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UNCLASSIFIED

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

PERU

PROJECT PAPER

CENTRAL SELVA RESOURCE MANAGEMENT

AID/LAC/P-096

Loan Number: 527-T-079
Project Number: 527-0240

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

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

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: PERU

3. PROJECT NUMBER: 527-0240

4. BUREAU/OFFICE: LA — 05

5. PROJECT TITLE (*maximum 40 characters*): Central Selva Resource Management

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 87

7. ESTIMATED DATE OF OBLIGATION (*Under 'B.' below, enter 1, 2, 3, or 4*)

A. Initial FY 82 B. Quarter 4 C. Final FY 85

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

A. FUNDING SOURCE	FIRST FY 82 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	(3,268)	15,682	(18,950)	6,318	15,682	22,000
(Grant)	(950)	(-)	(950)	(4,000)	(-)	(4,000)
(Loan)	(2,318)	(15,682)	(18,000)	(2,318)	(15,682)	(18,000)
Other U.S. 1.						
Other U.S. 2.						
Host Country	-	627	627	-	8,000	8,000
Other Donor(s)						
TOTALS	3,268	16,309	19,577	6,318	23,682	30,000

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	200	090	090			950,000	18,000	4,000	18,000
(2)									
(3)									
(4)									
TOTALS						950,000	18,000	4,000	18,000

10. SECONDARY TECHNICAL CODES (*maximum 6 codes of 3 positions each*): 010 020

11. SECONDARY PURPOSE CODE:

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

A. Code	BR	BF	R/AG	ENV	DEL		
B. Amount							

13. PROJECT PURPOSE (*maximum 480 characters*)

To plan and execute a development project for sustained production in the Palcazu valley, and thereby test and institutionalize a methodology for the long range management of Peru's high jungle and natural resources. At the end of the project a capacity will be established within the GOP to develop and carry out similar regional development projects.

14. SCHEDULED EVALUATIONS

Interim MM 09 YY 83 — MM 09 YY 85 Final MM 07 YY 87

15. SOURCE/ORIGIN OF GOODS AND SERVICES

[X] 000 [X] 941 [X] Local [X] Other (*Specify*) 935

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

17. APPROVED BY

Signature: Malcolm Butler

Title: Malcolm Butler - Director USAID/Peru

Date Signed:

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

D YY

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

PROJECT AUTHORIZATION

Name of Country: Peru

Name of Project: Central Selva Resource Management

Number of Project: 527-0240

Number of Loan: 527-T-079

1. Pursuant to Sections 103 and 104 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Central Selva Resource Management project for Peru (the "Cooperating Country") involving planned obligations of not to exceed Eighteen Million United States Dollars ($18,000,000) in loan funds ("Loan") and Four Million United States Dollars ($4,000,000) in grant funds ("Grant"), over a six (6) 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 ("Project") consists of testing and institutionalizing a methodology to promote sustained productivity in the Palcazu watershed and building within the Cooperating Country's Secretariat of Regional Affairs the capacity to gather, analyze, disseminate, and apply technical and scientific information for the planning and implementation of integrated regional development projects in the high jungle and other areas.

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

a. Interest Rate and Terms of Repayment

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

b. Source and Origin of Goods and Services (Loan)

Goods and services, except for ocean shipping, financed by A.I.D. under the Loan shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree

in writing. Ocean shipping financed by A.I.D. under the Loan shall be financed only on flag vessels of the Cooperating Country or of countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

c. Source and Origin of Goods and Services (Grant)

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

d. Conditions Precedent (Loan and Grant)

(1) Condition Precedent to Disbursement

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement for activities other than procurement of such technical assistance for project activities as USAID/Peru may approve, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence that the indigenous, native Indian communities in the Project area have received legal title to or legal permits for use and enjoyment of their tribal lands.

(2) Condition Precedent to Disbursement to Finance Forestry Credit Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance forestry credit activities except for technical assistance, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence of a program in the Banco Industrial del Peru (BIP) for sublending for forestry credit under the Project, including a description of procedures, administrative responsibilities, eligibility criteria and sublending terms and conditions.

(3) Condition Precedent to Disbursement to Finance Agricultural Production and Livestock Activities

Prior to disbursement, or to the issuance of commitment documents under the Project Agreement, to finance agricultural production and livestock activities, except for technical assistance activities necessary to prepare an operation plan and a technical assistance plan for both the agricultural production and livestock components and except for the procurement of vehicles, including trailbikes, and outboard motors, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish

to A.I.D., in form and substance satisfactory to A.I.D., an operation plan and a technical assistance plan for both the agricultural production and livestock components of the Project.

(4) Condition Precedent to Disbursement to Finance Continuous Land Use Inventory Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance continuous land use inventory activities, except for those technical assistance activities necessary to prepare an operation plan for land registration and a plan for establishment of land registration office(s) and except for the procurement of vehicles, including trailbikes, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an operation plan for land registration and a plan for the establishment of land registration office(s).

(5) Condition Precedent to Disbursement to Finance Health and Environmental Sanitation Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance health and environmental sanitation activities except for those technical assistance activities necessary to prepare a procurement plan and an operation plan for health and environmental sanitation activities and except for the procurement of vehicles, including trailbikes, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an agreement between The Special Project Office for Pichis Palcazu (PEPP) and the Ministry of Health which includes a procurement plan and an operation plan for health and environmental sanitation activities under the Project.

(6) Condition Precedent to Disbursement to Finance Road Maintenance Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance road maintenance activities under the Project, except for technical assistance and except for the procurement of pick-up trucks and outboard motors, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., a procurement plan and an operation plan for road maintenance.

(7) Condition Precedent to Disbursement to Finance the Communications Ground Station

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance the communications ground station under the Project, except for those technical assistance activities related

to the station, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., a procurement plan for the station and an agreement between PEPP and the Empresa Nacional de Telecomunicaciones del Peru ("ENTEL Peru") for operation of the station.

(8) Condition Precedent to Disbursement to Finance Regional Development Policy Support Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance activities for regional development policy support, except for technical assistance activities necessary to prepare an operation plan, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an operation plan for this component.

e. Covenants

The Cooperating Country shall covenant, except as A.I.D. may otherwise agree in writing, that:

(1) The BIP will charge interest for credit under the Project at rates no less than the rates normally charged by the BIP in that region for similar purposes;

(2) It will construct or cause to be constructed in the Project area during the life of the Project approximately 60 kilometers of feeder roads through land determined by the PEPP office to have high production potential;

(3) It will legally and formally designate the Yanachaga area as a national park and the San Matias area as a protection forest in accord with the study of JRB Associates carried out in 1981;

(4) The Agrarian Bank will maintain current levels of credit for livestock and open and maintain an office in Iscozacin; and

(5) It will establish a forest protection station and program in the Palcazu valley with adequate staff and equipment to prevent unauthorized and illegal logging or exploitation of timber resources in the Project area.

f. Waiver

The following waiver to A.I.D. regulations is hereby approved: A.I.D. source, origin and nationality requirements are hereby waived to allow procurement of up to 40 trailbikes, whose source and origin and nationality may be in any country included in A.I.D. Geographic Code 935. In so doing, I hereby certify that exclusion of procurement from Free World countries other than the

Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

g. Procurement Approvals

(1) I hereby approve the proprietary procurement of up to 40 Honda trailbikes of not more than 125cc each for the Project pursuant to the authority in 41 C.F.R. Sec. 7-3.101-50(b)(3).

(2) I hereby approve proprietary procurement of vehicles and road maintenance equipment financed under the Project, after an initial competitive procurement, to assure interchangeability of parts, vehicles (except trailbikes) and equipment and standardization of vehicles (except trailbikes) and of equipment, pursuant to the authority in 41 C.F.R. Sec. 7-3.101-50(b)(3).

M. Peter McPherson
Administrator

6/25/82
Date

Clearances:
PPC/PDPR:JEricksson: JA date 6/24
GC/LAC:BVeret: BV date 6/18/82
AA/PPC:JRBolton: JRB date 6/25/82
GC:CvanOrman: CvO date 6/22/82
AA/LAC:OJReich: date
M/DAA/SER:JFOwens: JO date 6/23

GC/LAC:SVRWhitman:ckg:6/3/82:x23273

CENTRAL SELVA RESOURCE MANAGEMENT
PROJECT PAPER OUTLINE

527-0240
527-T-079

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PROJECT ANNEXES

Annex I Legal Exhibits

Exhibit A	Director's 611(e) Certification
Exhibit B	Statutory Check List
Exhibit C	Draft Authorization
Exhibit D	Borrower's Loan Request
Exhibit E	Environmental Threshold Decision
~~Exhibit F~~	~~PID Guidance Cable~~
Exhibit G	Request SER/DM for Approval for ADP Component

Annex II Technical Exhibits

Exhibit A	Logical Framework
Exhibit B	Economic Evaluation of the Palcazu Valley Primary and Secondary Roads
Exhibit C	Implementation Plan
Exhibit D	Organization Charts of the Presidency of the Council of Ministers, the Secretariat of Regional Affairs, and PEPP
Exhibit E	Technical Assistance Plan
Exhibit F	Financial Plan and Equipment, Materials, and Human Resources Lists
Exhibit G	Health and Environmental Sanitation
Exhibit H	Institutional Analysis of Other Implementing Agencies
Exhibit J	Road Maintenance Equipment

Annex III Unattached Exhibits*

Exhibit A	Central Selva Natural Resources Management, JRB Associates, McLean, Virginia. Two Volumes
Exhibit B	Sustained-Yield Management of Natural Forests, Tropical Science Center, San Jose, Costa Rica
Exhibit C	"An Analysis of Planned Agricultural Development in the Palcazu Valley," Charlotte I. Miller and Hector Martinez, March 1981.

* For reasons of size, Annex III is not distributed as part of this Project Paper. These documents are available in the files of LAC/DR and USAID/Peru.

I. PROJECT SUMMARY AND RECOMMENDATIONS

A. Face Sheet (attached)

B. Recommendations

1. It is recommended that a loan be authorized to the Government of Peru (GOP) in the amount of $18,000,000 with a 25-year term including a ten-year grace period, at 2% interest during the grace period and 3% thereafter.

2. It is recommended that a grant be approved in the amount of $4,000,000 to be incrementally obligated as follows:

a. FY 82: $ 950,000
b. FY 83: $1,200,000
c. FY 84: $1,200,000
d. FY 85: $ 650,000

C. Summary Background

1. Project Setting

The Project area, the Palcazu river valley, is located in the central high jungle in the department of Pasco. The land area is approximately 190,000 hectares, of which 95,000 hectares are on the valley floor. In 1980, approximately 1200 hectares were under clean cultivation, fewer than 500 hectares were in permanent crops, and approximately 15,000 to 18,000 hectares were in pasture.

The population of the Palcazu valley is estimated to be between 10,000 and 15,000. Approximately 3,000 of these inhabitants are native Amuesha who have lived in dispersed, isolated settlements throughout the area since pre-columbian times. The Amuesha live in 13 communities of which nine are legally titled at present and the remaining four are in the process of receiving title. The non-Amuesha population consists of a heterogenerous group of people of Andean, coastal, and jungle origin, and a small elite of second- and third-generation descendants of European colonists, predominantly of German, Swiss, and Austrian extraction.

Economic activities reflect the population. The Amuesha still practice slash-and-burn horticulture, but they have become increasingly sedentary on their communal land grants or individual land claims. They are increasingly producing rice, poultry, and cattle and exploiting fish and game resources for sale or trade within the valley's local economy. A few Amuesha own small stores but trading activities are still largely controlled by the

larger ranchers. The economic activities of the non-Amuesha residents of the valley consist of subsistence agriculture, livestock raising, trading, and exploitation of the tropical forest. Pasture is the major land use and much of the valley floor has been cleared and converted to pasture, sometimes on land that does not have the capacity to sustain pasture.

At present, the Project area has no road access, but the GOP is building the Marginal Highway through the central jungle and completion of the highway will facilitate development in the region and in the Palcazu valley in particular.

The Palcazu watershed is characterized by rough terrain, numerous large and small streams, and very little flat land. The climate is warm and wet, becoming cooler and wetter with increasing elevation. Annual rainfall exceeds 3,000mm throughout the watershed and most places receive 4,000mm or more of rain each year. Flora and fauna exhibit great diversity. Most of the watershed is forested but considerable clearing has occurred in the valley floor. A few of the species of animals found in the area are rare and the existence of some is threatened by hunting. Fish are generally abundant in the rivers, although overfishing is reported in some areas.

A thorough environmental assessment was carried out in the Palcazu watershed by a team of experts in natural resources and environmental management, tropical land use, tropical livestock, ecological mapping, forestry, hydrology, agronomy, zoology, botany, wildlife biology, tropical epidemiology, and anthropology. Their findings (contained in Annex III, Exhibit A) describe the fragile conditions of the watershed in great detail and outline a course of action for long-term development and management of the area based on sustained productivity consistent with land use capability. Detailed study of 95,000 hectares on the floor of the Palcazu valley resulted in the following assessment of land use capability:

Capability Class	Area (Hectares)	Percent of Area
Clean Cultivation	7,200	8
Pasture	12,671	13
Permanent crops	13,653	14
High Production Forestry	19,150	20
Low Production Forestry	24,646	26
Protection Forest	14,841	16
Riverbed	2,839	3
Total	95,000	100

Because so much of the land in the Palcazu has the capacity for forestry production, and because most of the valley lands are still forested, production forestry holds the greatest potential for development. In addition, cultivation of permanent crops will produce higher incomes than either pasture or clean cultivation. Therefore, permanent crops also hold a high potential for development.

D. Summary Problem Statement, Rationale, and Strategy

1. Problem Statement

The proposed Project will address the basic problem facing the GOP in its high jungle development strategy: management of fragile high jungle areas such as the Palcazu as long-term productive resources. The GOP has repeated its commitment to the development of the high jungle on many occasions, but experience in Peru and elsewhere has shown that the high jungle is a difficult area to develop cientists, ecologists, and development planners continue to search for a replicable methodology for rational economic exploitation of jungle resources on a sustainable basis.

Originally chosen as a priority area for development, the central jungle was thought to be an area of potentially significant foodstuff production for the country. However, preliminary AID-funded feasibility studies in the Palcazu valley showed that the development potential of the area is more limited, and that without rational management serious resource degradation and loss of productive resources could result. In virtually all high and low jungle areas being opened to development by the GOP, this degradation would likely result from spontaneous colonization following road construction and the application of inappropriate land use technologies. Moreover, in much of the area, spontaneous colonization could jeopardize the rights of native communities. Similarly, if protection areas are not adequately managed, illegal and possibly destructive lumber extraction will take place.

As a result the findings of the AID studies, the GOP has significantly modified its approach to development of the fragile central jungle region. No longer does the GOP expect to resettle large numbers of colonists in the central jungle to exploit a highly productive agricultural area. Rather, the GOP, with AID assistance, proposes to develop the resources of the valley in a manner which will assure long-term sustained productivity and to design and test a sound technology for the development of other such ecologically fragile areas-- a technology which can be transferred to other high jungle regions selected for development and which protects the rights of native communities.

Without this Project, both the short- and long-term consequences in the Palcazu and at the national level are likely to be serious. In the Palcazu, colonization, lumber extraction, and cattle raising--if not properly managed--could result in resource degradation which would seriously affect productivity and probably render the valley uninhabitable within a matter of years. At the national level, failure to pass on the lessons learned about rational management of the productive resources of ecologically fragile areas from the development of one specific area to other areas will result in duplication of efforts or inappropriate management. Without rational development planning and long-range management of these natural resources, short-term exploitation will occur wherever access permits. Once the resources are exhausted, it will take decades to replace them.

2. Project Rationale

The Project Paper for the proposed Project builds upon the findings and recommendations of the JRB Report which is attached as Annex III, Exhibit A. The scope of this report far extended beyond that of the usual Environmental Assessment; the efforts of 17 consultants over a period of four months went into the preparation of the report which USAID/Peru has used as the basic design study for the Project.

When the GOP first requested AID assistance in developing the proposed Project, the Mission approached it cautiously, recognizing that the area would be a difficult one to develop and that it could present some very special problems. The Mission also realized that the GOP was committed to developing the high jungle and that if AID were not involved, the financing required would become available from GOP resources or some other source. The government's request, however, was also a challenge since it afforded AID the opportunity to influence the development process in ways which other donors might not attempt because of the specialized nature of the technical knowledge required to develop the Project, the long period needed for the studies, or the need for a resident staff who could be closely involved over an extended period in the development of the Project.

The Project gives AID the opportunity to influence the development of the high jungle by assuring that this development takes place in a rational manner, using a sustained production approach rather than an "exploit-and-move-on" approach which could permanently destroy large segments of the high jungle. With or without AID assistance, the Project area and other areas of the high jungle will be developed. However, without the expertise that AID can provide, land use will not be optimal; unprotected forests are likely to be harvested irrationally once the access road is completed; and long-range sustained use of the land will be endangered. The consequences for high jungle farmers and for the long-term productive base of the national economy could be extremely serious. Fully cognizant of these consequences, the AID Project has been designed to guide development efforts by identifying land use capability, encouraging optimal use of the land, and protecting certain areas whose vital contribution to productivity is to remain untouched.

Thus, the Project successfully implemented will serve not only to develop the agricultural and forestry production possibilities of the Palcazu valley, but also to guide high jungle development in other similar areas. AID places considerable importance on the methodology of optimizing resource use through examination of long-term land use capability and development of the area accordingly. The Project will produce technologies which are not only appropriate for the Palcazu valley, but also applicable and transferable to other areas. However, since climate and other factors vary in each region, the more significant output of the Project will be a production methodology to optimize land use in the high jungle. With appropriate adjustments, this methodology will be applicable to other high jungle areas as they are opened for development.

The Mission sector strategy recognizes that the GOP has set top priority for the development of the high jungle and, in particular, the central jungle. While the Mission is aware of the problems which the development of this area poses, we believe that a fundamental change has occurred in the GOP's understanding of the consequences of traditional development in the high jungle. The government now realizes that the entire high jungle cannot be treated identically and that the productive potential of each watershed in the region is distinguished by differing rainfall, topography, geologic formation, soil type and capability, flora, and fauna. This is a significant change in developmental thinking in Peru--one which has occurred at least in part because of AID's activities--and one which the Mission believes must be supported in order to further strengthen and institutionalize rational development planning

3. Project Strategy

Project activities in the Palcazu valley are designed to achieve long-term economic and social benefits which result from the appropriate, productive uses of the natural resources of the area on a rational, sustained-yield basis. Successful Project implementation will also demonstrate the replicability of Project methodology in the large portion of Peru which is tropical humid forest. The resource management focus of the Project will demonstrate methods designed to increase the agricultural and forestry potential of the area on a sustainable basis. This element will aim at increasing the incomes of the inhabitants of the region within the framework of improved environmental protection and conservation. Without such increases in income, farmers are not likely to continue the new practices, and without increases in regional production, the GOP will show little interest in replicating this program in other tropical forest areas. In addition to improving farmer incomes, the Project will achieve a significant employment generation benefit in support services such as transportation, processing, and marketing.

The Project objective is to maximize long-term sustainable productivity through effective management of the area's resources. By supporting the Project management structure and productive activities in the Palcazu watershed, the proposed Project will demonstrate that sustainable production can result from proper use of high jungle natural resources. The Project will take into consideration the special concerns and status of the Amuesha native communities located in the Palcazu valley in a way that is compatible with their society and traditions. At the national level, the Project will support the establishment within the GOP of a permanent capacity to examine regional development projects in the high jungle.

The Project is consistent with the Mission's agricultural sector strategy of increasing and revitalizing agricultural production and productivity and developing a framework for the rational use of Peru's limited agricultural resources. Moreover, the Project is in line with the Mission's strategy of targeting resources on activities through which AID can support

significant policy changes and innovations. As discussed below, AID's involvement in the design of the Project has already had a significant impact on the GOP's approach to development of the high jungle. The Project will continue to orient GOP policy in this area and will support the GOP in its efforts to promote and preserve sustainable economic growth.

In this regard, Project strategy and design will encourage private sector involvement in the area. While public sector investments in physical and social infrastructure are initially required, the Project administators, like the GOP, are committed to turning over economic functions to the private sector as soon as possible. Consistent with its overall economic policy, the GOP will rely on the private sector to take the lead in the economic growth of the area.

E. Summary Project Description

1. Project Goal and Purpose

The sector goal is to increase the employment and income of the rural population of Peru by increasing production and total resource productivity. The Project goal is to increase and diversify agricultural production in the Peruvian high jungle.

The Project purpose is to plan and execute a development project for sustained production in the Palcazu valley, and thereby test and institutionalize a methodology for the long-range management of Peru's high jungle human and natural resources. At the end of the Project a capacity will be established within the GOP to design and carry out similar regional development projects.

2. Project Activities

The Project comprises ten activities. Eight of these activities focus on productive development components in the Palcazu valley: forestry, agricultural development, livestock development, protection, continuous land use inventory, health and environmental sanitation, feeder road location planning and road maintenance, and communications. The two remaining activities, local project management and regional development policy support, focus on institutions.

Summary Financial Plan for the Central Selva Resource Management Project
(Thousands of U.S. Dollars)

	Project Components	A.I.D. Grant	A.I.D. Loan	GOP	Total
I.	Project Management/PEPP	497	797	865	2159
II.	Forestry	910	4895	890	6695
III.	Agricultural Development	368	3628	1982	5978
IV.	Livestock Development	-	683	198	881
V.	Protection	110	147	158	415
VI.	Continuous Land Use Inventory	88	196	173	457
VII.	Health & Environmental Sanitation	-	465	61	526
VIII.	Feeder Road Studies and Road Maintenance	218	2581	1395	4194
IX.	Communications	-	360	50	410
X.	Regional Development Policy Support	646	1980	500	3126
XI.	Miscellaneous Costs	810	-	-	810
XII.	USAID Project Advisor	191	-	-	191
	Sub-Total	3838	15732	6272	25842
	Plus: Inflation & Contingencies	162	2268	1728	4158
	Grand Total	4000	18000	8000	30000
		22000		8000	30000
		73%		27%	100%

a. The Special Project Office--PEPP (Loan $797,000 and Grant $497,000).

The Pichis Palcazu Special Project Office (PEPP), created in October 1980, is responsible for the development of the Pichis, Palcazu, and Pachitea valleys, and will be the key implementing and coordinating agency for the proposed Project. The principal Palcazu Project Office is located in Iscozacin, with secondary offices in Puerto Mairo and Loma Linda.

Under a series of working agreements, the PEPP Office will coordinate the implementation of the diverse Project activities with the

appropriate GOP agencies. These include INIPA, INFOR, SENAMHI, ONERN, OGCR, ORP, MOH, MTC, and ENTEL-PERU.

Specific PEPP functions will include staff training, coordination of research and extension activities, coordination and monitoring of credit activities, data collection and dissemination, monitoring of GOP enforcement activities, and Project evaluation. The elements of the data collection system are aerial reconnaissance, photography, and mapping; meteorological and hydrologic stations; and forest, permanent crop, livestock, and fisheries inventories.

b. Forestry (Loan $4,895,000 and Grant $910,000)

The general forestry plan includes two management models: natural forest management for sustained yield by systematic clearcutting and natural forest management of rubber and high-value timber species by small-group selection on white sand soils. The first of these will be the predominant one and engage the largest number of people. Both have three basic variants: individual small colonist, with a family management unit; native community, with a collective management unit; and industrial management unit.

To complement the forest management units, log transport, primary processing, and marketing activities will be established by small entrepreneurs with Project financing. Up to $3,000,000 in Project Loan funds will be made available to the Industrial Bank of Peru to establish a special line of credit for the development of small business activities in the Project area. Training, research, and extension activities will also be carried out under this component.

Systematic clearcutting is proposed as the principal natural forest management system to be utilized under the Project. The decision to select the forestry management technology which has been proposed is the result of in-depth on-site analysis performed by tropical forest scientists over the course of the last 12 months. During Project implementation, the appropriateness of this system will be evaluated from both a technical and a managerial point of view. Changes which further experience gained under implementation point out as appropriate will be reflected in adjustments to the system.

The natural forest management system could eventually be conducted on up to 50,000 hectares of mostly low hill lands with red clay soils classified as suitable only for forest production on a permanent basis. Approximately 17,000 hectares of native community lands in this capability class will be operated communally. The rest of the area will be divided into industrial units and into family-sized units each of which will be assigned to and worked by a head-of-household and one or more family helpers. Little or no paid help will be employed on the family units and operators will earn both the value of their family labor and of the standing timber. Each operator family will reside on its own holding and be provided with a small plot for

subsistence food production and pasture. The industrial units will consist of single concessions large enough to supply one processing unit, that is 4200 hectares, equivalent to 70 family units.

c. Agricultural Development (Loan $3,628,000 and Grant $368,000)

The objective of this Project component is to increase the income level of valley residents by improving existing tropical agricultural production systems. To accomplish this, an adaptive on-farm research program will be established to assist in the technology transfer between experimental station research and local residents. On-farm experience will determine viable cropping production systems that are best adapted to the high jungle. The Project will improve existing crop systems while taking into consideration the farmer's ability to absorb new technologies and incorporate appropriate management practices into a stable sustained-yield agricultural production system. This activity includes not only on-farm research but also training, extension, and the marketing and processing of locally produced crops.

d. Livestock Development (Loan $683,000)

This Project activity has the following objectives: (1) improve pasture and pasture management on those lands best suited for pasture; (2) improve cattle yields; (3) encourage swine raising in conjunction with the production of permanent crops; (4) improve animal health; and (5) prevent the establishment of new pastures on lands that do not have the capacity to sustain pasture.

Funds allocated for research and extension under the agricultural development component will be used jointly to support livestock activities as well. In addition, $500,000 in Project Loan funds will provide credit for swine raising.

e. Protection (Loan $110,000 and Grant $176,000)

The principal objective of the Project activity in protection is to designate and protect those lands in the Palcazu watershed whose only land use capacity is for protection. These lands are to be designated as protection areas not only because their land capability has been identified as such, but also because use of these lands for any other purpose would greatly reduce the sustainability of all other productive agricultural and forestry activities on the valley floor. These lands provide the greatest economic returns to the valley as a protection area. In order to further enhance the economic and financial returns of this component, the Project contemplates that this area will be officially designated a national park, thereby resulting in additional income and jobs to the valley through increased tourism, services, and commerce.

f. Continuous Land Use Inventory (Loan $196,000 and Grant $88,000)

This Project activity builds on the cadastral and titling work in progress by PEPP. Its objectives are to provide security of ownership to landholders and holders of long-term forest concessions; to match actual land use to land capability; to determine the location and size of new parcels; to identify areas for potential development and decide what form development will take; and to assist in the evaluation of development activities.

g. Health and Environmental Sanitation (Loan $465,000)

The objective of this component is to improve health service delivery in the Project area. The Project will provide support for training and supervision for health technicians, promoters, and midwives; equipment and supplies for area health posts; and support for the construction of potable water systems and latrines.

h. Feeder Road Location Planning and Road Maintenance (Loan $2,581,000 and Grant $218,000)

In order to insure that GOP-constructed feeder roads in the Project area are built so as to provide access to the most productive lands while avoiding environmental degradation, this Project component will provide funding for feeder road location studies and for the technical assistance of an environmental engineer to assist in the planning of these roads.

The road maintenance sub-component of this Project activity will assure that the Ministry of Transportation and Communications (MTC) provides a level of road maintenance in the Project area sufficient to preserve area roads in good condition. The Project will provide the non-recurrent expenditures for equipment and the training necessary to achieve the required build-up of the MTC's maintenance capacity for the primary and secondary roads in the area.

i. Communications (Loan $360,000)

The objective of the communication component under the Project is to improve the efficiency and effectiveness of communications among all Project participants, and to do this both within the valley and between the valley and the rest of Peru. The potential application of satellite technology to meet the development needs of this Project is virtually unlimited, but generally falls into four categories: administrative, consultative, information exchange, and training.

Administratively, the system can be used to coordinate logistics, to provide supervision and guidance to field staff, and to gather feedback information from field staff on development activities. Consultative uses will allow forest rangers, rural extension agents, para-professional health workers, and other field staff to obtain immediate advice on specific

implementation problems beyond their expertise. An example of information exchange would be the transmission of specific research, land inventory, meteorological, and other data from facilities in the valley to UNAS, INFOR, INIPA, and other such institutions, and vice versa. Radio and teleconferencing systems can be used for initial orientation training, periodic specialized in-service training of field staff, sensitivity training of agents who will work with native communities, basic skills training for technicians and producer groups in the new technologies and ideas being introduced by the Project, and special activities for the Amuesha, such as bilingual education.

j. Regional Development Policy Support (Loan $1,980,000 and Grant $664,000)

A national level policy-making body--the Secretariat of Regional Affairs--has been created within the Prime Minister's Office to coordinate regional and departmental affairs and the implementation of the multisector development projects. In addition, it provides support and advice to the Coordinating Council of Special Projects, the legal entity (composed of high-level ministerial representatives) charged with monitoring high jungle special projects, and insuring the rational design and implementation of rural development activities. Under the proposed Project, the Secretariat will link the activities of the Palcazu Special Project Office (PEPP) with other ministries, the National Planning Institute, and other special project offices.

Under the Project, the Secretariat and its offices of Planning, Special Projects, and Regional Development Corporations will be strengthened administratively so that they can assist in the design of new high jungle development projects and assure that individual projects are planned, implemented, and evaluated using similar criteria. Use of uniform criteria will permit similar evaluation of benefits and costs and will provide a system for comparing the development potential of various areas and for directing resources to projects with the highest returns and minimal economic, social, and environmental costs. Thus, through the Secretariat, the Project will support the development and implementation of a methodology for planning and execution of high jungle projects. This methodology will be compatible with the resource base, inherent social and technical constraints, and the Peruvian desire and need to develop unsettled regions of the country.

F. Summary Findings

The Project Development Committee has concluded that the Project is administratively, financially, economically, technically, socially, and environmentally feasible and consistent with the development objectives of the GOP and the objectives set forth in USAID's CDSS document. The Project analyses are found in Section IV of the Project Paper.

II. PROJECT BACKGROUND

A. Country Setting

Peru, the third largest country in South America, has a land area of 1.3 million square kilometers. Located south of the equator on the west coast of South America, Peru is bordered by Ecuador and Colombia to the north, Brazil to the east, Bolivia and Chile to the south, and the Pacific Ocean to the west along a 2,253 kilometer coastline.

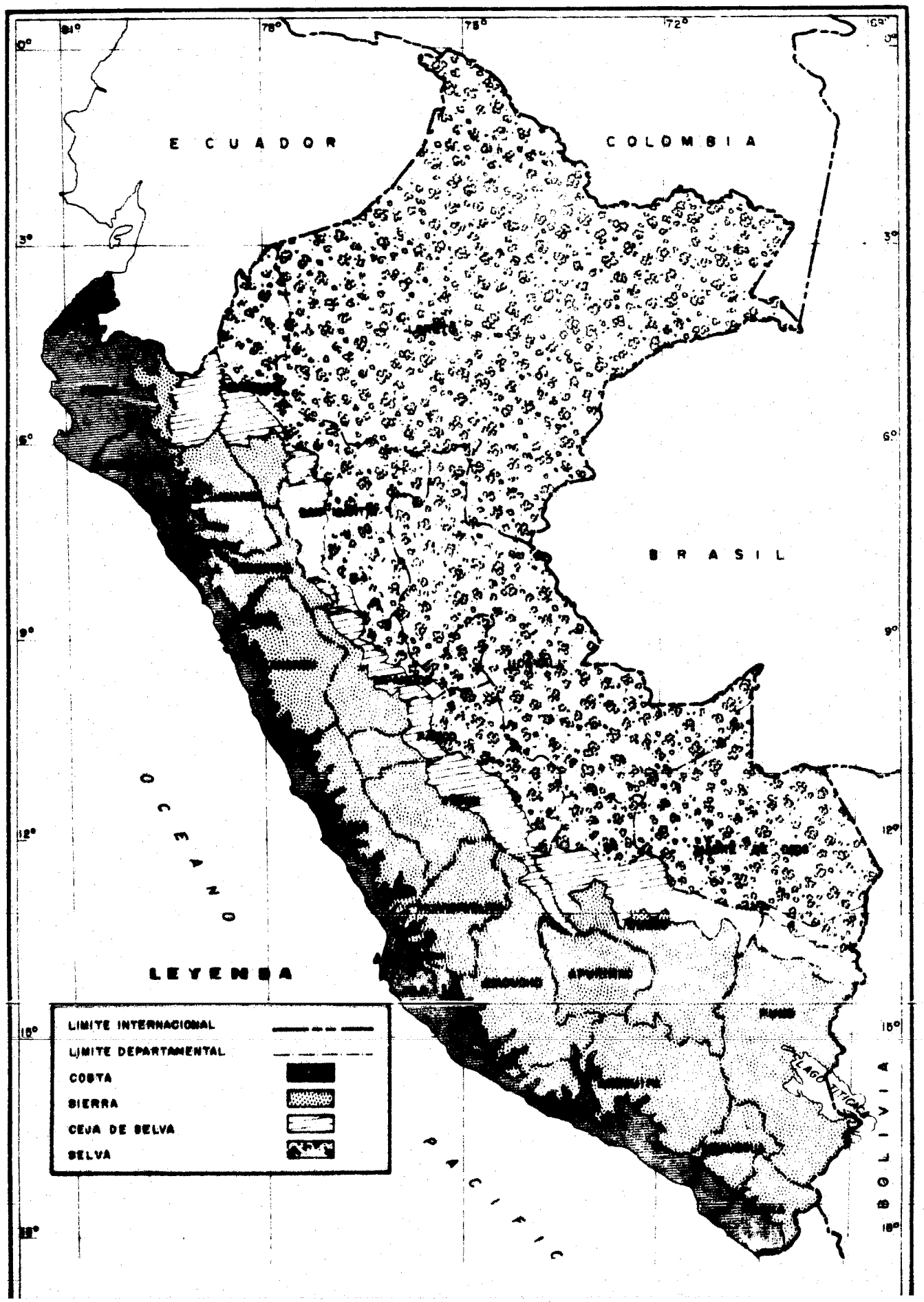
The country is sharply divided into three distinct geographic regions--coast, sierra, and jungle--relatively little of which is favorable for agricultural activity without substantial additional infrastructure investments. Most of the limited lands suitable for agriculture are already under cultivation. Those lands with agricultural potential, but not currently in use, are either in the high jungle, where costs of access to and clearance of lands are high, or in more easily accessible coastal or sierra regions, which are only marginally suitable for agriculture. The ratio of total cropland harvested to total rural population is less than 0.35 hectares; this ratio varies from 0.5-1.0 hectares on the coast to as low as 0.1-0.2 hectares in some areas of the sierra.

The coastal strip--between 16 and 160 kilometers wide--occupies 11% of the national territory, is arid or semiarid, and is uninhabitable and uncultivable except in river valleys irrigated by some 40 rivers which flow to the Pacific. Forty percent of the population lives in these coastal river valleys, principally in Lima which now contains more than a quarter of all Peruvians. Much of the country's agricultural, industrial, and commercial activity is centered on the coast. Sugar cane and cotton are the major cash crops of the coastal area with a number of other crops also cultivated. Coastal temperatures are mild, and rainfall is negligible.

The sierra region, which is the Andes mountain chain running north to south through Peru, is about 120 kilometers wide and occupies 27% of the land area. Climate in the sierra ranges from temperate to frigid; there are two seasons, wet and dry, with rainfall on the eastern mountain slopes exceeding 2,500 mm annually. Approximately 50% of the population, predominantly Indian, lives in the sierra and is primarily engaged in subsistence agriculture. The major mineral deposits are in the sierra. The mountainous terrain poses a formidable barrier to transportation and communications.

This region accounts for more than half of the cultivable land in Peru. However, highly productive, irrigable land is limited to a few valleys with permanent streams. Before the colonial era, the Incas had terraced large areas, but terrace maintenance was abandoned after the conquest. This abandonment, deforestation, and accelerated erosion have resulted in the permanent loss to agriculture of large areas. In addition, less than half of the agricultural land available is used for crops, while the remainder is used for grazing, generally under marginal conditions and often on steep slopes

iA


ECUADOR
COLOMBIA
BRASIL
BOLIVIA
OCEANO PACIFICO
LAGO TITICACA
LEYENDA
LIMITE INTERNACIONAL
LIMITE DEPARTAMENTAL
COSTA
SIERRA
CEJA DE SELVA
SELVA

with unimproved pasture. Crop farming is riksy and difficult, with erratic rainfall and danger of frost. Given deteriorating soil conditions, fallow periods have lengthened and now range up to five to seven years. As altitude increases, agricultural conditions become more difficult. Above 3,700 meters, the crop failure rate is as high as 40%, and only sheep and criollo cattle can survive. Above 4,200 meters, only llama, vicuna, and alpaca can survive. Approximately one-third of Peru's population makes a living in agriculture in the rural sierra and one-fourth of this group live at altitudes above 3,500 meters. Given these conditions, any increase in production in the sierra will have to come from intensification of agricultural methods, such as improved pasture and livestock management, more numerous and better-managed small-scale irrigation works, and the successful transfer of production technology, including the use of fertilizer and improved seeds.

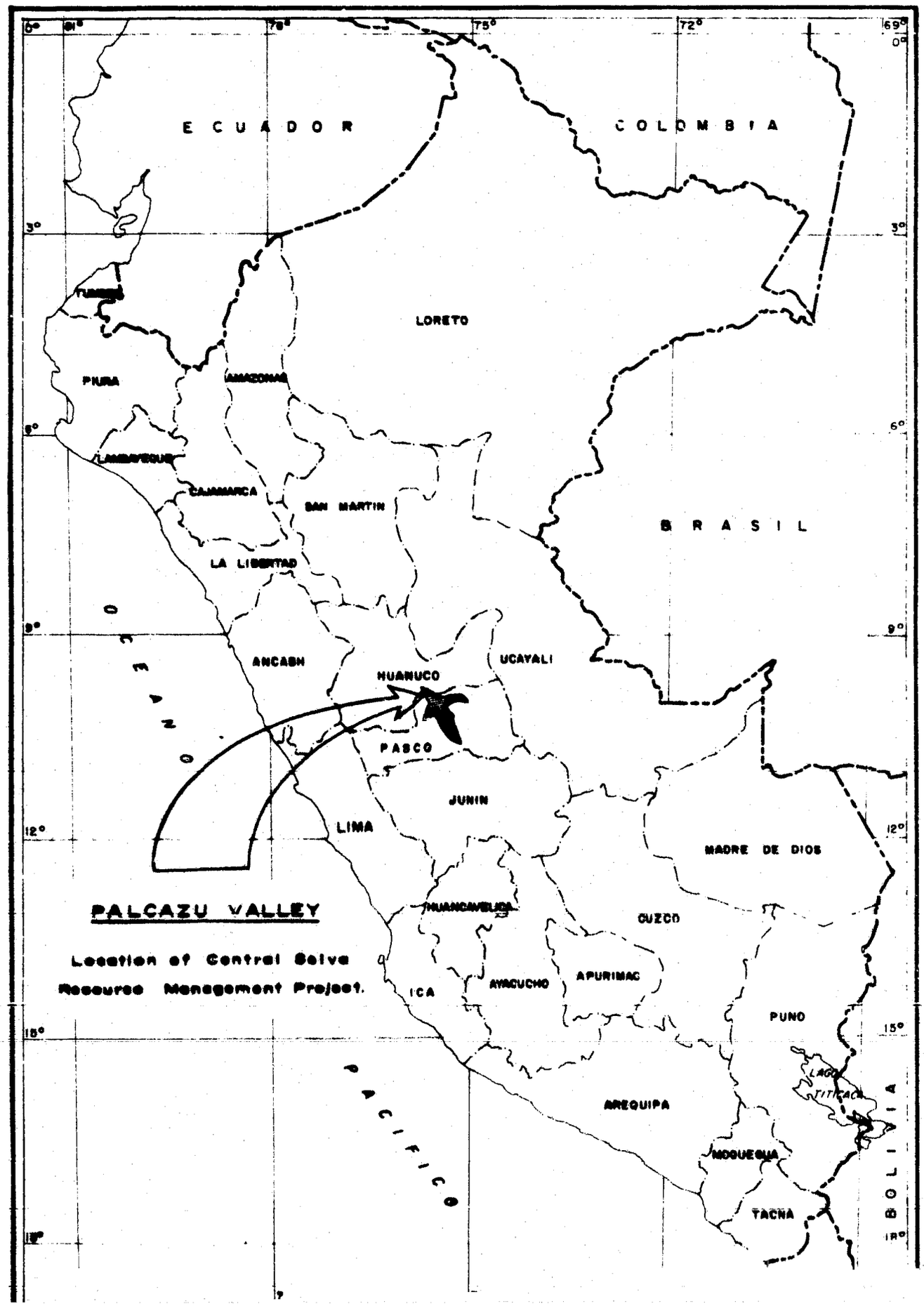
The jungle region occupies over half of Peru's land area, and is sparsely populated and largely underdeveloped. Transportation and communications within the jungle are very difficult; transport by air or by river is most common. The climate is tropical with abundant rainfall. The high jungle (ceja de selva) is more suitable for agriculture, particularly for cultivation of coffee, bananas, yuca, cacao, rice, corn, and tropical and citrus fruits as well as for commercial lumbering. The high jungle offers potential for expanded agriculture, agroindustrial, and agroforestry activities. However, constraints to the development of these activities include severe soil erosion, soil fertility problems, water management problems due to high rainfall levels, and the danger of poor resource use through inappropriate technology. If the high jungle is to be integrated into the national economy as a productive region over the long term, the GOP must introduce techniques of natural resource management in the initial stages of any development effort in the region so as to avoid uncontrolled, inappropriate exploitation.

B. Project Setting

1. Physical Setting

The Peruvian central jungle extends from the eastern slope of the Andes to the Brazilian border and includes large areas of the departments of Huanuco, Pasco, Junin, and Ucayali. Within the central jungle, three watershed basins have become the focus of GOP jungle development efforts: the Pichis, the Palcazu, and the Pachitea. Of these, the Palcazu is the most densely populated--with current estimates in the range of 10,000-15,000 ~~inhabitants--and the smallest in land area, approximately 190,000 hectares or~~ 15% of the total land area of the three watershed basins. This compares with 22% for the Pichis and 63% for the Pachitea. While the area has no current road access, the GOP is building the Marginal Highway through the central jungle to link the north and south. Completion of the highway will facilitate development of the central jungle. The proposed AID Project will be carried out in the Palcazu valley, excluding the "Codo del Pozuzo" area. The "Codo"

2A


ECUADOR
COLOMBIA
BRASIL
BOLIVIA
OCEANO PACIFICO
LORETO
PIURA
AMAZONAS
LAMBAYEQUE
CAJAMARCA
SAN MARTIN
LA LIBERTAD
ANCASH
HUANUCO
UCAYALI
PASCO
JUNIN
LIMA
MADRE DE DIOS
HUANCAVELICA
CUZCO
ICA
AYACUCHO
APURIMAC
PUNO
LAGO TITICACA
AREQUIPA
MOQUEGUA
TACNA
PALCAZU VALLEY
Location of Central Selva
Resource Management Project.

falls under the jurisdiction of the PEPP Office, but because the road into this area will not be completed for several years, it has not been included in the AID Project. The IDB is committed to development of the Pichis valley, and is considering the feasibility of undertaking the support of activities in the Pachitea valley as well.

2. Ecological Conditions and Land Use

A very thorough environmental assessment was carried out in the Palcazu watershed by a team of experts in natural resources and environmental management, tropical land use, tropical livestock, ecological mapping, forestry, hydrology, agronomy, zoology, botany, wildlife biology, tropical epidemiology, and anthropology. Their findings (contained in Annex III, Exhibit A) describe the fragile conditions of the watershed in great detail and outline a course of action for long-term development and management of the area based on sustained productivity consistent with land use capability. The Palcazu watershed is characterized by rough terrain, numerous large and small streams, and very little flat land. The climate is warm and wet, becoming cooler and wetter with increasing elevation. Annual rainfall exceeds 3,000mm throughout the watershed and most places receive 4,000mm or more of rain each year. Flora and fauna exhibit great diversity. Most of the watershed is forested but considerable clearing has occurred in the valley floor. A few of the species of animals found in the area are rare and the existence of some is threatened by hunting. Fish are generally abundant in the rivers, although overfishing is reported in some areas.

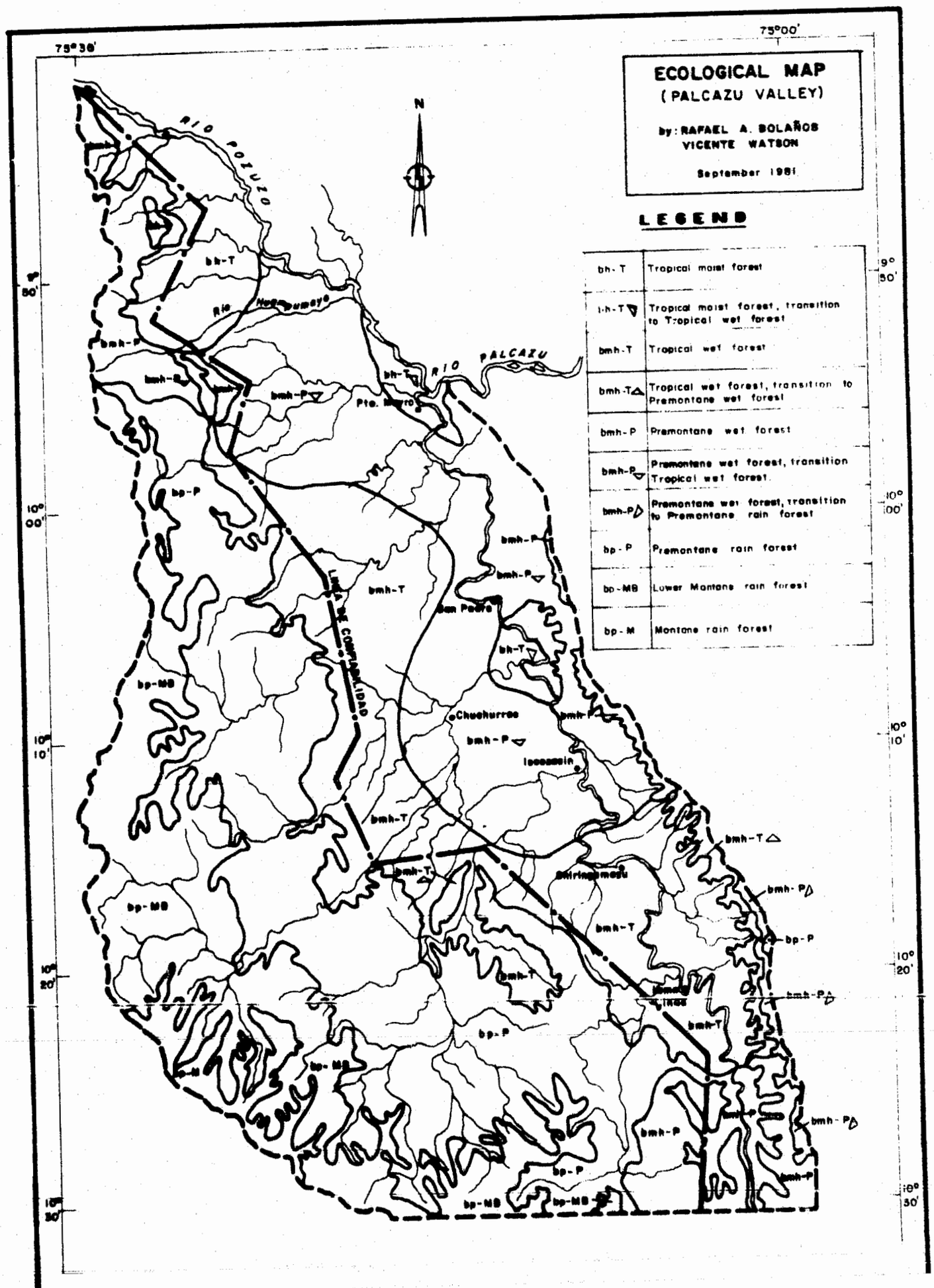
Table II-1 gives an indication of current land use in the valley. According to the table, approximately 1200 hectares were under clean cultivation by colonists and the Amuesha in 1980. Fewer than 500 hectares were in permanent crops. An estimated 12,300 head of cattle and 3,200 head of pigs are raised by colonists and the Amuesha.

Detailed study of 95,000 hectares on the floor of the Palcazu valley resulted in the following assessment of land use capability:

Capability Class	Area (Hectares)	Percent of Area
Clean Cultivation	7,200	8
Pasture	12,671	13
Permanent crops	13,653	14
High Production Forestry	19,150	20
Low Production Forestry	24,646	26
Protection Forest	14,841	16
Riverbed	2,839	3
Total	95,000	100

Because so much of the land in the Palcazu has the capacity for forestry production, and because most of this land is still forested, production forestry holds the greatest potential for development. Forestry concessions have been frozen in the Palcazu valley since late in 1981 as a

3A


ECOLOGICAL MAP
(PALCAZU VALLEY)
by: RAFAEL A. BOLAÑOS
VICENTE WATSON
September 1981
LEGEND
bh-T Tropical moist forest
bh-T Tropical moist forest, transition to Tropical wet forest
bmh-T Tropical wet forest
bmh-T Tropical wet forest, transition to Premontane wet forest
bmh-P Premontane wet forest
bmh-P Premontane wet forest, transition Tropical wet forest
bmh-P Premontane wet forest, transition to Premontane rain forest
bp-P Premontane rain forest
bp-MB Lower Montane rain forest
bp-M Montane rain forest
RIO POZUZO
RIO PALCAZU
Pto. Mayro
San Pedro
Chuchurras
Iscozazin
LINEA DE CONTAMINACION
75°38'
75°00'
9° 50'
10° 00'
10° 10'
10° 20'
10° 30'

result of the concerns regarding the carrying capacity of the valley. The granting of concessions will be reinitiated as appropriate during Project implementation. Agroforestry, the combination of raising timber and permanent crops together, will produce higher incomes than either pasture or clean cultivation. Therefore, it holds a high potential for development also.

The development potential for pasture is limited, because most of the land suited to pasture is already being used for pasture. Similarly, clean cultivation has limited development potential because of the small amount of suitable land.

In order to protect production lands, protection lands must remain forested. These lands are so steep and wet and have such fragile soil that they cannot be used for production forestry or any form of agriculture; their optimal economic use is to protect productive resources.

3. Area Population and Economic Activity

Of the estimated 10,000-15,000 population, about 3,000 are members of Amuesha native communities living on 13 reservations of which nine are legally titled at present and the remaining four are in the process of receiving title. The Amuesha have lived in very dispersed, isolated settlements throughout the area since pre-columbian times. The non-Amuesha population consists of a heterogeneous group of people of Andean, coastal, and jungle origin, and a small but powerful elite of second- and third-generation descendants of European colonists, predominantly of German, Swiss, and Austrian extraction. Since 1975, when the GOP resumed work on the Villa Rica-Puerto Bermudez highway in the Pichis valley, new colonists have arrived in search of lands and are interspersed among the existing land claims.

The economic activities of the non-Amuesha residents of the valley consist of subsistence agriculture, livestock raising, trading, and exploitation of the tropical forest. Pasture is the major land use and much of the valley floor has been cleared and converted to pasture. Some pasture is on land that does not have the capacity to sustain it, but a small percentage of presently uncleared land would be suitable for pasture.

The Amuesha still practice slash-and-burn horticulture, but they have become increasingly sedentary within their communal land grants or on individual land claims. They are also increasingly producing food (including rice, poultry, and cattle) and exploiting fish and game resources for sale or trade within the valley's local economy. A few Amuesha own small stores but trading activities are still largely controlled by the large ranchers. Estimated gross agricultural production in the valley for colonists

and the Amuesha is shown in Table II-1.

4. Governmental and Social Services

The administrative functions of government are carried out by lieutenant governors, justices of the peace, and representatives of the municipalities--positions which in general are filled by members of the large ranchers' group and Amuesha community members. An additional government organization is the Iscozacin Agricultural District (IAD) of the Ministry of Agriculture. IAD is staffed by three agricultural technicians who collect statistical data and treat animal health problems. These tasks and the occasional technical assistance offered by these agents are limited by their training and ability and by the lack of reliable means of transportation; the work they do carry out primarily benefits the large ranchers. Other government services are extremely limited in the valley, apart from the secondary school in Iscozacin, the bilingual primary schools in the native communities, and sanitary posts in some communities and settlements. In some cases, the delivery of government services is poor because of insensitive management, inadequate equipment, and minimally trained personnel.

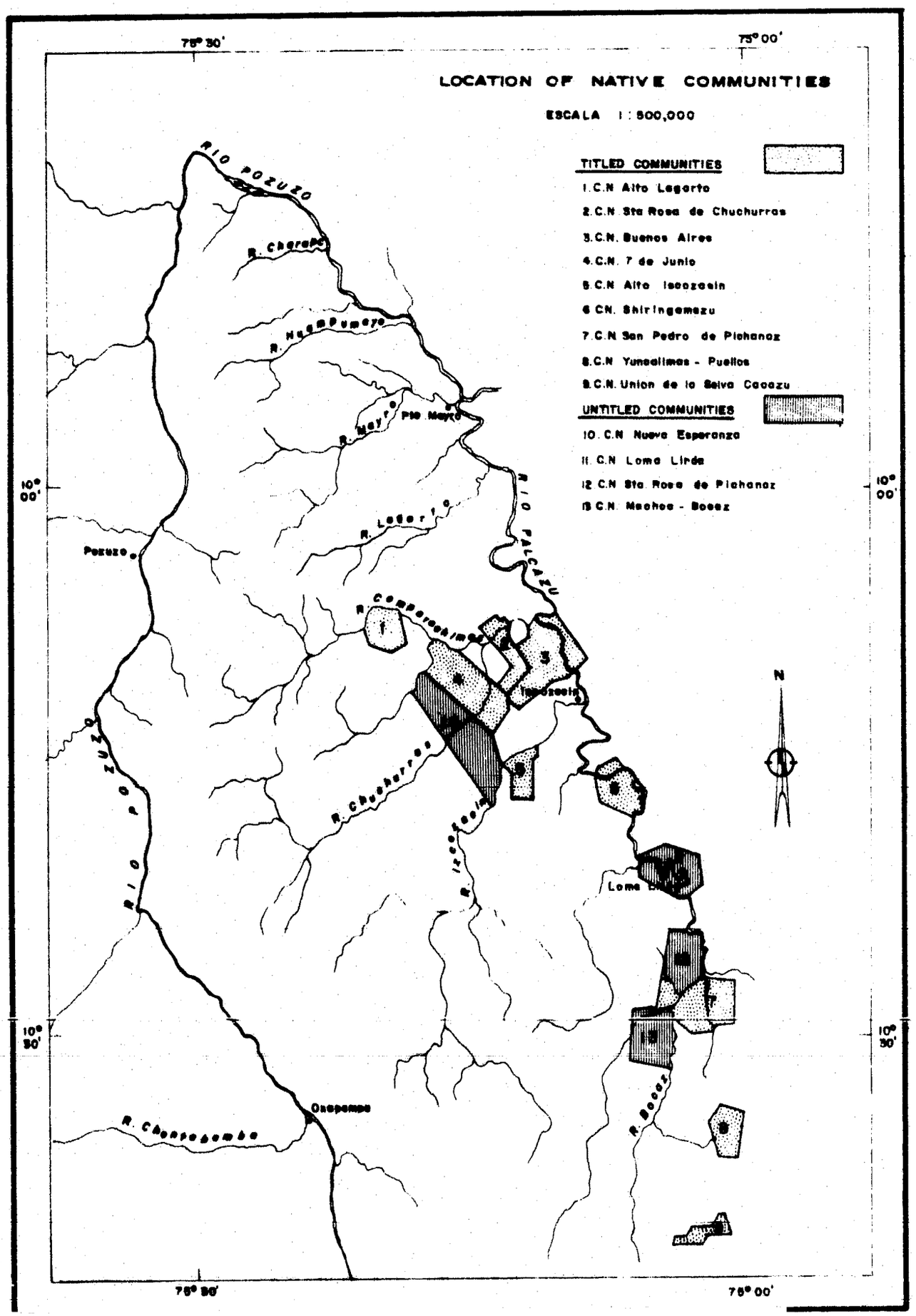
The Palcazu valley is faced with a severe shortage of basic health services. The serious health problems affecting the valley include parasitic diseases--which affect the entire population and account for an estimated 50% of deaths--as well as respiratory disease, enteritis, and hepatitis. The Ministry of Health is responsible for providing health care to the area population, but services is the valley are limited to seven health posts, each equipped inadequately and staffed by a health promoter with minimal training. Traditional health care is provided by curanderos (healers) and self-trained midwives. Serious illness must be treated in La Merced, but is beyond economic and transportation means of all but a few people.

5. Pichis Palcazu Special Project Office (PEPP)

The best organized and most effective office in the Palcazu is the multisectoral special project office, which will have sub-offices throughout the valley. This PEPP office (Proyecto Especial Pichis Palcazu) was established in November 1980 to plan and implement a development project which would maximize sustained productivity in the area. The decision to establish the implementing agency was based on the Mission's successful experience with a similar administrative mechanism under the Sub-Tropical Lands Project. USAID has maintained a close collaborative relationship with the PEPP office in all aspects of project development and has provided start-up funding (Grant Agreement No. 527-0166) for the office.

As an initial step in the implementation and development of such a project, PEPP signed an agreement with the Ministry of Agriculture (MinAg) Agrarian Reform Office and Rural Cadastral Office (OGCR) and ONERN to carry out a cadastral survey and a potential land use study of the floor of the Palcazu valley. PEPP assigns top priority to land titling for inhabitants

5A


LOCATION OF NATIVE COMMUNITIES
ESCALA 1 : 500,000
TITLED COMMUNITIES
1. C.N Alto Lagarto
2. C.N Sta Rosa de Chuchurras
3. C.N. Buenos Aires
4. C.N. 7 de Junio
5. C.N Alto Isacazain
6. C.N. Shiringamazu
7. C.N San Pedro de Pichanaz
8. C.N Yunaimas - Puellos
9. C.N. Union de la Selva Cacazu
UNTITLED COMMUNITIES
10. C.N Nuevo Esperanza
11. C.N Loma Linda
12. C.N Sta Rosa de Pichanaz
13. C.N. Machea - Boaez
RIO POZUZO
R. Charapa
R. Huampumaya
R. Mayro
Pto. Mayro
R. Lagarto
RIO PALCAZU
R. Comparasimaz
Isacazain
R. Chuchurras
R. Isacazain
Loma
R. Boaez
Pozuzo
Oxapampa
R. Chorobamba
N
75° 30'
75° 00'
10° 00'
10° 30'

of the zone, including the native communities. In order to provide the framework and funding to carry out a complete, updated cadaster and titling of the existing land holdings in the Palcazu valley, PEPP signed an agreement with the MinAg Agrarian Reform Office in August 1981. The PEPP Office reports that it has titled 6% of the land in the Project area, as well as nine of the Amuesha communities in the valley. The Minister of Agriculture has expressed his strong concern that the land rights of the native communities be preserved and has directed the Agrarian Reform and Rural Cadastral Offices of the MinAg to recheck and complete the delineation of the native community boundaries and to resolve outstanding land title problems of the communities and other inhabitants of the Palcazu valley.

The GOP recognizes that protection of the Project area environment is necessary to insure the productive long-term management of valley's resources. ONERN has now completed work on semi-detailed soils and land use capability studies and maps of the areas which are being used by PEPP to establish land holding limits and appropriate land uses, including the delimitation of very large potential forest reserve areas. Additionally, as a result of USAID/PEPP concerns, the Minister of Agriculture has stopped all processing of requests for new land and timber concessions in the Project region and frozen those already in varying stages of approval until a coherent production and management plan has been developed.

C. The Problem

The proposed Project will address the basic problem facing the GOP in its high jungle development strategy: Management of fragile high jungle areas such as the Palcazu as long-term productive resources. The GOP has repeated its commitment to the development of the high jungle on many occasions. Experience in Peru and elsewhere has proved that the high jungle is a difficult area to develop; scientists, ecologists, and development planners continue to search for a replicable methodology for rational economic exploitation of jungle resources on a sustainable basis. Originally, the GOP chose the central jungle as one of its priority areas for development, believing that it had the potential to become an area of significant foodstuff production for the country. The government requested AID support in this development, and the Mission made resources available to establish a special project office and carry out detailed analyses of the area. These preliminary AID-funded feasibility studies in the Palcazu valley showed that the development potential of the area is more limited and that, without rational management, serious resource degradation and loss of productive resources could result. In virtually all high and low jungle areas being opened to development by the GOP, this degradation would likely result from spontaneous colonization following road construction and the application of inappropriate land use technologies. Moreover, in much of the area, spontaneous colonization could jeopardize the rights of native communities. Similarly, if protection areas are not adequately managed, illegal lumber extraction will

take place.

As a result the findings of the AID-financed feasibility studies, the GOP has made significant modifications to its approach to development of the fragile central jungle region. No longer does the GOP expect to resettle large numbers of colonists in the central jungle to exploit a highly productive agricultural area. Rather, the GOP, with AID assistance, proposes to develop the resources of the valley in a manner which will assure long-term sustained productivity and to design and test a sound methodology for the development of other such ecologically fragile areas-- a methodology which can be transferred to other high jungle regions selected for development and which protects the rights of native communities.

Without this Project, both the short- and long-term consequences in the Palcazu and at the national level are likely to be serious. In the Palcazu, colonization, lumber extraction, and cattle raising--if not properly managed--could result in resource degradation which would seriously affect productivity and probably render the valley uninhabitable within a matter of several years. At the national level, failure to pass on the lessons learned from the development of one specific area to other areas, about rational management of the productive resources of ecologically fragile areas, will result in duplication of efforts or inappropriate management. Without rational development planning and long-range management of these natural resources, short-term exploitation will occur wherever access permits. Once the resources are exhausted, it will take decades to replace them.

Several factors condition the design and implementation of a sound policy for opening new, environmentally fragile areas for development. At the micro level, the design of regional development projects must take into account a number of environmental, agronomic, administrative, and social factors. In the case of the Palcazu valley, climate and terrain--extremely high rainfall and steep slopes with little flat land--pose constraints to agricultural activity. Soil compaction and erosion are serious problems; cultivation, harvesting, drying, and storage are all activities made more difficult by the high rainfall and irregular terrain of the area. Agronomic factors which limit the net production of Amazonic forest areas are weed and pest competition, nutrient leaching or inmobilization, high soil acidity, molds and diseases caused by excess moisture, and erosion by heavy downpours. In the Palcazu valley, the poor soils, together with extremely high rainfall, limit the productivity of row crops and pasture even on lands classified as having the capacity for those uses. Current land use patterns in the valley are at best inefficient; at worst, they are destroying the land, making it unfit for future use. An additional land use constraint is the danger of timber exploitation in areas unsuited for lumbering operations; irrational exploitation could cause irreversible damage to soils, flora, and fauna in the area.

