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

GUATEMALA

PROJECT PAPER

HIGHLANDS AGRICULTURAL DEVELOPMENT
(Amendment)

AID/LAC/P-147/1

Project Number:520-0274
Loan Number:520-T-037

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number 1 — DOCUMENT CODE 3

2. COUNTRY/ENTITY: Guatemala

3. PROJECT NUMBER: 520-0274

4. BUREAU/OFFICE: LAC — 05

5. PROJECT TITLE (maximum 40 characters): Highlands Agricultural Development

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 88

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 83 B. Quarter 4 C. Final FY 89

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

A. FUNDING SOURCE	FIRST FY 83 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	4,759	4,241	9,000	4,964	7,036	12,0
(Grant)	(1,300)	(200)	(1,500)	(1,300)	(200)	(1,5
(Loan)	(3,459)	(4,041)	(7,500)	(3,664)	(6,836)	(10,5
Other U.S. 1.						
Other U.S. 2.						
Host Country		5,782	5,782	–	6,311	6,31
Other Donor(s)						
TOTALS	4,759	10,023	14,782	4,964	13,347	18,31

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	200	210	260	1,500	7,500	0	3,000	1,500	10,500
(2)									
(3)									
(4)									
TOTALS				1,500	7,500	0	3,000	1,500	10,500

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

11. SECONDARY PURPOSE CO

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)
A. Code
B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

To improve the productive resource base of the rural poor in Guatemala's Highlands

14. SCHEDULED EVALUATIONS
Interim MM 07 YY 86 | MM YY | Final MM 06 YY 88

15. SOURCE/ORIGIN OF GOODS AND SERVICES
[X] 000 [X] 941 [ ] Local [X] Other (Specify) CACM

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

To add $3.0 million in Loan funds to expand the area covered within the natural resources component

T. Totino
Controller
AID/Guatemala

17. APPROVED BY
Signature
Title Director USAID/Guatemala
Date Signed MM 03 DD 18 YY 85

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

P-14711

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

ASSISTANT
ADMINISTRATOR

PROJECT AUTHORIZATION

Name of Country:	Guatemala
Name of Project:	Highlands Agricultural Development
Number of Project:	520-0274
Loan Number:	520-T-037

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Highlands Agricultural Development Project for Guatemala involving planned obligations of not to exceed Ten Million Five Hundred Thousand United States Dollars ($10,500,000) in loan funds ("Loan") and One Million Five Hundred Thousand United States Dollars ($1,500,000) in grant funds ("Grant") over a one year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project. The planned life of the Highlands Agricultural Development Project is five years from the date of initial obligation.

2. The project ("Project") consists of assistance to improve agricultural development in the Altiplano region through a labor-intensive access roads reconditioning and maintenance program and a natural resources management program (including terracing and small irrigation systems and a pilot reforestation program that will include as a component the management of existing trees and forests).

3. The Project Agreement(s), which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

RECORD COPY

a. Interest Rate and Terms of Repayment

The Government of Guatemala (GOG) shall repay the Loan to A.I.D. in U.S. Dollars within twenty-five (25) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The GOG shall repay to A.I.D. in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of (i) two percent (2%) per annum during the first ten (10) years, and (ii) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Commodities, Nationality of Services (Loan)

Commodities financed by A.I.D. under the Loan shall have their source and origin in countries which are members of the Central American Common Market (CACM) or countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have countries which are members of the CACM or countries included in A.I.D. Geographic Code 941 as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Loan shall be financed only on flag vessels of countries which are members of the CACM or countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

c. Source and Origin of Commodities, Nationality of Services (Grant)

Commodities financed by A.I.D. under the Grant shall have their source and origin in countries which are members of the CACM or in the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have countries which are members of the CACM or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Grant shall be financed only on flag vessels of the United States, except as A.I.D. may otherwise agree in writing.

d. Conditions Precedent to Disbursement (Loan)

(1) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance activities under the access roads activity, other than technical assistance, the GOG shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance satisfactory to A.I.D.: (a) a financial plan detailing the Direccion General de Caminos annual counterpart contribution to the Project and (b) a detailed time-phased plan setting forth all activities to be completed during the life of the Project.

(2) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance activities under the natural resources management activity other than technical assistance, the GOG shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance satisfactory to A.I.D.: (a) a financial plan detailing the annual counterpart contributions of the Direccion General de Servicios Agricolas (DIGESA) and Banco Nacional de Desarrollo Agricola (BANDESA) to the Project and (b) a detailed time-phased plan setting forth all activities to be completed during the life of the Project.

(3) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance activities under the reforestation activity other than technical assistance, the GOG shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance satisfactory to A.I.D. a detailed time-phased plan setting forth all activities to be completed during the life of the Project.

e. Covenants

The GOG shall covenant that, unless A.I.D. otherwise agrees in writing, it will initiate a program to maintain adequate funding levels during and after the Project to cover recurrent costs for maintenance of roads financed under the Access Roads Maintenance component of the Project.

f. Waiver

The requirement that motor vehicles financed by A.I.D. have their source and origin in the United States is hereby waived in order to permit the procurement of approximately 30 trail bikes, with displacement of 175 cc or less, in an amount not to exceed $50,000, from countries included in A.I.D. Geographic Code 935. The provisions of section 636(i) of the Foreign Assistance Act of 1961, as amended, are also hereby waived.

Assistant Administrator (Acting)
Bureau for Latin America and
the Caribbean

2

Date

Clearance:
GC/LAC:RMeighan
LAC/DR:DJohnson
LAC/DR:SESmith
LAC/DP:HJohnson
LAC/CEN:RQueener

GC/LAC:PJohnson:pet:7/6/83 #0458T

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HIGHLANDS AGRICULTURAL DEVELOPMENT
Project Paper Amendment

I. Executive Summary

The expansion to the Highlands Agricultural Development Project (520-0274) for an amount of US$3,529,000 (A.I.D. Loan: US$3.0 million and Government of Guatemala (GOG) Counterpart: Q529,000), is designed to carry out soil conservation and small-scale irrigation systems activities in Regions II, VI and VII of the Ministry of Agriculture, Livestock and Food (MINAG) during the period of July 1985 to June 1988.

Within the proposed expansion 1,300 soil conservations structures will be constructed which will protect approximately 3,000 hectares of land. Four thousand four hundred farmers will be trained in the construction of these structures which will benefit approximately 22,000 inhabitants of the rural area. In addition, 40 small-irrigation systems will be constructed, which will irrigate approximately 750 hectares of land and will benefit approximately 5,200 inhabitants of the target area.

The implementing units of the proposed expansion will be the "Dirección General de Servicios Agrícolas (DIGESA) and the "Banco Nacional de Desarrollo Agrícola (BANDESA). DIGESA will be responsible for the investigation, design, and the provision of technical assistance to small farmers to carry out soil conservation and the construction of small scale irrigations systems activities. BANDESA will provide grant financing to small farmers in the form of social payments to develop the soil conservation construction activities and small loans for the scale irrigation component.

To provide social payments and loan credit to small farmers, selected and trained by DIGESA, BANDESA will sign a revised trust agreement with the Ministry Finance which will include an increase to the current trust agreement in an amount of US$2,378,370 (A.I.D. Loan: US$2,311,494 and GOG Counterpart: Q66,876). During the life of the Project DIGESA, will increase its operational budget in Regions II, VI and VII by an estimated amount of US$839,567 (A.I.D. Loan: US$688,506 and GOG Counterpart: Q151,061) to cover procurement of vehicles, mortorcycles, furniture and equipment, materials and supplies and salaries of the in-field technical personnel to be contracted by the Guatemalan payroll system.

II. Background

On September 30, 1983 the AID Mission in Guatemala signed a Loan Agreement with the Guatemalan Ministries of Public Finance, Agriculture, Livestock and Food and Communications, Transportation and Public Works for an amount of $7.5 million. The purpose of this project, currently being implemented, is to improve the productive resource base of the rural poor in the Highlands of Guatemala. This is to be achieved by access roads maintenance ($3,879,000), a pilot reforestation program ($329,000), and

construction of small scale irrigation and soil conservation systems ($3,292,000). Also $1,500,000 in grant funds were provided to finance technical assistance for the reforestation and access roads maintenance components of the Project.

In September 1983 A.I.D. and the GQG signed the loan agreement for an initial contribution of $2,500,000. In December 1984, the remaining $5.0 million in loan funds were obligated. The original project was principally designed for the central and western Highlands of Guatemala. These areas are characterized by mountainous lands with high erosion potential where farmers cultivate small plots for subsistence farming. Although some permanent water springs exist, inhabitants of these areas generally depend on rainfall for their crops. Given the high erosion potential and current dependency on natural rainfall the need to expand soil conservation practices and irrigation system to these areas is great. The additional $3.0 million in loan funds will be used to expand the soil conservation and small scale irrigation activities to Guatemalan areas not included in the original project. Table I provides a Map which identifies the different Ministry of Agriculture's regions as well as illustrating the departments which compose Regions II, VI, and VII, the area selected for this expansion and describes their main characteristics.

