPONSIBILITIES OF SMALL FARMERS IN MAINTAINING THE SYSTEMS SHOULD BE DISCUSSED IN THE TEXT. THE PP SHOULD ALSO ADDRESS WHAT WILL HAPPEN IF THE FARMERS FAIL TO MEET THEIR MAINTENANCE RESPONSIBILITIES.

9. PP PLANNING.

---A. SUBPROJECT FEASIBILITY ANALYSIS. IN ACCORDANCE WITH FAA SECTION 611(A), FEASIBILITY STUDIES AND DESIGNS SHOULD BE INCLUDED IN THE PP FOR AN ILLUSTRATIVE NUMBER OF REPRESENTATIVE PROJECTS TO ENABLE A FIRM COST BASIS TO BE ESTABLISHED FOR SUBPROJECTS. BENEFITS AND COSTS FOR THESE SUBPROJECTS SHOULD BE CALCULATED (AS PROVIDED FOR IN FAA SECTION 611(B) AND THE PRESIDENTIAL MEMO TO WHICH THAT SECTION REFERS) AND DISCUSSED IN COMPUTING

OVERALL PROJECT BENEFIT/COST RATIO.

---B. DEMAND FOR SUBPROJECTS. THE PP SHOULD CLEARLY DEMONSTRATE THAT DEMAND EXISTS FOR SUFFICIENT PROJECTS TO JUSTIFY THE LOAN AMOUNT REQUESTED IN THE PP.

10. ENVIRONMENTAL EFFECTS. THE DAEC AGREED THAT A NEGATIVE DETERMINATION IS APPROPRIATE FOR THE PROJECT. IF THE USE OF PESTICIDES ON THE IRRIGATED LANDS IS SUBSEQUENTLY PLANNED, THE PP SHOULD DISCUSS THE MEASURES THAT WILL BE TAKEN TO ENSURE THEIR PROPER MANAGEMENT, USE AND CONTROL.

11. PLEASE CONFIRM TDY NEEDS SPECIFIED IN PRP 90 DAYS PRIOR TO DATE NEEDED. SLUG CABLE FOR SER/ENGR. LA/DR UNDERSTANDS THAT MISSION WILL FUND THIS ASSISTANCE.

12. I.E. THE THRESHOLD DECISION OF THE AA WAS A NEGATIVE DETERMINATION. AN EA OR EIS WILL NOT BE REQUIRED. ROBINSON

BT
#9091

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT IDENTIFICATION DOCUMENT FACESHEET
 TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE
 A A = ADD
 C C = CHANGE
 D D = DELETE

PID
 2. DOCUMENT CODE
 1

3. COUNTRY/ENTITY
 El Salvador
 ANNEX 3

4. DOCUMENT REVISION NUMBER

5. PROJECT NUMBER (7 DIGITS)
 (519-0184)

6. BUREAU/OFFICE
 A. SYMBOL LA
 B. CODE 3

7. PROJECT TITLE (MAXIMUM 40 CHARACTERS)
 Small Farm Irrigation Systems

8. PROPOSED NEXT DOCUMENT
 A. 2 = PRP
 3 = PP
 B. DATE MM YY
 1 0 7 16

10. ESTIMATED COSTS
 (\$000 OR EQUIVALENT, \$1 = Q2.50)

FUNDING SOURCE		EFFORT
A. AID APPROPRIATED		2,000
B. OTHER		
1. U.S.	2.	
C. HOST COUNTRY		1,625
D. OTHER DONOR(S)		
TOTAL		3,625

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION
 A. INITIAL FY [7] [3]
 B. FINAL FY [7] [8]

11. PROPOSED BUDGET AID APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. FIRST FY		LIFE OF PROJECT	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	H. GRANT	I. LOAN
(1) FN	201	054			2,000		2,000
(2)							
(3)							
(4)							
		TOTAL					

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)
 022 032

13. SPECIAL CONCERNS CODES (MAXIMUM SIX CODES OF FOUR POSITIONS EACH)
 BF EQTY LAB PART TECH

14. SECONDARY PURPOSE CODE

15. PROJECT GOAL (MAXIMUM 100 CHARACTERS)
 To increase the production and productivity (production efficiency) of small subsistence level farmers and move them to where they can produce surplus to subsistence needs and successfully market this surplus.

16. PROJECT PURPOSE (MAXIMUM 100 CHARACTERS)
 To provide loan funds to the OMS to help the lower income farmers construct small supplemental irrigation systems. The project beneficiaries to provide self-help labor. This will extend the growing season and encourage two crops in some areas where only one is grown at present.

17. PLANNING RESOURCE REQUIREMENTS (staff/units)
 1 agricultural economist - 1 person-month
 2 or 3 irrigation specialists - 3 person-months

18. ORIGINATING OFFICE CLEARANCE
 Signature: *Boyd T. Whittle*
 Name: Boyd T. Whittle
 Title: Rural Development Officer
 Date Signed: MM DD YY
 056 2 1 7 16

19. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS
 DATE OF DISTRIBUTION
 MM DD YY
 1 1 16

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

Name of Country:	El Salvador
Name of Project:	Small Farm Irrigation Systems
Project Number:	519-0184

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan to the Government of El Salvador (the "Borrower") of not to exceed Two Million Three Hundred Thousand United States Dollars (\$2,300,000) ("Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required to carry out the project described in the following paragraph. The entire Authorized Amount will be obligated when the Project Agreement is executed.

The project consists of a program for the development of small-scale irrigation systems in order to increase the production and productivity of small farmers in El Salvador (the "Project"). The purpose of the Project is to expand the capability of the Borrower to assist low income small farmers obtain and utilize needed water resources. The Project will be implemented by the Office of Small-Scale Irrigation Systems ("OSSIS") formed by the Direccion General de Riego y Drenaje ("DGRD") of the Ministry of Agriculture ("MAG") and the Direccion de Desarrollo Comunal ("DIDECO") of the Ministry of Interior ("MOI").

I hereby authorize the initiation of negotiation and execution of a Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority, subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

I. Interest Rate and Terms of Repayment

The Borrower shall repay the Loan to A.I.D. in United States Dollars within twenty (20) years from the date of first disbursement of the Loan, including a grace

period of not to exceed ten (10) years. The Borrower shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

I I. Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed by A.I.D. under the Project shall have their source and origin in the Central American Common Market or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall be procured in any eligible source country except countries in the Central American Common Market.

I I I. Conditions Precedent to Disbursement

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, the Borrower shall furnish to A.I.D., in form and substance satisfactory to A.I.D.:

- (a) A time-phased implementation plan for the Project which shall include:
 - (i) the criteria for the selection of subprojects;
 - (ii) the criteria for selection of and plans for training of extension agents, engineer agronomists and community promoters;
 - (iii) a written agreement with the National Center for Agricultural Research ("CENTA") relating to the provision of extension services to the Project;
 - (iv) plans for the maintenance of the irrigation systems built under the Project;
 - (v) plans for the utilization of long and short term technical assistance; and
 - (vi) initial guidelines for the formation and operation of water users associations for the small-scale irrigation subprojects;

- (b) evidence of the establishment of OSSIS, with staffing acceptable to A.I.D.;
- (c) evidence of the allocation of adequate Borrower budgeting support to OSSIS; and
- (d) evidence of interministerial agreements providing for appropriate definition of the Project-related roles of DIDECO and DGRD.

IV. Condition Precedent to Disbursement: Subsequent to September 30, 1981

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, subsequent to September 30, 1981, the Borrower shall furnish to A.I.D., in form and substance satisfactory to A.I.D., a policy statement setting forth over a ten year period the plans of the Borrower with respect to small-scale irrigation development, including a commitment by the Borrower to engage in research and development of alternative systems.

V. Covenants

The Borrower shall covenant:

- (a) to carry out the Project in accordance with site selection procedures acceptable to A.I.D. and to ensure that beneficiaries of the irrigation system constructed under the Project are members of appropriate water users associations;
- (b) to cooperate with A.I.D. in establishing a Project Committee consisting of representatives of CENTA, MAG and MOI for the purpose of systematic oversight and evaluation of the Project;
- (c) to provide continuing budgetary and personnel support for the maintenance of irrigation systems built under the Project;
- (d) to provide, for at least five years after final disbursement under the Loan, sufficient budgetary allocations to DGRD and DIDECO to (i) maintain OSSIS staff at the same level as during Loan disbursement and (ii) maintain the same level of

small-scale irrigation subproject promotion and construction that took place during Loan disbursement;

- (e) to provide appropriate complementary services to the small farmer beneficiaries of the Project, such as production credit, agricultural production inputs and marketing information and support; and
- (f) to utilize the equipment acquired with Loan funds only in the implementation of the Project during the life of the Project, and only for the continuation of the organization, construction and maintenance of small-scale irrigation projects among the Project beneficiary group during the life of the equipment.

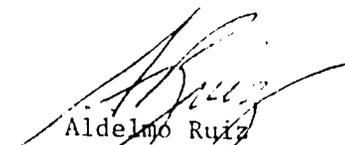
Assistant Administrator
Bureau for Latin America and the
Caribbean

Date

ANNEX 5

CERTIFICATION PURSUANT TO SECTION 611(a) OF THE
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Aldelmo Ruiz, the principal officer of the Agency for International Development in El Salvador, having taken into account among other factors the maintenance and utilization of projects in El Salvador previously financed or assisted by the United States, do hereby certify that in my judgement El Salvador has both the financial capability and human resources capability to effectively maintain and utilize the capital assistance project proposed in this paper: SMALL FARM IRRIGATION SYSTEMS.


Aldelmo Ruiz
Director, USAID/El Salvador

ANNEX 6

5C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

- | | |
|--|---|
| 1. <u>FAA Sec. 116.</u> Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights? | Yes. The project will provide basic small scale irrigation systems to small farmers to enable them to increase their production and productivity. (See Part II, A, 1 and B, 2 and Part III, C). |
| 2. <u>FAA Sec. 481.</u> Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? | No. |
| 3. <u>FAA Sec. 620(a).</u> Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba? | No. |
| 4. <u>FAA Sec. 620(b).</u> If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement? | Yes. |
| 5. <u>FAA Sec. 620(c).</u> If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government? | No. |
| 6. <u>FAA Sec. 620(e) (1).</u> If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? | No. |

- A
7. FAA Sec. 620(f). Will assistance be provided to Democratic Republic of Vietnam, South Vietnam, Cambodia, Laos, etc.
 8. FAA Sec. 620(h). Any way involved in military operations of any State or any vessel assistance, or log... of such... or aggression?
 9. FAA Sec. 620(i). Has the country permitted or failed to take appropriate measures to prevent the denial of destruction, by any action of its property?
 10. FAA Sec. 620(j). If the country has failed to... of guarantee... of appropriation, confiscation, has the... within the past year... assistance to such... for... reason?
 11. FAA Sec. 620(k). Fishermen's Protective Act, Sec. 5. If country... imposed any penalty or... any U.S. fishing activities in... national waters.
 - a. has any... required by Fishermen's Protective Act been...?
 - b. has complete denial of assistance been considered by AID Administrator?
 12. FAA Sec. 620(q). App. Sec. 494. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default... exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier... or appropriate steps taken to cure default?
 - *13. FAA Sec. 620(s). "If contemplated assistance is development loan (including Alliance loan) or security supporting assistance, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems?" (An affirmative answer may refer to the record of the taking into account, e.g.: "Yes as reported in annual report on implementation of Sec. 620(s)." This report is prepared at the time of approval by the Administrator of the Operational Year Budget.*

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* Upward changes in the Sec. 620(s) factors occurring in the course of the year, of sufficient significance to indicate that an affirmative answer might need review should still be reported, but the statutory checklist will not normally be the preferred vehicle to do so.) *

14. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No.
15. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? From the information available to the Mission, it appears that El Salvador is not experiencing problems in meeting its U.N. obligations.
16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? No.
17. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? No.
18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.? No.
19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? No.

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment.

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

El Salvador has demonstrated its commitment to involving the poor in development by undertaking various sectoral programs aimed at their needs. These programs include inter alia such AID financed projects as Intensive Small Farm Management, Family Planning and Population, and Educational Reform, which have the basic goals of increasing the incomes, employment opportunities, and overall standard of living of the country's poor

(1) El Salvador is supporting the expansion and improvement of its National Center of Agriculture Technology (CENTA) and its grain storage and distribution system operated by the government's Grain Price Stabilization Institute (IRA).

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- (2) Creating a favorable climate for foreign and domestic private enterprise and investment.
- (3) Increasing the public's role in the developmental process.
- (4) (a) Allocating available budgetary resources to development.
(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.
- (5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.
- (6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?

2. Security Supporting Assistance Country Criteria

a. FAA Sec. 502b. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section?

b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

c. 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?

(2) El Salvador has instituted the Investment Guaranty Program and encourages investment in the economy as a means to speed the development process.

(3) The project is aimed at providing basic and occupational skills to the urban and rural poor of the country thereby increasing the public's role in the development process.

(4a) From 1971-1975, between 13-20% of the government's expenditures went for investment purposes or the equivalent of about \$262 million.

(4b) Over the last five years, El Salvador has spent, on average, less than six percent of its budget for military expenditures.

(5) El Salvador is trying to improve its system of tax collection through, *inter alia* the AID financed National Cadaster Project and is attempting to address the land tenure problem through the Salvadoran Institute of Agrarian Transformation (ISTA). The government has been subject to criticism vis-a-vis its respect for the rule of law and individual freedoms and rights. However, the newly installed government has shown concern which provides hope that the situation will improve in this area.

(6) Yes.

c. N.A.

No.

N.A.

N.A.

N.A.

ANNEX 7

5C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

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

A. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)

(a) Describe how Committees on Appropriations 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 figure plus 10%)?

This loan project appeared in the FY 1978 Congressional Presentation.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

Yes. (See Part III, Section A)
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?

The need for further legislation is not expected.
4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

Yes.
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 the country's capability effectively to maintain and utilize the project?

Yes. (See Annex I, Exhibit 1.)

A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate?

No. The project addresses a country specific problem and is specifically designed therefor. The project will be carried out jointly by the Ministries of Agriculture and Interior.

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). 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; (c) encourage development and use of cooperatives, 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.

By providing small scale irrigation systems appropriate to the small farmer sector of El Salvador thus permitting an increase in production and productivity, the project will indirectly encourage all of the items listed.

8. FAA Sec. 601(b). Information and conclusion 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).

The project could indirectly provide for increased private U.S. participation in foreign assistance programs.

9. FAA Sec. 612(b); Sec. 636(h). 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 to meet the cost of contractual and other services.

El Salvador will contribute approximately fifty percent of the total project cost (See Part III, B). The U.S. holds no excess Salvadoran currencies.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

The project is designed to provide for the construction of numerous small scale irrigation systems throughout the country. Local community labor will be organized to construct the irrigation systems. This should have a positive effect on the development of cooperatives composed of small farmers.

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b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

The project will directly increase the production and productivity of the rural poor project beneficiaries.

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

N.A.

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

N.A.

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

N.A.

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(b) to help alleviate energy problem;

(c) research into, and evaluation of, economic development processes and techniques;

(d) reconstruction after natural or manmade disaster;

(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

B1

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

N.A.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

Yes. El Salvador is willing to contribute funds to the project and has so indicated in its loan request (See Annex 1, Exhibit 2)

d. 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?

N.A.

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on: (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

The project will particularly emphasize items 2, 3, 4, and 6 and will indirectly impact on the remaining items.

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

El Salvador has an urgent need to provide small farmers with appropriately sized irrigation systems in order to increase their production and productivity of labor. The project is designed to address this need and to develop the institutional capacity of the organizations involved in its implementation. The organization and use of self-help community labor will indirectly support increased participation in self government.

81

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). 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; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

2. Development Assistance Project Criteria (loans only)

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

The project will directly contribute to the development of productive capacities of the small farmer and his land. The project is directed toward the further social progress of the small farmer and is consistent with both GOES and AID development activities and long range goals. Part III A and D of the Project Paper provide information on the project's economic and technical soundness.

The project provides for the limited procurement of commodities and certain technical assistance from the U.S.. Most construction materials will be purchased locally. The project will not have any adverse effects upon the U.S. balance of payments.

Other international lending institutions have not indicated an interest in financing the project described in the PP.

The country appears capable of repaying the AID loan. Also, the terms of the AID loan appear reasonable and are legal under the laws of the U.S. and the host country.

Yes. (See Annex I, Exhibit 2.)

Yes. (See Part III, C of the PP.)

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

One hundred percent of the AID funds will be used to purchase technical services, equipment and supplies, and participant training from private sources.

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, 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.

3. Project Criteria Solely for Security Supporting Assistance

FAA Sec. 531. How will this assistance support promote economic or political stability?

N.A.

4. Additional Criteria for Alliance for Progress

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

Yes. The loan project will contribute to the economic and political integration of Latin America indirectly.

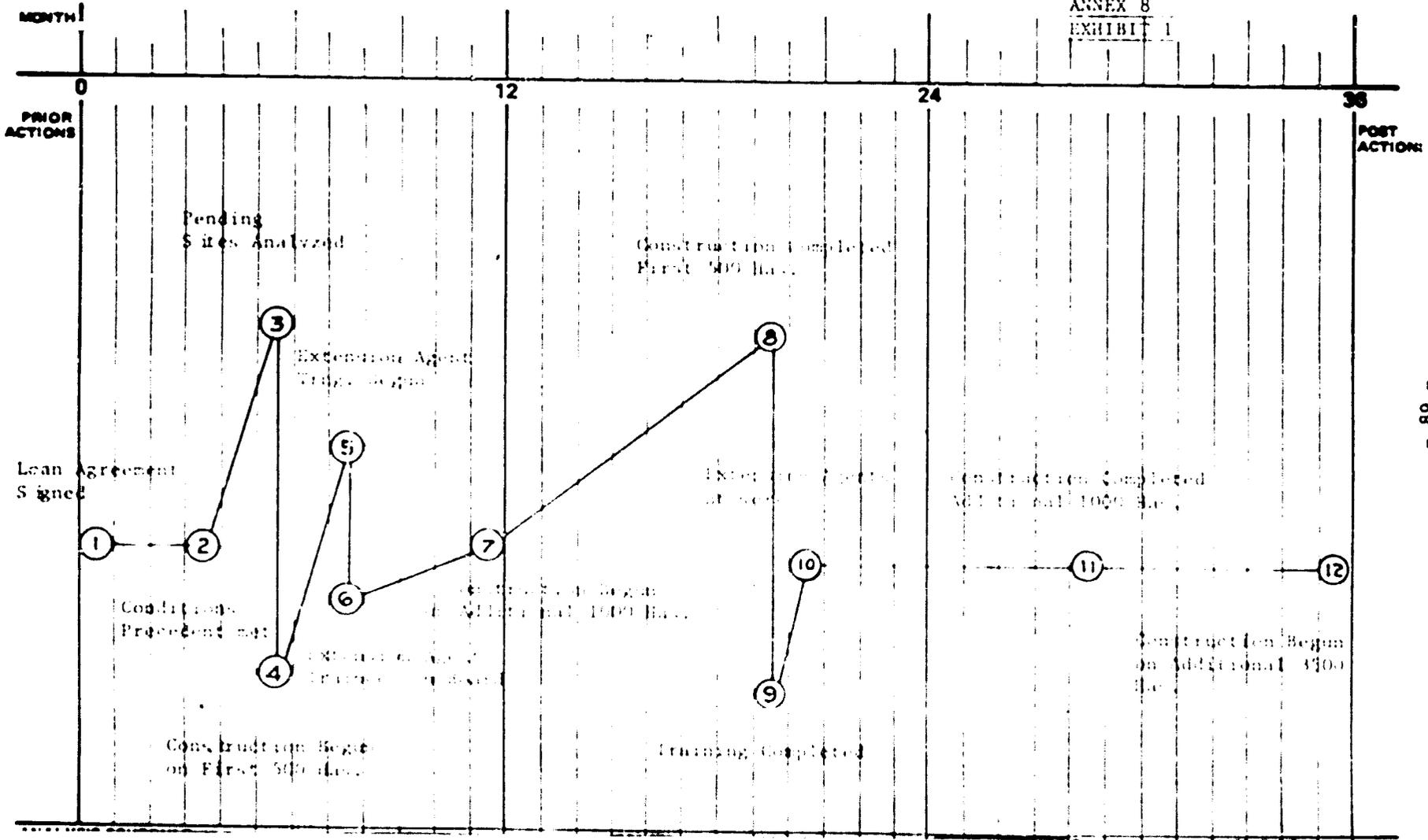
b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

Yes. The loan is consistent with the CEPCIES findings concerning El Salvador.