Another constraint associated with expanded production is the lack of appropriate soil management and crop rotation practices in order to avoid the lengthy fallow required to restore soil fertility. In addition, the isolated location of the Project area has presented problems in marketing. Distance from traditional markets; absence of roads; and inadequate drying, storage, and transportation facilities are all factors which have inhibited the growth of agricultural production beyond subsistence needs. Administrative and human resources constraints include lack of a complete rural cadaster, land titling, formal financial institutions, and trained professionals in agriculture (both researchers and extension agents), forestry, health, education, communication, and housing.

Finally, the hierarchical social structure which exists in the area is an important additional consideration warranting special attention. The Project area is culturally diverse and the native communities, in particular, have not been integrated into the local society and thus have not benefited either economically, legally, or socially from past development in the area. Natives as well as the smaller colonists are often ignorant of and thus powerless to enforce their existing rights; they are discouraged by red tape when dealing with financial, governmental, and other institutional bureaucracies which require them to spend money and time travelling to follow up on any request for aid.

At the national level, Peru has not yet established a permanent capacity to: (1) develop a coherent high jungle development strategy based on tested and proven models; (2) gather, analyze, and disseminate information regarding high jungle development technologies; or (3) conduct prefeasibility studies for area development projects and evaluate the results of past and current projects in order to better identify investment opportunities. By analyzing the technical, social, environmental, and economic benefits of opening high jungle areas, the GOP could select technologies based on research results and make rational investment decisions in specific areas. National-level planners would then be able to devise a coherent long-range jungle development plan. While the GOP has successfully used and will continue to use special project offices to implement a series of development projects, no permanent pool of expertise currently exists within the GOP to assist them and other GOP entities in the design of future projects for managing resources to insure maximum long-term productivity.

D. Project Rationale

When the GOP first requested AID assistance in developing the proposed Project, the Mission approached it cautiously, recognizing that the area would be a difficult one to develop and that it could present some very special problems. The Mission also recognized that the GOP was committed to developing the high jungle and that if AID were not involved, the financing required would become available from GOP resources or some other source. The government's request, however, was also a challenge since it afforded AID the opportunity to influence the development process in ways which other donors

might not attempt because of the specialized nature of the technical knowledge required to develop the Project, the long time period needed for the studies, or the need for a resident staff who could be closely involved over an extended period in the development of the Project.

The Project gives AID the opportunity to influence the development of the high jungle by assuring that this development is planned in a rational manner, using a sustained production approach rather than an "exploit-and-move-on" approach which could permanently destroy large segments of the high jungle. With or without AID assistance, the Project area and other areas of the high jungle will be developed. However, without the expertise that AID can provide, land use will not be optimal; unprotected forests are likely to be harvested irrationally once the access road is completed; and long-range sustained use of the land will be endangered. The consequences for high jungle farmers and for the long-term productive base of the national economy could be extremely serious. Fully cognizant of these consequences, the AID Project has been designed to guide development efforts by identifying land use capability, encouraging optimal use of the land, and protecting certain areas whose vital contribution to productivity is to remain untouched.

Thus, the Project successfully implemented will serve not only to develop the agricultural, agroforestry, and forestry production possibilities of the Palcazu valley, but also to guide high jungle development in other similar areas. AID places considerable importance on the methodology of optimizing resource use: examination of the long-term land use capability of a certain area and development of the area accordingly. The Project will produce technologies which are not only appropriate for the Palcazu valley, but also applicable and transferable to other areas. However, since climate and other factors vary in each region, the more significant output of the Project will be a production methodology to optimize land use in the high jungle. With appropriate adjustments, this methodology will be applicable to other high jungle areas as they are opened for development.

The Mission sector strategy recognizes that the GOP has set top priority for the development of the high jungle and, in particular, the central jungle. While the Mission is aware of the many serious problems which the development of this area poses, we believe that a fundamental change has recently occurred in the GOP's understanding of the consequences of traditional development in the high jungle. The government now realizes that the entire high jungle cannot be treated identically and that the productive potential of each watershed in the region is distinguished by differing rainfall, topography, geologic formation, soil type and capability, flora, and fauna. This is a significant change in developmental thinking in Peru—one which has occurred at least in part because of AID's activities-- and one which the Mission believes must be supported in order to further strengthen and institutionalize rational development planning.

Development of the central jungle (Pichis-Palcazu-Pachitea) was originally envisioned to follow completion of roads, already under construction, connecting the area to markets in Lima and other urban centers.

Peru has had experience in similar areas rich in forest and other natural resources in which road construction has become the focal point rather than a part of rational regional development planning. Experiences such as the 1962 Tingo Maria-Tocache development project and the present resource degradation problems in the Ayacucho department have demonstrated the detrimental effects of spontaneous, uncontrolled colonization and the resulting rapid deterioration of the resource base. These past experiences--not only in Peru, but also in Brazil, Colombia, and Bolivia--have led to increased public and government awareness of the danger of irrational exploitation of the land and the need to orient development activities toward rational and productive land use through the conservation of the natural base.

The Project will also support a national-level objective: that of fostering within the GOP a resource management approach to high jungle development. The Secretariat of Regional Affairs will be the repository of GOP experience in planning, designing, and implementing land use capability studies in all high jungle areas. A small, specialized staff will insure coordination of high jungle activities at the national level and the establishment and implementation of a development strategy for the high jungle. In the future, the Secretariat will have the capability to support the design and execution of prefeasibility studies carried out for each new regional project. A practical result of the experience with the development of a rational land use study for the Palcazu is that the GOP is already planning similar studies for the Pichis and Pachitea.

The data gathered and analyzed in these studies will assist the Secretariat to coordinate the implementation of a methodology for sustained, productive land use and to identify technologies which are transferable. In addition, the Secretariat will keep abreast of the research efforts of regional universities so that research results are disseminated and used in other areas. Finally, the Secretariat will work with the responsible GOP entity towards the establishment of a national native communities strategy so that the native communities can be brought into the development scheme as beneficiaries.

In summary, in the particular case of the Palcazu, options for the sustained development of the Palcazu are limited. Project area land is neither the richest nor the most promising, but Peru on the whole has this same problem, as less than 3% of the total land area of the country is suitable for intensive agriculture. Thus, the proposed Project supports an increase in agricultural production in the area in a rational way, based on optimum land use capability. Similarly, although the area may not support more settlers for farming activities, an increase in the current population in services (transportation, cottage industries, commerce, etc.) and agroindustrial processing plants is proposed. A national park program will be developed for the area's steepest slopes which are not suited to agriculture, and which must be protected if agricultural activities are to be successful on a sustainable basis on the valley floor. The program will propose tourism activities for these areas which could have significant positive economic benefits for the valley residents.

E. Project Strategy

The Project's objective is to maximize long-term sustainable productivity through effective management of the area's resources. By supporting the Project management structure and productive activities in the Palcazu watershed, the proposed Project will demonstrate that sustainable production can result from proper use of high jungle natural resources. The Project will take into consideration the special concerns and status of the Amuesha native communities located in the Palcazu valley in a way that is compatible with their society and traditions. At the national level, the Project will support the establishment within the GOP of a permanent capacity to examine regional development projects in the high jungle.

Project activities in the Palcazu valley are designed to achieve long-term economic and social benefits which result from the appropriate, productive uses of the natural resources of the area on a rational, sustained-yield basis. Successful Project implementation will also demonstrate the replicability of Project methodology in the large portion of Peru which is tropical humid forest. The resource management focus of the Project will demonstrate methods designed to increase the agricultural and forestry potential of the area on a sustainable basis. This element will aim toward increasing the incomes of the inhabitants of the region within the framework of improved environmental protection and conservation. Without such increases in income, farmers are not likely to continue the new practices, and without increases in regional production, the GOP will show little interest in replicating this program in other tropical forest areas. In addition to improving farmer incomes, the Project will achieve a significant employment generation benefit in support services such as transportation, processing, and marketing.

Another element in the Project strategy is to foster the application of a land use classification system and to increase the capacity of the GOP to plan and implement the projects using natural resource data. The land use system developed under this Project will be tested and evaluated as a methodology for determining optimal land use in other areas of the high jungle.

At the national level, the Project strategy is to support the Secretariat of Regional Affairs, a policy and planning entity which will institutionalize the current ad hoc arrangements for high jungle development based on the natural resource management approach begun in the central jungle. The Secretariat will facilitate the spread of benefits of the natural resource management/agricultural production model from one area to another, using the transmission features of a national office. It will also assist in the development of nationwide policy in appropriate areas such as assuring that native communities participate as equal partners and share in the benefits of integrated regional development projects. This particular policy will be primarily concerned with protecting the existing rights of the native communities, granting titles to existing native claims, and providing the

native communities with extension services and technical assistance which are adapted to native agricultural and social customs. In addition, the Secretariat will influence other donor project strategies; coordinate the various agencies involved in agricultural and natural resource programs; review and compile the existing land use and natural resource laws and policies into a comprehensive and effective package; propose new laws and policies; and insure coherence among the key institutions involved in the agricultural and natural resource policy-making.

F. USAID Assistance Strategy

1. Relationship to the USAID CDSS

Development of the high jungle is a priority GOP concern. For AID, the promotion of economic growth and increased productivity in both the high jungle and the sierra is a key component in the Mission development strategy. As cited in recent CDSS documents, Mission agricultural projects address two key issues: increasing and revitalizing agricultural production, and developing a framework for the rational use of Peru's limited agricultural resources. The proposed Project is in line with both of these objectives. Project activities are designed to achieve positive economic and financial returns based on rational, sustained yields.

As highlighted in the FY 84 CDSS, the development assistance resources of the Mission will be specifically targeted to projects and areas in which AID can influence significant policy changes and innovations. As discussed earlier, AID involvement in the design of the Project has already had a significant impact on the GOP's approach to development of the high jungle. The Project will assist the GOP to develop nationwide, comprehensive policies which will be institutionalized through the Secretariat of Regional Affairs. Assuring that this important body is on the right policy track will also mean that Project benefits and experiences are carried over to other donor efforts in the high jungle.

Until recently, less attention had been paid to the importance over the long term of preserving and developing Peru's resource base--soil, water, forests, and wildlife--to maximize long-term productivity, because of short-term agriculture production requirements. The GOP has become increasingly concerned over the ineffective management of water and land resources as food demands grow and as forest areas are destroyed due to population pressures as well as destructive forestry and cultivation practices.

The development strategy of the Project is also in line with the GOP and AID goal of using the private sector as the mechanism to achieve long-term growth. The high jungle is a frontier, with none of the physical or social infrastructure which development requires; initial public sector investments are basic. But, consistent with its overall economic policy, the GOP will rely on the private sector to take the lead in the area's economic growth. The concept of the small farmer as a businessman--and the provision of the services and policies that this businessman needs--has been

incorporated into the activities of the PEPP and the design of this Project. The PEPP is expressely committed to using the private sector wherever feasible, and to turning over its own economic functions to private ownership as soon as the possibility exists. To carry out this strategy, the GOP is actively exploring ways in which private business can be attracted to high jungle areas, and concrete steps have been taken in this direction with the creation of the Private Sector Integrated Development Project (PRIDI) under the Ministry of Agriculture. Technologies developed in the Palcazu will be very useful to this effort.

2. Relationship to Ongoing USAID Projects

AID has developed major bilateral loans and grants in support of GOP programs to promote high jungle economic growth; these include Sub-Tropical Lands (527-0163), and Upper Huallaga Area Development (527-0244). With these projects, and several other such as Integrated Regional Development (527-0178), AID has encouraged cooperation and coordination with regional development corporations and has thus fostered decentralized development decision-making. With the proposed Project, AID will support and guide GOP regional development efforts to develop an additional area of the high jungle and, at the same time, will strengthen the existing national-level Secretariat of Regional Affairs by providing technicians who can transfer field lessons learned in current projects to other high jungle development activities. This Secretariat will serve as a clearing house for the information generated by special project research and demonstration; its technicians will disseminate that information as they help to plan other similar activities.

The Project complements other Mission programs in other areas. Two ongoing grants--Land Use Inventory and Environmental Planning (527--0202) implemented by the National Office of Natural Resources (ONERN), and Soil Conservation (527-0220) implemented by the Ministry of Agriculture--are assisting the GOP to develop techniques aimed at increasing rural incomes by conserving the natural resource base of soil and water by improving agricultural and forestry practices. For the past eight years, an AID centrally funded tropical soil management grant (AID-TA-C-1236) with North Carolina State University has been active in Yurimaguas, a moist tropical forest area characterized by slash-and-burn agricultural production. Research carried out in Yurimaguas has been oriented toward maintaining sustained economic production on soils which are subject to decreasing production following clearing. In addition to these grants, the Mission is also funding a loan/grant project, Agricultural Research, Extension and Education (527-0192), to carry out crop-specific research and extension in various regions of the country.

G. GOP and Other Donor Activities

In November 1980, the GOP established a multisectorial office for the Pichis/Palcazu/Pachitea Special Project (PEPP). To assist in the development of these central jungle valleys, the government has enlisted the

assistance of several donors besides AID. These include the Inter-American Development Bank (IDB), the World Bank, the Kreditanstalt fur Wiederaufban (KFW) of West Germany, the Belgian Government, and the Canadian International Development Agency (CIDA). As a result of AID's early and rapid response to the GOP's request, the Mission has been able to play a leadership role in the planning and design of high jungle development activities, which has helped other donors focus their activities in the high jungle. Preliminary AID studies for the proposed CSRM Project have been made available to other donors and considerable consultation with those donors has taken place.

The IDB is in the process of designing a rural development project for the Pichis valley and possibly for the Pachitea. Feasibility studies for that project are currently being carried out. The GOP has requested US$76,000,000 from IDB for this project.

A World Bank Mission visited the PEPP project area in March-April 1981 to explore the possibility of financing a rural development project in the Satipo-Chanchamayo area. The Bank is currently carrying out feasibility studies for this undertaking.

The West Germany KFW has agreed to finance a road from Villa Rica to Puerto Bermudez as well as rural development program for Oxapampa. Total financing is estimated at $5,000,000.

As part of an earlier Belgian-Peruvian cooperative effort in Pucallpa (Proyecto Agro Silvo Pastoril), the Belgian Government has agreed to support development activities in the Von Humboldt Forest. The amount of assistance provided is to be determined.

Finally, the Canadian agency, CIDA, will provide assistance to Peru through a nationwide forestry development program ($35 million), a portion of which will be available for the Pichis/Palcazu/Pachitea area.

Table II-1
Estimated Gross Agricultural Production in the Palcazu Valley - 1980[a]

	Harvested Area (ha) Colonist	Amuesha	TOTAL	Yield[d] T/ha	Total Production Tons.	Price[b] S/. Kg	Gross Value (000Soles)	
ANNUAL CROPS								
Rice	100	215	315	1.0	315	90	28,350	
Beans	20	32	52	.7	36.4	100	3,640	
Corn	100	234	334	1.2	401	50	20,000	
Yuca	300	217	517	12.5	6,462	20	129,250	
Peanuts	-	3	3	1.2	36	100	360	
TOTALS:	520	701	1221					153,250
PERENNIAL CROPS								
Plantains	150	143	293	7.0	2,051	50	102,550	
Citrus	10	10	20	8.0	160	30	4,800	
Cacao	4	12	16	.4	6.4	680	4,352	
Achiote	100	?	100	1.0	100	150	15,000	
TOTALS:	264	165	429					126,702
LIVESTOCK[c] (pasture)			15,000 ha					
Beef			2790 head		466	420	195,711	
Pork			480 head		14	350	5,040	
TOTALS:								200,751
ESTIMATED GROSS AGRICULTURAL PRODUCTION (000 SOLES)								480,763

a/Areas of crop production have been based on recent census of the native communities(PEPP, 1981) and estimates of the Distrito Agropecuario de Puerto Bermudez (1979-80 campaign) (Villachica, 1981). Although coffee is produced in the upper watershed, no data was available concerning areas cultivated.
b/Data reflecting realistic farm gate prides is conflicting. Guesstimates are based on Villachia, 1981; Muro, 1981; and interviews with Palcazu farmers.
c/Meat flown to San Ramon 1980-81, (Staver, 1981). Total number of cattle sold was calculated by dividing the total weight of meat by an average carcass weight of 167 kgs. Estimated average pig carcass was 30 kgs.
d/Yield estimates are problematic since there is very little reliable data. Actual yields were estimated from data generated in the Upper Huallaga Agricultural Development Project (USAID, 1981), Villachica (1981), Muro (1981), and farmer interviews.

Source: Annex III, Exhibit A, JRB Report, Annex K, page K-18.

III. PROJECT DESCRIPTION

A. Project Goal and Purpose

The sector goal is to increase the employment and income of the rural population of Peru by increasing production and total resource productivity. The Project goal is to increase and diversify agricultural production in the Peruvian high jungle.

The Project purpose is to plan and execute a development project for sustained production in the Palcazu valley, and thereby test and institutionalize a methodology for the long-range management of Peru's high jungle human and natural resources. At the end of the Project a capacity will be established within the GOP to design and carry out similar regional development projects.

The Project purpose will be achieved: (1) by developing and testing a methodology to promote sustained productivity in the Palcazu watershed; and (2) by building within the GOP's Secretariat of Regional Affairs the capacity to gather, analyze, disseminate, and apply technical and scientific information for the planning and implementation of integrated regional development projects in the high jungle and other areas.

In the Palcazu valley, the Project will support the implementation of an integrated regional development project based on sustained production, environmental safeguards, and protection of the native community lands in the area. The specific activities to be carried out include: project management, forestry, agricultural development, livestock development, protection, continuous land use inventory, health and environmental sanitation, feeder road location planning and road maintenance, and communications.

At the national level, the Project will support the Secretariat of Regional Affairs. Through Project-sponsored activities, the Secretariat will develop the capability to formulate a strategy emphasizing high jungle development and to coordinate the research, design, and development of the highest priority projects identified through this strategy. This office will also be responsible for evaluating current, prior, and future projects and for collecting, interpreting, and disseminating data obtained from projects.

B. End-of-Project Status

By the end of the Project, the following conditions should exist indicating that the Project purpose has been achieved:

1. Development of the Palcazu valley will be under way using technology appropriate to long-term maximization of productivity. Specifically, the following conditions will exist:

a. Lands suitable for production forestry, permanent crops, pasture, and clean cultivation will have been designated. Production forestry lands will be managed in parcels by individual families or native communities. These parcels will be partially harvested and natural forest regeneration will be occurring after harvest. Processing and transportation systems for forest products will be operating.

b. Native community lands and family-sized parcels will be producing various tree crops and other permanent crops. These crops will be marketed directly or will be used as feed for livestock, usually swine. Systems for processing and transporting agroforestry products will be operating.

c. Pastures and livestock on lands suitable for pasture will have been improved. Cattle productivity will have increased on existing pasture lands and swine production will be increasing on other lands.

d. A functioning cadaster and registry system will exist and a complete set of maps of the Palcazu watershed will show each parcel, its ownership, its land use capability, and its actual land use. A management plan will have been designed and applied to each parcel.

e. A group of trained MOH health technicians, promoters, and midwives will be providing rural health services in the valley. Seven health posts will be equipped with motor boats, motorcycles, refrigerators and cold chests, basic furniture, and medical equipment. Potable water systems and latrines will have been constructed in up to 20 area communities.

f. A local capability will have been created to maintain the Palcazu road network and to operate and maintain road maintenance equipment. Feeder road location studies will also have been carried out.

g. The Yanachaga and San Matias range protection forests and the national parks will have been established. The forest will include representation of all the ecosystems in the Palcazu watershed. An inventory of forest resources will have been completed, as will a management plan for its use.

h. A communications network will be in place in the Palcazu, facilitating communications both within the valley and with other areas of the country.

2. The PEPP office will have a well-trained, capable staff who are coordinating with other agencies, particularly those in the Ministry of Agriculture, to carry out activities in research, extension, national parks, forest management, agricultural production, and livestock promotion. The INIPA system of promotion and extension will be operating throughout the ~~Palcazu, and each social group--Amuesha native communities, small settlers,~~ and large ranchers--will be receiving appropriate assistance. Credit will be available in the Project area on a continuing basis for agriculture, forestry, and livestock (other than cattle) raised in conjunction with agricultural activities. A data collection system--including aerial reconnaissance, photography, and mapping; meteorological and hydrologic stations; and inventories of forests, permanent crops, livestock, and fisheries--will be in place, disseminating Project information.

3. At the national level, an agency of the GOP, the Secretriat for Regional Affairs, will have the capacity to plan and coordinate rural development activities. This agency will have a trained staff capable of carrying out planning, research, data interpretation, project evaluation, and training; access to technical expertise from other agencies and outside consultants; good working relations with other GOP agencies, especially those responsible for local special projects; and the ability to evaluate the technical, social, economic, and environmental strengths and weaknesses of prior, current, and future development projects.

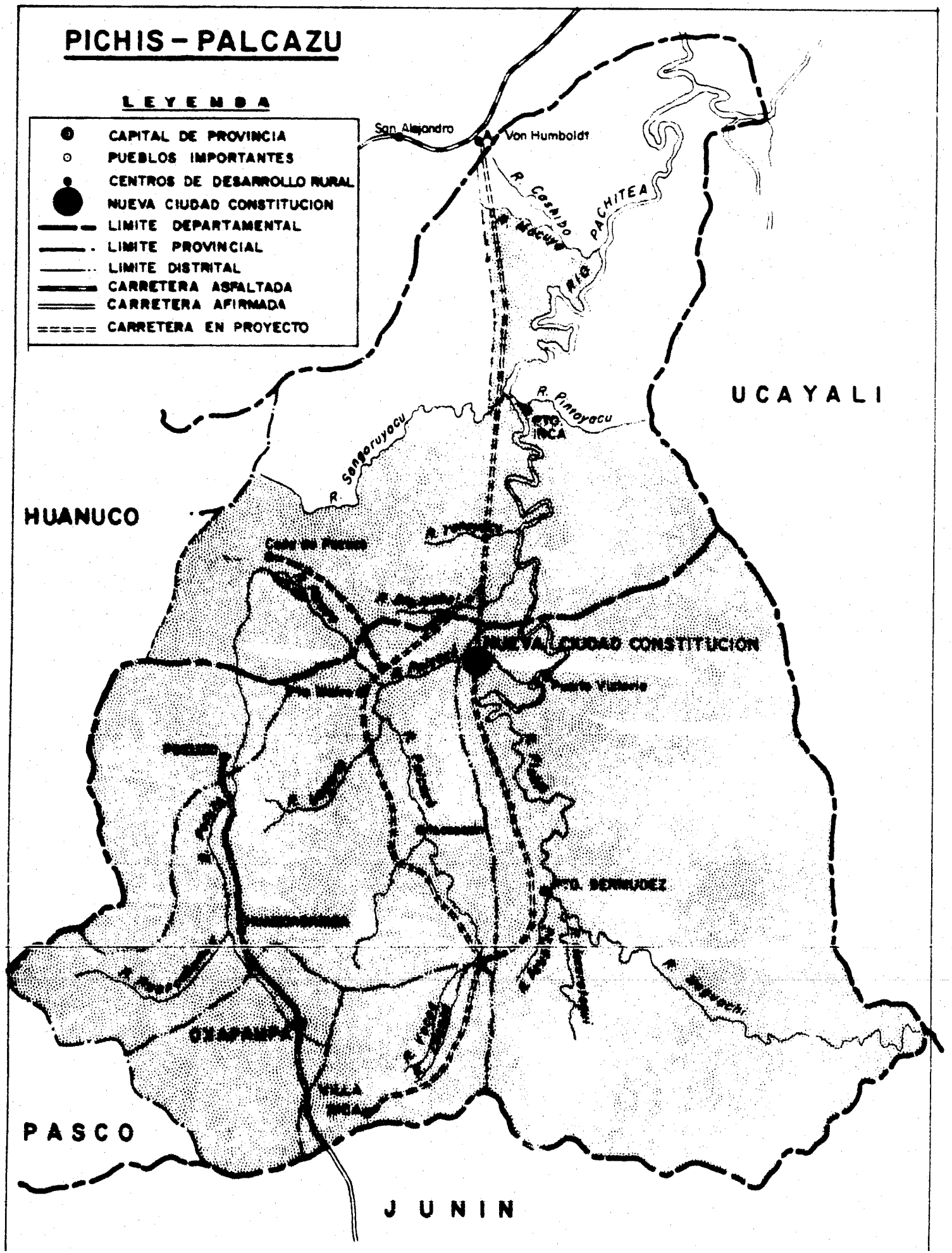
C. Project Activities

1. Background

The proposed Project was first discussed with the prior government and listed in the Mission's FY 82 ABS as Sub-Tropical Lands II (Pichis-Palcazu). Shortly after his inauguration in July 1980, President Belaunde approached USAID with a request for development assistance to finance a project in the Pichis, Palcazu, and Pachitea valleys of the central jungle. Because the Mission had been considering such a project in FY 82, it was able to respond rapidly to the GOP request, which represents one of the major pieces in the government's high jungle development focus. This response fostered a close working relationship with the new government, and as a result, the Mission has had an opportunity to play a key leadership role, particularly regarding natural resource management and native community issues, in a region which the GOP has committed itself to developing.

In September 1980, AID and the GOP signed a limited-scope grant agreement committing $232,000 in AID PD&S funds to undertake social, technical, and environmental studies required for the design of a development project for the Palcazu valley. GOP funds were also committed to assist in financing the Project design studies and to carry out urgent preliminary development activities in the Project area, such as completion of land use capability studies, preparation of basic topographic maps, establishment of an agricultural research facility, and the execution of a cadaster and land-titling operation for area inhabitants.

The proposed Project as initially described in the PID was to fund the development and implementation of land use policy in the Palcazu valley, construction and maintenance of a road, native community development programs, applied research and demonstration, technical assistance, training, agricultural and forestry development, credit, and Project administration. Subsequently, as a result of more careful study during intensive review, the Project design was modified. The road, currently under construction with GOP treasury funds and $7.0 million in PL 480 Title I funds, scheduled to be completed by the end of 1984, is no longer a part of the Project. It and the feeder road network will be entirely financed by the GOP, although AID will provide assistance to carry out the feeder road studies to insure compatibility with long-term resource management. In addition, the Project will place more emphasis on forestry and permanent crop activities, since the


PICHIS - PALCAZU
LEYENDA
CAPITAL DE PROVINCIA
PUEBLOS IMPORTANTES
CENTROS DE DESARROLLO RURAL
NUEVA CIUDAD CONSTITUCION
LIMITE DEPARTAMENTAL
LIMITE PROVINCIAL
LIMITE DISTRITAL
CARRETERA ASFALTADA
CARRETERA AFIRMADA
CARRETERA EN PROYECTO
San Alejandro
Von Humboldt
R. Cosipo
PACHITEA
R. Pinoyacu
R. Sangoruyacu
UCAYALI
HUANUCO
NUEVA CIUDAD CONSTITUCION
PASCO
JUNIN

land use studies funded by AID for the area indicate that potential for clean cultivation (annual crops) is limited.

During the course of Project development, the need for a national level unit charged with developing and managing a high jungle strategy as well as the design of specific projects for the development of the high jungle has become evident. At present, the GOP's permanent capacity to develop and implement a strategy and program for the integrated regional development of the high jungle or other geographic area is weak. On August 26, 1981, Supreme Decree No. 036-81-PCM created the new Council of Special Projects for Integrated Development of the Jungle and High Jungle. The members of the Council include the Minister of Agriculture, who presides; the Secretary General of the Office of the President of the Council of Ministers (Prime Minister); the Vice-Ministers of Education, Health, Housing, and Transportation and Communications; and the Technical Director of the National Planning Institute. One of the principal objectives of the proposed Project is to insure rational long-term resource management by strengthening the funding and staffing of the Secretariat of Regional Affairs (within the Prime Minister's Office), the office which provides technical and administrative backstopping to the Council. In addition, the Project will provide the technical assistance and training necessary to provide this office with the expertise required to assist the Council in the design and implementation of a national strategy of regional development.

2. Objectives

The Project comprises ten activities. Eight of these activities focus on productive development components in the Palcazu valley. The two remaining activities, local project management and regional development policy support, center on institutions. Funding for Project management support will be provided to the PEPP office (Proyecto Especial Pichis Palcazu) for technical assistance, training, and equipment for maximizing sustainable production in the Palcazu watershed. At the national level, the component for regional development policy support component will build upon the activities carried out in the Palcazu valley and elsewhere. It will strengthen the national Secretariat of Regional Affairs by providing: technical assistance for development planning using the land use capability technology in other selected high jungle areas; funding for in-depth evaluations of prior and current development projects in the high jungle; short-term training; and funding to carry out pre-feasibility studies for new development projects.

Project activities in forestry, agriculture, livestock, and protection deal directly with developing natural resources in the Palcazu watershed. These four activities were chosen because they fit the land use capability of the Palcazu. Most of the land in the watershed that has productive capacity is fragile and must remain forested or covered with permanent vegetation. The forestry and agriculture activities set out programs for developing this land to its potential. The livestock activity concentrates on herd and pasture improvement on the relatively small amount of land suitable for pasture. Swine and other small farm animal production, in

conjunction with permanent crop cultivation, is another aspect of the livestock activity. The protection activity preserves forests on lands which have no direct productive capacity, but develops the very important direct and indirect economic benefits which these lands produce for the rest of the watershed. Of the four remaining Project activities, continuous land use inventory compares actual land use to land use capability on individual parcels. It is a tool to manage and evaluate development that will be useful throughout the jungle region. Health and environmental sanitation will improve basic health and sanitation services in the Palcazu. Feeder road locations studies and road maintenance will assure that an adequately maintained system of secondary and feeder roads exists in the area. Finally, communications will expand Peru's communication network into the Palcazu valley using satellite technology, thus tying the Project area into the national telecommunications system.

The Project activities are interrelated and together embody the ideas that appropriate land use is the key to sustained development and that this methodology for resource management can be transferred from one area to another. The various Project activities related to land use management will be carried out through a program of research and extension (described below in Section III.C.3.b and c). Research will occur primarily on numerous individual parcels. Extension will consist of education, incentives, and enforcement throughout the Palcazu and will be designed to address the needs of the native communities as well as the colonists.

3. The Special Project Office - PEPP (Loan $797,000 and Grant $497,000)

The Pichis Palcazu Special Project Office (PEPP) was created in October 1980 to begin development of the Pichis, Pachitea, and Palcazu valleys. Since then, a functioning office has been established which divides its responsibilities between two development projects, one for the Palcazu and one for the Pichis. The main field office for both projects is located in La Merced, with the principal office for the Palcazu project in Iscozacin and secondary offices in Puerto Mairo and Loma Linda.

The PEPP office is headed by a director who divides his time between the offices in Lima and La Merced. He is assisted by a deputy director and six staff offices, two of which are located in Lima and four line offices located in the Project area, as well as the nine field offices distributed throughout the areas of the two projects funded by other donors. (Annex II Exhibit D contains an organizational chart for the PEPP office and a listing of Project personnel.) Beginning in April 1982, the principal Project office at La Merced became fully operational. The deputy director of the Project is permanently assigned to the PEPP office at Oxapampa, and he shares responsibility for Project activities in both Project areas with the Project director. The Institutional Analysis (Part IV.A.) contains additional information on the office structure and staffing, as does the JRB Report contained in Annex III, Exhibit A.

The Project activities detailed below will be implemented by the appropriate GOP agency having the specific programmatic responsibility and will be supervised and coordinated by the PEPP office. Working agreements describing the responsibilities of the participating agencies will be developed prior to the implementation of each of these components. This project office mechanism is used to facilitate Project implementation and it is similar to that used for the AID-funded Sub-Tropical Lands Development and Upper Huallaga Area Development Projects. (This administrative mechanism is described in the Institutional Analysis, Section IV.A.) The PEPP office, like other special project offices, is not intended to be a permanent bureaucratic entity. Rather, it is planned that the functions of PEPP with regard to the Project and subsequent Other Donor projects will eventually be taken over and carried out by the line Ministries and the departmental development corporations, as is occurring under the Mission's 061 and 063 projects. These actions directly support the GOP decentralization strategy.

The PEPP Office has already entered into agreements with several agencies of the GOP to carry out various elements of the Project, such as cadaster, land titling, and forestry. This arrangement will also be used to implement the other Project components, giving the appropriate agencies responsibility for activities which fall under their purview, yet guaranteeing PEPP the ability to focus these activities toward Project objectives.

Under the Project, agricultural research and extension activities will be carried out by the National Agrarian Research and Promotion Institute (INIPA). Additional forestry research and extension, as well as an agroforestry and agricultural training program emphasizing jungle technologies, will be carried out jointly by INIPA and the National Forest and Fauna Institute (INFOR). Meteorological and hydrological data will be collected directly by PEPP with the assistance of SENAMHI, the national agency responsible for this activity. The National Office for Natural Resources Evaluation (ONERN) will be responsible for land use capability mapping. Project-funded credit will be administered by the Industrial Bank, and in-kind credit programs will be set up by the PEPP. In addition, regular non-project-funded agricultural and livestock credit will continue to be available from the Agrarian Bank. The Ministry of Agriculture, National Rural Cadaster Office (OGCR) and the Ministry of Justice, Office of Public Register (ORP) will carry out and maintain a permanent land registry system for the area. The Ministry of Health will implement the health and environmental sanitation component with the assistance of PEPP. The Ministry of Transportation and Communications (MTC) will be responsible for road maintenance activities. The National Telecomunications Company (ENTEL) will implement the communications component.

a. Project Management

The Project management structure is designed to carry out the following objectives through appropriate management systems, research, extension, and education activities:

- Manage the Project inputs effectively in order to achieve maximum sustainable production;
- Increase the technical knowledge of the PEPP staff about the high jungle particularly the Palcazu;
- Sensitize the PEPP staff to the special concerns of the native communities and facilitate their interaction with the Project;
- Obtain basic information about the Palcazu; and
- Periodically evaluate the Project and its components.

The PEPP office in Lima will provide basic management and administrative functions for the Project regarding general administration, planning, and national-level coordination. The La Merced office will directly manage day-to-day Project activities for both the Pichis and the Palcazu development projects. Activities in the Palcazu Project area will be carried out from the Iscozacin office by a Project team comprised of a director and professionals who will have expertise in forestry, agroforestry, zootechnology, agronomy, veterinary medicine, sociology, and administration. INIPA, INFOR, ORP, and OGCR will also assign their respective area representatives for the valley to this office, and they will all form part of the Project team. Additional professional and technical personnel including personnel of the various implementing agencies, will be located at the two secondary offices located in the Project area at Puerto Mairo and Loma Linda. During the initial phases of Project implementation, the PEPP and each implementing agency, with the assistance of initial short-term technical assistance, will develop the agreements describing the working relationships between the Project Office and each agency and the objectives of the specific activity.

Staff training will consist of initial orientation for the entire Project staff, followed by periodic specialized training and occasional in-service training as needed. Initial orientation will familiarize the staffs of the implementing agencies with the characteristics of the high jungle. Aspects to be emphasized are its biological richness and diversity, fragility, and limited ability to support standard agriculture and livestock raising using the methods that have been developed in the temperate zone. Specific information about the Palcazu will include its climate, geology and geomorphology, soils, hydrology, flora, fauna, and social structure of the valley. The native communities involvement in Project-sponsored activities and the need to sensitize the Project Staff to their special concerns will also be emphasized.

The orientation activities will give special emphasis to the Project's rationale: that the Palcazu lands have identifiable capabilities for use; that productivity of uses within these capabilities can be sustained; and that uses which exceed land use capability destroy land and cannot be sustained. Finally, the training will describe the specific activities of the Project and the reasons why they have been chosen. It is extremely important that the technicians who will be performing the Project activities in the field have a firm grasp of the information taught in staff training. They will, in turn, teach that information to the landholders who will actually carry out the development of the Palcazu. Staff training will highlight how Project activities to be carried out by the colonists will differ from the way in which native communities can be expected to participate. Technicians will be sensitized to the need to tailor extension and other services to their target population. Representatives from the native communities will participate in staff training seminars and will assist the PEPP office and other implementing agencies to carry out Project activities.

In-service training for the Project staff will focus on evaluating the information obtained from the Palcazu and using information from other similar projects and ecological zones which might be put to use there. This training will involve the staff in teaching as well as learning. The material will be similar to that for initial orientation; it will include basic information on resources and information on the technology of development applicable to the Palcazu, and highlight the special concerns of the native communities. In-service training will occur about every six months during the first two years of the Project and annually thereafter.

Special technical training, directed at smaller groups of staff members, is designed to teach a specialized subject. For example, those responsible for hydrologic data collection will be taught how to use their instruments and how to process the data they obtain; extension agents will receive specific training on new research results. Special training should be given as needed and required by each specific activity.

Project evaluation will be based on the data generated under the Project and will increase basic knowledge about the Palcazu and provide facts from which to evaluate PEPP's progress in carrying out Project objectives. Specifically, the data will show whether and how productivity is increasing and whether and how resources are deteriorating. PEPP has been publishing periodic progress reports on its work and should continue to do so. In addition, PEPP, in close coordination with the Secretariat of Regional Affairs, should publish occasional reports describing the status of specific activities or resources. PEPP will use the data which it collects to manage its activities. Those activities that are progressing well will be continued, but where productivity is poor or resources are being damaged, adjustments will be made. Budgets will be flexible to allow transfer of funds as necessary and staff in-service training will be modified to cover weaknesses detected. Gaps in the data collection system will be filled and collection of less useful data will be discontinued.

Enforcement will be carried out by a forest guard station built by PEPP in the upper Palcazu along the road under construction into the valley. The station will be staffed with forest police who will prevent incursion into forest areas and the parks and who should also control the dynamiting of fish and illegal hunting. While this activity is under PEPP's coordination authority, it does not form part of, and will not receive any financing from the AID/GOP Project.

The PEPP Office will, however, enter into an agreement with the forest protection service to assure that an adequate number of well equipped forest police are assigned to the area. The Project-funded extension agents will work closely with the police in reporting illegal timber extraction activities, thus maximizing the impact of limited numbers of extensionists and police. Extension agents for the most part will focus on education as a means of control, but will, however, be able to call on the forest protection service when necessary.

The enforcement mechanism for the control of forestry concessions, protection, and conservation areas is under the jurisdiction of the forestry police of the Guardia Civil (GC) in accordance with the legal norms established under D.L. No. 21147 and its regulations. There are currently 700 forestry police nationwide, financed in part by the budget of the Ministry of Interior and by state taxes on timber collected by the Ministry of Agriculture.

Within the area under development by the PEPP, there exist forestry police posts in Von Humboldt, Pozuzo, Villa Rica, Oxapampa, San Ramon, and Satipo. In order to improve the enforcement activities during Project implementation and afterwards, the GC will establish a Comandancia of the forestry police in San Ramon/La Merced with new posts in Cacazu (already constructed by PEPP), Iscozacin, Codo del Pozuzo, Puerto Mairo, Atalaya, Pichimaki, Tambo-Ene, and Puerto Inca. The new posts to be constructed will include an office area, equipment, and living quarters; each post will have a 100w radio and a vehicle or boat. The GOP will finance both operating costs and fixed investments for this activity.

To improve the inter-institutional coordination for enforcement activities within the central jungle, a coordination committee with the participation of representatives from forestry police, PEPP, INFOR, and Ministry of Agriculture will be established. This committee will prepare an operational action plan for each of the forestry police posts. The plan will include: a)control of protection and production forests; b) control of extraction, processing, and transportation of forestry products; c) control of hunting, fishing, and endangered species; and d) control of national parks.

b. Research

Research is an aspect of all land use components, and will be carried out by INIPA and INFOR through agreements with the PEPP Office. Research activities conducted by INIPA will be coordinated by its personnel at

Iscozacin and will focus on plant protection, forestry, pasture improvement, livestock management, crop production (soil management, agronomic practices, agricultural economics, etc.), and forestry and plant breeding.

Research done outside the Palcazu--for example, at Tingo Maria, Yurimaguas, Tarapoto. or Iquitos--can be transferred as part of the research network approach directly by the INIPA staff in the Project area through extension or modified by adaptive research within the Palcazu. Thus, for example, research on tropical soil management with annual crops (rice, beans, etc.) and perennial crops done at the Yurimaguas Experimental Station and the research done on pastures and animal management at the Pucallpa Experimental Station will provide the basis to carry out extrapolative work at Iscozacin. Adaptive research in the Palcazu will be done by INIPA personnel on individual farms and on native community lands in collaboration with the PEPP Office.

INIPA and INFOR will run a central research, training, and demonstration area for forestry and agroforestry located near Iscozacin. The object of the forestry research will be to perfect a system for harvesting and naturally regenerating timber stands by systematic clearcutting. Agroforestry research will also be carried out on individual farms by INIPA, INFOR, and PEPP advisors in response to farmers' interest. This research will include identifying promising tree and permanent crop species, establishing mixed cultivation systems, and developing plant products at Project facilities in Iscozacin for direct marketing and animal feed. In order to carry out these activities, INIPA will assign a research coordinator to the Iscozacin office, and additional research personnel at the secondary offices.

c. Extension

The extension program for each of the Project components will draw from this local research and also from research done elsewhere by INIPA and other entities, such as UNAS (Universidad Nacional Agraria de la Selva), INFOR, etc. INIPA extension agents will be trained under PEPP auspices by Project advisors in several fields so that they can advise landholders on the various aspects of on-farm resource management. Agents dealing with native communities will have special knowledge of Amuesha culture and language. All the agents will have access to researchers for advice on specific technical matters. The forestry extension agents will assist landholders in making management plans for their lands and then developing the lands according to the plans.

The main extension office will be located at the Iscozacin Project Office, and three other offices will be located in the Project area. An INIPA and INFOR extension coordinator and a permanent staff will be assigned to the Iscozacin office and will be responsible for coordinating all extension activities in the Project area. Extension agents (sectoristas) will be assigned to the other offices. The objective of the extension program in the Palcazu valley will be to increase the rate of adaptation of new methods among the farmers of the region by developing an intensive and flexible

extension program. This program will build on the experiences in other jungle regions, such as Yurimaguas and upper Huallaga, and on the improved research base in the Project area.

During the initial implementation of the Project, INIPA, INFOR, and PEPP will contract experts in forestry, perennial crops, pastures, and annual crops to develop technical information using research data on individual crops. These experts will also develop technological packages for an extension program for each of the offices and will carry out the training of extension agents. The permanent staff at the office will consist of specialists in forestry, agriculture, agroforestry, credit and marketing, soil and water management, pastures, animal husbandry, 1/ and permanent crops.

The extension teams composed of the specialists and agents, some of whom will be from the native communities, will emphasize the forestry, agriculture, and agroforestry potential of the region. They will establish demonstration plots to test harvesting techniques, natural regeneration periods, fertility levels, and improved crop varieties; take soil samples; introduce new cultural practices; and provide technical assistance. The extension team will also assist INIPA research staff to establish on-farm tests. In order to assure farmer participation and offset the farmers' risk factor, the material costs for fertilizer, seed, and agricultural chemicals for demonstration plots and on-farm tests will be subsidized by the extension program.

d. Credit

The Project will provide credit for forestry, agriculture, and livestock other than cattle. Loan funded credit for cattle raising in the Palcazu is currently available through the Agrarian Bank and thus will not be provided by the Project. Loan funded credit for Project activities will be channelled principally by the PEPP office for the in-kind credit described below. In addition, the Industrial Bank of Peru (BIP) will provide credit for forestry extraction, processing, and other commercial and agroindustrial activities. This is described in greater detail in Section III.C.4.

In order to administer ongoing cattle and other credit funds more effectively, the Agrarian Bank will open an office in Iscozacin which will function once or twice a week to take loan applications and disburse approved loans. The La Merced office of the Bank will manage this line of credit while the PEPP office will, in turn, play an active role in coordinating the processing and disbursement of loans. This PEPP role will make it possible to provide credit to members of the native communities who in the past have obtained very few loans.

e. Data Collection

The Project will establish a data collection system for the Palcazu valley which will be administered by PEPP technicians in conjunction with the Ministry of Agriculture's Cadaster Office, the Ministry of Justice's Land Registry Office, and other national information agencies,

1/ Animal husbandry throughout this paper refers to both large (beef cattle) and small (swine, chicken, etc.) livestock development and production.

such as SENAMHI. Currently, there are no data collection stations of any kind in the Palcazu except for one weather station at Hacienda San Miguel on the Bocaz river. The purposes of the data collection system are to acquire basic information about the climate and hydrology of the Palcazu and to maintain a running inventory of natural resource use and productivity. This information will be made available to farmers for their production activities and will be used by PEPP in Project management and evaluation. PEPP will be able to tell from the inventories how productive the Project activities are, how economically sound they are, and whether they are conserving resource capacity. Adjustments toward these ends can be made in the Project activities from the inventory data. The data can be compared to climatic and hydrologic data to show how climate influences the effectiveness of the Project activities and how those activities affect the river system. Information from the data collection system will be fed to INIPA, INFOR, the Secretariat for Regional Affairs, ONERN, SENAMHI, and other interested agencies for comparison with other high jungle areas, both those under development and those considered for new development. A description of the principal elements of the data collection system follows.

Aerial reconnaissance, photography, and mapping will be carried out in coordination by PEPP by the Ministry of Agriculture's Cadaster Office. The Project will finance periodic aerial video-photography for determining actual land use and changing land use trends. This elementary data collection is essential to the Project activity in continuous land use inventory which is described below.

Meteorological stations: Four meteorological stations will be set up at convenient points in the watershed in each life zone in the valley floor. The stations will have identical data collection capabilities and the form of recording data should be uniform. Data will be collected at regular intervals and organized and processed systematically by PEPP in conjunction with SENAMHI. All the data will be summarized and analyzed annually by SENAMHI.

Each meteorological data collection station should be equipped with at least the following equipment: rain gauge, thermometer, humidity gauge, and instruments for measuring wind speed and direction. All of the instruments should be equipped with recorders. Data should be collected daily from each station and should be compiled at a central point every 15 or 30 days.

Hydrologic stations: Hydrologic stations will be located at four points on the Palcazu River near the mouths of its principal tributaries. These stations will measure water level continuously. Turbidity and water chemistry will be measured at regular intervals. The data will be

summarized and analyzed annually and then compared with any data available from earlier years to note changing trends. Each hydrology station should be equipped with recording instruments to measure river depth, water turbidity, and acidity or alkalinity. Water chemistry should be tested periodically to determine levels of selected nutrients and other components. Data should be collected and compiled centrally every 15 or 30 days.

Forest inventory: INFOR and PEPP will establish permanent forest inventory plots in both protection and production forests. Initial data from the plots will show species composition and sizes of the trees. Subsequent measurements at intervals of five years will show forest dynamics. In production forests, some plots will be established in regenerating stands.

Permanent crops inventory: The productivity of different types of permanent crops will be continuously observed. A data collection system will be designed to show the cost of establishing a crop, cost of production, and returns.

Livestock inventory: A periodic census of the livestock in the valley, both commercial and for domestic use, will be carried out. It will also measure productivity under different kinds of feeding and management systems.

Fisheries inventory: The best gauge of fisheries productivity is the measurement of fish consumption in the local diet and transport of fish out of the Palcazu to show how much and what kinds of fish are being caught. Collecting information on types of fishing gear and numbers of fishermen would also be worthwhile.

Data organization and dissemination: The several data collection systems discussed above will be organized to interlock. Periodic sampling and annual organization of data will be synchronized as much as possible. PEPP and the Directorate of Special Projects within the Secretariat of Regional Affairs will cooperate closely in designing data collection. The Directorate will assist in organizing and publishing data and in exchanging data between PEPP and other entities.

f. Project Inputs

Short-term technical assistance of 27 months will be financed for the PEPP office with Project Grant funds ($497,000). Technical assistance will be used to train the PEPP staff and to advise PEPP on data collection. Annex II, Exhibit E contains a technical assistance plan for this activity.

Project Loan funds for this activity will be used to purchase office furniture, a mini-computer system, equipment, and supplies for PEPP headquarters in Iscozacin and two substations; field equipment, photography and photographic equipment; meteorology and hydrology equipment; personnel costs on a declining basis; and vehicles.

Staff salaries, travel, offices, housing, and maintenance for this activity will be funded by the GOP.

Detailed costs of these items are set out in the Tables of the Financial Section, Annex II, Exhibits E and F.

4. Forestry (Loan $4,895,000 and Grant $910,000)

a. Background

The general forestry plan includes two site-specific components: (1) natural forest management for sustained yield by systematic clearcutting, mostly on hilly terrain; and (2) natural forest management of rubber and high-value timber species by small-group selection on white sand soils.

The first of these management models will be the predominant one and engage the largest number of people. Both have three basic variants: individual small colonist, family management unit; native community, collective management unit; and industrial management unit.

Adjunct to the forest management units, which will be grouped in the larger blocks of land with forest production capability, log transport, primary processing, and marketing activities will be established by small entrepreneurs with Project financing. Plant capacity in the early years will be used to process timbers originating in the terminal clearing of old growth forests on agroforestry and grazing lands. Up to $3 million in Project Loan funds will be made available to the Industrial Bank to establish a special line of credit for development of small business activities in the Project area. The credit will be directed primarily to the activities mentioned above, but a portion will also be available for other commercial activities in the area.

b. Forest Management System

Systematic clearcutting is proposed as the principal natural forest management system to be utilized under the Project. The decision to select the proposed forestry management technology is the result of in-depth on-site analysis performed by tropical forest scientists over the course of the last 12 months. During Project implementation, the appropriateness of this system will be evaluated both from a technical and a managerial point of view. Changes which further experience gained under implementation point out as appropriate will be reflected in adjustments to the system.

The natural forest management system could eventually be conducted on up to 50,000 hectares of mostly low hill lands with red clay soils classified as suitable only for forest production on a permanent basis. Approximately 17,000 hectares of native community lands in this capability

class will be operated communally. The rest of the area will be divided into industrial units and into family-sized units each of which will be assigned to and worked by a head-of-household and one or more family helpers. Little or no paid help will be employed on the family units and operators will earn both the value of their family labor and of the standing timber (stumpage). Each operator family will reside on its own holding and be provided with a small plot for subsistence food production and pasture. The industrial units will consist of single concessions large enough to supply one processing unit, that is 4200 hectares, equivalent to 70 family units.

Under the proposed system for an average-sized family unit of 60 hectares, an area of virgin forest totalling two hectares will be clearcut each year in a strip, or on widely-spaced narrow strips, 20 meters wide and totalling 1000 meters in length. A similar system of clearcut strips 20 meters wide will be employed on the industrial and native community management units so that one thirtieth of a total unit will be clearcut each year by the strip method. All of the woody biomass on each strip (175 m3/hectare/year) will be harvested while no timber of any kind will be removed from the forest outside of it. Timber and other forest products will be felled, bucked, worked up, and stacked for drying within the strip. For the harvesting process, the PEPP Office will provide rental of chainsaws as well as training in their use. All products will eventually be extracted to pre-determined roadside points for pick-up and transport to the nearest processing and sales facility. It is proposed that a combination of hand and draft animal power be used for the extraction process. PEPP will acquire oxen to be sold to the individual colonists, who will be trained in their use. It is anticipated that, as the Project develops, some colonists will rent oxen teams to those who do not own teams.

Wood extraction will be confined to the clearcut area of the given year, and it is anticipated that draft animals will be the principal means of extraction, except for large valuable logs. All felling and extraction will be progressive, both along the strip and with respect to tree size, proceeding from small to large. Seedlings, saplings, and immature trees of the most valuable species will be marked and reserved to grow through the subsequent rotation. All felling will be directed into the already opened and cleared area of the strip. Trees marked for enrichment regeneration and immature trees will be avoided in felling and extraction; such of these as are unavoidably damaged will be cut off at a proper height to stimulate sprouting from the established rootstock. Each top and all small material will be worked up and stacked or removed before another tree is felled.

The proposed system will require that, one year before harvesting operations on a given strip begins, all large bush-ropes or lianas be severed so that these will die and decompose before the main felling sequence is initiated. Part of the operator's work year will also be spent in silvicultural operations directed towards thinning and selective removal of deformed stems, vines, and undesirable regeneration from the young and immature stands naturally regenerated in previous years' clearcut strips. Some additional products may be forthcoming from these operations but have not been included in the production and income projections.

At the close of a year's work, the new clearcut area should be virtually free of woody biomass, except for scattered saplings and poles of highly valuable species reserved to the second rotation. Large logs, initially bucked up and sprayed with an environmentally safe insecticide and amounting to perhaps 20 m3/hectare, will have been hauled out under contract by skidder. All other wood of any size will have been extracted for sale as sawlogs, veneer logs, poles, posts, specialty woods (including palm products), and either pulping or firewood and charcoal. The latter will be manufactured on site in earth-covered kilns.

Each successive year of the rotation, a new parallel strip or strips, spaced so as to leave high forest or advanced regenerating forest on both sides, will be cut in this same manner. At the end of the full rotation of 30 years, the naturally regenerated forest on the first strip cut will have regrown to economic maturity. The forest will contain a regulated series of age classes, and the harvesting cycle will begin a new.

c. Pre-Production Activities

Prior to the establishment of the forestry production units, some further and more detailed field survey work, as well as initiation of the oxen team program, will be required under the supervision of Project-funded consultants and the Project staff. The survey work includes:

--Completion of the existing soils map to include those portions of the valley and foothills of the Yanachaga range not presently included(Described in Section III.C.9.).

--Completion of land capability map for unmapped portions of the valley (once the soils map is finished) plus verification of details on the existing map by on-the-ground checks.(Described in Section III.C.8.)

--Pre-cruise of timber stand and stocking inventory on those forests included in the "C", "F1" and "F2"1/ capability classes, stressing taxonomic identification of all common tree species and re-evaluation of the primary stand species based upon precise dendrological identifications.

--Survey, planning, and layout of logging trails which will connect production units to the road system being constructed in the valley.

--Search for optimal locations for service and machinery pool, timber processing plants, concentration and sales yard, and facilities.

Under the Peruvian constitution, title may not be granted to lands in the public domain which are classified exclusively for forestry production. However, the "concession-in-use" granted by the Ministry of Agriculture's Bureau of Forest and Wildlife provides for essentially permanent

1/Abbreviations for land use capability classes are:
C--Agroforestry, permanent crops

usufruct or long-term harvesting rights within the constraints placed on land utilization for forestry. For lands suited for agricultural and livestock production and forestry, the agrarian law calls for a "unidad de produccion agropecuaria/forestal" to be formed. In this case, title is given for those lands suited for agricultural and livestock production, and a "concession-in-use" permit, essentially permanent, is granted for the lands suited for forestry production. The combination of these two types of lands is classified as a single production unit; thus, sale or inheritance of the agricultural and livestock land is accompanied by a transfer of the forestry concession to the new owner in order to maintain the integrity of the production unit.

Native community lands, suitable for agricultural and livestock production, to which title has been granted to the community, may not be sold or divided without the community's consent. They are thus granted in perpetuity to the native community, and this is guaranteed by the Peruvian constitution. Forest lands are granted to the native communities in the same manner as they are granted to other settlers under the "concession-in-use" concept, and form an integral part of their territory.

d. Forest Management Plans

Major blocks of land to be operated within the context of the overall forestry program will first be located precisely upon a base map of the region. On the basis of data obtained from all specific survey activities and project inventories, the layout of these blocks and of the individual family, community, and industrial production units will then be drawn in. These layouts will show boundaries of each unit, primary and secondary access roads, possible fluvial routes, and proposed administrative and management centers for coordination of activities. Timber resources on each unit will be estimated and marking of unit boundaries and of specific annual cutting subdivisions will be superviced by the Project.

On the basis of the map and marked boundaries, Project staff and each farmer will draw up a simple management plan. This plan will indicate the specific location for each year's total harvest, harvesting sequence and extraction routes to roadside or river, estimated total annual production including sub-products, and a plan for intermediate cuttings and improvement cuttings in advanced regeneration.

e. Training and Extension

Training will be required for all technical and administrative cadres as a pre-operation activity of the Project. In

addition, each production forest owner-operator or native community operator-team will be given both advance training and yearly refresher on-the-job training, technical assistance, and periodic help with problems in farm management and silvicultural and animal management through a permanent forestry extension program run by the Project.

Training is conceived of as a long-term activity, to continue until all operators of production units are familiar with procedures for optimizing operations and until research findings have been translated into practical recommendations for management and transferred into practice through the extension process. Extension and training activities will be set up and staffed by INFOR/Project personnel for this purpose with the initial assistance of Project-funded consultants.

Technical and Administrative Cadres. These cadres will preferably be recently graduated forest and wood products engineers as well as forestry sub-professionals graduated from the ranger schools, such as those at Iquitos and Genaro Herrera. Preference in employment should be given to applicants from the Peruvian jungle region, who will be most at home there and inclined to remain.

Operator Training. Operators of family-sized forest production units or the selected leaders of forest work-groups for native communities will be trained on a demonstration unit for forest management. This demonstration unit will be set up to simulate specific management models which the operators or leaders will manage on completion of training. Training will be pragmatic, covering management principles for the type of unit, harvesting and extraction, silvicultural practices, tree and wood identification, charcoal manufacture in the woods, and use and care of tools and machinery. The use of chainsaws and draft animals in extraction and loading will also be taught.

A two-month course will be devoted to actual practice at management, harvesting, extraction, and forest products elaboration. The trainees will receive board and bed during their stay in the training forest. New colonist trainees who complete the course satisfactorily will be awarded an individual forest production unit under long-term "use-concession." Approximately five leaders from each of the major Amuesha communities as well as one colonist for each individual family forest management unit to be set up by the Project will be given training in one of the demonstration-training forests. These courses as well as refresher courses for already trained farmers will be repeated annually.

f. Research Activities

Given the pilot project nature of the Palcazu forestry development, unique in Peru and possibly in all tropical Latin America, it will be necessary to support development with research activities designed to clarify some technical and management aspects. The Project will also monitor the development and management process for practical information which may be

used both for its regulation and improvement over time and for application to similar developments subsequently in other regions. Research specifics will be set forth by the Project-funded technical assistance and will include determination of the following:

-- Optimal width of clearcut strips and diameter of group selection openings in high canopy to obtain desired species regeneration;

-- Optimal length of rotation by forest type and most economic end product, and species-specific regrowth rates;

-- Flowering and fruiting chronologies in desired species: relation to timing of harvesting and extraction operations and to climatic conditions, and plant-animal relations in pollinization and seed dispersal;

-- Comparison of burned and unburned strips vis-a-vis regeneration, subsequent growth rates, the species composition of natural regeneration, and the effects on seedling and stump sprout vigor;

-- Mycorrhizal and rhizobial relations in tree growth and soil fertility;

-- Stump height in relation to sprouting from established root stocks, and control of species composition in regeneration by selective height of stumps in felling;

-- Effects of extraction methods on regeneration: oxen skidding versus cable systems, articulated skidders, and tracked vehicles; and

-- General research on species-specific wood utilization, drying, and preservation.

g. Production of Rubber and High-value Timber Species

Some of the older alluvial deposits, both on high terraces and interior terraces in the low-hill areas, have a high content of almost pure quartz sand. The soils are very low in fertility but well-drained and with favorable topography. According to JRB consultants Hartshorn and Foster, these soils support a forest with higher-than-normal percentages of natural rubber trees (*Hevea sp.*) and "tornillo" (*Cedrelinga cataeniformis*).

The forest inventories of La Molina and ONERN do not indicate the location or composition of these forest types, probably due to the very low sampling intensity at which both were conducted. Under the Project, more intensive local surveys will be carried out in order to plan the rational use of the white sand soils.

h. Credit

Credit for forestry extraction and processing activities, as well as other commercial activities, will be administered by the San Ramon/La Merced office of the Industrial Bank (BIP) with $3,000,000 of Project funds. This credit will finance the cost of sawmills, log trucks, other major logging equipment, commercial and service activities in the valley, and other agroindustrial activities. The Bank has had ample experience under previous AID-funded projects in these types of activities and can be expected to adequately carry out this activity. An office will be opened in Iscozacin and will function once a week to take loan applications and make loan disbursements. This office will function under the direction of the BIP branch in San Ramon.

In addition to providing credit, the Project will also providse $44,000 to finance a chainsaw rental program and $560,000 to finance the purchase of oxen teams and related tools for forestry extraction activities. Project Loan funds will be used to purchase a sufficient number of chainsaws for rental to farmers and native communities. Rental fees will be used to maintain and replace the chainsaws. For the oxen teams, young bulls will be purchased during the first year of the Project. The bulls will be raised and trained with the help of six months of Grant-funded technical assistance, so that they will be available for sale to farmers as forest production units come into production. Proceeds from these sales will allow PEPP to purchase additional animals for training and future sale. Over the life of the Project, it is anticipated that private individuals will move into providing both the chainsaw and oxen team services.

i. Inputs

The Project will finance 48 months of long-term technical assistance and 48 months of short-term technical assistance for the forestry activity. Technical assistance will assist in performing tree identification and set up forestry inventory systems and advise Project technicians and forest operators on tropical silviculture and natural forest management. Forest extraction, processing, and marketing will also be developed through technical assistance. Annex II, Exhibit E contains a table of technical assistance.

The equipment for six forest product processing centers will be financed by the Project through a $3 million line of credit to be established in the Industrial Bank of Peru. Additional information regarding the processing centers can be found in Annex III, Exhibit B. For each processing center, the Project will also finance one skidder and three trucks for log hauling. The Project will finance through PEPP the purchase of one loader, two dumptrucks, and one bulldozer for maintaining logging trails to carry forest products to the feeder roads and on to processing centers. Funds for oxen teams will also be provided under the Project through the PEPP Office, as will a stock of chainsaws for rental to individual colonists. A

complete list of equipment for the forestry activity is located in Annex II, Exhibit F. AID funds will also support personnel costs on a declining basis: 100% the first year, 75% the second year, 50% the third year, and 25% the fourth year.

The GOP will provide approximately $890,000 for salaries, offices, maintenance, and support services for this activity.

5. Agricultural Development (Loan $3,628,000 and Grant $368,000)

Given the ecological constraints of the Palcazu, the choice of agricultural development strategies is limited. It is more beneficial to valley residents to increase their level of income by improving the existing tropical agriculture than it is to attempt to modify or accommodate monocultural or temperate zone production systems. To accomplish this, an adaptive on-farm research program will be established to assist in the technology transfer between experimental stations and local residents. On-farm experience will help in determining viable cropping and livestock production systems that are best adapted to the high jungle. The objective is to improve existing crop and livestock systems taking into consideration the farmer's ability to absorb new technologies and incorporate appropriate management practices into a stable sustained-yield agriculture. The scope of this activity covers not only on-farm research but also extension, training, as well as marketing and agro-industrial processing of locally produced crops.

a. Background and Objectives

There are approximately 33,000 hectares of land suited for agricultural purposes in the Palcazu; of those, about 7,000 ha are located in the Codo del Pozuzo region. Less than 20,000 ha are currently exploited and the bulk (15,000-18,000 ha) of this land is in pastures. While internal transportation will remain difficult, the road being built by the GOP into the valley will greatly improve transportation, thereby altering price relationships and providing incentives to producers to increase production.