Principal Characteristics of DIGESA/MINAG Regions II, VI, and VII

Region II

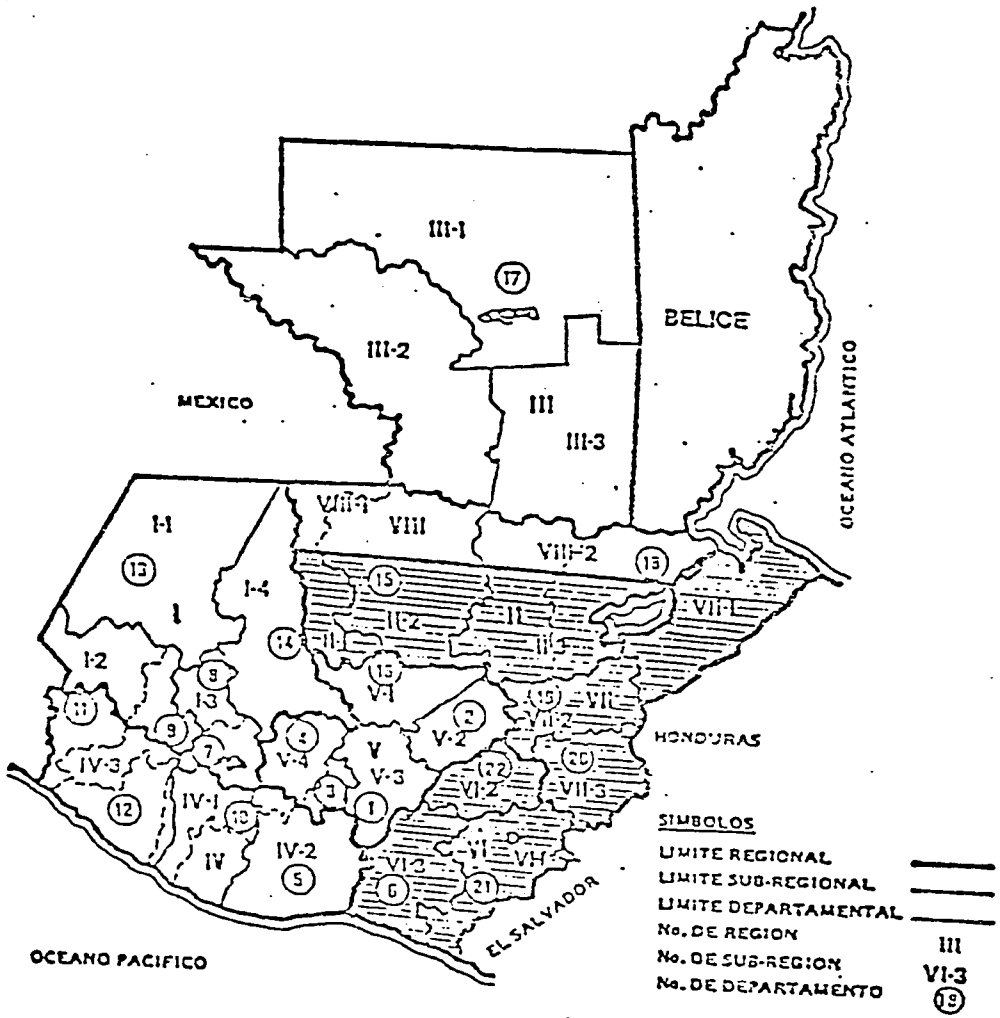
This region includes part of the Departments of Alta Verapaz, El Quiché and Izabal. It includes 10,368 square kilometers or nine and one half percent of the country where approximately five percent of the total population lives. This region is located in the northern part of the country and includes mostly mountainous terrain. The rainy season generally covers the whole year. The annual rainfall averages 2.284 to 4,100 mm. per year. The temperature ranges from 16 to 23 C. depending on the elavation which varies from 1,100 to 2,700 meters. This region has experienced rapid agricultural development in recent years as new roads providing better access have been constructed. Livestock development has been added to the traditional production of coffee and bananas. At the same time, essential grain production has been increased, especially corn and bean which currently are valued at 24 percent and 33 percent respectively of the total national agricultural production.

Census data indicates that in 1981 this region had a population of 302,140 inhabitants with an average a density of 29 inhabitants per square kilometer. The population of Region II is predominantly rural (83%) of which about 86 percent are considered indigenous and 14 percent are ladino. The population is made up as follows:

HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM (520-0274)

Table 1

REGIONS OF THE MINISTRY OF AGRICULTURE, LIVESTOCK AND FOOD



REGION I

13 HUEHUETENANGO
11 SAN MARCOS (PARTE)
9 QUEZALTENANGO (PARTE)
8 TOTONICAPAN
7 SOLOLA
14 QUICHE (PARTE)

REGION II

14 QUICHE (PARTE)
15 ALTA VERAPAZ (PARTE)
18 IZABAL (PARTE)
16 BAJA VERAPAZ (PARTE)

REGION III

17 PETEN

REGION IV

11 SAN MARCOS (PARTE)
9 QUEZALTENANGO (PARTE)
12 RETALHULEU
10 SUCHITEPEQUEZ
5 ESCUINTLA
4 CHIMALTENANGO (PARTE)

REGION V

16 BAJA VERAPAZ (PARTE)
2 PROGRESO
1 GUATEMALA
3 SACATEPEQUEZ
4 CHIMALTENANGO (PARTE)

REGION VI

21 JUTIAPA
22 JALAPA
6 SANTA ROSA

REGION VII

20 CHIQUIMULA
19 ZACAPA
18 IZABAL (PARTE)

REGION VIII

14 QUICHE (PARTE)
15 ALTA VERAPAZ (PARTE)
18 IZABAL (PARTE)

Total population	302,140	100.0%
Urban population	50,760	16.8%
Rural population	251,380	83.2%
Indigenous population	261,049	86.4%
Non-indigenous population	41,091	13.6%

Pursuant to data included in the 1979 Agricultural and Cattle Census, a total of 36,823 farms were registered in Region II covering an area of 392,195 hectares. Units classified as micro-farms and sub-family farms represented 87.5 percent of the total number of farms, covering only 15.5 percent of the total land area. On the other hand, farms classified as multifamily, medium and large, represented 1.6 percent of the farms and occupied 71 percent of the available land. Family Farms represented 10.3 percent utilizing 13.5 percent of the land area. This data indicates that, the minifundio (small estate) problem and/or latifundio (large estate) still prevails in this region.

Region VI

This region includes territory within the Departments of Jutiapa, Jalapa and Santa Rosa. It includes approximate 8,237 square kilometers, representing 7.7 percent of Guatemala. About 9.7 percent of the total population live within this region. Farming and livestock activities are not well developed in this region except in the valleys where irrigation potential exists and where agriculture and livestock activities have reached fairly high productive levels. There is insufficient knowledge on the optimum use of the soil resources. However, due to limited rainfall, specific infrastructure construction is required to maintain soil moisture.

This region consists of a population of 587,862 inhabitants with a density of 71.4 inhabitants per square kilometer.

The population is made up as follows:

Total population	587,862	100.0%
Urban population	133,052	22.6%
Rural population	454,810	77.4%
Indigenous population	72,795	13.8%
Non-indigenous population	455,670	86.2%

A total of 42,084 farms have been registered which cover 517,679 hectares. The micro-farms and sub-family farms represent 84 percent of the total number of farms and comprises approximately 16 percent of the land area. On the other hand, family farms represent 12 percent covering 20 percent of the available land area. Farms classified as medium and large multifamily represent 4 percent of the total number of farms and comprise 64 percent of the land area.

Region VII

This Region includes the Departments of Chiquimula, Zacapa and part of Izabal covering 9,286 square kilometers or 8.5 percent of Guatemala. About 7.2 percent of total population live in Region VII. The region is composed of three areas with very defined characteristics. One of these, the Department of Zacapa, has a semiarid, very warm climate. This subregion also includes a mountainous portion with a mean elevation from 500 meters to 1,700 meter above the sea level and valleys of unbroken topography. This region is covered with subtropical thorny grass. The rainy season is short and scanty. For this reason agriculture and livestock activities have been developed only with the aid of irrigation.

The subregion which includes the department of Chiquimula has a topography that varies from broken to steep mountainous terrain with a limited rainy season. This subregion is similar to Region VI, which requires appropriate technology to preserve soil moisture.

The subregion which includes the southern part of the department of Izabal is the one with the greatest potential for the development of agriculture and cattle activity. Its topography goes from broken to unbroken terrain along the Atlantic coast. Due to a limited road network, access to this subregion is difficult. Therefore, its agricultural potential can not be realized at the present time.

Region VII consists of a population of 436,742 inhabitants of which 82.3 percent is indigenous with 77 percent residing in rural areas.

The population is made up as follows:

Total population	436,742	100.0%
Urban population	99,384	22.8%
Rural population	337,358	77.3%
Indigenous population	76,867	17.7%
Non-indigenous population	359,875	82.3%

Region VII comprises 29,858 farms which cover an area of 325,188 hectares. The greatest number of units are made up of microfarms and subfamily farms representing 83.1 percent of all farms and covering 14 percent of the land area. Family farms amount 14 percent and the big multifamily farms represent 3 percent of all farms. Multifamily farms utilize 66 percent of the land area and family farms cover 20 percent of the available land.

III. Project Description

A. Project Goals

The goals of the expanded Project are: 1) to increase agricultural productivity, 2) to improve the productive resource base of the rural poor,

and 3) to improve the standard of living of disadvantaged groups in Guatemala, especially the rural population which lives in Regions I, II, V, VI and VII of the Ministry of Agriculture, Livestock and Food.

