

UNCLASSIFIED

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

PERU  
PROJECT PAPER  
SOIL CONSERVATION

LAC/DR:80-7

Project Number:527-0220

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT  
**PROJECT DATA SHEET**

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

Amendment Number \_\_\_\_\_

DOCUMENT CODE  
3

2. COUNTRY/ENTITY  
PERU

3. PROJECT NUMBER  
027-0200

4. PROGRAM TITLE  
LA

5. PROJECT TITLE (maximum 40 characters)  
Soil Conservation

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

7. ESTIMATED DATE OF OBLIGATION  
(Under "B." below, enter 1, 2, 3, or 4)  
 A. Initial FY 80 B. Quarter 5 C. Final FY 82

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

A. FUNDING SOURCE	FIRST FY <u>80</u>			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	100	100	200	477	523	1,000
(Grant)	( 100 )	( 100 )	( 200 )	( 477 )	( 523 )	( 1,000 )
(Loan)	( )	( )	( )	( )	( )	( )
Other:						
U.S.:						
Host Country		85	85		340	340
Other Donors						
<b>TOTALS</b>	<b>100</b>	<b>185</b>	<b>285</b>	<b>477</b>	<b>863</b>	<b>1,340</b>

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION PURPOSE	B. PRIMARY CODE	C. PRIMARY TECIL CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) EN	200	006				200		1,000	
(2)									
(3)									
(4)									
<b>TOTALS</b>						<b>200</b>		<b>1,000</b>	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)  
020

11. SECONDARY PURPOSE CODE  
240

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	B. Code	C. Code	D. Code
	BR	NUTR	PART
E. Amount			

13. PROJECT PURPOSE (maximum 480 characters)

To consolidate, strengthen and institutionalize a GOP Soil and Water Conservation System within the General Directorate of Waters and Soils of the Ministry of Agriculture and Food.

14. SCHEDULED EVALUATIONS

Interim	MM	YY	MM	YY	Final	MM	YY

15. SOURCE, ORIGIN OF GOODS AND SERVICES  
 000  041  Local  Other (Specify) \_\_\_\_\_

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

17. APPROVED BY

Signature: Leonard Yaeger

Title: Mission Director

Date Signed: MM DD YY

18. DATE DOCUMENT RECEIVED IN AID/9, OR FOR AID/9 DOCUMENTS, DATE OF DISTRIBUTION  
MM DD YY

## PROJECT AUTHORIZATION

Name of Country : Perú  
Name of Project : Soil Conservation  
Number of Project: 527-0220

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Soil Conservation Project for Perú involving planned obligations of not to exceed \$1,000,000 in grant funds over a 3-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.
2. The project consists of institutionalizing a Government of Perú soil and water conservation system, promoting soil and water conservation technical development in Peru, and carrying out a demonstration soil conservation activity.
3. The project agreement, which may be negotiated and executed by the Officers 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, covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.
4.
  - a. Source and Origin of Goods and Services  
Goods and services, except for ocean shipping financed by A.I.D. under the project, shall have their source and origin in Peru or in the United States, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.
  - b. Conditions Precedent to Disbursement for Project Activities Other than Contracting for the Long-Term U.S. Technical Advisor and the Peruvian Project Team Leader  
Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement for Project activities other than contracting for the long-term U.S. technical advisor and the Peruvian project team leader, Peru shall furnish in form and substance satisfactory to A.I.D.:
    - (a) An operational plan for the life of the Project;
    - (b) A time-phased plan for the provision of required counterpart personnel.
  - c. Condition Precedent to Disbursement for Pilot Demonstration Activity.



PROJECT PAPER

SOIL CONSERVATION

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## ABBREVIATIONS

DGAS	Dirección General de Aguas y Suelos del Ministerio de Agricultura y Alimentación (MAA)
ORDE (LAM)	Organismo Regional de Desarrollo de Lambayeque
ORDE (NORTE)	Organismo Regional de Desarrollo del Norte
ORDE (LIB)	Organismo Regional de Desarrollo de La Libertad
ORPI	Oficina Regional de Proyectos de Inversión de ORDE (LAM) (Jefe: Zuñiga)
SDAS	Sub-Dirección de Aguas y Suelos de la Región Agraria
ATDS	Administración Técnica del Distrito de Riego
OM y C	Departamento de Manejo y Conservación
PN PMI	Programa Nacional de Pequeñas y Medianas Irrigaciones
UNTC	Universidad Nacional Técnica de Cajamarca
NAU	National Agrarian University at La Molina
SCIPA	Inter American Cooperative Food Production Service
SIPA	Agrarian Investigation and Promotion Service
ONERN	Oficina Nacional de Evaluación de Recursos Naturales
SENAMHI	Servicio Nacional de Meteorología e Hidrología
OSPA	Oficina Sectorial de Planificación Agraria
INP	Instituto Nacional de Planificación
DIPRECO	Dirección de Preservación y Conservación

## I. SUMMARY AND RECOMMENDATIONS

### A. Recommendation

That a Grant in the amount of \$1.0 million be authorized to the Government of Peru to be incrementally funded as follows:

FY-80	=	\$200,000
FY-81	=	513,000
FY-82	=	287,000

### B. Summary Project Description

Watershed management and soil conservation activities in Peru are the responsibility of the Ministry of Agriculture and Food (MinAg/G) and within the Ministry, of the General Directorate of Water and Soils. The proposed three-year project will develop and consolidate within this Directorate the Institutional infrastructure for a national soil and water conservation system. This national conservation system will, in turn, develop conservation technology for dissemination to the small farmer of Peru, thereby easing production risks, increasing land use potential, and most importantly, maintaining long lasting use of a basic natural resource.

Project activities will include: (1) establishment of national, regional, and zonal soil and water conservation offices; (2) establishment of a 400 hectare pilot area to test conservation practices and to serve as a demonstration site for training; (3) quantitative assessment of field tests of various conservation methods and development of a conservation program for small farmers; (4) development of a specific soil and water conservation technical guide for GOP personnel encompassing practice standards and specifications for various conservation methods; (5) development of technical manuals, and bulletings covering criteria and standards for planning resources, study, design, and implementation of conservation practices; and (6) the training of approximately 200 technicians through formal and on-the-job-programs.

Total estimated cost of the project is \$1,340,000, of which A.I.D. will provide \$1,000,000 in grant funds and the Government of Peru will provide \$340,000, a counterpart contribution amounting to 25% of the total cost.

The PID, submitted to Washington originally proposed a funding level of US\$2.0 million but, as a result of budget cuts project funding has been reduced to \$1,000,000. The main focus of the project to develop the institutional infrastructure for a national conservation system is unaffected, but the project will be limited to only one demonstration area,

that in Cajamarca. The pilot in the high jungle area of San Martin has been eliminated under the project but soil conservation activities for the high jungle area will be carried out under the Mission's Sub-tropical Land project.

C. Summary Findings

The project committee has found the Project to be technically, administratively, economically, socially, and financially, feasible and consistent with the development objectives of the GOP and those objectives set forth in USAID's CDSS document. These analysis of the overall Project are found in Section III of the Project Paper.

D. Summary Financial Plan

SOIL CONSERVATION

SUMMARY FINANCIAL PLAN

(Thousands of U.S. Dollars)

	FX	A.I.D. LC	GOP LC	TOTAL	PERCENTAGE
<u>Technical Assistance</u>					
Foreign	320.6	-	50.0	370.6	27%
Local	-	236.3	30.0	266.3	19%
<u>Demonstration Site and Development of Publications</u>	20.0	180.0	150.0	350.0	26%
<u>Commodities</u>	55.0	12.0	50.0	117.0	8%
<u>Participant Training</u>	3.0	-	-	3.0	1%
Sub-Total	398.6	428.3	280.0	1106.9	
Inflation (15%) and Contingencies (7%)	78.9	94.2	60.0	233.1	17%
TOTAL	477.5	522.5	340.0	1340.0	100%
	75%		25%	100%	

## PART II. PROJECT BACKGROUND AND DESCRIPTION

### A. Country Setting

The availability of land suitable for agriculture in Peru is extremely limited. Most of the areas suitable for intensive agriculture (less than 3% of the country) are already under cultivation; most of the lands not in crop production and with agricultural potential are either in the high jungle (with high costs of access and clearance) or are in the marginal class. The ratio of total croplands actually harvested to total rural population is less than 0.35 hectares; this varies from 0.5 - 1.0 hectares on the Coast to as low as 0.1 - 0.2 hectares in the major Sierra departments (Puno, Cuzco and Cajamarca).

The Sierra accounts for well over half of the cultivable land in Peru, but, except for a few valleys with permanent streams, it is an unfavorable environment for agriculture. Before the colonial era, the Incas had terraced large areas, but after the conquest terrace maintenance was abandoned. This and subsequent deforestation, accelerated erosion, and large areas have been permanently lost. Additionally, under half of the available agricultural lands are used for crops, while the remainder are used for grazing, mostly under marginal conditions since steep slopes and unimproved pasture prevail over most of the Sierra. Crop farming is extremely difficult, risky and generally limited to one short growing season from about November to March. Besides severe topography, rainfall is limited (distributed erratically within and between years) and low seasonal temperatures impose a constant risk of frost. With low and gradually deteriorating soil fertility conditions, fallow periods have lengthened and now reach up to 5 to 7 years. At altitudes above 3,700 m. agricultural conditions become even more difficult. Yields of the major crops fall by as much as 40% and only sheep and criollo cattle can withstand the altitude. Beyond 4,200 m. only llama, vicuña and alpaca can survive. Around one-third of Peru's population makes its living in the rural sierra and over one-fourth of these live at altitudes above 3,500 m. practicing a type of farming which is often referred to as primitive, but could equally well be qualified as ingenious, given the precarious resource base. Given these difficult conditions any increase in production in the sierra will have to come from improved pasture and livestock management, more and better managed small - scale irrigation works and the successful transfer of production technology including use of fertilizers and improved seeds.

The Ceja de Selva area generally has soils of better quality, although communications with the rest of the country are exceedingly difficult. The area does offer more potential for expansion of the agricultural frontier in areas like the Huallaga Central and the Pichis-Palcazu settlement zones. However, this area also suffers from some of the same soil conservation and water management problems as does the sierra areas and would thus benefit from similar improved practices.

## B. Background

### 1. Past Soil Conservation Activities

Soil conservation activities in Peru began in 1943, when the Interamerican Cooperative Service for Agricultural Production (SCIPA) was organized. Activities carried out at that time included soil studies and extension of soil conservation practices at national, regional and local levels. During the years 1943 - 1972 although the GOP was not able to establish Soil Conservation Districts nor develop a strong grass-roots conservation system, the increasing level of activities carried out established the basis for future programs.

By the end of 1972 it became clear that a completely new organizational structure was required and a new organization was created in the Ministry of Agriculture, the General Directorate of Water and Irrigation (DGAI). Personnel from the Center of Drainage and Land Reclamation (CENDRET), a special center created at the National Agrarian University (UNA), were transferred to the Ministry of Agriculture to form this unit. Likewise, engineers from the former Ministry Sub-Division of Soil Conservation were transferred to the Directorate General of Forestry and Wildlife to work on land classification.

In 1973, the Ministry of Agriculture created DIPRECO <sup>1/</sup>. DIPRECO was organized with three Sub-Directorates: Watershed Management, Drainage and Land Reclamation, Agronomy and Hydraulics Structure. DIPRECO initiated two major soil and water infrastructure projects: PLAN REHATIC with financing from the World Bank and PLAN MERIS with AID financing. Plan MERIS was organized as a rational way of bringing technical assistance to small farmers in the highlands for the development of small irrigation schemes.

In 1977, DIPRECO initiated a watershed management project currently operated by the General Directorate of Water of the Ministry of Agriculture. The project emphasizes the development of the total surface of the watershed and has had substantial experience in soil conservation activities. It builds on the Ministry's objective to aid farmers in the highlands developed before the PLAN MERIS started.

Besides the activities of the DGAS and the National Agrarian University listed below, it is also important to stress the work of the National Technical University of Cajamarca at Aylambo, Cajamarca in developing a model for integrated watershed development and management in the Cajamarca region, as well as the activities of the Regional Director of the MAA in Huaraz on watershed management.

During this same period the role of the National Agrarian

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<sup>1/</sup> At the same time, in 1973, the Departments of Management and Conservation were created as part of the water districts organizations. DIPRECO has supervised the development of these departments.

University also developed. Thus, in 1959 the National School of Agriculture "La Molina" (ENA "La Molina"), the first agricultural engineering post-graduate training center, was organized. For the first time students were offered courses on irrigation, drainage, hydrology and soil conservation engineering (students from this program were sent to the coastal irrigation project in San Lorenzo for field practice). In 1961 the National Agricultural University of "La Molina" was created (to replace ENA "La Molina"). The first faculty of agricultural Engineering was organized with four academic departments: Farm Machinery, Rural Planning and Construction, Food Processing, Irrigation and Soil Conservation. In 1963, the Academic Department of Soil Conservation was organized, and the following year a Soil Conservation Program was also started. Since that time courses in erosion control and watershed management have been offered regularly at La Molina. Beginning in 1966, the Academic Department of Irrigation at La Molina, initiated a program of Drainage and Land Reclamation, and in 1969 the Academic Departments of Irrigation and Soil Conservation were combined into the Department of Land and Water Resources (DRAT). At the present time, the activities of the Soil Conservation Program of "La Molina" which are restricted to teaching, are principally carried out by the Department of Soils (Program of Agronomy). Courses on Soil Conservation Engineering and Watershed Management are offered by DRAT and courses on Soil Conservation (Cultural practices) are given by the Agronomy Department's Soil Division.

## 2. Current Status of Soil Conservation Activities

At present, soil conservation activities at the national level are a part of the regular activities of the Directorate General of Water and Soil (DGAS) through its Watershed Management Directorate which has two Sub-Directorates: Watershed Analysis and Soil Conservation. At the regional level, the soil conservation activities are implemented under the Sub-Directorate of Water and Soils of each of the MinAg/F's Regional Agricultural Offices. At the local level, the Technical Administration of the Water Districts of each zonal MinAg/F Office has a Department of Management and Conservation of Water and Soils. In general these organizations are weak and are not operating efficiently. Thus, while at the national level initial work has been done on basic studies, manuals and technical bulletin preparation and organizing of short courses on watershed management, at the regional and zonal level, regular activities on watershed soil conservation are not being carried out. In summary, the organizational basis for soil conservation activities has been developed, but has not yet been adequately implemented.

With regard to investment projects for watershed management and soil conservation, the experience has been more extensive. The DGAS is working in the Chumbao Watershed (Andahuaylas) and Illpa Watershed (Puno) and has developed a strong technical team. Recently,

an emergency program to overcome some problems of soil conservation was begun with public funding of S/.379,000,000. This program is being carried out in Cajamarca, Zaña, La Leche, Chancay, Chicama, Santa, Casma, Huaymay, Ica and Palpa. Some irrigation projects on the Coast, i.e. Puyango-Tumbes, Chira-Piura, Olmos and Majes (Alto Colca) have also included watershed management among their programmed activities.

A major problem for current activities has been a lack of sufficient budgetary resources. Recently, however, this problem has been overcome to some extent, with the passage of the 1980 National Budget, which provided that water charges will be used directly by the water districts where they are collected. Potentially the amount of money involved amounts to approximately S/.500 million a year with a charge of 15 cts./m<sup>3</sup> on regulated irrigated areas and 4 cts./m<sup>3</sup> on non-regulated irrigated areas.

Development of additional investment projects, however, is hindered because of lack of the appropriate technical and economic studies. Even though there are many qualified engineers in agronomy, agricultural engineering and forestry who could develop this information the lack of sufficient permanent funding to carry-out these projects, which would allow for the hiring and training of professionals in soil and water conservation, makes this difficult. An additional problem is the fact that Peru has not implemented watershed management activities using the most technically appropriate methods for Peru, nor has it carried out an evaluation of its efforts in soil conservation, particularly in soil conservation engineering practices. Soil conservation manuals are translations of manuals from other Latin American countries and from the U.S. Soil Conservation Service (SCS). In many cases these are not appropriate for the use in the Andes.

Regarding watershed analysis and basic data, the country has a fairly substantial amount of information. This data base would allow for a rapid start on a soil conservation program once suitable technical practices have been identified, their costs and benefits defined and an efficient organizational structure put in place.

#### C. Project Rationale

Good agricultural lands in Peru are very scarce. Of the 128,521,560 Has. available, only 4,902,000 (3.81%) are classified as appropriate for intensive crops, 2,707,000 (2.11%) for permanent crops, 17,916,000 (13.94%) for pasture lands, 48,524,000 (37.76%) for forest lands and 54,472,560 (48.38%) are marginal areas. At present there are 2,800,000 Has. (1.84%) being cropped per year. Of these agricultural lands there are approximately 1,000,000 Has. of irrigated croplands with 75% on the coast and 25% in the Sierra. The remaining 1,800,000 Has. are rainfed with approximately 500,000 Has. in fallow per year. Lands irrigated on the coast, produce 30% more per hectare than those in the highlands. In the highlands, the areas under irrigation give average yields of more than 50% in relation to average yields on

rainfed areas. Rainfed agricultural areas have yields that differ more than 80% from one plot to another, even under the same climatic conditions due to differences in technological levels. Thus, at present and traditionally, the major technical constraints to agricultural production are the scarcity of adequate soils and water. The GOP has identified three main alternatives to overcome this problem.

1. Increasing the Water Supply

a) Develop and implement irrigation schemes to regulate and supply water to new lands of the desert or supplementary water to areas being rainfed.

b) Improve watershed management and use of rainfall water in the highlands, as well as surface and subsurface runoff.

2. Increasing the Water Use Efficiency

a) Improve the operation and maintenance of the irrigation systems.

b) Improve the Management of soil and water at the farm level in areas being rainfed and/or irrigated.

3. Opening New Lands to Agriculture

While these activities are complementary, at present they are not generally being considered within an integrated approach at the watershed level. This is especially critical in the Sierra region, due to limited investment as compared to the Coast.

The GOP during the last 50 years, has focused almost all its interest and resources on the development of irrigation schemes, mainly on the coast. In fact, during fiscal year 1979, the Agricultural and Food Sector has invested 82% of its budget in irrigation. Of this 82% only 1% has been oriented to the operation and maintenance of the water districts and 10% for drainage and land reclamation. The investment in watershed management and improvement of soil and water use at the farm level, especially in the Sierra, has been negligible. Consequently, almost 71% of the budget of the Agricultural Sector has been directed to irrigation infrastructure projects. Irrigation schemes are crucial on the coast and in some areas of the Sierra, but even under the best conditions, they can reclaim only about to 150,000 Has of new land on the coast (35%) and sierra (15%) by the year 2000. Through the regulation of the discharge, these same projects could improve some 300,000 Has. more of land already irrigated.

It should also be remembered that on the coast of Peru, out of 757,010 Has. presently being cultivated, 255,230 Has (33%) have salinity and/or drainage problems and that these problems are severe in 152,870 Has. The areas with salinity problems increase with each new

irrigation project due to poor design of drainage systems and it can be anticipated that at least 30% of the new areas that are expected to be irrigated in the future on the coast will suffer from drainage and salinity problems.

As stated before, the investments made for watershed management, soil conservation, rainfall and runoff catchments and in general to improve the supply and efficiency of water use in the Sierra on rainfed areas has been negligible. This is in spite of the fact that it could improve agricultural production on more than 1,800,000 Has. and that the Government has developed an administrative system to carry out such projects.