Producers attempting to increase production in the Palcazu, however, are faced with several problems, the most important of which are the environmental problems of infertile acid soils, heavy rainfall, a limited land base, and disease and pest problems. Efforts to increase production through the use of additional inputs and improved management techniques are hampered by logistical and technical difficulties. An example of the latter is the fact that the Peruvian research, extension, and education system has not given emphasis to crops suited to tropical agriculture, such as pineapple, achiote, passion fruit, or cacao. Even though expanding the area under cultivation for increasing yields has its limitations, there is no question that the area under cultivation in the Palcazu will increase. Existing colonists no doubt have plans to purchase more land if it becomes available, and the high quality lands in the Codo del Pozuzo outside of the Project area, will be only 30 km from the road by the end of 1983. Thus, settlement of these lands can be expected.

The objectives of an agricultural development program in the Project area are the following:

(1) The improvement of high value/low weight crops that are presently grown in the area utilizing the knowledge of local farmers and incorporating it into the research extension program.

(2) Facilitating market outlets to cooperatives and INDALSA in the San Ramon-La Merced area.

(3) Increased production of basic foodstuffs such as rice and beans.

(4) Livestock intensification, which is necessary as a protection element, is technically and economically feasible. This intensification will be based on disease and pest control, improved pastures, and rotation systems.1/

The GOP is in the process of establishing a jungle network of research, extension, and training centers (RET) to develop the technical knowledge and manpower capabilities required to implement its high jungle development strategy. Given the relatively small population, lack of facilities, incipient road network, and limited land base in the Palcazu area, the development of a large, integrated crop and livestock research center for the Palcazu is not justified. Rather, the RET infrastructure already in place in other high jungle areas must be utilized. The principal centers of this network and area of specialization are:

- Yurimaguas - annual crops and improved pastures;
- UNAS/Tulumayo - tropical crops, including the UNAS research station in Satipo for tropical fruit crops; and
- IVITA/Pucallpa - livestock and pasture research.

Adaptive research will be conducted in the Palcazu, using the results developed in these centers. Research and extension activities in the Palcazu will be centered in four centers: the principal office in Iscozacin, and secondary centers in Puerto Mairo, the native community Siete de Junio, and Loma Linda. This arrangement provides for research in each of the "life zones" of the area and takes into account the different requirements of both the colonists and the native communities. The site at Iscozacin is best viewed as a sub-station within the Yurimaguas-Tulumayo/UNAS-IVITA network. In addition, the site at Puerto Mairo will provide the opportunity in the near future to conduct initial research in the Codo del Pozuzo region. In order to adapt research results and communicate these results to the members of the native communities, a center will be established on the lands of at least one native community. Siete de Junio is the likely candidate as it will be a prime beneficiary of the road, and has the largest cattle herd, an active leadership, and a school constructed and supported by the community.

1/ In general, the agriculture and livestock research and extension activities will be carried out concurrently using the same system, basic facilities, and personnel. While each component is treated separately in this paper, some duplication in the description is necessary.

The general strategy for research and extension is to concentrate on high value regional exports (achiote, passion fruit, pineapple, and palmheart), selected foodstuffs (rice and beans), and livestock intensification. However, the critical constraint on both adaptive research and extension is the general lack of knowledge among research and extension personnel of the crops that are most profitable. The research and extension emphasis has been on traditional food crops (rice, corn and yuca) as well as cattle. Even regarding cattle, however, the area producers are generally more knowledgeable about both the technical and economic aspects of cattle production than are extension agents. For crops such as pineapple, passion fruit, and achiote, local producers in Oxapampa, Chanchamayo, and Tingo Maria are more knowledgeable than extension agents. Therefore, the training of extension and research personnel is a high priority. Both researchers and extension personnel must be brought up to the level of knowledge of the best local producers and must then increase their expertise through contacts with outside crop experts. In addition, through the development of contacts with private marketing firms and processors, they must become knowledgeable about the marketing aspects of their crops. All agricultural and livestock development activities such as research, training, and extension will be coordinated with La Molina University, the Ministry of Agriculture, INIPA, Yurimaguas Experiment Station, and IVITA, as well as other ongoing high jungle development projects. The research activities for the agriculture and livestock activities will function as a combined activity and, in general, the costs for this activity are covered under the research and extension of the agricultural component.

b. Training

In the initial stages of the Project, a training program for the agricultural and livestock activities will be developed which will include the following elements:

(1) Local producers are the most knowledgeable source of information regarding current practice, the reasons for these practices, identification of problems, and results. Therefore, the best local producers of the commodities to be emphasized will be identified and research and extension personnel will work directly with these producers to learn in detail what they do, why, what problems they have, and their results. In order to do this and to provide standardized information for analytic purposes, a simplified farm records format will be developed to detail and quantify the activities associated with the crop being studied.

(2) The research and extension agents will, through the PEPP office, develop contacts with private marketing firms and processors such as INDALSA to learn what their requirements are in terms of quality, quantities, timing, and so on.

(3) For each specific commodity, outside experts (either international or national) will be brought into the area, to review the material developed in points 1 and 2 (above) and to give a short course on the particular commodity, stressing how modifications to current practices can achieve better results. The recommended modifications will provide the basis for research and on-farm demonstrations.

(4) The leading producers will participate in these courses and will be designated as crop paratechnicians with responsibilities for assisting in the implementation of extension activities in their respective areas.

(5) During the life of the Project, the commodity experts will rotate between research and extension. The time period will depend on the time required to develop research results. For annual crops and pastures, less than a year is likely. For permanent crops, 18-24 months may be required.

The purpose of this training is to forge the necessary linkages between the extension agent, research activities, and the communities to be served. Further, as extension agents will be housed at the research facility and researchers will in part be working with on-farm plots, it is expected that stronger than usual linkages between these activities will be sustained. It is expected that extension agents will be trained to work with farm families and Amuesha farmers.

For the training program, the grant will finance a total of six months of short-term technical assistance in the following areas:

- Agricultural economics to develop a simplified commodity-oriented record-keeping system;

- Pejibaye palm to determine its potential in the area for human and swine consumption and to provide a short course on how to improve the development of the pejebaye-swine system;

- Achiote to review the established production practices, varieties, yields, etc. and to provide a short course on how to improve area production;

- Tropical spices to determine what, if any, spices are adapted to the area and to develop recommendations for a research activity on spices that appear adaptable to the region;

- Cacao, passion fruit, and pineapple to review current practices and to provide short courses on methods to improve actual production;

- Beans (including winged beans) to evaluate the potential and provide a short course.

It may be that the specialities of some of these experts will overlap; the spice expert, for example, may also be an expert in achiote. During the courses, the principal researcher from the RET center involved with the particular crop activity will also attend, as research may be suggested that can best be carried out at the other centers. Loan funds will finance the cost of seminars, equipment, and materials for the training of reseachers and extension agents and to bring local experts into the area for assistance as required.

c. Research

The objective of the proposed agricultural research activities in the Project area is to provide a research base for the extension operations so that they meet the production demands of the farmers. The Project will finance adaptive research, both to apply regional results to other areas of the jungle and to adapt research conducted elsewhere to local conditions.

Adaptive research to support extension activities will be conducted at four centers: Iscozacin (primary), Puerto Mairo, Siete de Junio, and Loma Linda. Extension agents will also be stationed at these centers. Basic and/or long-term research will be carried out at the higher level centers (UNAS/Tulumayo, Yurimaguas, Satipo, IVITA). It is important that the facilities, while relatively small, have generally representative parcels of land.

Adaptive research will utilize the information generated by the training program to identify current practices and will test the modifications proposed by the crop specialists as well as systems developed at the other centers in the network. For permanent crops, the primary research areas are achiote, cacao, pineapple, passion fruit, and pejebaye. The only annual crops to be given attention are rice and beans and, as discussed above, the winged bean, which will be given particular attention. The first major activity will be to develop a research program specific to the Project area.

At the principal research station of Iscozacin, INIPA will provide a research coordinator, plus one specialist each in permanent crops, livestock, and annual crops, one agricultural economist, and a veterinarian. INIPA will also provide approximately six field technicians and 12 field workers. The principal responsibility of the agricultural economist will be in marketing. He will maintain contacts with INDALSA, FOCEX, INDA, and private exporters to determine potential markets,volumes required, and new crop potentials. The Grant will fund one long-term research and extension technical advisor for 36 months, to be located in Iscozacin. At each of the three sub-stations, INIPA will provide the following new personnel:

1. One specialist in permanent crops;

2. One specialist in livestock and pasture;

3. Three agricultural technicians, one trained in each of these areas: permanent crops, livestock, and annual crops; and,

4. Three field workers.

AID funds will support the personnel costs on a declining basis: 100% the first year, 75% the second, 50% the third year, and 25% the fourth year. The Project will also fund equipment and supplies for research activities at the principal station and the three sub-stations, including three pick-ups, four boats with outboard motors, and three trailbikes, as well as additional office and technical equipment.

d. Extension

The objective of the agricultural extension program in the Palcazu region is to increase the rate of adaptation of new farming methods among the farmers of the region. The Project will promote greater rates of change by developing an intensive and flexible extension program based on sucessful experience from other regions of the jungle, mainly Yurimaguas, and an improved research base in the Project area.

INIPA and the PEPP office will be the two institutions involved in this program providing personnel and the technical backstopping for the extension program. PEPP will work through a contractual arrangement with INIPA. Extension activities will promote interaction between the research and extension staffs located in the valley. The first priority of the program will be to find and train the extension staff. INIPA has contracted a private Israeli consulting firm, TAHAL, to train its extension personnel and this system will also be used in the Palcazu. After the initial TAHAL training period is finished, the extension staff will be brought together for one or two days a month to attend refresher courses, in order to make them aware of new developments in their field and to reinforce the initial training provided.

During the initial implementation of the Project, INIPA experts in pastures, annual crops, and perennial crops will be brought in for approximately three-month periods. These experts will collect technical information and develop training programs in order to upgrade the specialists' knowledge in their respective fields. This training program will emphasize the use of available research data on individual crops and how to develop the date into technological packages to create a program that can assist farmers immediately. When the group of commodity specialists is trained, they will develop a commodity program for each of the offices and carry out the training of the extension agents in the programs developed.

INIPA is currently implementing the Training and Visitation (T&V) system nationwide. Adjustments to this system for the Project area are envisioned, given the large size of the individual parcels in the valley and distance between producers. Furthermore, since permanent crops and livestock

have longer growth cycles, visits every 15 days as under the T&V system may result in a misallocation of time. Finally, the orientation of the T&V system is towards the modification of existing practices and may not be ideally suited to the introduction of new crops for which a farmer must be taught all the steps. In the Palcazu, a community or producer-group approach to extension appears to be more suitable for the reasons listed above. Such an approach may also be more appropriate for reaching the members of the native communities. During the training period, a detailed analysis of the T&V system will be carried out and adjustments required in the Palcazu made with the assistance of the outside experts. These outside experts will also identify the key points or activities associated with the current practices of each commodity. This material will be used to assist in the preparation of the training and extension program and materials. The latter will include an emphasis on radio as a promotional and informational medium, as well as an experimental program of video cassettes on specific crops, identifying the key practices essential to the economic success of the activity. Farmer-oriented bulletins will also be prepared from this information. Particular attention will be paid to developing messages that meet the needs of subgroups that have least access to regular, direct contact with the REE system. Subgroups such as farm women, non-Spanish-speaking farmers, illiterate farmers, and extremely remote and isolated communities will be identified by field staff for special radio programming. Use of the video cassette and written material will tend to reinforce the extension agents training and to ensure that the agent knows the commodity thoroughly and takes the producer through all the important steps in the production process. Extension programs will be prepared on the following activities: pejebaye palm and swine raising system, pineapple, passion fruit, winged beans and other beans, tropical pastures, irrigated rice, artificial insemination, and achiote.

While the tapes are important, they will not replace the work of the extension agents, such as visiting farmers and farmers' groups, carrying out on-farm demonstrations, and organizing field days. Project funds will support these on-farm extension activities and there will be a permanent crop specialist, a livestock and pasture specialist, and four agricultural technicians operating from each research and extension center AID funds will also support the personnel costs in a declining basis: 100% the first year, 75% the second year, 50% the third year; and 25% the fourth year.

With regard to the video tapes, none will be prepared on traditional crops grown for subsistence since these crops are well known and the cost effectiveness of tapes depends not on the number of viewers, but on the increased value of production obtained by adapters. Production of some of the tapes will require 18-24 months, since activities take place over a considerable span of time. INIPA will prepare the tapes made under an agreement with PEPP. INIPA has the personnel and equipment to do this work and funds have been allocated under this component for production of ten tapes. These funds will not be used to purchase equipment, other than blank tapes (or to purchase the tapes made in Costa Rica and Paraguay on pejebaye and pineapple, respectively.) The funds will cover the costs of personnel, training, and travel to the area.

e. Credit

The primary source of agricultural credit in the area is the Agrarian Bank of Peru, whose nearest office is in San Ramon. In the past, only the colonists have had the resources to fly to San Ramon to request credit. Because of the Bank's procedures, more than one trip was usually required. Under the Project, the Bank will establish an agency office in Iscozacin to facilitate credit activities and to speed up the approval process. In meetings with AgBank officials, the Bank has assured AID representatives that ample funds exist for both short- and long-term lending in the area and, therefore, Project funds are not required.

The Project will provide $1,350,000 for in-kind permanent crop credit to PEPP to manage and in-kind loan and payback system for planting stock (pejebaye, pineapples, and other permanent crops for which planting stock is in short supply in the valley) and non-cattle livestock. This amount is based on the estimated $2,000 required for one hectare of agricultural land. PEPP will use the funds it receives to establish programs to lend seed, plants, or animals to be repaid in kind. Two such programs operate in the valley now. One is a Swiss-sponsored cattle program; the other was recently started by PEPP to lend sheep to native communities. In addition $1.0 million will be provided to the BIP for an agroindustrial credit fund.

In order to overcome the main problem in the area--a shortage of plant stock--Project financing will provide for transfers of plant stock with a formal obligation to repay the supplies of stock with additional plant stock or in the final crop in sufficient amount to cover the real cost of the loan. To avoid overloading PEPP capacity, private individuals or groups will be contracted by the PEPP office to supply plant stock to others wishing to establish a particular crop.

The following is an example of how this sytem would work with the pejebaye palm: This palm yields 30 tons of fruit and four tons of heart of palm/ha. Currently, the palm is not propagated, but existing palms are harvested. Based on the detailed study of the production and marketing possibilities of the palm (carried out in the training phase), production will be intensified among the native communities expressing interest. The best method of selecting palm shoots for propagation will be determined. The PEPP office will finance an arrangement with private producers to purchase plant stock from the producers for sale to other potential producers. The purchasers will be required to return two units of plant stock for each one received. Up to $500,000 of the Loan funds will be used by PEPP to finance the plant stock program for the current producers, who are principally Amuesha native communities.

To enhance the market potential of pejibaye fruit, a parallel project of raising swine using pejebaye fruit for feed will be developed. As the Amuesha are the principal palm producers, they will also receive extension assistance on raising swine. PEPP will receive over the life-of-the-Project

up to $500,000 of Loan funds to purchase swine for initial distribution to the Amuesha communities raising pejebaye palms. The communities receiving swine will have the obligation to return twice the number of swine received to the PEPP or its designated agents. This type of credit distribution system provides a dual benefit to the communities by expanding the market for commodities they produce and by placing them in the role of suppliers of plant and animal stock. It also maintains the real value of the funds and permits the continuous distribution of the commodities and an expansion to other activities over time.

PEPP will use the same concept to develop appropriate programs for the distribution of permanent crops such as achiote, passion fruit, pineapple, and others found suitable for the area. While research on the winged bean has given mixed results in Peru, international experience suggests it could be an important food crop in the area. Plant stock is a major percentage of initial total input costs. Based on cost/price figures from Costa Rica, Paraguay, and Peru, it is estimated that input costs will be approximately $2,000 per hectare in the Palcazu. Assuming 500 to 750 hectares are brought into production, $1.350 million in credit over the life-of-the-Project will be reserved for the purchase and cultivation of plant stock for these crops. The distribution plans developed by PEPP will be reviewed by AID prior to their implementation. This credit program is not typical but it is an alternative means of providing credit while maintaining the real value of funds and it will tend to solve the constraint on plant and animal stocks.

The proposal has two notable merits: (1) the monetary illusion of high nominal interest rates is avoided (of course, the Central Reserve Bank indexation program also serves this objective) and (2) the farmer-borrower becomes the beneficiary of reduction in the real price of the crop if the government pushes the price down to subsidize urban consumers as occurred intermittantly in Peru in the 1970s. The commodity-indexation program will complement the Central Bank's graduated indexation plan. The commodity-specific program is also being implemented by the USAID's Upper Huallaga Agricultural Development Project (527-0244). Successful implementation of this innovative scheme under both projects, together with the graduated indexation program, will have important policy implications for agricultural credit in Peru and will revitalize term lending for agriculture in Peru.

f. Project Inputs

The Project Loan funds will finance $209,000 in training activities of researchers and extension agents in other areas of Peru and/or to bring local experts into the area for assistance as required; $805,000 in personnel costs for the research and extension activities; $149,000 for the purchase of three pick-ups, four boats with outboard motors, three trailbikes, and spare parts; $115,000 for equipment and supplies; $500,000 in credit for plant stock and for the pejibaye palm/swine production program; $800,000 for production of other permanent crops such as achiote, passion fruit, and pineapple; $50,000 for beans; and $1,000,000 for the BIP agro-industry credit

fund. The Grant will provide $66,000 for six months of short-term technical assistance and $360,000 for 36 months of long-term technical assistance.

The GOP will provide $875,000 in personnel costs for the research and extension activities; $70,000 for travel and per diem; $18,000 for materials for training; and $1,000,000 for the BIP agroindustry credit fund.

6. Livestock Development (Loan $683,000)

a. Background and Objectives

The principal economic activity now practiced in the Palcazu is cattle raising. The majority of the pastures, which are usually unimproved, are generally on good quality lands with the capacity to support them. Currently, about 15,000 hectares of pastures support about 13,000 head of cattle for 150 families. Including lands suitable for clean cultivation, roughly 20,000 hectares of land in the Palcazu could sustain pasture. These figures indicate that: 1) there is not much land left in the Palcazu on which to establish new pastures; and 2) the level of stocking on existing pastures varies from 0.6 animals/ha to 1.7 animals/ha, suggesting the possibility of increasing levels for many of the area's producers. As stated earlier, funds allocated for research and extension under the agriculture development component will be used jointly to support livestock activities as well. In addition, $500,000 in credit funds will be provided to support swine raising.

This Project activity has the following objectives:

- Improve pasture and pasture management on those lands best suited for pasture;
- Improve cattle yields on pasture lands;
- Encourage raising swine in conjunction with production of permanent crops;
- Improve animal health; and
- Prevent establishment of new pastures on lands that do not have the capacity to sustain pasture.

The following are examples of research team activities under this component.

- Detailed inventory of cattle production units in terms of pastures and cattle and evaluation of management level and possibilities and interest in improvement. This step would also serve to identify possible farms for on-farm investigation.

- Improved record-keeping, more regular health program, and stock selection based on simple production measures.
- Use of improved herd size.
- Fencing to divide existing large pasture units. This should permit more uniform grazing and allow separation of groups for special

management such as mineral supplement high in phosphorus for milking cows and heifers.

- Improvement of small area of pasture with potential for greater response with improved species of grass, legume or fertilization. This area would be used by animals needing highest level of nutrition.

- Expand area of improved pasture and increase number of pasture divisions.

- Begin to milk cows. Curd could be produced on the farm and transported to a central processing center for cheese production. Whey could be used for swine production.

- Develop renovation systems and more intensive use systems for existing pastures through the use of forage legumes, improved grass species, fertilizers, green manures, crop rotations, and management techniques. Recent alluvial soils in extensive pastures must become more productive through more frequent cropping, use of green chopped forages, and intensive rotational grazing of higher productive species.

- Test recommendations for achieving heavier weights at slaughter, milk production increases and improved reproductive efficiency through more intensive labor use, more careful management, and better nutrition, all of which are options more readily available to the farmer with few animals. Since the Amuesha and new colonists cannot expect to become large-scale cattle farmers, research and extension will be devoted to increasing the value and returns of each animal to them.

- Monitor the impact of grazing management, stocking rate, and age of pasture on completeness of cover, water runoff, erosion, pasture and species composition and nutrition value.

b. Pasture Improvement

The central aspect of pasture improvement will be a program of research and extension. Research will determine: which improved pasture species are best adapted to the area; alternative grass and legume mixes; grazing rates; fertilizer and weeding regimes for each type of pasture; best methods of pasture establishment; and methods of pasture enrichment and regeneration. Farmers currently using brachiaria, for example, indicate good results and this will be a starting point for research.

Extension activities will assist pasture owners to apply the improvement techniques developed through research on their pastures. Given the generally good results the colonists have had with brachiaria, the extension service will facilitate the distribution of brachiaria through on-farm demonstration sites. The demonstration sites provide the plant material to the farmer to gradually increase the farm area under improved pastures. Extension will stress tecniques an owner can afford and will be compatible with communal pasture management in native communities and with individual pasture management for individually managed pastures.

c. Herd Management

This activity is very closely linked to pasture improvement, particularly pasture rotation entailing fencing pastures into separate units and grazing them systematically. Research on herd management will concentrate on determining pasture rotation systems and feed supplements to pasture, herd culling practices, and methods of disease and parasite control. The extension agents will identify producers interested in improving their herd through improved culling practices. These producers will be instructed in marking individual cows and maintaining records on their productivity.

Two technicians from each center will be trained in artificial insemination practices at IVITA/Pucallpa. Under an agreement between PEPP and IVITA/Pucallpa, IVITA will supply the Project with the primary input, and PEPP/INIPA will implement the AID program.

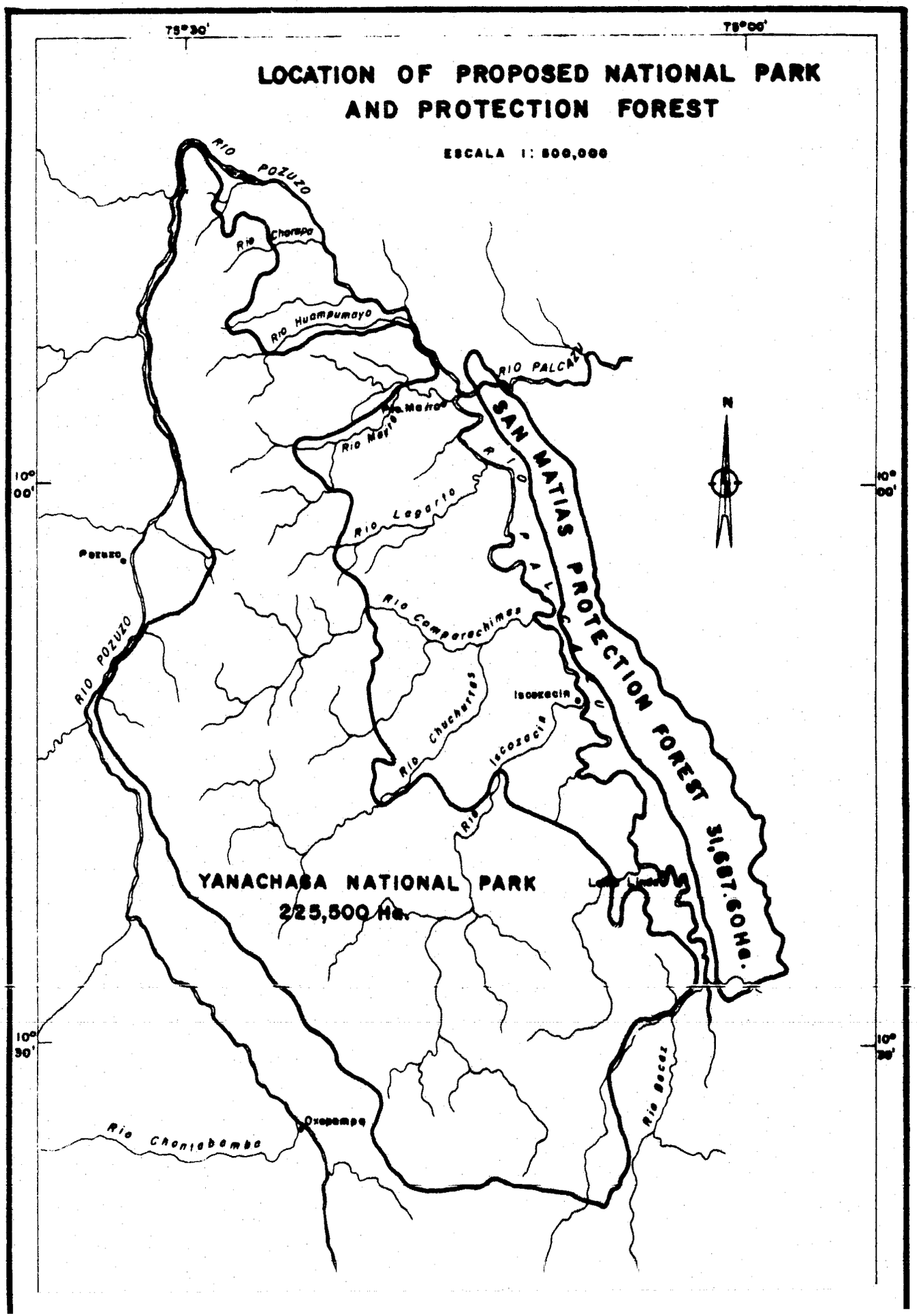
d. Swine Production

Increasing swine production in the Palcazu is closely linked to the Project activity in agriculture and agroforestry. Some of the products of permanent crops--timber, rubber, cacao--are for direct market sale. Other products or by products--pejebaye fruits, rubber fruits--are best used as livestock feed, most suitably for swine. Some, like plantains, are suitable for direct market sale or for livestock feed. In order to resolve these questions, the program will require specific research and extension activities which the Project will support. Unlike the Project activities for cattle, which are aimed almost entirely at production for markets outside the Palcazu, swine will be produced for a combination of distant markets, local markets, and household consumption. The production of swine on the native communities using locally grown feed supplies will be stimulated through extension efforts and an in-kind credit system ($500,000) as discussed in the agricultural development section.

Research on swine production will concentrate on the pejebaye/swine system. Extension will concentrate on the diffusion of the system among the native communities and the production and processing of feed for pigs. The landowners' financial ability and animal husbandry skills will help determine production methods and intended markets.

e. Animal Health

INIPA is charged with responsibility for conducting vaccination campaigns, but in the past the lack of refrigerators to maintain vaccines has been a problem. Periodic routine vaccination campaigns will be organized, under the responsibility of the veterinarian at Iscozacin and the Project will fund purchase of equipment to establish a reliable cold chain. In addition, in the native communities, the use of dipping pits for the control of external parasites will be developed.


LOCATION OF PROPOSED NATIONAL PARK
AND PROTECTION FOREST
ESCALA 1: 500,000
75°30'
75°00'
10° 00'
10° 30'
N
RIO POZUZO
Rio Chorapa
Rio Huampumayo
RIO PALCAZU
Rio Mairo
Rio Lagarto
Rio Comparachimas
Rio Chuchurras
Rio Iscozacin
Pozuzo
Iscozacin
SAN MATIAS PROTECTION FOREST 31,687.60 Ha.
YANACHASA NATIONAL PARK
225,500 Ha.
Oxapampa
Rio Chontabamba
Rio Bocai

f. Inputs

For the livestock development component, the Loan will provide $500,000 in credit for swine farmers; $180,000 for personnel, office equipment, research and extension supplies, and operations and maintenance; and $3,000 for training at IVITA, for a total of $683,000.

The GOP will provide $198,000 in counterpart funds for personnel, (which will be financed on a declining basis as mentioned earlier), travel and perdiem, operations and maintenance, and training.

7. Protection (Loan $147,000 and Grant $110,000)

a. Objectives and Anticipated Benefits

The principal objective of the Project activity in protection is to designate and protect those lands in the Palcazu watershed whose only land use capacity is for protection. These lands are to be designated as protection areas not only because their land capability has been identified as such, but also because if these lands were to be utilized for any other purpose they would greatly reduce the sustainability of all other productive agricultural and forestry activities on the valley floor. Therefore, these lands provide the greatest economic returns to the valley as a protection area. In order to further enhance the economic and financial returns of this component, the Project contemplates that this area will be officially designated a national park, thereby resulting in additional income and jobs to the valley through increased tourism, services and commerce.

The direct physical benefits of this activity are protection of soil from erosion and preservation of potentially endangered species and ecosystems. Prevention of soil erosion will help to maintain the regularity of streamflows and avoid excessive siltation and sedimentation of streams. These, in turn, will result in the conservation of fish habitat and reduced flooding and erosion on downstream production lands. The economic benefits, indirect but substantial, are higher long-term yields from fisheries, forestry, livestock, and agriculture.

Preservation of species and ecosystems is also important since some of the plants and animals found in the Palcazu occur nowhere else and their loss would be irreplaceable. Their preservation in undisturbed habitats will make them available for scientific study, aesthetic appreciation, and possible economic use. Designation of most of this area as a national park will ensure its use for scientific and recreational purposes. Resulting tourism will generate new economic activity, mostly in the private sector.

b. Establishment of Yanachaga National Park and San Matias Protection Forest

The Project through PEPP personnel and Project-funded technical assistance will establish a national park in the Yanachaga range and a protection forest in the San Matias range . The Yanachaga National Park

will include the entire western side of the Palcazu watershed in a continuous block of land whose use is only for protection. In addition, included within the park boundaries will be a corridor of lowland reaching the Pozuzo or Palcazu rivers. The lowland corridor is needed to protect lowland species and ecosystems including those which require a riverine environment. Total area of the park for all the sections noted is approximately 225,000 hectares. The GOP has already taken preliminary steps to establishing the park and protection forest, and the Project agreement will covenant that this process be completed. These lands, as well as the entire Palcazu watershed, are under the jurisdiction of PEPP.

The first step to be taken under the Project in accomplishing the activities contemplated for this component is to formally designate and delineate boundaries of the park and protection forest. This process will be performed by Project personnel and Project funded technical assistance contracted early in Project implementation by the Mission and will be based on the preliminary studies required by law. Once the park and protection forest are established the actual boundaries will be delineated on the ground. Clearly, it is important to prevent incursion into these areas for unauthorized purposes. Therefore, control activities, not financed by the Project, will begin even before boundaries are formalized for those areas that are certain to be included in the park and protection forest. The main object of preventing incursion is to prevent land clearing. Settlement will not be permitted within the boundaries of the park or forest, nor will any form of agriculture, grazing, or logging. Some limited hunting and gathering of wild plant materials might be possible.

c. Park Inventory and Management Plan

Shortly after the park is designated, an inventory of its resources will be made by Project personnel and Project funded technical assistance, describing and quantifying the flora, fauna, and ecosystems, of the parks. Use of parkland by native communities and settlers in the Palcazu valley will also be described. The inventory will provide the basis for developing a management plan for the park which will describe how the park will be used and developed over time. The management plan will state in detail how the park's resources will be used and conserved. It will describe the roads, trails, buildings and other infrastructural elements needed for tourism and recreational and scientific use of the park. The plan will state what specific activities are anticipated for the park and the estimated number of people they will involve. It will include a timetable of proposed development and a budget for proposed staffing and infrastructure, which should allow PEPP to request additional financing to carry out these new activities.

Although the Project will not finance any direct development of the parks, it does anticipate, however, that designation of the parks and some development by the GOP will begin soon after the management plan is completed. Opening the park to visitors will publicize them and contribute towards their protection. It will also generate economic activity

both directly in the parks and in secondary and support activities outside their boundaries, attracting as many as 22,000 visitors per year by as early as 1990.

d. Management Responsibilities

The Yanachaga National Park and San Matias Protection Forest will be under the jurisdiction of the Project which will take the lead in having the park and forest declared protected areas. Preliminary studies for designation of the areas will be planned for and done directly by the Project and Project funded technical assistance in conjunction with the appropriate GOP agencies. Before they have been officially designated, Project personnel will begin mapping their boundaries and locate them on the ground. Although PEPP will retain overall responsibility for management of the areas, INFOR administers the Peruvian national park system and in conjunction with PEPP will manage the park.

e. Project Inputs

In order to carry out these activities Project Grant funds totalling $110,000 will be provided to finance a short-term specialist for six months in park management and development who will assist the PEPP and INFOR in development and supervision of the park inventory and management plan. In addition four months of short term technical assistance (US$44,000) will provide specialists for performing the park inventory and for various specific aspsects of the management plan as well as a specialist in tourism and recreation. (Annex II Exhibit E contains a listing of this technical assistance and its cost.) $140,000 in Project Loan funds will also finance the cost of office and drafting equipment, personnel on a declining cost basis, as well as one (1) four-wheel drive vehicle for carrying out these activities. (Annex II, Exhibit F contains a listing of these items.)

Counterpart funds will provide for office space, salary costs for project personnel, establishment of the park and deliniation of its boundaries.

8. Continuous Land Use Inventory (Loan $196,000 and Grant $88,000)

a. Background and Objectives

PEPP is currently coordinating a program of cadastral mapping ~~and titling in the Palcazu basin. Under the program, the boundaries of nine~~ titled Amuesha native communities have been surveyed and marked on the ground. The remaining four Amuesha native communities which do not have title yet should receive title during 1982 after their boundaries are delineated, surveyed and marked. Individual parcels are also being surveyed and titled in both the Palcazu and Pichis basins. In 1981, 782 parcels were mapped and had their titles conformed. PEPP expects that the program will survey and title at least 2000 more parcels in 1982. All existing parcels in the Palcazu should be mapped and titled by mid-1983.

The current cadastral and titling program is being carried out under PEPP auspices by PEPP, the Ministry of Agriculture's National Rural Cadaster Office (OGCR), and the Ministry of Justice's Office of Public Register (ORP) under a special agreement with PEPP. An office has been established for this purpose staffed by personnel from all three entities and headed by a PEPP employee. After all existing parcels have been mapped and titled, new parcels will be authorized by PEPP under this same agreement and will then be delineated and titled. This Project activity builds on the work in progress by PEPP and carries it to the next logical steps in overall land use management. Its objectives are to:

- Provide security of ownership to land holders and holders of long-term forest concessions;
- Match land use to land capability;
- Determine location and size of new parcels;
- Identify areas for potential development and decide the form development will take; and
- Assist in evaluating development.

b. Continuous Plotting and Titling of Parcels

Under the Project, PEPP, OGCR and ORP will continue the current program of cadastral surveying and titling and will apply it to the new parcels and forest concessions when granted. To institutionalize this process further, the Ministry of Agriculture will establish a cadastral field office in the Iscozacin Project Office; the office will also maintain the cadastral surveys and maps for changes which occur in existing parcels. The Ministry of Justice will also establish a sub-office of Public Register at the Iscozacin Project Office to record, titles, concessions, and other legal documents. Thus, between the functions of the cadastral and registry offices, a permanent land registry system will be established and all changes in parcel boundaries and/or land rights will be duly recorded. As a result, every resident in the Project area will have a registered title or other legal document clearly establishing his rights to his land parcel, and disputes with third parties over ownership or possession will be minimized.

PEPP will also take an active part in protecting residents from invasion of their titled lands, especially in the case of Amuesha native communities. Because the communities hold land in common, their lands are more likely to appear empty or unowned than is an individual parcel. Moreover, claims of native communities to land in the high jungle have historically been ignored and this tendency must be thwarted by clearly marking their boundaries and recording their titled rights.

c. Determining and Mapping Land Use Capability

The land use capability of the productive lands in the promising portions of the Palcazu watershed which have not yet been mapped will be determined and mapped on a small scale as has been done in the JRB study for the valley floor. Larger-scale maps with more detail will be produced at the valley floor and other selected areas.

These accurate land capability maps will be the tool used to determine appropriate sizes of new parcels. A parcel should be large enough to provide a decent living on a sustained basis to the family who owns it and uses it in accordance with its capability. Land use capability maps show what kind of development is best suited to a parcel of land. Those extension services and other development services that conform to the land's capability can then be provided to its owner. In addition to directing development on a broader scale, the land capability maps can be used to define more precisely where feeder roads should be located.

d. Continuous Mapping of Actual Land Use

The actual use of land in the Palcazu watershed will be mapped by the OGCR and PEPP as soon as possible and the maps will be continuously updated thereafter by field observation and/or aerial video imagery. Land use maps will be the same scale as the land capability maps so that the two sets of maps can be used together to compare actual land use to land use capability. This comparison will serve two important functions:

(1) It will show what kind of development services should be provided on lands used in accordance with capability, so that development services can promote the continuation and improvement of those land uses. On lands not used in accordance with capability, development services will aim at converting actual land use to conform to land use capability.

(2) It will show how well actual land use conforms to land use capability and if nonconforming land uses are being converted to conforming ones.

e. Project Inputs

US$ 88,000 in Project Grant funds for this activity will finance eight months of short-term technical assistance to be provided by a specialist in land use capability.

US$196,000 in Project Loan funds will be used to purchase two trailbikes, a four-wheel-drive vehicle, survey and cartographic equipment, aerial video tape equipments, satellite imagery, office furniture, salaries(on a declining cost basis as mentioned above), and field and office supplies for this activity. A complete list of this equipment is set out in Annex II,

Exhibit F. Some of the Project inputs listed under this Project activity include aerial photography, map products, and aerial video tapes, which will be used as well in the project management component.

Counterpart funds will finance staff salaries of the PEPP, OCGR and ORP; office space, travel costs, and maintenance costs; the costs of the land use capability and mapping activities; and the costs of any additional aerial photography required.

9. Health and Environmental Sanitation (Loan $465,000)

a. Background

The Palcazu Project area lies in the Chanchamayo hospital area, in the Centro Medio health region of the Ministry of Health which has its regional office in Huancayo. Two baseline health studies 1/ of the Project area identify serious health problems and deficiencies in health service delivery in the Palcazu valley. Health problems include parasitic diseases, respiratory ailments, enteritis, hepatitis, and malnutrition. Parasitic diseases in particular affect the entire population and account for approximately 50% of the deaths in the valley. Among the most serious delivery deficiencies are: inadequate medical facilities and supplies; lack of trained personnel, including health promoters, midwives, and supervisory personnel such as nurses and doctors; and lack of basic sanitary facilities for potable water and disposal of human wastes.

Medical facilities in the valley include a partially constructed health center/hospital in Iscozacin and seven MOH health posts. The health posts provide only minimal services due to lack of basic medicines, supplies,and equipment, particularly refrigeration for storage of blood, plasma, and perishable medications. Access to health facilities is a serious problem. Currently river transportation is the only regularly available means of intra-regional transportation which is possible most of the time, but not everyone has access to boats. Health posts do not have boats and, therefore, health personnel cannot make calls away from the posts. Travel by foot is difficult for someone in need of medical care; during the rainy season, it is virtually impossible.

Most health post personnel lack adequate training but are often required to assume the increased responsibilities of a doctor. At present, no doctors are posted in the area, and one resident nurse, responsible for supervising all the promoters in the Palcazu and Pichis valleys, does one round of supervision every two years. Any sense of a "health system" is totally lacking and, as a consequence, virtually all

1/ Ira H. Marks, "Baseline Health Assessment of the Palcazu Valley," Annex H to Central Selva Natural Resources Management report prepared by JRB Associates, October 1981.
Jesus Toledo and John Holley, memorandum "Estado del Sector Salud en la region Pichis-Palcazu," 1981.

support mechanisms, including referrals, are absent. Serious illness must be treated in La Merced, an option requiring air travel that few people in the valley can afford. The alternative to the government medical care system is traditional medical care, provided by healers and self-trained midwives.

Sanitation is a major problem in the Palcazu. Few latrines for excreta disposal exist, and although water sources abound, few provide potable drinking water. Water is rarely boiled and knowledge of basic hygienic practices is limited. Sources of water contamination include latrines which empty directly into the river, waste flushed from slaughterhouses, garbage, and defecation along the river banks. As a result, parasitosis, hepatitis, gastroenteritis, and leptospirosis are endemic in the population, and epidemics of typhoid fever occur frequently. These diseases, in turn, contribute to the high levels of anemia, malnutrition, infant mortality, and generally high levels of morbidity and mortality among the population of the valley.

Palcazu ranchers use SASA, a private airline, for transportation to hospitals and physicians outside the valley for medical care. Smaller colonists do not have well-defined communities or a particular system for provision of health services. Therefore, they rely on the health posts, traditional healers, and self-medication. The native Amuesha communities use the health post system, in addition to traditional healers and midwives. Historically, the native groups did not use the services provided by health practitioners trained in modern concepts. The reasons for their reluctance included alienation to providers, fear and lack of understanding of modern medical practices, conflict with traditional medical practices, and inconsistency with native cultural beliefs. To encourage the Amuesha to accept modern facilities, the design and implementation of a health care system for the area will actively involve the communities. To the extent possible, traditional healers and midwives who hold the trust of the Amuesha will be trained under the Project.

b. Objectives

The objective of the health and environmental sanitation activities under the Project is to improve health service delivery in the area in order to improve health conditions for current and future populations. Specifically, the Project will provide:

- Training and supervision for health technicians, promoters, and midwives;
- Equipment and supplies for area health posts;
- Support for the construction of potable water systems and latrines; and
- Integrate three activities with those of the on-going MOH/AID Health Projects.

The MOH will provide the personnel, infrastructural support, and operating expenses necessary to carry out Project activities. Basic medicines required by the Iscozacin health center and area health posts will also be supplied by the Ministry. The Ministry will use the procedures developed under the MOH/AID sponsored health, family planning and rural sanitation activities.

c. Training and Supervision

The Project will provide support for training to upgrade the knowledge and skills of existing health technicians from the seven area health posts. In addition, the Project will train new promoters and midwives who reside in communities currently without health posts. In many cases, the new promoters and midwives will be traditional healers and midwives. They will receive medicines and supplies from the health posts. Health post technicians, the area nurse, and, as feasible, a doctor from the hospital area will supervise them.

Training courses, offered once a year, will be designed and run by the area nurse and the director of the hospital area or other doctor from the health region. For these courses, AID will make available the training materials used in similar courses for promoters under the AID Extension of Primary Health Project, 527-U-072.

Each year during the life of the Project, the seven currently employed health post technicians will receive advanced and refreshed training. In the first year of Project implementation, up to 30 new promoters and midwives will receive basic training. In subsequent years, up to a total of 40 additional promoters and midwives will be trained or will receive refresher training each year.

Training will emphasize preventive health care and basic curative medicine for the most common illnesses. Curriculum for these courses will include: vaccinations; prenatal, postnatal, and childbirth services; diagnosis and treatment of common diseases; community education including family planning; nutrition education; and environmental sanitation education. Trained promoters will in turn educate their communities in basic health and hygiene practices.

The Iscozacin health center staff and health post technicians will supervise the health promoters and midwives. Supervisors will monitor promoter activities, particularly the use of medicines by promoters and the diagnosis of cases requiring referral. Based on supervisory visits, additional training in refresher courses will be recommended.

At present, no organized health training takes place in the Project area. Under the Project, AID will fund per diem and transportation costs for the trainers, health post technicians, promoters, and midwives. AID will also provide training materials used in the Primary Health Project.

To facilitate supervision of health technicians; promoters, and midwives, the Project will fund per diem and travel expenses for supervisory personnel. Health post technicians will visit the promoters and midwives in communities under their jurisdiction once each year. The area nurse or doctor will visit the seven health posts once a year and selected communities once each year.

For details on training and supervision, see Annex II, Exhibit G.

d. Equipment, Supplies, and Medicines

The director of the hospital area and the area nurse identified equipment and supplies which are necessary for the operation of the health system in the valley. These will be provided under the Project. Equipment and supplies for the seven health posts will be purchased locally. The Project will purchase the equipment necessary to establish appropriate cold-chain procedures to include battery-run refrigerators, small generators to recharge the batteries, and cold chests to transport perishable medicines and blood. In addition medical equipment such as basic medical supplies, promoter kits, and midwife kits will be provided under the Project.

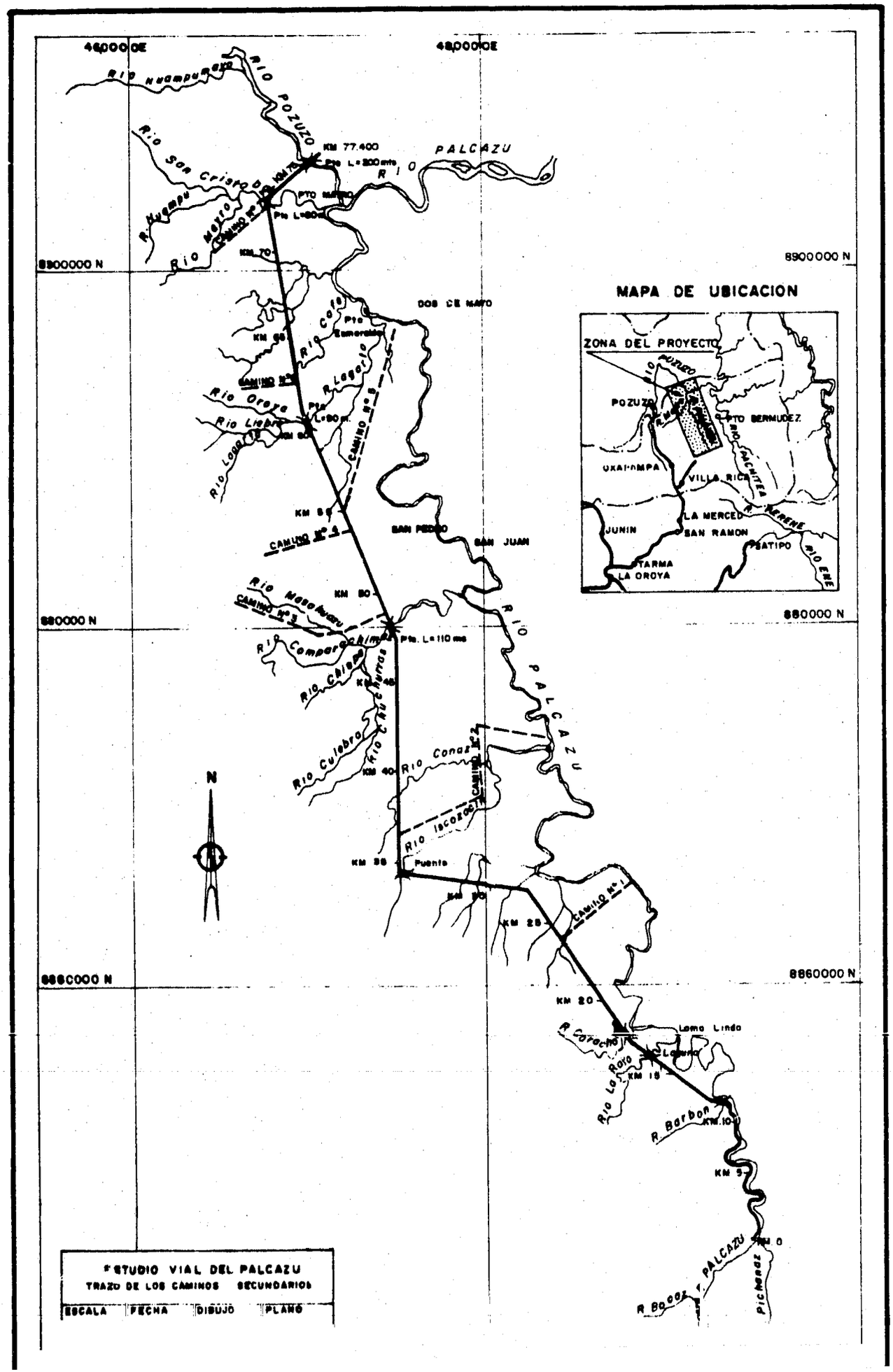
Because transportation is a constraint to health care delivery in the area, the Project will also finance the purchase of five motorcycles and five locally made boats equipped with imported outboard motors. The boats and motorcycles will be used by health promoters in those communities currently served by health posts to visit and transport patients and by health supervisors in their supervisory visits, as well as for a variety of other community needs.

The Project will provide $465,000 in Loan funds for the purchase of the above-mentioned items. Detailed lists of equipment and supplies are set out in Annex II, Exhibit G.

e. Construction of Potable Water Systems and Latrines

The provision of clean water supply and proper waste disposal will be instrumental in controlling disease transmission in the project area. Under the Project, approximately 20 area communities will be provided with potable water and sanitation services.

In Iscozacin, a gravity-fed water system will be designed and constructed under the supervision of a sanitary engineer from the PEPP office. Public sanitary units, including basins for washing clothes, taps, showers, and latrines, will be constructed for selected public buildings, such as the health center, school, and community center. The system will be designed to permit the addition of household connections by individual families and future expansion of the sytem as the town's population grows. The Project will also provide materials for those families wishing to build individual latrines.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TARMA
LA OROYA
RIO ENE
ESTUDIO VIAL DEL PALCAZU
TRAZO DE LOS CAMINOS SECUNDARIOS
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In the other communities in the Project area, systems will be designed by the PEPP engineer according to the specific conditions and needs of the community. Gravity-fed systems will be used in larger communities and wells with hand pumps and simple filtering systems will be considered for dispersed settlements. At a minimum, the seven health posts, area schools, and community centers will be furnished with potable water facilities and latrines. To the extent possible, these facilities will use locally available materials. They will be constructed with community participation and will be easily maintainable and consistent with community size and water source availability. Community promoters will assist in organizing the community for system construction and will educate and motivate community members in system use and maintenance.

System maintenance will be emphasized in order to avoid the construction of systems which deteriorate due to lack of proper maintenance. The sanitary engineer and the health promoter will develop a maintenance plan for each system. In order to qualify for a water system, each Project community will be required to establish a water committee with the assistance of the health promoter. The committee will organize voluntary labor for system construction and will be responsible for the maintenance of the system and collection of maintenance fees. The fee per user will be established by the committee; the system to be installed in each community will depend in part on the users' ability to pay the fees.

f. Project Inputs

Under the health and environmental sanitation component, up to $465,000 in Project Loan funds will be provided. The Loan will finance training and supervision costs, including perdiem, transportation, and training supplies. Loan funds will also be used for the purchase of motor boats and motorcycles; refrigerators, generators, and cold chests; and medical equipment. For the construction of water systems and latrines, the Loan will finance the purchase of construction materials, PVC piping and accessories, hand pumps, a four-wheel-drive pick-up, and skilled labor costs.

The GOP will provide $61,000 to finance support costs, including salaries, perdiem and travel expenses, vehicle operation and maintenance charges, office space, and supplies. Participating communities will provide unskilled labor for the construction of the water systems and latrines.

10. Feeder Road Location Planning and Road Maintenance (Loan $2,581,000) and Grant $218,000)

a. Feeder Road Location Planning

The GOP is currently in the process of building an 86-kilometer road through the Project Area. At present, seven kilometers have been constructed and it is anticipated that 22 Km will have been completed by

the end of 1982. It is also planned that at least 60 kilometers of feeder roads will be constructed in the valley during the life of the AID Project.

In order to insure that the feeder roads are constructed so as to provide access to the most productive lands while avoiding environmental degradation, AID will provide funding for feeder road location studies and for the technical assistance of an environmental engineer to assist inthe planning of these roads. Some feeder road studies have already been carried and construction of these feeder roads will begin as the main road reaches these areas. The remainder of the feeder roads for the Project area will be constructed in subsequent years, once AID-financed location studies have been carried out.

AID will provide $200,000 in Loan funds for the feeder road location studies and $33,000 for three months of technical assistance by an environmental engineer to assist with these studies. The feeder roads themselves will be entirely financed by the GOP with funds other than Project counterpart funds.

b. Road Maintenance

The need for improved road maintenance in Peru generally and especially in the Project area is evident. Without exception, all the roads inspected during a field trip in March 1982-- including the gravel road from Villa Rica to the start of the primary Project road (60 kms), the roads from Villa Rica to La Merced and Oxapampa, and numerous secondary roads near the Project area-- are in need of rehabilitation because of lack of maintenance. Without intervention by AID, it cannot be assumed that the Pichinaz-Puerto Mairo roads will receive adequate maintenance.

The reasons for the poor maintenance performance are complex and interrelated, and lasting improvements in road maintenance will require a coordinated effort directed at all areas of operation. The World Bank is addressing the overall problem of continuing to improve maintenance performance in Peru, and plans to provide considerable financial and technical assistance to the Ministry of Transportation and Communication (MTC) to improve road maintenance in the future. The seven World Bank highway loans initiated since 1955 all contained significant road maintenance improvement components; the recently approved Eighth Highway Loan contains a three-year road maintenance program (1982-1984) to raise the overall national level of road maintenance.

(1) Project Inputs

The maintenance component of the proposed Project will assure that the MTC will provide a level of road maintenance in the Project area sufficient to preserve the area roads in good condition. The Project will provide the non-recurrent expenditures for equipment and the training necessary to achieve the required buildup of MTC's maintenance capacity for the primary and secondary roads in the area. The Loan will finance the following:

Equipment and Vehicles. Estimates of the equipment and vehicles required to maintain the primary and secondary roads were made by the Jorge Miranda Patron y Asociados Company in their report "Programa Vial del Palcazu, Estudio de Ruta Alternativa." In their analysis, equipment requirements were defined in terms of total vehicle operating and equipment hours for adequate maintenance; these were then converted into units of vehicles and equipment. Their analysis was used as a point of departure for determining the equipment requirements as shown in Annex II, Exhibit F. The list includes equipment for the routine and periodic maintenance of the roads, front-end loaders for removal of land slide debris, open bed trucks and pick-up trucks for the transport of personnel, and various other types of equipment.

Preventive Maintenance Workshop, Tools, and Spare Parts. On the basis of the maintenance equipment and vehicles composition, the size of the workshop and the number of spare parts needed to establish an adequate initial stock for preventive maintenance have been estimated. The MTC preventive maintenance workshop will be located in Iscozacin, and major repairs will be done at the regional MTC workshop in San Ramon. This component of the proposed Project would finance the acquisition of hand tools and minor pieces of equipment such as wheelbarrows, picks, and shovels.

Technical Assistance and Training. The Project will provide technical assistance for a total of 32 months of local and foreign consultant services. The main objectives are to strengthen the MTC's planning and programming capabilities for road maintenance within the Project area, to advise and assist in improving road maintenance organization and operations, and to train equipment operators and equipment maintenance personnel in the preventive maintenance of road maintenance equipment. Two experts (one road maintenance engineer and one equipment maintenance specialist) will be required for a period of about 16 months each, and will be assigned to work with the MTC office in Iscozacin. The terms of reference for these services are presented in Annex II, Exhibit B.

(2) Execution and Monitoring

Under an agreement between the PEPP office and the MTC, the MTC will be responsible for the road maintenance and will provide the labor and operating costs required by this component.

(3) Cost Estimates

The investment by USAID to achieve the required buildup in maintenance capacity of the MTC to adequately preserve the condition of the primary and secondary roads will total $2,799,000. This includes $218,000 from the grant to finance the technical assistance services. Loan financing will include the following: road maintenance equipment and spare parts, $736,000: equipment maintenance workshop, $153,000; workshop tools and equipment, $80,000; hand tools for road maintenance, $17,000 feeder roads studies, $200,000 and $1,395,000 for fifty

percent of the operational costs during the first five years. Cost estimates for equipment and parts exclude taxes because of the exemption for equipment used by Government agencies. Costs were derived from the analysis of maintenance equipment needs by Miranda (1981) and from estimates prepared by the U.S. Department of Transportation advisor and USAID.

The GOP counterpart costs will be $1,395,000 for half of the operational costs during the 5 year project period.

11. Communications (Loan $360,000)

(a) Background

Slow and inefficient communication is a significant constraint on the delivery of development services to a large portion of Peru's jungle, high jungle, and sierra departments. Adequate transportation, mail and telephone services, and broadcast facilities are, for the most part, confined to the coast and to metropolitan areas. As a result, development agencies with projects in rural areas suffer from heavy travel requirements, inadequate information about and supervision of field activities, and inability to reach target groups with regular information and motivational messages.

Before the advent of satellite and related technologies, reliable communications could only be extended across great distance, over rugged terrain or to areas of difficult access through wires or cables, or by a series of costly towers and relay signals. These technologies discriminated against rural and isolated communities for three reasons: terrestrial facilities are costly to install and maintain; they are vulnerable since damage to one component knocks out the entire network; and the capacity of the system is fixed. Recent advances in satellite technology, including low-cost commercial availability of small satellite earth stations, now give rural people the opportunity to benefit from reliable communications as a development tool for delivering rural social services and promoting economic growth of rural economies. The advantages that satellite and related technologies have in meeting rural communications needs are: the cost of providing service is independent of distance, reducing the need for costly terrestrial linkages; the satellite system is less vulnerable because a breakdown at one point only affects that community; and the satellite system ties the rural area into the national telecommunications system in a permanent manner with the possibility for future growth, moving from a few telephone circuits and radio reception to an expanded telephone system, radio and television reception, and other modern technologies.

The national telecommunication service entity, ENTEL-Peru, has identified the expansion of its communication network into remote, rural areas as a high priority task in its National Development Plan. It is expanding into Peru's jungle areas using satellite technology. This Plan also states that telecommunication planning should emphasize services which stimulate socio-economic development. ENTEL-Peru has established a Social

Services Office and is collaborating with AID in the implementation of the "Rural Communications Services" project (598-0581). This project is providing communication ground stations with VHF radio-telephone links to villages surrounding these ground station communities in the high jungle area of San Martin. The network will be used for two-way telephone service, multiple-point teleconferencing, and relay of educational and motivational radio broadcast programming, and it will tie the Project area into the national telephone system.

ENTEL-Peru's Social Service Office has established contact with the Ministries of Health, Agriculture, and Education to identify specific applications which will be implemented this year in San Martin. Interest is high in all of the sectors and the programming shows that the sectors will be able to better supervise and coordinate their development activities at a reduced cost using the satellite network. Field experience in system installation and utilization as well as realistic cost and benefit data for development-oriented rural communications services from the San Martin experiment will assist Peruvian development planners to make decisions concerning replication in other areas. The Central Selva Resource Management Project will benefit directly and immediately from the application of satellite technology to social development in the San Martin experiment and from the increased communication accessibility and flexibility offered by the technology to the Palcazu valley.

(b) Objectives and Administration Arrangements

While the key element in the Project purpose is to plan and execute development project for sustained production in the Palcazu valley, the Project also aims toward developing a permanent GOP capacity to plan and implement a national regional development strategy. Thus, the Project assumes an importance beyond the Project area, and every effort should be made to assure success. The multiple administrative and operational arrangements required for Project implementation will depend upon the existence of an effective communication system, operating both within the valley and from the valley to other centers of activity, including Lima. These arrangements include coordination among the following entities: the national-level Secretariat of Regional Affairs; PEPP offices in La Merced, Iscozacin, Puerto Mayro, and Loma Linda; research, extension, forestry, and other project activities throughout the valley; key banking and research operations centered outside of the valley in San Ramon, La Merced, Yurimaguas, Tulumayo and Pucallpa; other participating entities such as INIPA, INFOR, SENAMHI, ONERN, OGCR, ORP, MTC, MOH, the credit banks, and such marketing groups INDALSA, FOCEX, and INDA.

However, the widely-dispersed settlement patterns in the valley and unreliable ground and river transportation combine to limit the extent to which Project services will effectively reach the valley's population. The complete lack of reliable communications between the valley and the rest of Peru will stifle the effectiveness of the administration of basic services in and to the Palcazu valley, will hamper the implementation

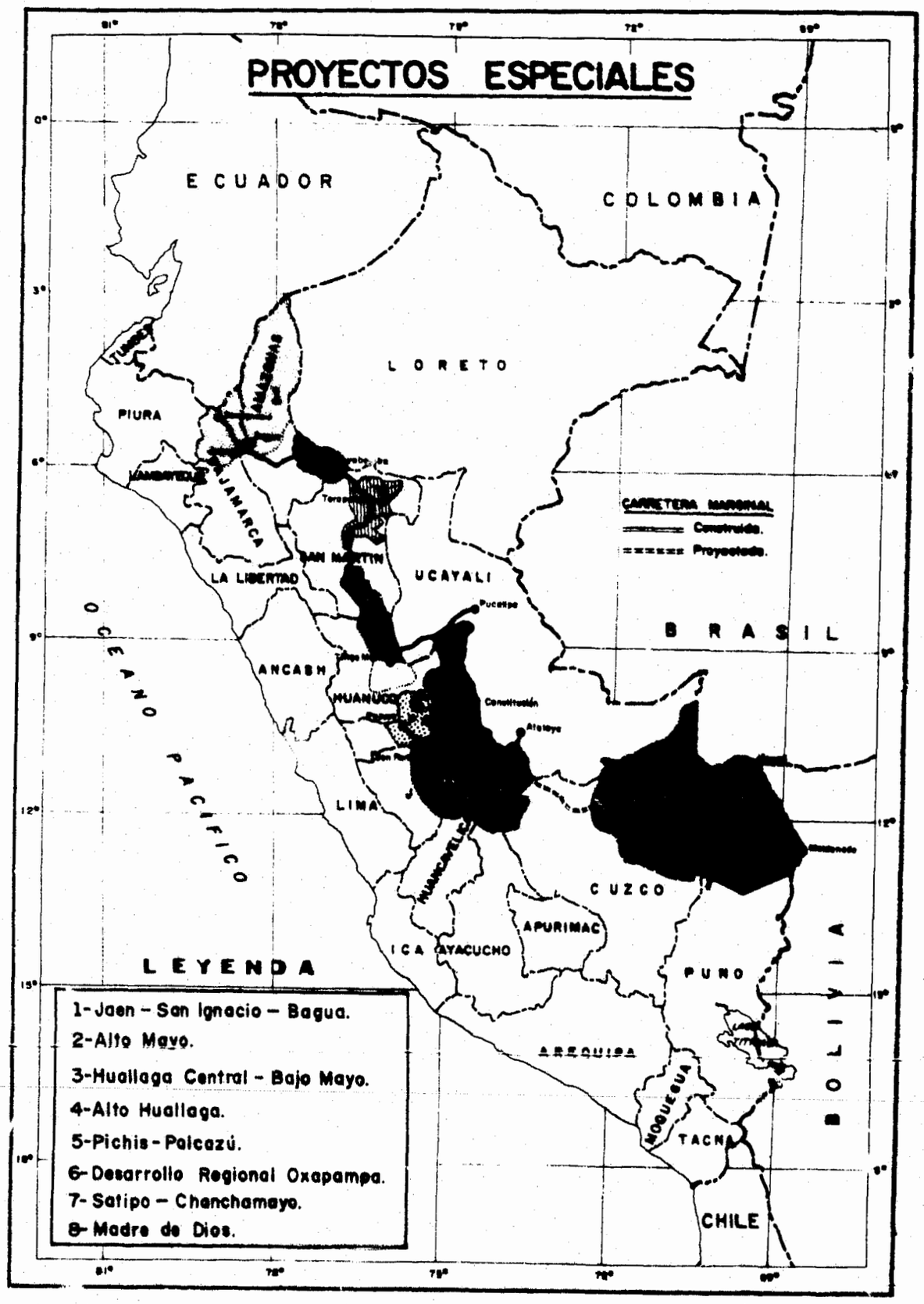
and management of the sector sub-projects in the area, and will threaten the successful formulation of a national strategy for regional development.