B. Project Activities

1. Soil Conservation and Construction of Small Irrigation Systems Activities

The activities within this component include the expansion of soil conservation practices and the construction of small scale irrigation systems in Regions I, II, V, VI and VII of the Ministry of Agriculture, Livestock and Food. The "Dirección General de Servicios Agrícolas" (DIGESA) will be the institution responsible for the implementation of these activities.

a. Soil Conservation Activity:

The objectives of this activity are: i) to reduce the deterioration of soil resources; ii) to increase soil retention of nutrients and moisture; iii) to increase the area of agricultural productivity without degrading soil resources; and iv) to provide training to the farmers in soil conservation practices. This activity will be implemented in the Ministry of Agriculture, Livestock and Food, Regions I, II, V, VI and VII and will benefit approximately 42,000 rural inhabitants.

DIGESA will train about 8,400 farmers in the construction of approximately 3,500 soil conservation structures which will protect approximately 8,000 hectares of land. The types of structures will vary in accordance with soil characteristics, water retention, and land topography. It is estimated that the principal type of structures to be built will be simple bench terraces. These structures will be constructed using local materials and tools as well as labor intensive methods. The "Banco Nacional de Desarrollo Agricola" (BANDESA), through a revised trust agreement with the Ministry of Public Finance, will finance social payments to the participating farmers in soil conservation on a non-reimbursable basis, with prior approval from DIGESA extension agents. Approximately U.S. $3,004,857 (U.S. $2,554,857 of Loan funds and not less than Q450,000 of Government of Guatemala counterpart funds) of Project funds will be used to finance the costs and expenses related to this activity. The revised trust agreement will include U.S. $1,335,000 of Loan funds and Q450,000 of Counterpart resources from the original trust agreement.

b. Small Scale Irrigation Construction Activity:

The objectives of this activity are: i) to increase the area of irrigation on small plots of land; ii) to increase agricultural production and productivity; iii) to diversify agricultural production; and iv) to promote the use of labor intensive activities. This activity will be implemented in the Ministry of Agriculture, Livestock and Food, Regions I, II, V, VI and VII, and will benefit approximately 1440 farm families.

DIGESA will research, design and provide technical assistance in the construction of approximately 90 small-scale irrigation systems which will irrigate approximately 1,500 hectares of land. Four types of irrigation systems will be built: i) on-farm simple diversion gravity flow systems, ii) community, simple diversion, gravity flow systems, iii) community, simple diversion, gravity flow pipe system, and iv) lake and river community, pump irrigation system.

Most of the systems to be constructed will be gravity flow systems using local hand labor, material and tools, systems that will not require pumps, electrical motors, or recurrent operational costs. BANDESA, through a revised Trust Agreement with the Ministry of Public Finance, will finance the construction of the small-scale irrigation systems based on the credit requests submitted by the participating farmers. Approximately U.S.$2,461,513 (U.S.$2,113,637 in AID Loan funds and not less than Q347,876 in Government of Guatemala counterpart funds) of Project funds will be utilized to finance the purchase of construction materials and other expenses related with this activity. DIGESA will assist farmers in the preparation of such credit requests. This revised Trust Agreement includes U.S. $1,022,000 of Loan funds and Q281,000 of Counterpart resources from the original trust agreement.

c. Credit and Social Payment Fund

The Project, through the establishment of a Credit and Social Payment Fund, will provide credit and social payments to those farmers selected by DIGESA to undertake small scale irrigation and soil conservation construction activities.

To promote the implementation of the soil conservation activity BANDESA will provide, as an incentive to participating farmers, social payments during the period of time the farmers will construct the soil conservation structures on their own farms. These one time social payments to each benefiting farmer are made to substitute for foregone labor wages that the farmers could have earned elsewhere if they had not been building the required structures on their own property.

In order to establish this Fund, the Ministry of Public Finance will sign a trust agreement with BANDESA under which not less than U.S. $5,466,370 (U.S. $4,668,494 of A.I.D. Loan funds and not less than Q797,876 in Government of Guatemala counterpart funds) will be transferred to BANDESA. This revised trust agreement includes U.S. $2,357,000 of Loan funds and Q731,000 of Counterpart resources from the original trust agreement. Prior to the utilization of this Fund BANDESA will elaborate regulations which will include the terms and conditions to provide credit and social payments to farmers who will perform the activities related to the construction of small scale irrigation systems and soil conservation, respectively. Both, the revised Trust Agreement and the regulations for the use of this Credit and Social Payments Fund will be approved by the Ministry of Public Finance and by A.I.D., prior to disbursing funds from the trust agreement.

C. Specific Description of the Project Expansion

The additional $3,000,000 of Loan funds will be utilized to finance the small irrigation and soil conservation activities in Regions II, VI and VII of the Ministry of Agriculture of the Government of Guatemala (which includes all or part of the departments of Huehuetenango, El Quiché, Alta Verapaz, Izabal, Jutiapa, Jalapa, Santa Rosa, Chiquimula and Zacapa). These Loan funds will be utilized as follows: small scale irrigation $1,091,637, logistic support for small scale irrigation $385,686, soil conservation $1,219,857, logistic support for soil conservation activities $302,820.

These activities will be carried out on approximately 3,750 hectares of land benefitting over 5,400 rural poor families. The geographic and climatic conditions as well as the cultural patterns of the regions are similar to those found in Regions I and V. A description of each additional activity to the Project is described below.

a. Small Scale Irrigation ($1,477,323 of Loan Funds and $383,044 of Counterpart Funds

These sub-projects include the construction of simple infrastructure works using local labor and materials to irrigate agricultural lands used primarily for rainy season cultivation. The addition of water introduces a potential for increased incomes on the same land area by permitting an additional harvest annually.

Based on the experience of Government of Guatemala engineers and agronomists, it has been shown that there are no overriding technical difficulties with this activity. Types of feasible small irrigation systems based on the terrain and water source are described below. These activities, when possible, will be carried out in conjunction with soil conservation and drainage improvements.

On-Farm - Simple Diversion, Gravity Flow System:

This system requires the project site to be close to sufficient water, which means that it is next to or running through the farm. Under these conditions, a simple diversion system with gravity ditching and complete open furrows will be constructed.

Community - Simple Diversion, Gravity Flow System:

For this system a stream flow adjacent to or flowing through the land to be irrigated is necessary to serve to each individual plot. This system consists of the construction of a rock and earth diversion dam, canals and open furrows. Due to the materials and construction systems utilized, the cost of the above two systems will be minimal.

Community - Simple Diversion, Gravity Pipe System.

This alternative requires water from a stream that can be diverted from a mountain. The system is designed to provide sufficient pressure for sprinklers and will be constructed using an entrance box, settling basin structure and appropriate pipelines. Using this system it is estimated that it will cost about $624 to irrigate one hectare of land.

Lake and River Community.

This system requires that water be pumped from the water supply for gravity flow distribution. This more complex system will require a pump, motor, pipe system, sprinklers, installation and annual operating costs. With the utilization of a pump system, the approximate cost to irrigate one hectare of land will be about $1,950.

Based on past experience, it is estimated that 80 percent of all irrigation systems to be constructed will be of the simple diversion gravity flow type. For the roughly 20 percent non-gravity flow systems, electrical or diesel pumps may be used, as well as hydraulic rams, wheel pumps or wind mills if proper circumstances to operate these irrigation mechanisms exist.

The Dirección General de Servicios Agrícolas (DIGESA) will be in charge of the design and construction of small scale irrigation and soil conservation systems in Regions II, VI and VII of the Ministry of Agriculture. Small scale irrigation technical teams consisting of a hydraulic engineer, an agronomist, a topographer and draftsmen will work with the farmers to draw up the plans and specifications, as well as to prepare a simple credit proposal. The plans and credit proposal will be reviewed by the Regional Chief of DIGESA and presented to the National Agricultural Development Bank for approval and disbursement. The teams will organize the labor and supervise construction as well as providing any other needed technical assistance. In addition, the DIGESA teams will monitor routine operation and maintenance of the irrigation system, advise in relation to proper irrigation techniques and encourage crop diversification and on-farm improvements. The DIGESA teams have conducted similar activities in the past and are familiar with all methods and technologies required for the construction of irrigations systems.

Site identification, design, construction and on-farm development will be carried out simultaneously. This procedure was chosen in order to take advantage of the capacity of the implementing agency to identify, study and implement small scale irrigation and soil conservation activities. The participating farmers and the DIGESA promoter will identify the potential site to construct a small scale irrigation system. One of the DIGESA small scale irrigation teams will make several visits to determine if an irrigation system is technically feasible and what type of structure best suits site specific

conditions. This team will also investigate water rights and land tenure, determine potential land use, calculate water quantity and availability and determine the social and economic feasibility of the irrigation system. The DIGESA team will draw appropriate plans and assist in the actual construction of the system.

The plan to be prepared will include what is to be done technically and structurally (such as simple diversion gravity flow pipe irrigation system with terraces), how it will be done (organization of labor/tools, materials), and who will accomplish given tasks (schedule man-days of work, local material procurement for small scale irrigation which will include cement, pipes, pump, materials, parts and fuel as required). The DIGESA team will also assist the participating farmers in the preparation of the application forms. These applications will then be submitted to the Regional Chief of DIGESA for presentation to the National Agricultural Development Bank (BANDESA) for approval. BANDESA will participate as the financial agent for the fund established for sub-lending to the benefitting farmers, for the purchase of needed materials. Credit procedures have been established in BANDESA which are currently functioning for administering medium term programs of this nature. Both individual or group loans are available. Actual construction of the irrigation system will be done by the participating farmers. Social costs payments will not be provided due to the high rates of return on investment and increased income potential when the irrigation system is in operation.

The time required for the completion of each phase and construction varies due to the land topography, problems involving water rights (if any), size and type of the irrigation system and the number of beneficiaries. However, an average project of 18 hectares requires approximately 670 person-days of labor for construction. It is estimated that 40 systems will be constructed under the project expansion irrigating 750 hectares and benefitting 1,040 farm families.