COUNTRY	PROJECT NO.	PROJECT TITLE	DATE	<input checked="" type="checkbox"/> ORIGINAL <input type="checkbox"/> REVISION #	APPROVED
EL SALVADOR	519-0184	Small Farm Irrigation Systems	4/14/78		X

OR FY
CY
MONTH

ANNEX 8
EXHIBIT 1



35

48

60

Construction Completed
Additional 4500 Bas.

13

14

Evaluation

EL SALVADOR: Small Irrigation Systems Loan

ANNEX 8
Exhibit 2

	<u>Month</u>	
1.	1	Loan Agreement signed between GOES and A.I.D.
2.	4	Conditions precedent met by the implementing agency of the GOES.
3.	6	Pending subproject irrigation sites analyzed for technical feasibility.
4.	6	Construction begun on first phase irrigation projects in an extension of 500 hectares of land.
5.	8	Training for Extension Agents begun.
6.	8	Proposed trainees on board for training.
7.	12	Construction begun on second phase irrigation projects in an additional extension of 1000 hectares of land.
8.	20	Construction completed in first 500 has.
9.	20	Training of Extension Agents completed.
10.	21	Final Training Group of Extension Agents assigned to work in different areas of the country.
11.	30	Construction completed on the second phase irrigation projects (1,000 hectares).
12.	36	Construction begun on third phase irrigation projects in an additional extension of 3,500 hectares of land.
13.	60	Construction completed on the third phase irrigation projects (3,500 hectares).
14.	60	Loan evaluation.

ANNEX 9
EXHIBIT 1

Proposed Composition of
Office of Small Scale Irrigations Systems

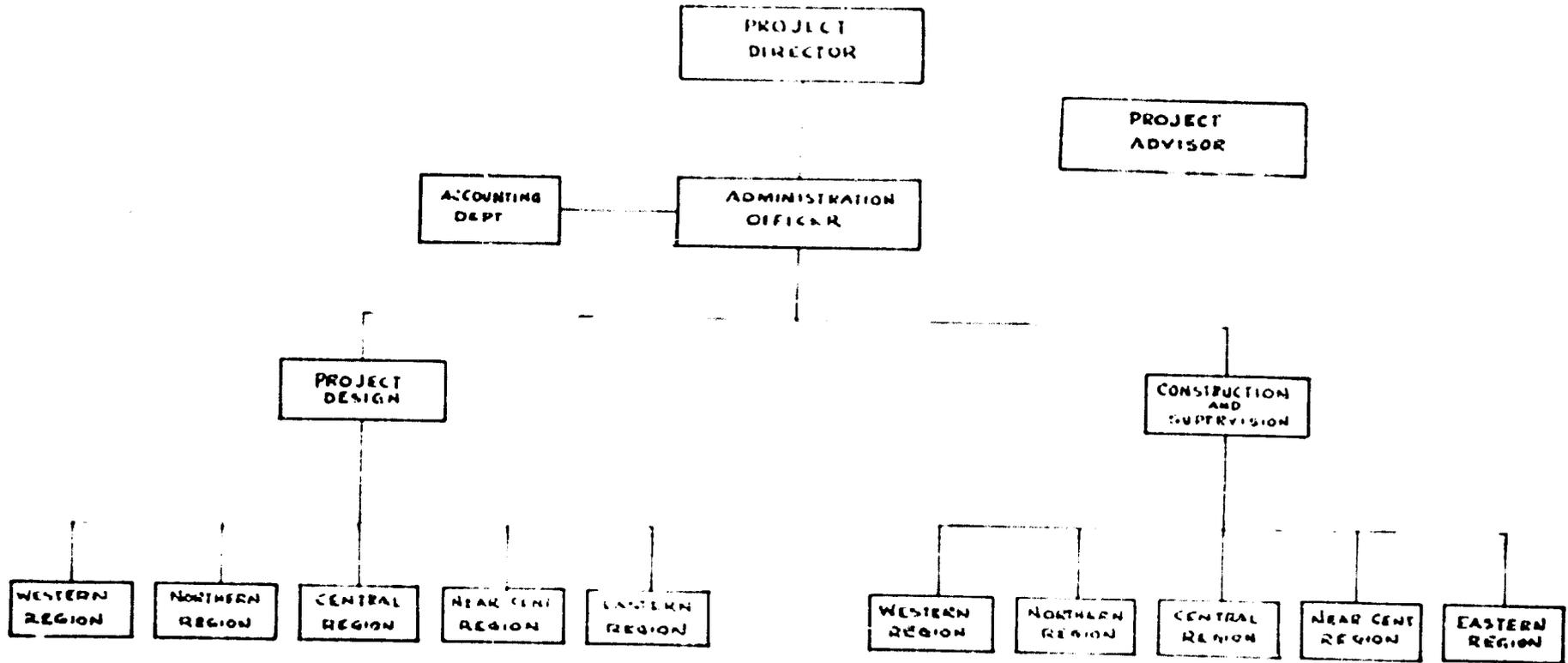
<u>Design</u>	<u>\$/mo.</u>	<u>\$/12mo</u>	<u>\$Christmas Bonus Per diem</u>	<u>\$1 year Cost</u>
1 Director of Project	1,200	14,400		
1 Administrator	800	9,600	1,200	15,600
1 Secretary I	320	3,840	800	10,400
1 Secretary II	240	2,880	320	4,160
5 Irrigation Engineers	4,000	48,000	240	3,120
3 Surveyors	1,500	18,000	4,000	52,000
3 Chainmen I	540	6,480	1,500	19,500
3 Chainmen II	420	5,040	540	7,020
6 Chainmen Assist.	720	8,640	420	5,460
5 Draftsmen	2,000	24,000	720	9,360
			2,000	26,000
<u>Supervision</u>				152,620
1 Secretary II	240	2,880	240	3,120
3 Surveyors	1,500	18,000	1,500	13,100
3 Chainmen I	540	6,480	540	4,700
3 Chainmen II	420	5,040	420	3,650
6 Chainmen Assist.	720	8,640	720	6,275
<u>Promotors and Construction</u>				30,845
1 Chief Project Const.	1,000	12,000	1,000	13,000
5 Assistants	4,000	48,000	4,000	52,000
20 Promotors	8,000	96,000	8,000	104,000
<u>Total First Year Cost</u>				117,000
				300,465

NOTES:

- (1) The Office of Small Scale Irrigation Systems will be staffed for five years.
- (2) Inflation in salary costs for the second to fifth years has been computed at 7% per year.
- (3) Design and supervision expense categories correspond to DGRD; promotors and construction expenses correspond to DIDECO.

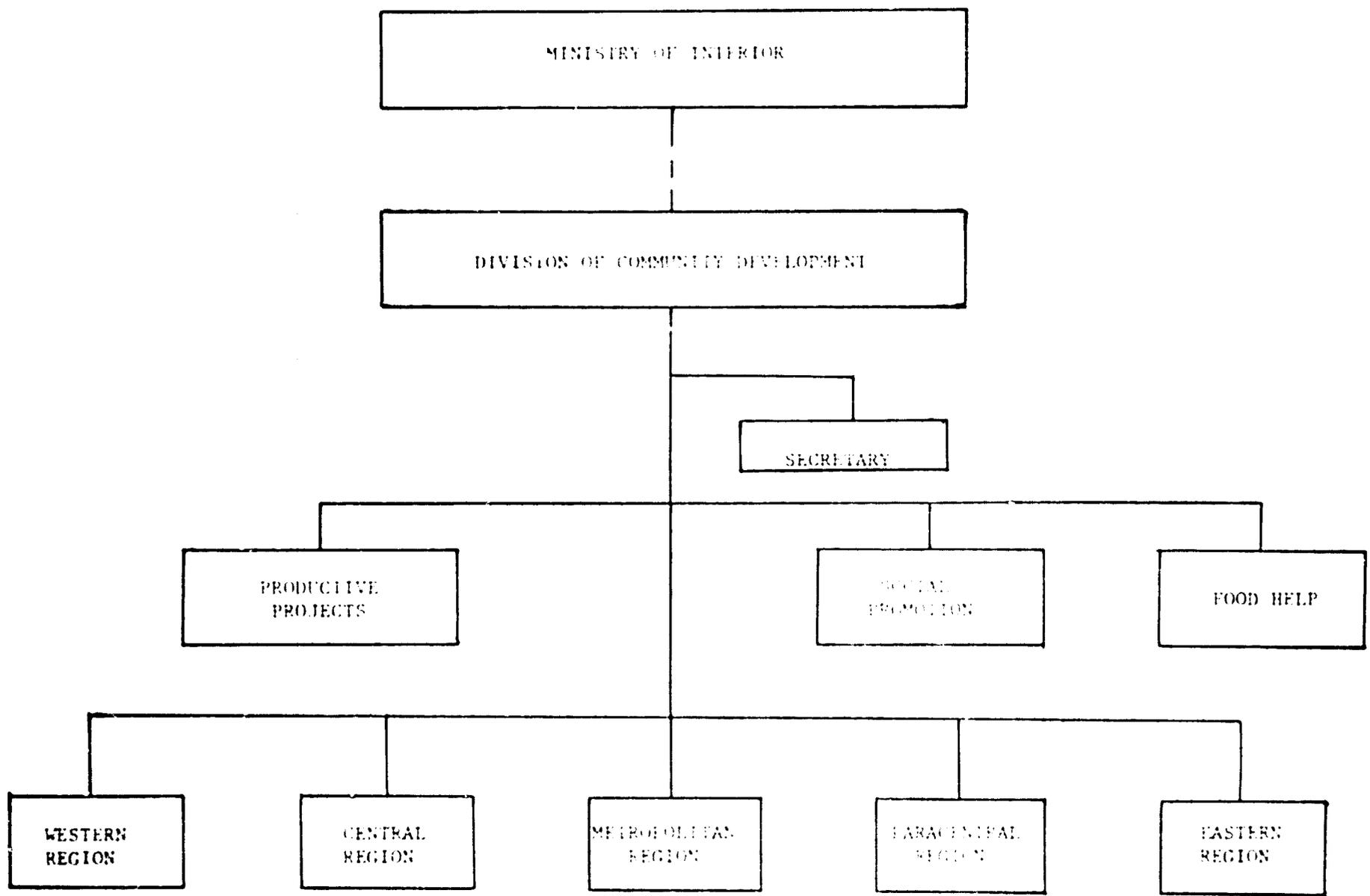
PROPOSED ORGANIZATION
OF ASSETS

ANNEX 9
EXHIBIT 2



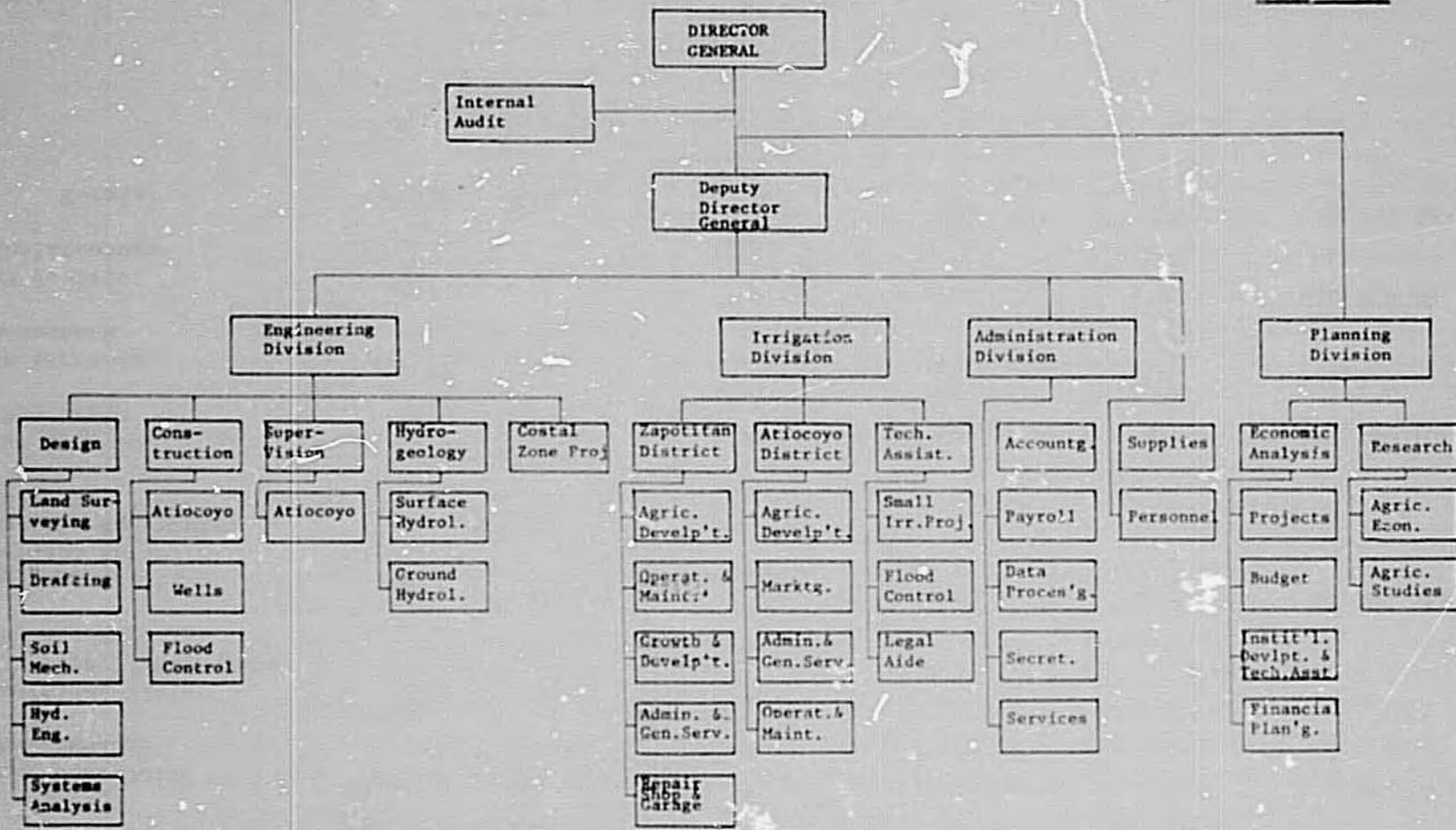
ORGANIZATION CHART OF THE DIVISION OF COMMUNITY DEVELOPMENT OF THE MINISTRY OF INTERIOR

D.D.C.O



ORGANIZATION CHART OF DGORD - 1977

ANNEX 11



GENERAL INFORMATION ON EXISTING DIDECO IRRIGATION PROJECTS 1973-1976

	<u>Irrigated Area (Has.)</u>	<u>No. of Beneficiaries</u>	<u>Avrge. No/Has. Per Beneficiary</u>	<u>DIDECO Input Percentage</u>	<u>Community Input Percentage</u>	<u>Total Costs In Dollars</u>	<u>Average Cost Per Hectare</u>
Nva. Concepción Chalatenango	100	20	5.00	33%	67%	\$ 7,660.70	\$ 76.60
Cas/Aldea Vieja C/Pacaya, J/La Laguna, Chalatenango	5.94	5	1.19	29%	71%	\$ 1,115.32	187.76
Cujuapa Arriba y Cujuapa Abajo, S. Antonio del Monte, Sonsonate	34	31	1.10	40%	60%	\$9,398.48	276.43
San Lorenzo, Ahunchapán	98.3	32	3.07	33%	67%	\$23,330.10	237.36
La Barranca, Sonsonate	243.72	53	4.60	40%	60%	\$36,068.98	147.99
El Rosario, Chalatenango	60	71	0.85	41%	59%	\$10,809.39	180.16
Totals:	541.96	212	2.55	38%	62%	\$88,182.96	\$162.71

<u>PROJECT</u>	<u>LOCATION</u>	<u>HAS. TO BE IRRIGATED</u>	<u>SOURCE OF WATER</u>	<u>POPULATION</u>	<u>BENEFICIARY FAMILIES</u>	<u>DATE OF REQUEST</u>	<u>TYPE OF ORGANIZATION</u>	<u>PROJECT PROMOTED BY</u>	<u>ACTUAL PRODUCTION</u>
1. Improvement of an irrigation system	C/Anal, J/de Nahuizalco, Sonsonate	304.9	Sensucnapan River	600	75	1969	Community Group	Extension Agent	Vegetables, Corn, Rice, Beans, Oranges
2. Construction of an Irrigation system	Hacienda Metalfo C/Metalfo, J/Acajutla	9.44	Metalfo River	500	16	12/77	Community Directive	ISTA* Promotor	Corn, Vegetables
3. Improvement of an irrigation system	c/Tajuilothan y Pushtan, J/de Nahuizalco, Sonsonate	979.02	Las Monjas River	2,800	300	1972	Community Directive	Extension Agronomist	Vegetables, Corn, Beans, Oranges.
4. Construction of irrigation system	Cas/Aldea Vieja, c/Pacayas, J/de la Laguna, Chalatenango	11.19	Pacaya River	300	30	1/77	Community Directive	DIDECO Promotor	Vegetables (tomatoes, onions, lettuces)
5. Construction of Irrigation system	Cas/Rio Grande C/Rio Frio, J/San Vicente, San Vicente	6.29	Grande River	475	8	3/76	Informal Group	DIDECO Promotor	Basic grains and vegetables
6. Lands irrigated by Gravity	Colonia Sta. Teresa, J/de Tonacatepeque, San Salvador	11.19	Chamulapa River	2,050	45	1/77	Community Directive	DIDECO Promoter	Corn, Beans.
7. Construction of Irrigation System	Cas/Planes de Huertas, c/Delicias, J/El Paisnal, San Salvador	69.93	Matizate and El Llano rainy-season rivers	200	20	1974	None	CENTA	Corn, rice, vegetables

ANNEX 13
Pending Request for Small Scale
Farm Irrigation Systems: DIDECO

<u>PROJECT</u>	<u>LOCATION</u>	<u>HAS. TO BE IRRIGATED</u>	<u>SOURCE OF WATER</u>	<u>POPULATION</u>	<u>BENEFICIARY FAMILIES</u>	<u>DATE OF REQUEST</u>	<u>TYPE OF ORGANIZATION</u>	<u>PROJECT PROMOTED BY</u>	<u>ACTUAL PRODUCTION</u>
8. Construction of Irrigation system	c/Taxalapa, J/de Arcatao, Chalatenango	139.86	Taxalapa River	500	96	1972		DIDECO Promotor	Corn, beans, sorghum
9. Construction of Irrigation system	Concepción Quezaltepeque	20.98	Guatemala River		20	1975	None	DIDECO	Corn, beans, sorghum
10. Construction of Irrigation system	C/El Potrerillo, J/El Carrizal, Chalatenango	1.03		350	100	1974	None	DIDECO	Corn, beans, sorghum

ANNEX 14

General By-Laws of Community Organizations Pertinent
to the Creation and Function of a Water User's Association

Source: Publication of the Legislature; National Assembly
"Recopilación de Leyes", Tomo V 6/72-6/77.