An example of the latter is the watershed management and soil conservation activities at the pilot project at Aylambo, Cajamarca, which have proven to be complementary to the irrigation projects in the highlands.

The Sierra is suffering severe erosion problems and droughts that can be reduced and overcome partially with soil conservation and better water use and management. The activities carried out on slopes and other marginal areas will benefit the poorest farmers giving them jobs and opportunities to invest in their farms as well as increasing the total agricultural, livestock and forest production. It should be clear that before investing in agricultural inputs, such as fertilizers, improved seeds and varieties, chemical pesticides, and in general improved technologies associated with rainfed areas in the highlands, the soil erosion problem must be addressed. If the natural resource base is depleted by soil erosion, other production inputs will not be fully effective. This is also true for investments being made in structure such as intakes, dams and reservoirs built below severely eroded areas.

Finally, the proposed Soil and Water Conservation Project will provide valuable experience to the Ministry of AG/Food, and the Mission in assessing potential activities for the proposed FY 81 Watershed Management Project. The activities to be undertaken on this pilot effort will be evaluated and as appropriate incorporated into a broader nationwide effort. The Watershed Management Loan is discussed in more detail in the PP section dealing with relationship to other Mission activities, however this pilot effort is designed to establish an institutional framework for future implementation of a broader national effort. The follow-on Watershed Management Loan will integrate soil and water conservation technology identified in this grant Project with small farm irrigation activities and afforestation activities. However because of GOP's weak technical and institutional framework in the area of soil conservation, it is important to develop a core staff of trained personnel

as well as develop and test conservation techniques which can be applied without delay upon initiation of the Watershed Management Loan.

The purpose of the Project therefore is to improve the standard of life of the poorest farmers in the highlands, through an improvement of their agricultural and rangeland livestock production and soil conservation activities.

The environment in the highland areas which are the focus of this Project is semiarid with severe topographical and climatic limitations. Soil erosion is very high. According to information developed by ONERN, only 1,474,800 Has. are appropriate for agricultural production in the highlands. In spite of this, 1,800,000 are cropped. This means that at least 300,000 Has. are inappropriately being used for cropland. In the Ceja de Selva Zone, a forestry survey has shown that more than 4,000,000 Has. have been damaged due to forest clearing and migratory cultivations. See Table I for description of land use.

The problems or constraints to reach the stated objective can be classified as technical and socio-economical. Socio-economical constraints include economic, financial, political, legal, institutional, administrative, social and cultural aspects. Technically the main constraints to be overcome by this Project are related to the scarcity of soil and water and the prevailing climatic conditions of the high altitude. At present, very few watershed management and conservation practices are being developed for these areas. In the Sierra, the main alternative has been only to develop irrigation projects without taking into consideration the areas above them that will remain rainfed and used for agriculture or pasture land or forestry. The only tools available to the MinAg/F to date have been the many soil and climatic studies that are available. However, the primary disadvantage of using these manuals is that very few of the conservation techniques have been adapted to the highlands. Thus, it is necessary to develop techniques suitable for the Peruvian highlands, situation, focussing on such aspects as runoff control, rainfall harvesting, watershed management, erosion control, and in general, techniques for land development of agriculture in rainfed areas.

Economic and financial problems exist. There are not sufficient funds assigned for the implementation of soil conservation and watershed management activities on a regular basis. Investment projects are also scarce, and there is a lack of economic studies, as well as sufficient knowledge on the cost and benefits of the different practices applicable to the area.

By law the Ministry of Agriculture and Food is in charge of watershed management and soil conservation activities. Additionally the water law, the forest and wildlife law, and the new Agricultural Promotion law being developed have articles relating to soil conservation and watershed protection. The problems that do exist are related more to the lack of specific regulations dealing with soil conservation in the

TABLE I

REGIONES NATURALES DEL PERU Y SU CAPACIDAD DE USO MAYOR DE LAS TIERRAS

REGIONES	(A) Cultivo en Limpio		(C) Cultivo Permanente		(P) Pastos *		(F) Forestales		(X) Protección		TOTAL	
	Ha.	%	Ha.	%	Ha.	%	Ha.	%	Ha.	%	Ha.	%
COSTA	1'098,100	0.85	496,300	0.39	1'622,400	1.26	-	-	10'378,100	8.07	13'594,900	10.58
SIERRA	1'474,800	1.15	No signific.	-	10'576,500	8.23	2,092,400	1.63	25'188,300	19.60	39'332,000	30.61
SELVA	2'329,100	1.81	2'210,700	1.72	5'717,100	4.45	48'431,600	36.13	18,900,160	14.71	75'594,660	58.81
TOTAL	4'902,000	3.81	2,707,000	2.11	17,916,000	13.94	48,524,000	37.76	54,472,560	42.38	28,521,560	100.0

FUENTE: Inventario Nacional de Tierras del Peru - ONERN (1979) - Carlos Zamora

(\*) Se estima una superficie bruta, según diversas fuentes, entre 22 a 27 millones de hectáreas de pastizales en la región de Sierra. Esta superficie incluye grandes extensiones de áreas empinadas, denudadas, suelos pedregosos y arenosos, asociadas a una superficie de menos de 11 millones de Has. de pastizales con capacidad para sostener una actividad pecuaria económicamente productiva.

highlands and the lack of regular budget support for such activities.

The PID discussed the promulgation of a new soil conservation law, however, the new government in reviewing existing legislation has found that the water law of 1976 deals adequately with soil as well as water conservation and has postponed for the time being further development of a new law. Thus MinAg/F will instead attempt a broader implementation of the several laws already in place. This change will not affect success of the proposed grant in any way nor will it affect the proposed FY 81 Watershed Management Loan.

Institutional and administrative problems, however are more serious. The Ministry of Agriculture and Food has organizations at the national, regional and local levels (see Administrative Analysis) in charge of soil conservation activities. Unfortunately these organizations lack operating programs. Where some projects and programs in soil conservation do exist, they overlap with the regular programs, lacking coordination. Functional relationships between the national, regional and local levels also vary according to the interest of each Regional Zonal Director and District Irrigation Chief. In general, the system needs to be improved, rationalized and coordinated.

#### D. Project Description

##### 1. Goal and Purpose

The overall sectoral goal that the Project addresses is to improve the quality of life for the rural poor by increasing food production, employment, income and nutritional levels. The proposed Project will contribute to the overall goal by developing the soil conservation institutional infrastructure which will develop and disseminate conservation technology to the small farmer of Peru, easing production risks, increasing land use potential and most importantly maintaining a long lasting use of a basic natural resource.

The purpose of the Project is to consolidate, strengthen and institutionalize a GOP soil and water conservation system within the General Directorate of Water and Soils of the Ministry of Agriculture and Food (MinAg/F). The Project activities are directed to: (1) strengthening the capacity of the MinAg/F to implement on a national level a program of small farmer soil and water management; and, (2) soil erosion control and improvement of water use and conservation, through land protection and development and the use of appropriate technologies for water harvesting on steep sierra slopes. Field work emphasis in a test area will address the key soil erosion problem areas found in the sierra, thus supporting the Mission's CDSS goal of creating a dynamic agricultural-based growth in the Sierra.

##### 2. End of Project Status

At the end of the three year Project, the following results will be attained:

a. Institutional Strengthening Activities

1) soil and water conservation office will be operative at national, regional and zonal levels and will be applying soil and water conservation methodologies which have been field tested for their effectiveness and approved by the GOP.

2) A quantitative assessment of the results achieved thru field testing during the life of the Project and a recommendation for the development of an incentive type conservation cost-sharing program for soil and water conservation for small farmers of Peru.

b. Soil Conservation Activities

1) A pilot area of approximately 400 Has, in the water district of Cajamarca will be implemented with soil and water practices such as soil erosion control, water harvestry, water control and land development techniques. The pilot area will have served as an experimental site for the preparation of appropriate soil and water practices and as a demonstration site for the training of GOP technicians and farmer members of Sierra water districts.

2) A specific soil and water conservation technical guide for GOP personnel shall be developed that will include practice standards and specifications for grassed waterways, level terraces and diversions, graded terraces and diversions, conservation cropping systems, pasture corrugations or furrows, rangeland seeding, water storage structures, grade stabilization structures, natural spring development, pasture and rangeland management systems, and grass seeding, among others.

3) A set of technical manuals, bulletins, and other publications covering criteria and standards for planning resources, study, design and implementation of soil and water conservation practices. Such technical manuals will also include unit cost and benefit data and economic evaluation methods for use in determining the applicability of a particular soil and water conservation practice for the small farmer'

4) The following training activities will take place:

(i) Two two-week formal short courses in soil and water conservation for GOP personnel (75 people).

(ii) Informal on-the-job training for approximately 20 Lima based and approximately 100 field based personnel.

(iii) One person will receive overseas short term on-the-job training in aspects of conservation management.

### 3. Project Activities

Project activities will focus on the following two principal components: (1) institutional strengthening; and, (2) soil and water conservation technical development. The activities will be carried out by the units of the MinAg/F charged with this responsibility, and will be assisted by the National Agrarian University (NAU) and the National Technical University of Cajamarca (NTUC) in addition to GOP investment projects.

#### a. Soil and Water Conservation Institutional Strengthening Component

At the national level, the GOP has stated its intention to reorganize, consolidate, and strengthen the activities of a permanent soil and water conservation office in order to carry on the responsibilities and management of this Project. This decision has been supported by the recent passage of soil and water related conservation laws. The national office for soil and water conservation activities will be located in Lima under the Directorate of Watershed Management of the General Directorate of Water and Soils of the MinAg/F. The responsibilities of this office are to:

- 1) Determine soil and water conservation needs by regions of the country;
- 2) Determine national workload to develop national priorities expressed in a plan of action;
- 3) Provide direct supervision to regional office employees and a national system of maintaining records of accomplishments; and,
- 4) Evaluate and analyze data collected in the field.

Regional offices have also been established with the same responsibilities except that they apply only to the field units supervised by the regional office.

Under the institutional strengthening component, the Project will carry-out the following two tasks: (1) staffing and training of the technical personnel of the Soil and Water Conservation Office, and development of a national system for soil and water conservation activities; and, (2) in addition, the GOP has committed itself to staff the Department of Soil and Water Management and Conservation with technicians in the following disciplines: soil conservationists, ag. engineers, soil scientists, administrative personnel, agronomists, range conservationists, economists and plant material specialists. The GOP will also implement the establishment of irrigation districts in the sierra as spelled out in the Peruvian Water Law, (see Annex II Exhibit G) as well as implement the soil conservation system also established in the same law.

AID inputs into the Institutional Strengthening Component will be:

1) Foreign Technical Assistance

(i) Long-term soil conservationist: 36 persons/months.

The soil conservationist will provide technical advice and leadership in the institutional development component of the Project and will be directly responsible to the Director General of Water and Soils of the MinAg/F. He will be hired under a PASA agreement with the Soil Conservation Service of the USDA.

(ii) Short-term technical personnel: 8 persons/months.

As outlined in Annex II Exhibit E, an economist, hydrologist, erosion control engineer and agronomist will assist in their respective areas of technical expertise on a short-term basis by providing training to counterpart personnel within the DGAS.

2) Local Hire Technical Assistance: 179 person/mo.

In order to strengthen the existing staff of the MinAg/F, local technicians will initially be hired using Project funds. The local hire team will be used to train permanent MinAg/F staff. This is an important input considering the present state of the MinAg/F soil and water conservation staff. Additionally, the availability of qualified Peruvian technicians at a low cost relative to foreign T.A. is an important cost consideration. The composition of the local hire team and the scopes of work are outlined in Annex II Exhibit E and include a project leader, agricultural economist, senior agricultural engineer, junior agricultural engineer, a rural sociologist and a soil scientist. The project leader will be hired on a PSC contract directly by USAID and will be responsible to the US long-term Soil Conservationist. He will be responsible for the management of the remaining local hire technical assistance team to be contracted by the DGAS.

3) Commodities

Project funds will be utilized to finance the purchase of supplies and equipment necessary to undertake field testing activities (see equipment list Annex II Exhibit C). The equipment to be procured under the Project will reinforce the equipment presently in use by the MinAg/F in soil conservation activities.

4) On Site Soil and Water Conservation Training in the U.S.

One individual from the MinAg/F will receive one month on-site training in the U.S. to work with the Soil Conservation Service on management and implementation of soil and water conservation activities.

b. Soil and Water Conservation Technical Development Component

The technical development required to satisfy the conservation needs of Peru will be achieved with the following three complementary activities (1) the implementation of test demonstrations activities in the pilot area of Porcon and (2) the development and publication of technical manuals describing appropriate soil conservation techniques, and (3) the training of Peruvian technicians at the field level in the soil and water conservation techniques to be extended to the small farmer.

1) Pilot Area of Porcon, Department of Cajamarca

Soil and water conservation and management practices will be implemented in an area of approximately 400 Has. in the Department of Cajamarca. The agricultural land in the area is presently rainfed and has varying slopes, altitudinal levels, crops and land uses. It is located within the boundaries of the watershed of the Porcon River, tributary to the Maschcon River. Porcon's watershed has been selected due to its representativity, access, data available and its priority in the national development scheme. The Porcon watershed has the advantage of being a perfect example of soil and water conservation laboratory due to the varying levels of soil erosion present in the area, the wide variety of soil types, and a number of controlled and non-controlled streams. In addition, the area has been selected as a potential site for an irrigation sub-project under Loan 527-059 "Land and Water Use in the Sierra". The development of the area will allow for: the improvement of the 400 Has. through testing and evaluating different soil and water conservation practices, including cost and benefit analysis of each of them; carrying-out specific economics and soil studies; testing hydrological formulae for measuring surface and sub-surface flow, sediment transport and erosion; and measuring yields at main crops (see technical analysis). It will also include the development of planning procedures for soil and water conservation, as well as an analysis of the most appropriate organization of campesinos and water district personnel to carry out this work. This activity will also include training and demonstrative activities for GOP personnel and campesinos at local, regional and national level.

The activities to be undertaken in the pilot area of Porcon are:

2) Planning

An evaluation of the two current projects currently being developed in soil and water conservation in the region (Programa Silvo-gropecuario and the Programa de Conservacion de Suelos del Plan de Emergencia por la Sequia) will be undertaken, with attention also given to projects which have already been completed. Simultaneously, the physical and socio-economic conditions of the Porcon's watershed will be analyzed. A comprehensive and systematic diagnosis of the main soil and water conservation problems and present level of production and technology will be made. A detailed work plan will then be developed and will include all the direct and indirect activities required for the implementation of the project. The campesinos will be organized so as to participate in the planning and evaluation process with the Water District personnel.

3) Implementation of the Work Plan

The work plan will be implemented with detailed studies, design and construction of the main soil and water conservation practices. Mechanical-structural practices will be combined with agricultural-cultural and forest-range and practices as needed. A strict and close control of cost, timing, jobs, equipment, materials, tools and other will be made on each practice. The data will then be evaluated and published through technical releases and manuals once the effectiveness of each practice has been demonstrated. On-site demonstrations will also be conducted. Hydrometeorological and other climatic data will be collected. Detailed socio-economic studies will be carried out in the area, as well as technical studies and other required standards and procedures for the effective operation and maintenance of the main structures. Once developed, these practices will be explained to the campesinos and GOP personnel.

Each activity to be executed will be programmed and evaluated through the collection of quantitative data. Data such as time and work load, cubic meters of land removed and other indexes will be carefully registered so as to build up a data bank. The planning of current activities will be updated as required.

Campesinos will be involved as much as possible in the development and implementation of soil conservation techniques in the area. During this process alternative organization methods and extent and levels of participation of campesinos in the program will be tested. The objective being the development of a replicable model for future use in other areas of the country.

4) Development and Publication of Technical Manuals

The development of handbooks, manuals, bulletins, and any other technical releases that explain detail methodologies and procedures to analyze, study, design, construct, evaluate, control, etc., the works in soil and water conservation are extremely important to the institutionalization of the soil conservation system. At present in Peru there are only a few technical manuals on soil and water. Those used are primarily adaptation or simple translations of techniques developed in other latitudes which in many cases is not appropriate for Peru.

The development of manuals and other material will be carried out taking as a base the Peruvian manuals already in use in the country. The information available will be combined and/or tested with the experience obtained in the pilot area. The development of these manuals requires the participation of highly qualified personnel with field experience and possessing a capability to write technical papers. Funds are being made available to hire on a part-time basis professors from local and national universities to work on specific chapters of the manuals. In addition to technical releases, posters, stickers, emblems and other material will also be produced for extension purposes.

#### 5) Training of GOP Personnel

Two two-week formal training programs for a total of approximately 75 soil and water conservation personnel from MinAg/F, NAU and NTUC will be held at the pilot area of Porcon in year III of the Project. The training/<sup>plan</sup> is found in Annex III (h). The training program is planned so as to maximize the experience of the foreign and local technical assistance and build on the experience of the GOP personnel, utilizing the results of the demonstration activities at Porcon.

AID inputs for the above component will include:

#### Pilot Area Implementation

To implement the pilot area with soil and water conservation and management practices, the Project will finance the purchase of materials and equipment (principally hand tools), and will pay for skilled and unskilled labor. It is anticipated that the unskilled labor costs may be minimized through the distribution of PL 480 Title II commodities in payment of the labor. Construction activities will be handled by MinAg/F force account.

#### Technical Publications

The Project will finance the purchase of materials and printing costs for the preparation of the technical publications which result from the Project. Also the Project will offer short-term sabbaticals to professionals in order to encourage the publication of technical materials.

A, U.S. soil conservationist and agricultural engineer will develop lesson plans and conduct the two 2-week formal training courses at the Pilot location. A detailed training syllabus is found in Annex II Exhibit F.

E. Relationship to CDSS

The proposed Project fits well within the Mission's overall development assistance strategy which assigns highest priority to improve the quality of life of the sierra and ceja de selva poor. As articulated in the CDSS, the role of A.I.D. during the next few years will be to fill the gap between Peru's strong commitment to the poor and its weak fiscal position. Soil conservation activities are necessary both to conserve the resource base and to increase agricultural production on the resource base. The proposed Project will complement such other USAID projects as Sierra Irrigation and Land Use, Floury Corn and Soybean Production, On Farm Water Management, Integrated Regional Development, Agricultural Research, Extension and Education, and Environmental Natural Resource Inventory. The latter mentioned project with ONERN will increase the available information of the resource base to which conservation activities will be applied.

F. Relationship to other Mission Activities

The Mission proposes under this Project to finance the development of a soil and water conservation system within the GOP which will complement other ongoing USAID projects in Peru.

The proposed grant will complement and in fact formalize relationships with that sector of the MinAg/F responsible for implementing the Mission's reforestation activities. An agreement will be entered into between the DGAS and the Directorate for Forestry and Fauna (DGFF) assuring interchange of data and coordination of efforts. Under the Mission's forestry activities during the most recent planting season (Dec. 79 through March 80) the SEPAS OPG Reforestation Project 527-0206 planted approximately 600,000 tree seedlings in the Cajamarca Department. Tree seedlings planted were eucalyptus globulus and pinus radiata. This three year project is conducted under OPG funding through Servicio Evangélico Peruano Acción Social (SEPAS), the Office of National Food Support (ONAA) and office of the Director General de Forestal y Fauna (DGFF).

The campesino laborers participate in the project on a Food for Work basis, receiving PL 480 Title II commodities for their labors in planting and caring for the tree seedlings.

The information and expertise gained from this soil conservation Project will be extremely beneficial for furthering the goals of reforestation activities. To achieve the objectives of both the soil and forestry projects tree planting activities will be incorporated, where appropriate within the 400 hectare pilot site. The collaboration between members of the SEPAS Reforestation project and the DGAS will assure that the benefits achieved will be made available to all appropriate offices.