Of the total funds allocated for this component $1,091,637 in Loan funds and $66,876 in GOG counterpart funds will be used for the purchase of materials for the construction of small scale irrigation systems. $114,600 in Loan funds and $8,022 in GOG counterpart funds will be used for the purchase of needed vehicles and motorcycles. $407,358 in Loan funds and $308,146 in GOG counterpart funds will be used for miscellaneous equipment, administrative costs and inflation.

b. Soil Conservation ($1,522,677 in Loan Funds, $145,462 in GOG Counterpart Funds)

This activity will be carried out in conjunction with small scale irrigation activities, and where technically feasible, on the same farm lands. The structures may consist of any one of several designs. However, due to soil and water retention and soil slopes encountered, it is estimated that 70% of these devices constructed will be simple bench terraces. Other types of soil conservation structures practiced will include rock and brush

dams, strip cropping or contour furrows. The type of soil conservation method used will be determined by the DIGESA extension agent and the participating local farmer.

Approximately 115 person-days of labor are required to construct one hectare of bench terracing while normal land preparation requires 25 person-days per hectare. It has been demonstrated that farmers, once they have observed the benefits derived from terracing, will construct soil conservation structures without social benefit payments. However, to maximize the demonstration impact of these works throughout the Highlands and the resultant spread effect, $1,288,576 in Loan funds will be used by DIGESA in Regions II, VI and VII for social benefit payments and logistical costs to compensate farmers for the extra labor and to make this practice more attractive. Using proposed Project funds and under the guidance of DIGESA, soil conservation structures will be built which will protect 3,000 hectares of land and will directly benefit over 4,300 families. Assuming that each participating family will terrace about 0.7 hectares of land, the one-time social benefit payment to each family will be approximately $300. BANDESA will participate as the financial agent for the social cost payments which will be approved by the DIGESA extension agent and which will be paid only after the construction has been completed. Once completed, the soil conservation terraces will require little additional input from the GOG. The hand construction of these soil terraces requires only rudimentary equipment to survey and design the terrace and minimal maintenance is required to keep the terraces in good condition.

DIGESA extension agents will be responsible for the site selection and construction of the soil conservation structures. Using home-made leveling devices and hand tools, the participating farmer will work under the guidance of the extension agent to construct the soil conservation structure. The construction process will be as follows:

- site identification by the interested farmer and DIGESA personnel
- examination of the topography and determination of appropriate structure
- construction of soil conservation structure using hand tools and locally made equipment

One hectare of soil terraces required approximately 96 days for construction. However, this construction time will vary considerably due to soil topography, soil type and size of structure. After the construction of the bench terrace, the backwall will be planted with grass (obtained from DIGESA) for animal fodder and to provide additional protection from soil erosion.

As in the original project, social cost payments will be used only to introduce soil conservation practices in areas where they are not presently used. Interested farmers will be selected by DIGESA agents to

receive payments and will be paid on a per unit of land improved basis. BANDESA will participate as the financial agent for the social cost payments which will be approved by the DIGESA extension agent and which will be paid after the construction process.

Of the total funds allocated for this component, $1,219,857 in Loan funds will be used for social cost payments for the construction of soil conservation structures. $72,200 in Loan funds and $5,054 in GOG counterpart funds will be used for the purchase of needed vehicles and motorcycles. $230,620 in Loan funds and $140,408 in GOG counterpart funds will be utilized for the purchase of miscellaneous equipment, administrative costs and for inflation.

To accomplish the construction of small scale irrigation projects and soil conservation structures, DIGESA has extensionists and technical personnel working in Regions II, VI and VII. These extensionists have experience in these regions in the construction of small scale irrigation systems and soil conservation structures. However, due to very limited resources from the GOG, these DIGESA personnel have not been able to realize their full technical potential. While small scale irrigation systems have been designed and sites identified for soil conservation structures, many of these works have not been initiated. The Loan funds under this expansion to the Project will permit these efforts to proceed and allow DIGESA personnel to identify and design additional works. New positions will be established in Regions II, VI and VII to assist the existing DIGESA personnel. These positions will primarily include skilled laborers to supervise the construction of small scale irrigation systems.

IV. Financial Plan

The total budget for the expansion to Project 520-0274 amounts to US$3,529,000, of which US$3.0 million are Loan funds from A.I.D. and Q529,000 are from GOG counterpart funds. GOG contribution is distributed between funds from DIGESA's normal annual budget (Q311,000) and new funds (Q218,000) which should be applied to the proposed expansion during the implementation of the Project (see Table 2 attached "Distribution of Counterpart Funds"). The detailed financial plans for Regions II, VI and VII for the implementation period and the cost for soil conservation activities and construction of small scale irrigation systems are included in Tables 3 and 4. The Illustrative Budgets (Expenses and Summary Projection) for use and source of funds and currency of the activities to be undertaken in the expansion to the Project are described in Tables 5 and 6 of this analysis. The Summary Financial Plan for the Project (original plus additional funds) by source, uses and currency is included in Table 7.

ADDENDUM AL PROYECTO DESARROLLO AGRICOLA DEL ALTIPLANO/HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM

DISTRIBUCION DE FONDOS DE CONTRAPARTIDA

(Counterpart Fund Distribution)

EN RECURSOS DEL PRESUPUESTO REGULAR Y RECURSOS NUEVOS

(In Resources of Regular Budget and New Resources)

JULIO (July) 1985 – JUNIO (June) 1988

Table 2

	JUN-DIC 1985 (Jun-Dec 1985) RECURSOS (Resources) EXISTENTES (Existent)	JUN-DIC 1985 (Jun-Dec 1985) RECURSOS (Resources) NUEVOS (New)	ENE-DEC 1985 (Jan-Dec 1985) RECURSOS (Resources) EXISTENTES (Existent)	ENE-DEC 1985 (Jan-Dec 1985) RECURSOS (Resources) NUEVOS (New)	ENE-DIC 1987 (Jan-Dec 1987) RECURSOS (Resources) EXISTENTES (Existent)	ENE-DIC 1987 (Jan-Dec 1987) RECURSOS (Resources) NUEVOS (New)	ENE-DIC 1988 (Jan-Dec 1988) RECURSOS (Resources) EXISTENTES (Existent)	ENE-DIC 1988 (Jan-Dec 1988) RECURSOS (Resources) NUEVOS (New)	TOTAL RECURSOS (Resources) EXISTENTES (Existent)	TOTAL RECURSOS (Resources) NUEVOS (New)
A. MINI-RIEGO (Small-Scale Irrigation)										
1. Equipo y Materiales de Construcción (Equipment and Constr. Materials)	—	6,979	—	19,130	—	28,499	—	12,268	—	66,876
2. Vehículos de Trabajo (Work Vehicles)	—	7,560	—	—	—	—	—	—	—	7,560
3. Motocicletas (Motorcycles)	—	462	—	—	—	—	—	—	—	462
4. Suministros y Equipo de Oficina (Office Supplies & Equipment)	—	3,970	—	5,087	—	5,087	—	2,544	—	16,688
5. Gastos Administración (Administrative Expenses)	38,820	—	73,680	400	73,689	14,027	38,820	15,247	225,009	29,674
6. Inflación (Inflation)	—	5,960	—	10,500	—	12,935	—	7,380	—	36,775
Sub-Total	38,820	24,931	73,680	35,117	73,689	60,548	38,820	37,439	225,009	158,035
B. CONSERVACION DE SUELOS (Soils Conservation)										
1. Pagos Sociales (Social Payments)	—	—	—	—	—	—	—	—	—	—
2. Vehículos de Trabajo (Work Vehicles)	—	3,360	—	—	—	—	—	—	—	3,360
3. Motocicletas (Motorcycles)	—	1,694	—	—	—	—	—	—	—	1,694
4. Suministros y Equipo de Oficina (Office Supplies & Equipment)	—	2,787	—	3,157	—	3,157	—	1,578	—	10,679
5. Gastos Administrativos (Administrative Expenses)	14,445	—	27,405	250	27,405	16,166	16,305	14,530	85,560	30,946
6. Inflación (Inflation)	—	2,228	—	3,081	—	4,673	—	3,241	—	13,223
Sub-Total	14,445	10,069	27,405	6,488	27,405	23,996	16,305	19,349	85,560	59,902
TOTAL	53,265	35,000	101,085	41,605	101,094	84,544	55,125	56,788	310,569	217,937

(4762C)

HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM (520-0274)
ACTIVITY: SOIL CONSERVATION REGION II
JULY 1985 - JUNE 1988

	ITEM	AID LOAN DOLLARS	AID LOAN QUETZALES	AID LOAN TOTAL	GOG QUETZALES	TOTAL
1	Social Payments		562,710	562,710		562,710
2	Work Vehicles (2x12,000)	24,000		24,000	1,680	25,680
3	Motorcycles (4x2,200)	8,800		8,800	616	9,416
4	Supplies and Equipment		27,590	27,590	5,872	33,462
5	Administrative Expenses		50,229	50,229	32,356	82,582
6	Inflation 1/	3,280	7,782	11,062	4,052	15,114
	TOTAL	36,080	648,311	684,391	44,576	728,967

1/ 10% Inflation excluding social payments.