Modern communication technology offers an opportunity to improve the delivery of development services to these communities and to enhance the chances for successful execution of this Project. Several other communication technologies were considered and rejected. The costs and benefits of two-way radio communication systems using citizen's band and other higher frequency radios were studied. The capital costs for installing these systems are considerably cheaper than the costs for the proposed satellite system; however, the operational costs of two-way radio systems are high and, more important, the system breakdown and failure rate is very high. The development communication literature indicates that two-way radio systems are almost invariably inferior to a properly functioning telephone system in terms of reliability, flexibility, capacity for growth, and long-term capital and operational costs. In addition, the proliferation of two-way radio systems often leads to unnecessary frequency congestion and can actually impede the development of permanent telecommunications services. For these reasons, utilization of the communication satellite technology described above and its adjunct technologies of low-cost two way radiotelephones, low-powered radio broadcast facilities, and audio and video cassettes has been included in the Project as a permanent solution to the valley's most formidable barriers to communications. By reducing these communications constraints, the technologies will be able to improve dramatically the penetration and impact of development programs in the Palcazu valley. The communications component will be implemented by ENTEL-Peru under an agreement with PEPP.

(c) Project Objectives and Activities

The objective of the communication component under the Project is to improve the efficiency and effectiveness of communications among all Project participants, and to do this both within the valley and between the valley and the rest of Peru. The potential application of satellite technology to meet the development needs of this Project is virtually unlimited, but generally falls into four categories: Administrative, consultative, information exchange, and training.

Administratively, the system can be used to coordinate logistics, to provide supervision and guidance to field staff, and to gather feedback information from field staff on development activities. ~~Consultative uses will allow forest rangers, rural extension agents,~~ para-professional health workers, and other field staff to obtain immediate advice on specific implementation problems beyond their expertise. An example of information exchange would be the transmission of specific research, land inventory, meteorological, and other data from facilities in the valley to UNAS, INFOR, INIPA, and other such institutions, and vice versa. Radio and teleconferencing systems can be used for initial orientation training, periodic specialized in-service training of field staff, sensitivity training of agents who will work with native communities, basic skills training for


PROYECTOS ESPECIALES
ECUADOR
COLOMBIA
LORETO
PIURA
CAJAMARCA
LA LIBERTAD
SAN MARTIN
UCAYALI
Pucallpa
BRASIL
ANCASH
HUANUCO
Constitución
Aguaytía
LIMA
HUANCAVELICA
CUZCO
APURIMAC
ICA
AYACUCHO
PUNO
AREQUIPA
MOQUEGUA
TACNA
CHILE
BOLIVIA
OCEANO PACIFICO
CARRETERA MARGINAL
Construida.
Proyectada.
LEYENDA
1- Jaen - San Ignacio - Bagua.
2- Alto Mayo.
3- Huallaga Central - Bajo Mayo.
4- Alto Huallaga.
5- Pichis - Paicazú.
6- Desarrollo Regional Oxapampa.
7- Satipo - Chanchamayo.
8- Madre de Dios.

technicians and producer groups in the new technologies and ideas being introduced by the Project, and special activities for the Amuesha, such as bilingual education. The training message that must be communicated to all levels--technicians and community members--is that good land use and environmental protection is the key to sustained development in the valley. The message must clearly communicate the concept of land use based on land capability for sustained development for sustained development, and the concept that misuse, while possibly profitable in the short term, will destroy the land over the long term. At the present time, this is only fully understood by a relatively small number of professionals. It must become accepted by all project technicians and also by valley residents if this Project is to succeed. It should be the key theme of all project training and promotion activities.

The following chart illustrates some of the major potential uses of the system by project activities:

	Use of the Communications System			
Project Activity	Administration	Consultative	Information Exchange	Training
Regional Development Policy	x			
Forestry	x	x	x	x
Agricultural Production	x	x	x	x
Livestock	x	x	x	x
Protection	x	x		x
Land Use Inventory	x	x	x	x
Health	x	x		
Road Maintenance	x	x		
Banking/Credit	x	x		

(d) Project Inputs

Under this component, up to $360,00 in Project Loan funds will be provided for: one satellite earth station, village telephones and other equipment, local sites and services, and technical assistance. The GOP will fund operating, personnel, and maintenance costs, estimated at $50,000.

Six months of technical assistance will be provided under this component. This short-term assistnce will focus on the initial planning of development applications for each Project activity. Effective communication planning requires an assessment of the needs and demands for communication technology as a support to development activities; determination of the types and characteristics of the communication equipment, facilities, and services needed to meet these needs and demands in a practical and cost-effective way; and design of a strategy, by sector, for using the

system. ENTEL-Peru, based on its experience with the San Martin project, is capable of designing a system which will respond to the communication needs and the demands (which have already been identified throughout this Project Paper). The short-term consultant will be needed after the ENTEL system design is complete and before equipment is procured. The consultant will review the ENTEL design, determine its adequacy for the area and need, and, based on the approved design, identify the broad uses, operational resources, and mechanisms needed to effectively utilize the system for administrative, consultative, informational exchange, and training tasks within each sector. Detailed planning and subsequent implementation will be carried out by each sector or by PEPP.

12. Regional Development Policy Support (Loan $1,980,000 and Grant $646,000)

A national level policy-making body--the Secretariat of Regional Affairs--has been created within the Prime Minister's Office to coordinate regional and departmental affairs and the implementation of the multisector development projects. In addition it provides support and advice to the Coordinating Council of Special Projects, the legal entity (composed of high-level ministerial representatives) charged with monitoring high jungle special projects and insuring the rational design and implementtion of development activities under the proposed Project, the Secretariat will link the activities of the Palcazu Special Project Office (PEPP) with other ministries, the Development Corporations, the National Planning Institute and other special project offices. The strengthening of the Secretariat will also serve to further the GOP decentralization strategy.

a. Background

During the past 20 years, selection of areas for high jungle development has often been haphazard, and has at times responded to political pressures and international donor interest as much to legitimate development potential. The JRB Report 1/ funded by the Mission pointed out that the political goal of most of these projects was to relocate inhabitants from the more heavily settled areas of the highlands and coast so as to benefit the country through a regeneration of the stagnant agricultural sector. This regeneration would, in turn, result in reduced rural-urban migration, reduced regional income disparities, increased rural employment, increased regional purchasing power, lower urban food prices, and an improved foreign exchange position. Development of a coherent national policy implemented in a consistent manner, however, did not occur. The review of both spontaneous and directed colonization schemes carried out by JRB showed that the government fell short of its implied goal both in the number of people settled and in the amount of land actually worked. The common features which adversely affected the planning, implementation, and evaluation of these projects were:

- A lack of project-specific goals and objectives to give concrete form to national political goals.

- Difficulties with focus of studies on natural resources capacity, target social groups, and the economics of alternative project designs.

- Weakness in project design such as
  - lack of land tenure schedule for existing and incoming populations;
  - lack of any plan for management of the existing natural resources;
  - lack of an integrated production schedule for agriculture livestock and forestry;
  - lack of a schedule for development of infrastructure; and
  - lack of plans or schedules for credit, technical assistance, and participation of target populations.

More recently, beginning with the AID-financed Central Huallaga Project in 1978, the GOP initiated the planning and execution of a series of high jungle development projects which are now in varying stages of implementation. Under the Belaunde administration, the President's personal commitment to carrying out activities of this type has heightened interest in high jungle development.

In recent meetings with the Director of the Secretariat of Regional Affairs in the Primer Minister's Office, Mission personnel discussed ways to strengthen the GOP capacity to pass on lessons learned from ongoing integrate development projects and to promote sustainable development technologies. Under the Project, the Secretariat will function as a service and coordination organization to evaluate prior development activities and examine potential areas under consideration for development, based on comparisons of benefits and costs of development activities in areas under study. The Secretariat will coordinate project analysis, planning, and evaluation activities and will monitor the execution of prefeasibility studies, the objective of which will be to identify and develop potentialproject activities. In addition, an adequate coordination structure and project management mode will be created.

b. Objectives

For Peru to benefit fully from high jungle development activities and the commitment of resources which they entail, the GOP requires a rational resource management methodology, as well as clearly defined projects which use this methodology while taking into account the development potential of each area. The proposed Project-funded activities at the national level will support the formulation of this resource management methodology for all high jungle development activities. The Secretariat and

1/ JRB Report, Volume I, Annex C.

its offices of Special Projects, Regional Development Corporations, and Planning will be strengthened administratively so that they can assist in the design of new high jungle development projects and assure that individual projects are planned, implemented, and evaluated using similar criteria. Use of uniform criteria will permit similar evaluation of benefits and costs and will provide a system for comparing the development potential of various areas and for directing resources to projects with the highest returns and minimal economic, social, and environmental costs. Thus, through the Secretariat of Regional Affairs, the Project will support the development and implementation of a methodology for planning and execution of high jungle development. This methodology will be compatible with the resource base, inherent social and technical constraints, and the Peruvian desire to develop unsettled regions of the country.

The Secretariat of Regional Affairs will carry out the following specific functions:

Policy: identify priority areas for development, integrate knowledge of the high jungle and its development with overall national goals and programs, and promote the implementation of national policy regarding forest extraction, native communities, and national parks.

Planning: evaluate current development projects in order to learn from their successes and failures, assess development potential of possible development areas, identify projects and infrastructure requirements to tap that potential, and promote private sector involvement in the financing and implementation of these projects.

Coordination: link the several special projects with each other, with other government agencies, and with other public and private groups.

Research: collect information related to high jungle development. Fields of inquiry would include basic science: botany, zoology, ecology, geology, hydrology, etc; economic botany, agricultural production and animal technology, especially of species native to the high jungle; sociology of peoples living in the high jungle; energy potential of the high jungle; and transportation systems for the high jungle.

Information: collect and organize information about the high jungle; evaluate the information to determine its usefulness and applicability elsewhere; and disseminate information about the high jungle to special projects, government agencies, and private sector groups.

Implementation: carry out administrative activities required to establish a special project office once a particular project has been funded.

Under the Project, the management staff of the three offices comprising the Secretariat will be expanded to consist of a small

group of highly qualified professionals who among them are trained in the following fields:

Agronomy/Forestry
Economics/Marketing/Product Development
Business/Finance/Private Sector
Regional Planning/Statistics
Anthropology/Sociology
Ecology/Geography/Soils
Graphics/Publications
Engineering

The Secretariat staff, headed by an executive director, will have the assistance of a long-term technical advisor in resource management. This advisor should have a thorough knowledge of regional development in the tropics and some direct experience working in similar high jungle environments. He should understand the complexities and difficulties of those environments as well as their opportunities. The advisor should be able to evaluate how well the Secretariat is meeting its goals and assist it in attaining high performance.

c. Project Support

Technical Assistance: The Project will provide Grant funds of up to $646,000 for technical assistance to the Secretariat to carry out its functions. This sum will provide 48 work months of the long-term technical advisor in resource management and 22 work months of short-term assistance in the areas of regional development, economic analysis, environmental protection, agroforestry, management and financial analysis, agroindustry, and systems analysis.

The long-term technical assistance will focus on designing and implementing the evaluation and prefeasibility methodologies required to carry out the studies component. Project personnel will be directly involved in the design and implementation of these studies in order to gain the practical experience necessary to continue these activities after Project completion. Short-term technical advisors will assist in the development of specialized components of the studies and in the analysis of the results.

Operating Expenses: Loan funds will finance initial operating expenses, including: (1) eight additional professional staff for the Secretariat to carry out studies and analyses (see Annex II Exhibit D for a detailed list of this personnel); (2) additional office space for this new personnel; and (3) office equipment including a small computer, supplies, and vehicles. Support for staff salaries and rental will be provided on a declining basis so that by the end of the Project, the GOP will have assumed 100% of these costs. Up to $ 280,000 in Loan funds have been budgeted for operating expenses.

Training: The Project will fund short-term training for the Secretariat's professional staff in project identification; economic, technical, social, and environmental analysis; project management; financial analysis and control methodologies; and project planning and implementation. Observational travel to gain experience from other Latin American regional development activities will also be funded. Up to $200,000 in Loan funds will be provided for training.

Evaluation and Prefeasibility Studies: Evaluations and prefeasibility studies will be carried out in order to provide GOP personnel with the necessary experience to allow them to perform similar types of studies prior to selecting and designing new development projects. Evaluations will examine completed and ongoing high jungle projects in order to gauge their successes and failures. New project development should be guided by the results of these past efforts and the deficiencies in project design and implementation which these evaluations may point out. The prefeasibility studies will rely heavily on the land capability model of the JRB report to assess the development potential of areas being considered for new projects. These studies should include a resource inventory, resources capability assessment, environmental analysis, and social analysis. They should precede infrastructure feasibility studies in areas where development requires extensive infrastructure. If the resource management studies are carried out first, then infrastructure can be located to tap resources most efficiently. The studies may even show that development, especially if it means high infrastructure costs, is uneconomical. They will serve as the basis for resource management planning so that projects can be designed to take advantage of development opportunities without exceeding constraints to development. Projects backed by good studies can allocate money wisely to project activities which show the most promise with fewest drawbacks.

Loan funds of up to $1,500,000 will finance evaluation and prefeasibility studies, with approximately $300,000 financing the evaluation component and $1,200,000 financing the studies component. It is anticipated that evaluations of all seven completed and ongoing high jungle development projects will be carried out under this Project. Prefeasibility studies will be carried out in certain additional high jungle areas already identified by the GOP for possible integrated development projects, capitalization on the technical assistance provided and the practical experience which the Loan-funded studies will afford. The studies will generally be carried out through contracts to private firms and public agencies. The Project will focus on using Peruvian governmental organizations and private consulting firms to the extent possible, directly or in conjunction with U.S. firms. This will be done in order to develop a cadre of experienced Peruvian organizations capable of carrying out studies of this type after Project funding ends, since many Peruvian organizations and individuals have, or will be able to develop, the appropriate skills to carry out these activities.

IV. PROJECT ANALYSES

A. Institutional Analysis

1. Pichis Palcazu Special Project Office (PEPP)

a. Institutional Organization

Project activities will be supervised and coordinated by the Pichis Palcazu Special Project Office (PEPP). An administrative mechanism for area development similar to the PEPP office was first established in late 1979 to direct the implementation of AID's loan-funded Sub-Tropical Lands Development Project in the central Huallaga and lower Mayo river valleys. This approach was adopted to facilitate the flow of funds to the six GOP agencies and ten sub-projects financed under the loan and to provide overall supervision and coordination. The special project concept was not completely new; it had been used for a few large projects under line ministries such as the Ministry of Agriculture's special projects for the Majes and Chira/Piura irrigation projects, and for Plan MERIS (Small- and Medium-Scale Irrigation Project supported by AID Loan 527-T-059, Sierra Irrigation). The placement of the Huallaga Central/Bajo Mayo Special Project within the Office of the Prime Minister was, however, an innovation. This was done because of the multi-sectoral nature of the Project and also because of the strong interest of the Office of the Prime Minister in closely monitoring the Project to assess its suitability as a model for possible future replication for other high jungle development projects.

The initiation of the Huallaga Central Project proceeded slowly. It took over a year to pass the necessary laws and decrees to establish the special project and to name the executive director. However, once this was accomplished and the special project staff was in place, Project implementation has proceeded at a much faster pace than has been the Mission's usual experience with GOP-administered projects. One of the principal reasons for accelerated Project implementation has been the speed and relative ease with which funds are made available for Project activities. The special project budget is carried as a line item under the Office of the Prime Minister and disbursements are made directly to the special project from the Ministry of Economy, Finance and Commerce. This procedure circumvents the more cumbersome and lengthy procedures involved in processing disbursements through the highly bureaucratized administrative structure of the line ministries. Another advantage of the special project has been its ability to attract and retain high quality professionals because of the more liberal salary schedules allowed under its enabling legislation and regulations. An additional positive feature has been the special project's authority to contract directly with public and private entities and individuals to carry out Project activities. However, despite its usefulness and flexibility and initiating project activities rapidly and efficiently, the Special Project Office mechanism is not meant to be a permanent bureaucratic fixture. It is anticipated that eventually its functions will be taken over by the line Ministries and departmental development corporations.

Both the President and the Prime Minister have been favorably impressed with the performance under the Huallaga Central Special Project and are using it as the model for other large-scale, high jungle development projects being implemented for the upper Huallaga, Jaen/Bagua/San Ignacio, and Madre de Dios areas. Other strong supporters of the special project institutional mechanism are the IDB, which will apply the model in financing the Jaen/Bagua/San Ignacio area development project, and the World Bank, which has requested that the Huallaga Central Special Project administer the proposed IBRD area develoment project for the upper Mayo river valley.

The Pichis Palcazu Special Project Office will enter into working agreements with several agencies of the GOP to carry out various sub-elements of the Project. For example, the agricultural research and extension activities will be carried out by the National Agrarian Research and Promotion Institute (INIPA); land use capability mapping will be carried out by the Ministry of Agriculture, Rural Cadaster Office (OCGR), the Ministry of Justice, Office of Public Register (ORP), and the National Office for Natural Resources Evaluation (ONERN); and road maintenance will be carried out by the Ministry of Transportation and Communications (MTC). The agreements between PEPP and the GOP agencies will lay out sub-project objectives, a work plan, and a detailed budget estimate which will serve as the basis for direct disbursement from PEPP to the cooperating agency. These procedures have been used for the Huallaga Central/Bajo Mayo Special Project and proved particularly effective in carrying out activities such as equipment procurement, and the design and construction of roads, storage facilities, and machinery centers. The PEPP Office in collaboration with the implementing agencies will establish the technical standards for the Project Agreements and will coordinate their implementation.

b. PEPP Background and Objectives

On October 10, 1980, under the jurisdiction of the Cerro de Pasco Development Committee, the Executive Commission for the Pichis Palcazu Project was created by Supreme Decree No. 137-80-AA for the purpose of designing and implementing a regional development plan for this area. The Pichis Palcazu Special Project was authorized to operate under the Presidency of the Council of Ministers (Prime Minister) and to commence its operations, inter alia, by administering the AID Grant Agreement 527-0166.

The Executive Commission comprises the following members: (i) the Minister of Agriculture, acting as President and representing the Council of Ministers; (ii) a delegate from the Ministry of Transportation; (iii) the Director of the Secretariat of Regional Affairs of the Prime Minister's Office, acting as the Executive Secretary of the Council; (iv) the technical director of the National Planning Institute; (v) the Executive Director of each of the Special Projects.

The above-cited Supreme Decree also provides for the appointment by the Prime Minister of an Executive Director, proposed by the Commission. Further, the law indicates that, to insure efficient operation, the Commission will be supported by appropriate technical and administrative units and that the implementation of sub-projects in the area will be executed by public and other specialized institutions. The main responsibilities of

the Executive Director are:

- To formulate, direct, supervise, and control the execution of the Project within the guidelines established by the Executive Commission and according to national development plans.
- To coordinate activities with the authorities of the various public and non-public agencies working in the Project area.
- To approve and sign agreements with public and private institutions to perform studies, infrastructural works, and rural extension activities.
- To approve personal service contracts and the acquisition of goods for the implementation of the Project.
- To open and administer bank checking accounts with the consent of the General Directorate of the Public Treasury.

The Project was conceived as an integrated rural development effort intended to accomplish GOP development goals for the country in general and for the jungle in particular. These goals, in brief, are:

- To broaden the agricultural frontier by incorporating land and other natural resources into the national economy.
- To occupy the Amazonian territory rationally by encouraging orderly migratory inflows.
- To integrate the jungle with other regions by means of the Marginal Highway.
- To boost the levels of employment and income of the population in the area.
- To preserve renewable natural resources and maintain the ecosystem equilibrium in the region.

The 1982 Operational Plan for the Pichis Palcazu Special Project was designed to accomplished these goals. The Plan includes seven investment components which are currently being implemented. The 1982 objectives for the seven components are:

(1) <u>Penetration Roads</u>

-- Pre-feasibility and feasibility studies for 35km or road from Puerto Mairo to Pozuzo.
-- Pre-feasibility study for 40Km of roads in the Von Humboldt Forest.
-- Construction of 30km of the Palcazu penetration road.
-- Construction of 25km of the Villa Rica to Oxapampa road.

(2) <u>Evaluation of Resources</u>

-- Soil studies for 50,000 ha in the Pozuzo area and in the Pichis and Palcazu valleys.
-- Forestry inventory of 50,000 ha in the Pozuzo

area.
-- Environmental assessment of 400,00 ha in the Pichis Pachitea region.
-- Aerial infrared photography of 750,000 ha in the Pichis-Pachitea-Palcazu region.
-- Orthophotography of 1,125,000 ha in the Pichis-Pachitea-Palcazu region.

(3) Rural Cadaster and Topography

Programmed activities will continue and PEPP and the OGCR will establish a cadastral pattern for approximately 4,000 units in the Pichis and Palcazu valleys.

(4) Land Tenure

Activities will continue and the PEPP, OGCR and ORP will provide property titles to land holders in the region.

(5) Production Services

Twelve rural development centers will operate in the three valleys providing technical assistance to settlers in the areas of forestry and agricultural extension, machinery services, and marketing. The centers are located in Iscozacin, Puerto Mairo, Loma Linda, Alto Pichinaz, Puerto Bermudez, Oxapampa, Puerto Inca, Von Humboldt, Villa Rica, Pozuzo, Cacazu, and Puerto Victoria.

(6) Social Services

--Construction and equipping of schools.
--Construction and equipping of medical posts.
--Development of urban infrastructure.

(7) Construction of Buildings for Rural Development Centers and Forestry Police

-- Rural Development Centers: Puerto Bermudez, Villa Rica, Puerto Mairo, Pozuzo, Cacazu, Puerto Victoria, Loma Linda, and Iscosazin.
-- Forestry Police: Cacazu, Puerto Victoria, Alto Pichinaz, and Puerto Inca.

To carry out its Operational Plan, the PEPP obtains its financial resources from the Public Treasury. The following table shows the 1982 budgetary allocations for the different investment components of the Pichis Palcazu Project.

Pichis Palcazu, 1982 Budgetary Allocations

	Component	Allocation (Millions of Soles)
1.	Penetration Roads	3,377
2.	Evaluation of Resources	530
3.	Rural Cadaster and Topography	102
4.	Land Tenure	335
5.	Production Services	600
6.	Population Services	250
7.	Construction of Buildings for RDCs & FP	150
	TOTAL	5,344
	Plus: Executive Directorate	400
	GRAND TOTAL	5,744

c. Administrative Structure

Organizationally, the Pichis Palcazu Project is implemented by the Executive Directorate, with the Executive Director acting as Project Manager, operating under the umbrella of the Executive Commission and ultimately under the Presidency of the Council of Ministers.* The Executive Directorate has three advisory bodies: the Legal Office, the Office of Planning and Evaluation, and the Office of Technical Affairs. It has three support units: the Office of Administration, the Office of Technical Communication and Training, and the Coordination Office, located in Lima. Two line units include the Division of Promotion and the Technical Division, which includes the Rural Development Centers. Finally, the Office of Audit serves as the control unit. (See Annex II, Exhibit D for the PEPP organizational chart.)

A brief description of the functions of key PEPP units is provided below.

(1) The Legal Office

This office provides judicial counsel to the special project office, advises the Executive Directorate on legal processes available to the office for an efficient execution of the various Project activities, and evaluates the application of the pertinent legislation.

(2) The Office of Planning and Evaluation

This office elaborates short- and long-range development plans for the socio-economic development of the region. It directs the planning and organizational processes of the various investment components of the Project; prepares base-line studies for pre-investment activities; formulates the guidelines for the preparation of budgets; and evaluates the attainment of objectives set up in the Development Plans. It also supports and coordinates the technical and financial cooperation of international institutions.

(3) The Office of Technical Affairs

This office provides the Executive Directorate with specialized technical assistance in the formulation of policies and preparation of plans as well as in project implementation activities. It proposes the adoption of policies and institutional actions needed to use technical assistance efficiently.

(4) The Office of Administration

This office manages the economic and financial resources of the Project, according to applicable budgetary and administrative public norms. It integrates the areas of budget, accounting, and personnel, and supports the operational units of the Executive Directorate by providing human resources, materials, and services required for timely and efficient

*(The Prime Minister's Office). The Secretariat of Regional Affairs within the Prime Minister's Office is responsible for providing technical and administrative backstopping, as well as overall supervision to the PEPP and other Special Project Offices.

implementation of the Project.

(5) The Technical Division

This office directs the execution of field operations and supervises the performance of studies and works implemented either by contract or administration. It provides guidance for the operation of the Rural Development Centers and serves as an agent of logistical support for the centers. It also acts as the link between the PEPP and other entities engaged in rural development programs in the region.

(6) Rural Development Centers

These centers are the executing units of the PEPP. They have been established in pre-determined areas, for the purpose of implementing rural development activities with the participation of the Project beneficiaries. These activities include production, human settlements, and conservation of natural resources.

Presently, the PEPP Office is well funded (S/.400 million for 1982) and adequately staffed to carryout its activities as detailed in the 1982 Operational Plan. PEPP employs 90 people who can be classified in the four following categories:

-- Professionals with university degrees	38	42.2%
-- Technicians without university degrees	7	7.8%
-- University students working for degrees	16	17.8%
--Secretaries and other support personnel	29	32.2%
	90	100.0%

Annex II, Exhibit D shows the distribution of professionals, technicians, and university students, following the structure of the PEPP organigram. Approximately 50% of all professionals, technicians, and students are the field personnel assigned to the Rural Development Centers, while the remaining half is stationed in the Lima central office. Each year, once most bureaucratic activities have been completed and implementation of the yearly Operational Plan has begun, most PEPP Lima employees will devote a substantial portion of their time to field operations, providing technical assistance and logistical support and evaluating Project progress.

In brief, the PEPP office has the appropriate legal means to implement the Project in the least bureaucratic way. Its organizational chart and manual of operations reflect a well functioning structure with clear-cut lines of authority and responsibility. PEPP professionals have ample technical expertise and sufficient support personnel to achieve the 1982 Project goals. The 1982 goals, as established in the Operational Plan, require that additional staff be hired. The knowledgeable and dynamic Executive Director of the Project has proved his capacity as an organizer and implementor, and under his management, 1982 operations should be successful.

2. Coordinating Council of Special Projects

Since a number of special projects have now been created, the GOP has been interested in establishing an appropriate mechanism for the direction and coordination of the special projects, under the jurisdiction of the President of the Council of Ministers. For this purpose, the Coordinating Council of Special Projects was created on August 20, 1981 by Supreme Decree No. 036-81-PCM as a legal entity for the monitoring of the special projects.

The Council comprises the following officials:

- The Minister of Agriculture, who presides over the Council representing the President of the Council of Ministers (Prime Minister)
- The General Secretary of the Office of the Prime Minister
- The Vice-Minister of Education
- The Vice-Minister of Health
- The Vice-Minister of Agriculture
- The Vice-Minister of Housing
- The Vice-Minister of Transportation & Communications
- The Technical Director of the National Planning Institute.

The Secretariat of Regional Affairs of the Office of the Prime Minister, through the Office of Special Projects, functions as the Technical Secretariat of the Council. The Technical Secretariat is responsible for preparing a monthly report for submission to the Minister of Agriculture, containing, inter alia, issues on which decisions/actions have to be taken. The Council meets at least once a month, and bi-monthly sessions are held with the Special Projects.

Organizationally, the Coordinating Council of Special Projects operates under the umbrella of the Prime Minister in direct coordination wth the Secretariat of Regional Affairs. (See Organizational Chart of the Office of the Prime Minister in Annex II, Exhibit D.)

The organizational structure of the Secretariat of Regional Affairs shows two line offices, the Office of Special Projects and the Office of Coordination of Departmental Corporations, and one staff office, the Office of Planning. (See Organizational Chart in Annex II, Exhibit D.)

The Secretariat of Regional Affairs is staffed with 20 highly qualified professionals in the fields of economics, engineering, planning, administration, and sociology/anthropology as well as with administrative and other support personnel. Each of its offices is headed by a director.

3. Other Implementing Agencies

Analysis of the GOP agencies which will be responsible for implementing their respective Project components is found in Annex II, Exhibit H. These include: INIPA, INFOR, SENAMHI, Agrarian Bank, BIP, ONERN, ORP, MOH, OGCR, and MTC.

B. Financial Analysis

The total cost of this five-year Project is estimated to be US$30,000,000, of which up to US$22,000,000 will be contributed by A.I.D. through a loan of US$18,000,000 and a grant of US$4,000,000. The GOP will finance 27% of total costs or US$8,000,000 with cash contributions. Tables IV-1, IV-2, IV-3, IV-4, and IV-5 show the Summary Financial Plan, the Detailed Financial Plan, the Requirements of Foreign Exchange and Local Currency, the Expected Disbursements by Year, and Recurrent Costs respectively.

The Project has ten components, of which forestry, agricultural development, and road maintenance jointly receive 66% of the total, while project management and regional development policy support require 8% and 12% of total Project funds, respectively. The remaining 14% will be used in other investment categories.

Annual salaries as well as operation and maintenance costs of vehicles and of major equipment will be financed jointly by the AID Loan and the GOP, according to the following scheme:

Year	I	II	III	IV	V
AID	100%	75	50	25	-
GOP	-	25	50	75	100%

Loan funds will also finance credit for the forestry, agricultural, and livestock components; the procurement of a stock of chainsaws with spare parts and oxen teams; the establishment of a satellite ground station; and the purchase of a computer system. Under the regional development policy support component, US$1,500,000 has been assigned to defray the costs of prefeasibility studies for new areas and evaluations of current special projects.

The A.I.D. Grant will finance a total of 302 work/months of US technical assistance, 128 work/months on a short-term basis and 174 work/months on a long-term basis. Grant monies will also be utilized to finance annual Project evaluations.

The GOP will finance office space, housing, and maintenance as well as travel and per diem for the Project personnel.

Table IV-5 shows the amounts of expected annual recurrent costs that the GOP will finance after the PACD. Given the estimated project operational needs after the PACD and the inflationary process facing the Peruvian economy, the average annual operational costs for life-of-Project have been extrapolated, in dollar terms, at the rate of 25% on a compounded basis. In spite of the stringent parameters used for the projections, the levels of recurrent costs seem reasonable: US$ 2,647,000 for year one after the PACD, and US$ 3,312,000 and US$ 4,141,000 for the two subsequent years. Since the Belaunde Administration took office, the GOP national budgets, have

been freed somewhat from the extreme fiscal austerity schemes of the past military government period. Allocations, in real terms, have increase during 1981 and 1982 and are expected to increase modestly in the future. Given the often stated interest of the GOP and President Belaunde high jungle and jungle development, and the concrete demonstrations over the past years of increased human and financial resources made available for development of these areas, the recurrent costs requirements, as detailed in table IV-5, are within the GOP financial capability.

Table IV-1
Summary Financial Plan for the Central Selva Resource Management Project
(Thousands of U.S. Dollars)

	Project Components	A.I.D. Grant	A.I.D. Loan	GOP	Total
I.	Project Management/PEPP	497	797	865	2159
II.	Forestry	910	4895	890	6695
III.	Agricultural Development	368	3628	1982	5978
IV.	Livestock Development	-	683	198	881
V.	Protection	110	147	158	415
VI.	Continuous Land Use Inventory	88	196	173	457
VII.	Health & Environmental Sanitation	-	465	61	526
VIII.	Feeder Road Studies and Road Maintenance	218	2581	1395	4194
IX.	Communications	-	360	50	410
X.	Regional Development Policy Support	646	1980	500	3126
XI.	USAID/Peru Project Advisor	191			191
XII.		810	-		810
	Sub-Total	3838	15732	6272	25842
	Plus: Inflation & Contingencies	162	2268	1728	4158
	Grand Total	4000	18000	8000	30000
		22000		8000	30000
		73%		27%	100%

Table IV-2
Detailed Financial Plan for the Central Selva Resource Management Project
(Thousands of U.S. Dollars)

Project Components	A.I.D. Grant	A.I.D. Loan	GOP	TOTAL
I. Project Management/PEPP				
1.1 Technical Assistance				
1.1.1 Short-term	297	-	-	297
1.2 Training and Project Evaluation	200	70	30	300
1.2.1 Staff Training and Materials	---	70	20	90
1.2.2 Evaluation	200	----	10	210
1.3 Data Collection		30	10	40
1.3.1 Meteorological Equip. & Materials	----	12	5	17
1.3.2 Hydrologic Equip. & Materials	----	18	5	23
1.4 Materials for Forest, Crops, Livestock and Fisheries Inventories	----	40	10	50
1.5 Vehicles, Boats and Trailbikes		242	125	367
1.5.1 Five Pick-ups	----	70	----	70
1.5.2 Four Boats	----	12	----	12
1.5.3 Six Trailbikes	----	15	----	15
1.5.4 Spare Parts, Operation & Maintenance	----	145	125	270
1.6 Office Furniture and Equipment		140	20	160
1.6.1 For Field Stations	----	40	----	40
1.6.2 For Headquarters	----	100	----	100
1.6.3 Maintenance	----	----	20	20
1.7 Computer		15	10	25
1.7.1 Computer, Software, and T.A.	----	15	----	15
1.7.2 Materials & Maintenance	----	----	10	10
1.8 Personnel		260	460	720
1.8.1 Salaries	----	260	260	520
~~1.8.2 Travel and Per Diem~~	~~----~~	~~----~~	200	200
1.9 Office, Housing & Maintenance	----	----	200	200
Sub-Total (I)	497	797	865	2159

II. Forestry	Grant	Loan	GOP	Total
2.1 Credit Fund	----	3560	----	3560
2.1.1 BIP for Processing Units		3000		3000
2.1.2 PEPP for Ox-Teams, Tools, etc.		560		560
2.2 Logging Trails Equipment for PEPP		452	200	652
2.2.1 One Front Loader	----	60	----	60
2.2.2 Two Dump Trucks	----	80	----	80
2.2.3 One Bulldozer	----	70	----	70
2.2.4 Spare Parts & Operation & Maintenance	----	242	200	442
2.3 Training & Extension		180	40	220
2.3.1 Technical and Admin. Cadres	----	60	15	75
2.3.2 Forest-unit Operators	----	100	20	120
2.3.3 Office Equipment & Materials	----	20	5	25
2.4 Technical Assistance	910			910
2.4.1 Short-Term	528	----	----	528
2.4.2 Long-Term	382	----	----	382
2.5 Personnel		400	560	960
2.5.1 Salaries	----	400	400	800
2.5.2 Travel and Per Diem	----	----	160	160
2.6 Vehicles, Boats and Trailbikes		159	75	234
2.6.1 Three Pickups with winch	----	48	----	48
2.6.2 Eight Trailbikes	----	20	----	20
2.6.3 Two Boats with Motor	----	6	----	6
2.6.4 Spare Parts, Operation & Maintenance	----	85	75	160
2.7 Chainsaws		44	5	49
2.7.1 Purchase of Saws/PEPP for Rental		33	-	33
2.7.2 Spare Parts & Maintenance		11	5	16
2.8 Research: Equipment and Materials	----	100	10	110
Sub-total (II)	910	4895	890	6695

	Grant	Loan	GOP	Total
III. Agricultural Development				
3.1 Technical Assistance	368			368
3.1.1 Short-Term	66	----	----	66
3.1.2 Long-Term	302	----	----	302
3.2 Vehicles, Boats and Trailbikes		149	75	224
3.2.1 Three Pick-ups	----	42	----	42
3.2.2 Three Trailbikes	----	8	----	8
3.2.3 Four Boats with Motor	----	12	----	12
3.2.4 Spare Parts, Operation & Maintenance	----	87	75	162
3.3 Personnel		805	875	1680
3.3.1 For Extension	----	280	280	560
3.3.2 For Research	----	525	525	1050
3.3.3 Travel and Per Diem	----	----	70	70
3.4 Training				
3.4.1 Seminars, Equipment and Materials	----	209	18	227
3.5 Equipment and Supplies		115	14	129
3.5.1 Office Equipment	----	10	----	10
3.5.2 Research and Extension Supplies	----	40	----	40
3.5.3 Research, Equipment and Tools	----	15	----	15
3.5.4 Four Electrical Generators	----	40	----	40
3.5.5 Four Refrigerators	----	4	----	4
3.5.6 Four Portable Generators	----	6	----	6
3.5.7 Operation and Maintenance	----	----	14	14
3.6 Credit Funds	----	2350	1000	3350
PEPP				
3.6.1 Pejebaye Crops	----	500	----	500
3.6.2 Passion Fruits, Pineapple & Achiote	----	800	----	800
3.6.3 Winged Beans	----	50	----	50
Banco Industrial del Peru (BIP)				
3.6.4 Agro-Industry Sub-Projects	----	1000	1000	2000
Sub-Total	368	3628	1982	5978
IV. Livestock Development				
4.1 Credit Fund				
4.1.1 To PEPP for Swine Farms	----	500	----	500
4.2 Personnel Equipment & Others	----	180	196	376
4.2.1 Personnel	----	140	140	280
4.2.2 Travel & Perdiem	----	----	50	50
4.2.3 Office Equipment	----	10	----	10
4.2.4 Research and Extension Supplies	----	30	----	30
4.2.5 Operation & Maintenance	----	----	6	6
4.3 Training At IVITA	----	3	2	5
Sub-Total (IV)	----	683	198	881

	Grant	Loan	GOP	Total
V. Protection				
5.1 Technical Assistance				
5.1.1 Short-Term	110	---	----	110
5.2 Vehicles & Trailbikes		57	25	82
5.2.1 One Pick-up	----	14	----	14
5.2.2 Five Trailbikes	----	13	----	13
5.2.3 Spare Parts, Operation & Maintenance	----	30	25	55
5.3 Office Furniture and Equipment		10	3	13
5.3.1 Furniture and Equipment	----	10	----	10
5.3.2 Maintenance	----	----	3	3
5.4 Personnel		80	130	210
5.4.1 Salaries	----	80	80	160
5.4.2 Travel and Per Diem	----	----	50	50
Sub-total (V)	110	147	158	415
VI. Continuous Land Use Inventory				
6.1 Technical Assistance				
6.1.1 Short-Term	88	----	----	88
6.2 Vehicles and Trailbikes		54	25	79
6.2.1 One Pick-up	-	14	-	14
6.2.2 Four Trailbikes	----	10	----	10
6.2.3 Spare Parts, Operation & Maintenance	----	30	25	55
6.3 Office Furniture, Equipment & Supplies	----	12	3	15
6.4 Personnel		85	145	230
6.4.1 Salaries	----	85	85	170
6.4.2 Travel and Per Diem	----	----	60	60
6.5 Aerial Video Tape Equipment		30		30
6.5.1 Equipment: Camera, TV & Video Tape	----	20	----	20
6.5.2 Airplane Rental	----	10	----	10
6.6 Satellite Imagery				
6.6.1 LANDSAT Tapes	----	15	----	15
~~Sub-total (VI)~~	~~88~~	~~196~~	~~173~~	~~457~~

	Grant	Loan	GOP	Total
VII. Health and Environmental Sanitation				
7.1 Training and Supervision	----	43	5	48
7.2 Equipment and Supplies		91	23	114
7.2.1 Eight Refrigerators with Motors	----	16	3	19
7.2.2 Medical Equipment	----	33	10	43
7.2.3 Supplies	----	42	10	52
7.3 Vehicles, Trailbikes and Boats		82	33	115
7.3.1 One Pick-up	----	14	----	14
7.3.2 Five Trailbikes	----	13	----	13
7.3.3 Five Boats with Motor	----	15	----	15
7.3.4 Spare Parts, Operation & Maintenance	----	40	33	73
7.4 Potable Water		249		249
7.4.1 Gravity System	----	150	----	150
7.4.2 Wells	----	69	----	69
7.4.3 Latrines	----	30	----	30
Sub-total (VII)	----	465	61	526
VIII. Feeder Road Studies and Road Maintenance (See detailed costs in separate table)				
8.1 Feeder Road Location Studies	----	200	----	200
8.2 Equipment		736	----	736
8.3 Maintenance Workshop	----	233	---	233
8.4 Hand Tools for Road Maintenance	----	17	----	17
8.5 Technical Assistance	218	----	----	218
8.5.1 Short-Term	77	----	----	77
8.5.2 Long-Term	141	----	----	141
8.6 Operation of Maintenance	----	1395	1395	2790
Sub-total (VIII)	218	2581	1395	4194

			A. I. D.		
		Grant	Loan	GOP	Total
IX.	Communications				
9.1	Satellite Ground Station	----	360	50	410
	9.1.1 Satellite Station	----	200	----	200
	9.1.2 Telephones & Other Equipment	----	50	----	50
	9.1.3 Local Site & Services	----	50	----	50
	9.1.4 Technical Assistance	----	60	----	60
	9.1.5 Maintenance & Other Services	----	----	50	50
	Sub-Total (IX)	----	360	50	410
X.	Regional Development Policy Support				
10.1	Technical Assistance	646	----	----	646
	10.1.1 Short-Term	242	----	----	242
	10.1.2 Long-Term	404	----	----	404
10.2	Personnel		170	470	640
	10.2.1 Salaries	----	170	170	340
	10.2.2 Travel and Per Diem	----	----	300	300
10.3	Computer, Software and T.A.	----	10	5	15
10.4	Evaluation and Pre-feasibility Studies		1500	----	1500
	10.4.1 Evaluations		1200		1200
	10.4.2 Prefeasibility Studies		300		300
10.5	Training	----	200	10	210
10.6	Office Furniture, Equipment and Supplies		40	5	45
10.7	Office Rental		60	10	70
	Sub-total (X)	646	1980	500	3126
XI.	USAID/Peru Project Advisor	191			191
	- Overhead and Miscellaneous Costs	810	-	-	810
	TOTAL	3838	15732	6272	25842
	Plus: Inflation & Contingencies	162	2268	1728	4158
	GRAND TOTAL:	4000	18000	8000	10000
			22,000	8000	30000
			73%	27%	100%

TABLE IV-3: Central Selva Resource Management Project
Requirements of Foreign Exchange and Local Currency
(Thousand US Dollars)

Project Components	A. Grant FX	I. Loan FX	D. Loan LC	GOP LC	Total
I. Project Management/PEPP					
1.1 Technical Assistance	297	-	-	-	297
1.2 Training & Project Eval.	200	-	70	30	300
1.3 Data Collection	-	30	-	10	40
1.4 Materials for Inventories	-	-	40	10	50
1.5 Vehicles, Boats & Trailbikes	-	117	125	125	367
1.6 Office Furniture & Equipment	-	-	140	20	160
1.7 Computer, Software & T.A	-	15	-	10	25
1.8 Personnel: Salaries & Per Diem	-	-	260	460	720
1.9 Office, Housing & Maintainc.	-	-	-	200	200
Sub-Total (I)	497	162	635	865	2009
II. Forestry					
2.1 Credit Fund	-	-	3560	-	3560
2.2 Logging Trails Equipment for PEPP	-	252	200	200	652
2.3 Training and Extension	-	-	180	40	220
2.4 Technical Assistance	910	-	-	-	910
2.5 Personnel: Salaries & Per Diem	-	-	400	560	960
2.6 Vehicles, Boats & Trailbikes	-	89	70	75	234
2.7 Chainsaws	-	40	4	5	49
2.8 Research, Equipment & Materials	-	-	100	10	110
Sub-Total (II)	910	381	4514	890	6695
III. Agricultural Development					
3.1 Technical Assistance	368	-	-	-	368
3.2 Vehicles, Boats & Trailbikes	-	74	75	75	224
3.3 Personnel: Salaries, Travel and Per Diem	-	-	805	875	1680
3.4 Training	-	-	209	18	227
~~3.5 Equipment & Supplies~~	-	50	65	14	129
3.6 Credit Funds	-	-	2350	1000	3350
Sub-Total (III)	368	124	3504	1982	5978

		A.I.D. Grant FX	A.I.D. Loan FX	A.I.D. Loan LC	GOP LC	Total
IV.	Livestock Development					
	4.1 Credit Fund	-	-	500	-	500
	4.2 Personnel, Equipment & Others	-	-	180	196	376
	4.3 Training at IVITA	-	-	3	2	5
	Sub-Total (IV)	-	-	683	198	881
V.	Protection					
	5.1 Technical Assistance	110	-	-	-	110
	5.2 Vehicles & Trailbikes	-	32	25	25	82
	5.3 Office Furniture & Equipm.	-	-	10	3	13
	5.4 Personnel: Salaries & Per Diem	-	-	80	130	210
	Sub-Total (V)	110	32	115	158	415
VI.	Continuous Land Use Inventory					
	6.1 Technical Assistance	88	-	-	-	88
	6.2 Vehicles & Trailbikes	-	29	25	25	79
	6.3 Office Furniture & Equipm.	-	-	12	3	15
	6.4 Personnel: Travel & Per Diem	-	-	85	145	230
	6.5 Aerial Video Tape Equipm.	-	20	10	-	30
	6.6 Satellite Imagery	-	15	-	-	15
	Sub-Total (VI)	88	64	132	173	457
VII.	Health & Environmental Sanitation					
	7.1 Training & Supervision	-	-	43	5	48
	7.2 Equipment & Supplies	-	49	42	23	114
	7.3 Vehicles, Trailbikes & Boats	-	50	32	33	115
	7.4 Potable Water	-	-	249	-	249
	Sub-Total VII)	-	99	366	61	526
VIII.	Feeder Road Studies & Road Maintenance					
	8.1 Feeder Roads Location Studies	-	-	200	-	200
	8.2 Equipment	-	736	-	-	736
	8.3 Maintenance Workshop	-	-	233	-	233
	8.4 Hand Tools for Road Maintenance	-	-	17	-	17
	8.5 Technical Assistance	218	-	-	-	218
	8.6 Operation & Maintenance	-	-	1395	1395	2790
	Sub-Total (VIII)	218	736	1845	1395	4194
IX.	Communications					
	9.1 Satellite Station, Equipment & Maintenance	-	160	200	50	410

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	Grant FX	A.I.D. Loan FX	GOP LC	LC	Total
X. **Regional Development Policy Support**					
10.1 Technical Assistance	646	-	-	-	646
10.2 Personnel: Salaries & Per Diem	-	-	170	470	640
10.3 Computer, Software and Technical Assistance	-	10	-	5	15
10.4 & Prefeasibility Studies	-	-	1200	-	1200
10.5 Evaluations	-	-	300	-	300
10.6 Training	-	50	150	10	210
10.7 Office Furniture, Equipment & Supplies	-	-	40	5	45
10.8 Office Rental	-	-	60	10	70
Sub-Total (X)	646	60	1920	500	3148
XI. USAID/Peru Project Advisor	191	-	-	-	191
Other T.A. Costs	810	-	-	-	810
Total (I) to (XI) & Other T.A.	3838	1818	13914	6272	25842
Plus: Inflation & Contingencies	162	500	1768	1728	4158
GRAND TOTAL	4000	2318	15682	8000	30000

TABLE IV-4: Central Selva Resources Management Project.
AID & GOP - Expected Disbursement of Loan and GOP Funds by Year
(Thousand of U.S. Dollars)

	Project Component	Year 1 (1983)	Year 2 (1984)	Year 3 (1985)	Year 4 (1986)	Year 5 (1987)	Total
I.	Project Management/PEPP						
	A.I.D.	355	218	108	72	44	797
	GOP	152	214	141	167	191	865
II.	Forestry						
	A.I.D.	597	2245	1205	724	124	4895
	GOP	42	151	191	232	274	890
III.	Agricultural Development						
	A.I.D.	437	851	1092	1163	85	3628
	GOP	17	218	600	782	365	1982
IV.	Livestock Development						
	A.I.D.	70	303	284	20	6	683
	GOP	13	25	39	53	68	198
V.	Protection						
	A.I.D.	69	35	22	14	7	147
	GOP	10	25	33	41	49	158
VI.	Continuous Land Use Inventory						
	A.I.D.	108	44	23	14	7	196
	GOP	12	26	36	45	54	173
VII.	Health & Environmental Sanitation						
	A.I.D.	147	71	76	77	94	465
	GOP	5	14	14	14	14	61
VIII.	Feeder Road Studies & Road Maintenance						
	A.I.D.	1611	551	279	140	-	2581
	GOP	-	140	279	418	558	1395
IX.	Communications						
	A.I.D.	325	35	-	-	-	360
	GOP	10	10	10	10	10	50
X.	Regional Development Policy Support						
	A.I.D.	470	503	586	369	52	1980
	GOP	66	83	100	117	134	500
	Sub-Total (1)	4516	5762	5118	4472	2136	22004
	Plus: T.A.	1500	1200	600	500	200	4000
	Sub-Total (2)	6016	6962	5718	4972	2336	26004
	Plus: Inflation & Contingencies (Loan & GOP)	839	1039	918	800	400	3996
	GRAND TOTAL	6855	8001	6636	5772	2736	30000

TABLE IV-5: Central Selva Resources Management Project
Recurrent Costs
(Thousands of U.S. Dollars)

	Component	Average Annual Operational Cost For Life of Project	After Project Year 1	After Project Year 2	After Project Year 3
I.	Project Management/PEPP	300	375	469	586
II.	Forestry	370	462	578	723
III.	Agricultural Dev.	430	537	672	840
IV.	Livestock Development	80	100	125	156
	Protection	50	62	78	98
VI.	Continuous Land Use Invent.	60	75	94	117
VII.	Health & Environmental Sanit.	50	62	78	98
VII.	Feeder Road Studies & Road Maintenance	570	712	890	1113
IX.	Communications	20	25	31	39
X.	Regional Dev. Policy Support	190	237	297	371
	Base =	2120	2647	3312	4141

Growth = Base $(1+0.25)^n$

Table IV-6 Central Selva Resource Management Project

Project Costs by Input
($ 000)

Component	Grant	Loan	GOP	Total
1. Technical Assistance	3,790	67	-	3,857
2. Training		790	150	940
3. Personnel Costs		2,172	3,600	5,772
4. Studies and Evaluation	210	1,900		2,110
5. Credit		6,410	1,000	7,410
6. Commodities and Equipment		4,081	150	4,231
7. Vehicles		950		950
8. Operational Costs		1,630	3,100	4,730
Total	4,000	18,000	8,000	30,000

C. Economic Analysis

1. Forestry Component

a. Introduction

The greatest economic potential for the Palcazu valley is clearly in one variety or another of forestry activity and the largest single component of the Project will be directed to this sort of activity. Forestry within the valley can take on a number of forms, however. It is important to distinguish the effects of one or another alternative form of forest exploitation to be undertaken within the Project--not only one from another, but also from the type of forestry exploitation which would take place in the absence of any project, once the road enters the area. In other words, it is necessary to distinguish: (a) the situation without the road and without the Project, which is minimal forestry activities; (b) the situation with the road but without the Project, which is the "with-project" case as far as the road project is concerned, but is the "without project" case for the forestry component; and finally (c) a number of alternative Project strategies.

The analysis which follows will examine, first, the adequacy of demand for project outputs which underlies all of the subsequent analysis. Second, it will examine the road-only case, including an estimate of the implicit cost of environmental degradation which would result from this alternative. Finally, it will consider the alternatives considered under the Project and their costs and benefits, including the benefits implicit in preventing environmental degradation.

b. Adequacy of Demand for Project Outputs

Some rough projections of domestic demand and supply of lumber have been made as part of the La Molina study cited in the Tosi Report, Annex III, Exhibit B. The primary use for lumber in Peru is in the construction industry with 50-55% of internal demand coming from that sector. The second largest consumer of lumber is the furniture industry and certain artisanal activities which together account for 20-25% of domestic demand. The remaining 20% of demand comes chiefly from the mining and transport industries. Given the prominence of the construction and furniture industries in the demand for lumber, it should not be surprising that the level of per capita consumption is closely associated with the level of GDP. In fact, the regression of the log of domestic consumption of lumber on per capita GDP shows a positive association with an R^2 of .72. Based on a projected increase in population of 3% and an increase of 2% per year in per capita GDP, the demand projections given in the first column of Table 1 have been derived.

Projections of domestic supply, also presented on Table IV-6, are based on simple linear regressions of past output and past levels of exports on trend, with R^2 of .79 and .94 respectively. While it would be foolish to place too much confidence in this sort of "black box" procedure, the resulting estimates appear superficially reasonable.

What all the estimates presented on Table IV-6 ignore, of course, is prices. To attempt to introduce price variations into the estimation procedures, however, raises an identification problem (one does not observe either the supply or the demand relationship but rather the effect of price changes acting on both simultaneously), which is not resolvable with the

late 1980s under the various project assumptions will be absorbed by the domestic market but suggests that domestic real prices may rise during this period as well. While the evidence to support this is inconclusive and any attempt to estimate what the rate of price increase might be is heroic, the assumption used in the following sections, that real lumber prices will remain constant during the Project period, probably understates the level of Project benefits under the various alternatives.

TABLE IV-6
Projected National Demand and Supply for Lumber
(000 m^3)

Year	Projected National Demand	Projected National Supply From Recent Trend	Projected Exports	Apparent Unsatisfied Demand
1980	408	430	20	-2
1981	444	446	23	21
1982	486	463	26	49
1983	530	479	29	81
1984	582	496	32	118
1985	638	415	35	161
1986	700	529	39	209
1987	770	546	42	266
1988	847	563	45	330
1989	933	579	48	402
1990	1,030	596	51	486
1991	1,137	612	54	580
1992	1,260	631	58	687

Source: La Molina Study Volume III

c. Situation with the Road but Without the Project

In the absence of a systematic forestry activity, the opening up of the Palcazu valley will almost certainly lead to a very rapid, but probably inefficient, utilization of the forestry resources, plus an additional cost resulting from the ensuing soil erosion. Without a Project, despite the government's desires for responsible resource utilization, the pressure to take advantage of the wealth that the standing timber represents would certainly prevail.

The pace of utilization, the level of benefits received, and the costs of extraction must necessarily be somewhat conjectural. However, based on the data developed in the La Molina and Tosi Reports, reasonable estimates can be made. Costs (except for environmental costs) and benefits are summarized on Table IV-7 with details of costs given on Table IV-8 and measures of feasibility given on Table IV-9. The estimates given on Table IV-7 are based on Tosi's estimate of approximately 32,000 has of removable timber and the estimate in the La Molina report that this could be cleared in a period of 15 years--although the latter figure is not by any means a minimum. Since no attempt would be made to cut or market species not now commercialized, it is assumed that only the $45m^3$ per ha of presently commercialized timber would be cut. The estimate of timber cutting costs in the first column of Table IV-7 is derived from Tosi's estimates modified accordingly. (Note that this assumes a more labor intensive system of cutting than is likely, in fact, to occur. However, the effect on actual cost of timber cutting should be minor.) The costs of sawmill operations are summarized on Table IV-7 and detailed on Table IV-8. These assume a series of mills each with a $50m^3$ per day capacity, operated 280 days per year.

The cost of environmental degradation is difficult to determine. Direct loss of soil fertility is probably a relatively small part. More important are likely to be damage to fish stocks downstream as a result of increased runoff and increased frequency and severity of flooding, due both to increased runoff and to the siltation of riverbeds. Direct measurement of these costs is obviously extremely difficult. However, it is possible to put an upper bound on the social valuation of environmental damage in general. In almost every case, there are measures which can be taken to eliminate the degradation. If such measures are taken (e.g. reforestation, or the installation of emission controls on cars), their cost will not exceed the actual cost of the environmentally damaging actions. If such measures are not implemented, that is evidence that the society's valuation placed on the environmental damage is less than the cost of the measures necessary to eliminate the damage. This, of course, assumes that there are political mechanisms which both accurately measure and effectively implement the preferences of the individual members of the society. In the case of Peru, it can be argued persuasively that such institutional mechanisms do exist.

Whether or not one accepts the "revealed preference" argument, the cost of reforestation appears to be a good overall estimate of the actual cost of environmental damage estimated. The value which can be placed on soil erosion, then, is the cost of taking measures which prevent it, probably through some form of protective reforestation. The cost of such hypothetical reforestation, based on recent AID experiences in Peru, could vary widely but are probably not less than $100 per hectare and probably not more than $500. These values, as well as an intermediate estimate of $250 per hectare, are presented in Table IV-9.

Finally, in computing net present value there is the question of the appropriate discount rate to be supplied. The value previously used in AID projects has been 15%. However, some have recently questioned whether there is really a "shelf" of projects in Peru with a 15% real rate of return. Without attempting to reach a resolution of this question here, values have been computed on Table IV-9 using 10% and 12% as well.

Simple timber extraction, then, has a net present value of $22,988,000 using the traditional 15% discount rate and assuming a cost due to environmental degradation of $250 per hectare.

d. Sustained-Yield Forestry with 40 Year Production Cycle

The strategy initially favored for the Project was continuous production on a sustained-yield basis within the Palcazu valley with the 40-year production cycle recommended by Tosi. Timber harvesting was to be managed on plots of a size sufficiently large to occupy a family essentially full-time. The size of holdings would vary but for planning purposes, a holding of 80 hectares was assumed. From this holding, approximately one-fortieth (two hectares) would be harvested each year, in such a way that neighboring uncut forest would seed the clear-cut land. Thus, at the end of the forty-year cycle, the first-year cut would be occupied by forest, just reaching maturity, which has essentially the same composition as the original forest. In this way, the harvesting operation can be continued essentially indefinitely, with no interruption in earnings for those who would be depending on this operation for their livelihood.

An integral part of this forest management system is the necessity to remove all cover from the area to be cut. To help ensure that this is effectively carried out, financially and economically viable uses would be sought for all forms of tree cover. This would include not only trees large enough for saw logs but smaller-sized poles (for telephone poles for the larger pieces and fence posts for the smaller) and pieces smaller yet for charcoal or firewood.

The second aspect of this forestry proposal is the gathering of cut logs stacked at roadsides, their delivery to sawmill, processing of sawlogs into lumber, and the treatment of timber, as well as poles, with preservative to guard against insect attack. Although it is conceivable that sawlogs and untreated poles could simply be trucked out of the valley, it appears that there are economic benefits from undertaking sawing and treatment close to the lumbering site within the valley.

(1) Financial and Economic Feasibility of Farm-Level Activities

The financial and economic costs of farm unit operations differ little in this case. Foreign exchange costs are small in any case, and the frequent revaluation of the Sol appears to prevent systemtic under- or over-valuation of the exchange rate. Labor surplus conditions are present in the capital and in the sierra but not in the jungle, where wage rates appears to reflect accurately the opportunity cost of labor. The only systematic deviation of market prices from economic costs appear to be indirect taxes on certain items, and market prices on certain fuels which are still somewhat below world market prices.

The most important costs for farm level operations are explicit and implicit labor costs. The labor requirement per hectare harvested per year is estimated from on Table IV-10. In addition to the amounts shown on the Table, which refer to the labor requirement for the land being cut, there may be some requirement for additional labor to clear underbrush from land to be cut the following year. The amount of such additional labor is highly uncertain, but, in any case, probably quite small. The labor required is of three kinds, manual labor (estimated at $4.40 per day), a chainsaw operator (estimated at $8.00 per day), and a chainsaw helper ($6.55 per day.)

The estimated annual implicit and explicit costs of clearing one hectare are summarized on Table IV-11. The predominant cost shown there is labor cost ($688.05 per hectare per year), with various equipment rentals accounting for $317.90 The total of economic costs is $1005.05 (Fuel for the chainsaw is gasoline, whose price differs little, if at all, from world market prices and is therefore not shadow-priced.) In addition, each operator is subject to a state tax on timber currently amounting to $57.75 per year. Thus total financial costs to proprietors is $1062.80 per hectare.

In computing these rental prices, the purchase price of oxen just reaching maturity has been estimated at $2500, with a useful working life of 15 years. Implict rentals were computed based on a discount rate of 15%. In addition. veternarian supplies and tool supplements are estimated at $100 per year. Oxen are estimated to work 40 days per hectare per year with a total work year of 115 days. Finally to allow for discontinuties and other problems, an additional requirement for man equal to 10% of the total has been added. The implicit cost of oxen resulting from this is $165 per hectare per year. No estimate of the opportunity cost of pasture has been added but this should be quite small

The rental cost at Chaievas has been based on an estimated delivery price of $1500, the requirement for a major overhaul once a year, supplies and parts at $100 per year and a total useful life of seven years. Final costs were estimated to be $200 per day. The resulting rental cost per hectare per year is $43.

Table IV-7
Costs and Benefits of Uncontrolled Cutting

Cost of Cutting ($ million)		Cost of Sawmill (Incl. Operation) ($ million)	Hectares Cleared	Commercial Lumber m^3	Value of Sawn Lumber ($ million)
0		5.213	0		
1	.325	6.049	500	22,500	3.180
2.	.650	10.683	1000	45,000	6.360
3.	1.300	7.978	2000	90,000	12.720
4.	1.625	4.123	2500	112,500	15.900
5.	1.690	3.971	2600	117,000	16.536
6.	1.690	3.971	2600	117,000	16.536
7.	1.690	5.392	2600	117,000	16.536
8.	1.690	5.392	2600	117,000	16.536
9.	1.690	6.346	2600	117,000	16.536
10.	1.690	5.022	2600	117,000	16.536
11.	1.690	4.123	2600	117,000	16.536
12.	1.690	3.971	2600	117,000	16.536
13.	1.625	3.971	2500	112,500	15.900
14.	1.300	3.135	2000	90,000	12.720
15.	.975	2.299	1500	67,500	9.540

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Table IV-8
Detailed Costs of Uncontrolled Cutting
($ Thousand)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	194	194	388	291	388	291										
	4	4	7	4												
	2956	2956	5173	2956												
ck	467	467	467				467	467	467							
rs	760	760	1520	760	152	0	0	760	760	1520	760	152				
rating enses	836	3672	3135	3971	3971	3971	3971	3971	3971	3971	3971	3971	3971	3971	3135	2299
al Costs	5213	6049	10683	7978	4123	3971	3971	5392	5392	6346	5022	4123	3971	3971	3135	2299

The value of farm unit outputs (again on a per hectare basis) is estimated on Table IV-13. It is clear from the value-of-output estimates of Table IV-13, that the lumbering activity, in and of itself, is quite socially and financially profitable. Private profitability for an 80-hectare unit cutting two hectares per year at present is $5,680 per year. Social profitability is equal to $5,790 per unit.

Table IV-10
Labor Requirement for Systematic Clearcutting by Two-Man Team Working Together, by task, for Average Hectare in F Land Use Capability Classes

Activity - Task	Man-Days
Boundary marking and vine-cutting	2
Clearing undergrowth and non-wood products collection and bundling	6
Cutting, bucking and limbing smallest tress and marking of valuable young trees	10
Chainsawing of pole and sawlog trees, bucking, and limbing	12
Hauling of posts, poles, and small sawlogs, with oxen or mules, to roadside landing	40
Blocking large logs and spraying with BHC	2
Cutting and piling firewood and charcoal wood	6
Assist with mechanized skidding of large logs	2
Production and bagging of charcoal	38
Hauling charcoal to roadside landing	6
Loading trucks	18
All forestry work except hauling firewood to homestead	142

Table IV-9

Measures of Project Feasibility: Uncontrolled Cutting

	Net Present Value at Discount Rate ($000)		
	10%	12%	15%
Cost of Clearing Land	- 10,143	- 8,933	- 7,472
Costs of Transport and Sawing	- 48,205	- 44,392	- 39,679
Value of Sawn Timber	99,057	87,262	73,009
Net Present Value (excluding environmental costs)	$40,709	$33,937	$25,858
Possible Costs of Environmental Damage			
$100 per Ha	$ 1,558	$ 1,372	$ 1,148
Net Present Value	39,151	32,565	24,710
$250 per Ha.	3,994	3,430	2,870
Net Present Value	36,315	30,507	22,988
$500 per Ha.	7,790	6,860	5,740
Net Present Value	32,919	27,077	20,118

The Peruvian government currently plans to introduce an additional tax of timber which will vary with the quality of timber but which is estimated by PEPP to be equal to $9 per m^3. This would reduce the estimated private profits from the annual two hectares cut by $900. The private financial incentives, even with the additional tax, remain substantial.