The second Mission activity which the proposed Project complements is an OPG. the purpose of which is to assist the Asociación para el Desarrollo Rural de Cajamarca (ASPADERUC) in developing three integrated rural development eco-systems comprising 2,000 hectares, in order to establish a balance between the preservation, regeneration and economic utilization of natural resources, and the provision of basic human needs, for an estimated 1,050 families residing within the project area. The \$200,000 grant is for a period of two years.

The ASPADERUC project is directly involved in the revitalization, presentation and conservation and economic utilization of land areas similar to those in which this Soil Conservation Project will be implemented. The technological experience gained and the interchange of knowledge between the two projects will be of extreme value in determining the most beneficial use of the diverse and limited agricultural lands in the areas involved. In addition the experience gained by the University of Cajamarca, which has been supplying technical assistance to the ASPADERUC project, and the trained members of the communities will provide a source of technical expertise which will be drawn upon and utilized during the implementation of this Conservation Project.

The information already established and the body of trained personnel available through CICAFOR will be utilized as a technical resource for the Soil Conservation Project. Vegetation species to be used in the various aspects of the Soil Conservation Project will be determined after consultation with members of CICAFOR.

Finally as stated earlier, the Mission is planning a \$10.0 million FY 82 Watershed Management Loan. The proposed loan will incorporate effective soil conservation techniques identified under this Project with an expansion of the Mission's small farm irrigation activities as well as linkages with sierra afforestation activities currently financed through OPGs. This integrated approach will be implemented in several key watersheds in the Peruvian sierra and high jungle.

#### G. Other Donors

Other donors are not currently involved in the financing of similar projects in soil and water conservation in Peru although the General Directorate of Water and Soil has been able to present various short-term training courses for their personnel under the auspices of FAO and the International Center for Drainage and Irrigation of Tropical Lands from Venezuela. The Belgian government is phasing out a project in forestation research in Cajamarca, thus the proposed Project will be able to capitalize on their experiences for application to soil conservation methodologies.

The Belgian project, the Centro de Investigaciones y Capacitación Forestal (CICAFOR) is a research and training center, located in Cajamarca. This center, established in 1974 is under continued funding from the Belgian Government and is devoted to the researching and determination of the most suitable tree and forest vegetation species for commercial and reforestation use in Peru. The Center is likewise designed to be used as a small training center for Forestry and Agrarian research personnel.

There is therefore no danger of duplication or overlap of efforts between other donor initiatives and the proposed Project.

### III. FINANCIAL ANALYSIS

The total cost of the Project is estimated at US\$1,340,000 of which up to US\$1,000,000 would be financed with an AID grant and US\$340,000, would be contributed by the MinAg/Food through cash and in-kind payments. Table 2 shows the sources and application of funds for the Project.

The Project will finance technical assistance, training, hardware, materials and supplies. Technical assistance covers the use of technical specialists in various fields to develop and demonstrate procedures, design and install conservation techniques and conduct short-term training, commonly on-the-job training, in conjunction with their technical duties. Training includes provision of educational services as the prime function. Peruvian support includes the labor effort by Peruvian professionals and technicians, whether under direct hire or under sub-contract, to complete the tasks. Hardware includes purchase of non-expendable items of hardware necessary for completion of the training tasks and future institution-building. Materials and supplies include all expendable items necessary for completion of the tasks.

It is estimated that a total of 44 man/months of U.S. and 179 man/months of local technical assistance will be financed with Grant funds during the implementation of the Project.

Tables 3 and 4 depict the requirements of foreign exchange and local currency as well as the cumulative disbursements under the Grant respectively.

### IV. PROJECT ANALYSIS

#### A. Technical Analysis

The Technical Analysis is essentially limited to the Pilot Project Area. The area selected for the Pilot Project is the Porcon Watershed in the Cajamarca Irrigation District.

The area selected for the Pilot Project is that portion of the Porcon Watershed upstream of the entrance of the Rio Grande River. The hydraulic outlet of the Pilot Project area is approximately 5 kilometers north of the city of Cajamarca. A map of the area is included in Annex II. This watershed is considered as being reasonably representative of the Andean area of Peru. It presents problems of low temperature, low rainfall and moderate to severe erosion. Agronomic treatment of the steep eroding land was considered initially. However, the lands are so steep that this type of treatment alone would be futile. For this reason, mechanical treatment of the erosion problem will also be carried-out and the technical analysis will focus on this aspect.

TABLE 2

FINANCIAL PLAN FOR THE SOIL CONSERVATION GRANT PROJECT

(In U.S. Dollars)

<u>Investment Category</u>	A. I. D.	G. O. P.	TOTAL
I. <u>Technical Assistance</u>			
Foreign	320,550	50,000	370,550
Local	236,360	30,000	266,360
II. <u>Demonstration Site and Development of Publications</u>	200,000	150,000	350,000
III. <u>Commodities</u>	67,000	50,000	117,000
IV. <u>Participant Training</u>	<u>3,000</u>	<u>-</u>	<u>3,000</u>
Total (I) to (IV)	826,910	280,000	1,106,910
Inflation & Contingencies <sup>1/</sup>	<u>173,090</u>	<u>60,000</u>	<u>233,090</u>
Grand Total	<u>1,000,000</u>	<u>340,000</u>	<u>1,340,000</u>

1/ Include inflation (15%) and contingencies (7%).

TABLE 3

SOIL CONSERVATION GRANT PROJECT

CUMULATIVE A.I.D. DISBURSEMENTS BY CALENDAR YEAR

(In U.S. Dollars)

<u>Investment Category</u> <sup>1/</sup>	<u>Year I</u>	<u>Year II</u>	<u>Year III</u>
<u>I. Technical Assistance</u>			
Foreign	75,000	277,364	381,364
Local	50,000	209,876	288,876
<u>II. Demonstration Site and     Development of Publications</u>	50,000	164,462	243,462
<u>III. Commodities</u>	25,000	57,298	82,298
<u>IV. Participant Training</u>	-	4,000	4,000
Grand Total	200,000	713,000	1'000,000

<sup>1/</sup> The inflation and contingency factors have been incorporated in the investment categories.

TABLE 4

SOIL CONSERVATION GRANT PROJECT  
REQUIREMENTS OF FOREIGN EXCHANGE AND LOCAL CURRENCY

(In U.S. Dollars)

<u>Investment Category</u>	<u>A.I.D.</u>		<u>GOP</u>	<u>Total</u>
	<u>FX</u>	<u>LC</u>	<u>LC</u>	
<u>I. Technical Assistance</u>				
Foreign	320,550	-	50,000	370,550
Local	-	236,360	30,000	266,360
<u>II. Demonstration Site and Development of Publications</u>	20,000	180,000	150,000	350,000
<u>III. Commodities</u>	55,000	12,000	50,000	117,000
<u>IV. Participant Training</u>	<u>3,000</u>	<u>-</u>	<u>-</u>	<u>3,000</u>
Total (I) to (IV)	398,550	428,360	280,000	1,106,910
Inflation & Contingencies	<u>78,923</u>	<u>94,167</u>	<u>60,000</u>	<u>233,090</u>
Grand Total	477,473	522,527	340,000	1'340,000

1. Soil and Climate Resource Basis for Analysis

No detailed soil survey for the Pilot Project Area is available. There is however, a semi-detailed soil survey report published in 1978 and titled "Los Suelos de la Cuenca del Río Cajamarca". This survey report covers a portion of the selected Pilot Project Area. As the Soil Survey area is in the same physiographic area as the Pilot Project and contains part of the Pilot Project, Soil Capability Class information is considered as substantially the same. Listed below is information regarding the distribution of Soil Capability Class land in the area of the Soil Survey report.

Class II land contains slopes from 0-12 percent with 70% of this land class in slope group 0-4 percent.

Class III land contains slopes from 0-25 percent with 25% of this land class in slope group 5-12 percent.

Class IV land contains slopes from 0-25 percent with 43% of this land class in slope group 5-12 percent.

There is an insignificant amount of class V land.

Class VI land contains slopes from 0-50 percent with 52% of this land class in slope group 13-25 percent.

Class VII land contains slopes from 5-70 percent with 51% of this land class in slope group 26-50 percent.

Class VIII land contains slopes from 13-over 70 percent with 47% of this land class in slope group 51-70 percent.

Peru aggregates soil capability classes into soil groups.

Group 1 is considered capable of intensive cultivation and include Capability Classes I, II, III and IV.

Group 2 is not considered suitable for cultivation, but can be used for orchards, pastures and forests. This group includes Capability Classes V and VI.

Group 3 includes soils suitable only for grazing and forestry. Capability Class VII makes up this group.

Group 4 includes land not suitable for agricultural use. This group contains Capability Class VIII only.

Classifications in accordance with Soil Taxonomy are also available for recent soil surveys in Peru. Laboratory characterization data are also available.

Much of the land being cropped in Peru would be considered unsuitable for cropland, according to United States Land Capability Classification Standards. However, there is no Peruvian alternative to cropping these very steep areas. It seems likely that a technology can be demonstrated that will minimize erosion, conserve water, and be economically feasible even on these steep slopes. The erosion control-water management system adopted will probably result in larger operations and maintenance requirements, but given the small farm size which each campesino owns and the availability of indigenous construction materials, this should not prove to be a critical constraint. See Table 5, and 6.

Precipitation in the pilot project area will normally range from 750 to 1200 mms. annually. The area has been experiencing a drought for the past 3 years. Rainfall distribution by months is shown on Figure 3 based on the meteorological station of Granja Porcon. In general, however, rainfall is extremely variable, not only from year to year, but also within the year. Potential evapotranspiration can be expected to exceed precipitation during the months of June, July and August of an average year. The mean monthly precipitation and potential evapotranspiration values for the station at Granja Porcon are shown on Figure 3.

## 2. Criteria for Selection of Conservation Technology

Any conservation technology which should be considered for the Sierra area of Peru must be acceptable both from the socio-economic and the technical aspects. Solutions to the severe erosion problems will be difficult, even under the most ideal set of conditions. The most sincere desire of the Government of Peru, conscientious efforts of professional soil conservationists, and strong cooperation of the campesinos will not insure successful solutions to the problems. However, solutions to the soil erosion problems and improved use of the often deficient rainfall must begin with sound plans based on technical data and scientific methods which will result in conservation on the land.

Conservation works of improvement must be capable of being constructed with indigenous materials. The Pilot Project area as well as the rest of the Sierra has a preponderance of rock which when used singly or in conjunction with cement mortar will build low-cost, durable structures.

Erosion-control or water management systems must be so designed so they can be installed primarily with hand labor, and the technology should be tied to soil taxonomic units so they can be duplicated over extensive areas in the Sierra. There is an ample supply of able-bodied laborers in the area. The GOP has recently launched a Drought Relief

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TABLE 5

REF. LOS SUELOS DE LA CUENCA DEL RIO CAJAMARCA

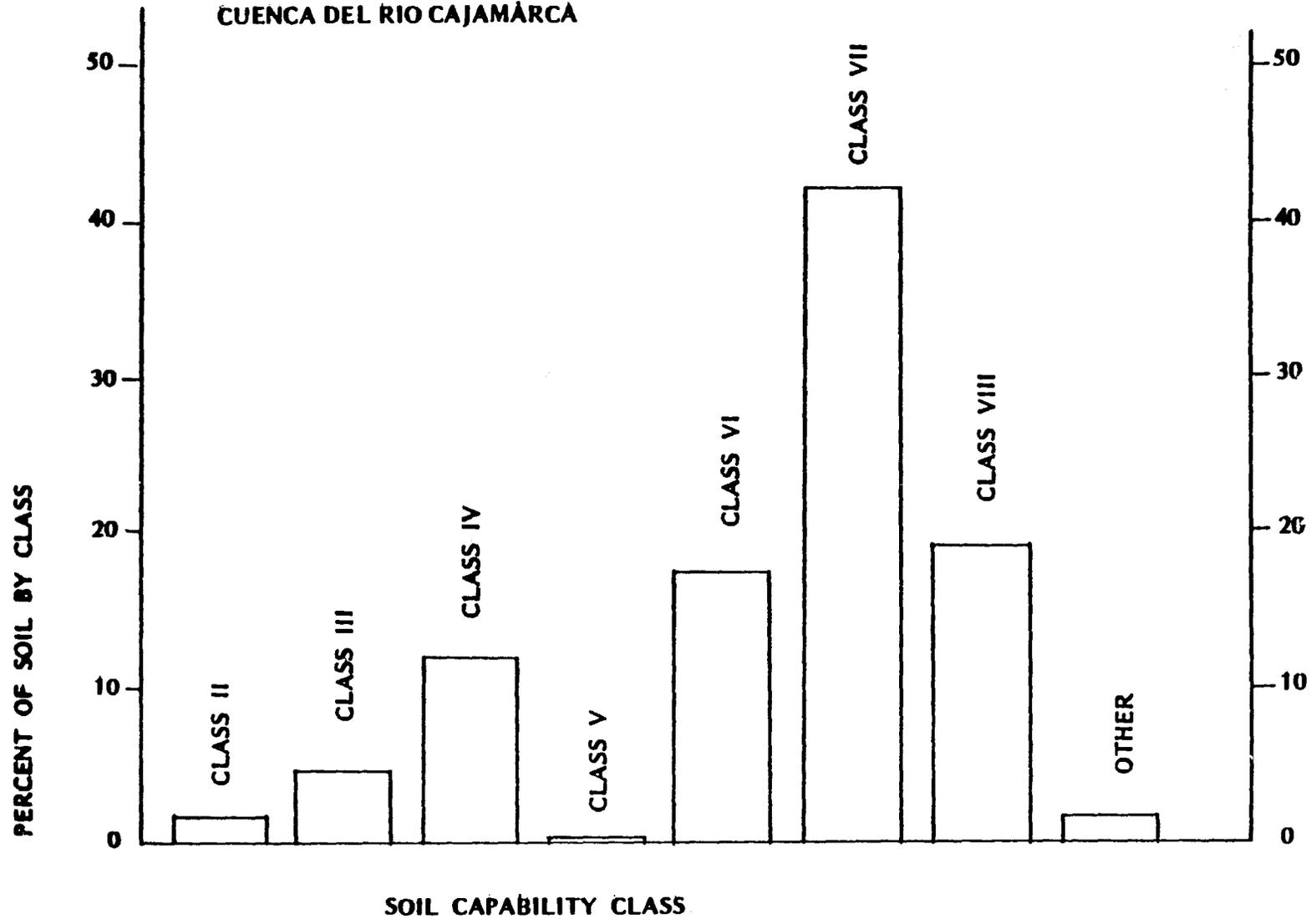
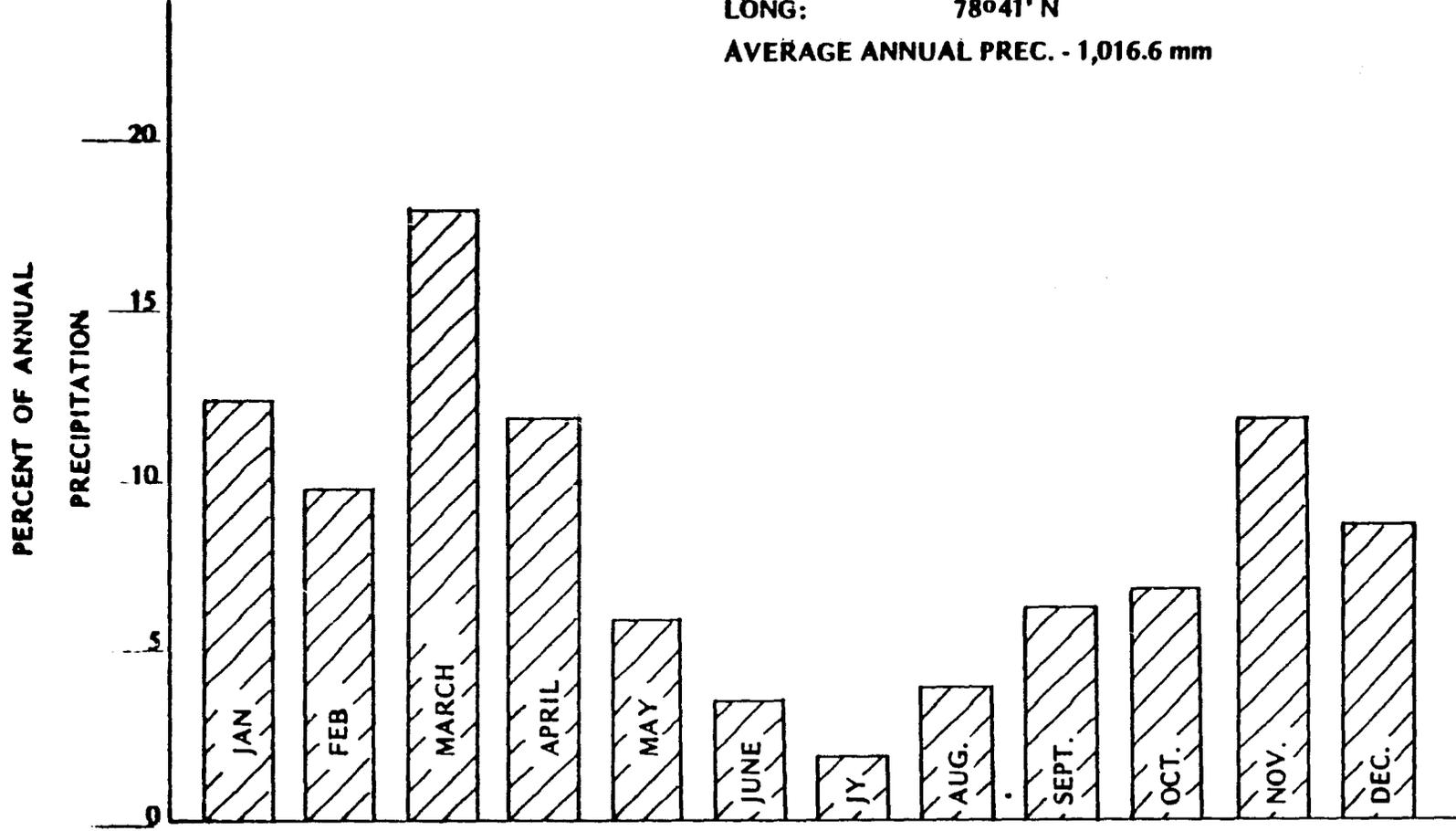