4899C

HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM (520-0274)
ACTIVITY: SOIL CONSERVATION REGION VI
JULY 1985 - JUNE 1988

	ITEM	AID LOAN DOLLARS	AID LOAN QUETZALES	AID LOAN TOTAL	GOG QUETZALES	TOTAL
1	Social Payments		278,207	278,207		278,207
2	Work Vehicles (1x12,000)	12,000		12,000	840	12,840
3	Motorcycles (3x2,200)	6,600		6,600	462	7,062
4	Office Supplies & Equipment		29,759	29,759	1,140	30,899
5	Administrative Expenses		39,056	39,056	36,901	75,957
6	Inflation1/	1,860	6,882	8,742	3,934	12,676
	TOTAL	20,460	353,904	374,364	43,277	417,641

1/ 10% Inflation excluding social payments.

HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM (520-0274)
ACTIVITY: SOIL CONSERVATION REGION VI
JULY 1985 - JUNE 1988

	ITEM	AID LOAN DOLLARS	AID LOAN QUETZALES	AID LOAN TOTAL	GOG QUETZALES	TOTAL
1	Social Payments		378,940	378,940		378,940
2	Work Vehicles (1x12,000)	12,000		12,000	840	12,840
3	Motorcycles (4x2,200)	8,800		8,800	616	9,416
4	Office Supplies & Equipment		20,660	20,660	3,667	24,327
5	Administrative Expenses		35,796	35,796	47,249	83,045
6	Inflation1/	2,080	5,646	7,726	5,237	12,963
	TOTAL	22,880	441,042	463,922	57,609	521,531

1/ 10% Inflation excluding social payments.

HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM (520-0274)
ACTIVITY: SMALL SCALE IRRIGATION REGION II
JULY 1985 - JUNE 1988

ITEM	AID LOAN DOLLARS	AID LOAN QUETZALES	AID LOAN TOTAL	GOG QUETZALES	TOTAL
1. Equipment and Materials		170,287	170,287	11,920	182,207
2. Work Vehicles (2x12,000	24,000		24,000	1,680	25,680
3. Motorcycles (3x2,200)	6,600		6,600	462	7,062
4. Office Supplies & Equipment		33,215	33,215	3,875	37,090
5. Administrative Expenses		24,317	24,317	60,827	85,144
6. Inflation	3,060	25,653	28,713	7,822	36,535
TOTAL	33,660	222,872	287,132	86,586	373,718

HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM (520-0274)
ACTIVITY: SMALL SCALE IRRIGATION REGION VI
JULY 1985 - JUNE 1988

	ITEM	AID LOAN DOLLARS	AID LOAN QUETZALES	AID LOAN TOTAL	GOG QUETZALES	TOTAL
1	Equipment and Construction materials		440,284	440,284	30,820	471,104
2	Work Vehicles (4x12,000)	48,000		48,000	3,360	51,360
3	Motorcycles					
4	Office Supplies & Equipment		40,353	40,353	4,265	44,618
5	Administrative Expenses		40,312	40,312	97,833	138,145
6	Inflation	4,800	58,416	63,216	14,618	77,834
	TOTAL	52,800	531,365	632,165	150,896	783,061

HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT ADDENDUM (520-0274)
ACTIVITY: SMALL SCALE IRRIGATION REGION VII
JULY 1985 - JUNE 1988

	ITEM	AID LOAN DOLLARS	AID LOAN QUETZALES	AID LOAN TOTAL	GOG QUETZALES	TOTAL
1	Equipment & Construction Materials		344,794	344,794	24,136	368,930
2	Work Vehicles (3x12,000)	36,000		360,000	2,520	38,520
3	Motorcycles					
4	Office Supplies & Equipment		73,640	73,640	8,548	82,188
5	Administrative Expenses		47,789	47,789	96,023	143,812
6	Inflation	3,600	52,203	55,803	14,335	70,138
	TOTAL	39,600	518,426	558,026	145,562	703,588

ADDENDUM AL PROYECTO DESARROLLO AGRICOLA DEL ALTIPLANO (520-0274)

DESARROLLO AGRICOLA DEL ALTIPLANO ENMIENDA 2/HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT AMENDMENT
PROYECCION DE GASTOS/PROJECTION OF EXPENDITURES
JULY 1985 – JUNE 1988

ITEM / RUBROS	JUL.10-DIC/JUL.9-DEC 1985				ENE-DIC/JAN-DEC 1986				ENE-DIC/JAN-DEC 1987				ENE-JUN/JAN-JUNE 1988				JUL.10 1985-JUN10 1988 / JUL 1985-JUNE 1988		
	AID LOAN/PRESTAMO DE AID		COUNTERPART		AID LOAN/PRESTAMO DE AID		COUNTERPART		AID LOAN/PRESTAMO DE AID		COUNTERPART		AID LOAN/PRESTAMO DE AID		COUNTERPART		AID LOAN PRESTAMO DE AID	COUNTERPART	
	FOREIGN EXCHANGE / MONEDA EXTRANJERA	LOCAL CURRENCY / MONEDA LOCAL	GOG CONTRAPARTIDA - GOEG	TOTAL	FOREIGN EXCHANGE / MONEDA EXTRANJERA	LOCAL CURRENCY / MONEDA LOCAL	GOG CONTRAPARTIDA - GOEG	TOTAL	FOREIGN EXCHANGE / MONEDA EXTRANJERA	LOCAL CURRENCY / MONEDA LOCAL	GOG CONTRAPARTIDA - GOEG	TOTAL	FOREIGN EXCHANGE / MONEDA EXTRANJERA	LOCAL CURRENCY / MONEDA LOCAL	GOG CONTRAPARTIDA - GOEG	TOTAL		GOG CONTRAPARTIDA - GOEG	TOTAL
Small Scale Irrigation/Mini-Riego																			
1. Equipo y materiales de construcción/equipment and construction materials	—	99,706	6,979	106,685	—	273,282	19,130	292,412	—	407,129	28,499	435,628	—	175,248	12,268	187,516	955,365	66,876	1,022,241
2. Vehículos de transporte/ Service vehicles	105,000	—	7,350	112,350	—	—	—	—	—	—	—	—	—	—	—	—	105,000	7,350	112,350
3. Herramientas/Herramientas (O & M)	6,500	—	462	7,062	—	—	—	—	—	—	—	—	—	—	—	—	6,500	462	7,062
4. Suministros y equipo de oficina/Office Supplies	—	56,714	3,970	60,684	—	36,198	5,057	41,255	—	36,198	5,087	41,255	—	18,099	2,544	20,642	147,208	16,658	163,866
5. Gastos administrativos Administrative overhead	—	23,838	38,820	62,658	—	45,916	74,080	120,996	—	33,298	87,307	120,795	—	8,470	54,275	62,792	112,418	254,683	367,101
6. Inflación/Inflation	11,450	14,222	5,960	31,642	—	35,091	10,300	45,451	—	55,072	22,935	71,007	—	24,997	7,380	32,377	147,772	36,779	184,567
SUBTOTAL	120,950	194,480	63,751	304,291	—	390,277	108,797	504,074	—	534,687	154,028	668,715	—	226,819	76,468	303,287	1,477,323	383,044	1,860,367
Conservación de Suelos/ Soil Conservation																			
1. Pagos Sociales/ Social Payments	—	258,741	—	258,741	—	439,050	—	439,050	—	374,256	—	374,256	—	347,810	—	347,810	1,219,557	—	1,857
2. Vehículos de transporte/ Service vehicles	48,000	—	3,360	51,360	—	—	—	—	—	—	—	—	—	—	—	—	48,000	3,360	51,360
3. Herramientas/Herramientas	24,200	—	1,694	25,894	—	—	—	—	—	—	—	—	—	—	—	—	24,200	1,694	25,894
4. Suministros y equipo de Oficina/Office Supplies	—	27,377	2,737	30,164	—	20,253	3,157	23,410	—	20,253	3,157	23,410	—	10,729	1,575	11,704	75,629	10,679	86,688
5. Gastos administrativos Administrative overhead	—	26,049	14,445	40,494	—	53,566	27,655	81,321	—	37,739	43,571	81,310	—	7,627	30,835	38,462	125,081	116,506	241,587
6. Inflación/Inflation	7,229	7,128	7,729	15,576	—	5,273	3,081	8,354	—	5,273	4,573	9,846	—	2,576	3,241	5,817	27,530	13,423	40,953
SUBTOTAL	79,429	319,295	29,914	423,228	—	518,142	33,893	552,135	—	437,521	51,401	488,922	—	168,199	35,654	203,853	1,521,017	145,462	1,666,479
TOTAL	200,480	513,775	88,265	802,519	—	933,519	142,520	1,056,209	—	972,208	155,429	1,157,637	—	395,018	112,122	507,140	3,000,000	528,506	3,528,506

CUADRO 6/TABLE 6

ADDENDUM AL PROYECTO DESARROLLO AGRICOLA DEL ALTIPLANO (520-0274)
DESARROLLO AGRICOLA DEL ALTIPLANO/HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT
ENMIENDA 2/AMENDMENT 2
RESUMEN DEL PLAN FINANCIERO POR MONEDAS, USOS Y FUENTES DE FONDOS/
FINANCIAL PLAN SUMMARY BY CURRENCY, SOURCE AND APPLICATION