The very high levels of income associated with the activity raises a question about its behavioral consistency. In particular, a casual inspection of Tables IV-7 and IV-10 will demonstrate that the value of time spent in charcoal making is substantially less that the value spent in timber cutting. In fact, the 50 days per hectare spent in charcoal making yields an output valued at $316.66, equivalent to $6.33 per day. While this is more than the assumed opportunity cost of labor, charcoal making itself is a sufficient desagreeable activity that these well-paid unit operators may not bother with it. More serious yet, there is clearly a strong incentive to use marginal time to "bootleg" trees from beyond the designated two hectares rather than spend time in low-value charcoal making.

(2) Economic and Financial Feasibility of Sawmill Operation

The financial and economic feasibility of sawmill operations is conceptually quite separate from those of timber cutting. In principle, the proposed Project could operate without any sawmill in the valley at all by trucking sawlogs and other wood products out of the valley. Nonetheless, the reduction in size and bulk which occurs in sawmill operations suggests that there are economic advantages to locating sawing operations as near as practical to the timber cutting site.

TABLE IV-12: Number of trees, average per hectare, greater than 30 centimeters in diameter at breast height (d.b.h.), in Palcazu land capability classes C, F^1, and F^2.

Number of trees by d.b.h. class			Total Number of Logs
30 - 60	Plus 60 cm	Total	
66.58	9.83	76.43	140

Table IV-13: Gross Returns per Hectare and Timber Volume Delivered to roadside by product-class for volume-average Clear-Cut in Old Growth Natural Forest, "F" - capability class average stand, Palcazu valley.

Product	Volume in cubic meters	Unit Value - $	Total Value $
Easily marketed, known woods (sawlogs)	45	40	1800
Woods with little present market acceptance (sawlogs)	55	25	1375
20 Telephone poles (roundwood)	7.80	15	300
89 Fence posts (roundwood)	3.41	1.25	111.25
2.85 tons of charcoal (in sacks)	56.80	111.11/ton	316.66
(firewood for home use)	7.0	---	---
Total	175.01	---	3,902.91

Table IV-11
Total per Hectare Costs in US Dollars, By Category,
For Systematic Clear Cutting of Old Growth
Forest on P -Land Capability Class
Lands, Palcazu Valley

Expense Item	Days Worked	Price/Day of Unit	Total Cost
Labor	142		688.05
Manual Laborer	120	4.40	528.00
Chainsawing	11	8.00	88.00
Helper on chainsaw	11	6.55	72.05
Machinery and Tools			317.00
Chainsaw (rent) and fuel	11	3.91	43.00
Skidder (rent)*	0.4	110.00	44.00
Rental Cost of Tools and protective work gear			15.00
Rental Cost on oxen and ox-cart			165.00
Insecticide (BHC)		est.	50.00
Total Economic Cost			1005.05
Non-Economic Financial charge			
State Tax on Timber			57.75
Total Financial Cost			1062.80

*Because of "lumpiness" in skidder purchases this item has been treated as a discrete capital purchases, on later ables, rather than being included as a rental equivalent hetted against the value of timber cut as the smaller items have been treated here.

The level of sawing operations is clearly a function of the availability of timber and depends on the pace of implementation of the number of timber units in operation. This relationship is set out in Table IV-14, showing the number of harvesting units in operation, the amount of land managed and the amount actually harvested. The next three columns give the estimate of the volume of sawlogs and numbers of small and large posts and the number of sawmill units of $50m^3$ per day capacity.

The financial (and the approximate economic) cost of installing and equipping transport, sawing,and preservation operations to process the volumes and raw material listed in Table IV-14 is given on the first four lines of Table IV15 and summarized on line 5. These figures have been estimated from Tosi on the assumption that sawmill and preservation plant and equipment have an expected useful life of 15 years while vehicles have an expected useful life of seven years. Estimated operating expenses (including maintenance expenses) are given on line six (again from Tosi). Estimated costs of timber purchased (equal to sales of timber units plus transport costs) are on line seven. Finally, estimated sales from sawmilling and preservation are given on line eight.

Since the advantage of sustained-yield cutting is precisely that it permits output levels to be sustained indefinitely, the costs and benefit of sawmill have been projected over 30 years. Beyond 30 years at the previously assumed discount rate of 15%, neither costs nor benefits are significant. The various increases of Project feasibility for the stream of costs and benefits for sawmilling and preservation operation is given at the bottom of Table IV-15. These measures show, first, financial feasibility of these operations per se. A private internal rate of return of 28.9% should be sufficient to induce private operators to undertake these operations as a business, particularly if credit is provided (even if at market prices).

Second, financial and economic values here differ only by the amount of indirect taxes and certain very small adjustments to fuel prices. The economic internal rate of return is approximately 36.0% and the sawmilling activity, apart from the project costs of promoting it, has a benefit-cost ratio of 1.32 and a net present value of $7,544,000 at 1982 prices (both at 15% discount rate).

(3) Overall Feasibility of the 40-year Sustained-Yield System

The 40-year sustained-yield forestry system described in this section has obvious advantages. It provides more or less automatic soil protection and a continuous source of employment and income. However, it also has obvious drawbacks. The existing mature forest is utilized at a much slower pace than in the non-Project situation. In addition, there are Project overhead costs for personnel, training, and technical assistance (summarized on Table IV-16). These represent additional economic costs which have not been incorporated in the previous analysis of timber extraction and sawmill operation.

Adding together the net present value of sawmill operation timber extraction, and project overhead for this proposal gives an overall net present value for the component of $16.0 million at a 15% discount rate, $26.2 million of 12%, and $33.3 million at 10%.

From these values, without-Project present values must be sustracted and the value of environmental damage averted by the Project must be added to determine the true economic feasibility of the Project. As a result of this process, it is clear that for all discount rates, the 40-year sustained-yield system has a negative present value. That is, the Project's economic gains from the environmental damage averted do not make up for lower harvest yields and the Project's overhead cost. Therefore, this option is not economically feasible.

TABLE IV-14

Projections of annual production for sawmills with concentration yard based by annual number of operating production units of 80 hectares during the development period, for systematic clear-cutting component.

Year of Project	Forest Units in Operation	Managed Area Hectares	Hectares Harvested	Total Volume of Harvest Sawlogs (m^3)	Total Fenceposts Harvest	Total Telephone Poles Harvest	Number of Processing Units In Operation	Trucks
1	--	--	--	--	--	--	0	0
2	10	800	20	2000	1780	400	1	1
3	35	2800	70	7000	6230	1400	1	2
4	80	6400	160	16000	14240	3200	2	4
5	150	12000	300	30000	26700	6000	2	6
6	250	20000	500	50000	44500	10000	4	10
7	410	32800	820	82000	72980	16400	6	17
8	500	40000	1000	100000	89000	20000	7	20

TABLE IV-15 - Financial and Economic Costs and Benefits of Sawmill Operations

40-Year Sustained-Yield System

($000)

Fixed Costs (with estimated useful life)	1	2	3	4	5	6	7	8	9	10	11
Skidder (7 years)	97	0	0	97	97	195	97	97	0	0	97
Sawmill & preservation plant (15 years)	739	0	0	739	739	1478	1478	0	0	0	0
Logging Trucks (7 years)	76	76	76	228	304	456	304	76	76	76	228
Loader, Dump trucks & Bulldozer (7 years)	467	0	0	0	0	0	0	467	0	0	0
Sub-Total	1379	76	76	1064	1140	2129	1879	640	76	76	325
Operating Expenses	0	209	209	209	418	627	1045	1463	1463	1463	1463
Cost of Lumber	0	78	273	624	1171	1952	3200	3903	3903	3903	3903
Sales	0	178	627	1425	2671	4452	7301	8903	8903	8903	8903

Internal Rate of Return = 36.0%

Present value of cost = - $23,904.8 at 15% -30,959.2 at 12% - 37,570

Present value of benefits = 31,448.8 at 15%, 42,087.1 at 12% 52,124

Benefit/Cost Ratio = 1.32

Net Present Value = $7,544.0 thousand at 15% 11,127.9 at 12%

14,554.2 at 10%

TABLE IV-15 (continued)

12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
97	195	97	97	0	0	97	97	195	97	97	0	0	97	97	195	97	97	0
0	0	0	0	739	0	0	739	739	1478	1478	0	0	0	0	0	0	0	0
304	456	304	76	76	76	228	304	456	304	76	76	76	228	304	456	304	76	76
0	0	0	467	0	0	0	0	0	0	467	0	0	0	0	0	0	0	467
401	651	401	640	815	76	325	1140	1390	1879	2118	76	76	325	401	651	401	173	540
1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463	1463
3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903	3903
8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903	8903

TABLE IV-16
Project Overhead
($000)

Year	1	2	3	4	5
US Personnel	720	720	360		
Peruvian Personnel	147	189	168	168	168
Training and Extension	15	128	15	15	15
Research, Survey Planning, etc.	75	75	75	75	75
	1007	1112	618	250	258

Net Present Value

At 15% - 2,758

At 12% - 2,840

At 10% - 2,899

TABLE IV-17 - Accelerated Sustained Yield -30 Years

(Cost and Value in $000)

YEAR	0	1	2	3	4	5	6	7	8	9	10
No. of Ha Cut	0	30	105	240	450	750	1215	1550	1550	1550	1550
Value of Logs	0	90	315	719	1348	2247	3648	4644	4644	4644	4644
Fixed Assets											
a. Sawmill number (cumulative)	1		2	4	6	9	11				
b. Cost (marginal)	739		739	1478	1478	2217	1478				
c. Skidder Cost	97			97	97	194	194	97	-	-	97
d. Logging truck cost	76	152	152	304	532	684	380	76	152	152	684
e. Loader, etc. cost	467							467			
Fixed Assets (b+c+d+e)	1379	152	891	1879	2107	3095	2052	640	152	152	401
Operating Costs		209	209	418	836	1254	1881	2299	2299	2299	2299
Cost of Lumber		117	410	937	1756	2928	4743	6051	6051	6051	6051
Sales	0	270	945	2157	4044	6741	10920	13932	13932	13932	13932

	Sawmills		Cutting		Total
at 5%	- 11,204.2	+	17,168.0	=	28,372.2
at 12%	- 16,744.3	+	23,134.0	=	39,878.3
at 10%	- 22,111.1	+	28,805.7	=	50,911.8

TABLE IV-17 (continued)

11	12	13	14	15	16	17	18	19	20
1550	1150	1550	1550	1550	1550	1550	1550	1550	1550
4644	4644	4644	4644	4644	4644	4644	4644	4644	4644
			739	-	379	1478	1478	2217	1478
97	194	194	97	-	-	97	97	194	194
380	76	152	152	304	532	684	380	76	152
			467						
629	878	574	1379	152	891	1879	2107	3095	2052
2299	2299	2299	2299	2299	2299	2299	2299	2299	2299
6051	6051	6051	6051	6051	6051	6051	6051	6051	6051
13932	13932	13932	13932	13932	13932	13932	13932	13932	13932

TABLE IV-17 (continued)

21	22	23	24	25	26	27	28	29	30
1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
4644	4644	4644	4644	4644	4644	4644	4644	4644	4644
97	-	-	97	97	194	194	97	-	-
152	314	502	314	502	684	380	76	152	152
467							467		
640	152	152	401	629	878	574	640	152	152
2299	2299	2299	2299	2299	2299	2299	2299	2299	2299
6051	6051	6051	6051	6051	6051	6051	6051	6051	6051
13932	13932	13932	13932	13932	13932	13932	13932	13932	13932

TABLE IV-18 - Accelerated Sustained Yield - 25 Years

(Cost and Value in $000)

YEAR	0	1	2	3	4	5	6	7	8	9	10
No. of Ha. Cut	0	30	105	240	450	750	1375	1950	1950	1950	1950
Value of Logs	0	90	315	719	1348	2247	4120	5842	5842	5842	5842
Fixed Assets											
Sawmill (No.)	1		2	4	6	10	14				
(Costs)	739		739	1478	1478	2956	2956				
Skidder	97			97	97	291	194	97	-	-	97
Tractors	76	152	152	304	532	836	836	76	152	152	304
Loader, etc.	467							467			
	1379	152	891	1879	2107	4083	3986	640	152	152	401
Operating Costs	0	209	209	418	836	1254	2090	2926	2926	2926	2926
Cost of Lumber	0	117	410	937	1756	2928	5368	7613	7613	7613	7613
Sales	0	270	945	2157	4044	6741	12359	17527	17527	17527	17527

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TABLE IV-18 (continued)

11	12	13	14	15	16	17	18	19	20
1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
5842	5842	5842	5842	5842	5842	5842	5842	5842	5842
			739	-	739	1478	1478	2956	2956
97	991	194	97	-	-	97	97	291	194
532	836	836	76	152	152	304	532	836	836
			467						
624	1127	1030	1379	152	871	1879	2107	4083	3986
2926	2926	2926	2926	2926	2926	2926	2926	2926	2926
7613	7613	7613	7613	7613	7613	7613	7613	7613	7613
17527	17527	17527	17527	17527	17527	17527	17527	17527	17527

	Sawmills	Cutting	Total
at 15% -	13,698.0 +	20,707.8 =	34405.8
at 12% -	20,481.7 +	28,101.8 =	48583.5
at 10% -	27,068.5 +	35,152.5 =	62221.0

NPV of Total 7,143.8 (at 15%)

TABLE IV-18 (continued)

21	22	23	24	25	26	27	28	29	30
1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
5842	5842	5842	5842	5842	5842	5842	5842	5842	5842
							739	-	739
97	-	-	97	97	291	194	97	-	-
71	152	152	304	532	826	826	76	152	152
467							467		
640	152	152	401	629	1127	1030	1379	152	891
2926	2926	2926	2926	2926	2926	2926	2926	2926	2926
7613	7613	7613	7613	7613	7613	7613	7613	7613	7613
17527	17527	17527	17527	17527	17527	17527	17527	17527	17527

TABLE IV-19
Summary Net Present Value of Project as a function of Rotation Age - Tosi System
($ 000)

Assume 15% Discount Rate and $250/Ha Environmental Cost

	ROTATION AGE		
	40	30	25
Timber Cutting	$11,180	$17,168	$20,708
Sawmill Operations	7,544	11,204	13,698
Project Overhead	-2,758	-2,758	-2,758
Less: Value of Timber Operations with road but without project	27,374	27,374	27,374
Plus Value of Environmental Damage Averted	2,870	2,870	2,870
Net Value of Forestry Component	-8,538	1,110	7,144

e. Accelerated Sustained Yield System

The technical characteristics of clear-cut harvesting, natural regeneration, and usage of as much as possible of the timber resource, which are the characteristics of the Tosi system, do not necessarily require the 40-year cropping cycle with constant levels of timber extraction. A shorter period harvesting of the existing timber would be sufficient to assure natural regeneration, but not necessarily to provide for uninterrupted timber extraction after the existing forest has been harvested.

The costs and benefits of this approach for various rotation periods are illustrated on Tables IV-17, IV-18, and IV-19.

The methodology and the overall pace of implementation is essentially the same as that proposed by Tosi but the ultimate pace of extraction is higher and consequently the rotation period for harvesting secondary growth is shorter. The results, summarized on Table IV-19, clearly demonstrate that a more rapid clearing of the existing forest cover is more desirable. There is, however, a technical constraint in the requirement for a sufficient cover of mature trees to assure regeneration of the harvested forest. Tosi has expressed the opinion that 30 years is the minimum time period which provides reasonable assurance of this. Table IV-19 demonstrates that a 30-year time period, the subproject has a net present value of $1.11 million. Nonetheless, a shorter period of rotation or a more rapid pace of recovery would be preferable. As the Project is implemented, attention should be devoted to either possibility, consistent with technical and environmental requirements.

2. Livestock Production Promotion

a. Cattle Improvement

The sub-project component for cattle improvement consists of a series of measures to improve the livestock yield of existing pastures rather than the extension of the area in pasture. This strategy is motivated primarily by the fact that much of the area appropriate for use as pasture is already in pasture and there is little scope for significant expansion of areas used for cattle production without serious environmental damage. In addition, however, the production costs listed by Staver in the JRB Report indicate that the establishment of new extensive or semi-extensive cattle raising operations in the Palcazu is not economically or financially justified. This does not mean, however, that a viable project may not exist, based upon improved pasture management and improved herd quality, given that pastures have been established and fences, corrals, and other structures already constructed.

In considering the economic and financial viability of the proposed project in improving management of existing livestock operations, it is important to establish clearly what is being assumed about the

without-project situation. For purposes of comparison, a pasture area of 50 hectares will be assumed, although for this type of extensive grazing operation, the size is not crucial. It is assumed that a pasture is already established and that to maintain it, it is weeded twice a yar at a cost of $35.51 per hectare. The pasture area is assumed to be stocked at the average level of .8 animals/ha or 40 animals on the assumed 50-hectare holding. In addition, recommended vaccinations, and parasite treatments, salt and mineral supplements at a cost of $14.56 per animal per year are already being administered.

The Project will instruct livestock raisers in methods of improved pasture management and will attempt to improve the genetic quality of the herd. Staver asserts that these measures will permit an increase in stocking level, from the present levels of .8 animals per hectare to between 1 animal and 1.5 animals per hectare. As a consequence of this increased density and also more rapid weight gain, Staver predicts an increase in yield from the present 31 kg/hectare/year to 56 kg/hectare/year. A beef price of $2.00 per kilogram has been assumed. Also it is assumed that additional cattle, which are added over a two-year period as the pasture is improved, are either obtained from those which would otherwise be marked or can be obtained from neighbors, at the current market price of cattle.

A comparions of the farm level costs and benefits are included on Table 1. The cost of fencing is based on an estimate of $500 per km obtained from the PEPP office and an estimated requirement for fencing (sufficient to divide the pasture into nine discrete segments) of 6,000 meters. The requirement will vary slightly depending on the shape of the parcel and the terrain. Based on these estimated costs and benefits, the private financial rate of return is estimated on Table 1 at 22.7% and the net present value per 50 kilometer plot is $3974.

It is clear from inspection that the private financial (and consequently the economic) feasibility of cattle improvement is very sensitive to assumptions about the various parameters. The effect of variation in the cost of fencing is obvious. Equally important are the assumptions about prices and yields. If variation in either prices or yields or both were to reduce the level of benefits by 23%, the on-farm IRR would be reduced to 15.7% and the net present value almost to zero.

The overall cost of project overhead for herd improvement and pasture management improvement is estimated at $500,000 disbursed over a four year period. All of this appears to represent true economic costs which have not already been included in farm local costs. The extent to which cattle improvement activities will ultimately be implemented at the farm level is uncertain but a reasonable guess would be that 10,000 ha of the 15,000 ha currently devoted to pastures will be affected and that this will take place at a pace of 2000 ha per year for five years beginning in the second year of the project. In other words it is assumed that the equivalent of 40-50 ha plots will be brought under improved management each year. Based on the previous estimates of a farm level net present value of $3974 per plot, the net present value of the subproject, at a 15% rate of discount, is $122,000.

Overall, subproject feasibility is moderately sensitive to the assumed rate of adoption. For example, if project disbursements are at the same level as previously assumed but the rate of adoption is only half that assumed, requiring 10 years to reach the 10,000 ha assumed, the subproject would have a net of

TABLE - 20

Farm Level Costs and Benefits of Improved Pasture Management

(US$)

	Year				
	0	1	2	3	4 - 20
Costs					
Fencing	3000				
Additional Cattle	2953	2953			
Medical Treatments and Mineral Supplements for Additional Cattle	109	219	328	328	328
Benefits					
Additional Sales		1251	2500	2500	2500

IRR =	22.7%
Net Present value at 15%	3973.8
IRR if benefits (e.g., beef prices) 25% lower	15.7%
NPV	333.4

Given the uncertainty about the on-farm economic and financial feasibility of this project component, it is not surprising that there is similar uncertainty about the overall feasibility of the project component. Nonetheless, certain ranges can be estimated. The overall cost of herd improvement and pasture management improvement is estimated at $500 thousand which will be disbursed over four years. All of this appears to represent true economic costs which have not already been included in farm level costs. The extent to which cattle improvement activities will ultimately be implemented at the farm level is uncertain; for purposes of illustration, it is assumed that 10,000 ha of the 15,000 ha currently devoted to pastures will be affected and that this will take place at a pace of 2000 ha per year for five years, beginning in the second year of the project. In other words, it is assumed that the equivalent of forty 50 hectare plots will be brought under improved management each year. The farm level net present value at a 15% rate of discount for each 50 hectares plot for project activities, as estimated above, ranges from $3,333 if all required fencing exists, to $1,540 if all fencing must be constructed. Under these assumptions, the project net present value would range from a positive $36,500 to a negative $617,000.

b. Swine Production Program

Whereas the cattle development program is meant to make marginal improvements in an existing major activity within the Project area, the swine program is intended as a research program to determine if an economically and financially feasible program for swine raising can be devised for the Project area. Swine raising is currently undertaken in the Project area which in 1981 had a population of 3200 animals. However, for most area residents, this seems to be a minor activity. To them, swine appear to represent a form of saving and a way to utilize small quantities of foodstuffs which cannot conveniently be either sold or stored.

The basic cost structure of a swine producing operation, assuming six breeding sows per unit, is given (from Staver) on Table IV-21. The principal unknown element, which is to be the subject of Project research, is clearly the cost of producing feed on-farm. The cost of purchased feed is considerably greater than the value of the butchered hogs. To be an economically and financially viable operation, the cost of producing feed of similar nutritional value on-farm must be substantially less than this. Furthermore, the cost of producing feed must be the higher of (a) the value of labor in other uses plus the farm level cost of machinery, purchased inputs, etc., and (b) the market value of the feed itself. In other words, the Project must take into account not only the total economic cost of producing feed, but also the possibility that feed may have a higher value when sold directly than when converted into pork.

TABLE IV-21

Animal Sales and Operating Costs for a Six Sow Pig Unit Income

	Live Weight	Price Kg	Year 1 Head	Year 1 Value	Year 2 Head	Year 2 Value
Butchers	55	$1.33	36	--	72	3,168
Culls	85	$1.33	--	1,584	3	204
TOTAL INCOME			36	1,584	75	3,372
Expenses						
Feed a/ 30% purchased, 70% farm produced				806		1,550
Veterinary supplies(S/.4500/Sow/yr)				60		60
Miscellaneous(10%)				87		161
TOTAL EXPENSES				953		1,771
Return to labor and other factors				631		1,601

a/ Assuming that all feed concentrates are purchased (62 lbs per pig), the operation clearly loses money.

In addition to the uncertainty about operating costs, no estimates have been made for the capital costs of structures or for the cost of purchasing the initial six swine. If one assumes a cost of $1000 for a suitable structure and a purchase price for breeding stock equal to the assumed market price, there is an initial investment of $1,678. If in addition it is assumed that the equivalent of 200 person days at $2 per day is sufficient to grow the assumed 70% of feed requirements which are not purchased and that there is no requirement for purchased inputs to grow the feed, then the operation has an initial investment of $1,678 and produces an annual return of $1,201 and has an internal rate of return at the farm level of 71.6% over a 20 year time horizon, and at 15% discount rate, has a net present value of $5,839 per farm.

These figures are illustrative only and a wide variety of different cost estimates for producing feed would produce a wide variety of results. Taking the illustrative figures one step further, the swine component is estimated to cost $500,000 over a four-year period, or $125,000 per year. If 500 swine units of six breeding sows each were to be established over a five-year period, the overall Project component would have a net present value of $1,547,000.

3. Regional Development Policy Support

The process of developing the Palcazu Project has highlighted the importance of long-range planning of the development of jungle areas so that projects with the highest level of net benefits can be given priority attention and so that long-range measures can be taken to minimize environmental and other costs.

The principal benefits of policy support for long-range planning are three: first, the priorization of potential regional development projects so that those with the greatest benefits are carried out first; second, the minimization of costs that otherwise would be greater--by opening up additional possibilities for avoiding environmental and resource misuse costs which a longer time frame provides; and third, the benefits of avoiding the costs of poorly-based projects and having well-based projects. This analysis will focus on the value of the first type of benefit because it is amenable to numerical analysis. It should be understood, however, that the second and third types of benefit are undoubtedly higher still, consisting not only of enhancing the chances for good resource use planning but also of the more generally found benefits--rejecting bad choices and accepting good choices. Unfortunately, data on the second and third types of benefits are extremely hard to derive at the global level; they are, however, dealt with at the project component level of analysis presented in following sections of this chapter.

The values hypothetized below are within the range of recent experience with such projects. Suppose that we have four potential integrated rural development projects, each costing $50 million. Inevitably there will be a range in the internal rate of return of such projects. Suppose that the four hypothetical projects have internal rates of return of 20%, 25%, 30% and 35%, respectively. This kind of range is quite typical of such projects. The question is, what is the value of undertaking long-range planning so that the highest value project is undertaken first, the next highest second, and so on.

The answer to this question is quite straightforward. Assume that one project can be undertaken every five years. The net present value (at a 15% rate of discount) of undertaking the projects in the "correct order" is $104.0 million. The expected value of the four hypothetical projects implemented at random can be shown to be $80.7 million. Thus the value of the planning exercise is $23.3 million which is far in excess of its likely cost.

4. Road Maintenance Component

The economic analysis for the road maintenance component is contained in Annex II, Exhibit B.

D. Technical Analysis

1. Forestry

a. Ecological Considerations

About 44,000 hectares of land within the Palcazu watershed have been classified as suitable only for production forestry (JRB, 1981). Of these lands, roughly 20,000 hectares occupy high terrace and low-slope hill positions and have little danger of soil erosion. The remaining 24,000 hectares occupy medium-to-high hills with often steep local topography. On these lands, great care must be taken in logging and road construction to avoid severe erosion. On both types, soils are of such low fertility that a nearly continuous cover of high forest is required to sustain even basic forest productivity.

Most of the lands classified as suitable only for forestry, perhaps as much as 95%, are still in relatively undisturbed natural mixed hardwood forest. Many distinctive forest associations of "forest types" are evidently present but these have as yet to be accurately defined and described on the maps of the region. With the exception of small areas of palm swamp or "aguajal," all forest types share common characteristics: a moderate to high diversity of species distributed in three to four canopy strata and a wide range in stem diameters and wood volumes of individual trees.

This diversity represents an evolved adaptation, in a frost-free climate favorable to year-round tree growth on soils of very low inherent fertility. Recent ecological research has demonstrated that this diversity favors direct nutrient re-cycling from dead to living vegetation, maximum efficiency in site exploitation and interdependence of species, all leading to plant community stability and survival.

In the Palcazu forests, many of the larger trees on well drained sites are buttressed, an indication of superficial rooting due to the concentration of scarce plant nutrients in the first few inches of the soil, where nutrient-rich organic matter, the product of high hydrocarbon turnover rates, is concentrated. Most of the trees in these forests probably have roots obligately associated with vesicular-arbuscular mycorrhizae as well, a further adaptation to survival on very infertile tropical soils.

Because of the superficial rooting, however, the larger trees are usually unstable and easily blown over by winds associated with occasional but violent tropical thunderstorms. The fall of any large forest tree creates a sizeable opening in the surrounding forest due to its usually widespreading crown which is oftentimes tied to its more immediate neighbors by a tangle of thick bushropes or lianas. As one tree falls, others may be brought crashing down with it.

In the openings or gaps in the canopy created by the fall of large trees, or even of huge tree limbs, all subordinate vegetation is

crushed and leaves soon wither and die. Thus, the forest floor is exposed to overhead sunlight and to the entry and germination of seeds from nearby canopy trees in the virgin forest. Most of these upper canopy giants are known now to be light- to medium-seeded, fast growing heliophytes evolved to take advantage of precisely these events. Their numbers include most of the large, valuable timber species in the forest. Seeds and seedlings of other, more tolerant species may have been present on the forest floor at the site and others will be brought in by birds, bats, and such mammals as monkeys and various species of rodents. The "light-gap" so created will thus soon be repopulated with young trees representing the spectrum of species already present in the surrounding mature forest. These trees will compete with each other to achieve and dominate the canopy space above. Winners in this race are usually the fast growing heliophytes, and, among them, those genetically most vigorous and adapted to the specific local conditions of site and soil. Subordinate strata are then filled by the slower growing, more shade-tolerant species. A great impulse is given to this overall surge of new growth by the progressive decay and release of minerals stored in the fallen biomass which created the gap in the first place.

On the predominantly poor soils of the wet tropics where rooting depth is ephemeral for most species, continuous creation and occupance of scattered light gaps may be the most prevalent way in which mixed evergreen tropical forests regenerate naturally. Unless and until another windfall interrupts its composition directly, the stand which develops in each specific gap is essentially even-aged despite often great size differences among the individual trees at maturity.

The typical mixed upland forest, then, is actually a mosaic of small even-aged stands of varying ages and stages of development. Within it, by far the larger number of dominant canopy trees, are fast-growing heliophytes. Immature specimens of such trees (as, for instance, tornillo, cedro, caoba, lupuna, cumala) are scarce or absent except in fairly young gap regrowth stands. These species grow very rapidly in height to attain a canopy position before the gap is closed again. They do not tolerate heavy shade and are never present in the understory of a mature high forest. Their selective removal in traditional logging thus results in loss of the species itself, the seed source being eliminated from the stand.

Under undisturbed natural conditions, it is probable that the larger part of the forest in any general locality is mature or over-mature and that recent regenerating light gaps comprise only a minor percentage of the total forest area at any given point in time. Net growth of new wood in such forests is, therefore, comparatively small inasmuch as all mature portions of the stand add little or no annual increment to the total standing biomass. The products of their photosynthesis being channeled into leaf, limb, and root replacement and into maintenance of the overall community through flowering, fruiting, and the production of the seed with which each year's new light gaps are repopulated and occasional standing dead trees replaced.

b. Timber Harvesting and Forest Regeneration

In the proposed Project, successful sustained-yield management of the natural moist tropical forest is predicated upon harvesting procedures which closely simulate the natural renewal processes just outlined, while simultaneously stepping up the rate of turnover of the mature stand to produce a mostly younger, faster growing forest with high net annual increment. At the close of the first full rotation, this operation will produce a fully regulated forest with a normal distribution of age classes. In subsequent rotations continuous, high-level production will be assured while species proportions should change in favor of a much larger proportion of fast growing, valuable heliophytic species in the mixture. No species will be lost entirely, however, and the greater part of the terrain will be covered with dense forest vegetation at any given time, assuring soil protection, good water retention, clear streams, and favorable habitat for all native animal species.

In this management system, narrow but widely-spaced strips will be clearcut in the old-growth natural forest. These strips will simulate the "light gaps" of nature, permitting the immediate natural regeneration of the same high forest tree species from abundant and fully diversified seed source in the totally undisturbed forest on the border of each new strip. Felling and removal of all or nearly all of the standing timber in the strips will provide mineral soil exposure sufficient for the establishment of the light, wind-borne seeds of the fast growing but valuable heliophytic species characteristic of the main canopy. Lack of burning or of extensive use of heavy logging machinery will insure the germination of the heavier, starch-rich seeds of more tolerant species already stored in the ground litter or brought in by small mammals and birds. Strips will be wide enough to provide needed illumination for rapid height growth in gap-type heliophytes yet dense side shade will largely inhibit the establishment or dominance of the low-value pioneer species which characteristically colonize large open areas following their abandonment from agriculture or heavy logging. Because burning is proscribed, residual small wood, leaf litter, and soil surface humus will be retained as a mulch and as a slow-release nutrient source for the regenerating forest. Heavy bolewood and crowns having been removed from the site as an economic product, the carbon-nitrogen ratio will be improved and there will be no support for heavy climber and vine stage competition in the early years of natural regeneration. Finally, many of the smaller stumps, cut low, will sprout vigorously from established root systems.

In this system, then, harvest of the economic product and silviculture leading to the re-establishment of the next (and improved) forest crop are one and the same operation. Harvesting procedures and activities are specifically designed and regulated in the field to achieve silvicultural objectives at little or no cost to harvest itself.

c. Annual Cutting Schedule and Probable Yields

The Tropical Science Center report on sustained yield management of natural forests tabulates stand and stocking characteristics of existing natural forests on C, F1, and F2 lands in the Palcazu. It is noteworthy in all three land classes that total volumes and volume distribution by tree size class show very little difference. In all cases, some 25 species make up about one-half of the total volume; most of these are heliophytes, and have a high to fair economic potential. A larger percentage, of the less valuable species are lower in present market value because they lack durability. Preservative treatment of these species should enhance both their market acceptance and, of course, their price.

More than 40% of the total volume in these stands is composed of trees smaller than 30 centimeters, d.b.h. A further volume, suitable for the manufacture of charcoal, or use as pulp or conversion to cattle feed, is found in the upper small logs and larger branches of the main canopy trees. This wood is currently not used in Peru but will be converted under the Project, yielding an appreciable additional annual income to the forest producer while eliminating excess carbon from the ground surface, favoring both timber extraction along the strip and subsequent natural regeneration and growth.

The average hectare of primary forest to be clearcut under the forestry component will yield the bulk of the material in small, easily extracted logs. About 67 trees are included in the 30-60 centimeters d.b.h. class and only 10 in the plus-60cm class. While there are an average of 149 logs per hectare in these 77 trees, only about 15 logs will be of size and weight requiring the services of a tracked or wheeled skidder for hauling to the roadside. The remainder of the logs, some 133 per hectare, plus all posts, poles, and smaller material can be conveniently extracted by a combination of manual and draft animal power, including, possibly, the use of a light Costa Rican-type ox-cart for the bulkwood material, charcoal, etc.

d. Transport, Processing, and Marketing

A regularized annual cut of a variety of timbers and other forest products will result from the individual, native community, and industrial natural forest management units. Smaller and less constant volume will derive from agroforestry units. This timber and woody raw material will be delivered to roadside points designated on the management plans. Transport units will load the material and transport it to local processing plants on appropriate-sized vehicles. Depending upon the character and size of the materials, loading may be mechanized, by draft animal overhaul, or by hand. If possible, road access should be provided to each management unit in order to avoid transporting logs by river.

Each processing plant will consist of one sawmill with a sawing capacity of $50m^3$/day when operated at two shifts per day. A wood treatment plant for treating poles, posts, and lumber which is susceptible to

decay will be attached to each sawmill. For each plant, a fleet of three log trucks and one skidder will be needed to remove logs from the forest and transport them to the plants. A detailed list of wood processing equipment is set out in Annex II, Exhibit F.

Each processing plant will process annually all the wood clearcut from 140 hectares of land. One processing plant, therefore, will process the products of 4,200 hectares of manage forest land over the course of the 30-year rotation under which the forest is managed. The Project anticipates that under the three management systems proposed-- family parcel, native community and industrial parcel-- enough land could be brought under management during the five-year life of the Project to support establishment of six wood processing plants. The six plants would process the sustained output of 25,200 hectares all together.

An excellent national market for sawn wood exists and forest inventories indicate low total volume in those species and sizes most suitable for use in plywood and decorative veneer. These may be sawn at the mill or provision made for the concentration and sale of these materials in log form to outside buyers if the economics are favorable. As the full forest area is brought into production over time, volumes sufficient to justify installation of veneer or lamination facilities in conjunction with the sawmills will probably be produced from all units, collectively.

The processing facilities could be powered by electricity generated in steam-turbine plants fueled by each mill's own wood waste or, if locational conditions permit, by hydroelectric power. Each processing plant will generate an appreciable quantity of wood waste in the form of slabs, sawdust, shavings, edgings, and trimmings. Fuel requirements would probably not use all of this material, but it is unlikely that the very large, uniform quantities needed to make composition board will be generated. Once the power option has been selected, studies need to be initiated to determine which of several alternative uses of this waste will be the most profitable: e.g., continuous flow charcoal retorting, partial stream hydrolysis to cattle feed (Stake Process), methanol production, or composition board. The cattle feed alternative would be attractive from the viewpoint of substitution of grazing on some eroded local pastures with intensive, feedlot production of beef animals, and the raw material for this process could be increased by the addition of much of the small stem and topwood to be removed from forest clearcuts.

A concentration yard will be set up in conjunction with each processing plant. Sawn lumber, posts, poles, sleepers, bridge timbers, charcoal, palm wood, and other specialty products resulting from operations on the managed forest and processing in the plant will be accumulated, segregated into lots by species or quality classes, treated if necessary with wood preservatives, and displayed for sale. Buyers may come with their own transport to these yards or the products may be shipped to buyers in other parts of the country, particularly the Lima industrial area and the sierra region. Some high-value products with specialized end uses may find greater

profit in overseas markets. A marketing and sales-promotion specialist will comprise part of the staff of each mill or concentration yard.

e. Production of Rubber and High-Value Timber Species

Hevea rubber, a tree of little timber potential, has a relatively soft white wood which stains easily and is not durable in contact with the ground. Its latex, on the other hand, is now regaining value in relation to synthetic rubbers as a result of rising petroleum prices and the generally better quality of natural rubber for many products, including radial tires. Some natural rubber is already harvested and sold from this region and the tree would be a logical component for agroforestry in pure or nearly pure stands.

Tornillo is one of the most valuable timber species of the region, a natural heliophyte, and rapid-growing nitrogen-fixing tree. It is unquestionably one of the most sought-after timbers in the region, there being close to 7 m3/hectare on the average in natural forests of the C, and 4 m3/hectare in the F land capability-class forests. Increasing its overall proportions in these lands might, therefore, be a major goal of management. Evidently, on the white sand soils, its percentage is already even higher than in the figures given above. Tornillo at maturity is a large tree of great girth and height of several logs. These large logs may be broken down into cants directly in the woods at the site of felling, using a chainsaw with rip chain and sawing guide, for the wood is relatively soft and straight-grained. Cants may be removed from the forest by mules or oxen.

Both tornillo and Hevea rubber ("shiringa" or "jebe" in local parlance) are light-gap species. The proportions of both in the stands might be increased to virtual exclusion of other species under a management system which stressed harvesting of all undesirable species, by small-group selection systems, leaving old-growth tornillo and rubber trees to seed in the openings in the canopy which resulted. Once tornillo regeneration is firmly established, the old-growth parent tornillo trees may be harvested while the rubber stands would be retained for regular tapping. Young, rapidly growing tornillo would not interfere with rubber production and might, in fact, augment production by improving soil fertility. In addition to latex rubber, the seeds of the Hevea rubber tree are rich in oil and an excellent mast for hogs. This agroforestry system would appear to be particularly adapted to development by native communities. Both survey and research are needed, however, before the component can be evaluated for economic feasibility.

2. Agricultural Development

The basic factors determine the potential for agricultural development in the Palcazu are the following:

a) Resource Base: This includes soil classes, natural resource, land area, and the climate and terrain that influence productivity.

b) Access to markets: The construction of the primary and secondary roads will radically alter price relationships within the area for both inputs and products.

c) Human Resources: Two principal groups are presently significant: the descendants of European immigrants and the members of the 13 native communities in the watershed. With the road, a third group, new colonists, will become increasingly evident.

A brief description of how each of these factors influences Palcazu development is necessary before turning to the specific constraints that can be modified through the Project.

a. Resource Base

The Palcazu valley is relatively long and narrow, flanked on the east by the Palcazu River (below Puerto Mairo) which parallels the Cordillera de San Matias and on the west by the Cordillera de Yanachaga. The northern end of the valley, called the "Codo del Pozuzo," is formed by the Rio Pozuzo and the Cordillera de Yanachaga. The land area of the watershed, including the northern tip, is approximately 190,000 hectareas. The area has been the subject of two land capability studies by ONERN since 1970. The initial reconnaissance study conducted in 1970, utilizing the USDA/SCS 8-Class system, was employed and somewhat modified in a study for the MTC. In 1981, ONERN carried out a semi-detailed 1:25,000 scale to determine land capability classification. This latter study did not employ the USDA/SCS classification system making comparisons with the earlier study difficult. The newer system, however, probably provides a more reasonable approximation to land capabilities in regions such as Peru. The ONERN 1981 study was used as the basis for the land capability mapping for the Project. The results of three studies are shown in Table IV-20.

The differences are significant, reflecting the differing degrees of precision and different methodologies. The MTC figures can probably be assumed to be overly optimistic, with 94.9% of the land area capable of supporting agricultural activities. The differences between the ONERN (1981) study and the JRB study are worth explanation because of the decrease in agricultural crop lands and the shift from pasture lands to permanent crop lands.

The JRB modification is the result of their finding that ONERN utilized the Holdridge "Life Zone" classification at too high a level of generality for the watershed. The life zone concept applies measures of precipitation, biotemperature, and ambient humidity in addition to soil characteristics to determine land capability. Thus a particular class of soil will have different use capabilities depending on the "life zone" in which it is found. Based on the 1959 Ecological Map of Peru the area was classified at a 1:1,000,000 scale as Tropical Moist Forest. The recent JRB consultants found, however, the area to be characterized by three "life zones": tropical moist forest, tropical wet forest, and premontane wet forest (including transition to tropical wet forest). The latter two classifications imply greater restrictions on agricultural uses and contain 40 and 45 percent of the 95,000 hectares surveyed by ONERN. The tropical moist forest classification

(15%) occurs only in the northern tip of the watershed, the Codo del Pozuzo. Taking into consideration the three life zones classes rather than only the less restrictive tropical moist forest class, provides the JRB results. The geographic distribution of the different life zones is shown on the ecological map.

Table IV-20

Estimates of Land Capability

MTC (1981)			ONERN (1981)			JRB (1981)		
Cropland	%	Ha.	Cropland	%	Ha.	Cropland	%	Ha.
Class II	9.4		A2s	3.5		A	7.6	
Class III	24.3		A2i	1.3				
Class IV	8.1		A3s	12.0				
Sub-Total	41.8		Sub-Total	16.8				
Pasture			Pasture			Pasture		
Class V	16.0		P2s	4.1		P	13.3	
Class VI	37.1		P2es	4.8				
			P2sw	0.2				
			C2s*	13.0				
			C2es*	5.7				
Sub-Total	53.1		Sub-Total	27.8				
			Permanent Crops			Permanent Crops		
			C2es	5.3		C	14.4	
Forestry			Forestry			Forestry		
Class VII	4.1		Intensive (F1)	33.7		Intensive (F1)	20.3	
			Extensive (F2)	3.0		Extensive (F2)	25.9	
			Sub-Total	36.7				
Protection			Protection			Protection		
Class VIII	1.0		X	13.4		X	18.6	
TOTAL:	100.0	96,000	TOTAL:	100.0	95,000	TOTAL:	100.0	95,000

* Includes both pasture and permanent crops.

b. Climate

The climate is the principal constraint on agricultural production. While metereological data is lacking, rainfall, biotemperature, and evapotranspiration were inferred from vegetational analysis. In the Codo del Pozuzo region, minimum annual rainfall is estimated to be 2,500 mm, similar to the Tingo Maria area of the upper Huallaga Project. In general, rainfall increases with higher elevations and from north to south on the valley floor. In the premontane wet forest areas, occupying 50% of the area

mapped, rainfall is estimated to average 3,200 mm to 3,800 mm as the tropical wet forest area is approached. In the tropical wet forest, annual rainfall likely exceeds 4,000 mm. This amount implies severe constraints on agricultural possibilities.

Rains occur in all months of the year, through the months of June-September are relatively less wet. December through March is the period of heaviest rainfall.

c. Soils

Soils are generally characterized by low fertility, acidity, and considerable exchangeable aluminum. As in most tropical areas, soil fertility declines rapidly under continuous agriculture use with traditional technologies. The alluvial terraces on the river banks are less susceptible to this, in part because of periodic flooding. Table K-6 in the JRB Report (Annex III, Exhibit A) shows estimates of soil fertility in the Palcazu area. Most soil deficiency problems have a technological solution, requiring lime and fertilizers, but lack of access to markets and resulting high cost in the past have made their use uneconomic.

d. Land Use

Available data indicate that the area planted to annual and permanent crops is small, estimated at 1650 hectares. The data is incomplete: crops known to be grown in the area such as coffee, passion fruit, and pineapple, for example, are not included. It is likely, however, that the area harvested does not exceed 2,000 hectares. Table K-8 in the JRB Report provides estimates of harvested area and yields for different crops and their distribution between Amuesha and colonists.

Livestock represents the principal agricultural land use in the area. Approximately 12,000 head of cattle are estimated to exist in the area. This is the principal activity of the colonists, who have herds ranging from 50 to over 1,000 head. The native communities are estimated to have some 1,800 head, with approximately 40% of these in the native community 7 de Junio. The land area dedicated to cattle production is estimated to be 15,000 hectares. Production is associated with the alluvial terraces on the banks of the rivers. These are the better soils and the river provides access to air strips for transporting the meat to San Ramon.

Production practices for both annual and permanent crops are not known in detail. In general, land is not plowed, but planting is done over land that has been cleared by hand and burned. Chemical inputs such as pesticides and herbicides are used by the colonists on pastures, but their use is not commong among the native communities. In the past two years, numerous colonists have started to use brachiaria as a pasture with apparently good results. Its use is spreading among the colonists. The diffusion mechanism appears to be informal: a colonist supplies plant stock to neighbors, friends, and family. Among the colonists, rotation systems and fencing are

uncommon. It is significant that the colonist may be using a significantly higher level of technology in cattle production than is found in Tarapoto, Yurimaguas, or Tingo Maria. Kudzu is commonly used as a legume in pastures because it grows well and seed is locally available. Colonists claim, however, that it is not consumed easily by the cattle and they are replacing it with another legume. The land covered with brachiaria is typically used for animals requiring a better diet. The bulk of the pasture lands are in torourco, a native paspalum resistant to trampling and tolerant of overgrazing. Vaccination for foot and mouth, black leg, and rabies is carried out by most producers. Problems with the quality of vaccines supplied by the Ministry of Agriculture have lead producers to purchase vaccines directly from Lima.

The production practices of the native communities differ vastly from those of the colonists, reflecting differences in land resource base, capitalization, cultural system, and access to information, markets, credit, and so on. In general, a slash and burn system is used in which a forest area of secondary vegetation is cleared, burned, and planted with food crops. Usually after one or two years, weed invasion and soil fertility depletion result in substantial yield decreases. The site is then abandoned and left in fallow for 10-20 years. On the cleared lands, a family will plant up to three separate gardens per year:

1. A small plot (1/4 ha.) in climbing beans.

2. Up to one hectare of bananas, corn, beans, manioc,tubers, peanuts, sugar cane, or fruits is planted on alluvial food plains.

3. On poorer soils, up to one hectare of land in manioc and rice may be planted.

The land is usually worked by the members of the family or with community assistance through reciprocal obligations.

Agricultural land area in the native communities is shown in Table L-7 in the JRB Report. For all native communities, approximately 60% of the A, P, and C land is under cultivation. The range is significant, from 34% in 7 de Junio de 126% in Buenos Aires.

Of the land available for annual and permanent crops in the native communities, only 22% is utilized. Again the variation among communities is significant. The native communities 7 de Junio uses less than 10% of the class A and C land, while Santa Rosa Pichinaz uses 64% of the A and C land. Land presently in pastures exceeds the amount of land classified as suitable for pasture in all native communities but one, San Pedro Pichanaz.

Forestry resources are shown in Table L-5 in the JRB Report. In total, there are 6,105 hectares of Class F1 lands and 4,414 hectares of Class F2 lands. The range of F1 land per family among native communities is from 2.2 hectares in Loma Linda-Puerto Laguna to 26.5 hectares in 7 de Junio.

e. Actual Land Use

The estimated amount of agricultural land in the valley (Class A+P+C) is 32,500 hectares. (The ONERN study indicated 47,405 ha.) Of this, approximately 17,000-20,000 ha are in use: some 15,000 in pastures and at least 1,650 ha in annual and permanent crops.

f. Other Resources

The other principal resource in the area is lime. The quality and volume of lime for agricultural uses is unknown. However, area residents speak of lime deposits and one person was met who had used lime to improve his orange trees.

g. Market Access

Access to markets is a key element in regional development. The concept of market access refers not only to the physical transport network within the area and its link to the outside, but also to the market size and structure outside the area. Maps in the JRB Report show the location of Class A, P, and C lands, the boundaries of the native communities, and the proposed road network. The path of the primary road is set, while the location of the secondary roads is still not finalized. Road construction has begun at the headwaters of the valley. It is expected that the road will reach the Puerto Mairo area by late 1983. Preliminary studies to determine the location of a 30 km road into the Codo del Pozuzo area are expected to be completed in late 1983, with the detailed engineering study to be completed by mid-1984. If funding is available, construction will begin in 1985.

Because of the terrain and the location of agricultural lands along the river, it is clear that river transport will continue to play a significant role in transportation within the area. The lack of feeder roads will continue to constrain the low cost, volume shipment of agricultural products.

The prime first order market outside the area is Villa Rica. Observation suggests that Villa Rica is likely to become a fast growing center in the Central Selva. The closest major market is the San Ramon-La Merced complex where market infrastructure exists, agricultural supplies are available, several coffee and cacao cooperatives function, and INDALSA, a fruit processing plant, operates.

While there is limited information on markets for products grown in the area, the following observations provide a general orientation to market potential:

Annuals

Corn - Local varieties (NC, Morocho, Pozuzo) are probably best adapted.

Rice - Several rice varieties are available from the Proyecto Nacional de Investigacion de Arroz which are well adapted to high rainfall areas of the Palcazu.

Beans - All types of beans are utilized in the local diet. Site selection and time of planting is very important in bean production since rainy periods can make harvest difficult. The varieties grown by the native communities are probably best adapted to the region.

Peanuts - On fertile alluvial soils peanuts can be grown as a rotation crop.

Sweet Potato - "Camote" is an underutilized dual purpose crop. The foliage can be used for animal feed and the tubers can be used for both animal and human consumption.

Vegetables - Even though leafy vegetables as well as tomatoes, peppers, egg plant and melons are difficult to produce commercially in humid climates, local varieties are available for the Palcazu growing conditions and could be planted for home consumption. Squash can be interplanted with corn or planted in the door yard garden.

Perennials

Yuca - This crop is well adapted to humid climates, poor soils, and is rarely attacked by insects or disease. Yuca could be an important crop if marketing is guaranteed and industrialization of yuca flour, starch, and leaf pellets is developed. Yuca is also easily intercropped while establishing long-term permanent crops, and can be planted in association with short-term crops such as rice, beans, and corn. Besides local varieties, research results from Tingo Maria, Tarapoto, and Yurimaguas as well as those developed by CIAT and in Brazil can provide access to improved varieties.

Taro - Pituca is very rustic and adapts easily especially in areas of heavy rainfall and poor soils. Although there is no industrial market developed, the tuber and leaf are well-known components of the rural diet.

Plantain - Already widely planted, the farmers of the region understand the cultivation methods and normally adapt suggestions from extensionists quite readily. Yields are generally quite good, but the establishment of an industrial market would encourage more plantings.

Coffee - In the upper elevations of the Palcazu watershed, coffee is probably the best adapted crop. Plantains or forest species can be used for shade. Prices tend to be quite cyclical and the effects of the coffee rust will be reflected in lower yields.

Cacao - Careful handling and well managed fermentation will turn out a quality cacao that brings premium prices. Pejibaye palm might be used as shade so that fruit and heart of palm can be harvested as well as the

cacao. The agricultural experimental station at Tulumayo has selected seeds that are disease resistant and high-yielding.

Achiote - If a market is guaranteed for this coloring agent, then achiote cultivation should be encouraged despite the intensive labor requirements in harvest and drying.

Fruits - Pineapple, papaya, citrus, passion fruit, guava, sour sop, and breadfruit are all adapted to this area, but require a stabilized fruit processing plant and a fresh market outlet before widescale planting is encouraged.

African Oil Palm - Since large plantations are required to support the industrial processing of oil palm, an investigation of the available lands is necessary before any recommendations can be made. The general dissected, broken topography of the Palcazu combined with the heterogenous distribution of appropriate lands for oil palm cultivation appear as major constraints agains future evelopment of such an industry.

Rubber - With the quadrupling of the price during the 1970's, control of the South American leaf blight and improved grafting techniques, the prospects for reviving the production of natural rubber in Peru appear favorable. However, the negative experience of 1950-60 when the Agrarian Bank cancelled all loans for rubber production has left few trained rubber collectors who understand the collecting/processing techniques nor the form of agro-silviculture that was generally practiced during the first four or five years of plantation establishment.

Other - Jute (Cochorus capsularis), kenaf (Hibiscus spp.),ramie (Boehmeria nives), abaca (Musa textilis) and tropical nuts such as cashew, brazil nut, and macadamia all have development potential, but the lack of assured markets suggests that further study is needed before recommending these crops. Coconut would also adapt to the region, but again processing and commercialization are lacking.

The Pejibaye Potential

A potential tree crop that is not currently exploited in the Palcazu, but is known by the indigenous people for its fruit and other useful parts is the Pejibaye palm (Bactris gasipaes). It grows well and is adapted to a humid climate such as the Palcazu. It is thought to have grown wild on the eastern slopes of the Andes where it is known as "pijuayo" (CATIE, 1979). Because the fruit crop is seasonal, the Indians had developed methods of storing the fruit, which they ate cooked and from which they prepared alcoholic drinks. The palm stems were used for house construction, tools, and weapons.

The most important product is the fruit. The edible portion is the dry floury mesocarp which contains oil, calcium, carotene, and ascorbic acid as well as high levels of phosphorus and niacine thus providing one of the best balanced foods in the wet tropics. According to CATIE reports (1979), food value appears to vary with the color, with red fruits containing

more nutrients than yellow ones. In Central America, under average conditions pejibaye yields 30 tons of fruits and 4 tons of heart of palm per hectare per year. The pejibaye starts to yield fruit in three years. Superior varieties are known which yield good quality fruits; however, widespread multiplication is not practical since pejibaye do not breed true from seed. Vegetative propagation is practiced by severing ratoon shoots from the base of the preferred palm and planting them.

The second important product is palmito or heart of palm cut from the inner portion of the terminal bud, where the tender-young leaf bases are rolled around one another in cylindrical form. Palmito can be served fresh as well as baked or boiled. Removal of the terminal bud for palmito kills the tree. However, since the parent tree has multiple suckers or ratoons, it is possible to harvest successive trunks at proper size without impairing the production and harvest of fruits.

In Central America, a current production system utilizes pejibaye as high shade over cacao or coffee or in conjunction with annual crops. Research on the wood, which is very hard and attractive, is underway. An unexplored potential use of the fruit is the suitability as a large component for feed for pigs. The Yurimaguas tropical soils research station (North Carolina State University) is planting pastures under pejibaye palm.

Meat: Beef is currently imported, and prices are expected to remain strong. Table K-8 in the JRB Report provides estimates of production costs, yields, prices, and returns for selected area crops.

h. Human Resources

Three groups of inhabitants can be roughly defined: Amuesha native communities, descendents of European colonists, and recent colonists. The latter group is expected to increase as the road is constructed. The agricultural practices of the Amuesha and European descendants have been discussed above, so it is sufficient to characterize the groups along the following lines:

(1) The Amueshas are undergoing a transition from traditional shifting agriculture and a few domestic animals with heavy dependence on "los patrones" to participation in the market system within a limited land base and with limited skills to manage new production activities and practices.

(2) The established colonists of European descent, occupying the best lands along the river, have the resources and management skills to intensify livestock production but have little experience in annual and permanent crop production.

(3) The new colonists in the area are undercapitalized and may be unfamiliar with the climate and soils of the area. They are generally on marginal lands. Small-scale crop agricultural activities are undertaken in

an attempt to get into cattle production which is viewed as the most profitable agricultural activity.

i. Conclusions

In summary, there are approximately 33,000 hecatares of land suited for agricultural purposes. About 7,000 ha are located in the Codo del Pozuzo region. Less than 20,000 ha are currently exploited with the bulk (15,000-18,000 ha) of this land in pastures. While internal transportation will remain difficult, the road will radically alter price relationships and provide incentives to producers to increase production.

Producers attempting to increase production are faced with infertile acid soils, heavy rainfall, and disease and pest problems. Efforts to provide inputs and improve management techniques are hampered by logistical and technical difficulties. The Peruvian research, extension, and education system has not given emphasis to crops such as pineapple, achiote, passion fruit, or cacao.

Increased production in the valley can take two forms: expansion of the land area and increased yields. There is no question that the area under cultivation will increase. Existing colonists have plans to purchase more land. The high quality lands in the Codo del Pozuzo will be only 30 km from a road by the end of 1984, and settlement of these lands must be expected.

The implications for an agricultural development program in the area are the following:

(1) Emphasis should be placed on the improvement of high value/low weight crops that are presently grown in the area. Local farmers are presently the principle resource for knowledge concerning these crops. Facilitating market outlets to cooperatives and INDALSA in the San Ramon-La Merced area is an important element of the strategy.

(2) To improve the nutrition levels of area inhabitants, secondary emphasis on rice and beans plays an important role.

(3) Livestock intensification is both necessary as a protection element and is technically and economically feasible. This intensification will be based on disease and pest control, improved pasture, and rotation systems.

3. Permanent and Annual Crop Agriculture

The three basic constraints on crop agriculture are road access, plant stocks, and markets.

Outside the Codo del Pozuzo area, the total of A, P, and C land is 27,386 ha with 2,787 ha of class A land, 11,897 ha of class P land, and 12,672 ha of class P land. Observation and inspection of the map

suggests that all class A land is currently in pastures. Similarly, it appears likely that practically all class C land is in pasture. This suggests that approximately 3,541 ha of class C land are also in pastures.

Farmers in the area view diversification as an alternative with the coming of the road. The only annual crop that apparently is both technically and economically feasible is irrigated rice. This is suggested by some as a use for the alluvial terrace class A lands along the river currently in pastures. Rice, however, is a high weight/low value crop. The marketing of rice requires a road network--farmers cannot be expected to carry out large quantities of rice by boat, by animals, or on their backs. As the road does not generally pass nearby these lands will probably not be put in rice production. The principal,use of the class A lands is likely, therefore, to be in permanent crops whose product can be transported by boat or animal or person to areas served by roads. Similarly, it is expected that the class C lands will become a mix of pasture and permanent crops depending on relative prices and access to transport. To the extent that internal transport remains difficult, cattle will compete with permanent crops as the principal land use on all agricultural land in the valley. It is not plausible, for example, to expect a farmer to enter into pineapple production on any commercial scale (3-5 ha) unless a truck can come up to his farm at the time of harvest. The areas where diversification into permanent crops and/or annual crops is possible is critically dependent on the location of the secondary roads. Extension efforts on permanent crops will consider not only the land use capability, but also the feasibility of marketing permanent crops from those areas. In areas not served by a secondary road, it must be assumed that cattle will remain the primary activity, whether the land capability class is C or A.

The crop budgets presented in the JRB Report show clearly that permanent crops are more profitable than annual crops. The agricultural research and extension effort will be directed principally towards these crops. Achiote, passion fruit, pejebaye, cacao, and pineapple are grown in the area. Other crops such as spices, nuts, and winged beans appear to have potential but little work has been done on the production and marketing of these crops.

The cropping schedule shown in Table of the JRB Report illustrates a potential income of $1,347 per year ($225/ha) on a 10 hectare plot with 5-6 ha in cultivation. Income is slightly higher with the application of improved technologies.

On a 30-35 ha. plot appropriate for permanent crops, it is assumed that one hectare will be planted with corn or yuca while the permanent crops are becoming established. The production plan with permanent crops will provide an income of $1,750 per year ($275/ha.) with 6 ha. in production.

4. Livestock Development

The following characteristics were found by the JRB team to be significant with regard to expansion and intensification of existing animal production systems in the area. (For a complete technical analysis of animal production in the Palcazu valley see Charles Staver's report in the JRB study, Annex III, Exhibit A of this paper.)

1. The land base of the Palcazu valley is a complex, fragile topography of low native fertility subject to high rainfall.

2. The land base of the Palcazu valley does not contain large, uniform areas available for the expansion of crop production or pastures.

3. Three groups of people, of different skills and with different levels of available resources, inhabit the area:

   - The Amueshas are undergoing a transition from traditional shifting agriculture and few domestic animals with heavy dependence on "los patrones" to participation in the market system within a limited land base and with limited skills to manage new production activities such as cattle raising.

   - The established colonists of European descent, occupying the best lands along the river, can no longer expand their extensive beef cattle production with the same profitability as before due to lower productivity of hill soils and higher labor costs. However, ownership of the best lands and management skills and experience in cattle production should provide the colonists with a solid basis to intensify their operations.

   - The new colonists in the area have low levels of capital, are unfamiliar with the climate and soils of the area, and are relegated to the more marginal lands. They have certain skills useful for animal raising and for participation in the market economy, but often extract small profits from the land through shifting agriculture and move on.

4. Increased levels of beef and milk production in the Palcazu based on forages require improved farmer management skills, increased inputs, and adapted technical information currently unavailable for the area. Little land is available for expansion of cattle production.

5. Restricted quality and quantity of local protein limits the intensification of poultry and swine production. Competition for crop land may also limit the availability of carbohydrates. Permanent crop byproducts and forest and tree products may be used for animal feeds, if harvesting and processing technology is developed.

6. Institutional structure in the valley is rudimentary and will need reinforcement in land use capability, resource management, applied agricultural research and extension.

7. Current economic conditions severely restrict the alternatives for animal raisers, especially in the absence of tested technical recommendations based on economic analysis.

The major problems associated with beef production in the area appear to be: (1) the low level of reproductive performance; (2) low level of meat production per hectare; (3) the potential for disease; and (4) the high transport costs for inputs and product.

There are three approaches to improve reproductive performance: (1) improvement of genetic material through crossbreeding or artificial insemination; (2) increased use of balanced salt-mineral mixture to correct the calcium-phosphorus ratio in the diet; and (3) a managed culling program to eliminate unproductive cows.

The return to both cross-breeding and improved culling practices is of a relatively long-term nature. Work in Bolivia, for example, showed that a rigorous culling program resulted in an increase in reproductive efficiency from less than 50% to 89% in eight years.

Genetic improvement is likely to take about the same amount of time to produce results, though a combination of improved genetic stock through artificial insemination and the feeding of mineral salts could reduce the time to produce visible results. Work at CIAT and IVITA/Pucallpa has shown the addition of mineral salts to substantially increase calving rates and weights at birth, and to decrease calf mortality.