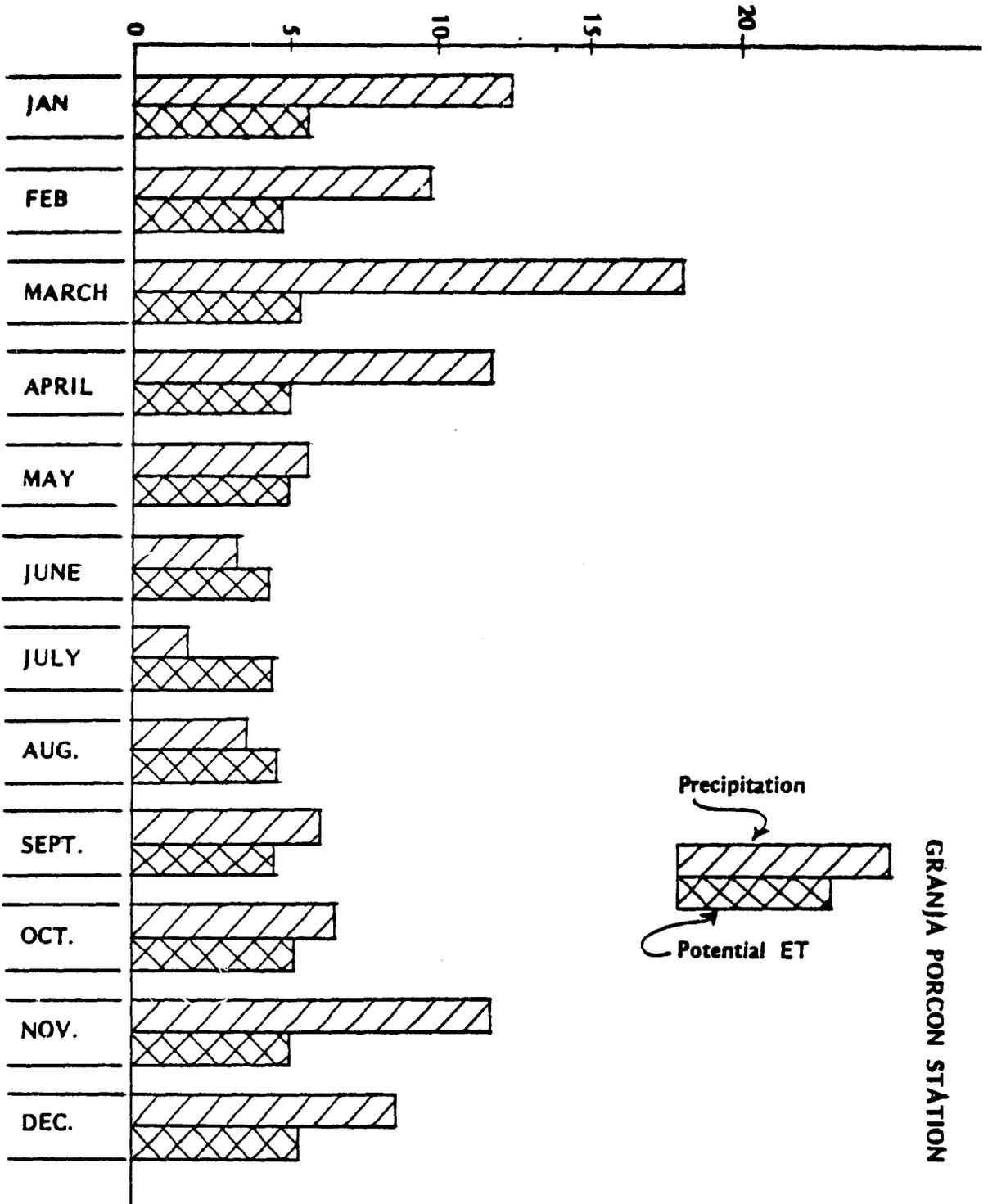
TABLE 6



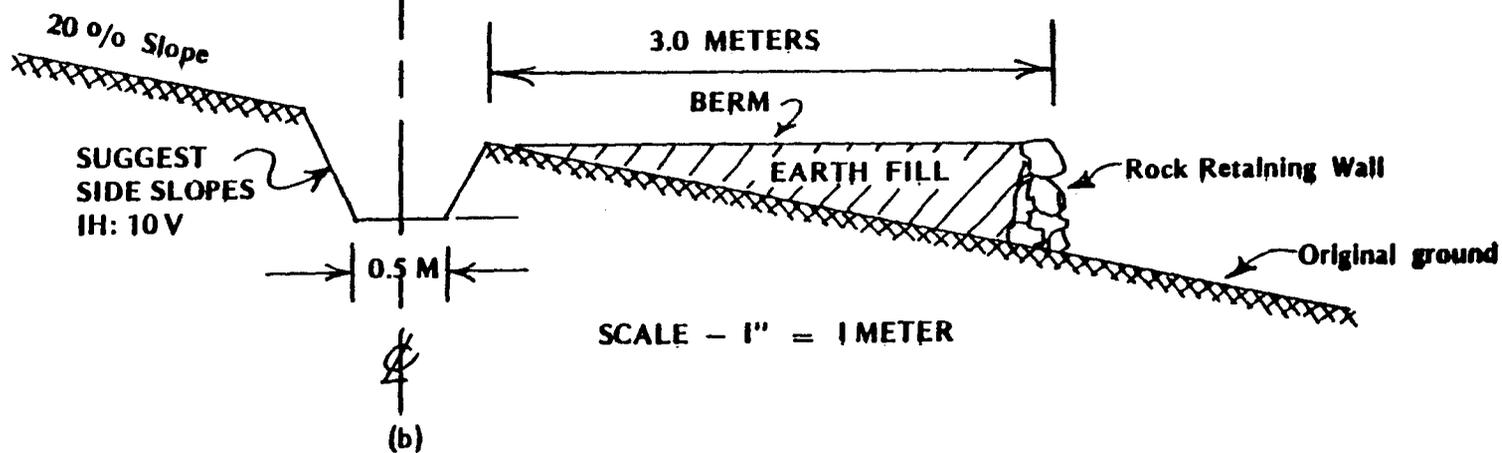
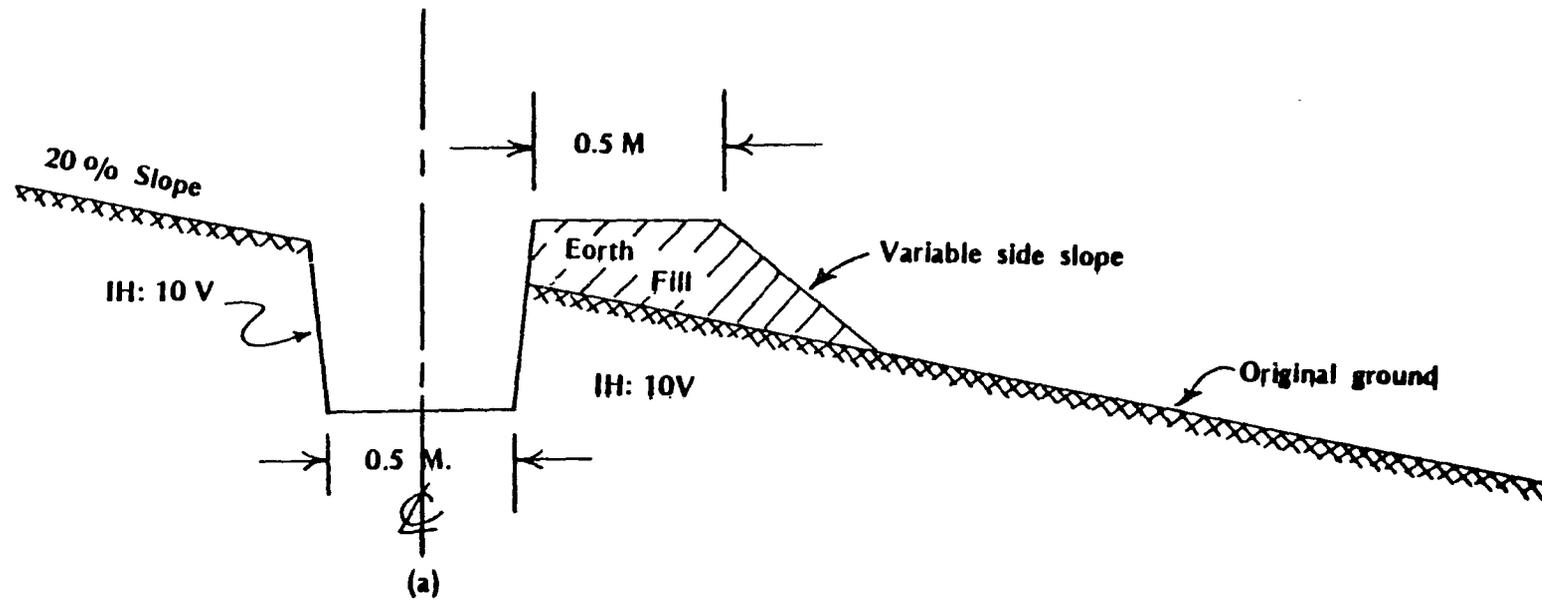
STATION: GRANJA PORCON  
ELEV: 3000 M  
RECORD: 1970-77  
LAT: 07°22' S  
LONG: 78°41' N  
AVERAGE ANNUAL PREC. - 1,016.6 mm

TABLE 7

MEAN MONTHLY  
PRECIPITATION OR POTENTIAL  
EVAPO-TRANSPIRATION (cm)



GRANJA PORCON STATION



TERRACE TYPES

Program in the Cajamarca area whereby laborers are employed to build terraces. Even with this drought program there are still campesinos looking for work. In order to accomplish the land development goal of the project, approximately 85 laborers will be required, working an average of 200 days per year, over the three year project life.

The selected technology must be technically sound. For example, terrace spacing should not be chosen arbitrarily. They should be designed on the basis of a runoff tied to a recurrence interval. Reported 24 hour rainfall events should be analyzed to determine the short interval intensity distribution throughout the entire event time period. Precipitation frequency, intensity distribution, and soils infiltration data should be integrated into a runoff prediction equation. The equation will necessarily be subject to revision as more data becomes available. However, it is desirable to put mechanical conservation system design on a locally adapted scientific basis. A U.S. hydrologist should be utilized on a 60 day TDY to develop the runoff data and this should be done during the first year of project implementation.

### 3. Discussion of Alternate Technologies to be Field Tested

In some cases it would be impossible, and in all cases undesirable, to attempt to transfer mechanical erosion control technology now used in the United States to Peru. The terraces now being constructed in the Cajamarca Area are proving to be effective. However, at the present time terrace spacing is not based on any technical rational criteria. The terrace currently being built consists of a contour ditch with extremely steep side slopes and the excavation placed down-slope from the ditch to form a 0.5 m. wide unsupported berm. All terraces observed were on level grades (See Table 8). These construction techniques have not been tested in a normal or excessive precipitation year and some failures will probably occur when rainfall returns to normal. A more appropriate type terrace, which is not as widely utilized in the area, is being constructed and consists of a contour ditch with the excavated material placed in a 3 meter wide level berm on the downslope side of the ditch. The berm is supported by a rock retaining wall. Not only should this terrace provide erosion control, if properly spaced, but the water in the ditch should also infiltrate into the berm. This 3 meter wide berm will receive ample moisture and will be an excellent location to plant high-value, high wateruse crops.

Terraces or diversions are also needed on the pasture areas. Where runoff storage sites are present, the terraces could be constructed on a mild grade (about 0.05% - 0.10%). Part of the runoff from the heavy rainfalls would go into storage and lighter rainfalls would infiltrate into the soil. Pasture land treatment demonstrations should include terraces, alternate species, rotation and deferred grazing, weed control, and a fertility program. Valuable guidance on this aspect of the project can be obtained from the proposed TDY Agronomist.

In addition to the excessive sheet and rill erosion occurring on both cropland and pasture land, gully erosion is also taking place.

Small rock overfall structures with adequate filters should be demonstrated and evaluated. These would be inexpensive structures and several vertical-horizontal ratios could be demonstrated for a minimal cost. Original costs versus operations and maintenance costs should be gathered to determine the optimum cost designs. Where possible these grade stabilization structures can be combined with beneficial runoff storage.

Vegetated waterways should also be tried on the project area to provide for stable terrace outlets. Conservation cropping systems should be demonstrated and evaluated as well as, and in conjunction with, fertility programs.

As previously mentioned, rainfall is highly variable with some droughts lasting several years and periods of deficient rainfall for several months even in a normal year. Any opportunity to put runoff to beneficial use should be taken, particularly when this can be accomplished in conjunction with erosion control. As indicated in Figure 1, almost 20 percent of the watershed area consists of Class VIII land. This land has minimal evapotranspiration requirements, a relatively impervious surface, and is in the higher rainfall area of the watershed. The largest runoff per unit area comes from these Class VIII lands and proceeds to the river. This runoff at the present time, is more of a curse than a blessing. Waterharvesting techniques and small constructed ponds should be utilized to store the runoff close of its origin and put it to use supplementing precipitation for crop production.

One water conservation technique that should be demonstrated and evaluated is a series of corrugations between terraces or pasture land. The corrugations should be semi-circular in shape with a depth of about 4 centimeters and a top width of about 10 centimeters. Different spacing should be demonstrated on soil capability classes VI and VII land. Alternate species should be evaluated.

Because of the large variability in precipitation, watersupply storage opportunities should be exploited. These water supply pools would not be large and could be used for irrigation, domestic water, livestock water, and fire protection. Water runoff from the contributing areas can be evaluated both qualitatively and quantitatively.

#### 4. Discussion of Levels, Types of Technical Assistance and Training to be Provided.

The objectives of this technical assistance grant can be achieved with one long-term (36 months) U.S. consultant, six short-term U.S. consultants, and a local-hire team of seven Peruvian professionals.

The long term U.S. consultant, hereafter referred to as the Soil Conservationist, should be located in Lima, and be the primary catalyst for the Institutional Development and Organization Component of the grant. In addition, the incumbent should provide guidance to the Peruvian team located on the Pilot Project and advice to the Director General

of Water and Soil on related problem throughout Peru. The Soil Conservationist should also coordinate soil conservation training activities under this grant. For suggested personnel requirements for this position and others included in this technical assistance grant, and a listing of the proposed personnel needs, see Annex

The TDY U.S. Hydrologist would be responsible for developing a runoff prediction equation for the highland areas of Peru. It is suggested that the TDY U.S. Economist be utilized on three 30-day assignments spaced throughout the three year project period. During these TDYs, assistance and direction will be given to the local hire economist regarding cost-return and other appropriate studies.

A U.S. Erosion Control Engineer is required on a short-term assignment to assess the mechanical erosion control aspects of the Pilot Project. This person should evaluate types of practices being installed on the project, make suggestions on new demonstrations, and initiate the development of practice standards and specifications for:

- Level Terraces and Diversions,
- Graded Terraces and Diversions,
- Grassed Waterways,
- Pasture Corrugations,
- Grade Stabilization Structures,
- Water Storage Structures,
- Spring Development.

The TDY should not start until the Hydrologist has developed the runoff prediction equation.

An Agronomist TDY is required early in the Project Life. The Peruvian team will benefit from guidance on conservation cropping systems, alternate specie selection for pasture seeding and grassed waterways, pasture management practices, weed control, and fertility programs.

Standards and specifications should be initiated for the following practices during this TDY:

- Conservation Cropping Systems
- Grass Planting (Pastures and Waterways)
- Pasture Management (Including Fertilizer)

A TDY team consisting of one U.S. Soil Conservationist and one U.S. Agricultural Engineer should be utilized to conduct two 2-week formal training courses at the Pilot Project site. This team should prepare comprehensive lesson plans for the training so it can be repeated by the Peruan team. This TDY should be initiated after the standards and specifications and the runoff prediction equation have been developed.

The training syllabus should be prepared by the Soil Conservationist. Suggested broad topics to be included are:

- Inventorying the Resource Base
- Identifying Problem
- Identifying Constraints
- Formulating Alternate Treatments
- Selecting the Treatment to overcome the problem.

It is essential that a local-hire team be a part of this technical assistance grant. The goals are ambitious and they cannot be met with U.S. specialists only. To meet the land development target and develop the proposed handbooks and technical standards and specifications will require a large amount of data gathering and field work. This can best be accomplished by a technically well qualified, motivated, team who can communicate with the local populace.

The proposed Peruvian team should be headed by a Project Leader or Coordinator located in Lima. This Project Leader would be the alter ego of the Soil Conservationist, assisting in coordinating the work on the pilot project area and other areas in Peru. This person could expedite the preparation of manuals, evaluations, and technical bulletins. This position will require a highly qualified Peruvian scientist who is experienced in management.

The Project Coordinator can be assisted by either the proposed Agricultural Economist or Senior Agricultural Engineer. These people should be located at Cajamarca and supported by two junior engineers for practice layout, a rural sociologist for socio-cultural studies, and a soil scientist to identify the taxonomic units associated with each demonstration.

The Peruvian team should provide informal on the job type training at the Pilot Project during the three years.

The Dirección de Manejo de Cuencas should serve as the GOP counterpart to the Soil Conservationist. This position is currently vacant. When the position is filled, and, if the person selected can communicate in English, a participant training opportunity in the U.S. should be provided for in the T/A grant. This training should consist of a through indoctrination of the U.S. Soil Conservation Service at the national, technical service center, state, and field levels.

In addition to the technical assistance covered by the scope of this grant, there is another opportunity for technical assistance which should be beneficial. In PASA AG/DSB-1129-5-79 there is an item on Soil Management Support Services. This PASA is funded by AID/W and implemented by the Soil Conservation Service through a contract with AID. It provides for technical assistance for as long as 6 weeks to countries in several subject areas. These services are provided at no cost

to assist countries in program planning, project review, and training in soil fertility, soil survey, soil classification, soil and water conservation, land use planning and other activities related to natural resource inventories and planning.

B. Administrative Analysis

1. Ministry of Agriculture and Food (MAA)

Decree Law N° 22 232 of July 11th, 1978, approved a new organizational law for the MinAg/F. 1/ The MinAg/F is the GOP agency directly concerned with the conservation, improvement and efficient use of renewable agricultural resources. According to the organizational law the MinAg/F has responsibilities for agricultural, range, forest and marginal lands; for water in rivers, lakes and any other aquifer; for forest flora and wildlife; for crops and livestock; and for investments and activities concerned with conservation and rational use of such resources.

Organizationally at the national level, the MinAg/F has five General Directorates with clear lines of internal responsibility: See Annex III (a)

- General Directorate of Land Reform and Rural Settlement (DGRA)
- General Directorate of Agriculture and Livestock (DGA y C)
- General Directorate of Agricultural Commerce (DGC)
- General Directorate of Water and Soil (DGAS) 2/
- General Directorate of Forestry and Wildlife.

The Ministry is organized in two Direcciones Superiores (Vice-Ministry): Technical and Administrative. 3/ The DGAS reports to the Technical Director Superior, together with the Oficina General Office of Irrigation, National Program of Small and Medium Irrigation (PNPMI), PLANREHATIC and Special Irrigation Projects.

The five General Directorates are responsible for proposing alternative policies, plans, programs and investment projects. They plan activities for national, regional and local levels, and also control, supervise and coordinate these activities. Recently the chiefs of these units have received an important new delegation of authority, decentralizing administrative actions from the Director Superior level. Simultaneously, however, their authority and responsibilities at the regional level has been somewhat reduced with GOP commitment to decentralization and the

1/ Formerly Ministry of Agriculture and Ministry of Food.

2/ Previously the General Directorate of Water (DGA)

3/ The DGAS has been transferred from the Dirección Superior Administrativa to the Dirección Superior Técnica on December 26, 1979 (R.M. #01737-79-AA-DGAS).

creation of Regional Development Organizations (ORDES). Although the decentralization is still undergoing changes as it stands now, the national leadership role that each of General Directorates will have will depend at present directly on their ability to deal with each ORDE, their technical proficiency, the quality of their programs, projects and the development of sound, standards, and criteria. It is expected that the relationships between the General Directorate and the Agricultural Regions will be more clearly defined shortly, as each ORDE becomes better organized and as each General Directorate improves its staff.

At the regional level the MinAg/F operates through Agricultural Regions (RA). The RA's are administratively responsible to the Regional Development Organizations (Organismos Regionales de Desarrollo - ORDE). Each RA has Sub-Directorates representing each General Directorate at regional level. The RAs also have three operating units at the zonal level: Agricultural Districts, Water Districts and Forestry Districts. These Districts are the first level management and authority of the MinAg/F.