TITULO II

ASOCIACIONES DE DESARROLLO COMUNAL

CAPITULO I

NATURALEZA Y CONSTITUCION

Art. 16.- Declárase de interés social la formación y protección de las asociaciones de desarrollo comunal, las cuales se organizarán y funcionarán como personas jurídicas de acuerdo con lo establecido en la presente ley.

Art. 17.- Para los efectos de esta ley se consideran "Asociaciones de Desarrollo Comunal" los conjuntos de habitantes de una determinada localidad urbana o rural, como ciudades, pueblos, villas, barrios, cantones, caseríos, etc. que integran una entidad permanente y aunán iniciativas, voluntades, esfuerzos y acciones en la persecución del objetivo común de elevar las condiciones económicas y avícolas de la comunidad.

Art. 18.- Las asociaciones de desarrollo comunal deberán:

- a) Ser abiertas a la incorporación y participación de todos los sectores de la población;
- b) Ser medios para facilitar las relaciones interpersonales e intergrupales, con el objeto de fortalecer el espíritu de comunidad y el principio de la ayuda mutua;
- c) Servir como escuelas prácticas para el perfeccionamiento de los líderes comunales y la formación de cuadros de dirigentes, sobre bases funcionales y democráticas;
- ch) Cooperar con los distintos organismos del Estado, los municipios y el sector privado para el mejor aprovechamiento de sus recursos en beneficio de las comunidades.

Art. 19.- Las asociaciones de desarrollo comunal estarán integradas por un número no menor de veinte personas, quienes deberán reunir los requisitos que señale esta ley.

CAPITULO II

ATRIBUCIONES

Art. 20.- Son atribuciones principales de las asociaciones de desarrollo comunal:

- a) Promover el progreso de su respectiva localidad conjuntamente con la Dirección General de Fomento y Cooperación Comunal y los organismos públicos y privados que participen;
- b) Fomentar el espíritu de comunidad, solidaridad y cooperación mutua entre los vecinos, sus grupos y entidades representativas;

- c) Coordinar y cooperar con otros grupos comunitarios organizados en la localidad, en la mayor integración de sus miembros y la mejor organización de sus actividades;
- ch) Impulsar y participar en los programas de capacitación de los dirigentes y de los grupos comunales con el fin de contribuir al mejoramiento de la organización de la comunidad, la administración de proyectos sociales y económicos y la elevación de los niveles educativos;
- d) Trabajar en el establecimiento y mejora de servicios de las comunidades con el equipamiento y los medios para solucionar los problemas de la salud, la educación, la vivienda, la alimentación, el subempleo y el desempleo;
- e) Promover las organizaciones juveniles, haciéndolas partícipes de la responsabilidad de los programas de desarrollo local;
- f) Incrementar las actividades comunitarias a fin de obtener recursos propios que sirvan para impulsar el mejoramiento de la comunidad;
- g) Participar en los planes de desarrollo, local, regional y nacional, especialmente en la determinación de los proyectos para el mejoramiento de sus comunidades y en cuanto a los recursos locales que deban utilizarse;
- h) Las otras que contemple esta ley.

CAPITULO III

GOBIERNO Y ATRIBUCIONES DE LAS ASOCIACIONES DE DESARROLLO COMUNAL

Art. 21. El gobierno de cada asociación de desarrollo comunal estará constituido por:

- a) La asamblea general, que será el órgano máximo de la asociación y estará formada por todos sus afiliados;
- b) La junta directiva, que será el órgano ejecutivo, integrado por el número de miembros que determinen los estatutos respectivos con base en lo señalado en los reglamentos de esta ley.

Art. 22. Son atribuciones de la asamblea general:

- a) Elegir y dar posesión a los miembros de la junta directiva;
- b) Aprobar los estatutos de la asociación;
- c) Aprobar el plan anual de trabajo y su respectivo presupuesto;
- ch) Recibir los informes de trabajo y aprobar o improbar el estado financiero de la asociación.

Art. 23. Son atribuciones de la junta directiva:

- a) Elaborar los proyectos de estatutos de la asociación y proponerlos a la asamblea general;
- b) Tramitar el reconocimiento legal de la asociación, conforme a la presente ley;
- c) Determinar, juntamente con las instituciones que colaboran, el plan anual de trabajo y el presupuesto correspondiente;
- ch) Constituir comisiones de trabajo de la asociación y encauzar su mejor organización y desenvolvimiento;
- d) Convocar a la asamblea general a reuniones ordinarias y extraordinarias;
- e) Vincularse con los organismos del Estado, las Municipalidades y con las entidades privadas que tengan que trabajar en la región en proyectos de desarrollo de la comunidad;
- f) Participar, en su caso, en las investigaciones, planeamiento, ejecución y evaluación de los programas y proyectos de mejoramiento de la localidad;
- g) Informar periódicamente a la asamblea general de las actividades que desarrolla y

presentarle el plan anual de trabajo y del presupuesto respectivo e informar igualmente a la Dirección General de Fomento y Cooperación Comunal y a los organismos con lo que cooperó en sus programas;

- h) Velar que el patrimonio de la asociación sea aplicado en la consecución de sus fines;
- i) Ejercer las demás actividades que se determinan en esta ley y en su reglamento.

Art. 24.—Los miembros de la junta directiva de cada asociación deberán renovarse en forma alterna y periódicamente según lo determinen los estatutos respectivos.

Art. 25.—La Junta Directiva de la asociación puede distribuir sus funciones en comisiones especiales de trabajo, conforme a los programas y proyectos sectoriales.

CAPITULO IV

AFILLADOS

Art. 26.—Pueden ser afiliados de las asociaciones de desarrollo comunal todas las personas mayores de dieciocho años de edad, residentes dentro de los límites de la unidad vecinal correspondiente o en unidades vecinales colindantes inmediatas.

Sin embargo, cuando las personas provengan de asociaciones juveniles, el requisito de edad a que se refiere el inciso anterior será el de quince años.

Art. 27.—La condición de afiliado se pierde por renuncia expresa o tácita; la renuncia tácita tiene lugar cuando el afiliado no cumple las obligaciones que le imponen los estatutos correspondientes.

Art. 28.—La junta directiva de la asociación puede decretar el retiro de alguno de los socios cuando establezca fehacientemente que el afiliado la daña en alguna forma, previa audiencia del interesado.

Art. 29.—La junta directiva, con aprobación de la asamblea general, puede declarar como asociados honorarios a personas o instituciones que lo hayan prestado servicios relevantes, aun cuando no sean vecinos de la misma jurisdicción territorial.

Art. 30.—Podrán afiliarse a la asociación, sin perder ni debilitar su individualidad institucional, los grupos organizados de la localidad, dedicados a actividades cívicas, culturales, deportivas, gremiales o económicas empeñadas en el progreso local. Estas organizaciones afiliadas estarán representadas por dos de sus miembros ante la junta directiva de la asociación de desarrollo comunal, a cuyas sesiones podrán concurrir con derecho a voz y voto.

CAPITULO V

ESTATUTOS Y PERSONERIA JURIDICA

Art. 31.—Las asociaciones de desarrollo comunal que cumplan con los requisitos de esta ley y sus reglamentos deberán solicitar su reconocimiento oficial e inscripción en el Registro de Asociaciones de Desarrollo Comunal, a fin de obtener la personalidad jurídica y gozar de los privilegios que les confiere la presente ley.

Art. 32.—Cada asociación de desarrollo comunal tendrá sus estatutos, que deben contener:

- a) Denominación y domicilio;
- b) Finalidades;
- c) Nómina de sus afiliados;
- ch) Gobierno de la asociación y duración de funciones de las directivas;
- d) Recursos humanos y económicos con que cuenta;
- e) Plan general de sus actividades;
- f) Los demás requisitos que establezcan los reglamentos de esta ley.

Los estatutos deberán ser presentados al Registro de Asociaciones de Desarrollo Comunal a fin de que se les califique y pase con informe a la Dirección General de Fomento y Cooperación Comunal para su aprobación.

CAPITULO VI

EXENCIONES Y PRIVILEGIOS Y REGIMEN ECONOMICO

Art. 33.—Las asociaciones de desarrollo comunal están exentas de todo impuesto fiscal, municipal, tasas y demás contribuciones sobre su establecimiento u operaciones. Podrán además, usar papel común en sus escritos y diligencias. En lo relativo a la adquisición de equipo, maquinaria, materiales y otros insumos que sean necesarios para el cumplimiento de sus fines, estos privilegios se otorgarán total o parcialmente a solicitud interesada, mediante Decreto Ejecutivo en el Ramo de Economía, por un plazo determinado, previa justificación con audiencia del Ministerio de Hacienda.

La Dirección General de Fomento y Cooperación Comunal organizará un sistema adecuado de inspección y auditoría para llevar un control minucioso de las operaciones de cada asociación y deberá informar al Ministerio de la Presidencia, del uso indebido de cualquiera de los privilegios concedidos a fin de que gestione ante el Ministerio de Economía para que se revoque, suspenda o se restrinjan los privilegios otorgados.

Art. 34.—El patrimonio de las asociaciones estará constituido por:

- a) Las cuotas de sus afiliados, de cualquier clase que sean;
- b) Las subvenciones y los aportes extraordinarios que provengan de diversas fuentes;
- c) Los ingresos provenientes de cualquier actividad realizada para allegar fondos a la asociación;
- ch) Sus bienes muebles o inmuebles y las rentas que se obtengan con la administración de los mismos así como los provenientes de donaciones, herencias y legados.

Art. 35.—La Dirección General de Fomento y Cooperación Comunal y las autoridades correspondientes, juntamente con las asociaciones de desarrollo comunal, estudiarán las formas que permitan el acopio de fondos para su capitalización y su debido incremento, con destino a facilitar las disponibilidades económicas de las referidas asociaciones.

CAPITULO VII

RELACION CON LAS AUTORIDADES LOCALES

Art. 36.—Para el mejor cumplimiento de sus funciones, las asociaciones de desarro-

lo comunal deberán coordinar sus actividades con las municipalidades y las gobernaciones departamentales en cuya jurisdicción realicen sus operaciones.

Art. 37.—Los funcionarios o empleados de dependencias del Estado o de instituciones descentralizadas del mismo, cuyas actividades se realicen en localidades urbanas o rurales de las mencionadas en el artículo 17, procurarán formar entre ellos un grupo organizado que coordine sus actividades en la promoción del desarrollo de la localidad o de la región, a fin de evitar cualquier interferencia entre sus respectivas labores o innecesaria duplicación de las mismas. Las municipalidades podrán incorporarse a dicha organización, la cual será una entidad de apoyo para las asociaciones de desarrollo comunal.

CAPITULO VIII

REGISTRO DE ASOCIACIONES DE DESARROLLO COMUNAL

Art. 38.—Se establece el Registro de Asociaciones de Desarrollo Comunal, dependiente de la Dirección General de Fomento y Cooperación Comunal, el cual se regirá por las disposiciones de esta ley y sus reglamentos.

Art. 39.—El Registro de Asociaciones de Desarrollo Comunal estará a cargo de un registrador jefe, responsable de los aspectos jurídicos y administrativos de la oficina y quien calificará la legalidad de todo lo relativo a la inscripción y cancelación en el registro de las asociaciones a que se refiere el artículo anterior, tendrá además, las otras atribuciones que le señale esta ley.

Para ser registrador se requiere, ser salvadoreño por nacimiento, abogado de la República o estudiante de Jurisprudencia y Ciencias Sociales que haya cursado el último año y de moralidad y competencia notorias para el ejercicio del cargo.

CAPITULO IX

DISOLUCION Y LIQUIDACION DE LAS ASOCIACIONES DE DESARROLLO COMUNAL

Art. 40.—Las asociaciones de desarrollo comunal podrán ser disueltas mediante acuerdo tomado en asamblea general convocada especialmente para este fin, en sesión extraordinaria, a la cual deberán asistir por lo menos las dos terceras partes de los asociados, con base en las causas siguientes:

- a) Por la disminución del número de sus miembros en un cincuenta por ciento del mínimo establecido por esta ley para su constitución; y
- b) Por la imposibilidad de realizar los fines para los cuales fue constituido.

El acuerdo de disolución deberá tomarse por mayoría absoluta de los socios presentes y será comunicado a la Dirección General de Fomento y Cooperación Comunal por la junta directiva, dentro de los ocho días siguientes a la fecha en que fue tomado, remitiéndole una certificación del acta respectiva.

Art. 41.—Las asociaciones serán disueltas, además, por las causas siguientes:

- a) Cuando su funcionamiento no se ajuste a los preceptos legales;
- b) Cuando no cumpla los fines para los cuales fue organizada;
- c) Cuando desarrolle actividades de proselitismo político o religioso o anárquicas o contrarias a la democracia, al orden público, a la moral o a las buenas costumbres.

-Estas causales serán constatadas fehacientemente por el jefe del Registro de Asociaciones de Desarrollo Comunal al tenerse conocimiento de ellas por cualquier modo, con audiencia de la asociación interesada, la cual podrá presentar las pruebas que estime pertinentes a su posición."

Establecida la causal, el Jefe del Registro pasará las diligencias, acompañadas de un dictamen al respecto, a la Dirección General de Fomento y Cooperación Comunal, la cual acordará la disolución de la asociación con base en dicho dictamen.

Esta resolución será recurrible únicamente en revisión para ante el Ministerio de la Presidencia dentro de los tres días siguientes al de su notificación.

El Ministerio fallará con la sola vista de los autos, sin otro trámite ni diligencia, en los ocho días subsiguientes de recibidas las diligencias, las cuales devolverá en su oportunidad con certificación de lo resuelto.

Art. 42.- La disolución de la asociación por cualquiera de las causas mencionadas en los artículos que anteceden implica la cancelación de su inscripción en el Registro de Asociaciones de Desarrollo Comunal.

La asociación continuará en sus funciones en tanto no se cancele su inscripción en el referido registro.

Cancelada la inscripción, la asociación conservará su personería jurídica únicamente para fines de liquidación.

Art. 43.- Hecha la cancelación, se integrará una comisión liquidadora con dos representantes de la asociación en liquidación y dos delegados nombrados por la Dirección General de Fomento y Cooperación Comunal; los primeros serán designados por la última junta directiva de dicha asociación en el término perentorio de tres días contados a partir del recibo del oficio en que la Dirección referida les solicite el nombramiento; si éste no fuere hecho, se procederá a la liquidación con sólo los delegados de la Dirección.

Art. 44.- Integrada la comisión, se les fijará el plazo en que la liquidación debe terminar, el cual en ningún caso, podrá exceder de noventa días.

Art. 45.- Concluida la liquidación, la comisión la someterá a la aprobación de la Dirección General de Fomento y Cooperación Comunal, acompañada de un informe detallado de su gestión y de la documentación que sea pertinente.

Aprobada la liquidación, se mandará a publicar en el Diario Oficial y se dará conocimiento de ella a las autoridades locales a cuya jurisdicción haya pertenecido la asociación disuelta.

Art. 46.- Si después de realizado el activo y cancelado el pasivo hubiere un remanente, éste será destinado para la promoción de programas de desarrollo comunal, a realizarse preferentemente en el lugar en donde tenía su domicilio la asociación liquidada. En tanto no se realice su inversión, dicho remanente será administrado por la Dirección General de Fomento y Cooperación Comunal.

CAPITULO X

DISPOSICIONES GENERALES

Art. 47.—Las compras de materiales, maquinaria, equipo, los arrendamientos y gastos generales los efectuará la Dirección General de Fomento y Cooperación Comunal, con cargo a las asignaciones presupuestarias que determine la ley respectiva, sin la intervención de la Dirección General del Presupuesto, Proveduría General de la República y Proveduría Específica de Obras Públicas; y tampoco estará sujeta a la Ley de Suministros pero sí a lo que disponga un reglamento especial. Las compras por valor de diez mil colones o superiores a esta suma serán aprobadas por un comité integrado por los funcionarios que designe el Ministerio de la Presidencia y del cual formará parte el Director General de Fomento y Cooperación Comunal.

Art. 48.—Toda inversión que haga la Dirección General de Fomento y Cooperación Comunal deberá efectuarse en terrenos nacionales o municipales o de las asociaciones de desarrollo comunal, salvo casos especiales aprobados previamente por el Director de aquella.

Las solicitudes de fondos en pro del mejoramiento comunal deberán seguir el procedimiento especial que se establezca en los reglamentos de la presente ley o en la Ley de Presupuesto General. Tales solicitudes serán aprobadas por la Dirección General de Fomento y Cooperación Comunal.

Art. 49.—El Director General de Fomento y Cooperación Comunal podrá conceder anticipos mediante el fondo circulante para actividades que de otra manera no puedan desarrollarse. La concesión de estos anticipos se hará contra recibos firmados por funcionarios o empleados de dicha Dirección y contra reservas de créditos globales cuando se trate de ejecución de obras. Estos anticipos no podrán exceder en ningún caso de un mil colones y su liquidación deberá efectuarse a más tardar sesenta días a partir de su otorgamiento.

Art. 50.—La Dirección General de Fomento y Cooperación Comunal podrá realizar obras por cuenta ajena, con cargo a los fondos que le sean entregados para tal efecto, ya sea por otras dependencias del Estado, por instituciones oficiales autónomas o por organizaciones privadas.

Art. 51.—Al finalizar las obras, éstas deberán ser entregadas, en su caso, al Estado, Municipio, instituciones autónomas o a las asociaciones de desarrollo comunal a que se refiere la presente ley según lo establezcan los reglamentos de la misma, y en su defecto, a instructivos que emitan conjuntamente el Ministerio de Hacienda y la Corte de Cuentas de la República a solicitud del Ministerio de la Presidencia.

Art. 52.—Los servicios de asistencia técnica que la Dirección General de Fomento y Cooperación Comunal proporcione a las asociaciones de desarrollo comunal serán gratuitos.

Art. 53.—El Ministerio de la Presidencia y la Dirección General de Fomento y Cooperación Comunal deberán realizar estudios para la localización de fuentes de financiamiento con destino a las asociaciones de desarrollo comunal.

Art. 54.—En todas las leyes, decretos o demás disposiciones en que se mencione la Dirección Ejecutiva de Fomento y Cooperación Comunal deberá entenderse "Dirección General de Fomento y Cooperación Comunal".

CAPITULO XI

DISPOSICIONES TRANSITORIAS

Art. 55.—Con el fin de darle continuidad a las acciones de desarrollo de la comunidad planificadas por el Programa de Fomento y Cooperación Comunal por Esfuerzo Propio y Ayuda Mutua (FOCCO), en las Disposiciones Generales de la Ley de Presupuesto General vigente, la Dirección General de Fomento y Cooperación Comunal adoptará la actual estructura y dirección de aquél hasta que las autoridades correspondientes lo consideren necesario.