The implementation of the above practices is easily within the management capacity of the colonists. The use of mineral salts is known and used. Current transport costs for mineral salts are approximately S/.1,500 per animal per year. With the road, this cost will fall to around S/.350.00 per animal per year. Management of improved culling practices involves the individual marking of animals and the maintenance of individual records on abortions, calving, and calf mortality. This practice is believed to be within the capacity of the colonist producers to carry out.

Among the Amuesha communities, the establishment of the practice of feeding mineral salts may be relatively straight-forward. The establishment of improved culling practices and artificial insemination is likely to be more difficult. Extension and agricultural education activities in the native community 7 de Junio will be used to monitor and diffuse these practices to the other native communities. This community was chosen because it will be a prime beneficiary of the road and it has the greatest amount of underutilized land, an active and intelligent leadership, and a school built and supported by the community.

The second aspect is the low weight gain of livestock. The establishment of well managed grass-legume pastures is the key element. In general, the herd should be divided and managed by grouping the following classes of cattle: (1) pregnant/lactating cows and calves; (2) pregnant heifers and replacement heifers; and (3) cull heifers and steers to meet the differing nutritional requirements of each group. This sort of management system requires fencing and rotations. Rotation is practiced to some extent by the colonists. Therefore, refinements to their systems should not be difficult to implement. The colonists have had good results with brachiaria as a pasture grass and place the animals with higher nutritional requirements on it.

In the initial stages of the project, extension efforts with the colonists will be focused on (a) the diffusion of brachiaria; (b) identification and training of producers interested in improved culling procedures; (c) the training of an artificial insemination team and the implementation of an artificial insemination program; and (d) vaccination program for disease control and spraying at regular intervals for external parasites.

The data on costs and production of livestock activities is made difficult because the data are area averages, yet observation suggests great differences between farmers. Stocking rates, for example, range from 0.7 A.U. per ha to 1.7 A.U. per ha. (At the same time, this range suggests the existence of known, locally adapted techniques which can be disseminated.)

Further, the data are inconsistent in terms of the relationship between total herd size, extraction rate, and weights shipped to San Ramon. The data most likely to be correct refer to the extraction rate (13 to 17%), the average carcas weight (167 kg), and the amount shipped to San Ramon (466,000 kg).

From data on shipments, we know 2,790 animals were slaughtered ~~for shipment to San Ramon. This represents as much as 90% of slaughter.~~ Thus, at minimum 3,100 animals were slaughtered. If the extraction rate is 15%, the total herd size must be approximately 20,670 animals. On a total of 15,000 ha, this suggests an average stocking rate of 1.37 animals/ha. Fairly detailed data on the native communities show them to have 1,792 animals on 3,315 ha. This implies that the colonists have 18,878 animals on 11,675 ha, a surprising stocking rate of 1.6 animals per hectare.

Discussions with the colonists do not suggest rates this high; rather rates of 1.0 to 1.3 are indicated. One possible interpretation is that the area in pastures has been underestimated. If the colonists have 18,878 animals with an average stocking rate of 1.2 animals per hectare, then the total land in pasture (colonists plus native communities) may be as high as 19,158 ha. This interpretation allows an average stocking rate of 1.2 animals/ha (rather than 0.8 animals/ha), an extraction rate of 15%, and the shipments to San Ramon.

On this basis, the herd of approximately 21,000 head produces 526 MT of meat per year at an extraction rate of 15%. This is an average of 27 kg meat per hectare.

Production by colonists is on the order of 30 kg/ha and for native communities approximately 13 Kg/ha. At a price of S/.680/kg paid in Iscozacin for carcass meat, gross returns to colonists are S/.20,400 and to native community producers S/8,840. With estimated production costs on the order of S/.22,000/ha, the net returns to both groups are negative. However, as the native communities actually use no inputs, there is a perceived gain. The colonists, with pasture establishment and fencing costs in the past and because they may carry out less than the recommended practices, also perceive a profit.

The increased use of improved pasture (principally Brachiaria and Kudzu), culling practices to eliminate non-productive cows, and artificial insemination should allow the colonists to intensify production along the following lines:

(1) A stocking rate of 1.7 to 2.0 animals per hectare. Thus, on a 100-ha unit, approximately 200 animals can be maintained.

(2) Extraction rate of 20% per year.

(3) Carcass weight of 167 kg.

Under current conditions, flying carcasses to San Ramon, this would produce 67 kg of meat/ha, for a gross return per ha of S/.45,424 ($97.00). The estimated decrease in transport cost after the road is constructed is S/.50/kg. This would produce an additional S/.3,350 ($7.00). The elimination of the SASA monopoly will tend to move prices toward the San Ramon price less transport costs. SASA was selling carcass meat in the market at around S/.1,000/kg when the study was undertaken.

A conservative estimate of the price of meat in the valley with the road is S/.750/kg. At this price, the gross returns per hectare under the above assumptions is S/.50,250 ($107).

A key element in this is a permanent, low-cost system for the distribution of improved pasture stock. Experience in Peru has not demonstrated that ministerial experimental farms are capable of providing

inputs. Therefore, the system is designed to utilize private producers as suppliers, building on the informal system presently in use. Private producers in various areas will be initially identified as pasture stock suppliers. This activity will be operated as a private business by the producers, with repayment in cash or in kind as they determine with purchasers. Demonstration plots of at least 100 sq.mts. will be run on numerous farms to show the benefits of the improved pasture and, thereby, to stimulate demand for the pasture stock.

Any person producing improved stock will be recognized as a certified supplier to avoid producing monopoly situations through certification procedures. A similar approach will be used with the native communities.

5. Research and Extension

a. The Amazon Research Network

Agricultural research, with few exceptions, has not been operative in Peru since 1970. In 1979, efforts were initiated to redevelop the agricultural research service of Peru. The present INIPA (National Institute for Agricultural Research and Promotion) was created and charged with national research and extension redevelopment. Over the next few years, a series of research programs will be initiated but severely constrained by a scarcity of experienced research, administrative, and operational personnel. An agricultural research emphasis in the Project area must compete with the issues of human scarcity, inadequate research facilities, and the historically low priority given to agricultural research efforts in the country.

Given the diversity of agriculture resources in the Amazon basin, agricultural scientists from Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela have formed a planning group identified as the Agricultural Research Network for the Amazon (Red de Investigacion Agraria para la Amazonia - REDINAA). After a series of meetings, the group has signed a cooperative agreement and is proceeding to plan the network which will lead to experiment station proposals for each country. Eventually, they will seek international support to implement the network. In the planning stages, the network has had participation from international organizations such as A.I.D., the Rockefeller Foundation, North Carolina State University, World Bank, IDB, United National Development Program, FAO, the Technical Cooperation Society of Germany, CIAT and IICA.

The general objectives of the network focus on the efficient generation of new knowledge, interchange of knowledge, collaborative ~~research duplications, and means to efficiently utilize scarce human research~~ resources. An important overall focus is to generate knowledge supporting actions that will rationally and scientifically exploit resources in the Amazon basin.

There are many concerns related to the fragile ecological balance of the Amazon basin, its probable influence on the climate of large land masses, and knowledge gaps of the consequences of increasing population pressure on traditional agricultural methods and the effect of alternative agriculture or agroforestry production systems. The research network is being designed such that the product of the network will add knowledge on these important issues.

Within a given country the general structure is to develop jungle research centers that will focus on such areas as soil management and conservation, the management of annual and perennial crops, pasture and animal management, forest and agroforestry management, permanent fruit tree management, and fisheries management. Each such center would also serve as a sub-station site to test and adapt ideas developed at the other centers. The same concept would extend beyond the borders of the six cooperating countries.

Tentative plans of the network within Peru consider some seven agricultural research center locations: Iquitos, Iberia, Pichis/Palcazu, Pucallpa, Tarapoto, Tulumayo, and Yurimaguas. Such an agricultural research network offers a series of benefits:

(1) Provides for an efficient use of very scarce agricultural research personnel--top research personnel at a center would direct research at the center but also direct similar research throughout the other six locations.

(2) Provides the much-needed research base for further development within the Peruvian Amazon.

(3) Provides a research base on which to build extension operations designed to create cropping and livestock alternatives.

(4) Provides for an effective exchange of research progress and issues across centers within and between countries.

The Amazon Research Network is seeking resources to further develop the Peruvian network model. Modest support toward this goal from the Central Selva Resource Management Project is proposed. Furthermore, the development of the Iscozacin Experimental Station as part of the research network with linkages to Pucallpa, Yurimaguas, and Tulumayo Experiment Stations is a step forward toward reaching this goal.

b. Extension Program

To increase crop yields, the agricultural extension program will need a group of dedicated and qualified extension agents. There are few agents at the present time. In order to rectify this situation, a number of experts, knowledgeable in the important crops of the area, will be needed at the beginning of the program. It will be their responsibility to

provide the necessary training in all aspects of crop production, so that knowledgeable commodity specialists and extension agents will be placed in the field to advise farmers.

This program is concerned with developing human capital through on-the-job training, refresher courses in other ares, and short courses provided by established research centers. These well-trained personnel would then be able to make an important impact in the area and other regions of the humid tropics.

6. Protection

The Peruvian system for classification of public lands identifies several types of preserved and protected lands. Two of these, protection forest and national park, are included in the protection activity.

The designation of protection lands is essential for the sustained economic productivity of the agricultural, production forestry, and pasture lands in the valley. If protection lands were used for any other purpose, resource degradation would result, greatly reducing the sustainability of all other productive lands in the area. Therefore, the Project places major emphasis on assuring that lands designated for protection remain protected.

The designation of national park was chosen for the lands in the Yanachaga range because the Yanachaga holds great scientific interest and high recreational potential. The Yanachaga is believed to be a pleistocene refugium and center of species endemism. Therefore, it probably contains many species of plants and animals that are found nowhere else on earth. The Yanachaga is also spectacularly beautiful. It is a rugged range cut by streams of clear water and covered with forest. At higher elevations the forests, known as cloud forest, are shrouded in nearly perpetual mist. Colorful birds and insects abound, as do monkeys and some large mammals. All of these features make the Yanachaga worthy of being a national park.

The San Matias range, on the other hand, is less diverse than the Yanachaga. It is a knife ridge that rises abruptly from the east bank of the Palcazu river. The forest which covers it cannot be exploited commercially because the ridge is so steep and has such thin soil. Protection of the forest conserves its water and soil resources and diminishes erosion and siltation of the Palcazu.

Peru has been successful in establishing and maintaining national parks and protection forests. The national park system embraces Macchu Picchu, Huascaran, and Pampas Galeras--the home of the vicuña, as well as lesser known treasures. Wildlife has been well protected in these national parks over the years. They have long attracted scientists and attract more tourists every year. Management plans for several of the national parks have been prepared by the National Agrarian University at La Molina. Peru, therefore, has the national capability to designate, manage, and develop the

Yanachaga National Park. Some technical assistance from outside the country is desirable for performing the park inventory.

An example of a successful national forest in Peru is Von Humboldt National Forest. A portion of this forest is in the Pachitea watershed, north of the Palcazu, within the jurisdiction of PEPP. Recently part of the marginal highway has been constructed in the Von Humboldt National Forest along the Pachitea. PEPP has successfully prevented unauthorized clearing and settling along the highway. PEPP should be able to protect reserved lands in the Yanachaga and San Matias equally well.

7. Continuous Land Use Inventory

The technology for the Project activity in continuous land use inventory consists of a set of four maps, a basic topography map and three thematic maps: one showing land tenancy, one showing land use capability, and one showing actual land use. The four maps will be drawn on the same format and scale so they can be overlaid and compared. The scale will be at least 1:10,000 so that land parcels of 10 or 20 hectares can be easily plotted. (On this scale, one square centimeter equals one hectare.)

Cadastral maps are currently being prepared for PEPP by MinAg under the contract to do mapping and titling. Once these maps are completed, they will have to be kept up to date as new parcels are created and titled. PEPP, OCGR, ORP and INFOR will perform this function in addition to issuing title to agricultural lands and long-term use concessions to forest lands.

A land capability map at 1:100,000 scale for most of the valley floor has been prepared as part of the JRB study. Larger-scale maps with more detail will have to be prepared. In addition, land capability will have to be mapped in those parts of the watershed which appear to have productive land, but have not yet been mapped. The first step in assessing land capability is to determine soil type by field sampling. The next step is to identify the life zone, which can be done from the life zone map prepared for the entire Palcazu watershed as part of the JRB study. Land capability by soil type and life zone can then be found from Table 1 in the Appendix N to the JRB Report. For soils or life zones not shown in the table, land capability can be determined by application of the Peruvian land capability system. Strict application of the criteria for interpreting land capability from soil data will result in realistic assessments of land capability. Land capability will remain constant if the land is properly used, so that maps should not have to be revised.

In the JRB Report land was classified into the following six capability classes:

Symbol	Capability Class
A	clean cultivation
P	pasture
C	permanent crops
F1	intensive forest production
F2	extensive forest production
X	protection

Land in each class may be used for its capability or for any less demanding use. That is: A land may be used for any use; P land may be used for any use except clean cultivation; C land may be used for permanent crops or production forestry; F1 land may be used for forest production without restriction as to harvesting methods; F2 land may be used for forest production with restricted harvesting methods; and X land may not be put to direct production uses. Using land in any class in excess of its capability will cause it to deteriorate.

By knowing land capability class, title and use concessions can be awarded to parcels of appropriate size for their capability. The Project forestry activity is based on land holdings of an average of 60 hectares. Actual parcel size will not always be exactly 60 hectares but will be somewhat larger for parcels on poor land and somewhat smaller for parcels on better land. No parcel size is recommended in the Project activity on agroforestry. Parcel sizes will probably vary quite a bit in accordance with fertility and terrain of the particular parcel. Because the agroforestry activity anticipates labor intensive production of a valuable mix of permanent crops, livestock, and timber products, an average parcel used for agroforestry would probably be about 15 hectares. Intensifying cattle production of P land would produce an acceptable family income from roughly 50 hectares. Again, size of specific parcels would fluctuate depending on their individual quality.

Actual land use maps will be prepared from field observation of individual and native community holdings using the aerial photography and base topographic maps provided under the local Project management activity of the Project. Land use will be checked and updated from additional field observation combined with aerial video tapes provided under the Project.

The precise format of all the maps and mapping techniques will be designed to fit with other Project activities such as data collection and extension. The mapping techniques should also be consistent with the AID/ONERN Natural Resource and Environmental Assessment Project.

8. Health and Environmental Sanitation

The health and environmental sanitation component of the proposed Project has been designed to help overcome some of the major constraints to the improvement of health conditions in the Project area. These constraints include: insufficient numbers of adequately trained

paraprofessional health personnel; lack of certain basic equipment and adequate means of transportation; and lack of potable drinking water, means of excreta disposal, and sanitation education. As under the AID Extension of Primary Health Care Project, the proposed Project will emphasize low-cost, effective health services, particularly preventive as opposed to curative services, family planning and service delivery by paraprofessionals.

a. Training and Supervision

Under the Project, one-week training courses and refresher courses for health post technicians will take place during the four years of Project implementation. Seven technicians will receive training each year. In addition to refresher training in the topics taught to the promoters, technicians will learn more advanced diagnosis and treatment of illnesses. Training will also emphasize the technician's role in supervising the promoters. These courses will be taught by the area nurse with the assistance of a doctor from the hospital area.

Three-week promoter training courses will be taught each year. In the first year, up to 30 promoters and midwives will receive basic training. In subsequent years, up to 40 additional promoters and midwives will be trained or will receive refresher training each year. Training will emphasize: vaccinations; prenatal, postnatal, and childbirth services; diagnosis and treatment of common diseases; need for referrals to higher level health personnel; community education; nutrition education; and hygiene.

At present, no organized health training takes place in the Project area. Under the Project, AID will provide $22,000 for per diem and transportation costs for the trainers, health post technicians, promoters, and midwives. AID will also provide training materials used in the Primary Health Project.

To facilitate supervision of health technicians; promoters, and midwives, the Project will provide $21,000 for per diem and travel expenses for supervisory personnel. Health post technicians will visit the promoters and midwives in communities under their jurisdiction once each year. The area nurse or doctor will visit the seven health posts once a year and selected communities once each year.

For details on training and supervision, see Annex II, Exhibit G

b. Equipment and Supplies

The Project will provide $159,000 in Loan funds for the purchase of the equipment and supplies described in Part III.C.9.d. Detailed equipment and supply lists with costs are found in Annex II, Exhibit G.

c. Construction of Potable Water Systems and Latrines

Most Palcazu communities have a nearby water source which could be developed as a relatively safe water supply. These sources near each community should be identified and reserved perpetually for the provision of safe and reliable water. Where possible, groundwater seeps of springs should be developed for water supply instead of surface streams because the former are less easily contaminated. Simple cholorination and storage facilities might be justified for the larger communities in the future. Such facilities may be critical to some villages whose preferred source is greatly reduced in the dry season, forcing use of polluted river water.

As population pressures increase, the level of water contamination will also increase. Thus, rural families should also be encouraged to set aside the upper watershed of smaller streams to serve as the source of water supply for the family or for groups of families. Where it is not possible to identify or protect a water supply watershed, water supplies for rural families may be provided from simple wells or infiltration galleries constructed in or next to stream beds. Again, in some cases, such a secondary system may be required in addition to protection of the primary source to insure a supply of potable water throughout the year.

Early in the life of the Project, it will be particularly important to educate colonists and communities on the need to reserve a forested watershed for water supply before these watersheds are cleared for agricultural purposes and their water supply value is destroyed. Identification and protection of water supply watersheds should be an integral part of the development program. Since water supply for agriculture will also be important for the main activities of the Project, the PEPP Office will devise a system for making water allocation decisions.

Hygiene education for rural families--particularly encouraging regular bathing and the use of latrines--is an educational need which is not currently being met. This need will become more important in the future as the population grows and rural families are exposed to increasing levels of contamination. Community promoters will provide this education.

(1) Description of Selected Technologies

Two system types will be constructed under the Project: gravity-fed system terminating in public taps and wells with hand pumps.

The gravity-fed sytem is based on a surface source found at a sufficient elevation above the community so that gravity flow alone will have the required hydrostatic head to provide necessary pressure for adequate water distribution. Intake, sedimentation, and treatment facilities will be used where necessary. For all systems, public sanitary units will be constructed.

Although the gravity-fed system is the most desirable, most communities are too small (generally under 200 inhabitants) to justify this type system. For these communities, and for others where no surface source of water is available, protected hand-dug wells with hand pumps will be provided.

Spring water needs no treatment as long as it is adequately protected on its route to final use from the spring sources. Adequate steps will be taken to see that water intake is at a spot where least contamination will occur. Wherever the conditions of terrain and source permit, filter galleries should be constructed, principally in order to improve the physical characteristics of the water. In cases where bacteriological tests show contamination of the water, the installation of simple clorine-dosing mechanisms will be carried out.

Gravity Systems: The gravity systems will consist of the following principal components:

--Water intake system consisting of a concrete box which takes in the spring water under cover. Where surface sources require, the intake will take place through a filter gallery or alternatively by means of a dike, with intake through the bottom or the side.

--Water lines from intake using piping of minimum 1" diameter.

--Reservoir (in cases where the minimum volume requires).

--Distribution network with pipes of minimum 1" diameter. PVC pipe will be used whenever possible.

--Public taps and some sanitary units. Sanitary units consist of full installations with two public taps, two showers, and washing sinks.

Hand Dug Wells. The wells will be dug by hand or machine tools using simple construction techniques. They will normally be five to eight feet in dismater and ten to 40 feet in depth, depending on the level of the water table. They will be lined with brick, stone, or cement mortar and provided with a top concrete slab. The wells will be operated with hand pumps of simple design to facilitate maintenance and repairs.

Latrines. As a complement to the water supply, latrines will be installed. These will consist basically of a hole 1.80m deep and 0.8m x 0.8m wide, a surrounding collar for support of 1.00m x 1.00m (Turkish type), and a shed with roof, made of locally available materials.

(2) Gravity System Design

Once a locality has been selected, the respective field studies will be carried out and systems will be designed. These designs will be based on the standard designs which the Directorate of Rural Sanitation (DRS) is using for AID Project 527-U-074, to provide water systems to communities with populations under 500.

Some of the more important parameters for the various types of systems under consideration are as follows:

Rate of Supply: Between 30 and 80 liters per inhabitant per day, depending on the type of system and the climate in the locality.

Conduits: PVC tubing with a minimum diameter of 1" should be used.

Distribution Network: PVC piping with a minimum diameter of 1" should be used; the maximum pressure should be 50m (5kg per cm2) and the minimum 10m (1kg per cm^2).

Reservoirs: These are calculated for 25%-35% of the average daily consumption, depending on type of system.

Duration: Generally, the systems are designed to last for 20 years, except for the hand pumps which would last 10 years.

Treatment: In the cases where the bacteriological quality of the water require it, water treatment will normally be carried out by disinfection using simple and cheap dosing mechanisms which are easy to operate and maintain. This treatment is in addition to filtering the water when necessary by means of filter galleries at the source intake.

(3) System Construction, Operation, and Maintenance

The construction technique to be used will generally be the most simplified, based on prior experiences with programs carried out in rural areas and on the contribution of community labor resources and materials from the government and the community.

The Loan will provide all the specialized materials (PVC piping and accessories, galvanized piping and bronze accessories, cement, reinforcing steel, corrugated roofing, anti-corrosive paints, cleaning agents, glues, finishing products for the tanks, pumping sheds and sanitary fixtures (such as metal covers, corrugated bars, metal window frames, etc.), hand pumps, and water treatment equipment and supplies. In addition, Loan funds will be used for the acquisition of a four-wheel-drive pick-up which will belong to the PEPP office. Boats and motorcycles acquired by the health posts for river and road transportation will be used as needed, in addition to heavier land vehicles from the PEPP office. The communities will supply

non-specialized materials (stone, aggregate, brick, and timber) which, if not available locally, will be brought in by PEPP.

Skilled labor will be funded by the Loan and non-skilled labor will be provided by the communities themselves. The GOP will cover all costs for administration, technical direction, studies, and logisticial support.

Completed systems will be administered, operated, and maintained by a community water committee to be set up by the PEPP technician and the community. This committee will also appoint an employee to operate the system and maintain it in good condition. The employee will be in charge of any repairs which might be required of the various system components and, in general, will take care of the units which require permanent maintenance. The committee will be governed by regulations jointly established by the PEPP technician and the community.

The community members will pay monthly user fees. This monthly tariff will be determined by the community, health promoter, and the PEPP technician on the basis of each individual community's economic situation. This tariff should at least cover the basic administrative costs required for the system, including a minimum salary for the operator, supplies for the operation and water treatment (if necessary), and a small margin for repairs and modifications of the units as required. In any case, this monthly tariff should not exceed the value of the average daily wage in the locality. Income from the system shall remain under the management of the village committee.

The PEPP engineer will schedule periodic visits (at least once every six months) to observe the way in which the water supply service is being run, to check if the tariffs are being paid regularly according to the tariff schedule, to see that the registers and other control documentation are being kept correctly, and to give any assistance required by the committees. Non-technical follow-up as well as health and sanitary education will be carried out by health promoters.

(4) <u>System Costs</u>

Tables 4 through 7 in Annex II, Exhibit G provide estimated costs for gravity systems with sanitary units (approximately $30,000 per system); hand dug wells with manual pumps (approximately $1,150 per well); and latrines ($150 each). Estimating that five gravity systems, 60 wells, and 200 latrines will be constructed during the life of the Project, the cost will be approximately $249,000. Purchase of one four-wheel-drive pick-up ($14,000) brings the total cost of this sub-component to $263,000.

9. Feeder Road Location Planning and Road Maintenance

a. Feeder Road Location Planning

The Project will finance feeder road location studies for at least 60 kilometers of feeder roads to be constructed in the Project area by the GOP. The PEPP office will contract for these studies; up to $200,000 in Loan funds will be provided for this purpose.

In addition, the Project will finance four months of technical assistance ($44,000 in Grant funds) by an environmental engineer who will assist in the preparation of these feeder road studies. This technician will examine the potential economic and environmental effects of the proposed road locations so that the roads will be built to open up the most productive lands and protect environmentally fragile lands.

b. Road Maintenance

(1) Program Description

The purpose of the road maintenance program is to establish in the Project area a maintenance capacity adequate to preserve main and feeder roads in good operating condition. This will assure continuous traffic during the dry season and will keep to a minimum the traffic interruptions during the most intensive rainy periods.

The road sections that will be maintained under the program include the 80 kms of main road between Rio Pichinaz and Rio Pozuzo and approximately 70 kms of feeder roads.

The first 17 kms of main road will generally be formed through cuts along rocky hills and may be affected by sliding activity. The intermediate portion between Kms 17 and 35 present "cut" and "fill" sections, while the final 45 kms will be constructed almost exclusively in embankment, through areas subject to flooding.

The maintenance work for the "cut" sections will normally involve slide removal, slope stabilization ditching, and replacement of base material. The predominant activities for the sections in embankment include filling of potholes and replacement of surfacing material as well as clearing and rehabilitation of drainage ditches and culverts.

The proposed maintenance program is designed to use a balanced combination of manual and mechanical procedures, depending upon the nature of the required work and the availability of financial and labor resources.

The maintenance activity will require the establishment of a small pool of mechanical equipment to be used exclusively in the Project area. The equipment will operate from a maintenance shop to be constructed in a suitable location, possibly Iscozacin. This shop will have two or three

mechanics and an adequate stock of spare parts and supplies. Maintenance personnel will include a permanent gang of ten to twelve workmen, in addition to those responsible for equipment operation. The labor component will be complemented with temporary workers who will be contracted according to seasonal needs.

(2) Determination of Equipment Needs

Equipment requirements have been determined through an analysis of individual needs of each maintenance activity. The total number of work per year has been estimated on the basis of frequency and progress rate for each activity. The results have been multiplied by 1.25 to allow for idle and repair periods.

The attached Tables I and II show the number of work days required from each unit of equipment for the main and feeder roads. Table III summarizes the requirements and also includes a list of the complementary units of equipment. This table shows that while the three dump trucks and roller and water trucks will be fully occupied, the grader, front loader, and farming tractor may have some free time. Part of this free time may thus be used in support of some feeder road construction work.

(3) Maintenance Shop

The proposed maintenance shop will be used as operational center for the road maintenance activity. It will be equipped with minor equipment and tools for routine maintenance and minor repairs of the equipment. The shop will be staffed by two or three mechanics and two administrative assistants, in addition to the group of equipment operators. The shop will be provided with a renewable stock of spare parts and supplies to reduce breakdown periods to the extent possible.

The shop will be built on a tract of land of approximately 4,000 sq.mts. It will have roofed and walled areas for offices and a warehouse and roofed open areas for mechanical work and parking. The shop will be provided with water supply and sewage disposal systems and an electrical generator.

(4) Labor Component

At present, labor is generally scarce in the Project area. The situation becomes worse during the dry season when most of the labor force is engaged in agricultural activities. Most of the local people are not used to strict working schedules; thus, their production rate is generally lower than the national average. The use of imported labor would, in turn, be more expensive, due to higher wages and logistical expenditures.

The above considerations have been taken into account in the design of the program and in determining the extent of the labor participation. Tables IV and V in Annex II, Exhibit J show the estimated

labor requirements for each maintenance activity. The combined annual requirements for the main and feeder roads total 644 work days for the foreman and 5,068 laborer work days. This would be equivalent to a permanent force of two to three foremen and 20 common laborers. However, due to the seasonal character of the maintenance activities, the recommended alternative would be to hire a permanent force of ten to twelve people and to fill the peak requirements with temporary workers contracted on a short-term basis.

(5) Cost of the Program

(a) Initial Investment

It is estimated that the proposed maintenance program will demand an investment of $1,210,000, broken down as follows.

Procurement of Mechanical Equipment (including 20% for spare parts) :	$ 736,000
Construction of Maintenance Center	153,000
Equipment for Maintenance Center	80,000
Hand Tools	17,000
Technical Assistance	218,000
Operation & Maintenance	1,395,000
Total	$2,799,000

Table VI in Annex II, Exhibit J shows the total estimated cost of the required mechanical equipment. The total cost, $735,000, includes 20% for the procurement of spare parts and 20% for shipping and insurance charges.

The estimated construction cost of the maintenance center is $153,000. This estimate was made assuming that the center will have 150 sq.mts. of offices and store rooms and 200 sq. mts. of roofed operation areas. The center will be provided with minor equipment and tools at an estimated cost of $80,000. Hand tools for maintenance work will cost approximately $17,000.

Technical assistance for the program will be provided by two specialists in road maintenance and mechanical equipment, for periods of eighteen and four months, respectively.

(b) Operating Costs

A Peruvian highway consultant has estimated the annual operation costs of the proposed maintenance program. The breakdown is the following:

Mechanical Equipment	$423,000
Labor	73,000
Tools	15,000
Maintenance Center	47,000
TOTAL:	$558,000

The estimated cost of the mechanical equipment includes fuel, oil, operator salaries, and minor repairs. It does not include any reserve for replacement of the equipment. Assuming a five-year working life, the depreciation cost would amount to approximately $150,000 per year.

The cost of labor includes the wages and social benefits of all personnel engaed in actual maintenance work.

Taking into account the depreciation costs and considering a total road length of 150 kms., the maintenance unit cost would amount to approximately $4,700 per kilometer per year.

E. Social Analysis

A detailed social analysis of planned agricultural development in the Palcazu valley was prepared as an annex to the PID for the proposed Project (See Annex III, Exhibit C). This study was followed by a thorough description of land, natural resources, and economic development of Amuesha native communities in the Palcazu, Appendix L to the JRB Report, Volume II, and a social analysis of a national resources project for the valley, Annex B to the JRB Report, Volume I, which are annexed to this paper. Although the major findings and recommendations of these three documents are summarized below, the documents themselves should be consulted for in-depth analysis.

1. Background

Studies of past colonization and jungle development projects highlight important factors which must be considered in the design of new projects.

First, the location of past projects has at times been determined by political factors and the existence in certain areas of government-owned land reserves, rather than by rational study and selection of the best possible sites for development. Jungle colonization projects have been justified as means to reduce the country's dependence on imported foods by broadening the agricultural frontier and creating breadbasket production areas, or to channel the Andean migratory exodus away from the coastal cities. Although some of the projects have been economically viable investments, these objectives have generally not been accomplished.

Second, jungle colonization projects generally focus activities around the construction of penetration roads, while only marginally addressing limiting factors such as the adequacy of the resource base, the quality and potential of the soils, the prior planning of physical infrastructure, the carrying capacity of the zone, and the effects of the degeneration or destruction of the ecosystem.

Third, these projects have generally over-emphasized agricultural or livestock activities as the exclusive project orientation, without focusing adequately on understanding the ecological or topographic capacity of the area. Integrated, rational forestry management has yet to be applied in a project in Peru. Forest extraction has generally been carried out privately, by commercial interests with minimal government effort to enforce existing resource management legislation and regulations.

Finally, settlement of colonists has been extremely precarious, marked by a high degree of abandonment when, in many cases, standards of living have not improved appreciably over those of their places of origin. Additional problems have included internal social stratification among colonists; lack of a viable marketing structure for colonists' production, especially for small holders; ecological

destruction to a greater or lesser degree in most of the project areas; inefficient colonist exploitation of commercial timber stands either due to slash-and-burn clearing or the landholders' lack of concessional rights to extract the wood; and marginalization or displacement of the native people within the project areas.

2. Social Profile of the Project Area

a. Population Profile

The demographic information available for the Project area is limited, but estimates of the valley population are between 10,000 and 15,000, of which 3,000 are members of Amuesha native communities and perhaps an equal number of natives living outside of these communities. The non-Amuesha population consists of heteroge ous groups of Andean, coastal, and jungle Peruvians, with a small but powerful elite of second- and third-generation descendants of German, Swiss, and Austrian colonists.

The Amuesha have lived in dispersed, isolated settlements throughout the area since pre-columbian times and in the past fifty years have received additional waves of native migrants from Chanchamayo and Oxapampa provinces. The Peruvian and European migrants have also come in waves, associated with cycles of extractive activities: rubber early in this century and lumber and petroleum exploration in recent years.

b. Social Stratification

Three socio-economic strata exist in the Project area: the large ranchers, the native Amuesha, and the colonists. The majority of the large ranchers are descendants of German, Swiss, and Tyrolian colonists who arrived in the Pozuzo region in the middle of the last century. To a large extent, this group tends to marry among themselves.

Most of the Amuesha residents are in the process of forming communities that are recently established as a result of Decree Law 20653 (6/24/74) authorizing communal land ownership; the communities have nothing in common with the traditional native social organization. In the Project area, there are 13 communities, nine of which have title to communal land. Many of these residents were born in the zone, but some are migrants from other areas and the rest are outsiders (mestizos and Campas) who have been granted community membership by mutual consent.

The colonists come from other regions of Peru and have gradually taken possession of free areas not disputed by the other two groups. This group is extremely heterogenous, coming from the highlands the coast, and tropical and subtropical lands.

Another stratum includes livestock dealers and timber entrepreneurs. In numbers, this group is minor and fluctuating, but its ecological and economic impact is disproportionately great.

c. Ethnicity and Interdependence

Valley residents of differing ethnic origin live side by side and interact with mutual interdependence. The proximity of large concentrations of indigenous peoples to the larger ranchers is no coincidence. Since the times of the rubber trade, the Amuesha have lived near the large colonists and traders for two reasons. First, the Amuesha constituted the labor force for rubber exploitation and subsequent opening up of pastures and farmlands. Second, the colonists and traders developed a patron-client relationship with the Amuesha, serving as agents of innovations (such as steel tools), sources of western medicine, commercial links to the outside world, and godparents and "protectors" of their clients. As a result, the Amuesha have lost or are losing the knowledge of many of their traditional subsistence technologies, such as clothweaving, basketry, pottery making, hunting with spears and bows and arrows, and herbal medicine.

The economic activities of the valley residents include subsistence agriculture, livestock raising, trading, and exploitation of tropical forest. The Amuesha still practice slash-and-burn horticulture, but they have become more sedentary within their communal land grants or on individual land claims. They increasingly produce food for sale or trade within the valley; a few own small stores, but most trade is controlled by the large ranchers.

d. Inter-Connections Among Groups

The three socio-economic strata mentioned above are hierarchically related in a pyramidal system, except for the merchants and timber dealers who to some extent are identified with the interests and aspirations of the large ranchers. The large ranchers control economic and social activities in the zone, due to their earlier access to the area, their appropriation of the best lands, their development of significant livestock enterprises, and their better access to other parts of the country. They own most of the cattle in the zone; they are minority stockholders in SASA airlines and thus may have had in the past some advantage in priority use of air transportation to market their livestock; and they own the most diversified general stores for sale of basic foodstuffs and manufactured goods.

The Amuesha remain in a subordinate position, marginalized from scarce government services. In their livestock activities, they use a type of cattle share-cropping system under which they borrow cows from large ranchers for breeding and reproduction. They and the ranchers share the newborn animals equally, but the Amuesha are often forced to sell their own animals to the ranchers before maturity. The Amuesha are unable to obtain credit, and their application for forestry extraction permits were usually not processed.

The small colonists find themselves in a situation similar to that of the natives in the development of their livestock

activities and the marketing of their agricultural products. Their precarious position as owners of often untitled plots of varying sizes and their lack of ethnic identity and organization (which the Amueshas do have) result in their marginalization.

e. Access to Services in the Palcazu

The administrative functions of government are carried out by lieutenant governors, justices of the peace, and representatives of the municipalities--positions which in general are filled by members of the large ranchers' group and Amuesha community members. An additional government organization is the Iscozacin Agricultural District (IAD) of the Ministry of Agriculture. IAD is staffed by three agricultural technicians who collect statistical data and treat animal health problems. These tasks and the occasional technical assistance offered by these agents are limited by their training and ability and by the lack of reliable means of transportation; the work they do carry out primarily benefits the large ranchers. Other government services are extremely limited in the valley, apart from the secondary school in Iscozacin, the bilingual primary schools in the native communities, and sanitary posts in some communities and settlements. In some cases, the delivery of government services is poor because of insensitive management, inadequate equipment, and minimally trained personnel.

The Palcazu valley is faced with a severe shortage of basic health services. The serious health problems affecting the valley include parasitic diseases--which affect the entire population and account for an estimated 50% of deaths--as well as respiratory disease, enteritis, and hepatitis. The Ministry of Health is responsible for providing health care to the area population, but services in the valley are limited to seven health posts, each equipped inadequately and staffed by the health promoter with minimal training. Traditional health care is provided by curanderos (healers) and self-trained midwives. Serious illness must be treated in La Merced, and is beyond economic and transportation means of all but a few people.

f. Economic Activities

In the past fifteen years, the system for removal of tropical forest in order to create pastures and maintain the existing livestock enterprises has evolved from one of absolute subordination of the native population in which labor was mostly paid in kind to a truly capitalist system in which salaries and contracts are dominant. Various factors have resulted in an effective labor shortage for the large ranchers who now have difficulty enlarging or maintaining their pastures. These factors include:

(1) The creation of native communities and the permanent allotment of land to the Amuesha without the risk of expulsion.

(2) The establishment of small cattle operations by

native families, based on the share-cropping system described above which demands intensive labor efforts.

(3) The formation of small communal cattle enterprises in five communities under a revolving cattle fund system established by the Swiss Technical Assistance Program (COTESU).

(4) Native groups' emulation of the ranchers' economic model, so that some have become livestock operators with considerable herds.

(5) Increased Amuesha awareness of their rights and the usual salary levels and working conditions for hired labor.

These factors have resulted in improved salaries and/or more frequent contracts for the natives. However, the acceleration of tropical forest destruction by the natives themselves has been encouraged by these processes.

g. Land Tenure and Use

(1) Land Tenure

Two types of land tenure are found in the Project area: individual and communal ownership. Large ranchers and small colonists hold their homesteads as individual properties while the Amuesha communities claim or have title to lands as a group. However, within the communities, members use land as individual families according to their individual needs and capabilities, with the exception of the five communal enterprises mentioned above. Individual tenure is characterized by the de facto possession of land or the formal claim of a homestead through the Ministry of Agriculture. Holding size is variable, although the large ranchers have acquired a large proportion of cleared land, compared with that of small colonists.

With an average of 140 hectares per claim, more than 20,000 hectares have been claimed by a total of 169 claimants, not including uncensused areas or squatter colonists. Exact determination of land claimed through use and/or official documentation as well as land use is becoming available as a result of PEPP-initiated cadastral and land use surveys and titling. As these are completed, it is becoming more evident that the valley is more fully occupied and populated than some had believed. Therefore, valley residents are very anxious to get title for homesteads and claims. The titling process is impeded by the superimposition of claims and the case of invasion and occupation of lands.

(2) Land Use

Land use differs among the three socio-economic groups. The large ranchers have, for the most part, eliminated the tropical forest to establish pastures for intensive livestock raising.

Elimination of forest and over-grazing of the land is causing serious and progressive soil erosion which could eventually degrade and destroy the ecosystem.

The small colonists and the Amuesha make similar use of the land for livestock purposes, but the natives' use is less intensive due to their lack of capacity to develop larger livestock operations. Natives use communal lands for subsistence agriculture and for rice cultivation as an income source. Agricultural activities are of the shifting type and include cultivation of bananas, manioc, taro, beans, corn, pineapple, citrus fruits, and sugar cane.

Both agricultural and livestock activities result in the destruction of tropical lands from overly intensive land use and the destruction of timber stands from clearing.

(3) Land/Family Relationship

The average land holding in the area is approximately 87 hectares for native community families, compared with 234 hectares for the colonists and large ranchers. Moreover, the lands owned by the large ranchers are generally better located (near the riverbanks) and of better quality, both in topography and type of soil, whereas the natives' lands are often located on the slopes and the foothills of the San Matias and Yanachaga mountains.

Among the native communities, the large family unit (seven to eight members) prevails. Easier access to modern health care in health posts run by promoters from the community has led to a decline in infant mortality and increased life expectancy. Improved health and resulting population increases will put additional pressure on land resources in the future.

h. Diet and Nutrition

The Palcazu valley has been nearly self-sufficient in food production. The major food producers are the Amueshas and the small colonists who trade their surpluses for cash or manufactured goods. Local foods come from slash-and-burn agriculture, animal keeping, hunting, and fishing. Large ranchers with access to airports tend to import food items for their stores from outside. The Palcazu area is becoming more dependent upon outside food resources. Increased use of land for pasture by the Amueshas and the small colonists is resulting in insufficient food production. Furthermore, their livestock production is destined for sale rather than consumption so their own nutrition does not benefit from the livestock activities.

Health post records indicate that the diet of the natives and the small colonists is not adequate. The most significant cause of death in the valley are diseases related to malnutrition. Anemia, parasites, rickets, tuberculosis, and gastroenteritis are prevalent.

i. Role of Women

The native women have an important role in food processing and preparation as well as in producing and caring for children. They are no longer involved in cultivation to the extent they were in the past. Younger women are losing the traditional skills of cloth and basket weaving and are more interested in manufactured clothes and containers.

Girls are not discriminated against in the schooling process, as occurs in Andean regions. An important factor in the lives of young Amuesha girls is the search for domestic servants by the ranchers' housewives. This is one mechanism for assimilating native women into Western life, including the possible dangerous influences of foreign norms. Native women have given birth to children of European descent, but no cases of marriage between native and Germanic classes are known.

The life of the hard-working women on the ranches is devoted to child care, education, sewing, and cooking. They complain of inadequate obstetric services in the valley and fly to La Merced, Tarma, or Lima to give birth.

3. Project Beneficiaries

The environmental and natural resource problems of developing countries are the subject of global concern. In recent years, United Nations conferences on the environment, population, food, human settlements, water, desertification, and environmental education, together with a growing literature, have engendered a wide recognition that the critical environmental resources of developing countries are subject to stresses of unprecedented magnitude. Because the health, nutrition, and general well-being of the poor majority are directly dependent on the integrity and productivity of these resources, the capability of governments to manage them effectively over the long term may well be the single most important prerequisite to the eradication of poverty, the fulfillment of basic human needs, and the ultimate achievement of sustained development. Conversely, it is the poor who suffer most from the failure to address these problems successfully.

The direct beneficiaries of the proposed Project are the native communities, small farmers, cattle ranchers, and farm laborers in the Palcazu valley. Modified agricultural practices, appropriate forestry management, and improved pasture and cattle management will provide increased incomes for the area native residents and small farmers. Additional employment opportunities and higher wages will result for day laborers from the improved pasture and cattle management practices introduced, since these activities are labor-intensive. The area residents will also benefit from support activities in health, road maintenance, and communications, sponsored by the Project. Through sustained productivity and the protection and improvement of the

environment, the quality of human life in the zone will be enhanced. Pasture improvement activities, such as the introduction of grass/legume mixtures and rotation of cattle onto various grazing sites, will both improve available cattle forage and maximize soil conservation through improvement and protection of the vegetative cover. By carrying out planned activities in forestry, agriculture and livestock, farmers will protect the soil through sound conservation practices, and will develop additional sources of income.

The small and medium-sized farmers and native communities in the Palcazu watershed will also benefit from increased technical and financial assistance from the Project-sponsored agricultural and forestry credit, forestry activities, and the addition of new annual or permanent crops. The farmer's situation within the watershed will thus be stabilized through higher employment and improved income opportunities.

Strengthening the institutional mechanism and data gathering activities through which the GOP manages Peru's renewable natural resources will ultimately benefit the entire population of Peru. The rural poor in particular will receive direct and indirect benefits from the knowledge gained by this Project, inasmuch as the findings will provide pertinent information on the natural environment and its resources upon which all, and especially the poor, are dependent. Longer-range benefits will derive from greater land productivity and higher employment.

The direct productive activities included in the Project will have substantial indirect benefits to "downstream beneficiaries," and those benefiting from follow-on activities. The experience gained in the Palcazu watershed, when extended to other watersheds in the high jungle, will directly and indirectly benefit a large percentage of the population of Peru, through additional production of food stuffs, increased supply of fuelwood and timber products, and through the environmental benefits associated with rational land management and soil and water conservation measures.

4. Summary of Social Constraints

The social soundness analysis (Miller and Martinez) concludes that the Palcazu valley development project will be socially feasible and beneficial to the target groups assuming appropriate measures were taken to protect the environment and special activities for aiding and developing native communities were instituted. The following is a summary of constraints identified in the social analysis. All have been addressed and incorporated in all major Project components:

- A rural cadaster for the area had not been completed.

- The agricultural lands of the Palcazu seemed to be largely occupied and the potential for additional colonization is limited.

- There exists the possibility of timber exploitation

by unauthorized persons and by government concessionaries in areas that are unsuited for these types of lumbering operations.

- In the Project area, there is an insufficient number of trained forest rangers, agricultural and livestock specialists, and health, nutrition, and community development advisors to aid native and colonist residents and to disseminate information on appropriate land use.

- The valley lacks agricultural marketing alternatives for its production, resulting in an extremely exploitative and hierarchical social structure with monopoly benefits accruing to a few.

- The native communities and the small colonists are uneducated and relatively powerless in enforcing their rights.

- The native communities and small colonists lack effective access to credit, although in theory, it is available to them. They are often discouraged by the arduous nature of documentation procedures when dealing with financial, governmental, and other institutional bureaucracies.

- There is a great deal of ignorance, even among well trained people, concerning appropriate agricultural and livestock production techniques for the area.

- The native communities are extremely concerned that the government plans to take away their recognition, take away their land titles, refuse to grant land titles to communities without them, relocate untitled native communities on the lands of those with title, and allow timber extraction concessions on native community lands.

Technical assistance to the PEPP office will be provided by an anthropologist contracted for eight months who will help train members of the PEPP staff and work with the PEPP sociologist in developing plans for monitoring social impact on a continuous basis. The role of the sociologist is very important to the success of the Project, especially since the Amuesha have expressed strong interest in the Project and are seeking active participation in the market economy.

A Project evaluation format will be designed based on the following recommendations:

a. An annual evaluation of Project activities with both ~~field work and office studies. In some areas, more precise baseline~~ information is needed as soon as possible.

b. Field inspection trips to see all physical results of Project activities, especially public works.

c. Studies of immediate impacts (consisting of no less than two weeks of field work) with interviews and short questionnaires

administered to target beneficiaries in the areas of technical assistance, credit, and the establishement of services.

d. Annual visits to forestry reserves to observe the nature and extent of compliance with environmental regulations concerning timber extraction, reforestation, and land use, among other factors.

e. Annual recommendation for Project redesign based on possible unforeseen negative ecological and social consequences, including impacts on nutrition and health.

f. Evaluations carried out by specialists in the appropriate fields of activity, giving priority to individuals who participate in Project design, as long as they are not associated directly with the Project execution.

F. Environmental Assessment

1. Background

The JRB Report attached (See Annex III, Exhibit A) contains the detailed environmental assessment performed for the Central Selva Resource Management Projectby JRB Associates . The assessment, which was carried out over a period of four months by a team of 17 experts in natural resources and environmental management, tropical land use, tropical livestock, ecological mapping, forestry, hydrology, agronomy, zoology, botany, wildlife biology, tropical epidemiology and anthropology, studied all aspects of the valley.

A detailed ecological map of the Palcazu valley was prepared by the JRB team based on the Life Zone Classification system developed by Holdridge. Due to the lack of meteorological station data from within the valley, mapping was based on vegetation. This valley had been included in the earlier Ecological Map of Peru at a scale of 1:1,000,000, but classifications were changed considerably by JRB to take increased humidity into considera^ion.

New mapping was prepared at a scale of 1:100,000 and in it were differentiated six life zones and four transitions. The bottom of the valley, which is the part of greatest interest from the point of view of agri-livestock potential, covers three life zones: 40% in tropical wet forest, 45% in premontane wet forest, transition to tropical wet forest, and 15% in tropical moist forest. Of these, the first is most restricted for livestock production, the second is somewhat less restrictive, and the last shows more favorable conditions for agricultural and livestock activities.

The results of this study, combined with the in-depth social analysis (see Section IV.E.),provided the Mission with extensive knowledge concerning the environmental and social conditions of the valley and its residents. Based on the Project description contained in the PID,

the JRB assessment team made recommendations regarding design changes which would minimize any significant negative environmental impacts expected to result from the Project. These have been incorporated by the Mission in the final design of the Project.

In the PID, a major portion of total Project funds were allocated to road construction and maintenance. Before the environmental assessment was completed, however, the proposed Project was redesigned to exclude road building, since the GOP had already begun road construction. As more precise knowledge of the valley became available, natural resource development suited to land capability, an important element initially, became the central focus of the Project. Following the completion of the environmental assessment, Project design was further modified to coincide with the final recommendations of the assessment. Forestry, permanent crop cultivation, and livestock intensification have emerged as the principal Project activities to be carried out in the Palcazu valley. Emphasis has also been given to strengthening a national institution to coordinate high jungle development so as to benefit from the natural resource management techniques learned in the valley. These later changes in Project design do not affect the validity of the environmental assessment, but rather respond to it; they increase the likelihood that development activities will be carried out in a manner that is ecologically sound.

2. Environmental Constraints to Development

The environmental assessment identified a number of constraints which could give rise to unnecessary loss of resources and development opportunities in the Palcazu watershed. The watershed has a total area of 190,000 hectares and is characterized by steep and broken topography and soils of low infiltration and water retension capacity. These factors, combined with high rates of precipitation often of high intensity, lead to greatly accelerated rates of erosion. Improper land use practices could give rise to flooding, erosion, sedimentation, and run-off problems that would foreclose optimum and sustained development of resources, not only in the Palcazu valley but also downstream in the Pachitea floodplain.

Lands which do have the capability to sustain agricultural productive uses have limitations due to the extremely wet climate and soils of low fertility, high soil acidity, and high aluminum concentrations. Successful techniques for fertilization and cultivation, which have been developed in areas with less rainfall but similar soil characteristics, must be modified and adapted for the Palcazu. Given the dissected, heterogeneous land of the Palcazu and the environmental constraints, the carrying capacity of the Palcazu is relatively low. Moreover, there is already a sizeable population in the valley. A comparison of 1981 census and completion of land titling activities with land capability data will give a better approximation of carrying capacity and how much additional population the valley can maintain. The colonization of the Palcazu valley will also be determined by the degree

to which proper land use practices are adhered to. Deforestation of protection forest lands and improper harvesting of forest production lands would lead to waste of forest resources, impoverishment of vegetation, and loss of wildlife habitat.

The full environmental assessment is attached; the following points, however, summarize some of the more important considerations:

- The climate of the Palcazu valley is rainy and there is no definite dry period, since rains come any time of the year. Two seasons or periods are defined--winter, which lasts from October-November up to April or May, and summer during the remaining months of the year. Rains are generally heavy and last from a few hours to up to a week or more during winter and even occasionally in the summer.

- The Palcazu zone is more humid than sectors such as San Ramon, Oxapampa, Pozuzo and Villa Rica, from which come most of the present population of the valley. Rainfall estimates for the the lower part vary from 3,000 to 4,500 mm/year on average and in general rain increases from Puerto Mayro towards Loma Linda (from north to south) and from the San Matias range towards the Yanachaga range (east to west). However, in the southern part of the rio Palcazu watershed, at medium-high elevations, there are some small sectors protected from rainfall.

- The crops and cropping systems that might be recommended for the tropical moist life zone cannot be expected to give the same yields in the tropical wet life zone due to higher annual rainfall and lack of a definite dry season. Additionally, areas characterized by heavy textured soils imply slow drainage that is detrimental to many annual and tree crops. Humid conditions imply more restrictive land uses for agriculture. These restrictions affect the cropping and livestock activities whereas forestry use is more tolerant of wet conditions.

3. Environmental Opportunities Afforded by the Project

The environmental constraints in the Palcazu identified in the assessment are addressed by the Project through a series of environmentally sound development opportunities. These opportunities may be summarized in the idea that land use must be in accordance with land use capacity, and they are embodied in the Project elements listed below which are proposed in this Paper for the Central Selva Resource Management Project.

a. Regional Development Strategy

This Project element is aimed at the entire high jungle, but it will also be directly useful in the Palcazu. Principal aspects of this element that will protect the environment are increased

data on the environment, environmental education of technicians and land owners in the valley, and the application elsewhere of the lessons learned about long-term resource management in the Palcazu.

b. Land Capability Zoning

Application of land use capability to actual land use will insure that land is not put to uses that it cannot sustain. This will prevent deforestation of protection lands, improper harvesting of forest production lands, and establishment of pasture on unsuitable lands. Avoiding inappropriate land uses will also avoid secondary adverse environmental effects, such as erosion.

c. Upper Watershed Protection

Upper watershed protection will involve establishing Yanachaga National Park and San Matias National Park. These protected areas should prevent deforestation of upper slopes and the consequent negative effects both there and downslope. The protected areas will also be a refuge for flora and fauna which will be enhanced by a lowland corridor for protection of lowland species as well. These environmental benefits are complemented by the social and economic benefits of tourism, recreation, and scientific study which the parks will provide.

d. Forest Management and Agricultural Research and Extension

These project elements will enhance productivity on lands which are being used in accordance with their best use capacity. The specific objective is to conform use to capacity and then to increase productivity by rational management. This would be the best way to sustain productivity in the valley with minimal environmental damage.

4. Conclusions

The Project gives AID the opportunity to influence the development of the high jungle by assuring that this development is carried out in a rational manner, using a sustained production approach rather than an "exploit-and-move-on" approach which could permanently destroy large segments of the high jungle as productive resources.

With or without AID assistance, the Project area and other areas of the high jungle will be developed. However, without the expertise that AID can provide and the GOP is anxious to receive, land use will not be optimal; unprotected forests are likely to be harvested irrationally once the access road is completed; and long-range sustained use of the land will be endangered. The consequences for high jungle farmers in this and other areas, and for the long-term productive base of the national economy, could be extremely serious. The CSRM Project has

been designed to guide development efforts by determining land use capability, encouraging optimal use of the land, and protecting certain areas whose vital contribution to productivity is to remain untouched.

Thus, the Project successfully implemented will serve not only to develop the agricultural and forestry production possibilities of the Palcazu valley, but also to guide environmentally sound high jungle development in other similar areas. The Project is based on the methodology of optimizing resource use by examining the land use capability of a certain area and developing the area accordingly. The Project will produce technologies which are not only appropriate for the Palcazu valley, but also applicable and transferable to other areas. However, since climate and other factors vary in each region, the more significant output of the Project will be an ecologically sound production methodology to optimize land use in the high jungle. With appropriate adjustments, this methodology will be applicable to other high jungle areas as they are opened for development.

V. IMPLEMENTATION ARRANGEMENTS

A. Administrative Arrangements

1. GOP Implementing Agency

The GOP entity responsible for coordination of the implementation and execution of the Project through the GOP implementing institutions will be the Pichis Palcazu Special Project (PEPP) Office. This Office has been officially created under the Prime Minister's Office and will function in a manner similar to that of the Special Project offices for the Upper Huallaga and the Huallaga Central and Bajo Mayo Projects. The PEPP Office will coordinate the activities of all other implementing institutions participating in Project implementation, including INIPA, ONERN, SENAHMI, the Ministries of Agriculture, Transportation, Health, and other public sector agencies. Part IV, Section A contains a more detailed discussion of these arrangements.

The following reports from the PEPP office and the Secretariat of Regional Affairs will be required to assist the Mission in monitoring the Project:

a. A monthly summary of activities and expenditures which will highlight potential problems or issues, and which will serve as an agenda for the monthly Project review meetings held between the Special Project Office and the Mission's Project Committee.

b. A quarterly progress report detailing the advances and expenditures by components and activities, based on the detailed Implementation Plan.

c. An annual summary of accomplishments by components during the calendar year, which will serve as a basis for the joint GOP/AID evaluation.

d. Appropriate reports reflecting compliance with procurement requirements.

2. USAID

USAID/Peru will coordinate closely with the Special Project Office and with the GOP implementing institutions involved in Project activities to review and monitor overall Project performance and to assist the GOP in Project implementation. Monitoring will be exercised by a USAID Project Committee with the following responsibilities:

a. The Project Manager for the Project will be assigned from the Mission's Office of Agriculture and Rural Development (OARD). The Mission will use Project grant funds to finance a PASA or PSC for 24 months of services to assist the OARD Project Manager in implementing the Project. The Project Manager will work closely with the Project

Committee, the Special Project Office, the GOP implementing institutions, and the technical assistance team to insure that provisions of the A.I.D. Project Agreement and Implementation Letters are met. The close involvement of the Project Committee will be assured through monthly meetings between the Committee and the Special Project Office to review Project implementation and resolve Project issues.

b. Joint annual reviews will be an essential feature of Project implementation; the reviews will be undertaken by A.I.D. and the GOP.

c. The Development Resources Office will monitor Project implementation to assure that the terms and conditions of the Project Agreement are met.

d. The Mission Controller will review disbursement and reimbursement requests for conformity with A.I.D. regulations and will ensure that adequate financial controls are followed.

e. The Engineering Office will be called upon to examine and review vehicle, equipment, and road maintenance activities.

f. The Evaluation Officer from the Program Office will assist in carrying out annual evaluations.

g. Additional Mission offices, such as the RLA and the Executive Office, will be called upon as appropriate.

B. Implementation Plan

The Implementation Plan is contained in Annex II, Exhibit C.

C. Disbursement Procedures

No deviation from established AID disbursement procedures is anticipated. Materials and equipment procured in the United States or other Code 941 countries will be paid using AID's standard disbursement procedures. Disbursement for local currency costs will likewise be made in an established manner acceptable to AID. These procedures will be transmitted to the Project Office with Implementation Letter(s).

D. Procurement Procedures

1. Source, Origin and Nationality

Goods and services procured and their suppliers under the Loan shall have their source and origin and nationality, as applicable, in countries included in Code 941 of the AID Geographic Code Book and Peru, with the exception of trailbikes which will be procured from any country included in Code 935 (waivers are attached to the Draft Loan/Grant Authorization).

Goods and services procured under the Grant shall have their source and origin and nationality in the United States, Code 000 and Peru of the A.I.D. Geographic Code Book.

2. Procurement

Major equipment procurement, including all off-shore procurement, will be the responsibility of USAID/Peru. The Mission decided to use direct A.I.D. procurement in lieu of host country contracting because of the lack of procurement experience of the PEPP, because most of the off-shore procurement will be accomplished at a single time, and because it is anticipated that the implementing organization will not function long beyond the conclusion of the Project. The Mission believes that these factors justify the deviation from host country contracting.

In order to assure rapid acquisition of critical equipment and technical assistance components, the Mission anticipates the TDY assistance from a procurement specialist. The specialist will have the responsibility for organizing the required documentation, including preparation of IFBs, PIO/Cs, and final workscopes and technical specifications for all goods and services, including the Grant-funded technical assistance. The Project Office will, however, actively participate in the preparation of the IFBs and the scopes of work for the T.A. The technical specifications for the road maintenance equipment for the MTC service center and for vehicles and trailbikes are available from other similar projects, as are the specifications for other project equipment. US technical advisors will be called upon to develop the specifications for all other specialized equipment and for the scopes of work of the majority of the short-term and all of the long-term technical assistance. The small boats to be procurred under the Project have been determined to be eligible items per Handbook 15, AID Commodity Eligibility List.

3. Equipment Acquisition

The Implementation Plan calls for the prompt acquisition of the trailbikes, vehicles, road maintenance equipment, and all other goods and commodities required to implement the Project.

a. Trailbikes. The early delivery of trailbikes is needed to carry out the basic support activities and to initiate the extension activities. With AID authorization for proprietary procurement and source/origin waiver (see Section V, D.5.a.), USAID/Peru will solicit bids locally and directly from the manufacturers in Japan soon after the signing of the Project Agreement and meeting of the appropriate Condition Precedents.

b. Vehicles. Once the Project Agreement has been signed and relevant Conditions Precedent met, USAID/Peru will begin procurement of the vehicles required to implement the Project.

c. Road Equipment. Following the signing of the Project Agreement and meeting of relevant Conditions Precedent, USAID/Peru will

forward a PIO/C to AID/W for acquisition of road maintenance equipment.

d. Computer Equipment. The Project will procure two computers. One will be installed in the Secretariat of Regional Affairs Office in Lima. The primary purpose of this minicomputer will be to process and analyze data collected concerning various activities within all regional development projects in Peru. The second minicomputer will be used by the PEPP office in La Merced to process and analyze data collected with respect to the land use inventory, accounting, or other activities being carried out in the Project area. The two computers will be procured simultaneously from the same supplier to insure compatibility between the two offices. As required in AID Handbook 18 a memorandum has been sent to the director of SER/DM requesting review and approval of this acquisition. A copy of the memorandum is included in Annex I, Exhibit G.

e. Other Equipment. Procurement actions for other equipment will take place in accordance with the Project Implementation Plan.

4. Acquisition of Technical Assistance

Short-term technical assistance will be procured directly by the Mission to assist the Special Project Office in meeting the Conditions Precedent to disbursement for the Project components. The Mission will procure short-term assistance to assist the Special Project Office, the other implementing institutions in the project area, and the Secretariat of Regional Affairs in the preparation of the workscopes for the institutional contract under which the remainder of the short-term and all of the long-term technical assistance will be acquired for the PEPP Office and the Secretariat. Based on these workscopes, USAID/Peru will issue an RFTP and will award a contract for the services described in the RFTP. Under this arrangement, the contract group will be responsible for the timely provision of the technical assistance required under the Project.

In addition, the Mission will contract directly for the technical assistance required for feeder road location studies and a portion of the protection component based on the workscopes developed by the initial short-term technical assistance. The technical assistance for the forestry component will also be contracted directly by the Mission. The workscope for this activity will be developed as one of the first activities of the Regional Environmental Advisor stationed in Lima. The technical assistance for the feeder road feasibility location studies will not be contracted under the institutional contract, since this very specific activity would not benefit greatly from the coordination provided by the institutional contract arrangement. These services could also no doubt be obtained at a lower price with few additional management responsibilities. A part of the technical assistance for the protection and forestry components will be required early in Project implementation as described in Section III C. Therefore, the Mission will also contract services related to establishment of the National Parks and to the rapid initiation of the forestry technical assistance activities. The remainder of the technical assistance for the protection activity will be obtained under the institutional contract. ANNEX II, Exhibit E contains a list of the required technical assistance.

5. Procurement Waivers

For the loan-financed procurement of approximately 40 motorcycles, the following justification is provided. USAID/Peru will procure on the borrower's behalf approximately 40 Honda small, off-road motorcycles (125 cc) on a proprietary basis for use by the extensionists, surveyors, researchers, and health personnel visiting farms and communities in outlying rural areas where access roads are in poor condition and long distances necessitate some form of motorized transportation. Small, off-road motorcycles (trailbikes) are necessary to achieve project objectives. They are not manufactured in the United States. The only brand of small, off-road motorcycles (125cc) with spare parts and maintenance facilities in the project area is Honda. Although Honda does have a local assembly plant for city motorcycles, the off-road motorcycles needed for the project are manufactured and assembled only in Japan. Your approval is necessary for proprietary procurement of Honda motorcycles per Handbook I, Supplement B, Chapter 12B, 2g (6) which provides for proprietary procurement when necessary to purchase goods by reference to a particular specification, trade name, or designation in order to assure interchangeability or standardization equipment. It is also necessary to waive source origin and nationality requirements to allow procurement of these motorcycles from Japan, a Code 935 (Special Free World) country per Handbook 1, Supplement B, Chapter 4C2d; Chapter 5B4a.