The MinAg/F and ORDEs also have a strong program of investments projects. Most of these projects have special administrative and organizational units and play an important role in the development of the above listed Districts. The coordination between the Regional Units and the Investment Projects Units varies substantially according to the level of the project and people involved.

Conservation of soil and water resources is the responsibility at the national level of the Directorate of Watershed Management of the DGAS; at the regional level by the Sub-directorate of Water and Soil; and at the zonal level by the department of management and conservation of each water districts.

## 2. General Directorate of Water and Soil (DGAS)

The Organizational Law of the Agricultural and Food Sector places DGAS in charge of the conservation and efficient use of water resources and the conservation of agricultural and range lands. Specific objectives of the DGAS are:

- i) The efficient administration and allocation of water;
- ii) The conservation of soils, land reclamation, watershed management, flood and drought control;
- iii) The operation, maintenance and maintenance and improvement of the hydraulic structures;
- iv) The establishment of water tariffs and quotas;
- v) The organization of farmers and campesinos in operating units;

vi) The implementation of short, medium and long term planning for the development of water districts.

DGAS prepares, executes and evaluates water utilization programs. It also engages in programs for the improvement of water districts, including watershed management, improvement of irrigation and drainage infrastructure, land reclamation and improvement, soil conservation, flood control, drought control and groundwater studies among others.

The DGAS is also involved in training and extension programs at the national, regional and local levels. The organization of the DGAS appears in Annex II, Exhibit b. The DGAS has at present two investment projects: Manejo de Cuencas (Watershed Management) and Ampliación de la Frontera Agrícola (Increase in Agricultural Lands) primarily through the provision of ground water.

The Director General is also a member of the board of Directors of the National Agricultural Research Institute (INIA) and as such has an opportunity to influence research in the field of soil and water conservation and use. The Director General has similar opportunities as President of the Superior Water Council, as a member of the National Commission of the Water Resources Plan of the National Planning Institute (INP), and also as a member of the Board of Directors of the principal water resources development investment projects.

### 3. Directorate of Watershed Management (DMC)

The Directorate of Watershed Management (Dirección de Manejo de Cuencas - DMC) is the unit of the DGAS directly involved in soil and water conservation activities (prior to 1978 it was known as DIPRECO). It functions at the national level. Previously the main function of the Directorate was to inventory, analyze and implement projects related to rehabilitation of agricultural lands affected by salinity and drainage problems in the coastal region and to improve existing and implement new small scale irrigation projects. At present the DMC's major concern is to develop Departments of Soil and Water Conservation and Management in each Water District (which include an area of one or more watersheds) in the Sierra, as well as to implement a national soil conservation program. The DMC has two sub-Directorates: Watershed Analysis and Soil Conservation. It is composed of engineers, nondegree specialists and clerical workers.

Other functions of the DMC are to promote the development of pilot watershed 1/ projects and organize courses on soil conservation and watershed management, promote soil conservation and watershed management projects at the regional level (which by law should be coordinated with the General Directorate of Forestry and Wildlife) request international

1/ DMC has requested support from FAO for hydro-meteorological equipment to implement the San Lucas Pilot Watershed Project in Cajamarca and from the Canadian International Development Agency (CIDA) to implement the Andahuaylas Pilot Watershed Project in Cuzco.

technical assistance, publish technical bulletins and manuals do detailed soil studies and climatic evaluations, prepare flood control programs and keep a record of all the activities in soil and water conservation in each main watershed.

#### 4. Watershed Management Investment Project (PMC)

The implementing unit of the DGAS in Watershed Management is the Programa de Manejo de Cuencas (PMC). The PMC has as its main functions: i) to identify, evaluate and prioritize investment projects for the improvement of soil and water conservation activities in small watersheds in the Sierra and Ceja de Selva regions; ii) to promote watershed development and management activities in the Sierra region; iii) to assist local projects oriented to the improvement of irrigation schemes and other related water development activities. The projects identified by this unit are implemented and executed by the zonal offices.

The studies, and project identifications are being done in close relationship with the local agencies (Water Districts and Regional Development Projects) through formal agreements. At present they are carrying out a project in the Chumbao Watershed (Andahuaylas) and Illpa Watershed (Puno). The staff for the project is listed in Annex .

The Sub-Directorate of Water and Soils is in charge of the local Water Districts, and all activities concerning water and soil conservation and use, including local investment projects. It is technically responsible to the DGAS. ORDELAM also has a special unit named ORPI in charge of investment projects which are mainly related to soil and water resource development.

#### 5. Water Districts (D.R.)

Even though the Water Districts are called Distritos de Riego (irrigation districts) their responsibility is not only for the irrigated lands and the agricultural use of water, but for multipurpose uses of water for all the watershed area. 1/ The head of this unit is the Administrador Técnico del Distrito de Riego (ATDR) and according to the water law is the primary water authority as well as the primary authority on soil conservation in irrigated, rainfed and rageland areas.

Functions of the ATDR are:

- i) Manage soil and water resources.
- ii) Formulate plans for the operation and maintenance of the hydraulics structures.

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1/ The denomination Distrito de Riego has been transferred from Mexico but the Peruvian water law has assigned to them more comprehensive functions. They should be named Water Districts or Soil & Water Districts.

iii) Promote and organize the water users and keep a control on water permits and distribution.

iv) Keep statistical records on water discharge, water in reservoirs, groundwater levels and others.

v) Promote and organize the users of soil conservation activities.

vi) Conduct other specific activities related to water and soil conservation and development.

### C. Economic Analysis

#### 1. Economic Overview

The proposed pilot soil conservation project is intended to shed light on several key economic issues. Foremost among these is whether the economic benefits of programs of this nature will be large enough to persuade the GOP that large investments in soil and water conservation in the sierra will justify the costs. Equally important, the Project will lay the ground work for farm budget analysis to determine whether on-farm benefits are sufficient to warrant farmer participation and support.

The Project will also help focus future efforts on the types of conservation activities that are most cost effective for each different soil situation. During the course of Project Execution the GOP and USAID will have the opportunity to study whether or not structures should play a large role in soil and water conservation or whether vegetative controls are more appropriate to Peruvian conditions. The Project will also give the GOP an opportunity to determine whether or not investments of this sort will encourage development in areas which currently have significant outmigration.

There are also some less obvious economic benefits deriving from conservation activities (e.g., making more water available during dry periods or protecting water supplies from sedimentation) which the proposed Project will assess during implementation and through periodic evaluations.

Technically, Peru is extremely well situated for investigating these important economic questions. Peru's soils data include semi-detailed soil taxonomy maps for part of the project area and for a third of the rest of the country. Soils are grouped according to soils class and rough yield estimates can be developed for each soil class similar to what is used in economic studies in the U.S. Although programming models are beyond the scope of the present Project, the data base which will be built up during its execution will be extremely useful as it

will then be easy to generalize from the Project and to build economic considerations into manuals for similar sierra projects. It will also afford the GOP with a basis upon which to calculate costs of projects for different locations using different approaches to conservation. Thus, the GOP will be in a much better position to evaluate alternative approaches to soil conservation and be able to calculate, with much more precision than current technology allow, where the greatest economic potential lies. Data concerning benefit and cost variables are crucial for Peru in the development of manuals of suitable conservation practices. Cost and yield estimates will be developed for groups of soils and different size farm parcels that have similar production potential and similar management needs.

Peru's conservation work has traditionally been concentrated on forest planting programs. The benefits of these programs include raising groundwater levels, erosion reduction and the promotion of regional development resulting from expansion of wood industry. Generally such programs have been considered economically beneficial since studies indicate positive benefit/cost ratio. <sup>1/</sup> The economic viability of these projects enhances regional development because employment results not only from the original tree planting and road building stages, but throughout the years to come, as trees are harvested.

The Project aims at providing more integrated approach to conservation. One approach that has been considered would use trees to conserve water at the upper end of the watershed, improve pasture and vegetative cover below this by replacing steep and unproductive cropland with terraces.

Each part of the system developed for different regions with specific soil properties must prove itself with positive benefit/cost ratios. It may be possible that replacing crops on very steep land with improved pasture may be as cost effective as the forestry practices further up the watershed, while the structures for protecting cropland may on the other hand, be more costly than allowing some erosion on these lands.

The pilot study will place emphasis on the economic components of each study, since these are so important to decisions concerning what new directions future GOP conservation programs will take. Failure to confront economic realities at this stage could lead to the development of skills and techniques, and even a conservation ideology which will be frustrated over time by lack of farmer interest if microeconomic considerations (i.e. returns to the farmer) are not demonstrated.

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<sup>1/</sup> FAO-UNESCO, "Pilot Watershed Investigations in Peru and Ecuador, 1978. Findings are also supported by the GOP National Planning Institute "Estudio Socio-Económico del Modelo Aylambo", 1977.

## 2. Approaches Toward Measuring Benefits and Costs

Measuring the costs of conservation practices implemented under the pilot projects is straightforward and will not be discussed here; expenditures on each aspect of the project will simply be recorded as the project progresses. Benefits on conservation practices are, on the other hand, somewhat more difficult to measure.

The classic problem of anticipating or estimating soil conservation benefits is that the main benefits occur over long periods of time as soil productivity is preserved by maintaining the thickness of the productive topsoil. These benefits obviously cannot be monitored directly in a project that will be implemented over a three year period. Where there is very detailed research available on soil depth and soil productivity relationships, it is possible to project economic benefits based on estimates of the reduction in erosion. However, such information is not available in Peru. (Nor is it available practically anywhere else in the developing world).

Yet, there remain some very good prospects for documenting some of the most important benefits of soil conservation. This is because several of the practices offer some immediate benefits that are not difficult to estimate. For instance, an expert on range management can estimate the increases in forage yield which results as a product of practices to conserve soil and moisture by increasing pasture cover. Although some of the increases in forage from these practices will take more than three years to be realized, again a range management expert can make projections of what these yield increases will be, and then be converted to monetary equivalents. To the extent that these practices are to be emphasized in the pilot project, it is important that the project's economist be experienced in pasture and range management economics.

Methods for estimating the economic benefits of forestry practices need not be described at length here, because two studies have already been cited that have demonstrated the favorable benefit/cost ratios for forestry practices. What remains is to document in a more descriptive sense the ways that these practices can be integrated into a system for protecting a watershed.

The structures for protecting cropland are expected to be the most difficult to justify in an economic sense, although this may be partly due to the lack of information anywhere in the world on the long term benefits of these practices. To the extent that terraces increase the immediate availability of moisture, this particular source of increased yields may be observed as in the case for pasture improvement practices.

What an economist primarily can do is estimate what future yield increases would be required to justify an investment in terraces. Using such estimates, one can make reasonable assumptions about what kinds of terraces expenditures are justified. This will be done before the pilot

project selects a strategy for protecting cropland. As the Project is carried out, it will then be possible to verify that the structures can be built within the financial limits that have been identified as reasonable based on the productivity of the soils.

For example in a terracing project currently near Cajamarca, the cost of labor alone is over \$700 hectare. This figure does not include the costs of technical help, tools and supervision. Although these terraces are capable to conserving water, raising yields and protecting soil productivity over time, these soils are not yielding enough to economically justify the investment. A GOP incentive program will however be investigated as part of this Project which will study means to encourage adoption of soil conservation techniques through such devices as Food for Work, etc.

Consider the production capability of the average cropland in Cajamarca. Gross receipts per hectare in 1973/1974 according to ONRA data that is also quoted in the FAO study average about \$60 per hectare, (based on the lowest cost terraces being built in Cajamarca) the yearly increase in receipts needed to amortize this expenditure over on assumed twenty year life of project is \$13.80; this would require a rather discouraging 23 percent increase over present yields just to cover labor costs. A higher initial soil productivity would clearly have made it easier to justify this kind of expenditure. Since high yielding soils are not available in the area, the Cajamarca project must concentrate on seeking very low cost means of protecting cropland, or else concentrate on seeking very low cost means of protecting cropland, or else concentrate on the other parts of the watershed.

The above examples indicate how presently many soil conservation projects in Peru are being undertaken which do not represent an efficient allocation of resources. The proposed Project will assist in creating a data base which will allow planners to effectively measure economic benefits before committing financial resources.

The Cajamarca examples do, however, indicate some of the techniques that an economist can use to evaluate the success of different aspects of the project, while also guiding the project toward those techniques that are most likely to yield success.

#### D. Social Analysis

##### 1. Social Structure Overview of Target Population

The associative enterprise members and small-scale individuals farmers who comprise the primary target population of the proposed Project are by no means a homogenous social grouping. Their heterogeneity is evidenced by examining two key factors:

a. Ethnic composition/language

At the risk of over-generalization, we can generally divide the target farmer population into two distinct ethnic groupings, Indian (principally Quechua-speakers) and Mestizo (principally Spanish-speakers). The Indian/Quechua population is primarily concentrated in the Southern Sierra, or mancha india area of Peru, with lesser concentrations in parts of the Central Sierra. This population is considered to be the poorest in Peru; illiteracy rates frequently are above 70%; they have virtually no access to on-going extension or education programs of the GOP because of language isolation; per capital income averages an estimated \$75 per year, and many families virtually have no cash income, relying on self-sustenance farming and barter. The Quechua-speaking population is, on the other hand, a much more cohesive unit than their mestizo counterparts. The majority of Southern Sierra Indians are grouped into indigenous communities, many of which have been in continuous existence for well over 200 years. There is a strong family and community social structure. This provides a sense of stability among community members, but also frequently acts as a hindrance to adopting new social and economic practices, since the older members of the community -- usually those with the least amount of education and exposure to the modern world -- are those which make community decisions, including those related to farm practices.

The second broad grouping, the mestizo/Spanish ethnic population, is the more populous in the Central and Northern Sierra and the high jungle. Most are small freeholders or members of associative enterprises created as a result of the Agrarian Reform process. While many have some roots back in indigenous communities, the majority have no real tribal or communal identification; this lack of identification has created some very real problems in the entire Agrarian Reform, since most attempts to create an atmosphere of "worker solidarity" among its beneficiaries have met with little success, and farm workers will tend to perceive their own best welfare in terms of individual rewards instead of collective benefits. The mestizo/Spanish population does, however, possess many advantages which the Indian population groupings do not. First, they have, by reason of language and higher degree of literacy, far greater access to dissemination efforts of the MAF -- through radio, extension visits, and promotional literature distributed either by the MAF or commercial distributors of agriculture inputs, they have a much closer contact with the modern sector. Second, the very lack of community cohesion acts to allow for a far greater degree of individual innovation/experimentation, since farm cultural practices are not carried out on a communal basis. If a small farmer wishes to experiment with new seed varieties, agro--input mixes, new soil and water conservation techniques, or even new cropping patterns, there is little if any social pressure put on him to conform to general practices in the area.

b. Geographic location

The target area to be served by the Project comprises a portion of the northern sierra. The sierra is characterized by both

climatic and geographic extremes, relatively small extensions or contiguous land, and while transport and communications are comparatively good in the major interconnecting valleys, access to highland areas is extremely difficult, often requiring several hours -- or in extremely remote areas, several days -- on horseback or foot to reach producer areas. In recent decades, the sierra has seen a rapid growth in the phenomenon of market towns, which serve as general service centers, for the outlying agricultural hinterlands. Small entrepreneurs have located in these market/towns, providing such services as transportation, provision of agricultural inputs, and serving as marketing middlemen. A system of informal credit has been fostered by these entrepreneurs, who offer pre-harvest credits to small farmers and associative enterprises in return for marketing contracts. While it is clear that the middlemen frequently take a disproportionately large share of profits, they do perform necessary services which the GOP has neither the outreach capacity nor the financial means to perform. The average sierra farmer, then has fairly good, if expensive, access to the commercial amenities of production.

## 2. Project Beneficiaries

The major beneficiaries of the Project will be those 275,000 sierra and high jungle farm families which will ultimately receive information on improved soil and water conservation methodology from the GOP as a result of the Project activities. In the central and northern sierra regions, farmers typically have much lower incomes, though it is difficult to obtain reliable income data. Sociologists and economists from the Catholic University have estimated, as a result of an on-going project in eight southern sierra villages, that as many as 35% of all families may receive no cash income at all, and that the average income is somewhere around half of that in the central and northern sierra areas. Income levels in the high jungle tend to be somewhat higher, averaging around \$250 per capita.

Nutritional status and housing conditions reflect the poverty of the target areas. Data reveals that throughout the sierra the average daily caloric intake is 1,780 compared to 2,264 among coastal residents and 2,600 which is considered to be normal adult requirements. The diet, moreover, is extremely limited, consisting basically of potatoes, corn, rice and other starches; protein deficiency in the sierra is the highest in the country. In the high jungle the diet is more balanced, and caloric intake is probably close to that on the coast. There are, however, severe deficiencies in vitamin A and D. and iodine and potassium.

Housing conditions are also below average in the sierra where it is estimated that 90% of all dwellings, including rural and urban, are substandard; in rural areas, it is likely that this percentage is very close to 100%. A typical dwelling has adobe walls, a tin or straw roof, dirt floors and no windows, the door serving as the only source of light and ventilation. Overcrowded conditions cause major health-related problems, chief of which are tuberculosis and infectious diseases related to lack of

sanitary facilities. High jungle housing conditions reflect the milder climatic conditions, and are combined indoor-outdoor structures. As a result, there is far less crowding than in the sierra, but the lack of potable water and sanitary facilities combined with more exposure to disease-carrying insects has led to much the same health status as in the sierra.

The sierra is affected greatly by out-migration, principally to the already overcrowded coast. Sierra migration typically follow the pattern of farm to sierra urban center, as a first step, and sierra urban to coastal urban as a final step. The low productivity of the typical sierra farm is such that increased population pressure cannot be absorbed in producing areas; younger family members thus migrate at first to the neighboring provincial capital for educational purposes or to find permanent work. When schooling is finished, or the anticipated work opportunities do not materialize, the coast -- the Lima metropolitan area in particular -- has become a magnet, which has produced alarmingly high growth rates in the capital.

### 3. Constraints to Project Success

The average Peruvian small farmer, whether located on the coast, sierra or high jungle, is typified by a very high degree of risk aversion. Because typical income levels are low, almost at the subsistence level, farmers cannot assume the same risks as small commercial or industrial entrepreneurs who have at least modest cash reserves in case of failure. For the vast majority of farmers, failure means bankruptcy and loss of land in the best of cases and literal starvation in the worst. Changing sierra productive patterns, to increase productivity and income, implies subjecting farmers to new risks. Thus Project success will involve: (a) recognizing that risk aversion is an important sociological reality among the target sector; and (b) designing mechanisms within the Project to insure that the farmer's perceived risk is minimized while at the same time inducing them to introduce new on-farm practices which will result in the intended benefits.

The Project contemplates a number of methods to overcome this potential constraint. First, marginal producers will be encouraged under the REE project as well as the proposed Soil Conservation Project to exercise broad cropping options; movement out of subsistence crops into higher income cash crops will occur gradually, thus allowing farmers to witness experimentation results without jeopardizing family food consumption. As results are witnessed by the farmers, both on their own land and that of neighbors, perceived risk will be minimized and further crop substitutions and production practices will be encouraged.

Finally, the Project will finance a rural sociologist who will work with farmer organizations to determine what cultural practices can be readily adapted to immediate use and what practices need to be treated more extensively via the extension outreach personnel.

#### 4. Role of Women

The impact of this Project on women cannot be separated from its impact on the general population. However, to the extent that the trend towards increased female participation continues, the information generated by this Project will result in a more constructive orientation of the role of women in Peruvian Society.