Julio 1985-Junio 1988/July 1985-June 1988

	A.I.D. Préstamo/A.I.D. Loan			Contrapartida FdeG/ GOG Counterpart	
	Moneda Extranjera Foreign Exchange	Moneda Local Local Currency	Total	Total	Total
Mini Riego/Small Scale Irrigation					
1. Equipo y Materiales/Equipment and Materials	--	955,365	955,365	66,876	1,022,241
2. Vehículos de Trabajo/ Working Vehicles	108,000	--	108,000	7,560	115,560
3. Motocicletas/Motorcycles	6,600	--	6,600	462	7,062
4. Suministros y Equipo de Oficina/ Office Supplies	--	147,208	147,208	16,688	163,896
5. Gastos Administrativos/ Administrative Overhead	--	112,418	112,418	254,683	367,101
6. Inflación e Imprevistos/ Inflation and Contingencies	11,460	136,272	147,732	36,775	184,507
Total Mini Riego/ Total Small Scale Irrigation	126,060	1,351,263	1,477,323	383,044	1,860,367
Conservación de Suelos/Soil Conservation					
1. Pagos Sociales/Social Payments	--	1,219,857	1,219,857	--	1,219,857
2. Vehículos de Trabajo/ Working Vehicles	48,000	--	48,000	3,360	51,360
3. Motocicletas/Motorcycles	24,200	--	24,200	1,694	25,894
4. Suministros y Equipo/ Supplies and Equipment	--	78,009	78,009	10,679	88,688
5. Gastos Administrativos/ Administrative Overhead	--	125,081	125,081	116,506	241,587
6. Inflación e Imprevistos/ Inflation and Cointingencies	7,220	20,310	27,530	13,223	40,753
Total Conservación de Suelos/ Total Soil Conservation	79,420	1,443,257	1,522,677	145,462	1,668,139
GRAN TOTAL/GRAND TOTAL	205,480	2,794,520	3,000,000	528,506	3,528,506

4761C

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)
REGION II

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SOIL CONSERVATION

JULY - DECEMBER 1985

EXISTENT/ NEW	POSITION TITLE	No.	SALARY/MONTH	SALARY 6 MONTHS	FRINGE BENEFITS 6 MONTHS	TOTAL	FINANC.
Existent	Agricultural Technician III	1	240.00	1,440	990	2,430	GOG
New	Agricultural Technician III	2	240.00	1,440	902	2,342	L
New	Surveyor	1	204.00	1,225	433	1,658	L
New	Chainman	1	140.00	840	401	1,241	L
New	Laborers Crew	2	120.00	1,440	782	2,222	L

GOG = 2,430
L = 7,463

JANUARY - DECEMBER 1986

	Agricultural Technician III	1	240.00	2,880	1,740	4,620	GOG
	Agricultural Technician III	2	240.00	5,760	1,794	7,554	L
	Surveyor	1	200.00	2,400	857	3,257	L
	Chainman	1	140.00	1,680	797	2,477	L
	Laborers Crew	2	120.00	2,880	1,554	4,434	L

GOG = 4,620
L = 7,554

GOG = Government Counterpart
L = Loan

0367R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

REGION II

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SOIL CONSERVATION

JULY - DECEMBER 1985

POSITION TITLE	No.	SALARY/MONTH	SALARY 6 MONTHS	FRINGE BENEFITS 6 MONTHS	TOTAL	FINANC.
Agricultural Technician III	1	240.00	2,880	1,740	4,620	GOG
Agricultural Technician III	2	240.00	5,760	1,794	7,554	L
Surveyor	1	200.00	2,400	857	3,257	GOG
Chainman	1	140.00	1,680	797	2,477	GOG
Laborers Crew	2	120.00	2,880	1,554	4,434	GOG

GOG = 4,620
L = 7,554

JANUARY - JUNE 1988

Agricultural Technician III	1	240.00	1,440	990	2,430	GOG
Agricultural Technician III	2	240.00	2,880	902	2,342	GOG
Surveyor	1	200.00	1,200	433	1,658	GOG
Chainman	1	140.00	840	401	1,241	GOG
Laborers Crew	2	120.00	1,440	782	2,222	GOG

GOG = 4,620
L = 7,554

GOG = Government Counterpart
L = Loan

0367R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

REGION II

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SMALL IRRIGATION

JULY - DECEMBER 1985

POSITION TITLE	NO.	SALARY/MONTH	SALARY 6 MONTHS	FRINGE BENEFITS 6 MONTHS	TOTAL	FINANC.
Planning Analyst II	1	400.00	2,400	1,150	3,550	GOG
Agricultural Technician	2	180.00	2,160	1,860	4,020	GOG
Skilled Worker	1	245.33	1,472	455	1,927	L
Agricultural Technician III	1	240.00	1,440	990	2,430	GOG
						GOG = 10,000
						L = 1,927

JANUARY - DECEMBER 1986

Planning Analyst II	1	400.00	4,800	1,900	6,700	GOG
Agricultural Technician II	2	180.00	4,320	3,360	7,680	GOG
Agricultural Technician III	1	240.00	2,880	1,740	4,620	GOG
Skilled Worker	1	243.33	2,920	900	3,820	L
						GOG = 19,900
						L = 3,820

GOG = Government Counterpart
L = Loan

0356R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

REGION II

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SMALL IRRIGATION

JANUARY - DECEMBER 1987

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Planning Analyst II	1	400.00	4,800	1,900	6,700	GOG
Agricultural Technician I	2	180.00	4,320	3,360	7,680	GOG
Agricultural Technician III	1	240.00	2,880	1,740	4,620	GOG
Skilled Worker	1	243.33	2,920	900	3,820	L
						GOG = 19,000
						L = 3,820

JANUARY - JUNE 1988

Planning Analyst II	1	400.00	2,400	1,150	3,350	GOG
Agricultural Technician I	2	180.00	2,160	1,860	4,020	GOG
Agricultural Technician III	1	240.00	1,440	990	2,430	GOG
Skilled Worker	1	245.33	1,472	455	1,927	GOG
						GOG = 11,927
						L = 0

GOG = Government Counterpart
L = Loan

0356R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)
REGION VI

DETAIL OF PERSONNEL
ACTIVITY: SOIL CONSERVATION

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
JULY - DECEMBER 1985						
Skilled Worker	3	245.33	4,416	1,365	5,781	L
Agricultural Engineer	1	525.00	3,150	1,575	4,725	GOG
JANUARY - DECEMBER 1986						
Skilled Worker	3	243.33	8,760	2,700	11,460	L
Agricultural Engineer I	1	525.00	6,300	2,625	8,925	GOG
JANUARY - DECEMBER 1987						
Skilled Worker	2	243.33	5,840	1,800	7,640	L
Skilled Worker	1	243.33	2,920	900	3,820	GOG
Agricultural Engineer I	1	525.00	6,300	2,625	8,925	GOG
JANUARY - JULY 1988						
Skilled Worker	3	245.33	4,416	1,365	5,781	GOG
Agricultural Engineer I	1	525.00	3,150	1,575	4,725	GOG

GOG = 36,901
L = 24,881

GOG = Government Counterpart
L = Loan

0356R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROYECT (520-0274)

REGION VI

DETAIL OF PERSONNEL
ACTIVITY: SMALL IRRIGATION

JULY - DECEMBER 1985

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Agricultural Engineer I	1	525.00	3,150	1,575	4,725	GOG
Assistant Engineer III	1	270.00	1,620	1,020	2,640	GOG
Agricultural Technician III	2	240.00	2,880	1,980	4,860	GOG
Agricultural Technician II	1	200.00	1,200	950	2,150	GOG
Day Laborer for Ag. Tech. III	5	61.33	1,840	2,048	3,888	L
Day Laborer for Ag. Engr. I	3	92.00	1,656	1,275	2,931	L

GOG = 14,375
L = 6,819

GOG = Government Counterpart
L = Loan

C356R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

REGION VI

DETAIL OF PERSONNEL
ACTIVITY: SMALL IRRIGATION

JANUARY - DECEMBER 1986

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Agricultural Engineer I	1	525.00	6,300	2,625	8,925	GOG
Assistant Engineer III	1	270.00	3,240	1,770	5,010	GOG
Agricultural Technician III	2	240.00	5,760	3,480	9,240	GOG
Agricultural Technician II	1	200.00	2,400	1,700	4,100	GOG
Day Laborer for Ag. Tech. III	5	60.83	3,650	4,064	7,714	L
Day Laborer for Ag. Engr. I	3	91.25	3,285	2,530	5,815	L

GOG = 27,275
L = 13,529

GOG = Government Counterpart
L = Loan

0356R

ADDENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

REGION VI

DETAIL OF PERSONNEL
ACTIVITY: SMALL IRRIGATION

JANUARY - DECEMBER 1987

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Agricultural Engineer I	1	525.00	6,300	2,625	8,925	GOG
Assistant Engineer III	1	270.00	3,240	1,170	5,010	GOG
Agricultural Technician III	2	240.00	5,760	3,480	9,240	GOG
Agricultural Technician II	1	200.00	2,400	1,700	4,100	GOG
Day Laborer for Ag. Tech. III	5	60.83	3,650	4,064	7,714	GOG
Day Laborer for Ag. Engr. I	3	91.25	2,190	1,686	3,876	L
Day Laborer for Ag. Engr. I	1	91.25	1,095	843	1,938	L

GOG = 34,989
L = 5,814

GOG = Government Counterpart
L = Loan

0356R

ADDENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT

REGION VI

DETAIL OF PERSONNEL
ACTIVITY: SMALL IRRIGATION

JANUARY - JUNE 1988

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Agricultural Engineer I	1	525.00	3,150	1,575	4,725	GOG
Assistant Engineer III	1	270.00	1,620	1,020	2,640	GOG
Agricultural Technician III	2	240.00	2,880	1,980	4,860	GOG
Agricultural Technician II	1	200.00	1,200	950	2,150	GOG
Day Laborer for Ag. Tech. III	5	61.33	1,840	2,048	3,888	GOG
Day Laborer for Ag. Engr. I	3	92.00	1,656	1,275	2,931	GOG