After initial competitive procurement of vehicles (except trailbikes) and road maintenance equipment, approval is requested for proprietary procurement to assure interchangeability of parts and standardization of vehicles and equipment for the GOP's Special Project Office and the implementing agencies for use in this project. The procurement approval will permit better utilization of equipment due to operational compatibility, interchangeability of spare parts which will reduce inventory requirements and facilitate maintenance, improved operator training and work efficiency, and standardized maintenance procedures which should guarentee less down time for the equipment procured under the Loan.

E. Evaluation Plan

Project evaluation will focus on several issues: (1) the efficacy of the administrative and institutional infrastructure; (2) Project impact on employment, incomes, and living conditions of small farmers and community inhabitants in the Projects area; (3) the implementing institutions' attainment of planned objectives; and (4) Project impact on the capacity of the GOP to develop the high jungle region. Along with continual Mission monitoring, as described in section V A, annual evaluations will be undertaken by A.I.D., representatives of the PEPP Office, and the implementing institutions. The Project will place special emphasis on establishing a strong planning and evaluation capacity.

The first evaluation will be undertaken at the end of the first year of Project implementation, approximately December 1983. The evaluation will focus on the institutional and administrative mechanisms outlined in the Project Paper. Specifically, the evaluation will examine progress to date on agreements between the Special Project Office and implementing institutions (INIPA, ONERN, Agrarian Bank, INFOR, etc.) and the performance of these institutions where Project activities have begun. The PEPP Office will be an active participant in the evaluation and will assure that the policy, procedure, and technical improvements included in the agreements are in fact carried out. Of particular interest will be progress on activities related to implementation of the system components and procurement of commodities and technical assistance. Where bottlenecks are identified, the evaluation will make specific recommendations with regard to their resolution in a timely fashion.

Annual evaluations will measure overall Project progress during the course of the preceding year against output levels and other Project indicators in the areas of:

-- Research and Extension
-- Agricultural Credit
-- Forestry and Agroforestry Production
-- Road Maintenance
-- Health, Potable Water, and Environmental Sanitation
-- Native Community Participation

It is expected that the Project will have a major impact on the GOP capacity to develop the high jungle region which under prior GOP projects has not always yielded the expected results. In addition, Project Evaluations will examine the issues and constraints raised in the social analysis to determine the degree to which the native communities have benefited from the Project. (See IV E, Social Analysis for greater detail).

A mid-course AID evaluation, which will use outside consultants, will be carried out to measure progress in meeting EOPs' indicators and identify any implementation problems which have occurred. Similarly, an end-of-project evaluation will be carried out. The End-of-Project Evaluation Report will address pertinent questions which will provide an improved base for the design and implementation of high jungle projects. The Final Evaluation Report will also address the attainment of End-of-Project conditions as outlined in the Logical Framework and Section III.B.

The Project Grant budget includes $200,000 for evaluations. While GOP and in-house USAID resources will be used to the extent possible for all evaluations, outside consultants will provide additional expertise, particularly for the final evaluations. The results of these evaluations will be disseminated to GOP institutions.

F. Conditions, Covenants, and Negotiating Status

The conditions and convenants proposed for the Project Agreement are contained in the draft authorization included as Annex I, Exhibit A. In addition a side letter concerning the understandings of the two governments with regard to coca production control within the Project area will be signed.

With regard to the negotiating status, USAID/Peru has been in close contact with the Prime Minister and the PEPP office, who have been kept appraised of the Project's evolution. No difficulties are anticipated in promptly negotiating and signing the Project Agreement before the end of the fiscal year.

CERTIFICATION PURSUANT TO SECTION 611(e) OF THE

FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Malcolm Butler, 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 human resources capability to effectively maintain and utilize the proposed Project: CENTRAL SELVA RESOURCE MANAGEMENT PROJECT.

May 12, 1982
Date

Malcolm Butler
Malcolm Butler
Director USAID/Peru

PROJECT CHECKLIST

A. GENERAL CRITERIA FOR PROJECT

1. Continuing Resolution Unnumbered; FAA Sec. 634A; Sec. 653(b).

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

(a) An advice of program change describing the Project will be sent to Congress in accord with normal AID notification procedures.
(b) Yes.

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

(a) Yes.
(b) 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); Continuing Resolution Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973.

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?

A 611(e) certification is included in the Project Paper.

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.	This Project is not susceptible to regional or multilateral execution.
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; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	The Project will improve the technical efficiency of forestry, agroforestry and agriculture in the Project area. The Project will directly encourage and foster private initiative and competition through the opening of access to markets for products from the area and maximize long-term sustainable production.
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).	Many goods and services under the Project will be purchased from private U.S. sources.
9. FAA Sec. 612(b), 636(h); Continuing Resolution Sec. 508. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	Peru will provide counterpart to meet the costs of many services and commodities required for the Project.
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?	The U.S. does not now own any Peruvian currency available for use in financing the Project.

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. Continuing Resolution Sec. 522. 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 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, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and 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?	The Project will help to spread investment out from cities to small towns and rural areas, and will directly support the self-help efforts of Peru.

(2) (104]for population planning under sec. 104(b) or health under sec. 104(c); if so, (i) 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 — N.A.

(3) (105]for education, public administration, or human resources development; if so, (i) 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; and (ii) extent to which assistance provides advanced education and training of people in developing countries in such disciplines as are required for planning and implementation of public and private development activities. — N.A.

(4) [106; ISDCA of 1980, Sec. 304] for energy, private voluntary organizations, and selected development activities; if so,, extent to which activity is: (i) (a) concerned with data collection and analysis, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; (b) facilitative of geological and geophysical survey work to locate potential oil, natural gas, and coal reserves and to encourage exploration for potential oil, natural gas, and coal reserves; and (c) a cooperative program in energy production and conservation through research and development and use of small scale, decentralized, renewable energy sources for rural areas; — N.A.

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

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 paragraph for each fund source).

(1) [103] for agriculture, rural development or nutrition; if so (a) extent to which activity is specifically designed to increase productivity and income of rural poor; 103A if for agricultural research, full account shall be taken of the needs of small farmers and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration of programs explicitly addressing the problem of malnutrition of poor and vulnerable people; and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses and improving food distribution.

The Project will directly address the concern of Congress with respect to the accelerating loss of forests and tree cover as expressed in Section 103 (b)(3) and Section 118 (d)(1). This Project will help prevent the loss of forests and tree cover by assisting to establish properly managed tropical forest which will provide sustainable long-term economic growth based on spund policies with respect to forestry, agroforestry and agriculture in the Project area.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?	Yes.
2. Development Assistance Project Criteria (Loans Only)	
a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.	In the Mission's judgement, Peru has the capacity to repay the Loan. Peru is following sound economic policies, and the prospects for repayment are excellent.
b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	The assistance is not for any productive enterprises which will compete with U.S. enterprises.
3. Project Criteria Solely for Economic Support Fund	
a. FAA Sec. 531(a). Will this assistance promote economic or policital stability? To the extent possible, does it reflect the policy directions of FAA Section 102?	N.A.
b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?	

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

(iv) reconstruction after natural or manmade disaster;

(v) for special development problems, 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? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor).

Yes. For example, the Project will foster the use of animal traction implements and equipment for the selected harvesting of forests.

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

Yes.

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

N.A.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

The Project has been designed in close collaboration with Peruvian institutions and inhabitants of the Project area and attempts to address the needs of the Peruvian people in that area.

STANDARD ITEM CHECKLIST

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?	Yes.
2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him?	Yes.
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will commodities be insured in the United States against marine risk with a company or companies authorized to do a marine insurance business in the U.S.?	Yes.
4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). 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? (Exception where commodity financed could not reasonably procured in U.S.)	N.A.
5. FAA Sec. 603. Is the shipping excluded from 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?	No.
6. FAA Sec. 621. If technical assistance is financed, to the fullest extent practicable will such assistance, goods and professional and other services be furnished from private enterprise on a contract basis? If the 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?	Yes.

7. 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. carriers will be utilized to the extent such service is available? — Yes.

8. Continuing Resolution Sec. 505 If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States? — Yes.

B. Construction

1. FAA Sec. 601(d). If 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 interests? — N.A.

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

3. FAA Sec. 620(k). If for construction of productive enterprise, will agregate value of assistance to be furnished by the U.S. 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? — Yes.

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 exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or — Yes.

4. Continuing Resolution Sec. 514 — N.A.
If participants will be trained in the United States with funds obligated in FY 1981, has it been determined either (a) that such participants will be selected otherwise than by their home governments, or (b) that at least 20% of the FY 1981 fiscal year's funds appropriated for participant training will be for participants selected otherwise than by their home governments?

5. Will arrangements preclude use of financing:

a. FAA Sec. 104(f). To pay for performance of abortions as a method of family planning or to, motivate or coerce persons to practice abortions; to pay for performance of involuntary sterilization as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization? — Yes.

b. FAA Sec. 620(g) To compensate owners for expropriated nationalized property? — Yes.

c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs — Yes.

d. FAA Sec. 662. For CIA activities? — Yes.

e. FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained. — Yes.

f. Continuing Resolution Sec. 504. To pay pensions, annuities retirement pay, or adjusted service compensation for military personnel? — Yes.

g. Continuing Resolution Sec. 506 To pay U.N. assessments, arrearages or dues. — Yes.

h. Continuing Resolution Sec. 507. To carry out provisions of FAA section 209(d) (Transfer of FAA funds to multilateral organizations for lending.) — Yes.

i. Continuing Resolution Sec. 509. To finance the export of nuclear equipment fuel, or technology or to train foreign nationals in nuclear fields?	Yes.
j. Continuing Resolution Sec. 510 Will assistance be provided for the purpose of aiding 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?	No.
k. Continuing Resolution Sec. 516 To be used for publicity or propaganda purposed within U.S. not authorized by Congress?	Yes.

PROJECT AUTHORIZATION

Name of Country:	Peru
Name of Project:	Central Selva Resource Management
Number of Project:	527-0240
Number of Loan:	527-T-079

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Central Selva REsource Management project for Peru (the "Cooperating Country") involving planned obligations of not to exceed Eighteen Mission United States Dollars ($18,000,000) in loan funds ("Loan") and Four Million United States Dollars ($4,000,000) in grant funds ("Grant"), over a five (5) 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 ("Project") consists of developing and testing a methodology to promote sustained productivity in the Palcazu watershed and building within the GOP's Secretariat of Regional Affairs the capacity to gather, analyze, disseminate, and apply technical and scientific information for the planning and implementation of integrated regional development projects in the high jungle and other areas.

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

a. Interest Rate and Terms of Repayment

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

b. Source and Origin of Goods and Services (Loan)

Goods and services, except for ocean shipping, financed by A.I.D. under the Loan shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Loan shall be financed only on flag vessels of the Cooperating Country or of countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

c. Source and Origin of Goods and Services (Grant)

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

d. Conditions Precedent (Loan and Grant)

(1) Condition Precedent to Initial Disbursement

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence that the indigeneous, native Indian communities in the Project area have received legal title to or legal permits for use and enjoyment of their tribal lands.

(2) Condition Precedent to Disbursement to Finance Agricultural Production and Livestock Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance agricultural production and livestock activities, except for technical assistance activities necessary to prepare an operation plan and a technical assistance plan for both the agricultural production and livestock components and except for the procurement of vehicles, including trailbikes, and outboard motors, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an operation plan and a technical assistance plan for both the agricultural production and livestock components of the Project.

(3) Condition Precedent to Disbursement to Finance Forestry Credit Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance forestry credit activities except for technical assistance, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence of a program in the Banco Industrial del Peru (BIP) for sublending for forestry credit under the Project, including a description of procedures, administrative responsibilities, eligibility criteria and sublending terms and conditions.

(4) Condition Precedent to Disbursement to Finance Continuous Land Use Inventory Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance continuous land use inventory activities, except for those technical assistance activities necessary to prepare an operation plan for land registration and a plan for establishment of land registration offfice(s) and except for the procurement of vehicles, including trailbikes, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an operation plan for land registration and a plan for the establishment of land registration office(s).

(5) Condition Precedent to Disbursement to Finance Health and Environmental Sanitation Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance health and environmental sanitation activities except for those technical assistance activities necessary to prepare a ~~procurement plan and an operation~~ plan for health and environmental sanitation activities and except for the procurement of vehicles, includding trailbikes, the Cooperating Country shall, except as A.I.D. may otherwise ~~agree in writing, furnish to A.I.D., in form and substance~~ satisfactory to A.I.D., an agreement between The Special Project Office for Pichis Palcazu (PEPP) and the Ministry of Health which includes a procurement plan and an operation plan for health and environmental sanitation activities under the Project.

(6) Condition Precedent to Disbursement to Finance Road Maintenance Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance road maintenance activities under the Project, except for technical assistance and except for the procurement of pick-up trucks and outboard motors, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., a procurement plan and an operation plan for road maintenance.

(7) Condition Precedent to Disbursement to Finance the Communications Ground Station

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance the communications ground station under the Project, except for those technical assistance activities related to the station, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., a procurement plan for the station and an agreement between PEPP and the Empresa Nacional de Telecomunicaciones del Perú (ENTEL Perú) for operation of the station.

(8) Condition Precedent to Disbursement to Finance Regional Development Policy Support Activities

Prior to any disbursement, or to the issuance of commitment documents under the Project Agreement, to finance activities for regional development policy support, except for technical assistance activities necessary to prepare an operation plan, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an operation plan for this component.

e. Covenants

The Cooperating Country shall covenant, except as A.I.D. may otherwise agree in writing, that:

(1) The BIP will charge interest for credit under the Project at rates no less than the rates normally charged in that region for similar purpose;

(2) It will construct or cause to be constructed in the Project area during the life of the Project approximately 60 kilometers of feeder roads through land determined by the PEPP office to have high production potential;

(3) It will legally and formally designate the Yanachaga area and the San Matías area as national park areas in accord with the study of JRB Associates carried out in 1981;

(4) The Agrarian Bank will maintain current levels of credit for livestock and open and maintain an office in Iscozacin; and

(5) It will establish a forest protection station and program in the Palcazu valley with adequate staff and equipment to prevent unauthorized and illegal logging or exploitation of timber resources in the Project area.

f. Waiver

The following waiver to A.I.D. regulations is hereby approved: AID source, origin and nationality requirements are hereby waived to allow procurement of up to 40 trailbikes, whose source and origin and nationality is in any country included in A.I.D. Geographic Code 935. In so doing, I hereby certify that exclusion of procurement from Free World countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

g. Procurement Approvals

(1) I hereby approve the proprietary procurement of up to 40 Honda trailbikes for the Project pursuant to the authority in 41 C.F.R. Sec. 7-3.101-50(b) (3).

(2) I hereby approve proprietary procurement of vehicles and road maintenance equipment financed under the Project, after an initial competitive procurement to assure interchangeability to standarization of vehicles and of equipment, pursuant to the authority in 41 C.F.R. Sec. 7-3.101-50(b) (3).

M. Peter McPherson
Administrator

Date

Presidente del Consejo de Ministros
Secretaría General

ANNEX I
EXHIBIT D

OFICIO Nº 0088-82-PCM-SG

Lima, 14 de Mayo de 1982.

Señor
MALCOLM BUTLER
Director
Agencia para el Desarrollo
Internacional
Presente.

Estimado señor Butler:

Tengo el agrado de dirigirme a Ud., en relación al Proyecto Especial denominado "Pichis-Palcazú", que responde a uno de los principales intereses del Gobierno Constitucional dentro de la política nacional de desarrollo: El Desarrollo Económico y Social de las zonas de la Selva y Ceja de Selva. Para llevar a cabo esta política, el Gobierno ha dado los primeros pasos para planificar la inversión e identificar Proyectos en distintas regiones del país.

Una de las regiones más importantes de la Ceja de Selva es el Valle del Río Palcazú. El Gobierno da la más alta prioridad a la necesidad de desarrollar un Proyecto en esa zona, que comprendería un programa de actividades productivas forestales y agropecuarias; así como actividades de protección de los recursos forestales; levantamiento catastral, titulación y registro de tierras; salud y saneamiento ambiental; estudios de carreteras secundarias y mantenimiento de carreteras; sistema de comunicaciones; y, a nivel nacional, apoyo a la Secretaría de Asuntos Regionales para la coordinación de Proyectos de desarrollo rural.

Para ejecutar este Programa, el Gobierno ha creado una oficina especial bajo la Oficina del Primer Ministro. Esta modalidad que ha sido utilizada por el Gobierno para llevar a cabo otros Proyectos tales como el del Huallaga Central y Bajo Mayo y del Alto Huallaga, ha demostrado ser una manera eficiente y rápida para la ejecución de programas prioritarios.

El monto total del Proyecto se estima en US$ 30'000,000, de los cuales el Gobierno Peruano aprotaría la suma de US$ 8'000,000, y se solicita que la Agencia para el Desarrollo Internacional (A.I.D.) fi-

Presidente del Consejo de Ministros
Secretaría General

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Malcolm Butler

En lo que respecta a las condiciones financieras del préstamo, esperamos que ellas sean, como en casos anteriores, los más favorables - para el país, con 25 años para el reembolso que incluyan diez años de gracia e intereses del 2% por los años de gracia y del 3% en adelante.

Reiterándole el interés del Gobierno Peruano de realizar este Proyecto y esperando una respuesta favorable, hago propicia la oportunidad para manifestarle los sentimientos de mi especial consideración

Atentamente,

JORGE TRELLES MONTERO
Secretario General
Presidente del Consejo de Ministros

ENVIRONMENTAL THRESHOLD DECISION

An Environmental Assessment was prepared for this Project and is presented in its entirety as Annex III, Exhibit A. The Project design was based on this Assessment and follows closely its recommendations. The Mission recommends approval of the Environmental Assessment concurrently with the approval of the Project Paper.

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TAGS:

SUBJECT: DAEC REVIEW OF CENTRAL SELVA RESOURCES MANAGEMENT PID

1. THE DAEC REVIEWED SUBJECT PID ON MARCH 27, 1981. SUBSEQUENTLY, AS MISSION IS AWARE, AID ADMINISTRATOR REVIEWED PID AND DISCUSSED STRATEGY AND DESIGN PROBLEMS WITH BUREAU AND MISSION DIRECTOR. PID WAS APPROVED FOR INTENSIVE REVIEW STUDIES ONLY. PROJECT DEVELOPMENT ACTIVITIES SHOULD PROCEED WITH THE UNDERSTANDING NUMEROUS PROBLEMS VOICED BY ADMINISTRATOR WILL BE RESOLVED BEFORE PP IS SUBMITTED FOR AID/W REVIEW AND APPROVAL. PLEASE NOTE THAT AN ADVICE OF PROGRAM CHANGE WILL BE REQUIRED PRIOR TO AUTHORIZATION.

2. THE FOLLOWING MAJOR ISSUES SHOULD BE ADDRESSED DURING INTENSIVE REVIEW AND IN THE PP:

—A. PROJECT STRATEGY:

1. REPLICATION: THE PP SHOULD SPECIFY THE GOP'S COMMITMENT TO AND STRATEGY FOR HIGH JUNGLE DEVELOPMENT IN GENERAL AND THE PALCAZU VALLEY SPECIFICALLY, INCLUDING THE UTILIZATION OF SPECIAL PROJECT OFFICES AS IMPLEMENTATION UNITS

AND THEIR EVENTUAL EVOLUTION INTO A SINGLE, NATIONAL LEVEL, HIGH JUNGLE DEVELOPMENT OFFICE. WE RECOMMEND THAT THE MISSION EXPLORE WITH THE PERUVIANS THE POSSIBILITIES OF EVENTUALLY CREATING A NATIONAL OFFICE FOR HIGH JUNGLE DEVELOPMENT AND THAT PROGRESS TOWARD THIS OBJECTIVE BE MADE A COVENANT IN THE PROJECT AGREEMENT. THE MISSION SHOULD ENCOURAGE THE GOP TO INSTITUTIONALIZE ITS AD HOC ARRANGEMENTS FOR JUNGLE AREA DEVELOPMENT IN ORDER TO FACILITATE THE SPREAD OF BENEFITS OF THE NATURAL RESOURCES MANAGEMENT/ AGRICULTURAL PRODUCTION MODEL FROM ONE AREA TO ANOTHER, USING THE TRANSMISSION FEATURES OF A NATIONAL OFFICE. THIS NATIONAL OFFICE SHOULD BE STRONG ENOUGH TO INFLUENCE OTHER DONOR PROJECT STRATEGIES, AND ITS FORMATION COULD BE DISCUSSED AT THE CONSULTATIVE GROUP MEETINGS SCHEDULED FOR MAY. THE PROJECT'S TECHNICAL ASSISTANCE, ESPECIALLY THAT FOR NATURAL RESOURCES PROTECTION POLICY AND PROGRAM DEVELOP-

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pg 5-125209

2. APPROPRIATE AGRICULTURAL TECHNOLOGIES: AS AN EARLY STEP IN PROJECT DESIGN THE MISSION HAS RECOGNIZED THE NEED TO: (A) FIRMLY ESTABLISH RAINFALL AND THE CLASS AND PRODUCTIVITY OF THE SOILS IN THE PALCAZU; AND (B) DETERMINE WHETHER THE TECHNOLOGIES DEVISED IN YURIMAGUAS CAN BE TRANSFERRED AND APPLIED TO THE PALCAZU VALLEY IN ORDER TO BE ABLE TO PREDICT ACCURATELY THE INPUT AND YIELD EXPECTATIONS AND SUBSEQUENT ECONOMIC BENEFITS ANTICIPATED UNDER THE PROJECT. THE PP SHOULD DESCRIBE THE RESEARCH BASE ON WHICH THE PROJECT RESTS, INCLUDING WORK DONE AT YURIMAGUAS, AND THE DEGREE TO WHICH ADAPTIVE RESEARCH, FIELD TESTING, FARM PLOT TESTING AND TRAINING OF AG AND AGRO-FORESTRY EXTENSION AGENTS AND OTHER PROMOTIONS IN MODIFIED AGRICULTURAL AND AGRO-FORESTRY PRACTICES WILL BE CARRIED OUT UNDER THE PROJECT. THE PP SHOULD ALSO DISCUSS WHAT TECHNOLOGIES AND EXTENSION PACKAGES ARE ALREADY AVAILABLE AT THE TIME OF PP APPROVAL.

3. ENFORCEMENT: THE PP SHOULD DESCRIBE THE GOP ENFORCEMENT MECHANISMS PERTAINING TO LAND TITLING, FORESTRY CONCESSIONS, PROTECTION OF CONSERVATION AREAS, ETC. PROPOSED UNDER THE PROJECT AND ANALYZE THEIR ADEQUACY BOTH DURING IMPLEMENTATION AND AFTERWARDS. IN THIS REGARD THE MISSION HAS PROPOSED LOAN FINANCING FOR EQUIPPING AND TRAINING FOREST RANGERS WHO ARE PART OF THE NATIONAL CIVIL GUARD. DUE TO SECTION 660 OF THE FAA, THE AGENCY IS PROHIBITED FROM USING LOAN OR COUNTERPART FUNDS TO FINANCE POLICE OR LAW ENFORCEMENT ACTIVITIES. WE THEREFORE RECOMMEND THAT THE MISSION, IN CONSULTATION WITH THE RLA, ADVISE THE GOP TO USE ITS OWN FUNDS, WHICH WILL NOT BE

CONSIDERED PART OF THIS PROJECT, OR PL-480 TITLE I LOCAL CURRENCY GENERATIONS OR ANY OTHER ALTERNAIVES TO PROVIDE ADEQUATE TRAINING AND EQUIPMENT FOR THE FOREST RANGERS. IN THIS REGARD MISSION AND RLA SHOULD ALSO CONSIDER INCLUDING A COVENANT IN THE PROJECT AGREEMENT PERTAINING TO ADEQUATE ENFORCEMENT MEASURES CRITICAL TO PROJECT SUCCESS SUCH AS ENVIRONMENTAL PROTECTION MEASURES TO BE PROVIDED BY THE GOP.

ALTHOUGH NOT DISCUSSED DURING THE REVIEW, THE MISSION SHOULD ALSO PROPOSE LANGUAGE FOR INCLUSION AS A COVENENT IN THE PROJECT AGREEMENT OR IN A SIDE LETTER INSURING THAT ILLEGAL NARCOTICS SUBSTANCES WILL NOT BE CULTIVATED OR PROCESSED IN THE PROJECT AREA.

B. PROJECT COMPONENTS:

1. NATIVE COMMUNITIES: LAND-TITLING ACTIVITIES IN THE PALCAZU SHOULD BE CONCLUDED BEFORE THE PROJECT IS INITIATED. IF SOME RESIDUAL TITLING REMAINS TO BE DONE BY THE TIME OF

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PP APPROVAL AND AUTHORIZATION, THE MISSION MAY WISH TO CONSIDER, AS AN ALTERNATIVE TO DELAY IN LOAN SIGNING, ADDING ACONDITION PRECEDENT TO INITIAL DISBURSEMENT PERTAINING TO LAND-TITLING. ADDITIONAL SOCIAL SOUNDNESS ANALYSIS SHOULD ADDRESS SUCH MATTERS AS EXISTING CROPPING AND LAND USE PATTERNS OF THE AMUESHA/CAMPA COMMUNITIES, EXISTING DELIVERY OF SERVICES, ESPECIALLY EXTENSION, TO THE NATIVE COMMUNITIES NEED FOR INCENTIVES FOR ADOPTION OF AGRO-FORESTRY PRACTICES, ETC. HOW WILL THE PROJECT INSURE ADEQUATE ACCESS TO CREDIT TO THESE NATIVE GROUPS? THE MISSION MAY WISH TO REVIEW THE BANCOOP EXPERIENCE ESPECIALLY REGARDING THE MARKET RATES OF INTEREST CHARGED BY THIS PROJECT.

2. FORESTRY POLICY FOR TIMBER CUTTING: THE PP SHOULD DISCUSS THE STATUS OF ON-GOING, TIME-LIMITED CONCESSIONS FOR TIMBER CUTTING AND DESCRIBE HOW THE GOP WILL DEVELOP A FORESTRY POLICY FOR TIMBER MANAGEMENT AND THE REQUISITE ENFORCEMENT MEASURES, E.G. CONCESSIONS WON'T BE GIVEN ON LAND TO WHICH THE AMUESHA INDIANS HAVE TITLE OR LAND IN WILDLAND PROTECTION STATUS.

3. ISCOZACIN - PUERTO MAIRO ROAD: THE PP SHOULD INCLUDE AFULL BENEFIT/COST ANALYSIS FOR THE ROAD, DESIGN STANDARDS TOBE USED, MAINTENANCE PROVISIONS, POSSIBLE USE OF LABOR INTENSIVE ROAD CONSTRUCTION METHODS, AND A COMPLETE ASSESSMENT OF THE ANTICIPATED ENVIRONMENTAL IMPACT OF THE ROAD. INADDITION, THE MISSION SHOULD SEE TO IT THAT CONSERVATION ANDLAND MANAGEMENT MEASURES AND APPROPRIATE AGRICULTURAL TECHNOLOGIES ARE IN PLACE AS SOON AS POSSIBLE IN ORDER TO BETTER ASSURE THE ACHIEVEMENT OF PROJECT GOALS FOR RESOURCE MANAGEMENT AND SUSTAINABLE AG DEVELOPMENT.

C. PROJECT DEVELOPMENT/ENVIRONMENTAL ANALYSIS:

THE NEED TO UNDERTAKE AN ENVIRONMENTAL IMPACT STATEMENT (E.I.S.) WAS DISCUSSED DURING THE REVIEW, AND THE ISSUE REMAINS UNRESOLVED. HOWEVER, BECAUSE THE LEVEL OF TECHNICAL ANALYSIS IS SIMILIAR AND BECAUSE AN E.I.S. WOULD ADD AN ADDITIONAL 60 - 75 DAYS TO PROJECT DEVELOPMENT, THE MISSION ~~SHOULD PROCEED WITH AN ENVIRONMENTAL ASSESSMENT, THE SCOPE~~ OFWORK FOR WHICH IS BEING REVIEWED BY THE LAC ENVIRONMENTAL ADVISOR. PROPOSED MODIFICATIONS WERE DISCUSSED WITH THE MISSION REPRESENTATIVE. WE CAUTION THE MISSION THAT PRESSURE BY THE VARIOUS CONGRESSIONAL STAFFS AND ENVIRONMENTAL GROUPS, AFTER THEY RECEIVE COPIES OF THE PID (ENTITLED MISSION'S STATUS REPORT ON PROJECT DEVELOPMENT), MAY RESULT IN THE ADMINISTRATOR'S DECISION TO DO AN E.I.S. WE WILL KEEP YOU ADVISED REGARDING AN E.I.S. DECISION. BECAUSE DEVELOPMENT OF THIS PROJECT WILL REQUIRE EXTENSIVE T.A. TO THE MISSION AND TO ASSURE MAXIMUM DEVELOPMENT PAYOFF AND MINIMUM ECOLOGICAL AND SOCIAL COST, PP PREPARATION CAN BE EXPECTED TO BE EXTENDED AND COSTLY. WE CONCUR IN THE MISSION TARGET DATE OF LATE OCTOBER FOR PP REVIEW. HAIG

MEMORANDUM

May 13, 1982

TO: Mr. Paul P. Spishak, Director SER/DM

FROM: Malcolm Butler, Mission Director USAID/Peru

SUBJECT: SER/DM Approval of Project-Funded ADP Equipment

Pursuant to paragraph 1G5 of AID Handbook 18, Chapter 5, USAID/Peru requests approval to finance the acquisition of two Apple II plus or similar minicomputers. The acquisition of these computers will be financed from the soon to be approved Central Selva Resource Management, Project 527-0240, Loan No. 527-T-079.

Project funds in the amount of $20,000 have been budgeted to procure the following equipment:

2	Apple II Plus (64K) Microprocessors	US$ 3,300
2	Epson Printers with Interface	1,750
2	5 M. Byte Hard Disk Drives	7,500
2	Dual Diskette Drives (1.1 MB)	6,200
2	Monitors	640
	Freight and Insurance	610
	Total:	US$20,000

One minicomputer will be located in the Secretariat of Regional Affairs office in Lima and will be used in the analysis of socio-economic data generated by this Project and eight other regional development projects. It will be used to perform market and demand studies and prefeasibility studies, and will produce financial reports on Project activities.

The other computer will be located in the Special Project Office in the Project area and will be used to analyze data collected with respect to the land use survey. It will also be used to analyze metereological data, hydrology information, and agriculture and forestry production statistics. This minicomputer will also maintain project and inventory records.

Peru has the capacity to use and maintain this equipment. A similar request to acquire two minicomputers for another regional development project 527-0178 was approved by SER/DM in May, 1981.

ANNEX II
Exhibit A

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 82 to FY 87
Total U.S. Funding $22,000,000
Date Prepared: 5/12/82

Project Title & Number: Central Selva Resource Management, No. 527-0240

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Program or Sector Goal: Employment and income of the rural population of Peru increased by increasing production and total resource productivity.		GOP records.	1. GOP continues to support high jungle development.
Project Goal: Agricultural production in the Peruvian high jungle increased and diversified.	Increased productivity of existing crops and livestock. Increased regional income from forestry activities and new crops and livestock.	Project reports and records. Publications by researchers.	2. Farmers accept and use new production packages. 3. GOP agricultural and industrial policies continue to be consistent with long-term growth.
Project Purpose: 1. A development project for sustained production in the Palcazu valley, planned and executed; 2. A methodology test and institutionalized for the long-range management of Peru's high jungle human and natural resources; and, 3. A permanent capacity within the GOP to coordinate, plan, and execute similar regional development projects established.	End-of-Project Status: 1.a. Well-trained, capable PEPP staff in place, coordinating with other agencies to carry out activities in research, extension, national parks, forest management agroforestry forestry production, and livestock promotion. b. INIPA extension/promotion system in operation in the Project area. 2. Development of the Palcazu under way using technology appropriate to sustained long-term productivity. a. Appropriate land use established. Production forestry lands managed in small parcels. Forest processing and transportation system operating. b. Permanent crop parcels producing various tree crops and other permanent crops for market or use as feed. Processing and transportation systems operating. c. Pastures and livestock improved and livestock productivity increased. d. A protection forest and a national park established. e. A cadaster and registry system functioning. f. An improved health service delivery system functioning. g. Feeder road studies carried out. A local road maintenance capability established. h. A communications system in place and functioning. 3. A national-level agency to plan and coordinate high jungle development functioning.	GOP records. Project reports and records. Publications by researchers. Project evaluations.	GOP forestry policy not changed adversely. 2. Native communities continue to seek technical assistance for forestry and permanent and annual crop production. 3. Road network completed on time. 4. Weather and pest conditions do not change adversely.
Outputs: 1. PEPP office staffed, trained, and equipped. 2. Production forestry activities under way. 3. Agricultural development activities under way. Permanent crop lands in production. 4. a. Livestock herds and pastures improved. b. Pig production increased. 5. Fragile, non-production lands protected. 6. Land use surveys completed. 7.a. Health personnel trained. b. Health posts equipped. c. Potable water systems and latrines constructed. 8.a. Feeder road studies completed. b. Machinery maintenance facility constructed and equipped. c. Road maintenance carried out. 9. Communications system installed. 10. National office staffed ~~[illegible]~~.	1. 3 offices equipped, 74 new technical personnel hired and trained; 40 exirting PEPP staff trained. 2. Up to 50,000 hectares. 3. 50% increase inland in permanent crops. 4.a. Capacity increase from 0.8 head/ha to 1.2 head/ha. b. 50% increase 5. 225,000 hectares. 6. Entire valley suraveyed and mapped; parcels titled. 7.a. 37 in 1st yr, 77 in years 2-4 = 268 total; b. 8 health posts. c. 5 gravity systems, 60 wells, and 200 latrines. 8.a. Studies for 60 kms of feeder roads. b. 1 facility; see equipment list Annex II, Exhibits F and J. c. 150 km roads maintained. 9. 1 satellite station. 10. 1 office, 8 profesionals hired and trained.	GOP records. AID records. Site inspections. Project evaluations.	1. Local-level personnel available and willing to work in the Project area. 2. Farmers willing to try out new production techniques in forestry, agriculture, and livestock raising.

Inputs: (US$ 000)

		Loan	Grant	GOP	Total
1. Project Management/PEPP	1.	797	4.5	865	7097
2. Forestry	2.	4895	910	890	6695
3. Agricultural Development	3.	3628	390	1982	6000
4. Livestock Development	4.	683	-	198	881
5. Protection	5.	147	176	158	547
6. Continuous Land Use Invent.	6.	196.	88	173	457
7. Health & Environmental San.	7.	465	-	61	526
8. Feeder Road Studies and Road Maintenance	8.	2581	218	1395	4194
9. Communications	9.	360	-	90	450
10. ~~Regional Development~~ Policy Support	10.	1980	668	500	3148
Overhead and Furniture for LU/TA		251	-	-	251
Sub-total (1-8)		15732	3636	6272	25660
Inflation & Contingencies		2868	364	1728	4360
TOTAL		18000	4000	8000	30000

GOP and USAID accounting records.

1. AID and counterpart funds available and disbursed as required.

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ECONOMIC EVALUATION OF THE PALCAZU VALLEY PRIMARY AND SECONDARY ROADS PROJECT

Table of Contents

A. Introduction and Summary
B. Outline of the Economic Methodology for Determining Agricultural Benefit
C. Incremental Agricultural Production
D. Personal Mobility Benefit
E. The Proposed Road System
F. The Proposed Road Maintenance Component
G. Economic Evaluation of the Road Maintenance Component
H. Overall Economic Return of the Road Project

Appendix A: Summary of Road Studies for the Palcazu Valley.
B: On the Need to Construct the Puerto Mairo-Pichinaz Road to Primary Road Standards.

ECONOMIC EVALUATION OF THE PALCAZU VALLEY PRIMARY AND SECONDARY ROADS PROJECTS

A. Introduction and Summary

The purpose of this analysis is to assess the economic feasibility of just the road project by itself, and without the additional benefits that can be expected from the USAIL Central Selva Resource Management Project (CSRMP). The latter subject is addressed in the Project Project.

The CSRMP aims at developing the valley in a manner that optimizes the agricultural and forestry production, is environmentally and ecologically sound, and gives due attention to the welfare of the local indian tribes. Therefore, with the USAID project, one can expect higher benefits and better income distributional effects than if only the road is constructed. Nevertheless, this paper will show that the road by itself will generate significant development benefits (even taking into account the costs of possible environmental damage) and is economically justified with an internal rate of return of 27 percent.

Because the Palcazu valley contains no roads at this time, and is not accessible by road (a new 20 kilometer road through difficult terrain is needed to reach the southern tip of the valley), construction of the road system will have both positive and negative impacts. On the positive side, the road project will do the following:

1. Open up for intensive agricultural use large areas of fertile lands that are presently not cultivated for lack of market access. This includes a potential area of 7200 hectares of class A cropland of which currently only 1200 hectares are cultivated, and 13,600 hectares of class C land for tree crops of which currently only 400 hectares are cultivated;

2. Open up 44,000 hectares of virgin forest land for timber extraction;

3. Decrease transport costs for passengers and cargo by 80-90 percent by providing relatively cheap road transport for traffic that currently travels by air or river;

4. Greatly increase personal mobility within the valley for the project population, and access into an out of the valley; and

5. Reduce the costs of inputs to the cattle industry and the transport cost of meat production that is currently transported by air at high cost.

On the negative side, it is feared that the road project, by itself, may cause the kind of rapid forest depletion and associated water and soil resource deterioration problems described in the PID. 1/

B. Outline of the Economic Methodology for Determining Agricultural Benefits

The economic evaluation of the primary and secondary road system is based on an assessment of their likely impact on agricultural production and increases in personal mobility, rather than simply on account of benefits arising from the reduction in transport costs to the existing and projected traffic. This approach, often called the "value added" approach, is necessary because the existing traffic is minute compared with the traffic that can be expected to develop, and the existing traffic therefore does not provide a satisfactory base for traffic projection purposes. The year mid-1981 was taken as the basis for costs, benefits and the rate of exchange (1$:452 Soles Oro).

In calculating the net value of the incremental agricultural output due to the road project, the well known methodology for rural road appraisal outlined in the world Bank Staff Working Paper No. 362, Identification and Appraisal of Rural Roads Projects, October 1979 is used. In this methodology, the net value added estimates are derived by deducting incremental current operating costs (including costs of agricultural inputs like fertilizers and pesticides and labor at market prices) from the estimates of gross value of incremental agricultural production, taking into account local consumption. Net value added of incremental agricultural output constitutes induced agricultural production benefits.

1/ A short field trip into the area revealed, however, that these fears may be unfounded. It was observed that nearby areas that had been under development for 30 years and some for as much as 130 years, exhibited little of the environmental deterioration that will allegedly occur in the Palcazu valley. Vegetation quickly recovers scars made by poor logging techniques or agricultural practices, and the land appears remarkable resilient to damage. Another example are the old poorly engineered roads which, though bumpy, have lasted 15 or more years with little maintenance. Soils for road construction appear to be stable, and roads that, without adequate maintenance, would have dissappeared in 10 years or so in African or Asian countries appear to fare well without adequate maintenance in the project area. These observations must be qualified or course, by the statement that they were made during a short fieldtrip. But it is perhaps appropriate to say that more research must be done before a definite statement regarding possible adverse environmental impact of roads in the project can be made. In fact, one of the CSRMP objectives is to accomplish such research.
Furthermore, without assistance to the Indian communities and strong efforts to control "land grabbing," the road by itself may have adverse income distribution and equity consequences. This paper, however, addressed solely the economic analysis of the incremental impact of the USAID CSRM project, given that the road is constructed is discussed in the Project Paper.

In equation form, the equation used for the Net value Added, B, is:

$$B: P_2q_2-P_1q_1-P_1(H_1-H_2)-\tfrac{1}{2}(H_1-H_2)(P_2-P_1)-(C_2-C_1)$$

as given on page 72 of the IBRD working paper, and where:

P_1 and P_2 are the farm gate prices without and with the project;

q_1 and q_2 are the exportable surplus without and with the road project;

H_1 and H_2 are the local consumption without and with the road; and

C_1 and C_2 are the production costs excluding transport of the exportable surplus, without and with the road.

The analysis in this paper assumes that the transport fares will be equal to the economic transport costs. This will likely be reasonable true for the with road case because of the expected competition between carriers. In the without road case, this is not likely to be. In this case, however, there is almost no export of surplus anyway, and the inaccuracy introduced by the assumption is negligible.

Agricultural Input Data

The data used in the calculations were derived from several background studies made on the potential of the project area, especially Pool (1981) and MTC (1980), and from personal observations during a short field trip to the project area. The results are tabulated in Tables 1 and 2.

Yields

Pool (1981) gives yields for two cases. One is for the traditional slash and burn agriculture without fertilizer but with improved seeds. this yield was taken as appropriate for the without road case. The second case is for yields expected from medium levels of technology as propposed in the USAID small farm improvement project. Inputs here include fertilizers, herbicides and pesticides plus technical assistance in appropriate cultivation practices. this paper assumes that this level of yield would be too high for the with road case because, without the CSRMP, one cannot expect adequate levels of agricultural extension assistance. this was verified by spot checks in the project area. Thus, for purposes of this paper, the yield for the with road case was estimated as falling halfway between the yields for the traditional technology and the medium level of technology. To illustrate, the yields for corn are given by Pool as 1200 and 2500 kilograms per hectare for the traditional and medium level of technology. In this paper we therefore assume a yield of 1200 for the without road case, and 1850 for the with road case.

Production Costs

The derivation of the production costs also follows Pool, and using the same reasoning as for the yields described above.

Crop Areas

Data on currently planted as opposed to potential crop areas, without road, are sparse, though some information is presented in Pool and MTC (1980). Pool, for example, gives 1650 hectares as the total current crop area for row crops and tree crops. However, to enable sufficient production to at least satisfy the existing local demand, and also to introduce a conservative note into the analysis (i.e. benefits will be understated), the existing crop

area was assumed at 5214 hectares, with 60 percent devoted to row crops and 40 percent to tree crops.

For the with road case, the total potential area for row and tree crops is given as about 21,000 hectares, with 7000 for row crops and 1400 hectares for tree crops. Because tree crops are said to be more profitable than row crops, and since Pool indicates that ultimately most of the cultivable land will be devoted to tree crops, it would be reasonable to assume that by the tenth year all and is covered by tree crops. In this analysis, however, to remain conservative, it is assumed that the land use will be split with 60 percent to row crops (12,500 hectares) and 40 percent to tree crops (8340 hectares).

Farmgate Prices

The farm gate price for crops is calculated as the market price in San Ramon (the regional market center) less transport cost and a 10 percent middlemen's handling charge. Without the road, the lowest transport cost is 60 Soles/Kg, the price of air transport from Iscozacin to San Ramon in 1981. River transport to Pucallpa is even higher, as given by Pool, and amounts to 100 soles per kg. With the road, transport cost by truck from Iscozacin to San Ramon is expected to drop to about 11 Soles per kg.

For the without road case a check is made to detemine if the calculated market price minus the transport and production cost is negative. This can happen for low value products, such as yucca, which obviously would not be exported by air to San Ramon (non-traded commodities). In such cases, and to avoid distortions produced by negative farmgate prices, the farmgate price is assumed equal to he prduction cost without the road.

Per Capita Consumption and Population

The figures for per capital consumption and population of the locally produced products are taken fom the MTC study.

C. Incremental Agricultural Production by the Tenth Year

Given the data on cultivated areas, yields, etc. given in table 1 and 2, the net present values and exportable surplus of the various crops for the tenth year after road opening are calculated using the equation given above. The results are given in Table 3.

D. Personal Mobility Benefits

Except for the old colonists, many of whom are wealthy and can afford the soles 6500 passenger airfare from Iscozacin to San Ramon, travel by the Palcazu valley population to outside market centers is limited. Even for those who can afford the airfare, there is reluctance to exposure to the dangers of flight. The weather is unpredictable, radio navigation assistance does not exist and consequently there have been seven aircrashes in the past few years with several fatalities.

The indians living in the area may travel to the nearest market center Villa Rica-two days walk from Iscozacin-several times a year. According to a few interviews with the Amuesha indians, they may travel to

TABLE 3: Net Present Values (10th Year) and Exportable Surplus (10th Year) by Crop

Crop		Incremental Value (million Soles)	Exportable Production (Tons)
Rice		294.0	3,900
Corn		119.0	3,900
Beans		606.7	2,400
Yucca		998.3	30,800
	Sub-Total:	3056.6	45,000
Platano		1772.8	15,900
Cacao		294.5	1,300
Citrus		2024.5	28,100
Piña		1194.0	18,100
	Sub-Total:	4785.0	73,400
	TOTAL:	7842.4 ($17.4 million)	118,400

that town, and San Ramon once or twice a year, and the man takes with him the whole family. The trip purpose is to sell produce, purchase commodities, and visit government officials. The new colonists, lacking funds for airtravel and with little inclination to walk, engage in very little travel outside the region.

Lacking data on existing and projected travel behavior, the current number of trips outside for the present population is estimated at 28 trips per day, or about 2.2 trips per day per thousand population. This is derived by taking the number of passengers carried by SASA (3230 passengers per year) and adding the trips by Indians (perhaps 7000 trips per year) divided by 365. After the road provides access, travel is expected to increase to about 50 trips per day per thousand population. This trip rate is appropriate for many developing countries. Thus assuming a population of 27,600 by the tenth year, the daily travel would be 1380 trips, (two-way) per day with the road and 62 trips without the road.

We assume that the trip cost, without the road, is 6500 soles per passenger for the airfare and 1100 soles per person for the trip by foot. The weighted trip cost is therefore .316X6500+684X1100= 2806 Soles per trip.

With the road, the passenger fare to Villa Rica by bus is expected to be about 1130 Soles, at most.

Using the well known equation for consumer surplus from a reduction in travel cost, and accounting for the generated travel:

Surplus : $1/2\ (Q_1+Q_2)\ (P_2-P_1)$ where

Q_1, P_1 : trips and cost without the road

$Q_2 P_2$: trips and cost with the road

we have the benefits from increased passenger mobility in the tenth year as

$$1/2\ (62 + 1380)\ (2806 - 1130) = 1{,}208{,}396 \text{ Soles/day}$$
$$= \$\ .952 \text{ million/year}$$

E. <u>The Proposed Road System</u>

<u>Status of Road Construction</u>

The Proyecto Especial Pichis Palcazu (PEPP) has contracted for the construction of a primary road of approximately (the detailed engineering will not be complete until late 1982) 80 kilometers length, and a system of about ten secondary roads with a total length of about 80 kilometers. The detailed engineering on the secondary roads is expected to start next year. The alignment generally follows that of the Miranda (September 1981) study (See Appendix A).

The construction on the primary road has already started by the Vilasol construction company. The road starts at the junction with the road from Villarica to Puerto Bermudez, about 60 kilometers from Villarica. Using eight pieces of heavy equipment and a crew of about 40 laborers, the contractor has cleared about six kilometers of jungle. The workforce and

equipment will be increased at the start of the dry season. The detailed engineering (done by the MTC) has been completed for 18 kilometers. PEPP expects 25 kms of primary road to be completed this year (1982), and funding for this section is apparently in hand. Next year, provided funding is made available, PEPP expects the primary and secondary system to be completed.

Design Standards and Costs

The primary and secondary roads are gravel surfaced with a pavement width of 3 to 4 meters depending on the terrain and expected traffic, and with one-half meters shoulders on each side. Details on the thickness of the sub-base and base course could not be obtained, but for the primary road are expected to be about eight inches for the sub-base and six inches for the gravel surface.

The expected construction costs are considerably lower than these estimated in earlier studies of the road system (see Appendix A) and it appears that the design standards, especially with respect to alignment (maximum allowed steepness of grade and radius of curvature), have been reduced. The justification for the reduction of design standards is discussed in Appendix A, and hinges on the concept of stage construction. The first stage consists of a low design standard and low-cost road - but with adequate attention to drainage structures. If, after a period of say 5 to 10 years, the increase in the volume of traffic indicates that strengthening of the pavement or re-alignment is required, this would be accomplished at that time.

As it stands now, the primary road is expected to cost 100,000,000 soles per km, including structures, or about $180,000 per kilometer. The secondary roads would cost 30,000,000 soles per km or about $54,000 per km (1$=555 soles, March 1982). The total system of 80 kilometers of primary and 80 kilometers of secondary road would therefore cost about $19 million.

The proposed road system, however, may not cover the fertile Northern tip of the valley containing about 5000 hectares of good farmland. And when the definitive studies of the secondary roads are started by PEPP early next year, it may well be found that either the primary or secondary roads must be extended by about 20 kilometers to adequately cover the Northern area. This may increase the total cost of the road system by about $4 million, since five additional bridges are required with a total length of about 450 meters. In total therefore, the cost of the road system may be assumed at about $19 million (original system) plus $4 million (the 20 kilometer extension) equals $23 million. This cost was assumed valid for the year mid-1981 though in fact, this assumption will tend to overstate the true cost.

F. The Proposed Road Maintenance Component

The need for improving road maintenance in Peru and especially in the general project area is evident. Without exception, all the roads inspected during a field trip in March 1982, including the gravel road from Villa Rica to the start of the primary Project road (60 kilometers), the roads from Villa Rica to La Merced and Oxapampa, and numerous secondary roads near the Project area are in need of rehabilitation because of lack of maintenance. Without intervention by AID, itcannot beassumed that the Pichinaz-Puerto Mayro project roads will receive adequate maintenance.

The reasons for the poor maintenance performance are complex and interrelated, and lasting improvements in road maintenance will require a coordinated effort directed at all areas of operations. The World Bank is addressing the overall problem of improving maintenance performance in Peru, and is continuing providing considerable financial and technical assistance to improve road maintenance. Their seven highway loans initiated since 1955 and the pending Eighth Highway Project loan all contained significant road maintenance improvement components. In fact, the Eighth Highway Project loan contains a three year road maintenance program (1982-1984), to raise the overall national level of road maintenance.

The maintenance component of the USAID Central Selva Resource Management project has as objective assuring that the level of road maintenance in the project area will be sufficient expenditures for equipment and the training necessary to achieve the required buildup of maintenance capacity for the primary and secondary roads in the program. The project would provide the following:

(a) Equipment

- acquisition of new maintenance equipment and vehicles to meet the maintenance requirements of the primary and secondary roads;
- spare parts for the preventive maintenance of new equipment and vehicles;
- acquisition of a workshop in Iscozacin, and workshop tools and equipment for light maintenance in the road maintenance equipment; and
- acquisition of handtools for road maintenance operations.

(b) Technical Assistance and Training

Consulting services to (i) strengthen the MTC's or other implementing agencies technical and managerial capabilities to implement the maintenance program; and (ii) advise on improving labor productivity through the possible application of labor-intensive techniques.

Project Components

Equipment and Vehicles

The need for equipment and vehicles required to maintain the primary and secondary roads were estimated by the Jorge Miranda P. y Asociados Company report in their "Programa Vial del Palcazu, Estudio de Ruta Alternativa". In their analysis, equipment requirements were defined in terms of total vehicle operating and equipment hours for adequate maintenance, which were then converted into units of vehicles and equipment. Their analysis was used as a point of departure for determining the equipment requirements as shown in Table 4. The list includes equipment for the routine and periodic maintenance of the roads, front-end loaders for removal of land slide debris, open bed trucks and pick-up trucks for the transport of personnel, and various other types of equipment.

TABLE 4: Road Maintenance Equipment
(U.S, Dollars, excluding taxes)

TYPE	NUMBER	UNIT COST	TOTAL
Dumptruck	3	40,000	120,000
Front end loader	1	60,000	60,000
Roller	1	35,000	35,000
Water Truck	1	25,000	25,000
Grader	1	60,000	60,000
Tractor (Agr)	1	30,000	30,000
Stake Truck	2	20,000	40,000
	0	35,000	
Pick up	3	12,000	36,000
	0	20,000	
Compressor	1	20,000	20,000
Cement Mixer	1	5,000	5,000
Grass Cutter	1	5,000	5,000
Generator, electric	1	15,000	15,000
Outboard Motor		5,000	
Equipment Trailer	1	15,000	15,000
Fuel Truck	1	25,000	25,000
			491,000

Source: Miranda, September 1981.
U.S. Department of Transportation

Preventive Maintenance Workshop, Tools and Spare Parts

On the basis of the maintenance equipment and vehicle composition, the size of the workshop and the number of spare parts needed to establish an adequate initial stock for preventive maintenance has been estimated. The preventive maintenance workshop would be located in Iscozacin. Major repairs would be done at the regional MTC workshop in San Ramon. A low-boy trailer is provided for transport of road maintenance equipment to the regional MTC workshop in San Ramon.

Hand Tools for Road Maintenance

This component of the proposed project would finance the acquisition of hand tools and minor pieces of equipment such as wheelbarrows, picks, and shovels.

Technical Assistance and Training

The project would provide technical assistance for a total of 32 person-months of local and foreign consultant services. The main objectives would be to strengthen the MTC's planning and programming capabilities for road maintenance within the project area, to advise and assist in improving road maintenance organization and operations, and to train equipment operators and equipment maintenance organization and operations, and to train equipment operators and equipment maintenance personnel in the preventive maintenance of road maintenance equipment. Two experts (one road maintenance engineer and one equipment maintenance specialist) would be required for a period of about 16 months each, and would be assigned to work with the MTC office in Iscozacin. The terms of reference for these services are presented in Attachment A.

Cost Estimates

The investment by USAID to achieve the required buildup in maintenance capacity of the MTC to adequately preserve the condition of the primary and secondary roads would total $1,160,000. This estimate excludes taxes because of the exemption for equipment used by Government agencies. The cost breakdown is presented in Table 5. These costs were derived from the analysis of maintenance equipment needs by Miranda (1981) and from estimates prepared by the U.S. Department of Transportation advisor and USAID.

G. Economic Evaluation of Road Maintenance Component of the Project

The economic evaluation considered that the benefits to be generated by good maintenance practices would be the savings in vehicle operating costs due to the improved riding surface, and the savings in road rehabilitation costs that could be avoided because of good maintenance. The vehicle operating costs over various surfaces were estimated from data provided by the MTC. Benefits not quantified in the evaluation were reduced passenger time costs and higher service levels, and decreased or prevented economic loss due to accidents and road closures. The evaluation is therefore conservative.

The objectives of the road maintenance are two fold. One is to preserve road integrity so that the road is open to traffic all year. Next is to preserve the quality of the pavement so that vehicle operating costs are at their optimal level. In this section we will assess the economic benefit of the road maintenance component proposed for this project by comparing its

TABLE 5: Maintenance Component Cost Estimates

(U.S. Dollars, excluding taxes)

Components	Cost
1. Road Maintenance Equipment (see Appendix A)	491,000
2. Initial Stock of Spare Parts for Preventive Maintenance	7,000
3. Equipment Maintenance Workshop	153,000
4. Tools and Equipment for Workshop	80,000
5. Hand Tools for Road Maintenance	15,000
6. Technical Assistance, 36 period months each $9,000/month	324,000
	1'160,000

Source: Miranda, Septemter 1981
U.S. Department of Transportation Estimates

costs and benefits with those of a project without the maintenance component. This will require quantification of vehicle operating costs over road surfaces that are in good, fair, bad, and very bad condition, and the quantification of the costs of road closure due to road deterioration. The latter will be approximated by the cost of rehabilitating the road to all-weather conditions after the road has become impassable.

Quantification of Vehicle Operating Costs

Table 6 shows the vehicle operating costs in Peru on gravel roads with good, fair, bad and very bad surfaces. The costs are for each major type of vehicle (car, light truck, medium truck and medium bus) that are expected to use the roads in the Palcazu valley. Using the percentage distribution by vehicle type of the expected traffic, the weighted vehicle operating cost is calculated. This weighted cost represents the vehicle operating cost of a composite or national vehicle, and simplifies subsequent calculations.

Table 7 presents the rate at which a gravel road is expected to deteriorate without maintenance. Starting with a good road, it is expected to deteriorate to fair condition in two years, to bad condition in another three years, and to very bad condition (impassable during rainy season) in a further two years. At that time the road has lost its all-weather characteristics and must be rehabilitated. Vehicle operating costs, of course, have also gone up during the time the road deteriorated. The rate of deterioration is believed conservative. In many countries with poorer soil conditions for road construction it is not unusual to find a rate of decay double that given in Table 7.

The traffic expected to be using the road by the tenth year after the road has opened is estimated from the total tonnage of agricultural production estimated for that year. This total tonnage is 118,400 tons in the tenth year. The number of medium truck trips per day required for transporting this tonnage, assuming an average payload of five tons per truck, is 65 truck trips per day. It is estimated that about 80 additional passenger carrying vehicles will be required to transport passengers, so that the total number of vehicles using the road system by the tenth year is 145 vehicles per day.

The buildup in traffic is assumed to be linear between the first and tenth year, and to remain constant after the tenth year.

Economic Rate of Return

Table 8 presents the cost and benefit flow from the first to the twentieth year for the with maintenance and without maintenance case. The costs of the maintenance policy are taken from Tables 2 and 3. It is assumed that the cost of rehabilitating the primary and secondary road system after each seventh year is $10,000,000. This is less than half of the initial 24 million dollar construction cost, and is believed conservative. (In fact, halving this cost still yields a favorable rate of return for the maintenance policy).

TABLE 6: Vehicle Operating Costs in Peru on Gravel Roads with various Surface Conditions (1981)

Vehicle Type	Percentage Composition	Vehicle Operating cost, Soles/Km			
		Good Road	Fair Road	Bad Road	Very Bad Road
Passenger car	35	44.4	50.2	62	73
Small Truck	15	61.7	60.6	86	102
Medium Bus	5	228.6	286	363	438
Medium Truck	45	238.6	299	378	457
	100%				
Composite Vehicle		144 ($.32)	175 ($.38)	223 ($.49)	268 ($.59)

Source: MTC (1980)
IBRD Staff Appraisal Report, Eighth Highway Project, Peru 1982.
D.O.T. estimates.

TABLE 7: Rate of Change of Road Condition Without Maintenance

From good condition to fair condition	2 years
From fair condition to bad condition	3 years
From bad condition to very bad condition	2 years

Source: Department of Transportation Estimates

The righthand side column given the net benefits of the maintenance policy, taking into account the initial investment required in the vehicle maintenance workshop, and replacement of road maintenance equipment every seven years. The Internal Rate of Return (IRR) of the maintenance component works out to 36 percent. The maintenance component is thus well justified.

H. Overall Economic Return of the Road Project

Table 9 presents the time flow of benefits and costs of the road project categorized by the major activities of agriculture, cattle, forestry, personal mobility, road construction costs and road maintenance costs. The tenth year benefits from agricultural production were derived as discussed in this paper. For row crops, a one year gestation period (zero production while land is cleared and other investment activities take place) is followed by a linear increase in production until the tenth year. Then, the conservative assumption is introduced that, due to lack of conservation practices in forest areas, land erosion causes increases in production costs and lowering of yields starting after the tenth year. Land erosion will therefore cause a linear reduction in benefits so that, by the year twenty, the benefits from agriculture have been reduced to zero. The same reasoning applies to the benefit flow from tree crops, except that a four year gestation period is assumed.

The benefits from cattle production are small compared to agriculture, and result solely from the savings in transport cost on existing production. This is in line with the statement made in the JRB study that there appears to be litle opportunity for expansion of the cattle industry. The benefits from forestry exploitation are taken from the analysis presented in the project paper, and assuming uncontrolled cutting of timber. The benefits from increases in personal mobility are derived as discussed in an earlier section of this paper. A linear build-up is assumed from the year zero, (the year the road opens for traffic) to the tenth year. Then, according to the assumption that productivity will decline from the tenth year on, the benefits from personal mobility (because of reduced travel) decrease to zero by the twentieth year.

The road construction cost is $23 million. This includes the twenty kilometer secondary road and the five bridges that are required to reach the 5000 hectares of productive land in the Northern part of the valley. It is assumed that the road is constructed in one year though, in fact, it is scheduled for completion in two years. This is a conservative assumption in that it will tend to increase the net present value of the road, thereby reducing the economic return.

TABLE 8: Costs and Benefits of the Road Component
(U.S.$ 000)

Year	Traffic ADT	Road Condit. Without Maint.	Maint. Cost With	Maint. Cost Without	Vehicle Op.Cost Without	Vehicle Op.Cost With	Net Benefits
0			1160	0	0	0	1160
1	14.5	G	160	0	271	271	- 160
2	29	G	160	0	542	542	160
3	43.5	F	160	0	965	813	- 8
4	58	F	160	0	1287	1084	43
5	72.5	F	160	0	1609	1355	94
6	87	B	160	0	2490	1626	704
7	111.5	B	660	0	2904	1897	347
8	116	VB	160	10,000	3997	2168	1669
9	130.5	G	160	0	2439	2439	- 160
10	145	G	160	0	2710	2710	- 160
11	145	F	160	0	3218	2710	348
12	145	F	160	0	3218	2710	348
13	145	F	160	0	3218	2710	348
14	145	B	660	10,000	4149	2710	10779
15	145	B	160	0	4149	2710	1279
16	145	VB	160	0	4996	2710	2126
17	145	G	160	0	2710	2710	- 160
18	145	G	160	0	2710	2710	- 160
19	145	F	160	0	3218	2710	348
20	145	F	660	0	3218	2710	- 152

IRR = 36%

The basic maintenance cost are taken from the maintenance section of this paper, and it is assumed that the maintenance equipment requires replacement each seven years. The operating costs of the maintenance work are assumed at $1,000 per kilometer per year, or $ .16 million per year for the network.

Results

The Net Present Value (NPV) calculated by discounting the benefit and cost streams at a 15 percent discount rate are presented in Table 9. The largest contributer to the total NPV of $35.3 million is forestry, with a contribution of $24.5 million. Almost as high is agriculture, with a NPV of $33.6 million and about equally divided between row crops and tree crops. The NPV of personal mobility benefits are only $2.46 million, a number that is probably too conservative by a factor of three or four. In the absence of data on the valley populations' travel patterns, however, not much can be done to improve on that estimate.

The benefit cost ratio, calculated by dividing the discounted benefits (15%) by the discounted costs is 1.85, and the Internal Rate of Return (IRR) is 27 percent. The road project is therefore economically justified.