### V. IMPLEMENTATION ARRANGEMENTS

#### A. Schedule of Major Events

##### 1st Year

1. Study of Current Systems
2. Conservation Needs Inventory
3. Work Load Analysis
4. Setting Priorities and Goals
5. Development of detailed 3-year Action Plan
  - a. Training Plan (See Annex III h)
6. Carry Out and Evaluate Trials
7. Establish relations with Universities, Key Organizations and Research Agencies.

##### 2nd Year

1. Development of Information and Conservation Education Program
2. Development of Demonstration Areas
3. Establish Methodology and Build Cost-Benefit Data
4. Develop Standards and Specifications
5. Carry Out and Evaluate Trials and Demonstrations
6. Maintain relations with Universities, Key Organizations and Research Agencies.

##### 3rd Year

1. Publish Technical Manuals and Bulletins
2. Maintain relations with Universities, Key Organizations and Research Agencies
3. Request Funding for Development of a Conservation Project in Cajamarca Area
4. Evaluate Trials and Demonstrations

#### B. Procurement and Disbursement Procedures

##### 1. Procurement Procedures

The selection of consultants and contractors, procurement of equipment and material, shipping and insuring will be done in accordance with standard A.I.D. procedures detailed in the Project Agreement. Goods and services procured under the Grant shall have both their source and origin in countries included in Code 000 of the A.I.D. Geographic Code

The Book and Peru. / U.S. long term technician will be hired under a PASA with USDA. The local hire long term team leader will be contracted directly by the Mission, while all other local T.A. will be contracted by the DGAS. Procurement of supplies and equipment will be direct MinAg/P procurement.

2. Disbursement Procedures

A three-year disbursement period will be required for the Project. No deviation from A.I.D. established disbursement procedures is anticipated. Materials and equipment procured in the United States will be paid through A.I.D.'s standard direct procurement procedures. Disbursement for local currency costs will likewise be made in an established manner acceptable to A.I.D., established with the DGAS.

C. Project Approval Procedures

The proposed Project is funded at a level within the Mission Director's approval authority and will be authorized by him. The Mission's Project Committee consisting of representatives of the Agricultural and Rural Development Office, the Development Resources Office, the Controller's Office and the Regional Legal Advisor will review the Project and recommend its approval to the Director. Signing of the Project Agreement will take place during August.

D. USAID Monitoring Requirements

Monitoring will be exercised by a USAID Project Committee with the following responsibilities:

1. Project Management. The Project Manager for the Project will be assigned from the Mission's Office of Agriculture and Rural Development. The Project Manager will work closely with the DGAS and the technical assistance provided to insure that provisions of the A.I.D. Project Agreement and Implementation Letters are met.
2. Joint Annual Reviews. Joint annual reviews will be an essential feature of Project Implementation, the reviews to be undertaken by A.I.D. and the GOP.
3. The Evaluation Officer from the Program Office will assist in doing the annual evaluations.
4. The Mission Controller will review disbursement/reimbursement requests for conformity with A.I.D. regulations and will ensure that adequate financial controls are followed.
5. Additional Mission offices, such as the Executive Office and RLA, will be called upon as appropriate.

The following reports will be required to assist the Mission in monitoring the Project:

1. A quarterly report on activities and counterpart expenditures completed and projections of activities and counterpart expenditures for the next quarter.

2. An annual implementation plan which will include a projection of project activities for the coming year in addition to an annual operating budget which will include inter alia GOP counterpart allocation and A.I.D. local currency requirements.

E. Evaluation Plan

Joint annual evaluations will be carried out. In addition to checking the evaluation indicators suggested in the Project Logical framework, the annual evaluations will look at the relevance and effectiveness of Project management mechanisms established.

Although the Grant should be signed by August 31, 1980, disbursements are not likely to begin until FY 81. Therefore, the first annual evaluation is not scheduled until August 1981. Between signing and this first evaluation, the Mission will be monitoring progress towards meeting CPs and project implementation; AID/W will be kept informed through Quarterly Project Reports.

ANEXOS

I. LEGAL EXHIBITS

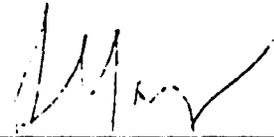
- A. 611 (e) Certification
- B. Grant Application
- C. Draft Authorization
- D. Statutory Checklist
- E. PID Approval Cable
- F. IEE

II. TECHNICAL EXHIBITS

- A. Log Frame
- B. Organization Charts and Listing of Institutions
- C. Supplies and Equipment List
- D. Technical Assistance Costs
- E. T.A. Scopes of Work
- F. Training Outline
- G. Peruvian Water Law (in Mission Files)

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

I, Leonard Yaeger, the principal officer of the Agency for International Development in Peru, having taken into account among other factors the maintenance and utilization of projects in Peru previously financed or assisted by the United States, do hereby certify that in my judgment Peru has both the financial capability and the human resources capability to effectively maintain and utilize the capital assistance project:  
SOIL CONSERVATION



---

Leonard Yaeger,  
Director, USAID/Peru



"Año de los Deberes Ciudadanos"

MINISTERIO DE AGRICULTURA Y ALIMENTACION

Lima, 19 de Agosto de 1980

OFICIO N° 1615/80-AA-DM-DGAS

Señor Leonard Yeager  
Director de la Agencia para el  
Desarrollo Internacional (AID)

Asunto : Solicita Cooperación Técnica para Proyecto  
"Conservación de Suelos" por US \$ 1'000,000.

Tengo el agrado de dirigirme a usted, con el objeto de someter a su consideración una solicitud de Cooperación Técnica para el financiamiento parcial del Proyecto que hemos denominado "Conservación de Suelos en Cuencas Altas" mediante una donación ascendente a la suma de US \$ 1'000,000. Cabe mencionar que la contraparte peruana será de US \$ 340,000 que será cubierta, fundamentalmente, mediante la capacidad instalada de los organismos nacionales que participarán en el Proyecto; asimismo ponemos en su conocimiento, que la Dirección General de Aguas y Suelos del Ministerio a mi cargo será la responsable de llevar adelante el mencionado proyecto.

Los aspectos generales para la formulación del Plan de Operaciones del Proyecto, a ser ejecutado durante tres años, han sido planteados en forma conjunta por funcionarios de la Dirección General de Aguas y Suelos y la Misión del AID, que con tal fin nos visitara en el mes de Abril del presente año. La AID en base a los planteamientos generales antes señalados ha preparado el Plan de Operaciones como documento a negociarse posteriormente con el Ministerio de Agricultura y Alimentación a través de la Dirección General de Aguas y Suelos.

El Proyecto consistirá en la determinación y aplicación de metodologías tendientes a la priorización de cuencas, sub-cuencas y micro cuencas a fin de determinar su situación actual y potencial que permita el establecimiento de políticas e inversiones para la superación de la problemática establecida para el uso racional y conservación de los recursos naturales renovables, iniciándose en algunas de ellas acciones concretas para dicho fin.



MINISTERIO DE AGRICULTURA Y ALIMENTACION

OFICIO N° 1012/80-AA-DM-DGAS

Pág. 2

Asimismo, mediante la aplicación de técnicas específicas en áreas piloto se elaborarán Manuales y Directivas Técnicas para la aplicación de medidas físico-mecánicas, agronómico-culturales y agrastológicas, cuya aplicación sea válida en otras regiones del país. Para todo ello el Proyecto contempla asesoramiento técnico, entrenamiento y adquisición de equipo y materiales.

De contar nuestra solicitud con la aceptación de la AID, nos permitimos sugerir que la adquisición de equipo y material técnico sea realizada a través de los canales de adquisición de la AID.

Agradeciendo anticipadamente la atención que se sirva conceder a la presente solicitud y en espera de su respuesta, me es grato reiterarle a usted los sentimientos de mi mayor consideración.

Dios guarde a usted,

ING. NILS ERICSSON CORREA  
Ministro de Agricultura y Alimentación

DRAFT

PROJECT AUTHORIZATION

Name of Country : Perú  
Name of Project : Soil Conservation  
Number of Project: 527-0220

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Soil Conservation Project for Perú involving planned obligations of not to exceed \$1,000,000 in grant funds over a 3-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.

2. The project consists of institutionalizing a Government of Perú soil and water conservation system, promoting soil and water conservation technical development in Peru, and carrying out a demonstration soil conservation activity.

3. The project agreement, which may be negotiated and executed by the Officers 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, covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

4. a. Source and Origin of Goods and Services

Goods and services, except for ocean shipping financed by A.I.D. under the project, shall have their source and origin in Peru or in the United States, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

b. Conditions Precedent to Disbursement for Project Activities Other than Contracting for the Long-Term U.S. Technical Advisor and the Peruvian Project Team Leader

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement for Project activities other than contracting for the long-term U.S. technical advisor and the Peruvian project team leader, Peru shall furnish in form and substance satisfactory to A.I.D.:

- (a) An operational plan for the life of the Project;
- (b) A time-phased plan for the provision of required counterpart personnel.

c. Conditions Precedent to Disbursement for Pilot Demonstration Activity.

Prior to disbursement, or to issuance by A.I.D. of documentation pursuant to which disbursement will be made, for the pilot demonstration activity under the Project, Peru will, except as the parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., a detailed plan describing activities to be carried out in the area of the pilot demonstration activity.

d. Covenants

Perú covenants:

- (a) to provide necessary financial and technical resources after the termination of A.I.D. financing of the project to provide for the continuing management and implementation of a soil and water conservation system for Perú.

---

Leonard Yaeger  
Director

Date:

Clearance:

CONT:JRDavison: \_\_\_\_\_  
 ARD:JBO'Donnell: \_\_\_\_\_  
 RD:LSchulze: \_\_\_\_\_  
 DR:LATwentymen: \_\_\_\_\_  
 CD:GWachtenheim: \_\_\_\_\_  
 PRG:BKramer: \_\_\_\_\_  
 DD:HDLusk: \_\_\_\_\_

Drafted by:RLA:SWhitman

COUNTRY CHECKLIST

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

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. <u>FAA Sec. 716.</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 a consistent pattern of gross violations of internationally recognized human rights?</p>                                                                                                                                                                                                                                                      | <p>The Department of State has not so determined.</p>                                                                                                                                                                                                                                                                                               |
| <p>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 United States unlawfully?</p> | <p>It has not been so determined. The GOP has an active narcotics control program with USG support.</p>                                                                                                                                                                                                                                             |
| <p>3. <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?</p>                                                                                                                                                                                                                                                                                                                                                                     | <p>The Secretary of State has so determined.</p>                                                                                                                                                                                                                                                                                                    |
| <p>4. <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?</p>                                                                                                                                                                                                               | <p>No such case is known.</p>                                                                                                                                                                                                                                                                                                                       |
| <p>5. <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?</p>                                                                                                                                           | <p>The GOP is fully aware of USG requirements for prompt, adequate, and effective compensation regarding expropriation of US investments. To date there have been several expropriation claims settled to the satisfaction of both Governments, including Marcona Mining Company's claim in September 1976 and the recent Gulf Oil Corp. claim.</p> |

A. 6. FAA Sec. 620(f), 6200, FY 80 App. Act, Sec. 511, 512, 513. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos or Vietnam? Will assistance be provided to Afghanistan or Mozambique without a waiver.

NO.

7. FAA Sec. 620(f). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?

NO.

8. FAA Sec. 620 (1). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?

NO.

9. FAA Sec. 620(f). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, convertibility, or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?

Information not available at Mission.

10. FAA Sec. 620(n); Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters:

Information not available at Mission.

a. has any deduction required by the Fishermen's Protective Act been made?

b. has complete denial of assistance been considered by AID Administrator?

11. FAA Sec. 620; FY 80 App. Act, Sec. 518. (a) Is the government of the recipient country in default for more than 6 months 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?

NO.

12. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, 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

N/A

A.12.

amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, as reported in annual report on implementation of Sec. 620(s)." This report is prepared at time of approval by the Administrator of the Operations Year Budget and can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

13. 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.

14. 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? Information not available at Mission.

15. FAA Sec. 620A, FI or App. Act, Sec. 521. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? Has the country granted sanctuary from prosecution to any individual or group which has committed a war crime? No.

16. FAA Sec. 686. 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.

17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the nonproliferation treaty? No.

FUNDING CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy? Yes.

8.1.

IDC Act of 1979

b. 17A Sec. 104(d)(1) If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban <sup>and</sup> ~~and~~ through community-based development programs which give recognition to people motivated to limit the size of their families.

Only indirectly.

2. Economic Support Fund Country Criteria

a. 17A Sec. 302B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? N/A

b. 17A Sec. 533(b). Will assistance under the Southern Africa program be provided to Mozambique, Angola, Tanzania, or Zambia? If so, has President waived prohibition against the assistance by determining that such assistance will further U.S. foreign policy interests. N/A

c. 17A Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? N/A

d. 17 80 App. Act. Sec. 510 Will assistance be provided for the purpose of aiding directly the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? N/A

e. PL 94-328 Sec 406, 17A Sec. 620B, Will security supporting assistance be furnished to Argentina or Chile? N/A

SC(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 80 App. Act Unnumbered; FAA Sec. 634A; 634(b): (a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure)? Congress will be notified. Project Agreement will not be signed until notification period has expired.
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.
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? N/A
4. FAA Sec. 611(b); FY 80 App. Act Sec. 501: If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973? N/A
5. FAA Sec. 611(e): If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project? N/A
6. FAA Sec. 209: Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. No. Project is specific to Peru.

A.

7. FAA Sec. 601(a). 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.

The Project will improve the technical efficiency of industry and agriculture.

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).

Goods and services under the Project will be supplied, where appropriate, by private contractors from the United States.

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.

The GOP is supplying over 25% of the Project's costs. The AID funds are primarily to provide the foreign exchange costs.

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

No.

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes.

12. 1980 App. Act Sec. 504. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?

N/A

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 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 and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained

The Project will serve the overall development needs of Peru and will encourage agricultural and rural development and the involvement of the poor in such development.

8.1.a.

basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106, 107.  
Is assistance being made available: (include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraphs 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;

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

(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;

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

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

(ii) to help alleviate energy problems;

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

(iv) reconstruction after natural or manmade disaster;

The assistance is being made available for agriculture, rural development, and nutrition, under Section 103 of the FAA. The Project will stress the building of institutions which can be used to serve agricultural development.  
N/A.

N/A

N/A

B.1.D.(4).

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

(vi) 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.

c. [107] Is appropriate effort placed on use of appropriate technology?

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

e. FAM Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to the Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

f. FAM 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 civil education and training in skills required for effective participation in governmental and political processes essential to self-government.

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

2. Development Assistance Project Criteria (Loans Only)

a. FAM Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

b. 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?

The Project is specifically designed to develop, demonstrate, and disseminate technologies appropriate to the needs of the small farmer in Peru.

Yes. The GOP will provide over 25% of the costs of the Project.

The Project does not involve grant capital assistance.

The Project fulfills an expressed GOP need. Peruvians were involved closely in its design. The Project will be carried out through a variety of Peruvian institutions.

Yes, the project is designed to identify technology that will help to increase Peruvian food production. Thus it should directly contribute to the country's self-sustaining economic growth

N/A

N/A

AID NUMBER 3, App AC(2)	YR/MT/DA	EFFECTIVE DATE	PAGE NO.
	3:32	June 7, 1979	5C(2)-5

ANNEX I  
 Exhibit D  
 Page 9 of 12

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a) Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102? N/A

b. FAA Sec. 533. Will assistance under this chapter be used for military, or paramilitary activities? N/A

SC(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

- |                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1. <u>FAA Sec. 602</u> . Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?                                                                                                                                                                                                                                                                        | Yes. AID procedures encouraging small business participation will |
| 2. <u>FAA Sec. 604(a)</u> . Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?                                                                                                                                                                                                                                                              | Yes.                                                              |
| 3. <u>FAA Sec. 604(d)</u> . If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the United States on commodities financed?                                                                                                                                                                                                              | N/A                                                               |
| 4. <u>FAA Sec. 604(e)</u> . If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?                                                                                                                                                                                                          | N/A                                                               |
| 5. <u>FAA Sec. 608(a)</u> . Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?                                                                                                                                                                                                                                                                             | Yes.                                                              |
| 6. <u>FAA Sec. 603</u> . (a) Compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. | Such provision will be written in Project Agreement.              |
| 7. <u>FAA Sec. 621</u> . If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the                                                                                                                                                                                              | Yes.                                                              |

A.7.

facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes.

9. FY 80 App. Act Sec. 505 Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?

Yes, such contracts will.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

N/A

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

N/A

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the United States not exceed \$100 million?

N/A

C. Other Restrictions

1. FAA Sec. 122 (b) If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

N/A

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

N/A

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-bloc countries, contrary to the best interests of the United States?

Yes, arrangements will preclude activities as stated.

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or guaranty of such transaction?

Yes.

AID MANUSCRIPT 3, App 5C(3)	Version used as 3:32	Effective date June 7, 1979	Page no. 5C(3)-3
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5. Will arrangements preclude use of financing
- a. FAA Sec. 104(f). To pay for performance of abortions or to motivate or coerce persons to practice abortions, to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to undergo sterilization?
  - b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property?
  - c. FAA Sec. 660. To finance police training or other law enforcement assistance, except for narcotics programs?
  - d. IAA Sec. 662. For CIA activities?
  - e. FY 80 App. Act Sec. 504 To pay pensions, etc., for military personnel?
  - f. FY 90 App. Act Sec. 506 To pay U.N. assessments?
  - g. FY 80 App. Act Sec. 507 To carry out provisions of FAA sections 205(d) (Transfer of FAA funds to multilateral organizations for lending.)
  - h. FY 79 App. Act Sec. 112. To finance the export of nuclear equipment, fuel, or technology or to train foreign nations in nuclear fields?
  - i. FY 79 App. Act Sec. 601. To be used for publicity on propaganda purposes within United States not authorized by the Congress?

Arrangements preclude the financing of all items listed.

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ACTION: AID-2

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DATE:	<i>10/1</i>
INITIALS:	<i>[Signature]</i>

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 PP RUESLM  
 DE RUEHC #2539/31 2592556  
 ZNR UUUU ZZE  
 P 252252Z SEP 79  
 FM SECSTATE WASHDC  
 TO AMEMBASSY LIMA PRIORITY 1299-1300  
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 UNCLAS SECTION 31 OF 72 STATE 252539/31

ACTION:	<i>CS</i>
Info:	<i>AKO - ENUGRI</i>
	<i>CHIEF - PIRG</i>
	<i>D</i>
	<i>OO</i>

AIDAC  
 E.O. 12065 v/A  
 TAGS:

SUBJECT: REVIEW OF LAND USE INVENTORY AND ENVIRONMENTAL  
 PLANNING PID AND SOIL CONSERVATION PID

A. THE SUBJECT PID'S WERE REVIEWED BY THE DAEC ON AUGUST  
 27, 1979. GUIDANCE FOR PP DEVELOPMENT IS GIVEN BELOW FOR  
 EACH PID.

B. LAND USE INVENTORY AND ENVIRONMENTAL PLANNING (ONERN)

1. THE PID IS APPROVED AND FURTHER PROJECT DEVELOPMENT AU-  
 THORIZED, SUBJECT TO SUBMISSION AND APPROVAL OF AN INTERIM  
 REPORT, OR DISCUSSION PAPER, WHICH CLEARLY ARTICULATES THE  
 PROJECT PURPOSE (SEE DISCUSSION BELOW).