Art. 56.—Para dar existencia a las asociaciones de desarrollo comunal, la Dirección General de Fomento y Cooperación Comunal deberá iniciar sus acciones encaminadas a este fin dentro de los ciento ochenta días subsiguientes a la fecha en que entre en vigencia la presente ley.

Art. 57.—Los gastos y compromisos que la Dirección General de Fomento y Cooperación Comunal efectúe o registre entre el lapso comprendido entre la fecha en que entre en vigencia la presente ley y el treinta y uno de diciembre de mil novecientos setenta y seis, se cargarán a las respectivas asignaciones autorizadas en la Ley de Presupuesto General correspondiente al "Programa de Fomento y Cooperación Comunal por Esfuerzo Propio y Ayuda Mutua", votado para el presente ejercicio fiscal; lo mismo que a los saldos de reservas de crédito aprobadas con aplicación a asignaciones presupuestarias del presente y años anteriores autorizadas para el Programa FOCCO. En este último caso, el período se extenderá de acuerdo a lo prescrito en la Ley Orgánica de Presupuestos.

Los compromisos del Programa FOCCO que por cualquier causa no fueren cancelados antes del treinta y uno de diciembre del presente año, los absorberá como sus propios compromisos la Dirección General de Fomento y Cooperación Comunal, y los cancelará con aplicación a la asignación que le fuere autorizada en su Presupuesto.

Facúltase a la Corte de Cuentas de la República para darle curso a los pagos y compromisos a cargo de la Dirección General de Fomento y Cooperación Comunal que sea necesario tramitar en el lapso indicado, de conformidad con este artículo.

Art. 58.—Las órdenes de pago legalizadas, los salarios y otros cargos periódicos reconocidos hasta la fecha en que entre en vigencia la presente ley, así como las órdenes de suministros y reservas de crédito a favor del "Programa de Fomento y Cooperación Comunal por Esfuerzo Propio y Ayuda Mutua", serán a cargo de la Dirección General de Fomento y Cooperación Comunal y se tramitarán de acuerdo con lo establecido en el artículo anterior.

Art. 59.—Las disposiciones generales de la Ley de Presupuesto General y de Presupuestos Especiales de Instituciones Oficiales Autónomas vigente, relacionadas con la ejecución del "Programa de Fomento y Cooperación Comunal por Esfuerzo Propio y Ayuda Mutua", se entenderán aplicables a la Dirección General de Fomento y Cooperación Comunal en lo que no se opongan a la presente ley.

Art. 60.—Mientras no se decreten los reglamentos de la presente ley, el Ministerio de la Presidencia emitirá las órdenes, resoluciones e instructivos que sean necesarios a fin de que entre en funcionamiento la Dirección General de Fomento y Cooperación Comunal y no sufra interrupción el "Programa de Fomento y Cooperación Comunal por Esfuerzo Propio y Ayuda Mutua".

Art. 61.—Quedan derogadas las leyes y demás disposiciones legales que se opongan a la presente ley.

Art. 62.—El presente decreto entrará en vigencia ocho días después de su publicación en el Diario Oficial.

**DADO EN EL SALON DE SESIONES DE LA ASAMBLEA LEGISLATIVA;
PALACIO LEGISLATIVO: San Salvador, a los veintiocho días del mes de octubre
de mil novecientos setenta y seis.**

**Rubén Alfonso Rodríguez,
Presidente.**

**Alfredo Morales Rodríguez,
Vice-Presidente.**

**Benjamín Wilfrido Navarrete,
Vice-Presidente.**

**Mario S. Hernández Segura,
Primer Secretario.**

**José Francisco Guerrero,
Primer Secretario.**

**Matías Romero,
Primer Secretario.**

**Mauricio Gutiérrez Castro,
Segundo Secretario.**

**Pablo Mateu Llor,
Segundo Secretario.**

**Víctor Manuel Mendoza Vaquedano,
Segundo Secretario.**

**CASA PRESIDENCIAL: San Salvador, a los cuatro días del mes de noviembre
de mil novecientos setenta y seis.**

PUBLIQUESE.

**ARTURO ARMANDO MOLINA,
Presidente de la República.**

**Agustín Martínez Varela,
Ministro del Interior.**

**Roberto Escobar García,
Ministro de Agricultura
y Ganadería.**

**Jorge Antonio Seaman Soto,
Ministro de Obras Públicas.**

PUBLIQUESE EN EL DIARIO OFICIAL,

**Rafael Flores y Flores,
Ministro de la Presidencia de la República.**

SMALL FARMER IRRIGATION
PROJECT PAPER
ENGINEERING ASPECTS

INTRODUCTION

In partial development of the A.I.D. El Salvador Small Farm Irrigation Project Paper, the following analysis has been made from data collected on a random sample and supporting engineering data. The purpose of this analysis is to determine the amount of land in El Salvador that can be utilized in small farm irrigation projects. Small farms in this study are defined as all farms 8 hectares and less.

PROCEDURES

Forty areas ranging in size from about 19 hectares to 113 hectares were selected at random. This selection was made from the larger set random study sample of the Ministry of Agriculture of El Salvador. A subscript variable i , corresponding to the sample area i , was assigned to all the data pertaining to that area.

Data from the Ministry was obtained on each of these sample areas showing the area in hectares of farms in the areas according to the following size ranges:

- A. 0 - 2 hectares
- B. 2 - 4 hectares
- C. 4 - 8 hectares
- D. 8 - 20 hectares
- E. 20 + hectares

From this information the total area, A_i , and the percent of the total area pertaining to small farms, $(PSF)_i$, for each sample area was determined.

Each sample area was visited. From aerial photographs and on-site inspections, the percent area not irrigable, $(PNI)_i$, and the percent irrigable area, $(PIA)_i$, were determined. The criterion for this evaluation was: 1) was there available surface water, 2) was the geographical location of the sample area conducive to receive the water by gravity conveyance, 3) were the physical characteristics, in particular slope, satisfactory for surface methods of irrigation.

When $(PIA)_i$ was a value greater than zero, streamflow data of

the potential water source was taken from the surface water records kept by the Hydrologic Department of the Ministry of Agriculture for those rivers where data is kept. For all other rivers, the streamflow was measured and the low flow area constraint calculated.

From this data, the percent of the irrigable area of the river basin that could be irrigated with the low flow constraint, $(PRBI)_i$, was calculated.

$$PRBI = \frac{FACTOR}{PIA}$$

FACTOR = area of the river basin that can be irrigated

In calculating PRBI, 10% of the low flow was eliminated from the area determination to remain in the river for social and environmental considerations. A 60% total irrigation efficiency is assumed.

Combinations of these five basic pieces of data for each sample area, A_i , $(PSF)_i$, $(PNI)_i$, $(PIA)_i$ and $(PRBI)_i$ provide the data reduction possibilities necessary to evaluate the pertinent points of this study.

1. Percent of the land area of El Salvador that is not irrigable due to terrain and/or geography:

$$\frac{\sum_{i=1}^n A_i (PNI)_i}{\sum_{i=1}^n A_i}$$

where $A_i (PNI)_i$ is the area within the sample area i that is not irrigable due to terrain and/or geography.

2. Percent of the land area of El Salvador that is small farms not irrigable due to terrain and/or geography:

$$\frac{\sum_{i=1}^n \frac{40}{A_i (PNI)_i (PSF)_i}}{\sum_{i=1}^n \frac{40}{A_i}}$$

where $A_i (PNI)_i (PSF)_i$ is the area that is small farms within the sample area i that is not irrigable due to terrain and/or geography.

3. Percent of the land area of El Salvador that is irrigable by gravity means with no storage:

$$\frac{\sum_{i=1}^n \frac{40}{A_i (PIA)_i (PRB)_i}}{\sum_{i=1}^n \frac{40}{A_i}}$$

where $A_i (PIA)_i$ is the irrigable area within the sample area i .

4. Percent of the land area of El Salvador that is small farms that is irrigable by gravity means with no storage assuming all the available water is allocated to the small farmers.

$$\frac{\sum_{i=1}^n A_i (PISFAW)_i}{\sum_{i=1}^n A_i}$$

where $(PISFAW)_i$ is the percent of the irrigable area of the river basin that is small farms that can be irrigated assuming all the water available goes to the small farmers.

$$\text{If } A_i (PIA)_i (PSF)_i \leq A_i (PIA)_i (PRBI)_i, (PSF)_i = (PRBI)_i; \\ (PISFAW)_i = (PIA)_i (PRBI)_i.$$

$$\text{If } A_i (PIA)_i (PSF)_i > A_i (PIA)_i (PRBI)_i, (PSF)_i < (PRBI)_i; (PISFAW)_i \\ = (PIA)_i (PSF)_i$$

5. Percent of the land area of El Salvador that is small farms that is irrigable by gravity means with no storage assuming that the available water goes to all farmers proportionately to their land holdings.

= item 4 if water is not limiting.

= item 3 multiplied by $(PSF)_i$ if water is limiting.

RESULTS AND DISCUSSION

Table 1 contains all the reduced data in tabulated form with the data columns building one upon the other, as explained previously, from left to right on the page. The accumulation over the variable i is found as a total at the bottom of each pertinent column.

1 No.	2 A1 (Ha)	3 (PSE)A %	4 (PNI)A %	5 (PIA)A %	6 (PRR)A %	7 A1(PNI)A (Ha)	8 Col A(PSE)A (Ha)	9 A1(PIA)A(PRR)A (Ha)	10 A1(PSEAW)A (Ha)	11 Col A(PSE)A (Ha)
1										
01-13	94.12	0.340	45	55	2.99	42.35	0.133	1.55	0.176	0.005
01-24	44.73	76.526	30	70	11.37	13.42	10.260	3.56	3.560	2.724
02-15	35.21	0.733	100	0	0	35.21	0.260	0	0	0
03-02	44.72	75.390	100	0	0	44.72	32.954	0	0	0
03-20	96.07	1.634	100	0	0	96.07	1.570	0	0	0
03-33	31.82	100.000	80	20	32.60	25.46	25.456	2.52	2.520	2.520
04-10	62.75	18.566	100	0	0	62.75	11.650	0	0	0
08-04	95.49	20.096	100	0	0	95.49	19.190	0	0	0
2										
01-07	48.53	0.522	20	80	9.45	9.71	0.536	3.67	2.144	0.203
01-20	30.01	11.363	100	0	0	30.01	3.410	0	0	0
02-03	51.43	78.223	2	98	0.30	1.03	0.805	0.15	0.150	0.117
02-16	70.00	0.000	100	0	0	70.00	0.000	0	0	0
03-09	55.82	44.156	100	0	0	55.82	24.670	0	0	0
04-02	70.86	36.727	100	0	0	70.86	26.060	0	0	0
04-15	79.34	41.393	100	0	0	79.34	21.910	0	0	0
05-04	20.20	36.039	100	0	0	20.20	11.600	0	0	0
07-05	19.11	1.099	100	0	0	19.11	0.210	0	0	0
08-12	85.61	27.228	90	10	100	77.05	20.979	8.55	2.331	2.331
3										
01-05	32.60	61.656	5	95	5.45	1.63	1.005	1.68	1.630	1.036
01-18	44.10	0.000	3	97	2.60	1.32	0.000	0.57	0	0
02-01	29.67	31.581	85	15	5.21	25.22	7.965	0.23	0.23	0.073
02-14	33.94	11.311	100	0	0	33.94	3.840	0	0	0
03-07	48.37	58.052	100	0	0	18.37	28.070	0	0	0
04-08	102.20	23.288	100	0	0	102.20	23.800	0	0	0
04-21	55.37	82.301	100	0	0	55.37	45.570	0	0	0
07-06	72.10	0.000	100	0	0	72.10	0.000	0	0	0
08-13	77.06	59.123	100	0	0	77.06	45.560	0	0	0
4										
01-06	55.80	0.000	100	0	0	55.80	0.000	0	0	0
01-19	50.58	83.036	100	0	0	50.58	42.010	0	0	0
02-02	49.17	37.360	100	0	0	49.17	18.370	0	0	0
02-15	61.63	6.296	25	75	1.65	15.41	0.970	0.76	0.480	0.480
02-28	50.18	0.000	35	65	0	10.67	1.000	0	0	0
02-41	29.30	10.125	100	0	0	29.30	2.070	0	0	0
03-04	46.89	56.634	100	0	0	16.89	26.500	0	0	0
03-17	44.62	31.741	100	0	0	44.62	15.970	0	0	0
04-10	113.87	58.558	100	0	0	113.87	66.680	0	0	0
04-23	66.08	41.232	60	40	2.99	29.65	16.542	0.79	0.79	0.330
05-06	36.27	25.090	76	24	4.11	21.19	5.505	0.37	0.37	0.097
08-07	169.49	28.076	100	0	0	169.49	30.740	0	0	0
08-20	---	---	100	0	0	---	---	0	0	0
TOTAL	2,263.00					1,863.05	597.767	14.71	14.711	9.484

SUMMARY AND CONCLUSIONS

The solutions to this portion of the project paper are as follows:

1. % of country not irrigable
 - = 83.06%
2. % of country that is small farms not irrigable
 - = 26.65%
3. % of country that is irrigable by gravity means and no storage
 - = 1.102%
4. % of country that is small farms that is irrigable by gravity means with no storage assuming all the available water goes to the small farmers.
 - = .656%
5. % of country that is small farmers that is irrigable by gravity means with no storage assuming that the available water goes to the farmers in proportion to their land holdings
 - = .423%

The most difficult part of this study was the determination of the (PRBI)_i's. This was because the critical months always occurred during the dry season, and the sample areas were visited during the rainy season. For those rivers that didn't have records, the only data available was the rainy season river measurement made on a one time basis. These measurements were adjusted using hydrologic methods, but this measurement remains the most sensitive because almost every area has water as the limiting factor. The errors from all other observations appear minor compared to the uncontrollable noise in this data.

FIELD NOTES

01 Series

1-01-24 Acajutla

Rolling land with hills and flat areas. It is approximately 70% irrigable by gravity canal of length 2 1/2 kilometers. The water is to be taken from the Rio Sucio.

1-01-13 Sonsonate

Rolling land with hills and flat area. It is approximately 55% irrigable by gravity canal of length of about 2 kilometers. The water is to be taken from the Rio Chiquihuat. There is already irrigation taking place near the sample area, though not in the sample area. Some of this irrigation utilizes water from the Rio Chiquihuat.

2-01-07 San Juan Opico

Lots of water is available from the Rio Suquiapa. The length of the canal to service the area would be about 4 kilometers. The Rio Paso Hondo also borders the area but water cannot be extracted by a gravity canal. The sample area is approximately 80% irrigable.

2-01-20 Suchitoto (Bottom of map sample area)

This sample area is cut in two by a quebrada, leaving each side flat and irrigable by pumping. There are no sources of water for a gravity canal to service the area. The Rio San Antonio passes approximately 1 kilometer from the Southeast corner of the sample area. If pumping is used this sample area is 80% irrigable. Sprinkle irrigation.

3-01-18 La Herradura

Looks like one large farm makes up the sample area. Flat beautiful land that is totally irrigable except for houses, barns, etc. The area is 97% irrigable by canal from the Rio Viejo o Comapa or the Rio Jalponga.

3-01-05 San Vicente

95% of the sample area is irrigable and irrigated. 4% could be cleared for crops that is now in pasture, bush and trees. Water comes from the Rio Acahuapa.

4-01-06 Jiquilisco

The land is owned by one large owner and is beautiful 100% irrigable farmland. There is no water (surface) source within reasonable reach of a canal. After the quebrada passes the sample area, it is filled by large springs but at depth of 50-70 feet below the ground surface.

4-01-19 Usulután

Rolling hills and quite broken land. No water (surface) source is available for irrigation.

02 Series

1-02-15 Desembocadura Río Paz

Flat beautiful land but not irrigable from gravity canal. Must be pumped from brazo of Río Paz which is 1 1/4 kilometers away. The canal from the geothermal plant to the ocean passes along one edge of the sample area making the area 97% irrigable by pumping.

2-02-16 Suchitoto

No water (surface) at all. 0% irrigable unless pumped long distance. Better to drill well.

2-02-03 El Paraíso

Flat good land 98% irrigable from the Río Metayate by a gravity canal of length 3 kilometers. Plenty of water, it appears.

3-02-14 Puente Cuscatlán

No water (surface) available. 0% irrigable.

3-02-01 Ilobasco

15% irrigable with a canal 4 1/2 kilometers long from the Río Los Naranjos small farms on and around the mountains. Small lower flat areas are irrigable.

4-02-41 Puente Cuscatlán

Springs form a stream 100-200 meters above sample area, making irrigation by gravity impossible. 58% of area is irrigable by pumping. This stream (part or all) is being utilized downstream 4 or 5 kilometers for sprinkler irrigation.

4-02-02 Conchagua

40% fairly flat and irrigable but no surface water. Maybe wells? 0% irrigable otherwise.

4-02-15 San Miguel

75% of sample area irrigable. The land in this sector is so flat that for irrigation to be applied to the sample area only, the water would have to be pumped from the Río San Miguel. In reality, a large scale canal would be built to water all the land around, from the Río San Miguel.

4-02-28 Jocoró

45% irrigable or 65% if cleared. Lots of irrigation taking place due to dry spell in rainy season, therefore streams are down. No irrigation being done in the sample area, not enough water in pertinent streams to get measurement of any kind.

03 Series

1-03-20 Santa Ana

No water. 0% irrigable. Steep café land.

1-03-07 Ahuachapán

No water. 0% irrigable. Steep café land.

1-03-33 Jujutla

The upper end is fairly flat and irrigable and the rest is high broken hills. 20% irrigable with canal from Río Sunzacuapa of length about 1 - 1 1/2 kilometers.

2-03-09 Nueva San Salvador

Steep café land. No water available. 0% irrigable.

3-03-07 San Pedro Nonualco

Steep café land. No water. 0% irrigable.

4-03-04 Berlín

No water. Non-irrigable, very hilly and broken land. 0% irrigable.

4-03-17 Puente Cuscatlán

No water (surface). Lies in valley of the Lempa (20%). Rest is non-irrigable hills. 20% irrigable if pumped from Río Lempa, 3.5 km. away or if large canals for entire valley irrigation - large scale irrigation project.

04 Series

1-04-10 Paso El Jobo

30% irrigable if pumped from the Rio Agua Caliente. 0% irrigable if not pumped. 15% need clearing work done. A few flat places but mostly broken. 50% - 60% irrigable if sprinkled.

2-04-15 San Salvador

80% irrigable but no surface water available. 0% irrigable unless by well. In the quebrada, there is a lot of water just under the sand that flows for a while and then disappears all year long. There is some irrigation on the vegas of the quebrada but they are not in the sample area.

2-04-02 Nueva Concepción

No water. Only 10% irrigable if there was water, and then conveyance would be very difficult. 0% irrigable.

3-04-8 Ilobasco

Very broken and non-irrigable land. 0% irrigable.

3-04-02 Olocuilta

Very broken and non-irrigable land. 0% irrigable.

4-04-10 Jucuarán

No water. Mountain top land. Rolling hills. 0% irrigable unless by well.

4-04-23 Sesori

40% irrigable. Heavy rather poor soil. 0.5-0.8 cfs in small river. Pump 1.5 km. from it or canal 3 1/2 kilometers. Larger Río Jiotique can be pumped for 3 1/2 - 4 kilometers or by canal 25 kilometers. Note: All this area will be under water with the filling of the new dam at San Lorenzo. The small river dries up in summer.

05 Series

2-05-04 Tonacatepeque

2/3 irrigable but only source of water is to pump from the Río Las Cañas.