GOG = 21,194

GOG = Government Counterpart
L = Loan

0356R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SMALL-IRRIGATION

JULY - DECEMBER 1985

	POSITION TITLE	NO.	SALARY/MONTH	SALARY 6 MONTHS	FRINGE BENEFITS 6 MONTHS	TOTAL	FINANC.
Existing	Agricultural Engineer I	1	525	3,150	1,575	4,725	GOG
Existing	Agricultural Technician III	4	240	5,760	3,970	9,720	GOG
New	Surveyor	1	153.33	920	408	1,328	L
New	Secretary	1	122.66	736	392.53	1,128.53	L
New	Designer	1	122.66	736	392.53	1,128.53	L
New	Topography Crew Laborers	3	92.00	1,656	1,275.12	2,931.11	L

GOG = Government Counterpart
L = Loan

GOG = 14,445
L = 6,516.18

0360R

ADDENDUM THO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SMALL-IRRIGATION

1986

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Agricultural Engineer I	1	525	6,300	2,675	8,925	GOG
Agricultural Techncian III	4	240	17,520	6,960	18,480	GOG
Surveyor	1	152.08	1,825	809	2,634	L
Secretary	1	121.66	1,466	778	2,238	L
Designer	1	121.66	1,466	778	2,238	L
Topography Crew Laborers	3	91.25	3,285	2,528	2,931.12	L

GOG = 27,405
L = 12,923

1987

Agricultural Engineer I	1	525	6,300	2,675	8,925	GOG
Agricultural Technician III	4	240	11,520	6,960	18,480	GOG
Surveyor	1	152.80	1,825	809	2,634	L
Secretary	1	121.66	1,460	778	2,238	L
Designer	1	121.66	1,460	778	2,238	L
Topography Crew Laborers	3	91.25	3,285	2,528	5,813	GOG

GOG = 33,218
L = 7,110

GOG = Government Counterpart
L = Loan

0360R

ADDENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SMALL-IRRIGATION

JANUARY - JUNE 1981

TITLE POSITION	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Agricultural Economist I	1	525	3,150	1,575	4,725	GOG
Agricultural Technician III	4	240	5,760	3,970	9,720	GOG
Surveyor	1	150.83	905	401.28	1,306.22	GOG
Secretary	1	120.66	724	368.13	1,110.13	GOG
Designer	1	120.66	724	386.13	1,110.13	GOG
Topography Crew Laborers	3	90.50	1,629	1,254.33	2,883.33	GOG

GOG = Government Counterpart
L = Loan

GOG = 20,854.81
L = 0.00

0360R

ADDENDUM TO HIGHLANDS AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SOIL CONSERVATION

JULY - DECEMBER 1985

TITLE POSITION	NO.	SALARY/MONTH	SALARY 6 MONTHS	FRINGE BENEFITS 6 MONTHS	TOTAL	FINANC.	OBSERVATIONS
Existing Agricultural Technician III	2	240	2,880	1,980	4,860	GOG	Improvement + Christmas Bonus
Existing Agricultural Technician III	1	240	1,440	990	2,430	GOG	Improvement + Christmas Bonus
Existing Agricultural Technician III	2	245.33	2,944	907	3,851	L	Q8.00/day (Improvement + 50% Christmas Bonus)
Existing Secretary	2	92.00	552	425	977.53	L	Q3.00/day (Improvement +50% Christmas Bonus)

GOG = 7,940
L = 4,828

GOG = Government Counterpart
L = Loan

0360R

ADDENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SOIL CONSERVATION

JANUARY - DECEMBER 1986

POSITION TITLE	NO.	SALARY/MONTH	SALARY ANNUAL	FRINGE BENEFITS ANNUAL	TOTAL	FINANC.
Agricultural Technician III	3	240	8,640	5,220	13,860	GOG
Agricultural Technician III	2	243.33	5,840	1,800	7,640	L
Secretary	1	91.25	1,095	843	1,938	L

GOG = 13,860
L = 9,578

JANUARY - DECEMBER 1987

Agricultural Technician III	3	240	8,640	5,220	13,860	GOG
Agriculrural Technician III	2	243.33	5,840	1,800	7,640	L
Secretary	1	91.25	1,095	843	1,928	GOG

GOG = 15,788
L = 7,640

GOG = Government Counterpart
L = Loan

0360R

ADDENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (520-0274)

DETAIL OF PERSONNEL, PERMANENT AND BY PAYROLL
ACTIVITY: SOIL CONSERVATION

JANUARY - JUNE 1988

POSITION TITLE	No.	SALARY/MONTH	SALARY 6 MONTHS	FRINGE BENEFITS 6 MONTHS	TOTAL	FINANC.
Agricultural Technician III	5	240	7,200	1,950	9,150	GOG
Secretary	1	90.50	543	418.11	961.11	GOG

GOG = 10,111.11
L = 0.00

GOG = Government Counterpart
L = Loan

0360R

ADDENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT

ESTIMATED TIMES TO ACCOMPLISH THE NECESSARY ACTIVITIES TO IMPLEMENT A SMALL-IRRIGATION PROJECT

ACTIVITY/RESPONSIBLE	WEEKS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
a) Localization of Irrigationable Areas DIGESA	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
b) Recognition/Prefeasibility DIGESA	----																			
c) Feasibility Studies DIGESA		---------																		
d) Calculation and design DIGESA				----------																
e) Farmers Organization DIGESA		----------	----------	----------																
f) Project Planification DIGESA							----													
g) Credit Transaction DIGESA/BANDESA								----------	----------	----------	----------	----------								
h) System Construction DIGESA/Farmers													----------	----------	----------	----------				
i) Operation Supervision DIGESA/Farmers																	----------	----------	----------	----------

ADDENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT

ESTIMATED TIMES TO ACCOMPLISH THE NECESSARY ACTIVITIES TO A SMALL-IRRIGATION PROJECT

ACTIVITY/RESPONSIBLE	WEEKS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
a) Identification of problem areas DIGESA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
b) Recognition/Promotion DIGESA	---	---	---																	
c) Calculation and Design of works DIGESA			---	---	---															
d) Farmers organization DIGESA	---	---	---																	
e) Financing Requests BANDESA/DIGESA					---	---	---	---												
f) Construction/Teaching DIGESA/Farmers								---	---	---	---	---								
g) Supervision/Capacitation in maintenance DIGESA/Farmers												---	---	---	---	---	---	---	---	---

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TABLE 13

Highland Agricultural Develop
Amendment 2

ADENDUM TO HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (520-0274)
GOALS TO OBTAIN FOR SMALL IRRIGATION SYSTEMS CONSTRUCTION AND SOIL CONSERVATION
Julio 1985 — 1988

	July - Dec. 1985			Jan. - Dec. 1986			Jan - Dec. 1987			Jan - July 1988			July/85 - June/88		
gion/ tivity	No. of Projects	Benefited Families	Irrigated & Conservated Areas	No. of Projects	Benefited Families	Irrigated & Conservated Areas	No. of Projects	Benefited Families	Irrigated & Conservated Areas	No. of Projects	Benefited Families	Irrigated & Conservated Areas	No. of Projects	Benefited Families	Irrigat Conserv Areas
ALL- IRRIGATION															
II	2	61	12	2	30	16	2	145	70	—	—	—	6	236	98
VI	6	34	35	4	150	94	5	159	93	1	94	58	16	437	280
VII	3	47	20	5	119	165	6	135	138	3	67	81	17	368	404
TOTAL	11	142	67	11	299	275	13	439	301	4	161	139	39	1,041	782
SOIL CONSERVATION															
II	34	237	237	34	700	378	15	480	240	8	321	95	91	1,738	950
VI	18	248	248	18	495	495	18	495	495	18	244	244	72	1,482	1,482
VII	17	228	114	25	392	196	32	416	208	12	136	68	86	1,172	586
TOTAL	69	713	599	77	1,587	1,069	65	1,391	943	38	701	407	249	4,392	3,018

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V. Administrative Analysis

The activities proposed within Ammendment 2 to Loan Agreement 520-0274, represent the first time that signilficant resources have flowed into Regions II, VI, and VII of the Ministry of Agriculture. In the past, the Guatemalan government has channelled most of the funds obtained from international financing agencies to the Western Highlands of the country. As a result, the regions which benefited by these resources have, gradually, developed technical know how to effectively use monies for the small farmers who are handicapped by lack of proper equipment, (i.e. vehicles, equipment, furniture) and also cash. For the purpose of insuring that the administration of the additional financing for project 520-0274 will be properly utilized, an analysis of available human and physical resources, as well as such additional needs as might be required, was undertaken. Charts 8, 9, and 10 offer information on existing and new personnel required to carry out the proposed aims in the regions named. These charts show a combination of existing and new personnel during the period of execution of the project assigned to perform the professional technical and administrative work related to soil conservation and construction of mini-irrigation systems. It also shows that during the first portion of the project, the AID loan will finance minimum personnel required, until the year 1988, when the Guatemalan Government will absorb the total financing of the new jobs, with counterpart resources. In addition, it was considered convenient to provide the regions with vehicles, motorcycles, furniture and equipment, required to achieve the proposed aims. Finally, in regard to professional and technical personnel available in these regions, it is considered that they are capable to administrate, perform the investigation, design, train, and perform related activities of the Project. BANDESA has an administrative, financial and technical force in the three regions to channel the resources that will be made available through the trust agreement since it has three regional districts, 134 bank agencies, 9 rural cashiers, and 4 information offices.