2. PROJECT PURPOSE AND DESIGN: THE PROJECT PURPOSE .  
 APPEARED TO BE BOTH INFORMATION GATHERING FOR THE IDENTIFI-  
 CATION OF NATURAL RESOURCES AND INSTITUTION-BUILDING FOR  
 ONERN. AS AN INSTITUTION-BUILDING ACTIVITY, CONCERN WAS  
 EXPRESSED REGARDING THE HEAVY INVESTMENT OF PROJECT FUNDS  
 IN NATURAL RESOURCE SURVEYS AND LAND USE CAPABILITIES MAPS,  
 E.G., DOLS. 1.3 MILLION IN THE BUDGET FOR MAPPING PURPOSES.  
 THE RATIONALE FOR DOING BASELINE AND DETAILED RESOURCE  
 STUDIES OF TWO AREAS WAS NOT CLEAR. GIVEN LIMITED RESOURCES,

AND IN LIGHT OF THE AMBIGUITY REGARDING THE PROJECT'S  
 OBJECTIVE, THE MISSION SHOULD SUBMIT AN INTERIM REPORT, OR  
 DISCUSSION PAPER, WHICH CLEARLY ARTICULATES THE PROJECT'S  
 PURPOSE AND DEVELOPS THE RATIONALE FOR INVESTING  
 SUBSTANTIAL PROJECT RESOURCES IN DATA COLLECTION ACTIVITIES.  
 FURTHER, ASSUMING THE RATIONALE CAN BE ESTABLISHED, THE  
 INTERIM REPORT SHOULD ESTABLISH A SERIES OF PRIORITIES OR  
 CRITERIA FOR SELECTING MAPPING SITES AND DISCUSS THE  
 APPROPRIATE LEVEL OF DETAIL (1:50,000; 1:25,000; OR

1:12,300) REQUIRED FOR DIFFERENT PLANNING PURPOSES. THE REPORT SHOULD ALSO EXPLAIN HOW THE PROPOSED MAPPING ACTIVITIES WILL STRENGTHEN ONERN'S INSTITUTIONAL CAPABILITIES RELATING TO PHOTO/SATELLITE INTERPRETATION AND ENVIRONMENTAL PLANNING IN GENERAL. BASICALLY, WE UNDERSTAND THAT ONERN ALREADY HAS SUBSTANTIAL TECHNICAL COMPETENCE IN THE FIELD OF NATURAL RESOURCES INVENTORY AND ENVIRONMENTAL PLANNING. WE WOULD LIKE TO CONSIDER THE PROPOSED PROJECT ACTIVITIES AS ADDRESSING A SECOND LEVEL CONCERN IN INSTITUTION-BUILDING OR, IN OTHER WORDS ENHANCING ONERN'S ABILITY TO COORDINATE EFFECTIVELY NATIONAL PROGRAMS FOR LAND USE. LASTLY, IN ORDER TO INSURE THAT THERE WILL BE NO DUPLICATION WITH THE DATA COLLECTION EFFORTS OF THE MINISTRY OF AGRICULTURE, THE INTERIM REPORT SHOULD DESCRIBE THE RELATIONSHIP OF THE ONERN DATA COLLECTION ACTIVITIES TO THE \$1.0 MILLION PROPOSED FOR AGRICULTURE PLANNING AND STATISTICS WHICH WE UNDERSTAND MAY BE INCLUDED IN THE BY 80 AGRICULTURE EXPANSION AND RESEARCH PROJECT. THE INTERIM REPORT MUST BE SUBMITTED AND REVIEWED BY THE BUREAU BEFORE A DETERMINATION WILL BE MADE REGARDING THE MISSION'S REQUEST TO AUTHORIZE THE PP.

3. INSTITUTIONAL FRAMEWORK: THE PID DID NOT CLEARLY DESCRIBE THE INSTITUTIONAL LINKAGES BETWEEN ONERN (A PLANNING AGENCY) AND THE VARIOUS GOP IMPLEMENTING AGENCIES, INCLUDING THE SECTORAL MINISTRIES. DURING INTENSIVE REVIEW THESE LINKAGES SHOULD BE CLEARLY ESTABLISHED AND PROJECT DESIGN SHOULD INSURE THAT INFORMATION BOTH USEFUL AND NECESSARY FOR GOP IMPLEMENTING AGENCIES' NEEDS BE PRODUCED. CONCERN WAS EXPRESSED THAT ONERN WAS NOT PRESENTLY FULFILLING THE ROLE OF SUPPORT AGENCY TO OTHER GOP MINISTRIES, BUT CHOOSING TO ACT INDEPENDENTLY. THE PP SHOULD ADDRESS THIS CONCERN AND DEVELOP A STRATEGY FOR ACHIEVING GREATER COORDINATION BY ENCOURAGING BETTER COLLABORATION AMONG THE GOP AGENCIES AND ONERN, NOT ONLY IN THE AREA OF ENVIRONMENTAL IMPACT ASSESSMENTS, BUT ALSO IN THE RESOURCE INVENTORY AREA AS WELL. THE ROLE OF THE GOP'S PLANNING OFFICE IN HELPING TO ACHIEVE COORDINATION SHOULD ALSO BE DESCRIBED IN THE PP.

4. TRAINING: THE PID PROPOSES \$110,000 FOR IN-COUNTRY AND U.S. TRAINING IN RESOURCE INVENTORIES AND ENVIRONMENTAL ASSESSMENTS FOR ONERN. DURING INTENSIVE REVIEW THE MISSION SHOULD CONSIDER INCREASING THE LEVEL OF GRANT FUNDING FOR TRAINING ACTIVITIES AND EXAMINE THE MERITS OF TRAINING NOT ONLY ONERN PERSONNEL, BUT ALSO MEMBERS OF OTHER GOP AGENCIES ENGAGED IN UTILIZATION OF ONERN GENERATED INFORMATION IN ORDER TO REINFORCE THE LINKAGES BETWEEN ONERN AND THE IMPLEMENTING-MINISTRIES:

- 4 -

5. BECAUSE OF THE INSTITUTION-BUILDING AND DATA COLLECTION ACTIVITIES, THE IMPACT ON THE TARGET GROUP WILL MOST LIKELY BE INDIPECT. THE PP SHOULD CLEARLY DESCRIBE THE RELATIONSHIP BETWEEN THE PROJECT AND THE TARGET GROUP AND INSURE THE MAXIMUM IMPACT POSSIBLE ON THE RURAL POOR.

C. SOIL CONSERVATION PIE

1. THE PROJECT WAS APPROVED FOR DEVELOPMENT AND AUTHORIZATION BY THE MISSION. THE FOLLOWING ISSUES SHOULD BE CONSIDERED DURING INTENSIVE REVIEW AND ADDRESSED IN THE PP.

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2. PROJECT DESIGN: THE PROJECT WILL FIELD TEST AND ADAPT VARIOUS SOIL CONSERVATION TECHNIQUES IN TWO PILOT REGIONS IN PERU (SIERRA AND HIGH JUNGLE) WHICH MAY BE RECOMMENDED FOR REPLICATION UNDER THE PROPOSED FY 81 WATERSHED MANAGEMENT LOAN. IN ORDER TO INSURE THE ACCEPTANCE OF SOIL CONSERVATION TECHNOLOGIES BY THE TARGET GROUP, QUESTIONS OF SOCIAL FEASIBILITY AND BENEFIT INCIDENCE SHOULD BE ADDRESSED DURING INTENSIVE REVIEW AND IN THE PP. IN ADDITION, BECAUSE THE SOIL CONSERVATION PROGRAMS WILL OPERATE ON BOTH COOPERATIVE HOLDINGS AS WELL AS ON PRIVATE LANDS, THE INTRODUCTION OF THE TECHNOLOGIES TO THESE COMMUNITIES COULD VARY WITH THE DIFFERENT TYPES OF SOCIAL ORGANIZATIONS PRESENT. MOREOVER, THE SOCIOLOGICAL ASPECTS SHOULD BE CONSIDERED WHEN DETERMINING THE INCENTIVES REQUIRED TO INTEREST FARMERS IN SOIL CONSERVATION; THIS IS ESPECIALLY IMPORTANT BECAUSE WIDESPREAD REPLICATION OF THE TECHNOLOGIES IS PROPOSED UNDER THE FY 81 LOAN PROJECT. THE MISSION IS THEREFORE REQUESTED TO CONSIDER THE ADVISABILITY OF ALLOCATING PROJECT RESOURCES WITHIN THE \$2.0 MILLION LOP TO FUND A LONG-TERM ANTHROPOLOGIST OR RURAL SOCIOLOGIST DURING PROJECT IMPLEMENTATION IN ORDER TO PROVIDE TECHNICAL ASSISTANCE IN EVALUATING THESE IMPORTANT SOCIOLOGICAL ASPECTS OF THE FIELD TEST PROGRAM. THE PP SHOULD ALSO DISCUSS THE FULL RANGE OF POSSIBLE SOIL CONSERVATION TECHNOLOGIES (E.G., REVEGETATION, WATER IMPOUNDMENT ETC.) WHICH WILL BE FIELD TESTED UNDER THE PROJECT.

3. SOIL CONSERVATION LAW: THE PP SHOULD CLARIFY THE DEGREE TO WHICH THE PASSAGE OF THIS LAW AFFECTS PROJECT SUCCESS AND DESCRIBE THE IMPACT ON THE PROJECT IF THE LAW IS NOT PROMULGATED. CHRISTOPHER

BT  
#2539

PROJECT : SOILS CONSERVATION PROGRAM

Project N° 527-0220

Attachment to Annex  
Initial Environmental  
Examination (IEE)

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Identification  
and  
Evaluation 1/

Impact Areas and Sub-areas

A. LAND USE

- 1. Changing the character of the land through:
  - a. Increasing the population----- N
  - b. Extracting natural resources----- N
  - c. Land clearing----- N
  - d. Changing soil productivity capacity---- L
- 2. Altering natural defenses----- N
- 3. Foreclosing important uses----- N
- 4. Jeopardizing man or his works----- N
- 5. Other factors----- None

B. WATER QUALITY

- 1. Physical state of water----- N
- 2. Chemical and biological states----- N
- 3. Ecological balance----- N
- 4. Other factors----- None

---

1/ Use the following symbols: N - No environmental impact  
 L - Little environmental impact  
 M - Moderate environmental impact  
 H - High environmental impact  
 U - Unknown environmental impact

- 7 -

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Peru

Project Title: Soil Conservation

Project Number: 527-0220

Funding: First FY 80: \$ 700,000

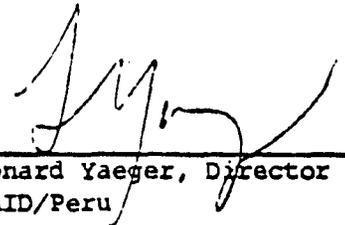
Life of Project: \$2,250,000

IEE Prepared by: Mario Quiroga USAID/Peru  
Environmental Officer

The USAID/Peru project committee for the Soils Conservation Program has undertaken a complete Initial Environmental Examination (IEE) of the project environmental impacts and has arrived at a recommendation for a Negative Determination as indicated in the Threshold Decision Section.

Concurrence: \_\_\_\_\_ Date: \_\_\_\_\_

I have reviewed the Initial Environmental Examination prepared by the Project Committee for the Soils Conservation Program and concur in the Threshold Decision recommendation for a Negative Determination.



\_\_\_\_\_  
Leonard Yaeger, Director  
USAID/Peru

AA/LA Decision:

Based upon the Development Assistance Executive Committee review of the Project Identification Document, including the Initial Environmental Examination for the Soils Conservation Program, I approve the Threshold Decision for a Negative Determination.

\_\_\_\_\_  
Assistant Administrator for  
Latin America

IMPACT IDENTIFICATION AND EVALUATION FORM

C. ATMOSPHERIC

- 1. Air additives \_\_\_\_\_ N
- 2. Air pollution \_\_\_\_\_ N
- 3. Noise pollution \_\_\_\_\_ N
- 4. Other factors \_\_\_\_\_ None

D. NATURAL RESOURCES

- 1. Diversion, altered use of water \_\_\_\_\_ N
- 2. Irreversible, inefficient commitments \_\_\_\_\_ N
- 3. Other factors \_\_\_\_\_ None

E. CULTURAL AND SOCIOECONOMIC

- 1. Altering physical symbols \_\_\_\_\_ N
- 2. Changes of cultural traditions \_\_\_\_\_ L
- 3. Changes in population \_\_\_\_\_ L
- 4. Other factors \_\_\_\_\_ None

F. HEALTH

- 1. Changing a natural environment \_\_\_\_\_ N
- 2. Eliminating an ecosystem \_\_\_\_\_ N
- 3. Other factors \_\_\_\_\_ None

G. GENERAL

- 1. International impacts \_\_\_\_\_ N
- 2. Controversial impacts \_\_\_\_\_ N
- 3. Larger program impacts \_\_\_\_\_ N
- 4. Other factors \_\_\_\_\_ None

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

ANNEX II  
Exhibit A

Life of Project: \_\_\_\_\_ to \_\_\_\_\_  
 From FY 1988 to FY 1991  
 From U.S. Funding Allocation: \_\_\_\_\_  
 Date Prepared: \_\_\_\_\_

Project Title & Number: Soil Conservation

MAJOR PROJECT ELEMENT	QUALITATIVELY MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS																																																				
<p><b>Objective or Impact Goal:</b> The project objective is to <b>improve the quality of life for the rural poor by increasing food production, employment, income and nutritional status.</b></p>	<p><b>Measure of Goal Achievement</b></p> <ul style="list-style-type: none"> <li>Improvements in the rate of growth of the agricultural sector. Reversal of negative trends.</li> <li>Decreasing levels of food imports</li> <li>Higher and more productive employment levels in the rural areas.</li> <li>Increased availability of food supply levels for the rural and urban poor.</li> </ul>	<ul style="list-style-type: none"> <li>National accounts prepared by the Central Reserve Bank.</li> <li>Employment statistics published by the National Office for Statistics.</li> <li>National surveys conducted by GOP agencies.</li> </ul>	<p><b>Assumptions for achieving goal impact:</b></p> <ul style="list-style-type: none"> <li>The GOP continues recognizing the need to foster economic and social development.</li> <li>Investment projects implemented in the National Development Plans, maintain strong leadership in favor of the rural poor.</li> <li>The Development Strategy for the Agricultural Sector includes adequate incentives to reverse negative growth trends.</li> <li>Labor intensive production processes, whenever possible, are favored by the GOP.</li> <li>Political stability prevails.</li> </ul>																																																				
<p><b>Direct Purpose:</b></p> <p>Consolidate, strengthen and institutionalize a GOP soil and water conservation system within the National Directorate of Water and Soils of the Ministry of Agriculture and Food (MINDA/F).</p>	<p><b>Conditions that will ensure purpose has been achieved: End of project status:</b></p> <ul style="list-style-type: none"> <li>Soil and water conservation offices established.</li> <li>A well established and in operation experimental site for the preparation of appropriate soil and water practices.</li> <li>Technical manuals published.</li> <li>farmers actively engaged in good water and soil management practices.</li> <li>MINDA/F technicians trained</li> </ul>	<ul style="list-style-type: none"> <li>Records of the MINDA/F</li> <li>Project Manager monitoring reports</li> <li>Annual joint evaluations</li> <li>Technical manuals issued and distributed by the MINDA/F.</li> <li>Visual inspections</li> </ul>	<p><b>Assumptions for achieving purpose:</b></p> <ul style="list-style-type: none"> <li>A core of MINDA/F technicians are appointed (at least) on full time in the project.</li> <li>Technical assistance available on a timely basis.</li> <li>Timely acquisition of equipment</li> <li>Trained technicians continue working for the MINDA/F once the pilot project is completed.</li> <li>The GOP supports the institutionalization of the system.</li> </ul>																																																				
<p><b>Goal:</b></p> <ul style="list-style-type: none"> <li>Soil and Water Conservation Offices</li> <li>Quantitative Assessments</li> <li>Program for water and soil conservation.</li> <li>An experimental site for the preparation of appropriate soil and water practices.</li> <li>Technical Guide</li> <li>Technical Manuals and bulletins</li> <li>Trained Personnel.</li> </ul>	<p><b>Completion of Outputs:</b></p> <ol style="list-style-type: none"> <li>Established at three different levels: (i) national (all regional and (iii) zonal. Fully staffed and in operation.</li> <li>Miscellaneous in-depth surveys executed thru field testing during the life of the project.</li> <li>One program involving small farmers on a cost-sharing basis.</li> <li>One pilot area of approximately 400 has. in Calamanga.</li> <li>One specific soil and water conservation technical guide for GOP personnel.</li> <li>Miscellaneous sets of technical manuals &amp; bulletins covering criteria &amp; standards for planning resources, study, design &amp; implementation of soil and water conservation practices.</li> <li>Approximately 200 technicians trained thru formal and on-the-job programs.</li> </ol>	<p><b>For 1 to 7</b></p> <ul style="list-style-type: none"> <li>MINDA/F records</li> <li>Publications</li> <li>Project evaluation reports</li> <li>Project Manager monitoring reports</li> <li>USAID records</li> <li>Visual inspections</li> </ul>	<p><b>Assumptions for achieving output:</b></p> <ul style="list-style-type: none"> <li>Project Plan is implemented as scheduled.</li> <li>AID and GOP counterpart funds are disbursed as planned.</li> <li>Project procurement is delivered within expected time frame.</li> <li>Technical assistance is provided on a timely basis.</li> </ul>																																																				
<p><b>Costs:</b></p> <table border="1"> <thead> <tr> <th></th> <th>A.I.D.</th> <th>G.O.P.</th> <th>TOTAL</th> </tr> </thead> <tbody> <tr> <td><b>Technical Assistance</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Foreign</td> <td>112.5</td> <td>50.0</td> <td>162.5 (41 m/months)</td> </tr> <tr> <td>Local</td> <td>10.4</td> <td>10.0</td> <td>20.4 (179 " " )</td> </tr> <tr> <td><b>Communication Costs</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Development of Publications</td> <td>200.0</td> <td>150.0</td> <td>350.0</td> </tr> <tr> <td><b>Commodities</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>67.0</td> <td>50.0</td> <td>117.0</td> </tr> <tr> <td><b>Participant Training</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total (1) to (4)</td> <td>490.4</td> <td>360.0</td> <td>850.4</td> </tr> <tr> <td>Inflation &amp; Contingencies</td> <td>100.0</td> <td>40.0</td> <td>140.0</td> </tr> <tr> <td><b>Grand Total</b></td> <td><b>590.4</b></td> <td><b>400.0</b></td> <td><b>990.4</b></td> </tr> <tr> <td></td> <td>75%</td> <td>25%</td> <td>100%</td> </tr> </tbody> </table>		A.I.D.	G.O.P.	TOTAL	<b>Technical Assistance</b>				Foreign	112.5	50.0	162.5 (41 m/months)	Local	10.4	10.0	20.4 (179 " " )	<b>Communication Costs</b>				Development of Publications	200.0	150.0	350.0	<b>Commodities</b>					67.0	50.0	117.0	<b>Participant Training</b>				Total (1) to (4)	490.4	360.0	850.4	Inflation & Contingencies	100.0	40.0	140.0	<b>Grand Total</b>	<b>590.4</b>	<b>400.0</b>	<b>990.4</b>		75%	25%	100%	<p><b>Implementation Target (Type and Quantity): (Thousands of USDollars)</b></p>	<ul style="list-style-type: none"> <li>USAID and MINDA/F accounting records.</li> <li>Project financial reports.</li> <li>Project audit reports.</li> </ul>	<p><b>Assumptions for providing inputs:</b></p> <ul style="list-style-type: none"> <li>MINDA/F complies with conditions precedent.</li> <li>The GOP provides the MINDA/F with required budgetary allocations to implement the Project.</li> </ul>
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OFICINA GENERAL DE PROYECTOS  
DE INVESTACION  
ING. CARLOS BARRALES S.