4-05-06 San Miguel

30% irrigable - the area is filling fast with dwellings. Canal would have to come from Río San Miguel and would be about 6 kilometers long.

07 Series

2-07-05 Cuisnahuat

Part would be irrigable but is more filled with houses. 0% irrigable.

3-07-06 Desembocadura del Río Lempa

Sample area is located on an island and there is no water. 0% irrigable.

08 Series

1-08-04 Metapán

No water. 0% irrigable

2-08-12 Masahuat

The vega of the river is the only part that is irrigable. It must be taken from the Lempa. 10% irrigable. The upper part is high and rocky and broken and not conducive to irrigation.

3-08-13 Sensuntepeque

30% on west side is only part irrigable but there is no surface water. 0% irrigable unless by well and pumping.

4-08-07 Nueva Esparta

Steep rocky and hilly. Little bit of water in quebrada El Roble in summer but would have to pump. 0% irrigable.

4-08-20 Sabanetas

Hilly and broken, pine trees. 0% irrigable.

1-01-13 Río Chiquihuat Basin area = 105 Km² from measurement point

Winter flow measured at 1.17 m³/sec.

Río Ceniza in Conacaste Herrito is continuously measured and is similar in geography to Río Chiquihuat (most similar of any measured river).

Río Ceniza Basin area = 168 Km²

Promedio July = 4.14 m³/sec.

Low flow = 0.7 m³/sec. (leaving 10% in stream)

Reduction factor = $\frac{0.7}{4.14}$ 0.169

Estimated low flow of Río Chiquihuat

$$= 1.17 \text{ m}^3/\text{sec.} \times 0.169 = 0.2 \text{ m}^3/\text{sec.}$$

Area possible to irrigate (leaving 10% in stream)

$$A = \frac{qt}{d} = \frac{0.2 \text{ m}^3/\text{sec.}}{6 \text{ mm/day}} \times 60\% \text{ eff.} \times \frac{86400 \text{ sec.}}{\text{day}} \times \frac{1,000 \text{ mm}}{\text{m}}$$

$$172.7999.999 \text{ m}^2 = 172.8 \text{ ha.} = 1.720 \text{ Km}^2$$

$$\text{Factor} = \frac{1.728}{105} \times 100 = 1.646\%$$

$$(\text{PRBI}) \times \frac{\text{Factor}}{(\text{PIA})} = \frac{1.646}{0.55} = 2.99\%$$

1-01-24

Río Sucio $A = 95 \text{ Km}^2$

Measured winter flow = $2.6 \text{ m}^3/\text{sec.}$

Río San Pedro = compare river

Promedio July Flow = $2.73 \text{ m}^3/\text{sec.}$

Low flow = $0.92 \text{ m}^3/\text{sec.}$ (10% left in Río)

Basin Area = 102.2 Km^2

$$\text{Reduction Factor} = \frac{0.92}{2.73} = 0.336$$

Estimated low flow of Río Sucio

$$= 0.336 \times 2.6 \text{ m}^3/\text{sec.} = 0.873 \text{ m}^3/\text{sec.}$$

Area possible to be irrigated (>10% left in river)

$$A = q \times 864 \frac{\text{ha.} \times \text{sec.}}{\text{m}^3} = 0.873 \times 869 = 754 \text{ ha.} = 7.54 \text{ Km}^2$$

$$\text{Factor} = \frac{7.54 \text{ Km}^2}{95 \text{ Km}^2} \times 100 = 7.96\%$$

$$(\text{PRBI}) = 11.37\%$$

1-03-33

Río Sunzacuapa A = 22.85 km²

Measured winter flow = 0.54 m³/sec.

Reduction factor from Río San Pedro = 0.385

Low flow Río Sunzacuapa = 0.385 x 0.54 = 0.21 m³/sec.

A = 0.21 m³/sec. x 864 181 ha. = 1.81 km²

Factor = $\frac{1.81}{22.85} \times 100 = 7.92\%$

PRBI = $\frac{7.82}{.2} = 39.6\%$

2-01-07

Río Suquiapa measured area = 308 km²

Low flow = 2.7 m³/sec.

A = 2.7 x 869 = 2332.8 = 23.33 km²

Factor = $\frac{23.33}{308} \times 100 = 7.57\%$

(PRBI) = 9.45%

2-02-03

Río Metayate Area = 185.2 km²

Low flow = 0.063 m³/sec.

A = 0.063 x 864 = 54.43 ha. = .5443 km²

Factor = 0.294%

(PRBI) = 0.30%

3-01-05

Río Acahuapa Area = 225 km²

Low Flow = 1.35 m³/sec.

Area = 1.35 x 869 = 1166 ha. = 11.66 km²

Factor = $\frac{11.66}{235} \times 100 = 5.15\%$

(PRBI) = 5.43%

3-01-18

Río Jiboa Area = 413.9 Km²

Low flow = .9, 1, 1, 1.08 = 1 m³/sec.

Río Jalponga Area 58 Km²

Low flow = 0.0918, 0.0827, 0.045, 0.13
= 0.08 m³/sec.

A = 1.08 x 864 = 933.12 = 9.33 km²

Factor = 0.0198 = 1.98%

(PRBI) = 2.04%

3-02-01

Río Copinolapa A = 295 Km²

Low flow = 0.27 = m³/sec.

A = 0.27 x 864 = 233.28 = 2.33 km²

Factor = 0.00782 = 0.782%

(PRBI) = 5.2%

4-02-15

Río San Miguel A = 910 km²

Low Flow = 1.3, .9, 1.3

A = 1.3 x 864 = 1123.2 = 11.23

Factor = 0.01234 = 1.234%

(PRBI) = 1.65%

4-04-23

Río Joitique A = 217 km²

Low Flow = 0.3 m³/sec.

A = 0.3 x 864 = 259.2 = 2.59 km²

Factor = 0.0119 = 1.19%

(PRBI) = 2.99%

4-05-06

Río San Miguel

Same as for 4-02-15

Factor = 0.0119 = 1.19%

(PRBI) = 4.11%

INITIAL ENVIRONMENTAL EXAMINATION

I. FACESHEET.

PROJECT LOCATION: The Rural Areas of the Republic of El Salvador.

PROJECT TITLE: Small Farm Irrigation.

FUNDING: FY 1978, \$2,000,000.

LIFE OF PROJECT: Five years.

IEE PREPARED BY: C. R. Savidia, Gen. Eng.
L. T. Armstrong, CRDO
D. Steen, Ag. Econ.

THRESHOLD DECISION:

Negative environmental decision recommended (see Page 3 where the recommendation for environmental action is fully stated.)

CONCURRENCE:



Edwin A. Anderson
Director, USAID/El Salvador



DATE

Eugene M. Girard II
Assistant Administrator
for Latin America

DATE

II. DESCRIPTION OF PROJECT.

The project will involve the construction of very small irrigation projects to assist small farmers throughout the country of El Salvador to increase their agricultural production, productivity, and income. For the most part, the projects will involve the diversion of water from local streams or rivers by means of small man-made ditches/channels averaging 24 inches in width and 24 inches in depth. Smaller drainage ditches will also be constructed to carry away the run off. None of the irrigation projects to be undertaken contemplate steep slopes that would tend to build high velocity in the irrigation channels. Rather, the slope of the channels to be constructed will average between 1 and 1.5 percent, thereby causing no erosion.

Water will be used in its natural form and no additives will be applied. Nearly all land in the proposed project is already being used for agricultural production and is being farmed primarily during the rainy season. Therefore, the project will increase the production and productivity of the land in the proposed project areas by allowing it to be cultivated during the dry season or more effectively farmed during rainy season, drought periods.

The project will not, of itself, change the present population size, but, through increased production, productivity and income of the beneficiaries, should improve their nutritional levels. Further, as a result of increased production and productivity, additional employment opportunities should be created for rural dwellers. However, no movement of families is foreseen as a result of the project.

III. IMPACT IDENTIFICATION AND EVALUATION FORM.

Impact
Symbols^{1/}

A. Land Use.

1. Changing the character of the land through:
 - a. Increasing the population.....N
 - b. Extracting natural resources (water).....L
 - c. Land clearing.....L
 - d. Changing soil capacity (by applying water to crop land).....L to H

1/ Legend

- N - No environmental impact
- L - Little environmental impact
- M - Moderate environmental impact
- H - High environmental impact
- U - Unknown environmental impact

- 2. Altering natural defenses.....L
- 3. Foreclosing important uses.....L
- 4. Jeopardizing man or his works.....N
- 5. Other factors
- Ecological Balance.....N

B. Water Quality.

- 1. Physical state of water.....L to M
- 2. Chemical and biological states.....L to M
- 3. Ecological balance.... ..L

C. Atmospheric.

- 1. Air additives.....N
- 2. Air pollution.....N
- 3. Noise pollution.....N

D. Natural Resources.

- 1. Diversion, altered use of water.....L to M
- 2. Irreversible, inefficient commitments.....N

E. Cultural.

- 1. Altering physical symbols.....N
- 2. Change of cultural traditions.....L

F. Socioeconomic.

- 1. Changes in economic/employment patterns.....M
- 2. Changes in population.....N
- 3. Changes in cultural patterns.....L

G. Health.

- 1. Changing a natural environment.....N
- 2. Eliminating an ecosystem element.....N
- 3. Other factors
 - Nutrition.....M

H. General.

- 1. International impacts.....N
- 2. Controversial impacts.....N
- 3. Larger program impacts.....N

IV. ENVIRONMENTAL ACTION RECOMMENDED:

It is recommended that a negative determination be given to this project.

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 an Environmental Assessment will not be required.

CONCURRENCE:

 Edwin A. Anderson
 Director, USAID/EI Salvador

DATE

 Eugene N. Girard II
 Assistant Administrator
 for Latin America

DATE

Status of National Economy

1. Rate of Economic Growth

The economy of El Salvador has undergone some drastic changes since 1960 after the formation of the Central American Common Market (CACM). During the period 1961-67, the gross domestic product (GDP) grew at the average annual rate of 6.7%. This relatively high rate of growth was realized mainly from the industrialization that took place in response to the captive industrial products market behind the protection of the newly formed CACM. El Salvador, a country with very limited landspace and little natural resources but an abundant labor force, established many manufacturing industries to produce import substitute goods for the CACM. However by 1968, the CACM began to show signs of regional trade difficulties resulting from uneven economic growth of member countries and consequent balance of payments problems experienced by some of them. The GDP growth rate during 1968-75 slowed down considerably to about 4.6% per annum. The Honduran-El Salvador war of 1969, the worldwide crop failure of 1972, and the oil crisis of 1973 help explain a large part of the economic slowdown. However, in 1976, the economy rebounded and grew at about a 6% annual growth rate mainly due to high world coffee prices. The recovery extended into the first half of 1977. The estimated real GDP grew at about a 10% annual rate, but the unseasonal summer draught together with the ill-timed rains in the fall reduced the basic grain and coffee harvest by about 25%. Furthermore, inflation accelerated during the second half of 1977 to reach more than 11% for the year. The overall growth for 1977 is estimated to be between 5 and 6%.

2. Current Economic Situation

The characteristics of El Salvador's economy are different from that of most developing countries. Usual economic problems that one expects to find in a developing country are not evident in El Salvador. First, the public sector fiscal deficit financing through emission of new money by the Central Bank, commonly observed in a typical developing country, is not a big problem in El Salvador. However, central government tax revenues are short of its expenditures in current and capital accounts. The shortfall was financed through public sector borrowing as shown in the Table below.

TABLE III EL SALVADOR CENTRAL GOVERNMENT FISCAL ACCOUNTS
(In millions of Colones)

	1974	1975	1976	1977	1978
A. Current Revenue	484	578	810	990	1160
B. Current Expenditures	422	493	617	694	813
C. Fiscal Surplus of the prior year	+ 62	+ 85	+193	+296	+347
D. Fiscal Surplus of the prior year	39	42	102	61	40
E. Available Capital Fund	101	127	295	357	387
F. Capital Expenditures	173	216	411	375	438
G. Surplus (+) or Deficit(-)	- 72	- 89	-116	- 18	- 51
H. Sources of Finance					
- External Borrowing	55	83	78	56	51
- Sale of Government Bonds	56	100	78		
I. Carry over to next year*	39	94	60	38	0

* Line "I" should equal line "D" one year lagged. The differences are due to errors and omissions that are ignored here.

Source: Ministry of Finance, "Informe Complementario Constitucional Sobre La Hacienda Pública," 1974-7 and Official Newspaper, "Ley de Presupuesto General," 1977-78.

Central government current revenues covered all operating expenditures and an average of 71% of the capital budget during the period 1974-1977. Financing of the remainder (deficit) of the capital budget is traditionally achieved through foreign borrowing and sale of government bonds (internal borrowing). The percent of required deficit financing as a proportion of total expenditures is about 12% in a typical year, but in 1977 it was only 2% because of the increased coffee export tax revenue. Table III also shows that the GOES always borrowed more than the necessary amount (see line "I") to insure surplus of public resources.

Second, El Salvador has experienced international payment problems during the last 15 years with two or three years of trade deficits followed by one or two years of trade surpluses. A closer look at the balance of payments situation reveals that the net long-run balance of goods has been roughly in equilibrium. High world prices for El Salvador's principal exports (coffee and cotton) and the country's relatively advanced manufacturing position in the Central American Common Market account for this situation (although El Salvador's trade balance vis-a-vis CACM countries has been negative for the past two

years). The balance of services, however, is heavily negative largely due to shipping charges, and only slightly offset by current transfers, so that the current account balance of payments has tended to be in deficit. However in 1977 the balance of payments of goods and services swung back into an estimated 283 million surplus.

Table IV below shows that in 1974 and 1975 El Salvador had large trade deficits. However, it should be kept in mind that these were the world's worst recession years since the great depression of 1930 and that no country had a favorable balance except the OPEC countries. In 1976, El Salvador's trade balance made a recovery and in 1977 it was in the surplus column.

When there was an imbalance of international payments, substantial net inflows of private capital (including those to autonomous entities of the public sector) have been the main offsetting factor to balance reserves, but net inflows of official capital (including concessional loans to the government) have also been important. Thus, although El Salvador has had balance of payments difficulties in the past, it is in a relatively better balance of payments position than many third world countries.

TABLE IV: EL SALVADOR BALANCE OF PAYMENTS
(In millions of Colones)

<u>Goods & Services</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
Exports	1293	1499	2126	2450
Imports	1677	1799	2213	2367
Trade Balance	- 384	- 300	- 87	83
<u>Transfers</u>	46	71	75	NA
<u>Current Balance</u>	338	- 229	- 12	NA
<u>Private Capital</u> (net)	154	274	177	NA
<u>Official Capital</u> (net)	61	45	59	NA
<u>Errors</u>	+ 1	+ 21	- 16	NA
<u>BALANCE</u>	- 123	111	208	NA

SOURCE: Central Bank of El Salvador, October 1977.

The third point that distinguishes El Salvador from the typical under-developed country is the historical low level of inflation. El Salvador experienced only 1-2% annual inflation during 1960-72. During 1973-75, however, El Salvador could not avoid the external inflationary pressure caused by the worldwide crop failure of 1972 and the quadrupling of oil price increase in 1973. As a result, inflation rates in 1974 and 1975 reached 20% per year. However, the general consumer price index (CPI) declines steadily to about a 5% annual rate beginning in June 1976 and maintained itself at that level until March 1977. However, the inflationary pressure fueled by the recent coffee windfall again appeared in April 1977. The year 1977 ended with an inflation rate of more than 11%.

In spite of these favorable conditions, El Salvador has two major economic and social problems for which it must provide solutions. They are (i) the imbalance between the growth rate of the work force and new job creation, and (ii) the extremely uneven distribution of income. Although the annual population growth rate was estimated at 3.1% in 1977, the labor force is projected to grow for the next 10 years at about 3.5 annually. An economic implication of this is that the economy has to provide 50,000 to 60,000 new jobs annually just to maintain the same number of unemployed, much less reduce the number of currently unemployed workers. The USAID estimates unemployment at about 18% of the available workforce in 1976 which is 8 percentage points more than the reported unemployment rate of 10% in 1971. This suggests that the average annual GNP growth rate of 4.7% during 1971-75 is not fast enough to absorb the new labor entrants into the economically active workforce.

The distribution of income has become worse between the skilled workers, who live mostly in urban areas, and the unskilled workers who reside mainly in rural areas. Although time series data on income distribution are not available, it is clear that most unemployed workers are found among the unskilled and very few among the skilled workforce. An ILO study of employment reports that as much as 46% of rural workers were under employed in 1974. The estimated per capita income of landless rural workers was \$62 in 1974, which is less than 1/5 of the per-capita national income (\$322) in that year. The demographic and labor survey completed in 1974 for the metropolitan area of San Salvador reveals the severity of uneven income distribution. It shows that the lowest 20% of income earners obtained 2% of total income, while the highest 20% enjoyed 66% of the income. There are four basic reasons for this: (1) uneven distribution of land, (2) low levels of education, (3) fast population growth and (4) capital intensive industries.

SERVICE PAYMENTS, COMMITMENTS, DISBURSALS AND PAYMENTS DURING PERIODS OF EXTERNAL PUBLIC DEBT PROJECTIONS BASIC ON DEBT OUTSTANDING INCLUDING UNDISBURSED AS OF DEC. 31, 1975 DEBT REPAYABLE IN FOREIGN CURRENCY AND US\$ IN THOUSANDS OF U.S. DOLLARS TOTAL

YEAR	DEBT OUTSTANDING AT		TRADE PROJECTIONS DURING PERIOD						OTHER CHANGES	
	BEGINNING OF PERIOD		COMMITMENTS	DISBURSALS	SERVICE PAYMENTS			CANCELLATIONS	ADJUSTMENTS	
	(1)	(2)			PRINCIPAL	INTEREST	TOTAL			
1968	65,944	50,027	12,025	11,530	3,571	2,511	3,042	-	-	
1969	73,504	56,481	23,558	16,068	3,577	2,726	4,303	-	-	
1970	85,856	119,462	12,391	7,557	5,374	3,224	9,353	1	1	
1971	77,704	126,325	25,257	16,706	11,263	3,721	15,936	65	235	
1972	92,474	139,712	23,192	22,321	6,723	1,440	10,487	-	149	
1973	107,440	157,295	53,239	19,103	16,705	3,226	21,226	2,102	915	
1974	111,701	153,266	136,245	87,394	19,267	5,891	24,710	53	1,546	
1975	101,647	110,327	116,760	47,242	47,553	7,995	54,548	53	114	
1976	102,226	175,443	-	-	-	-	-	1,471	-2,499	

THE FOLLOWING FIGURES ARE PROJECTED

1976	107,900	175,443	-	40,636	20,330	14,051	34,941	-	-478
1977	242,733	154,640	-	40,452	15,294	14,840	34,154	-	5
1978	203,897	135,351	-	79,293	23,735	14,440	33,275	-	5
1979	269,417	111,561	-	24,075	23,559	11,474	37,033	-	4
1980	202,737	280,001	-	12,007	20,625	12,100	32,725	-	4
1981	259,917	267,161	-	4,114	16,425	10,595	27,020	-	5
1982	255,610	250,760	-	1,940	14,105	9,865	24,234	-	4
1983	206,327	236,447	-	74	14,104	9,045	23,152	-	4
1984	222,305	222,341	-	31	12,945	5,339	18,284	-	4
1985	209,390	209,395	-	5	10,752	1,091	11,843	-	4
1986	153,647	196,347	-	-	11,033	7,724	18,757	-	4
1987	177,604	177,604	-	-	11,064	6,840	17,904	-	4
1988	176,542	176,542	-	-	11,141	6,641	17,782	-	2
1989	165,380	165,380	-	-	11,474	5,872	17,346	-	1
1990	153,935	153,934	-	-	11,701	5,124	16,825	-	1
1991	142,754	142,254	-	-	4,364	4,737	14,533	-	1
1992	132,467	132,467	-	-	9,455	4,328	11,783	-	1
1993	122,994	122,994	-	-	9,212	1,922	11,134	-	1
1994	113,750	113,750	-	-	6,780	3,575	12,355	-	1
1995	105,005	105,005	-	-	7,674	3,165	10,839	-	1

NOTES: (1) Only debts with an original or extended maturity of over one year are included in this table.
 (2) Includes service on all debts listed in Table 1, prepared July 3, 1976, except for the following:

Principal in arrears	
Publicly issued bonds - US	
Issues with unknown repayment terms	172
Publicly issued bonds	
United Kingdom	8
United States	161
Total	341

THIS COLUMN SHOWS THE AMOUNT OF ARITHMETIC IMBALANCE IN THE ABOVE OUTSTANDING INCLUDING UNDISBURSED FROM THE YEAR TO THE YEAR. THE MOST COMMON CAUSES OF IMBALANCES ARE CHANGES IN ENDING DATE AND TRIMMING OF DEBT FROM THE YEAR TO THE YEAR.