VI. Engineering Analysis

A. Mini-Irrigation Systems

The enlarged project, refers in good measure, to the building of small-irrigation systems, that are adapted to the specific needs and characteristics of the farmers. Technically, this mechanism represents important advantages to the producer, by participating directly and actively in the design phase, because he can be consulted regarding the desired investment level, and also regarding the type of operation with which he will use the system. Also, he indirectly receives training in the management of his irrigation crops while constructing his system under DIGESA supervision.

In general terms, the activities to carry out the work are the following:

a) Localization of the irrigation areas. Prior to any specific request from the farmers, the technical team identifies - through different means - those areas that through their hydrologic conditions may have high irrigation potential and priority. This priority is determined by the number of families involved, the number of individual developments, the agricultural potential of the soil, the organizational infrastructure, land communication, etc. When these conditions have been established, a promotional sub-activity may begin through field agents, who will inform the potential investors of the advantages provided by irrigation, and also regarding the availability of credit and technical assistance.

b) Prefeasibility survey of irrigation areas. Information for this phase may be obtained from two sources. First, the promotional sub-activity previously outlined may generate this information. Second, spontaneous requests from farmers may be used. Although there is no formal mechanism for technical and credit assistance for irrigation at the present time, there is a sizable number of requests for this assistance through the promotional activities conducted by DIGESA.

c) Feasibility studies. Once it has been established that the project has no restrictions and/or limitations that might make its construction impossible, a detailed evaluation of the technical-financial feasibility follows. In this phase, crops to be cultivated under irrigation will be analyzed, and the feasibility of adopting the financial risk related to the investment will be determined. Also, the corresponding study of markets and commercialization mechanisms available will be undertaken.

d) Estimate and design. With the terms provided in the aforementioned activities, a system may be designed complete with technical specifications and costs.

e) Farmer organization. This activity may not necessarily follow the others. When project feasibility has been established, it is necessary to promote the formal organization of the participating farmers, not only to share in the cost of the investment and operation, but also to obtain all the benefits related to participation in production and commercialization.

f) Project planning. When groups have been formed, detailed planning of required activities is necessary to put the system into use. Farming and commercialization plans must be made. This activity involves all the requirements of the development of the farmer groups. The irrigation system is an important factor around which all the other activities unfold.

g) Credit plan procedure. As at this point in time, BANDESA becomes involved through the presentation of formal credit request. The Bank will record and process each request. This operation has the support of the technical staff of DIGESA in order to guarantee the technical success of the project.

h) Construction of system. The phases of this activity vary according to the type of system being built, i.e. if by mere gravitation, by pumping and sprinkling, etc. Consequently, the construction time for each system varies accordingly.

i) Supervision of operation projects. When the systems have been finished and put into use, the technical team will pay frequent visits to the site in order to train the farmers in the handling, operation and maintenance of the new system. Furthermore, farmers will be trained in the handling of the crops undergoing irrigation, on fertilizing procedure and the use of pesticides, etc. Activities and average time required to construct a mini-irrigation system is shown in detail in Chart 11.

The investment cost of each system is highly variable, and obviously depends on the individual conditions in which the project is developed. These costs vary from Q700 to Q2,250 per irrigated hectare. Also operation costs vary from simple payment of hand labor of the irrigators, when referring strictly to irrigation by gravitation, to the payment of fuel, lubricants and repairs, when pumping systems and complete pipe network is involved.

Mini-irrigation activities will occur in the southeast and central east areas of the country. The major part of these areas have long, dry seasons, poorly distributed rainfall (averaging some 1,200 mm yearly), high evaporation losses (over 1,000 mm per year), and soil with good drainage characteristics and without too many salinity problems. In addition, the physical and chemical quality of the water is, generally, good for irrigation and pumping system operations. The region's agriculture consists principally of basic cereals and livestock which render poor yields. For instance, the average yield of corn is less than 18 qq/Ha - of corn, about 5 to 6 qq/Ha for beans and an animal land capacity of 0.25 units per beast/Ha.

The previous description corresponds to the zone where it is estimated that the mini-irrigation projects will be developed to the highest degree. Within the total area, there are highly productive regions without humidity problems. Such is the case of Izabal in the northern Section of Zacapa and Region II. In this area, soil conservation activities will be strongly promoted.

B. Soil conservation performance. The mini-irrigation systems, per se, are a soil conservation practice, since leveling, and other similar actions are undertaken. However, the conservation activity judged individually, refers to all measures and mechanisms at the field level tending to prevent the loss of the superficial and unstable layer or soil, through the washout of flowing water.

The type of activity is of maximum importance for the small farmer, because the erosion process tends to decrease the productive capacity of his property, with the corresponding lowering of his yield and production levels. The final result is the gradual impoverishment of the families involved and, eventually, the initiation of a migration process.

In a good number of cases, it is only necessary to put into practice in the field a few simple measures which, through lack of knowledge, the farmer is not prepared to carry out without assistance. For this reason, this program strives to bring to the farmers the technical assistance required and, additionally, the hand labor necessary to carry out this work. This hand labor is to be provided by the communities and will be financed through social payments. This mecanism permits the inhabitants of the area to put aside their daily chores and work in the neighboring parcels of land, without loss of income.

The steps for the design and implementation of the soil conservation work, are very similar to those described for the mini-irrigation projects. In these cases the first step is to choose the erosion susceptible areas, and promote the use of technology among the inhabitants. This promotional work is designed to point out the economic and technical benefits that form part of the proposed practice, preparation of the land for morè profitable farming (and/or "cash crops"), greater facility in conducting field work (planting, fertilization, removing of suckers, etc.) and soil moisture conservation to name some of the immediate benefits for the users. Work and average time to carry out the preparation of the soil conservation method is contained in Chart 12.

The prevention of erosion has a long term impact that goes beyond the immediate and direct benefits of the farmers. This refers to the protection of the upper part of the deep valleys, avoiding the obstruction of river beds, which in turn prevents floods and over flowing of rivers during the rainy season. The geographical location of soil conservation activities does not exclude mini-irrigation in any manner or form, therefore, in some instances both could be carried out simultaneously within the same area. However, it is expected that the soil conservation activities will be undertaken principally in the mountanious regions covered by the enlarged project. This includes, Izabal, the northern section of Zacapa, sections corresponding to Quiché and Alta Verapaz and, the mountainous regions of the rest of the departments included within the project expansion. The aforementioned areas, besides their topographical characteristics, have higher precipitation levels than those preferentially destined for irrigation.

VII. Implementation plan

A. Principal contingencies for carrying out the expansion to the 520-0274 Project

To initiate the construction of the soil conservation and mini-irrigation systems in Regions II, VI, and VII of DIGESA, it is necessary to execute certain varied activities of a legal, technical and administrative nature, such as described in Chart 12. This chart describes the major events or activities required to fulfill the expansion of Project 520-0274, the executive units responsible for their execution and the corresponding dates. Nevertheless, not all the detailed events are considered basic for the realization of the activities and planned aims (see Chart 11 - Planned aims for the expansion to Project 520-0274). It is advisable, from the outset, to place emphasis on activities to legalize Ammendment 2 to the Loan Agreement, modify the Trust Agreement, acquire vehicles, furniture and equipment for DIGESA Regions, enlarge DIGESA and BANDESA budgets, choose and contract field personnel required to support work in the Regions and take care of all details corresponding to the execution plan of each one of the Regions. Although these activities in some cases are merely pre-requisites, such as the legal ones, they should be carried out simultaneously.

B. Execution and Financing Methods

The purchasing procedure to be put into effect by DIGESA to acquire motorcycles, pick-ups, equipment, furniture, materials and supplies will be covered in the Purchase Law of Guatemala and its Regulation, Decree No. 35-80. These procedures are compatible with AID regulations and furnish guidence for the purchase of goods and for the hiring of professional and technical personnel. Due to the urgent necessity of pechasing pick-ups and motorcycles, to strengthen investigation activities, design and execution for Regions II, VI, and VII of DIGESA, it is possible that the Government of Guatemala may request the AID Mission to purchase them directly in the U.S.A.

For the most part, the purchase of all requirements by DIGESA will be carried out by any of the three different procedures covered by the Purchase Law of Guatemala, depending upon the amount, cost and specifications required; quotations for limited quantities, and minimum cost, open contract for items on which price, quality and maintainment of offer is bid at auction every three months by the Ministry fo Public Finance, and public bid for major purchases. The limits and requirements for the use of these proceedings are clearly defined in the aforementioned Purchase Law and their eligiblity of reimbusement or expense acceptance will always be consistent with AID requirements.

Regarding the purchase of materials and equipment for the construction of the mini-irrigation sytems, BANDESA will issue credit to small farmers and they, in turn, will make purchase the through competitive proceedings with DIGESA supervision, regarding terms of price and quality.

B. Methods for carrying out activities.

The construction of systems for soil conservation and mini-irrigation will be carried out by the method of direct administration by

the small farmers to be benefitted, under the technical guidance and supervision of DIGESA. In the case of pumping system, the hydrualic engineer will develop the technical specifications for the system and small farmer will be instructed in operation and maintenance methods.

C. Financing Procedure.

Loan financing of the goods and services required for the carrying out of the expansion to of the project may be issued through two systems:

1. Advance/liquidation, through which the executor requests an advance from AID supported by the required documents. After a period that does not regularly exceed 30 days, the executor will pay to AID the advanced amount issued, including the invoices and presenting the evidence of competitiveness demanded by regulations of the Financing Agency.

2. Funds personal/reimbursement, by means of which the executor (DIGESA or BANDESA) acquires goods or services with its resources and, afterwards, presents the correponding documents to AID for reimbursement.

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