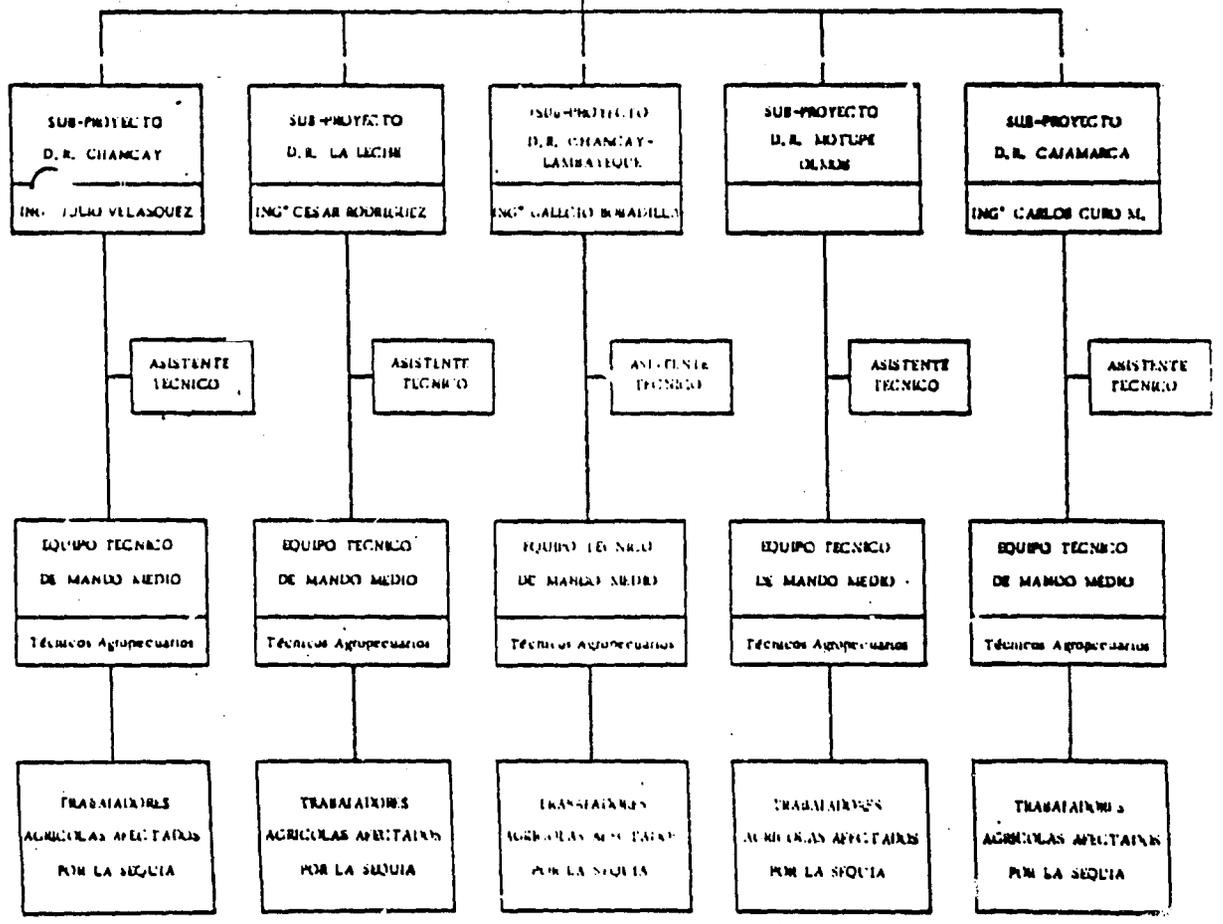
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SUPERVISION  
PROGRAMACION  
ING. ROBERTO ZUNIGA AL.

ADMINISTRACION  
ING. HIRSH ESPINOZA V.

PLAN DE EMERGENCIA A LOS DISTRITOS  
DE RIEGO AFECTADOS POR LA SEQUIA  
PROYECTO CONSERVACION DE SUELOS  
ING. JAVIER AGUIRRE ROMERO



UNIVERSITIES

Universidad Nacional Agraria "La Molina" (UNA "La Molina")  
- Departamento de Recursos de Agua y Tierra (DRAT-UNA "La Molina")  
- Departamento de Suelos (UNA "La Molina")  
- Departamento de Pastos (UNA "La Molina")  
- Departamento de Manejo Forestal (UNA "La Molina")  
Universidad Nacional "Pedro Ruiz Gallo" (Lambayeque)  
Universidad Nacional Técnica de Cajamarca (UNTC)  
Servicio Agro-Silvo-Pastoril (UNTC)

ORGANIZATIONS

Ministerio de Agricultura y Alimentación (MAA)  
- Oficina Sectorial de Planificación del MAA (OSPA)  
- Dirección General de Aguas y Suelos (DGAS - MAA)  
- Dirección de Manejo de Cuencas (DGAS - MAA)  
- Dirección General de Forestal y Fauna (DGF y F - MAA)  
- Oficina Nacional de Evaluación y Recursos Naturales (ONERN)  
- Servicio Nacional de Meteorología e Hidrología (SENAMHI)  
- Instituto Nacional de Planificación (INP)  
- Administración Técnica del Distrito de Riego de Cajamarca  
- Programa de Desarrollo de Cajamarca (PRODESCA)  
Oficina Regional de Desarrollo de Lambayeque (ORDELAM)  
- Oficina Regional de Proyectos de Inversión (ORPI - ORDELAM)  
- Subdirección de Aguas y Suelos de la Región Agraria II  
(RAII - ORDELAM)  
- Dirección Zonal de Cajamarca  
Oficina Zonal de Cajamarca del INP

RESEARCH

Instituto Nacional de Investigación Agraria (INIA)  
Centro de Investigación Forestal y Fauna (CIFF - Cajamarca/INIA)  
Centro de Investigación Agraria del Norte (CIAG - Norte/INIA)

SUPPLIES AND EQUIPMENT LIST

<u>Quantity</u>	<u>Item</u>	<u>US\$</u>
1	4 wheel drive vehicle (Chevy Suburban Type)	15,000
2	Printing desk electronic calculators 2 each US\$ 100	200
1	Manual Typewriter	200
2	Surveyor's Levels complete with tripods and carrying cases - 2 each US\$1,300	2,600
2	Surveyor's Transit complete with tripod and carrying case - 2 each US\$2,400	4,800
4	Abney-type hand levels - 4 each US\$ 40	160
4	Metric Surveying rod - 4 each US\$ 110	440
4	Range Poles - 4 each US\$ 40	160
4	Sets Chaining pins - 4 each US\$ 20	80
2	Pr. - 7 x 35 binoculars - 2 each US\$ 100	200
2	Portable Parshall Water measurement Flume (can be constructed locally) - 2 each \$150	300
1	35 mm Camera with lenses (28 mm, 50 mm, 135 mm)	550
2	Drafting tables - 2 each US\$ 250	500
1	Drafting Machine	250
1	Set Drawing Instruments	60
	Office Furniture for 5 local hire professionals	2,500
Various	Surveying & Office Supplies: clip boards, water canteens, flagging material, paper, pencils, field notebooks, etc. Lump sum	<u>5,000</u>
	Total Equipment Cost	<u>33,000</u>
	Technical publication costs	<u>22,000</u>
	<b>TOTAL SUPPLIES AND EQUIPMENT</b>	<b><u>US\$ 55,000</u></b>

TECHNICAL ASSISTANCE COSTS

## U.S. TECHNICAL ASSISTANCE

## USED:

Round Trip Airfare	\$ 1,100
Per Diem Allowance	45
Base Salary - U.S. Consultants	3,000/
Salary Factor	1.30

## SOIL CONSERVATIONIST

36 months @ \$3,000 x 1.30	= \$ 140,400
Round Trip Transportation of Family	= 4,500
Transportation of Household Effects	= 20,000
In-country Travel	= 13,500
Education Allowance	= 36,000
Housing Allowance	= 24,000
Household Furniture	= 8,000
Miscellaneous Expenses	= 1,500
Sub-Total	= \$ 248,500

## ECONOMIST

3 months @ \$3,000 x 1.30	= \$ 11,700
3 Roundtrips	= 3,300
90 days Per Diem	= 4,050
Extra Expenses	= 1,500
Sub-Total	= \$ 20,000

## HYDROLOGIST

2 months @ \$ 3,000 x 1.30	= \$ 7,800
1 Round Trip	= 1,100
60 Days Per Diem	= 2,700
Extra Expenses	= 1,000
Sub-Total	= \$ 12,600

EROSION CONTROL ENGINEER, AGRONOMIST, SOIL CONSERVATIONIST  
(TRNG) AND AGRICULTURAL ENGINEER (TRNG)

1.5 months @ \$3,000 x 1.30	= \$ 5,850
1 Round Trip	= 1,100
45 Days Per Diem	= 2,025
Extra Expenses	= 750
Sub-Total	= \$ 9,725

TOTAL U.S. TECHNICAL ASSISTANCE = \$ 320,550

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## LOCAL HIRE TEAM

## PROJECT LEADER

35 mos. @ \$1,500/mo.	= \$ 54,000
Travel	= 13,500
Insurance, etc. mos. @ \$ 35	= 1,250
Misc. Expenses	= 500
Sub-Total	= \$ 69,260

## AGRICULTURAL ECONOMIST

36 mos. @ \$1,200/mo.	= \$ 43,200
Travel and Misc. Expenses	= 1,800
Insurance, etc. 36 mos. @ \$ 35	= 1,260
Sub-Total	= \$ 46,260

## SENIOR AGRICULTURAL ENGINEER

36 mos. @ \$1,000/mo	= \$ 36,000
Travel and Misc. Expenses	= 1,800
Insurance, etc. 36 mos. \$ 35	= 1,260
Sub-Total	= \$ 39,060

## JUNIOR AGRICULTURAL ENGINEER

36 mos. @ \$600/mo.	= \$ 21,600
Travel and Misc. Expenses	= 900
Insurance, etc. 36 mos. @ \$ 35	= 1,260
Sub-Total	= \$ 23,760

## RURAL SOCIOLOGIST

12 mos. @ \$600/mo.	= \$ 7,200
Travel and Misc. Expenses	= 800
Insurance, etc. 12 mos @ \$ 35	= 420
Sub-Total	= \$ 8,420

## SOIL SCIENTIST OR AGRONOMIST

24 mos. @ \$1,000	= \$ 24,000
Travel and Misc. Expenses	= 1,000
Insurance, etc. 24 mos @ \$ 35	= 840
Sub-Total	= \$ 25,840

TOTAL LOCAL HIRE TECHNICAL ASSISTANCE: \$ 236,360

TOTAL TECHNICAL ASSISTANCE: \$ 548,910

EQUIPMENT: (See list) \$ 33,000

**TECHNICAL PUBLICATIONS**

5 Tech. Handbooks (1000 copies of each)	= \$ 15,000
13 Practice Stds. (1000 copies of each)	= 4,000
Misc. Bulletins, Evaluations, etc.	= <u>3,000</u>
TOTAL	= \$ 22,000

**FINANCIAL SUMMARY**

U.S. TECHNICAL ASSISTANCE	\$ 320,550	
LOCAL HIRE TECHNICAL ASSISTANCE	236,360	
TOTAL TECHNICAL ASSISTANCE		\$ 556,910
EQUIPMENT		33,000
TECHNICAL PUBLICATIONS		22,000
DEMONSTRATION		200,000
VEHICLE OPERATING COSTS		12,000
PARTICIPANT TRAINING		<u>3,000</u>
TOTAL		\$ <u>826,910</u>

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U.S. SOIL CONSERVATIONIST - Provides leadership to the institutional development and organization component of the grant; guidance to the Peruvian team located on the Pilot Project; advice to the Director of Watershed Management, Ministry of Food and Agriculture, on related problems through Peru; and coordination for the training activities.

U.S. ECONOMIST - Provides assistance and direction to the local hire economist on data gathering for cost-return and other appropriate economic studies; training on economic analysis of the gathered data; and assist in the preparation of a Cost-Return Handbook.

U.S. HYDROLOGIST - With the assistance of the local hire Senior Agricultural Engineer, gathers precipitation data; including frequency distribution, intensity, and duration information, as well as soils infiltration data, and integrates this information into a runoff prediction equation for the Sierras.

U.S. EROSION CONTROL ENGINEER - Will assess the mechanical erosion control aspects of the Pilot Project; evaluate types of practices being installed on the project; make suggestions on new demonstrations, and initiate the development of practice standards and specifications for engineering practices.

U.S. AGRONOMIST - Will provide guidance on conservation cropping systems, alternate specie selection for pasture seeding and grassed waterways, pasture management practices, weed control, and fertility programs. Initiates development of standards and specifications for agronomic practices.

U.S. SOIL CONSERVATIONIST AND AGRICULTURAL ENGINEER TRAINING TEAM - Prepares comprehensive lesson plans and conducts 2 two-week formal training courses at the Pilot Project location. For the detailed training syllabus, see another part of these Annexes.

#### LOCAL HIRE TEAM

PROJECT LEADER - Assists the Soil Conservationist in managing the Pilot Projects; expedites the publication of manuals, evaluations, handbooks, and bulletins; and provides technical assistance in other areas of Peru.

AGRICULTURAL ECONOMIST - Makes cost-return and other economic studies. With the assistance of the U.S. TDY Economist, prepares a cost-return handbook for soil conservation and water management practices for the Andean region. Serves as an assistant to the Project Leader. Provides training to Peruvian Soil Conservation workers.

SENIOR AGRICULTURAL ENGINEER - Directs the Junior Agricultural Engineers in investigating, designing, and laying out conservation practices. Assists the TDY Hydrologist and Erosion Control Engineer with data gathering and preparation of handbooks and standards and specifications. Provides training to Peruvian Soil Conservation workers.

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JUNIOR AGRICULTURAL ENGINEERS - Investigate, make preliminary design and layouts on the field for soil conservation engineering practices in the project area. Assist the Senior Agricultural Engineer with the preparation of technical reference material. Assist with the training of Peruvian Soil Conservation workers.

RURAL SOCIOLOGIST - Makes socio-cultural studies in the project area, including demographic studies. Summarizes information.

SOIL SCIENTIST - Identifies soil taxonomic units associated with soil conservation and water management practices. Documents descriptions of soil by location and descriptions of soil by location and practice installed. Assists other members of the team on soil or agronomic problems. Provides training for Peruvian Soil Conservation workers.

TRAINING OUTLINE

- A. A training course on Resource Conservation Planning is planned to include the following material:
1. Conservation Planning Process
    - Steps in planning (Ten elements)
    - Resource data for planning. This will include soils, land use, ownership, drainage area and sediment sources.
    - Basis for conservation planning (Technical guide and how to develop one),
  2. Preparation of a Conservation Plan
    - Classroom
    - Field exercise (development of a plan)
- B. Another training course planned is involving office and field exercises, Application of Practices and Treatment Systems for Watershed and Management as follows:
1. Design of Ditches
    - General
    - Drainage runoff (20-40 rule)
    - Ditch alignment
    - Hydraulic or Energy gradient
    - Design methods
  2. Erosion Control
    - Erosion Processes
      - Water erosion
      - Wind erosion
      - Factors influencing the rate of erosion
      - Soil loss prediction equations
    - Estimating runoff
      - Introduction
      - Factors affecting surface runoff
      - Volume of flood runoff
      - Peak Rate of Discharge
    - Preparation of Engineering Plans
      - General
      - Planning Procedures

- Structures
  - Definition
  - Introduction and Purpose
  - Component parts of structures
  - Structure Selection
  - Stability of Grades Below Spill Ways
  - Structure Types (Selection & Design)
  
- 3. Crossed Waterways and Outlets
  - Definition
  - Protection
  - Shape or cross section
  - Watershed Treatment
  - Location
  - Surveys
  - Design and Design Criteria
  - Construction
  - Maintenance
  
- 4. Terraces
  - General
  - Objectives of Terrace Systems
  - Types of Systems
  - Soil Considerations
  - Terrace Cross Section
  - Terrace Spacing
  - Alignment
  - Layout Geometry
  - Layout
  - Design
  - Construction
  - Maintenance
  
- 5. Diversions
  - General
  - Survey
  - Design of Diversions
  - Layout and Construction
  - Maintenance
  
- 6. Ponds and Reservoirs
  - General
  - Types of Ponds and Reservoirs
  - Selecting the Pond Site
  - Primary Site Studies
  - Engineering Surveys
  - Embankment Ponds (dams)
  - Damless or Excavated Ponds

7. Springs and Wells (Hydro-Geology)
  - General
  - Ground Water Resources in Cajamarca
  
8. Soil Management and Land Improvement
  - Soil Improvement Practices
  - Crop Rotation Systems
  - Soil Profile Modification
  - Fertilizer Application
  
9. Torrent Control
  - Torrents characterization
  - Establishing torrent control parameters and criteria
  - Design of torrent control works
  - Engineering and maintenance
  
10. Institutional Aspects of Water Management in Small Watersheds
  - Application of Engineering Practices
  - Economic Aspects
  - Extension - Conservation Education
  - Summary

GLOSSARY OF TERMS

SOIL CAPABILITY CLASS II

Soils with some limitations which reduce the selection of crops and require moderate soil conservation practices. Limiting factors, that act alone or in combination are:

- Slightly sloping
- Moderately eroded and erosive
- Moderate workability because of depth or structure
- Slightly saline or alkaline, but easy to overcome
- Occasional flooding
- Slightly wet, but easily correctable

These soils can be used for cultivated crops, natural or cultivated grasslands, productive forests, or wildlife.

SOIL CAPABILITY CLASS III

Soils with severe limitations which reduce the selection of crops and require special soil conservation practices. Limiting factors are:

- Moderately steep slopes
- Very erosive
- Shallow
- Stony
- Very low permeability
- Low water holding capacity
- Moderately saline or alkaline, and difficult to overcome
- Frequent flooding with crop damage
- Poorly drained
- Low fertility

These soils can be used for cultivated crops, natural or cultivated grasslands, productive forests, or wildlife. When they are used for crops, good soil conservation practices are required.

SOIL CAPABILITY CLASS IV

Soils with very severe limitations which strongly reduce the selection of crops and require intensive soil conservation and management practices. Limiting factors are:

- Steep slopes
- Very eroded or highly erodable
- Shallow
- Low water holding capacity
- Highly saline or alkaline
- Poorly drained

These soils can be used for cultivated crops, natural or cultivated grasslands, productive forests, or wildlife. When they are used for crops, difficult and expensive soil conservation practices are required.

SOIL CAPABILITY CLASS V

These soils have permanent limitations. They can only be used for natural and cultivated grasslands, forests, or wildlife. The characteristics are:

- Lowlands which frequently flood
- Climatic conditions caused by altitude or aspect
- Very shallow
- Stoney

SOIL CAPABILITY CLASS VI

Soil with severe limitations which reduce its use for grasslands, forests, or wildlife. Its limiting factors are:

- Steep slopes
- Severe erosion problem
- Very stoney
- Extremely wet
- Minimum water holding capacity
- Severely saline or alkaline

SOIL CAPABILITY CLASS VII

Soils which can be used for natural grasslands, protective forests, or wildlife. Limiting factors are:

- Very steep slopes
- Severe Erosion
- Very shallow
- Very stoney
- Very frequent flooding
- Severely saline or alkaline

SOIL CAPABILITY CLASS VIII

Lands which are useable for their scenic values, for wildlife, or as a source of runoff. These may include badlands and mine spils.