METHODOLOGICAL AND STATISTICAL NOTES ON ECONOMIC ANALYSIS SECTIONA. Data and Methodology

Using field data on actual irrigated and non-irrigated small farms has two principal disadvantages. First the data from field surveys is six years old, many changes have taken place in El Salvador in that period. The second difficulty is in the control group comparison in that irrigated and non-irrigated small farms, even of similar size and from a very limited geographic area, are not similar in all ways except irrigation. This implies that some of the differences we observe may be due to things besides irrigation. We have attempted to isolate the most important of these non-irrigation related differences, but many subtle ones probably persist. In a quantitative sense by far the most important difference is in terrain and its implication for coffee growing. Irrigated farms lie predominantly at lower elevations below stream flow water sources. It is logical that they will cultivate coffee less frequently than a random sample of non-irrigated farms in the same district which can statistically include also the higher elevation small farms. This difference is important because coffee is a high value crop grown without irrigation and it is an important source of small farm income. By comparing irrigated (largely non coffee potential) small farms with non-irrigated which includes both irrigable (non-coffee potential) low-elevation farms and higher non-irrigable but coffee potential farms, the net result will be a substantial underestimate of the income impact of irrigation. This results because irrigated farms do not lack coffee due to their having irrigation water but because of their elevation. A truer control group comparison would have compared only lower elevation farms and excluded higher non-irrigable farms. The data source from which this analysis is drawn did not allow such a distinction based on elevation. This difficulty implies that the benefits to irrigation are higher than those estimated. Since the coffee distortion can only result in making more profitable, what is otherwise already a profitable investment, this methodological difficulty is not thought to be critical.

Data was obtained by permission of the El Salvador Census Office on computer tapes including information on all farms for 1971 (272,000 farms in all). In 1971 there were 2,525 irrigated farms of all sizes. All of these irrigated farms were extracted from the general census tapes and placed in a separate tape file as the "experimental" group. A search was then made for a farm to match each of these "experimental" farms to provide a control group for comparisons. In order to decrease non-irrigated related differences between the experimental and control groups, the smallest geographic unit possible was used for matching. Thus the computer

grouped farms matching the irrigated farm in the same census district (smallest sample unit) in size, and randomly selected one of the matching non-irrigated farms as the control. Since the census district is an extremely small geographic area, it could be expected that there would be no non-irrigated farm of similar size to draw for a match. Matches were found for 2,450 out of 2,525 searches resulting in a control group only 3% smaller than the experimental group which should cause little distortion.

Of these 2,525 irrigated farms 1,920 were under 10 Ha. and while all of the comparisons described in this document were also computed for the larger farms, only those for farm sizes up to 10 Ha. are reported here. While the Sector Assessment indicated that farms from 8-10 Ha. have average incomes slightly over the AID Mandate definition for "poor", census size classifications forced their inclusion in our "small farmer target group" category.

The data gathered in the census form is remarkably complete for a census, over 600 data items could be included on each farm. For the purposes of this analysis, the focus of the data was excellent in that careful accounting was undertaken on major crops for each of the three crop cycles, and interplanted crops were accounted for separately. Since irrigation will have important impact on dry season land use, these seasonal distinctions in the data were critical. The same methodology was used to obtain income estimates from the census data as that found in the methodological notes (Appendix A) of the Sector Assessment.

B. Additional Detailed Findings.

Livestock differences are relatively unimportant for the smallest farms under 3 Ha. but predominate for the mid-range farms from 2-5 Ha. Shifts in the mix of crops grown and a slight increase in the total acreage under cultivation through dry season multiple cropping is the principal impact of irrigation for more than 80% of the small farms including all of those under 3 Ha. It would also appear that shifts in the kinds of crops grown, predominate as an income impact on larger farms. The farms from 3-5 Ha. are the single exception to this pattern.

Table 1 outlines the impact of specific crop type differences and yield impacts for the average of all small farms. It can be seen that the principal shift in crops grown is in the 2nd. and 3rd. cropping cycles, roughly corresponding to the dry season. Basic grain areas stay unchanged during the first cycle and increase significantly during the dry (apante) cycle. The average small farm adds .15 Ha. of basic grains in the dry season with irrigation, an area identical to the total added vegetable and intensive annual additions. The income potential of these additions in intensive crops is highlighted by the fact that while the areas added in basic

Table 1
El Salvador
Income Impact of Irrigation by Crop Type

Crop Type Source	Percent Increase in Farm Net Income by Source	US\$ Additional Income per Farm from Irrigation by Source
<u>Crop Mix and Area Changes</u>		
Basic Grains Total	1.5%	\$ 9.00
1st Cycle (Invierno)	0.0%	0
2nd Cycle (Verano)	0.3%	1.50
3rd Cycle (Apante)	1.2%	7.50
Sugar Cane and Cotton	1.7%	10.50
Vegetables + Annuals	29.0%	180.00
Coffee + Tree Crops	-8.4%	-50.50
<u>Livestock Changes</u>		
Improved Pasture (Beef and Milk)	8.5%	\$ 52.50
Poultry, Pork Etc.	1.0%	7.20
<u>Yield Changes</u>		
Basic Grains Total	1.4%	8.50
Cotton and Sugar	0.0	-1.00
Coffee	0.4	2.50
Vegetables and Annuals	-5.0	-30.00
Tree Crops	-1.0	-6.00
Total Income Difference ^a	30.0%	\$182.00

^aRounding may cause totals not to sum.

Source: Computation by Samuel R. Daines based on 1971 Agriculture Census

grains and intensive annuals is equal, Table 1 indicates that the income impact of the intensive crops is more than 15 times higher than basic grains. The difference in income impact would have been even higher had the irrigated farms been able to improve their yield performance in the vegetable crops.

While the average figures for all small farms indicate an important role for livestock in adding income on irrigated farms, this average is deceptive because it overweights the larger 4-10 Ha. farms which cover only a small percentage of the farms yet produce a large proportion of the total income. Livestock is only an important impact item on farms over 3 Ha. where improved pasture under dry season irrigation is the principal factor.

Yields are left mostly unchanged except for the actual decrease in yields of vegetables and intensive annuals. This result is not an important finding because it results from comparing a wide variety of irrigated producers with a very few specialized producers with high level technology who produce with available rainfall near major markets. One important conclusion can be drawn from this finding, that extension of irrigation to small farmers will probably be attended by significant income increases but expectations that high level technology will or need to accompany that transformation are unfounded.

The coffee results indicated in Table 1 need amplification. Coffee differences between the irrigated and non-irrigated farms are due more to the elevation and contours of the terrain than to the introduction of irrigation as has already been mentioned. Much discussion has occurred about the potential of lower elevations in irrigated coffee. The findings of this study are perhaps instructive on this issue in that while the lower elevation irrigated farms have much less coffee than the higher average elevation non-irrigated farms, their yields are 3% higher. When one amplifies this result by the fact that few varieties have been developed and emphasized for lowland coffee, and small producers in these areas are probably utilizing a very low level of coffee technology, the result holds some promise that coffee might be an important possibility for irrigated small farms.

C. Statistical Tables.

Table 2
El Salvador
Source of Added Income from Additional Area in Basic
Grains on Irrigated Farms

Farm Size	Percent of Added Basic Grains Income Originating in Each Cropping Cycle			
	All Seasons	First Cropping Cycle (Invierno) May-July %	Second Cropping Cycle (Verano) Aug.-Oct. %	Third Cropping Cycle (Apante) Nov.-April %
All Small Farms	100%	0	16.5%	83.5%
0 - .5 Ha.	100	0	30.0	70.0
.5- 1 Ha.	100	0	0	100.0
1 - 2 Ha.	100	0	25.5	74.5
2 - 3 Ha.	100	0	38.8	61.2
3 - 4 Ha.	100	35.7%	9.8	54.5
4 - 5 Ha.	100	0	20.9	79.1
5 - 10 Ha.	100	0	30.8	69.2

Source: Computation by Samuel R. Daines based on 1971 Agriculture Census Sample of 1,920 irrigated small farms and an equal number of matching dryland farms.

* This figure results from a small number of farms with large increased areas in interplanted corn and sorghum.

Table 3
El Salvador
Added Income from Irrigation on Small Farms
Income Differences between Irrigated and Non-Irrigated
Farms due to Areas Cultivated in Crops

Farm Size	Added Income from Crop Mix Changes and Areas in Specific Crops			
	Basic Grains US\$/Farm	Sugar and Cotton US\$/Farm	Vegetable and other Annuals US\$/Farm	Tree Crops Including Coffee US\$/Farm
All Small Farms	\$ 8.80	\$10.50	\$180.00	\$-50.40
0-.5 Ha.	2.00	1.00	70.60	-12.80
.5-1 Ha.	11.50	1.50	129.00	-55.30
1-2 Ha.	-12.00	13.00	156.00	-69.00
2-3 Ha.	-11.00	4.00	267.00	-135.00
3-4 Ha.	52.00	0.0	155.00	-193.00
4-5 Ha.	46.11	15.00	342.00	-400.00
5-10 Ha.	57.00	26.00	415.00	10.50

Source: Computations by Samuel R. Daines based on 1920 small irrigated farms and a control group of equal size of matching non-irrigated farms drawn from Agriculture Census 1971.

* Note: Tables 3 and 4, when added, may not match the totals in Table 6 due to the modifying assumptions listed in Table 6 and rounding.

Table 4
El Salvador
Income Impact of Irrigation on Small Farms: Added Income from Increased Crop Yields and Livestock Differences

Farm Size	Added Income from Increased Yields on Irrigated Small Farms						Added Income from Livestock on Irrigated Small Farms	
	Yields in Basic Grains Invierno Verano	Coffee	Cotton + Sugar	Vegetables + Other Annuals	Other Tree Crops	Added Areas in Improved Pasture, Milk and Beef	Added Poultry Pork, Bees etc.	
-----Added Income Measured as Difference between Irrigated and Non Irrigated in US\$ Per Farm-----								
0 - .5 Ha.	\$3.80	\$3.90	\$-0.20	\$ 0.0	\$ 0.0	\$0.0	\$ 0.0	\$ -9.50
.5- 1 Ha.	27.00	2.50	-0.30	0.0	26.30	0.50	6.50	1.00
1 - 2 Ha.	12.00	0.50	3.80	7.00	0.0	0.0	10.00	1.00
2- 3 Ha.	-5.00	8.50	-1.00	1.00	14.00	0.0	66.00	6.00
3 - 4 Ha.	35.00	-1.00	-15.00	-16.00	24.00	16.00	146.00	-54.00
4 - 5 Ha.	30.00	-12.00	9.00	-8.00	-10.00	0.0	163.00	40.00
5 - 10 Ha.	13.00	-11.00	-25.00	6.00	-115.00	3.50	122.00	52.00
All Small Farms	\$10.30	\$ -2.00	\$ 2.50	\$-1.00	\$-35.00	\$ -0.61	\$ 52.50	\$ 7.20

Source: Computations by Samuel R. Daines based on 1920 irrigated small farms and a control group of equal size of matching non-irrigated farms from the Agriculture Census 1971

Table 5

The Crop Mix Impact of Irrigation on Small Farms
in El Salvador

Farm Size	No. of Irrigated Farms Included	Crop Mix Differences by Farm Size in Hectares Irrigated Farms Minus Matched Non-Irrigated Farms			
		Ha. in Basic Grains (net)	Ha. in Cotton and Sugar Cane	Ha. in Intensive Crops excluding Coffee	Artificial Pasture
0-.49 Ha.	347	-0.006 Ha.	0.005 Ha.	0.068 Ha.	0.000 Ha.
.5-1 Ha.	485	0.021	0.006	0.112	0.002
1-2 Ha.	442	0.004	0.050	0.153	0.009
2-3 Ha.	245	0.076	0.016	0.259	0.028
4 Ha.	107	0.112	0.001	0.120	0.146
5-7 Ha.	94	0.212	0.056	0.302	0.208
8-10 Ha.	200	0.354	0.096	0.359	0.398

SOURCE: Computed from 1,920 irrigated small farms, and a matching sample of non-irrigated farms of similar size and location drawn from the Census of Agriculture 1971 for El Salvador.

Table 6
El Salvador
Benefit Cost Estimates for Small Irrigated Farms: Benefits and Costs Based on Minimum Impact Assumption

Farm Size	Benefits from Irrigation in US\$ per Farm			Costs of Irrigation in US\$ per Farm			
	Income from Area in Basic Grains Cotton	Income from Yields in Basic Grains and Livestock	Income From Yields and Area Veg., Tree Crops	Irrigation Works	On Farm added annual costs and System Maintenance	Circulating Capital as Credit	Added Investment in Livestock
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
0. - .5 Ha.	\$ 3.30	\$ 9.40	\$57.50	\$124.40	\$ 8.40	\$ 13.70	\$ 0.0
.5 - 1 Ha.	13.00	35.00	100.50	250.00	17.00	27.00	13.00
1 - 2 Ha.	1.00	28.00	91.00	388.00	26.00	40.00	27.00
2 - 3 Ha.	-7.00	76.00	142.00	554.00	37.00	64.00	218.00
3 - 4 Ha.	52.00	110.00	-13.00	581.00	39.00	25.00	275.00
4 - 5 Ha.	61.00	214.00	-59.00	803.00	54.00	69.00	608.00
5 - 10 Ha.	83.00	182.00	290.00	993.00	67.00	237.00	521.00
All Small Farms	\$19.00	\$ 67.00	\$91.00	\$421.00	\$28.00	\$62.00	\$158.00

- (1) These benefits come from added areas in irrigated farms. Computed from control group comparison. These benefits are assumed to occur in year 3
- (2) These benefits include yield differences in basic grains and differences from added livestock. They are assumed to occur in year 4. Both estimates are based on the control group comparison of 1920 irrigated farms.
- (3) These benefits come from yield and area differences in other crops and are assumed to occur in year 5. Since almost none of these benefits come from increased tree crops the 5 year time period was allowed to adjust for the time involved in making a transition to more intensive cropping patterns. Estimates based on control group comparison.
- (4) Costs of installation are based on a survey of FOCCO existing projects and Mission Estimates at US\$ 483/ Ha. Irrigated.
- (5) On farm added costs of irrigation and Maintenance based on a survey of 38 FOCCO beneficiaries in 1977 by Mission contractor. These costs begin in year 3 and continue to end of project at 25 years. Construction costs yrs 1 and 2.
- (6) Control group comparison indicated that once small farms are adjusted to irrigation it requires no added credit to obtain the benefits noted in columns 1-3. However a credit requirement was added based on actual credit use observed in Census for crops of similar nature to encourage small farmers to make the changes involved in irrigation benefits. Credit is assumed to be disbursed in year two and withdrawn in year five.
- (7) Added livestock income requires added investment in livestock. Since irrigation is associated with added livestock income, the resultant total value of livestock investment is added as a cost based on costs of production studies cited in Daines and Steen, Analysis of Small Farms and Rural Poverty, AIB 1977.

Assumptions Used in the Economic Analysis1. Shadow Pricing Project Labor

Rural unemployment in El Salvador according to the ILO is the highest in Latin America (See Agriculture Sector Assessment, 1977). The rate of underutilization of labor on the 71% of farms under 2 Ha. is probably over 75% of the available man-days not utilized on the farm. When an estimated off-farm employment rate of 23% is subtracted from this total, it implies that very nearly half of the available man-days of family labor on the smallest farms is unutilized in directly productive activity. Little production or welfare is lost if these unutilized days are used to build and maintain the small irrigation works contemplated by this project. It would not make sense therefore in calculating the true costs of the project to include the unskilled small farm labor contribution at the average daily wage when attempting to view the costs and benefits of the project in the broader perspective. Using shadow prices is a way of reducing this distortion.

The shadow prices chosen should reflect the opportunity cost of the labor actually drawn to the project, and not simply the estimated opportunity cost of the average rural family laborer. The most practical way of selecting a shadow wage for unskilled labor is to estimate the kind of laborers who will be drawn to the project, and then review their wage rates and patterns of unemployment. Underutilization of rural labor has two important dimensions which must be considered in selecting a shadow wage. The first is often called "structural" under-utilization and refers to the proportion of a laborer's time (or the proportion of laborers) which is unutilized all year round. Seasonal under-utilization is the second dimension and refers to the proportion of a laborer's time which is unemployed due to seasonal fluctuations in his work.

Table 1 outlines the structural and seasonal under-utilization patterns of labor for small farm families. This is the relevant group for this project since there is a high degree of certainty that they will be the ones to contribute the labor under the DIDECO system of establishing small-scale irrigation projects. Small farm unemployment varies by farm size both in magnitude and in the proportion of the unemployment which is caused by seasonal fluctuations and that which is essentially unutilized year round. As the farm size grows, the proportion which is seasonally under-utilized grows. On the smallest farms under 2 Ha. which should be the principal focus of the irrigation activity, off-farm employment may be used to absorb some of the 14-16% seasonal slack, but it most likely is used whenever it is available since there is a much larger

Table 1
El Salvador
Patterns of Labor Underutilization

Farm Size	On Farm Labor	Underutilization	Rates		off Farm	Total
	Structural Underutilization %	Seasonal Under-Utiliz. %	Seasonal as a % of Total	Seasonal Utilization %	Utilization %	Employment %
0 - 1 Ha.	62.7	13.9	76.6	(18%)	23%	46.6%
1 - 2 Ha.	51.1	16.3	67.4	(24)	23	55.6
3 - 4 Ha.	30.4	22.9	53.4	(43)	4	50.6
5 -10 Ha.	10.5	28.5	39.0	(73)	4	65.0

51-63% structural slack available. On the slightly larger farms from 5-10 Ha. there is less structural slack (10-30%) but increasing seasonal underutilization. Small farm families from 0-10 Ha. are employed in farm production less than 15% of their time during the months of January-March, and even allowing for off-farm labor, the employment rate is not likely to be more than 20-25%. These national averages vary some by region, but more by farm where each family will have significant periods of seasonal, and certain members with structural underutilization. The fact that families are asked to contribute their own labor should act as a powerful incentive to draw only unutilized labor into the project.

The minimum impact assumptions included a costing of all labor in the project including the contributed labor of unskilled farm families at the average wage. To adjust this estimate for unemployment, two shadow prices have been selected based on different assumptions. First a shadow price of zero for project labor based on the assumption that the beneficiaries will be predominantly under 2 Ha. where seasonal slack is not significant and structural slack predominates, and that those farms over 2 Ha. will be motivated by the contribution scheme for labor to work only in non-work-displacing situations. The second shadow price is 25% of the average wage based on an average unemployment rate during the construction months.

Based on a review of the labor and local material contributions of 38 participants, data on local vs. DIDECO contributions to the irrigation subprojects including 212 beneficiaries, and AID Mission estimates of \$160/HA. of DIDECO engineering and supervising costs, the percent of local labor in total installation and construction costs is 39%. Local labor in maintenance of the system over its useful life was also shadow priced. When labor is shadow priced at zero, the benefit cost ratio for all small farms (0-10 Ha.) rises from 1.06 to 1.89, and when labor is shadow priced at 25% of its market rate

the ratio becomes 1.57.

2. Increased Technical Assistance

One of the difficult issues in computing benefit/cost ratios on this project surrounds the choice of the level of technical assistance. Since the benefit measures are made for small farmers in the existing environment, where almost no TA exists, it might be assumed that no additional technical assistance is necessary for them to reach the indicated benefits under the minimum impact assumption. It is, however, true that altered behavior requires at least time. A dryland farmer will take time to adjust to the patterns of an irrigated farm. In the projections which have been made of the benefits, it was assumed that it will take five years for this adjustment period. It was further assumed in the minimum impact projections that the adjustment of dryland farmers in a five-year period to production patterns of currently irrigated farms will require \$20 of formal technical assistance per irrigated hectare.

Benefit cost analysts are often faced with a situation in which little is known about the specific magnitudes of impacts of a proposed project or project element. This is the case with additional technical assistance. While it appears to be a good idea, we have been unable to obtain quantitative data about the magnitudes of benefit response to different levels of investment in technical assistance.

It would be relatively easy to make some rough estimates, or invite project experts to do so, and based on these estimates recalculate the basic ratios in the same fashion as was done for shadow priced labor. While all of the estimates in benefit cost analyses are "estimates" and involve different levels of confidence, when that level drops to the point that no quantitative estimates are available based on field measurements, it is best to argue for the project outside of the arithmetic of the benefit cost ratios.

An alternative approach is to use cost effectiveness analysis estimating the break-even benefit which would have to result in order to justify the added costs. Using this approach, rather than estimate the benefits that would flow from an added cost, we ask what is the level of benefit which has to result from the added cost in order to justify its inclusion in the activity. It will probably be easier to judge whether the benefits are likely to be above or below the break-even point than it would be to estimate the expected benefits which an additional investment would generate. This alternative can be a useful decision tool and it reduces the magnitude of the difficulty of estimation based on expert opinion, but it does not

eliminate the difficulty and is not a satisfactory substitute for field measurement. If linked to a plan for field monitoring and evaluation which will provide the necessary field confirmation or judgment of the design hypothesis and expert opinion, this alternative is a safe way to proceed.

Results of break-even analysis for additional investment in the project above what was assumed in the minimum impact assumption are included in the following tables (Tables 2 and 3):

Table 2

Break-even Analysis of Technical Assistance
Expenditures above those included (\$20 per hectare)
in the Minimal Impact Assumption for Small Farms

	Present Value of Additional Technical Assistance	Present Value of Benefits under Minimum Impact Assumption	Additional Annual Benefit (income) in Nominal Dollars required to restore B/C ratio to original 1.06
Per Hectare	\$114	\$105	\$33
Per Farm	\$660	\$609	\$29
Benefit/Cost Ratio assuming no additional benefits	0.923		
Percentage increase in net farm income required to justify the additional technical assistance		16%	
Percentage increase in net family income required to justify the additional technical assistance		5%	

Table 3

Break-even Analysis of Engineering, Design and Administration
Expenditures above those included (\$160 per Hectare)
in the Minimum Impact Assumption for Small Farms

	<u>Present Value of Additional Engineering, Design and Admin. Costs</u>	<u>Present Value of Benefits under Minimum Impact Assumption</u>	<u>Additional Annual Benefit (income) in Nominal Dollars required to restore B/C ratio to the original 1.06</u>
Per Hectare	\$186	\$168	\$44
Per Farm	\$776	\$699	\$39
Benefit/Cost Ratio assuming no additional benefits	0.901		
Percentage increase in net farm income required to justify the additional Engineering, Design and Admin. Cost		25%	
Percentage increase in net family income required to justify the additional Engineering, Design and Admin. Cost		7%	

The additional investment above what was assumed in the minimum impact assumption is composed of vehicles (275,000), technical assistance and training (340,000), and 145,000 for contingencies for a total of 760,000. For this analysis, it makes little difference what the additional funds will be used for in order to estimate the value of benefits necessary to justify the expenditure. As indicated in Table 2, the additional costs listed above raise the total project cost approximately \$114 per farm above the minimum impact estimate and would require an additional \$29 of net income per farm per year to not deteriorate the 1.06 base benefit/cost ratio. Each farm thus would have to increase its net income by only 5% to justify the additional cost input to the project.

Irrigation experts feel that current water use on irrigated small farms in El Salvador is technically backward. The minimum impact assumption benefits were based on these technically

backward irrigated farms. For example, evidence shows that small farmers in El Salvador irrigate too frequently and to an inadequate depth to obtain the maximum or nearly maximum efficiency from a limited water supply. It is because of this belief that the technical assistance is being proposed and it is also because of this that the expected benefit should greatly exceed the necessary break-even level. This simple change in irrigation frequency and irrigation depth could produce all the additional benefits required to justify the additional investment.

3. Indirect Project Impacts

Indirect project impacts should be divided between indirect costs and indirect benefits.

Indirect costs would be losses, displacements, or costs caused by the project but not paid by project beneficiaries. The most obvious of these is the loss of the benefit of dry season water downstream from the planned diversion. The deprivation of formal water users downstream of their rights is protected by the existing law (Decree Law No. 153). However, it is not entirely clear that the legal and organizational structures are sufficiently mature in El Salvador to make this protection automatic.

Aside from the possible losses to formal water users downstream are the inevitable losses to the many informal users who may rely on these small streams for a wide variety of services. These potential losses include reduced water for irrigating household gardens, for stock watering, for household washing, bathing, and even possibly drinking. While these are all potential losses, they all depend on a reduction of dry season flows which is very nearly complete. Even small residual flows could support most of these informal uses downstream and since the irrigation projects will only locate on dependable streams, it is unlikely that these losses would be substantial.

Indirect benefits are more obvious and perhaps more subject to estimation than the indirect costs mentioned. Probably the most important indirect benefit involves the multiplier concept.

Additional production will involve additional inputs, and create an income stream beyond project beneficiaries, both forward (to those involved in transporting, marketing, processing, and providing other services for the additional production) and backward, (to transportation, marketing, and production of inputs and input services for the additional production). Beyond the backward and forward linkage benefits are a cascade of similar benefits coming from the increased demand implied by each of the additional backward and forward income streams. Each household receiving additional income

will spend a large portion of that additional income on goods and services which themselves create income streams. The complex set of economic interactions has often been referred to as the "multiplier effect" and has been empirically estimated in many Latin American economies. No estimates are directly available on El Salvador. Some estimates for Colombia will serve to indicate the general magnitude of these anticipated benefits.

Multiplier effects depend significantly on the commodities produced. Of the total employment generated both directly and indirectly by the project on farms, more than one third will likely be on non-beneficiary farms (See Table 22 Colombia Agriculture Sector Analysis Doc. 2). A total income multiplier of from 2.2 to 2.8 could be expected, meaning that for every dollar of additional output on beneficiary farms, \$2.20-2.80 of additional income would be generated in all households in the economy. From AID's point of view, all of this income cannot be credited as a target group benefit since much of it will accrue to upper income households. If we limit the multiplier to low income households, that is to exclude indirect income benefits to non-poor households, the multiplier could be expected to drop significantly. The range in the "target group income multiplier" based on measurements in Colombia would be from 1.2-1.5. Since the first dollar of direct and indirect benefit is to direct beneficiaries, indirect target group households could be expected to derive from \$0.20 to \$0.50 of total income. For methodological reasons it is difficult to translate these figures easily into the benefit/cost ratios because of the danger of double counting benefits and of failing to accurately deduct costs. It is useful, however, to observe the range of differences among these multiplier effects with other non-project poor households.

Using the midpoint in the indirect income multiplier to poor households (1.35) derived from Colombia, the benefit cost ratio for this project would rise from the minimum impact ratio to 1.63. If all households in the economy are included (which is the recommended benefit cost procedure used by most international assistance agencies), the benefit cost ratio would be 1.70.

4. Selecting Discount Rates

The selection of a discount rate is of critical importance for benefit cost analysis for both conceptual and practical reasons. Conceptually the discount rate chosen implies a time preference for benefits on the part of the project decision makers using the ratios for project choice decision. The time preference for benefits will indirectly but fundamentally affect the kind of projects which will appear most attractive in the final ratios. The practical and

simple reason for treating the selection of the discount rate as an important choice is that small changes in the rate will result in substantial differences in the absolute and relative values of ratios for projects which are being compared.

Two discount rates ought to be used, first a commercial or private discount rate which attempts to reflect the time preferences for benefits illustrated in private financial money markets in the project country. This discount rate may be thought of as the interest rate which project funds would earn if they were invested conservatively in the existing project country money markets. The second discount rate should be a "social" discount rate which attempts to reflect a broader societal or public time preference for benefits. Society as represented by the public sector is usually less shortsighted than private investors who desire benefits in a narrower time frame, and it is logical that this different perspective should be reflected in a difference in the rate at which future benefits are discounted.

For benefit cost computations the discount rate should be net of estimated annual inflation. While there is no rigorous method available to construct a private sector rate, existing data on El Salvador indicate that a gross annual rate of approximately 30% would be a reasonable figure representing interest rates to conservatively invested capital. Inflation rates are likewise difficult to estimate with confidence. For El Salvador, a conservative rate of 15% annual inflation has been netted from the 30% discount rate to arrive at the 15% figure used.

Many countries have legislated or publically mandated a social discount rate. In most cases these rates are between 3-8%. El Salvador has not so chosen to specify its public time preference for benefits from public investment in any official documents available. A rate of 3% was chosen arbitrarily for the social discount rate.

Table 4
Benefit Cost Ratios for Private and Social
Discount Rates 1/

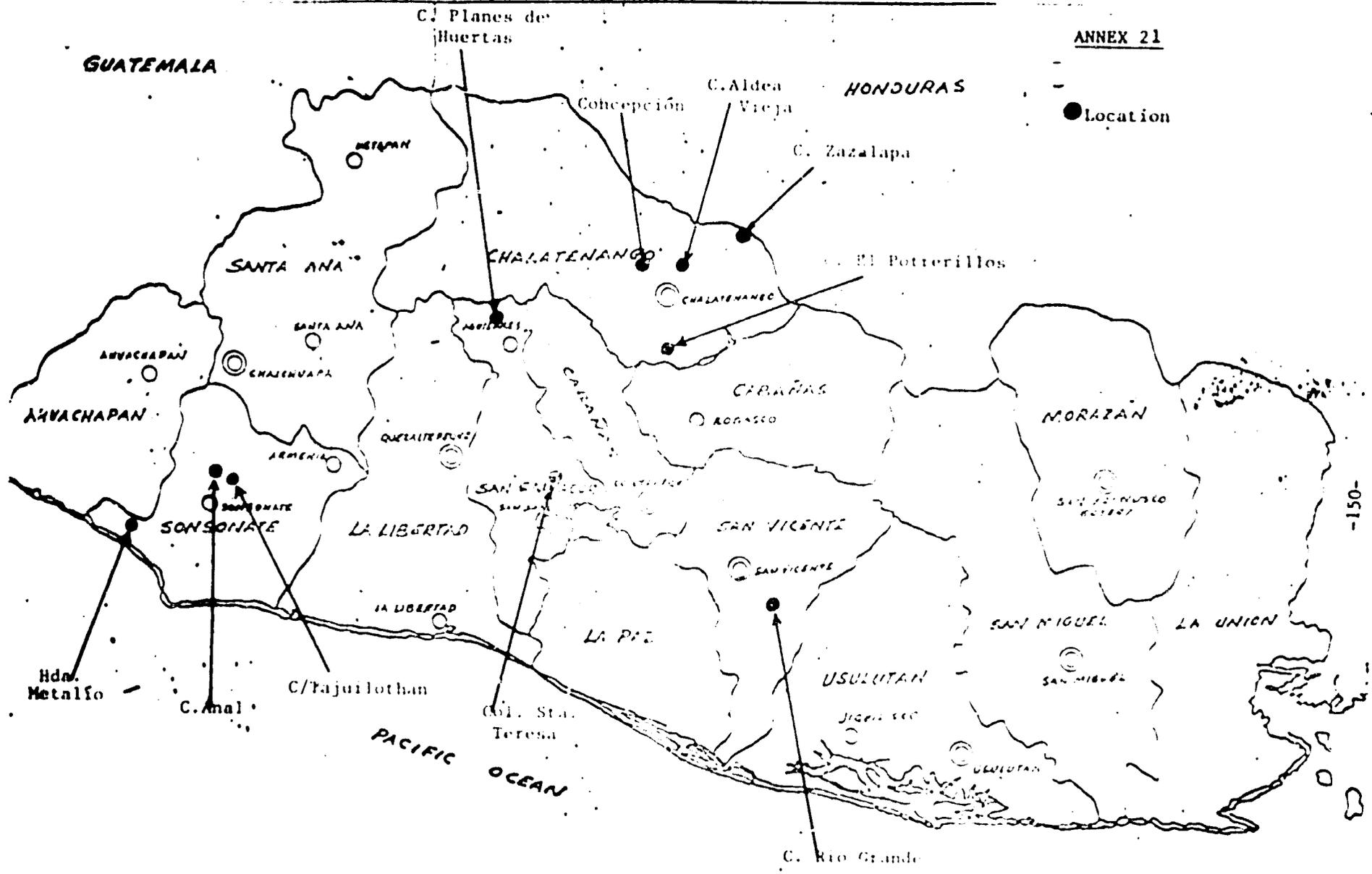
Farm Size	Benefit Cost Ratio Private Discount Rate		Benefit Cost Ratio Social Discount Rate	
	15%	Rank	3%	Rank
All Small Farms	1.06		2.45	
0 - .5 Ha.	1.14	3	2.83	3
.5 - 1 Ha.	1.72	1	4.06	1
1 - 2 Ha.	0.94	4	2.05	5
2 - 3 Ha.	0.90	5	2.19	4
3 - 4 Ha.	0.71	6	1.54	6
5 - 10 Ha.	1.29	2	3.13	2

1/ All estimates in this table are based on minimum impact assumptions.

The social discount rate may be effectively used as an intraproject choice mechanism to select among acceptable profitable project alternatives when measured by the private market interest rate standard. Rankings will not always be the same under the two different criteria for discount rates. It has been demonstrated that all project components, including sizes 1-5 Ha. have benefit cost ratios over 1 when any of the modifying assumptions are added to the minimal impact assumptions set. It should therefore be assumed that all project components meet the private profitability criterion. The difference in ranking for this project is not significant, only two project components would change priority ranking positions with the use of the social discount rate. This is not an important finding for this project since it is probable that all project funds could be adsorbed in farms under 1 Ha. if farms of similar size were geographically contiguous.

5. Alternative Assumption on the Useful Life of the Project

Twenty five years was chosen as the minimum impact term for the project. For the kind of small-scale irrigation works contemplated for this project, useful life is more a function of the type of maintenance employed and its frequency than the natural life of the diversion and conveyance structures. If poor maintenance is used, project life would be considerably less than 10 years due to silting and other short-term effects of project structures. If timely and adequate maintenance is budgeted, project life should be considerably longer than 25 years. In both cases, 25 years is less than adequate as a time horizon. It was chosen simply to add conservatism to the minimum impact since even these estimates include maintenance budgeted at a level which should insure at least 40 years useful life to the basic project structures. If the useful life of the project is extended to 40 years, the benefit cost ratio for all small farms would change from 1.06 to 1.12 under minimum impact assumptions.



Illustrative Vehicles and Equipment List

<u>No.</u>		<u>SUS</u>
5	Carryalls, 4WD	40,000
11	Pick Ups, 4WD	88,000
3	Trucks, 2 ^{1/2} TON, 16', beds	51,000
2	Dump Trucks, 3yd ³	42,000
2	Agricultural Tractors, 45 HP	32,000
<u>Misc.</u>	Implements, wheelbarrows, tools, etc.	22,000
	<u>TOTAL</u>	<u>275,000</u>

Proposed Training for Extension Agents

Course Length: Approximately 1 to 2 weeks.

Extension agents have to be trained in the use of water, amounts required to raise crops and how or when to apply the water to improve the crop yields.

The following topics will be covered in the training of extension agents:

1. Water requirements of plants.
2. Methods of applying water, control of application, uniformity of application, depth of water penetration into the soil, and when to irrigate.
3. Location of sources of water: rivers, springs, wells.
4. Water conservation methods.
5. Irrigation scheduling.
6. Maintenance of irrigation systems.
7. Cultivation practices: when to plant, how to plant for irrigated agriculture, spraying, weeding, cultivating to improve crop production under irrigation.
8. How to make the water users aware of the fact that although irrigated agriculture takes more work, the potential gains and security of a yield make it worthwhile.
9. Measurement of water supplies.
10. How to train the small farmer in the above topics in a manner understandable and appropriate to the small farmer.

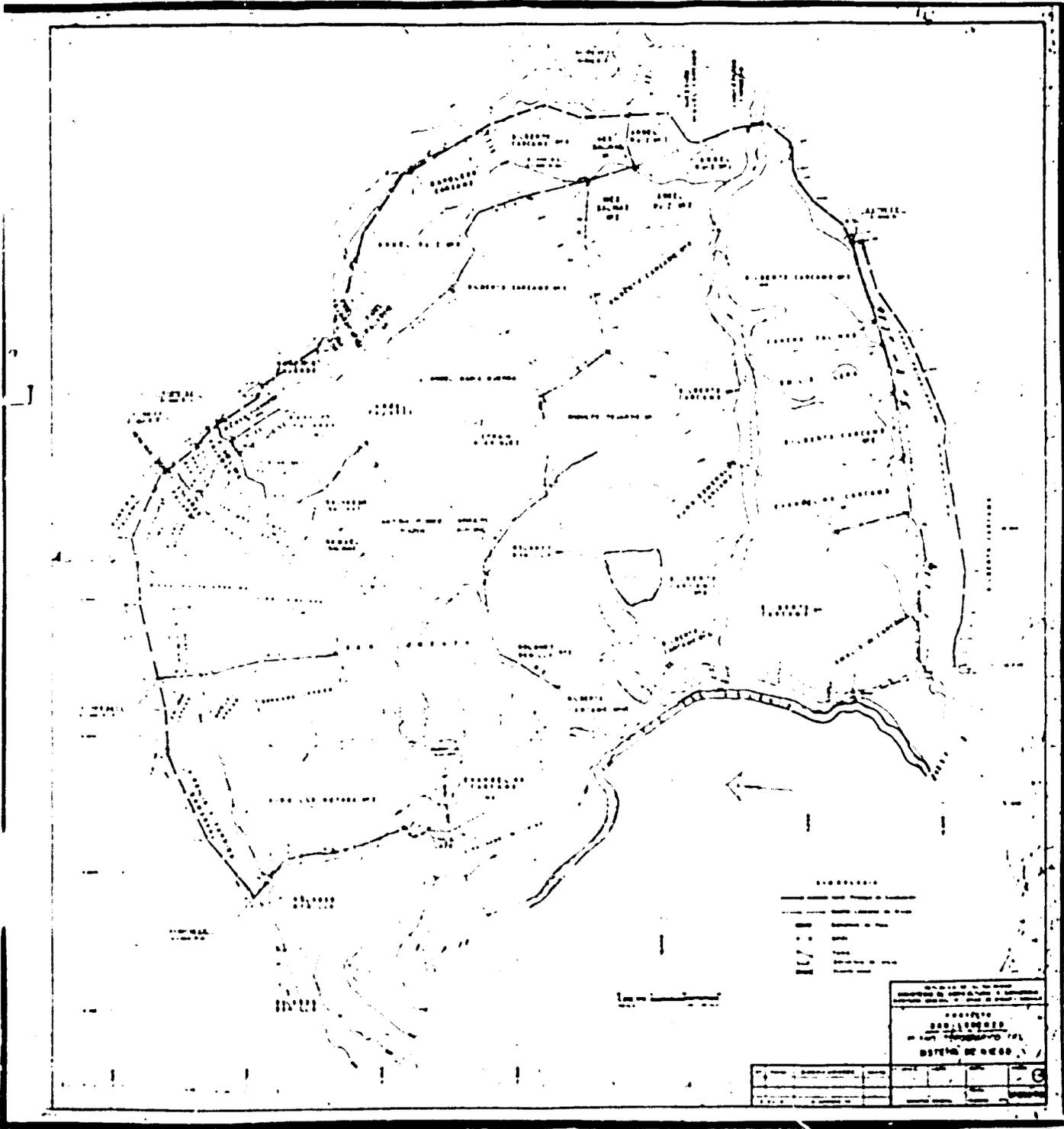
Illustrative Irrigation System Plans

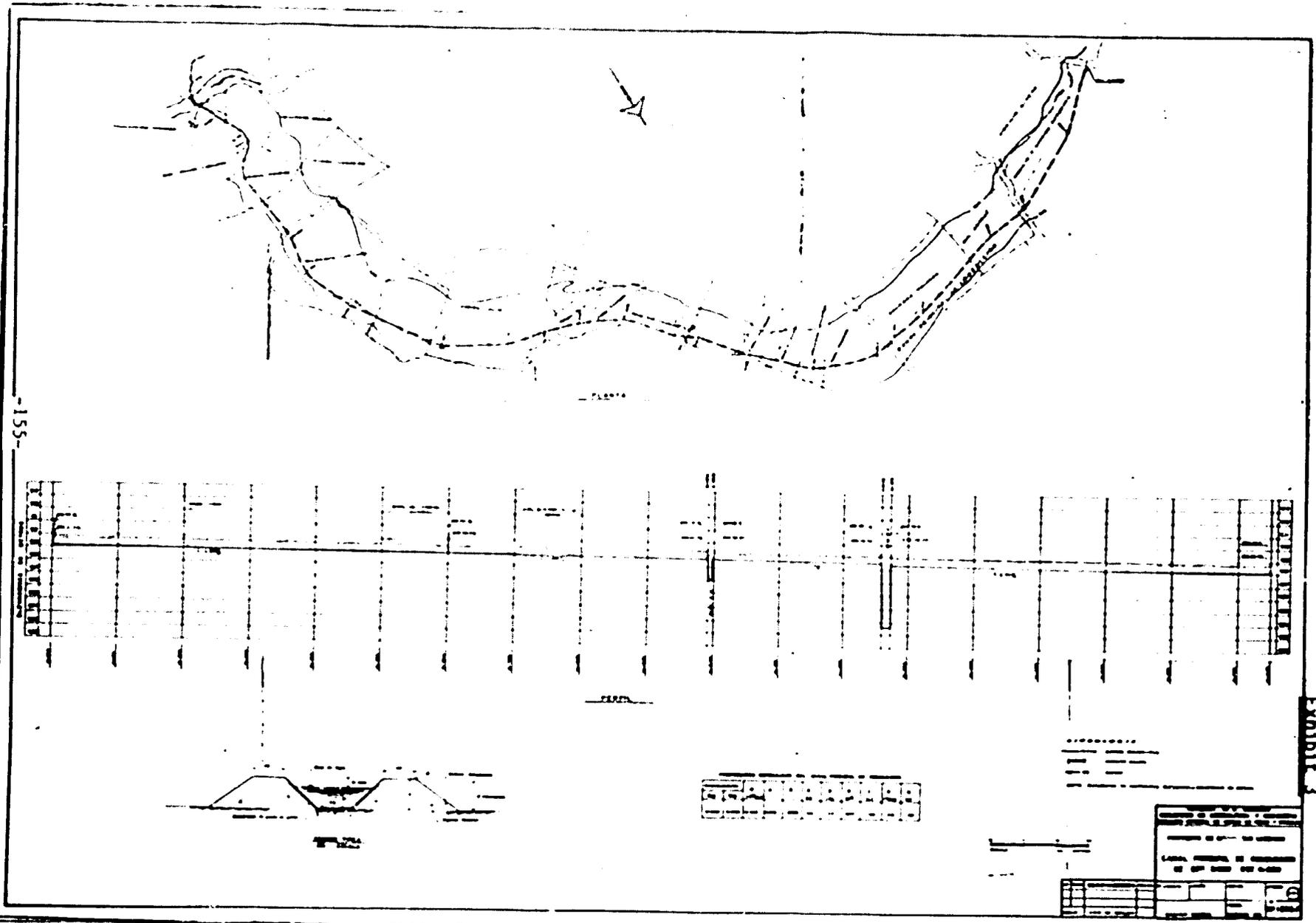
"San Lorenzo"

Subproject

100 Ha.

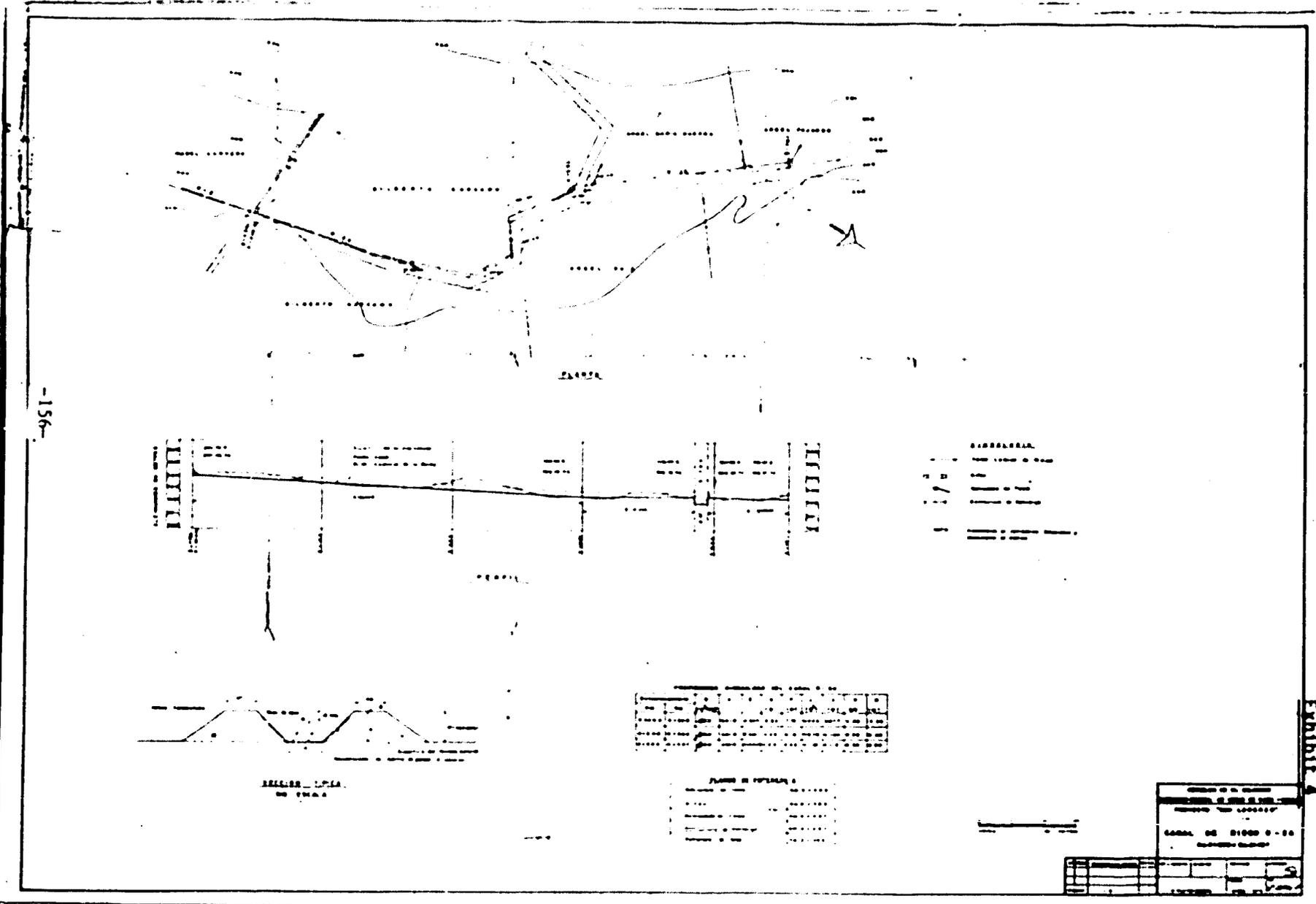






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Annex 24
Exhibit 3

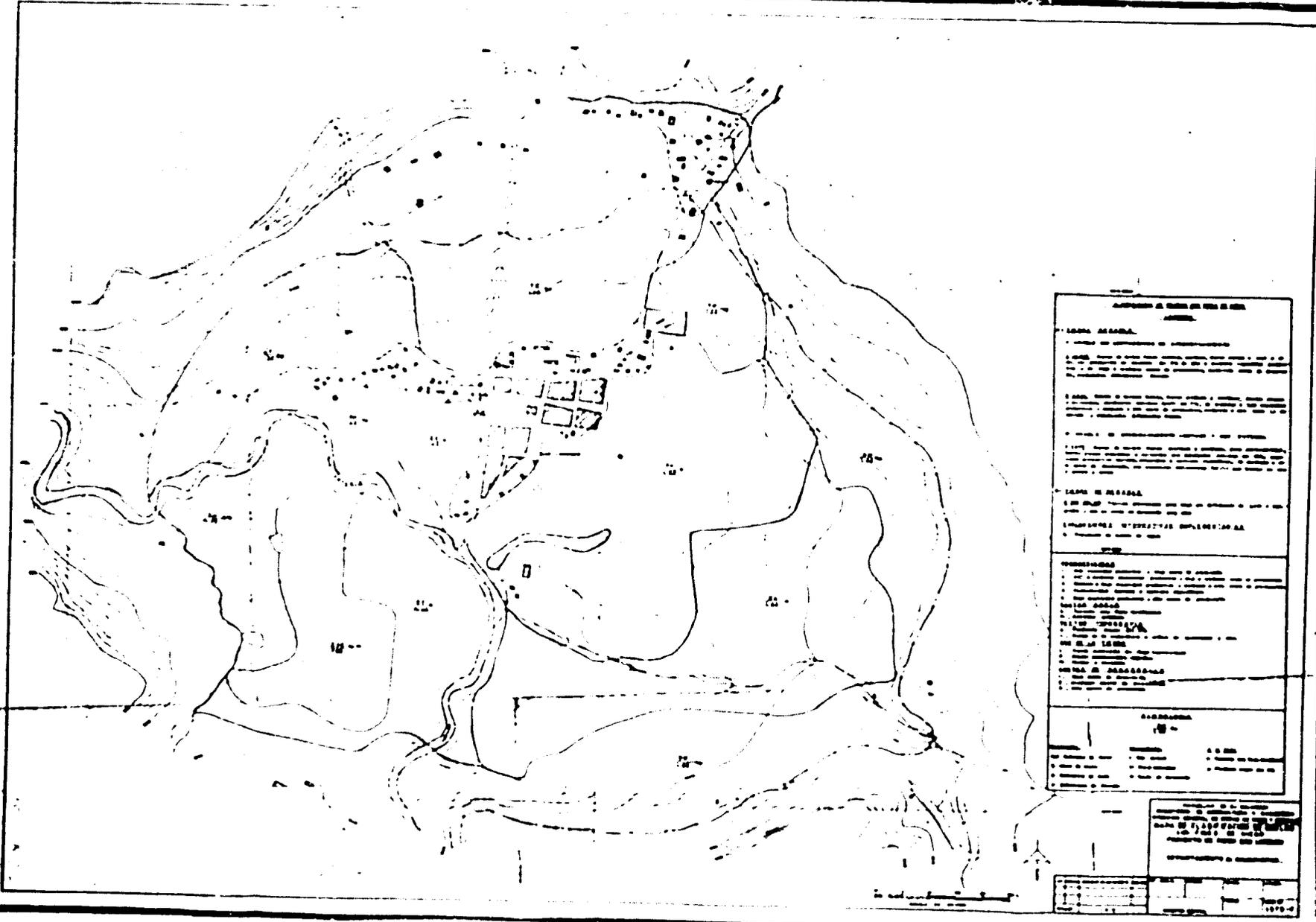


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PLANO DE COCINA

PLANO DE VESTIBULO

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Illustrative Subproject Cost Breakdown"San Lorenzo100 Hectares

<u>Amount</u>	<u>Unit</u>	<u>Materials</u>	<u>\$ Unit Price</u>	<u>\$ Sub-total</u>
17,000	ea	Clay tile brick 0.30 x 0.30"	0.10	17,000.-
115,000	ea	" " " 0.25 x 0.25	0.10	115,000.-
7,000	ea	" " " 0.20 x 0.20	0.10	700.-
7,000	ea	Regular Construction Brick	0.09	630.-
1,500	bgs	Cement	3.00	4,500.-
212	m ³	Sand	3.20	678.40
35	m ³	Crushed Rock	9.00	315.-
176	m ³	Rock	6.00	1,056.-
15	ea	Pre-cast Concrete Channels 4 meters long	20.00	300.-
27	ea	Concrete Pipe 15"	5.20	140.-
2	ea	" " 24"	10.00	20.-
12	ea	" " 30"	40.00	480.-
40	ea	" " 48"	2.00	80.-
13	qq	Reinforcing Steel #1/4"	23.20	301.60
25	qq	" " #3/8"	20.00	500.-
1	qq	" " #1/2"	19.20	19.20
5	qq	" " #5/8"	19.20	96.-
16	ea	Wood Planks 1"x11"x15ft.	6.00	96.-
5	doc	" Studs 2"x4"x15ft.	4.20	21.-
12	doc	" Planks 1"x14"x15ft.	58.00	696.-
5	doc	" " 1"x8"x15ft.	28.00	140.-
120	lbs	Tie Wire	0.32	38.40
9	lbs	Nails 3"	0.32	2.88
7	lbs	" 4"	0.32	2.23
60	lbs	" 2.1/2"	0.32	19.20
5	ea	Diversion Gates	80.00	400.-

- 2 -

<u>Amount</u>	<u>Unit</u>	<u>Materials</u>	<u>\$</u> <u>Unit Price</u>	<u>\$</u> <u>Sub-total</u>
7	yds	Wire Mesh	2.40	16.80
1	ea	Flow Measuring Gate	80.00	80.-
		<u>Sub-total (Materials)</u>		<u>\$24,529.12</u>
		<u>Estimated Labor Costs</u>		<u>\$16,320.--</u>
		Total Subproject Cost		\$40,849.12

* All measurements are in meters.

** Unit Costs per Linear Meter:
 - Diversion structure using cyclopean concrete \$7.20
 - Main conduction canal \$1.50
 - Secondary canal \$2.90

Project Advisor Position Description

1. Project Advisor

This technician will advise and assist the Dirección General de Obras de Riego (DGRD) in the overall planning and execution of irrigation systems and irrigated agriculture. His typical duties will involve, but not be limited to: a) design and operation of irrigation systems, b) training agricultural engineers and agronomists to carry on these projects.

He should have complete knowledge of water requirements of plants, basic hydraulic design, layout of fields to be irrigated, methods of applying water to land, how to control the application of water, scheduling of water to individual users, construction cost estimates, construction supervision and training host government personnel to perform the same functions. Knowledge of Spanish is preferable.



MINISTERIO DE PLANIFICACION
COORDINACION DEL DESARROLLO
ECONOMICO Y SOCIAL

ANNEX 27

GOES Loan Application Letter

DIREPROY

No. 131

San Salvador, 9 de junio de 1978.

Ingeniero
Aldelmo Rufz
Director USAID/El Salvador
Embajada de Estados Unidos
Ciudad.

Estimado ingeniero Rufz:

Esta Secretaría ha recibido de los Ministerios del Interior y de Agricultura y Ganadería, una solicitud relacionada a gestionar con AID asistencia financiera para el proyecto "Sistemas de Riego para Pequeños Agricultores", cuyos términos de referencia han sido preparados por personal técnico de ambos Ministerios y la misión de AID en nuestro país.

El proyecto propuesto incluirá el desarrollo y construcción de aproximadamente 4.000 a 5.000 hectáreas de sistemas de riego en pequeñas parcelas, usando la tecnología más adecuada de que se dispone y será llevado a cabo conjuntamente por los Ministerios del Interior y Agricultura y Ganadería, a través de la Dirección de Desarrollo de la Comunidad y de la Dirección General de Riego y Drenaje, durante un período estimado de cinco años.

La Dirección General de Riego y Drenaje determinará la factibilidad técnica de los sub-proyectos y supervisará la construcción de los sistemas. DIDECO promoverá, en la comunidad, el interés por dichos sub-proyectos y organizará la fuerza laboral de la comunidad para su construcción.

Tal como ha sido diseñado, el proyecto es totalmente acorde con la política de desarrollo del Gobierno de El Salvador y contribuye a los objetivos formulados en el Plan Nacional Bienestar para Todos 1978-1982.

El costo total del Proyecto ha sido estimado en aproximadamente \$5,450.000, de esta cantidad nuestro Gobierno aportará aproximadamente \$2,000.000 en la forma de salarios y gastos administrativos, costos para el mantenimiento de equipo, vehículos, etc.



MINISTERIO DE PLANIFICACION
COORDINACION DEL DESARROLLO
ECONOMICO Y SOCIAL

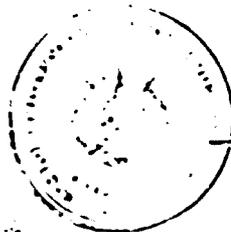
DIREPROY

NO 131

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Las comunidades darán su aporte principalmente en mano de obra, cuyo valor se estima en \$1,200.000. Para cubrir el balance del financiamiento que el proyecto requiere, el Gobierno de El Salvador, por este medio somete a la consideración de esa Agencia, la solicitud de un préstamo por la cantidad de aproximadamente \$2,250.000.00. Del resultado del estudio de factibilidad del Proyecto propuesto se definirá el financiamiento requerido, el cual será descrito en el convenio de préstamo.

Hago propicia la ocasión para reiterarle las muestras de mi más alta consideración y estima.



J. EDUARDO REYES
Ministro.