TABLE 9: Economic Rate of Return of the Road
(Million U.S. Dollars)

Year	Row Crops	Tree Crops	Cattle	Forestry	Personal Mobility Passenger Traffic	Road Construction Cost	Road Maintenance Cost: Workshop & other initial investment	Road Maintenance Cost: Equipment	Road Maintenance Cost: Operating	Net Benefits
0	0	0	0	-5.213	0	- 23	- 1.16			-29.373
1	0	0	.52	-3.352	0				-.16	- 2.893
2	.71	0	.52	-5.092	.11				-.16	- 3.912
3	1.43	0	.52	3.204	.21				-.16	5.204
4	2.14	1.185	.52	9.855	.32				-.16	13.860
5	2.86	2.37	.52	10.566	.42				-.16	16.576
6	3.57	3.55	.52	10.566	.53				-.16	18.576
7	4.28	4.74	.52	9.145	.63			-.5	-.16	18.655
8	5.00	5.92	.52	9.145	.74				-.16	21.165
9	5.71	7.11	.52	8.191	.85				-.16	22.221
10	6.42	8.293	.52	9 515	.952				-.16	25.540
11	5.78	7.464	.52	10.414	.86				-.16	24.878
12	5.14	6 63	.52	10.566	.76				-.16	23.456
13	4.50	5.81	.52	10.007	.67				-.16	21.347
14	3.85	4.98	.52	8.047	.57			-.5	-.16	17.307
15	3.21	4.15	.52	6.088	.48				-.16	14.288
16	2.57	3.32	.52	0	.38				-.16	6.630
17	1.93	2.49	.52	0	.29				-.16	5.070
18	1.28	1.66	.52	0	.19				-.16	3.490
19	.64	.83	.52	0	.10				-.16	1.930
20	0	0	.52	0	0			-.5	-.16	.140
Net Present Value	16.6	17.0	.375	24.50	2.46	- 23	-.1.16	-.33	1.15	35.30

15%, $000,000

IRR=27.1
B/C=1.85

ATTACHMENT A: Terms of Reference for Road Maintenance Technical Assistance

PERU: CENTRAL SELVA RESOURCE MANAGEMENT PROJECT

A. The purpose of the technical assistance program is to provide consultant services over a period of 32 months to guide and assist the road maintenance implementing agency in placing the maintenance of project roads on a sound basis. The principal objectives are:

(1) To improve the implementing agency's capability to plan and program road maintenance activities;

(2) To assist in the preparation and implementation of an annual work program for the primary and each of the secondary roads;

(3) To improve the organization and operational procedures of road maintenance, especially with regard to the possible application of labor-intensive techniques;

(4) To establish preventive maintenance procedures and techniques for the equipment and vehicles purchased under the project;

(5) To institute procedures for measuring equipment and vehicle availability and utilization, and to monitor these indices during the project period; and

(6) To establish procedures for spare parts procurement and for distributing spare parts purchased under the project.

B. Outline Job Description for Road Maintenance Engineer

Duration: 16 months

Duty Station: Project road maintenance center in Iscozacin, Peru.

(1) Qualifications and Experience

(a) A good general and technical education up to university level or equivalent - road engineer or senior road contruction/ maintenance superintendent;

(b) effective previous training and subsequent extensive field experience in road construction and maintenance;

(c) experience in developing and implementing on-the-job productive training in road maintenance at supervisory level;

(d) capacity to plan, organize and control work activities, and maintain a team spirit;

(e) working experience in the rural areas of South American countries; and

(f) fluency in Spanish.

(2) Responsibilities

(a) planning, organizing and implementing practical productive training of personnel assigned to the road maintenance team as well as maintenance works to be carried out while training takes place;

(b) providing on-the-job training to road foremen, overseers, equipment operators, drivers and certain levels of mechanics, and ensuring that they also receive instruction in planning and scheduling road maintenance;

(c) supervising the activities of the equipment maintenance specialist;

(d) ensuring an adequate supply control system to enable the preventive maintenance workshop to be properly stocked with materials, lubricants, etc.;

(e) training a Peruvian counterpart.

(3) In discharging his duties, the road maintenance engineer will report to the Chief of the road maintenance implementing agency.

C. Outline Job Description for the Equipment Operation and Maintenance Expert

Duration: 18 months

Duty Station: Equipment maintenance center in Iscozacin, Peru.

(1) Qualifications and Experience

(a) A good general and technical education up to technician level or equivalent;

(b) sound prior training with seven to ten years responsible experience in heavy and light construction and maintenance equipment, particularly in preventive maintenance; should have experience as operator of most important road equipment;

(c) experience in developing and implementing on-the-job productive training of equipment operators and drivers of supervisory level;

(d) sound practical training and subsequent extensive practical experience in the maintenance and repair of heavy road construction/ /maintenance equipment, dump trucks and other road vehicles. Institutional training experience would be an advantage;

(e) experience in developing and implementing on-the-job productive programs in maintenance and repair of road equipment;

(f) capacity to plan, organize and control activities of other, while maintaining a team spirit;

(g) working experience in rural areas of South American countries; and

(h) fluency in Spanish.

(2) Responsibilities

The expert will be responsible for:

(a) organizing and implementing on-the-job productive training of equipment operators and drivers as well as maintenance while training takes place;

(b) developing, in collaboration with the implementing agency, basic training materials to be used for those trainees with limited backgrounds;

(c) training a Peruvian counterpart.

(3) In discharging his duties, the expert will report to the road maintenance engineer.

APPENDIX A: Summary of Road Studies for the Palcazu Valley

Road Construction Cost Estimates

At least three road alignment and design studies for the Palcazu Valley road have been made. The first, done in May 1980, was by the Ministry of Transport and Communications as part of their Estudio de Transportes para la Selva Central Pre-Factibilidad. Their proposed road led from Pichinaz to Puerto Mayro, a distance of 77 km. The road was of low design standards with a gravel surface and a roadway width of about five meters depending on the terrain. The total length of bridges was 270 meters, with the longest bridge (80 meters) over the river Mayro. The river Palcazu was not crossed. In general, the alignment of this road stayed near the Palcazu river up to Iscozacin, after which point it cut inland about 10-15 kms to skirt the mountain ranges west of the river Palcazu. It then turned Eastward to connect with Puerto Mayro. The cost of the road, as calculated at June 1979 prices was Soles 2,272,724,162 or about $10,000,000 at an exchange rate of 1US$=225 Soles. This cost included the bridges. Adjusting this cost (in Soles) to reflect September 1981 costs cannot be done accurately, but based on the escalation of labor and equipment costs would be between 2 1/2 3 1/2 times higher. This would make the cost of the principal road between S/.6 billion; or between $12 million and $18 million in September 1981 dollars.

The plans included 210 kms of feeder roads of very low level design, and without drainage or bridges. The total cost of the feeder roads in 1974 was estimated at S/. 1.3 billion. This cost would be equivalent to between $33,000 and $46,000 per km, or between $7 million and $10 million.

Maintenance cost of the primary road was estimated at $1100 per Km (1979). For the feeder roads it was estimated at about $700 per km.

This early study of the road alignment follows that of the later alignments quite well, and in fat is identical for the first 27 kilometers. It differs mainly from subsequent alignments in that it passes almost through the village of Iscozazin, whereas the other alignments skirt that village by about 7 kilometers. Furthermore, in order to avoid some river crossings, it also deviates further westward towards the end of its alignment than do the subsequent studies.

The next study was commisioned by USAID, and was executed by Jorge Miranda P. y Asociados during February to May 1981. The terms of reference for the study stated that the roads lead as closely as possible to those areas in the Palcazu valley with good agricultural potential, and that the road should end at the Huampamaga river. The road design resulted in a primary road of 86 kilometers length with 16 bridges (one-lane) spanning a total of 935 meters and a system of secondary roads with a length of 77 kilometers. Except for a large potentially productive area in the North which had not yet been identified by the project team at the time the engineers started their work, all other potentially productive areas were included by the engineers, and the primary road appears to provide good access to them. The primary and

secondary roads are well engineered with good drainage, and have an uncrushed gravel surface. The width of the primary road carriageway is four meters with one-half meter shoulders on each side, and the width of the secondary road is 3.5 meters with one-half meter shoulders. For the primary road the sub-base is 8 inches, and the gravel surface is 6 inches thick.

Though the design of the roads is simple, though well engineered, the cost ofthe road system is high. Excluding the bridges, the cost of the primary road is about $14,000,000 (May 1981), or about $ 163,556 per kilometer. With the bridges, the per kilometer cost rises to $ 265,000 per kilometer. This excludes cost of the right of way which is valued at zero since much of the land is public, and landoweners apparently will donate land required for the roads. In the economic analysis, this right-of-way cost should, of course, be included since the road replaces scarce agricultural land.

Upon review of this design, USAID asked the firm to prepare another design that reduces the cost of the bridges. This would be done by changing the alignment of the road so that it crossed rivers lower downstream, at which point the flow is better defined and fewer tributaries need to be crossed. A disadvantage was, of course, that the primary road did not serve those areas with agricultural potential as well. This second design, completed in September 1981, indeed resulted in fewer bridges, ten instead of sixteen, and the total bridge length was reduced from the initial 935 meters to 570 meters. The second design also terminated the road at Puerto Mayro at a location where a bridge across the Pozuzo close to where it joins with the Palcazu river could be constructed, and enabling the later connection with the proposed IDB financed road leading to Alejandro. In addition to terminating further South than did the original design, thereby missing good agricultural land though this was not yet known at the time of the design in the Northern part of the valley, the primary road is also shorter by about eight kilometers than the 85 kilometers earlier design.

The unit prices of labor, materials, and machinery has appreciated significantly during the four months between completion of the earlier design and the subsequent design. For example, the daily labor wages for an unskilled worker (peon) increased from S/. 3,584 in May to S/. 5,039 in September, 1981, an increase of 41 percent. However, because of its shorter length, fewer bridges, and fewer secondry roads, the cost of the revised road network, except for the Chucharras secondary road, the contract with Jorge Miranda P. y Asociados did not require costing the new secondary roads system. This paper therefore estimated the cost of this system as based on the unit costs of the Chucharras secondary road, including the primary road, bridges and secondary roads decreased to $25.8 million in September 1981. This compares to $32.6 million for the earlier AID sponsored design costed in May 1981.

The revised design has the disadvantage that it does not serve the agriculturally productive areas in the valley as well as the earlier design because it is both shorter in primary road length, and also has fewer secondary roads. In fact, even the earlier design could be improved by extending its reach into the northern part of the valley where much of the productive land is. To correct this deficiency, this paper presents a crude

estimate of the cost of a network that would serve the valley as well as the earlier design (86 kilometers or primary road and 77 kilometers of secondary road), would follow the original alignment, would use the same number of bridges (ten) as the revised design, and would add a secondary road of 20 kilometers length to serve the northern area. This secondary road would require an additional five bridges, resulting in a total of 1020 meters for the 15 bridges. The advantage of this third design, from the analytic point of view, is that it corresponds to the region for which the agricultural projections with and without the project have been made. In fact, the earlier designs serve only part of the project region, and it would be inappropriate to use these earlier costs in any benefit-cost analysis of road impact.

Table 10 presents a review of the costs of two road design prepared under the studies financed by USAID, and the estimated cost of the "extended" alignment that would serve the northern area of the Palcazu valley. The cost of the extended network is estimated at around $38 million (September 1981).

Some Comments on the Road Costs

The USAID engineers consider the costs for these roads as normal for Peru, though they appear high compared to road costs in other countries. Other roads currently under construction in Peru, such as the 180 kilometers of roads financed by USAID under Loan No.061, also cost about $150,000 per kilometer; and the proposed gravel road improvement financed by the IBRD of the 44 kilometer gravel road to Oxapampa is anticipated to cost $136,000 per kilometer.

There are several reasons for the high road cost. According to Miranda (Sept. 1981), labor wages are high compared to other countries. For example, for Sept. 1981, the wage of a peon 1/, including benefits, was S/.5,039 per day, or about $11 per day. A capataz (foreman) earns $17 per day. Furthermore, the terrain is difficult and the road must be raised in the level areas. Therefore, the road alignment calls for much cutting and filling, accounting for 40 percent of the total road cost. Because of the high rainfall in that area, the cost of the sub-base and base is also high and accounts for 27 percent of the total cost for the road. Finally, overhead costs are high, and these cost of mobilization, general costs, final design and engineering, benefits and utilidad (profit) add 64 percent to the basic cost of the road.

1/ According to Miranda (Sept. 1981).

The March 1982 field trip revealed, however, that peons are paid only 3,000 Soles per day if food is excluded. According to the contractor currently building the road, the 3000 Soles wage ($5.41 per day) is in accord with the labor law which states that in the Palcazu region the wage for construction workers and agricultural workers is equal. In fact, the legal wage is only 1600 per day, but this is not sufficient, according to the contractor, to attract the required labor.

TABLE 10: Road Costs for Three Alternative Networks

	Length Km.Mts.	Total Cost Million Soles	Unit Cost Million Soles	Total Cost Dollars	Unit Cost Dollars
A. Original USAID Alignment (May 1981;1US$:S/. 385)					
Primary Roads	86	5,415.3	62.969	14,065,829	163,556
Bridges	935(mt)	3,359.9	3.593	8,726,932	9,333
Secondary Roads	77	3,770.6	48.969	9,793,811	127,192
Total		12,545.8		32,586,572	
B. New Alignment USAID (Sept. 81:1US$:S/. 452)					
Primary Road	77.4	6,221.1	80.376	13,763,562	177,824
Bridges	570(mt)	2,410.5	4.229	5,332,896	9,356
Secondary Roads	48.7	3,044.0	62.506	6,734,600	138,287
Total		11,675.6		25,831,058	
C. Extended Alignment*					
Primary Road	86	6,912.4	80.376	15,292,846	177,824
Bridges	1020(mt)	4,313.6	4.229	9,543,318	9,356
Secondary	97	6,063.1	62.506	13,413,898	138,287
Total		17,289.1		38,250,062	

* With 97 kms of feeder road, 86 kms of primary road and 1,020 mts of bridges (Sept. 1981) (An additional five bridges-Huampamayo, Quintora, Carachama, Pucacunga and Charapa)

The GOP may wish to consider alternatives for reducing the cost of the road. One way would be to reduce the amount of cut and fill required by changing the alignment of the road, of by changing the design criteria on the minimum radious of permitted curvature and maximum ascent slopes. In effect, this would make the road more sinuous and steeper, and the greater length and lower travel speed would increase vehicle operating costs. With the expected low level of traffic, however, the savings from the lower design standards would probably exceed by far the increased operating costs. Another way is to reduce the design standards for the road width of the primary road, perhaps by reducing the thickness of gravel surface. If the primary road were constructed to secondary road standards (three meter instead of four meter roadway width,) a saving in cost of about 20 percent could be expected for the primary road construction.

The secondary roads design standards could also be reduced. In eseence, this change would mean going from a system of one primary plus secondary roads to a system of one secondary plus feederroads, and could result in a reduction of five million dollars. Reducing design standards may well prove to be an effective alternative considering the uncertainty regarding the amount of traffic that will materialize on the road. Under these conditions, it is often economically advantageous to start with a barely adequate road, even though vehicle operating costs and maintenance costs might be higher than those for a good road. Once the region has proved itself and traffic starts to build up, and this may easily take five years or so, the road can be upgraded. Economic analysis has demonstrated that, under many conditions, this concept of staging is advantageous since the additional future cost of upgrading the road (to accomodate the additional traffic that materialized) are discounted at the opportunity cost of capital. Thus, if the upgrading of the road can be postponed for five years, and if the opportunity cost of capital is 15 percent, the future upgrading cost has a value of only one-half that cost measure in the first year. If the upgrading can be postponed by 10 years, the future costs can be discounted by 75 percent.

APPENDIX B: On the Need to Construct the Puerto Mayro - Pichinaz Road to Primary Road Standards

There would be justification for constructing the Puerto Mayro-Pichinaz road to primary road standards if a strong possibility existed that the road might serve as an alternate route between Lima and the Pucallpa area, and would attract considerable diverted traffic from the existing road over Huanuco. Inspection of a map indeed appears to support the contention that the new road would serve as a viable alternative between Pucallpa and Lima since the distance over the new road (via Puerto Mayro) would be approximately 111 kilometers shorter than over the existing road via Huanuco. The distance over the new road would be about 736 kilometers versus 848 for the existing road.

Distance, however, is not the only factor in determining the amount of traffic that will be diverted from one route to the other. More important factors are the travel time and the travel cost, and the existence of other routes that might also divert traffic. And, all of these factors mitigate against the presumption that the Puerto Mayro-Pichinaz road might attract considerable diverted traffic.

In calculating travel times, costs, and distances, the proposed Marginal Highway segment via Alejandro, Puerto Inca, and Puerto Bermudez was taken as the reference case for the Palcazu valley route. In all likelyhood, travel times distances, and costs over the Puerto Mayro-Pichinaz route would be higher than for the Marginal Highway segment.

The existing route is considerably less strenuous to drive and imposes less wear and tear on vehicles than the alternate route via Puerto Bermudez. The main reason is that existing road is mostly asphalt paved, whereas the alternate roads are gravel. Terrain differences may also be a factor and this is reflected in the travel times and vehicles operating costs for the routes. Travel time from Pucallpa to La Oroya over the existing route is 17 hours and 20 minutes, as compared to almost 19 hours via Puerto Bermudez route, or almost 1 1/2 hours shorter. These data as well as the date on travel distance and vehicle operating costs were taken from Reference 1 (MTC Estudio de Transportes para la Selva Central, Lima, May 1980) and apply to the Volvo N-10 three axle truck with an 165 ton payload capacity. (See Table 11).

Between Pucallpa and La Oroya, the vehicle operating cost over the new route is 14 percent greater than that over the existing route.

Finally, a considerable network of roads is planned for the Central Selva region, and in addition to the possible alternate route via Puerto Mayro and Pichinaz, there are at least three other routes that might also serve as alternates. These are shown in Table 12. In fact, route number

five leading from Alejandro-Puerto Inca-Puerto Bermudez-San Ramon is part of the Marginal Highway, and would surely be preferred by the road users over the Puerto Mayro-Pichinaz route.

In summary, the higher vehicle operating costs combined with the longer travel time over the Puerto Mayro-Pichinaz route compared with the existing route over Huanuco make it very unlikely that much diverted traffic will use the new road. Furthermore, diverted traffic, if any, will prefer the segment of the Marginal Highway over the new road. Thus, though there might be other reasons for doing so, expectations of diverted traffic is insufficient justification to design the Puerto Mayro-Pichinaz road to primary road standards.

TABLE 11: Costs and Travel Times Over Alternative Routes Between Pucallpa and Lima (May 1980)

Route and Segments	Km	Soles per ton/Km	Travel Time (hrs,min)	Speed (Km/hr)
Pucallpa-Lima, Old Route				
Pucallpa-Alejandro (asphalt)	61	765.55	1 hr 16'	48.2
Alejandro-Huanuco (asphalt)	366	5557.10	9 hr 32'	38.4
Huanuco-Cerro de Pasco (asphalt)	105	1700.16	2 hr 56'	35.8
C.de Pasco-La Oroya (asphalt)	134	2059.94	3 hr 33'	37.7
La Oroya-Lima (asphalt)	182	2809.08	4 hr 48'	37.9
Total	848	12891.82	22 hr 05'	38.4
Pucallpa-Lima, Via Pto. Bermudez (Gravel)				
Pucallpa-Alejandro (asphalt)	61	765.55	1 hr 16'	48.2
Alejandro-Pto. Inca (gravel)	76	1494.92	2 hr 22'	32.1
Inca-Pto.Bermudez (gravel)	116	2281.72	3 hr 37'	32.1
Pto.Bermudez-Villa Rica (gravel)	109.6	3346.24	5 hr 38'	19.5
Villa Rica-P.Paucartambo(gravel)	20	708	1 hr 15'	16.0
P.Paucartambo-San Luis (gravel)	11	288.20	27'	24.4
San Luis-P.Chanchamayo (gravel)	10	262	25'	24.0
P.Chanchamayo-La Merced(gravel)	11	288.20	27'	24.4
La Merced-La Oroya (asphalt)	134	2016.72	3 hr 25'	39.2
La Oroya-Lima (asphalt)	182	2809.08	4 hr 48'	37.9
Total	736.6	14260.63	23 hr 40'	31.1

Source: Estudio de Transportes para la Selva Central, MTC, May 1980; U.S. Department of Transportation.

TABLE 12: Possible Future Alternate Routes
Pucallpa-Lima, Via La Oroya

1. Direct over the existing route over Huanuco.

2. Pucallpa-Alejandro-Puerto Inca-Codo del Pozuzo-Chaglla-Panao-Huanuco-La Oroya-Lima.

3. Pucallpa-Alejandro-Puerto Ica-Codo del Pozuzo-Pozuzo-Oxapampa-San Ramon-La Oroya-Lima.

4. Pucallpa-Alejandro-Puerto Inca-Puerto Mayro-Pichinaz-San Ramon-La Oroya-Lima.

5. Pucallpa-Alejandro-Puerto Inca-Puerto Bermudez-San Ramon-La Oroya-Lima.

IMPLEMENTATION PLAN

DATE	ACTIVITY
1982: July	- Mission prepares PIO/Ts for ST Park Development and Management Specialist, LT Resource Management Specialist. - Mission prepares workscope for ST and LT Forestry Component TA.
1982: August	- Project Agreement signed. - Implementation Letter No. 1 issued concerning CPs. - Mission prepares PIO/T for ST Road Environmental Engineer. - Mission advertises for candidates for ST Park Development and Management, LT Resource Management and ST and LT Forestry Specialists.
1982: September	- Initial CPs met by the GOP. - Implementation Letter No. 2 issued setting forth procurement procedures and disbursement mechanism. - Implementation Letter issued explaining the key Project personnel requirements for PEPP and the Secretariat. - Mission issues ST/TA PIO/T under IQC to assist in meeting the conditions precedent to disbursement for the overall operational Plan for Project components, and to develop work scope for RFTP for the TA Institutional Contract.
1982: October	- Mission Issues PIO/Ts for ST Park Development and Management Specialist, LT Resource Management Specialist, ST Road Maintenance ST/TA Road Environmental Engineer. - Mission issues contract for ST/ST Forestry TA. - PEPP initiates building or refurbishing of the field stations for Project implementation. - PEPP prepares draft agreements with GOP agencies for implementation of the different project components. - PEPP develops job description and technical qualifications for key personnel. - Preparation by Mission of PIO/C for trailbikes. - Preparation by Mission of PIO/C for vehicles, and logging equipment and chainsaws for PEPP. - PEPP advertises the contracting of key personnel for PEPP and the Secretariat.

	- Arrival of ST/TA to assist PEPP in meeting the conditions precedent to disbursement for overall Operational Plan for Project components, and to develop workscope for RFTP for the T.A. Institutional Contract.
1982: November	- PEPP negotiates draft agreements with other executing sub-agencies. - Mission issues Implementation Letter approving the Operational Plan for the Road Maintenance. - Mission issues PIO/C for trailbikes. - Mission issues PIO/C for vehicles, road maintenance equipment and logging equipment and chainsaws for PEPP.
1982: December	- Implementation Letter issued approving the Operational Plans, secondary CPs for PEPP and the Secretariat. - PEPP signs implementation agreements with other executing sub-agencies. - Mission issues RFTP for the Institutional Contract for ST and LT technical assistance.
1983: January	- PEPP contracts key Project personnel for PEPP and the Secretariat. - Arrival of LT Specialist in Natural Forest Management, 24 months. - Arrival of LT Forest Industrial Engineer, 24 months. - Arrival of initial ST/TA for Forestry component. . Tropical Inventory Specialist. - INIPA assigns a research coordinator at Iscozacin. . Forest Inventory Specialist. . Logging Engineer. . Forest Products and Marketing Expert. . Specialist in Draft Animals. - Arrival of ST/TA Specialist in Park Development and Management. - Requirements for 1st. group of draft animals by Draft Animal Specialist.
1983: February	- 1st. Group of draft animal purchased. - Draft Animal Specialist develops schedule for purchase and training of draft animals for subsequent periods. - Credit funds to be administered by PEPP and Ag Bank established and PEPP and BIP establish credit fund for processing plants. - Implementation Letter issued approving the Operational Plan for the Forestry Credit component, CP met. - Initiation of Forest inventory and pre-cruise. - Search for initial location for timber processing

units and and planning for logging trails.
- Establishment of the Cadastral and Public Register offices.
- Initial training for PEPP and Secretariat personnel, in Lima and the field offices.

1983: March
- Review and negotiation of Technical Proposals for the T.A. Institutional Contract submitted to the Mission.
- BIP opens agency at Iscozacin.
- Arrival of ST Road Environmental Engineer.
  . Specialist in Road Maintenance.
- Mission prepares PIO/C for outboard motors.

1983: April
- Implementation Letter issued approving the Operational Plan for the Agricultural Development component.
- Mission issues PIO/C for the purchase of outboard motors.
- PEPP completes the building/refurbishing of offices and housing quarters.
- Purchase by PEPP of office furniture, equipment and supplies for the Agricultural Development, Protection and Continuous Land Use Inventory activities.
- Initiation of research program by INFOR and establishment of central research, training, and demonstration area for forestry.
- Forest Research Begins.
- Forestry operator training strategy developed.
- Initial Forestry Management Plan development.
- Mission prepares PIO/C's for computers for PEPP and Secretariat.
- Road alignment studies contract let.

1983: May
- Mission issues PIO/C for computers for PEPP and for the Secretariat.
- Implementation Letter approving the Operational Plan for the Protection and Continuous Land Use Inventory components.
- Arrival of vehicles, logging equipment and chainsaws.
- Imported trailbikes arrive.
- Training for Technical and Administrative cadres in Forestry.
- Forestry in-service training.
- T.A. Institutional Contract signed.

1983: June
- PEPP negotiates with ENTEL the establishment of the satellite ground station.
- GOP establishes National Park and Protection Forest.
- ~~Second training seminar for the PEPP and Secretariat~~ personnel and initial training for hired personnel under Forestry.
- Evaluation of first group of SPO's begin.

- Training for 1st Group of Forest Unit Operators.
- Issuance of Implementation Letter approving the Operational Plan for the Health component, CP met.
- Arrival of ST/TA for Regional Development Policy Support for initial period.
  . Anthropologist
  . Land Use Ecologist
  . Economist
  . Expert in Marketing and Product Development.

1983: July

- Construction of road maintenance center begins.
- ST Road maintenance equipment specialist returns.
- Mission issues PIO/C for the acquisition of equipment for maintenance center and hand tools for road maintenance.
- Experts under the Institutional Contract on board.
- Initiation of research program by INIPA and establishment of a central research, training and demonstration area for agriculture.
- INIPA extension coordinator and permanent staff assigned to the Iscozacin office.
- Arrival of LT/TA Agricultural Research Technical Advisor, 36 months.
- Arrival of ST/TA for PEPP and implementing agencies for initial period.
  . Hydrologist
  . Meteorologist
  . Land Use Ecologist
  . Geologist
  . Anthropologist
- Procurement of initial materials and equipment for the environmental sanitation component.
- Prepare PIO/C for hydrologic and meteorological equipment.
- Purchase of furniture and equipment for the Health component.
- Construction of road maintenance center begins.
- Mission issues PIO/C for the acquisition of equipment for maintenance center and hand tools for road maintenance.
- Arrival of ST/LT T.A. for Road Maintenance.
  . LT Specialist in Equipment Maintenance, 4 months.
- Arrival of ST Specialists for initial Park Flora and Fauna Inventory.

1983: August

- ~~Arrival of Resource Management Specialist~~ LT/TA Specialist, 48 months.
- Third training seminar for technical and

administrative cadres.
- Primary Health activities begin.
- Issue PIO/C for hydrological and meteorological equipment.
- Training provided for health post technicians, promoters and midwives.
- Mission issues PIO/C for the purchase of aerial video tape equipment and Landsat tapes.
- In-service training for PEPP staff.
- Training for research and extension specialists.
- Agricultural demonstration plots established by extension teams.
- Arrival of ST/TA for Agricultural Development.
  . Agricultural Economist
  . Specialist in Pejebaye Palm
  . Specialist in Achiote
  . Expert in Tropical Species
  . Cacao Expert
  . Passion Fruit Expert
  . Pineapple Expert
  . Winged Bean Specialist

1983: September
- Annual Project Evaluation (1).
- Training provided for new health promoters and midwives.
- First prefeasibility study initiated by Secretariat.
- The Secretariat submits to AID a list with supporting analysis for tentative areas for prefeasibility studies.
- Extension Agents assigned to other field offices.
- Initiation of aerial reconnaissance, photography and mapping of the area by Ministry of Agriculture's Cadaster Office.

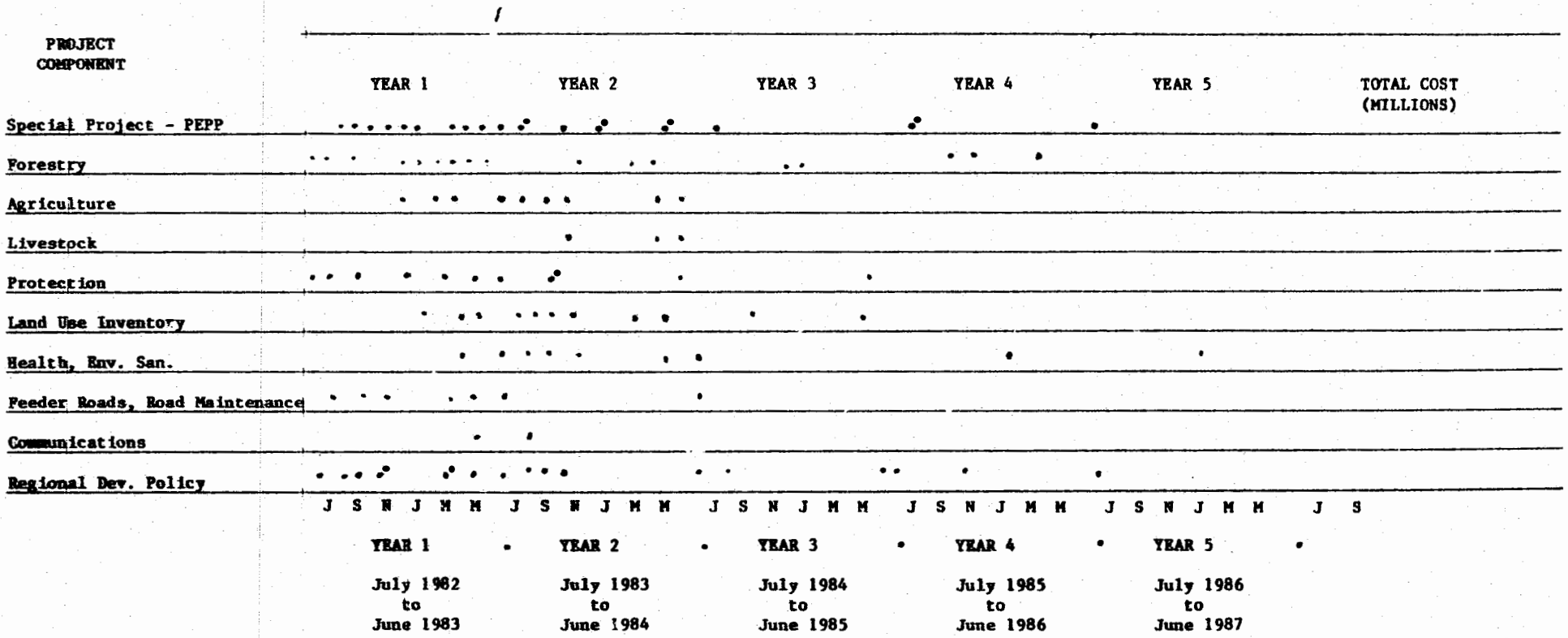
1983: October
- Completion of satellite ground station.
- Arrival of ST/TA Specialist in Tourism and Recreation.
- All existing parcels in the Palcazu mapped and titled.

1983: November
- Establishment of hydrological and meteorological stations.
- ST/TA arrives for second visit to train staff responsible for hydrologic and meteorological data collection.
- Arrival of ST/TA Specialist in Land Capability.
- Initiation of mapping and titling of new parcels.
- Selection of area communities to be provided with potable water and sanitation services.
- Implementation of inventory for permanent crops, livestock and fisheries.

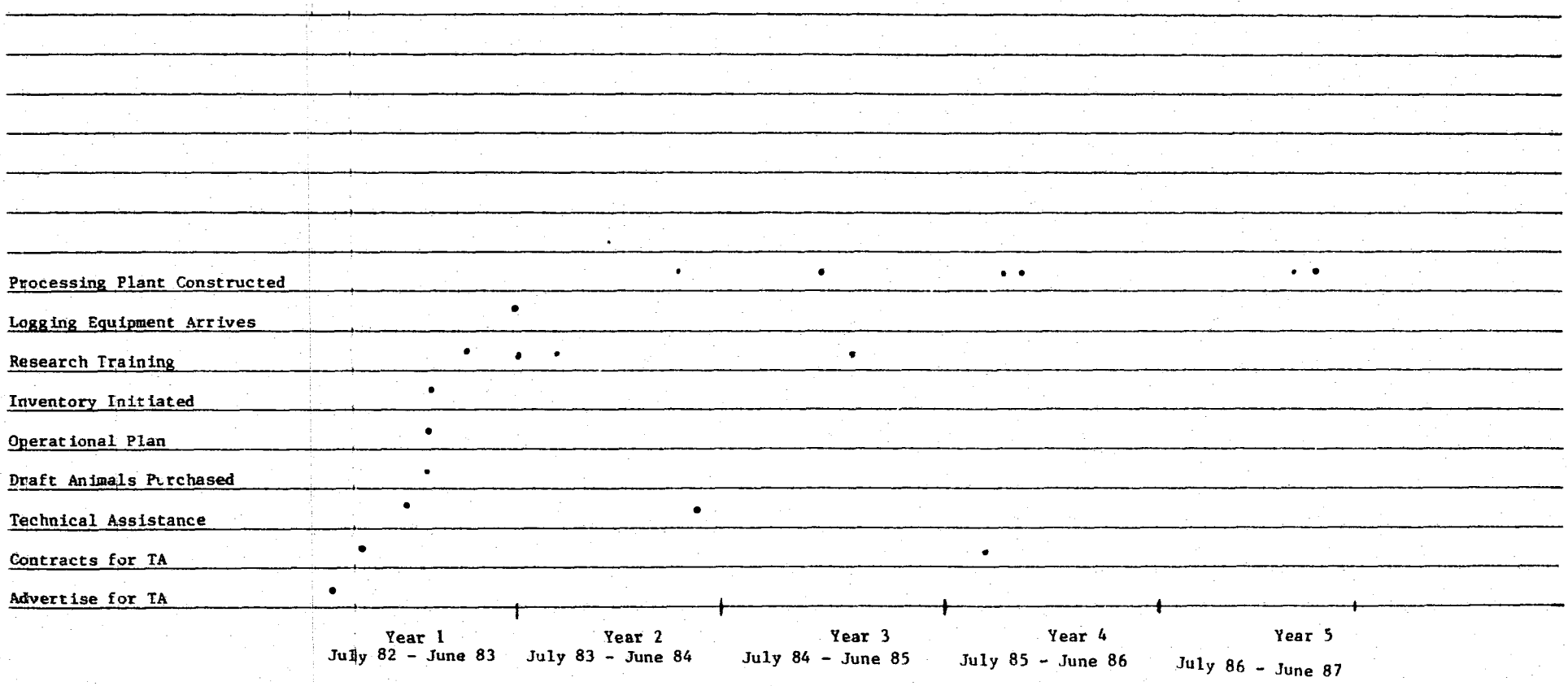
	- Research and extension personnel identify local producers to obtain information on local agricultural practices.
1983: December	- First processing plant constructed.
1984: January	- In-service training for PEPP staff.
1984: February	- Completion of the existing soils map including the Yanachaga range.
1984: April	- Arrival of ST/TA for initial period for Forestry component . Tropical Dendrologist . Forest Inventory Specialist . Logging Engineer . Forest Products and Marketing Specialist - Completion of land capability map for unmapped portions of the valley.
1984: May	- Training for 2nd. group of forest unit operators. - 1st water systems constructed. - Establishment of on-farm demonstration sites. - Specialists in herd management attend training at IVITA/Pucallpa.
1984: June	- In-service training for PEPP staff. - First animal vaccination campaign. - Arrival of ST Specialists for Park Flora and Fauna Inventory. - Agriculture research and extension agents visit private marketing firms and processors to learn about their requirements in terms of quality, quantity and timing.
1984: July	- Refresher training for health promoters and midwives. - ST road maintenance specialist returnf for last visit. - Second group of SPO's evaluated.
1984: August	- Arrival of ST/TA for PEPP and implementing agencies. . Land Use Ecologist . Meteorologist . Hydrologist . Anthropologist . Fisheries Biologist - Second prefeasibility study carried out. - Establishment of additional on-farm demonstration sites.
1984: September	- Annual Project Evaluation (2)
~~1984: November~~	~~- Initiate aerial reconnaissance, photography and mapping of the area to determine changes.~~
1984: December	- 2nd. Processing Plant constructed.
1985: January	- Training seminar in forestry for Project Technical and Administrative cadres.

1985: June	- Continued resource inventory of the Yanachaga Park by trained personnel. - Field observation for continuous mapping of actual land use. - Arrival of ST/TA for Regional Development Policy Support. . Anthropologist . Land Use Ecologist . Economist . Marketing and Product Development - Development of management plan for the Park's resources and its conservation.
1985: July	- Third group of SPO's evaluated.
1985: August	- Arrival of ST/TA for Project Management . Land Use Ecologist . Meteorologist . Hydrologist . Anthropologist . Fisheries Biologist
1985: September	- Annual Project Evaluation (3)
1985: October	- Third prefeasibility study carried out
1985: November	- Arrival of ST/TA for Forestry component . Tropical Dendrologist . Specialist in Forest Inventory . Logging Engineer . Forest Products and Marketing Expert
1985: December	- Third and Fourth Processing Plants constructed.
1986: February	- Refresher training for health promoters and midwives.
1986: April	- Training for Fifth and Sixth Groups of Forest Unit Operators.
1986: July	- Arrival of ST/TA for Regional Development Policy Support . Anthropologist . Land Use Ecologist . Economist . Marketing and Product Management - Arrival of ST/TA for Project Management . Land Use Ecologist . Anthropologist
1986: September	- Annual Project Evaluation (4)
1987: January	- Refresher training for health promoters and midwives.
1987: July	- Final Project Evaluation
1987: August	- PACD

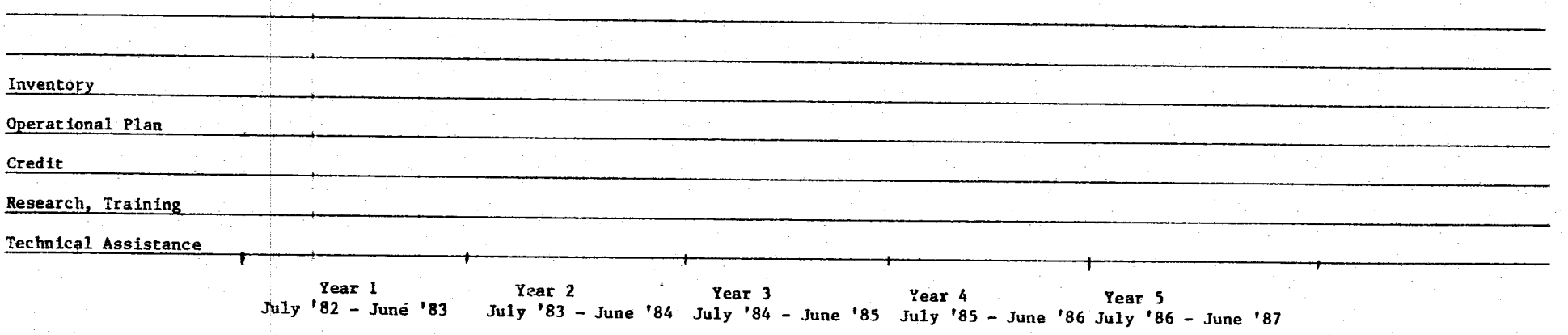
IMPLEMENTATION SCHEDULE
CENTRAL SELVA RESOURCE MANAGEMENT PROJECT



IMPLEMENTATION SCHEDULE, FORESTRY COMPONENT
CENTRAL SELVA RESOURCES MANAGEMENT PROJECT



IMPLEMENTATION SCHEDULE, AGRICULTURE COMPONENT
CENTRAL SELVA RESOURCES MANAGEMENT PROJECT



IMPLEMENTATION SCHEDULE, PROJECT MANAGEMENT - PEPP
CENTRAL SELVA NATURAL RESOURCES PROJECT

Personnel

Implementation

Equipment

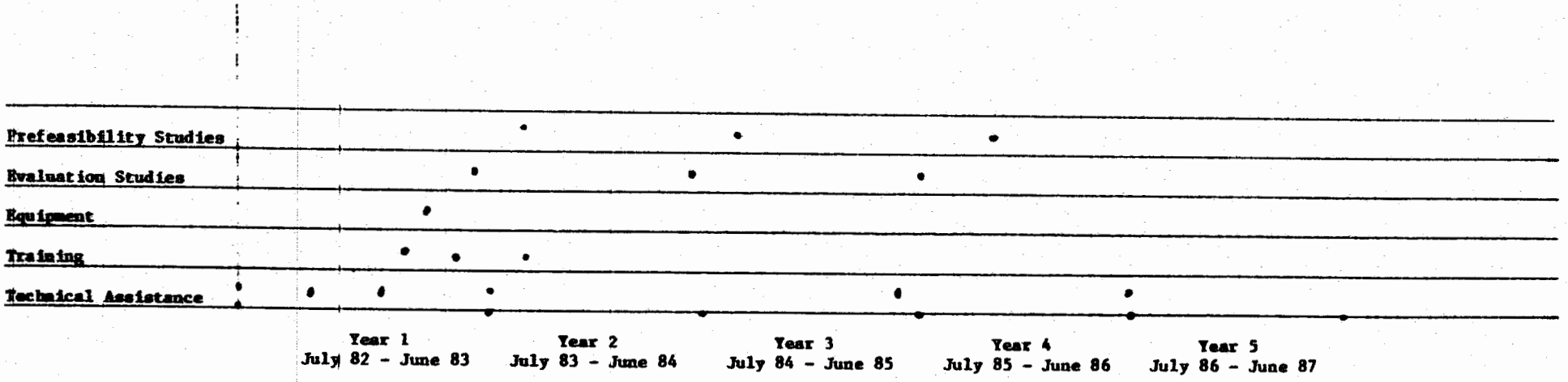
Training

Technical Assistance

Conditions Precedent

Year 1	Year 2	Year 3	Year 4	Year 5
July 82 - June 83	July 83 - June 84	July 84 - June 85	July 86	July 86 - june 87

IMPLEMENTATION SCHEDULE, REGIONAL DEVELOPMENT POLICY SUPPORT
CENTRAL SELVA RESOURCES MANAGEMENT PROJECT



RELACION DE PERSONAL PROFESIONAL DEL PEPP.

DIRECCION EJECUTIVA

1.- Ingeniero Agrónomo	1

EQUIPO DE ASESORES

Ingeniero Agrónomo	1
Médico Veterinario	1
Arquitecto	1

DIRECCION TECNICA

Dr.en Ciencias Naturales	1
Arquitecto	1
Ingeniero Agrónomo	1

OFICINA DE ASESORIA LEGAL

Abogado	1
Estudiante de Abogacía	1

OFICINA DE COMUNICACION TECNICA

Ingeniero Agrónomo	1
Estudiante de Cienc.y Comunic.	1

OFICINA DE PLANEAMIENTO Y EVALUACION

Economista	1
Ingeniero Zootecnista.	1
Ingeniero Agrícola	1
Estudiante de Arquitectura	1
Estudiante de Agronomía	1
Dibujante	1

DEPARTAMENTO DE INTEGRACION CONTABLE

Contador - Egresado	1
Estudiante en Económicas	1
Contador Mercantil	1

DEPARTAMENTO DE TESORERIA

Estudiante en Económicas	1
Estudiante de Artes Plasticas	1

DEPARTAMENTO DE PRESUPUESTO

Economistas Bachilleres	2

DIVISION DE ABASTECIMIENTO

Licenciado en Administración de Empresas	2
Estudiante en Económicas	1
Estudiante de Administración de Empresas	1

en

DIVISION DE PERSONAL

Bachiller en Administración de Empresas	1

CENTRO DE DESARROLLO RURAL ALEJANDRO V.H.

Ingeniero Agrónomo	2
Ingeniero Forestal	1
Bachiller en Económicas	1
Estudiante de Agronomía	1
Bachiller en Topografía	1

CENTRO DE DESARROLLO PUERTO INCA

Ingeniero Agrónomo	1
" Zootecnista	1
Bachiller en Ingeniería Agrícola	1
Técnico en Administración	1
Estudiante de Agronomía	1
Estudiante en Ecomómicas	1
Estudiante de Administración de Empresas	1

CENTRO DE DESARROLLO RURAL ISCOZACIN

Ingenieros - Zootecnistas	3
Ingenieros- Agrónomos	2
Sociólogo	1
Técnico en Administración	1
Topógrafo	1
Estudiantes de Agronomía	2
Estudiante -Ingenieria Civil	

CENTRO DE DESARROLLO RURAL PUERTO BERMUDEZ

Ingenieros - Agrónonomos	2
Bachiller en Ecomómicas	1
Bachiller- Agrónomo	1
Topógrafos	1

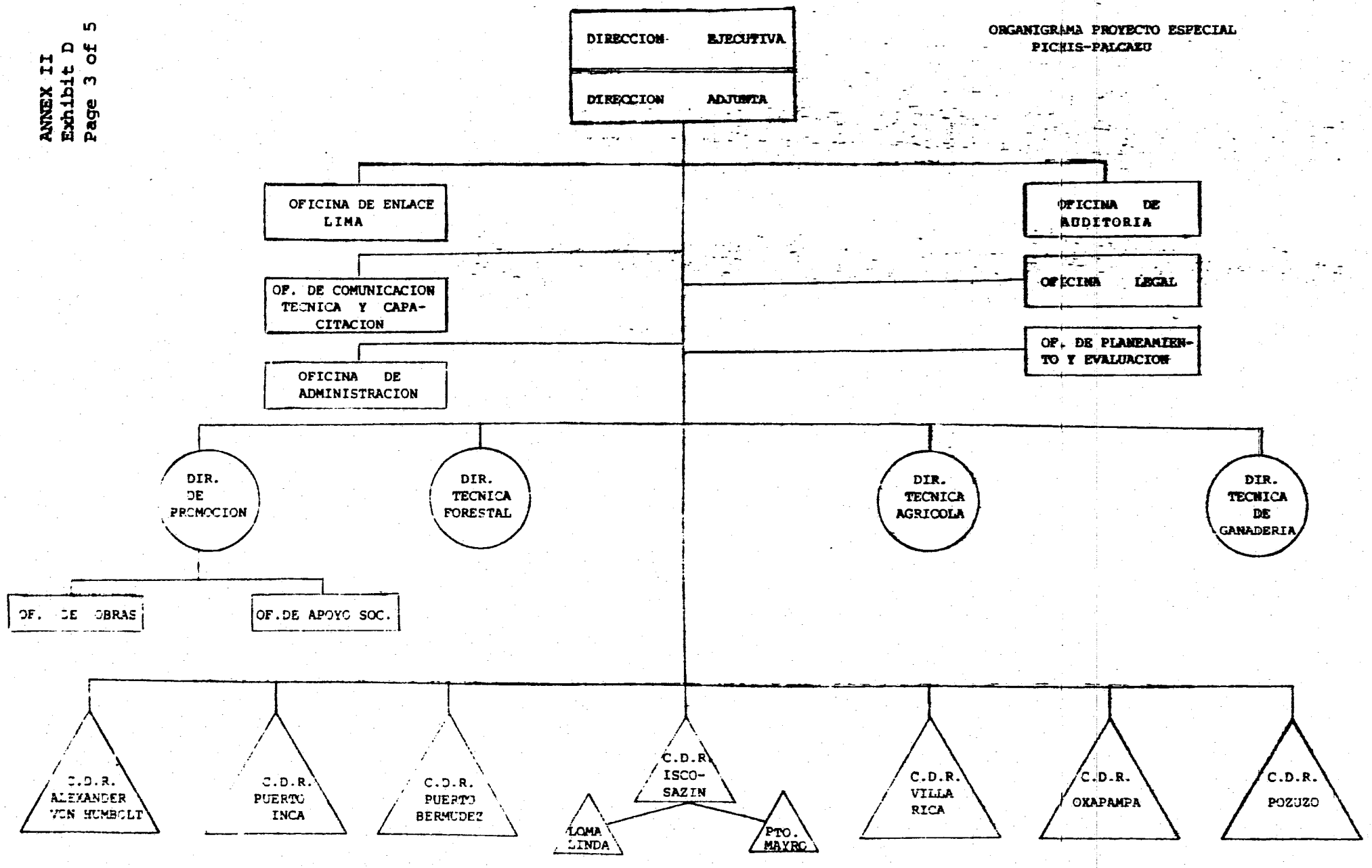
CENTRO DE DESARROLLO OXAPAMPA

Ingeniero Zootecnista	1
Licenciado en Administración de Empresas	1

CENTRO DE DESARROLLO VILLA RICA

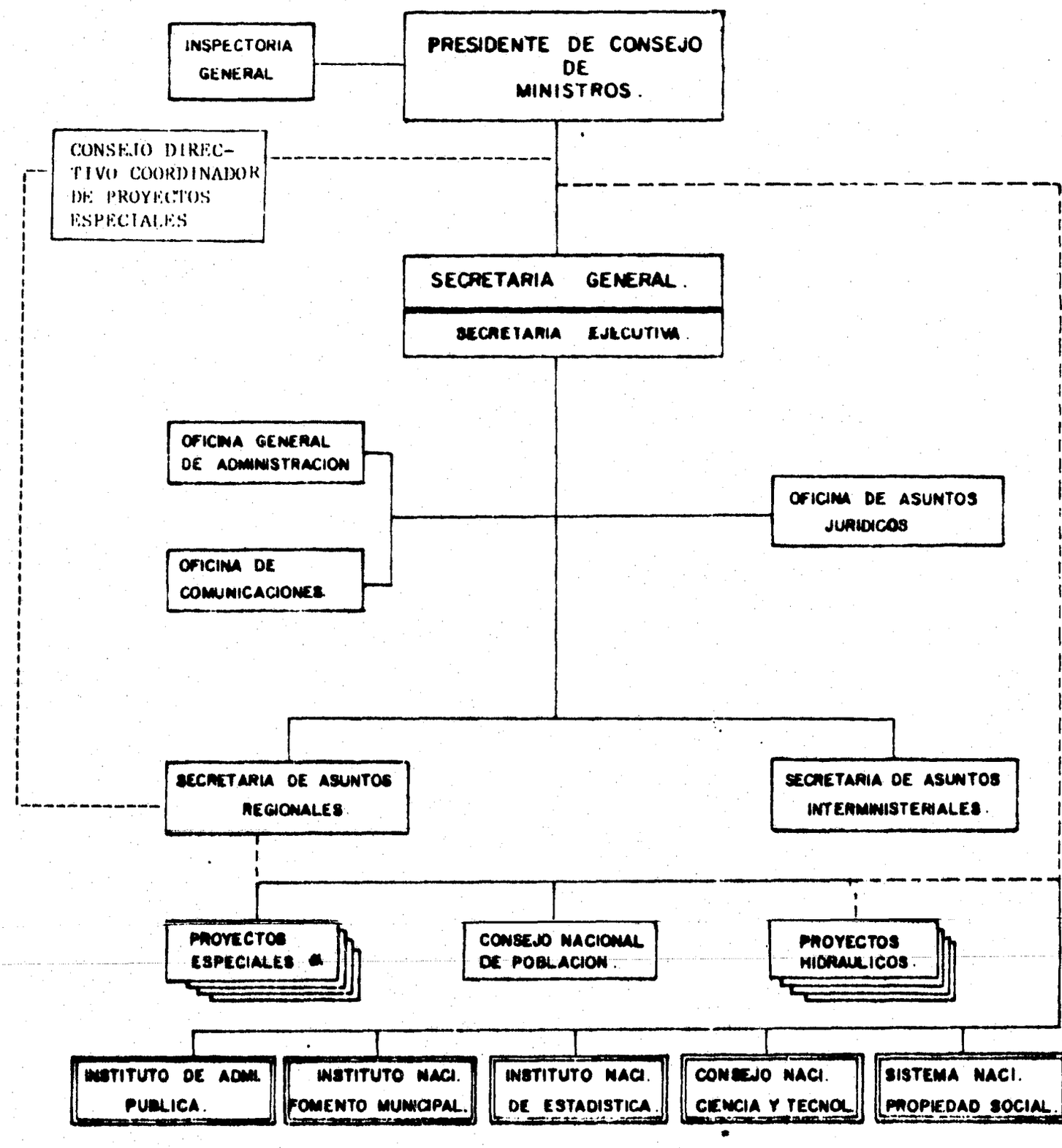
Médico Veterinario	1

ORGANIGRAMA PROYECTO ESPECIAL
PICHIS-PALCAZU



PRESIDENCIA DEL CONSEJO DE MINISTROS

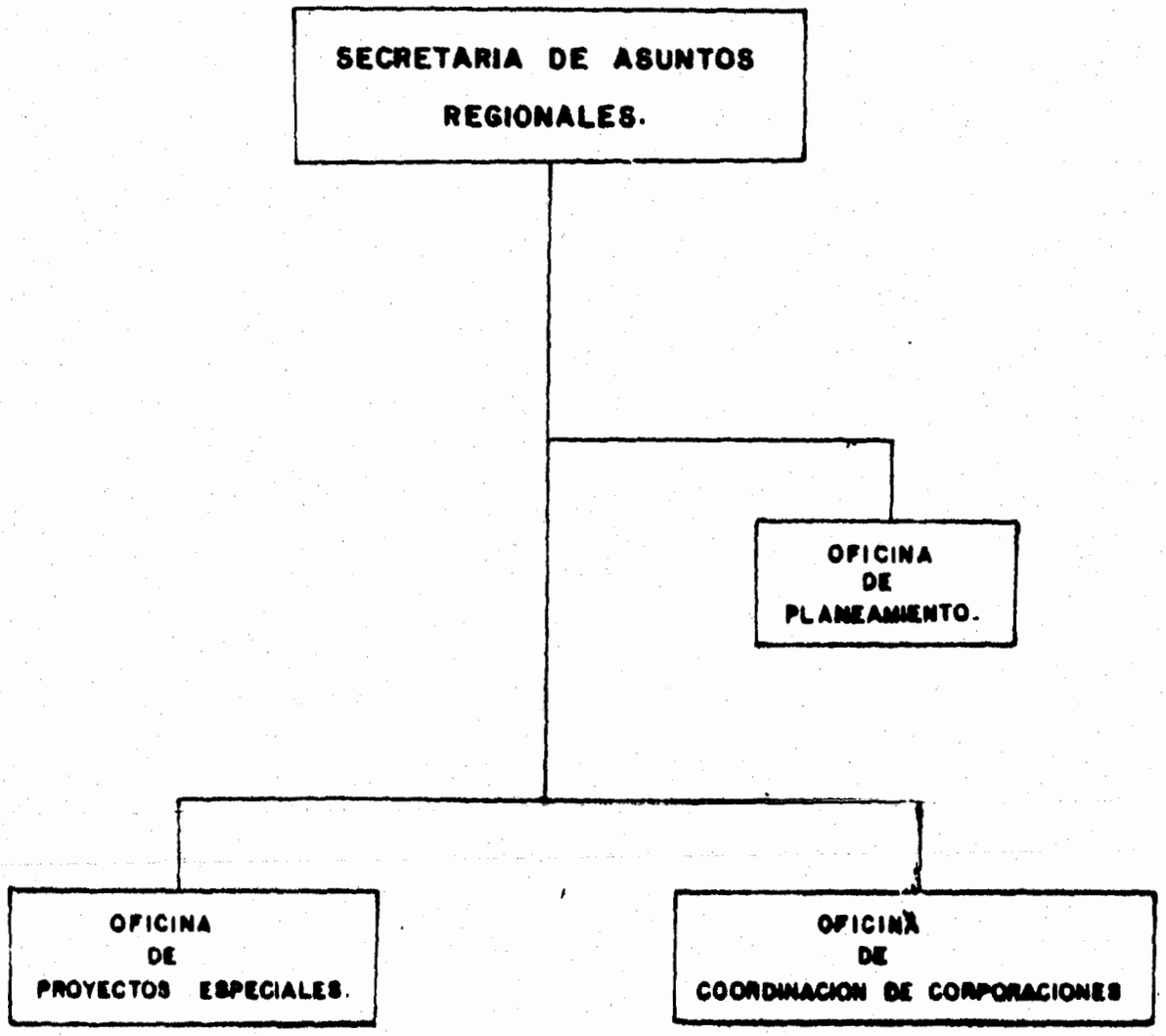
ORGANIGRAMA ESTRUCTURAL



* INCLUYE PLAN SIERRA

SECRETARIA DE ASUNTOS REGIONALES

ESTRUCTURA ORGANICA



Technical Assistance Plan

Component		Work/Months		Value (US$000)	
I. Project Management					
- Short-Term:	Land Use Ecologist	8		88	
	Meteorologist	2		22	
	Hydrologist	2		22	
	Geologist/Geomorphologist	4		44	
	Anthropologist/Sociologist	8		88	
	Fisheries Biologist	4		44	
	Meeting of Initial CPs	3	27	33	297
II. Forestry					
- Short-Term:	Tropical Dendrologist	6		66	
	Specialist in Forest Inventory	12		132	
	Logging Engineer	12		132	
	Forest Products and Marketing Expert	12		132	
	Specialist in Draft Animals	6		66	
- Long-Term:	Specialist in Natural Forest Management	24		191	
	Forest Industrial Engineer	24	96	191	910
III. Agricultural Development					
- Short-Term:	Agricultural Economist				
	Specialist in Pejebaye & Palm				
	Specialist in Achiote				
	Expert in Tropical Spices				
	Cacao Expert				
	Maracuya Specialist				
	Pineapple Expert				
	Winged Beans Specialist				
		6		66	
- Long-Term:	Agricultural Research Technical Advisor	36	42	302	368
IV. Protection					
- Short-Term:	Specialist in Park Development & Mngmt	6		66	
	Specialist in Park Flora & Fauna	2		22	
	~~Specialist in Tourism & Recreation~~	2	10	22	110
V. Continuous Land Use Inventory					
-Short-Term:	Specialist in Land Capability	8	8	88	88

VI.	Road Maintenance				
	-Short-Term: Specialist in Equipment Maintenance	4		44	
	Environmental Engineer for Feeder Road Studies	3		33	
	-Long-Term: Specialist in Road Maintenance	18	25	141	218
VII.	Regional Development Policy Support				
	Short-Term: Anthropologist/Sociologist	6		66	
	Land Use Ecologist	5		66	
	Economist	5		66	
	Expert in Marketing & Product Develop.	6		66	
		22		264	
	Long-Term: Resource Management Expert	48	70	404	646
VII.	USAID/Peru Project Manager	24	24	191	191
	Sub-total(1)		302		2828
	(a) Overhead - Long-term Experts				
	Forestry Expert			59	
	Forestry Expert			59	
	Agricultural Development			102	
	USIAD/Peru Project Manager			34	354
	(b) Miscellaneous				100
	(c) Overhead - Short-term Experts				456
	Sub-Total (2)				3638
	Evaluation				200
	Sub-Total (3)				3838
	Plus: Contingencies				162
	GRAND TOTAL				4000

Detailed Financial Plan
Component: Project Management/PEPP

Investment Category	
(1) Technical Assistance (See Annex E)	
(2) Training of Project Evaluation	120,000
Staff Training	
Evaluations	
(3) Data Collection	30,000
-Metereological Equipment and Materials	12,000
4 Rain gauges with packs of charts	
4 Humidity Temperature and Indicator	
4 Hygrothermograph (Recording equip.)	
4 Recording Wind System	
-Hydrologic Equipment & Materials	18,000
7 river depth gauges	
7 water turbidity gauges	
7 water chemistry testing kits	
7 flow or volume meters	
(4) Materials for Forest, Permanent Crops, Livestock and Fisheries Inventories	40,000
(5) Vehicles, Boats & Trailbikes	242,000
- Pick ups: 2 for field headquaters	28,000
3 for field offices	47,000
- Boats/motor: 1 for field headquarter	3,000
3 for field offices	9,000
- Trailbikes: 3 for field headquarters	7,500
3 for field offices	7,500
Spare Parts & Maintenance: Value of vehicles x 20% for spare parts + 10,000/yr for operation.	145.000
(6) Chainsaws for PEPP for Rental	44,000
50 Chainsaws + spare parts	33,000
(20%) + operation (13%)	11,000
(7) Office Furniture & Equipment for Three Field Offices:	140,000
6 Secretarial desks with chairs	40,000
6 Office desks with chairs	
12 Office chairs	
6 Typewriters	

	3 Office tables	
	3 Drafting tables	
	3 Sets of drafting equipment	
	3 Office stereoscopes	
	3 Field stereoscopes	
	3 File cabinets	
	3 Map cabinets	
	3 Book cases	
	3 Supply cabinets	
	Office supplies	
	For Headquarters	28,000
	6 Office desks with chairs	
	4 Office tables	
	3 Office chairs	
	4 Secretarial desks with chairs	
	6 Typewriters	
	2 Drafting tables	
	2 Sets of drafting equipment	
	4 Filing cabinets	
	6 Book cases	
	2 Supply cabinets	
	2 Office stereoscopes	
	4 Field stereoscopes	
	Equipment:	
	4 Video projectors for aerial video photography	72,000
	1 Geoceiver	
	5 Hand compasses	
	5 Hand levels	
	5 Measuring tapes	
	5 Clip boards	
	5 Soil Test Kits	
	5 Soil Augers	
	5 Diameters tapes	
	5 Polaroid cameras	
	5 Tape recorders	
(8)	Computer & Software + T.A. (Apple III)	15,000
(9)	Satellite Ground Station:	360,000
	Station	200,000
	Equipment	50,000
	T.A.	60,000
	~~Site/Services~~	
	Maintenance + supplies (to be supplied by GOP)	50,000

(10) Additional Personnel 260,000
2 agronomists + 2 zoologists + foresters
+ 1 computer specialist + 2 experts for communication ground station
+ 6 motorists (boats) + 2 drivers + other support

(11) Travel of Perdiem (provided by GOP)

(12) Office, Housing & Maintenance(Provided by the GOP)

Component Forestry

(1)	**Saw Mill**	(US$000)
	Equipment	
	-Front Loader	$ 96.0
	-Chainsaw	1.1
	-Tool Set	0.9
	-Log Carriage	15.5
	-Band saw	69.5
	-Edger resaw	13.0
	-Two Trimmers	2.8
	-Sawfiling equipment	13.0
	-Conveyors	12.0
	-Treatment vat	4.1
	-Power House and Control Panel	96.8
	Buildings	
	-Shed (1,050m^2)	37.0
	-Warehouse (960m^2)	35.7
	-Shops and Offices (280m^2)	19.2
	Engineering	
	-Studies & Plant installation	51.0
	Other	
	-Annual Supplies	25.8
(2)	**Wood Preservation Plant**	
	Equipment	
	-Complete Plant, Cylinder size 6' x 42', including extra tank, roof above control board	103
	-Front Loader	60
	Land & Buildings	
	-Pole Yard and Fances (30,000m^2)	25
	-Office, Laboratory and Store	10

	Engineering		
	-Installation	5	
	Supplies		
	-CCA Salts at US$0.90/pound	54	
	-Maintenance and Others	20	
	TOTAL	74	
(3)	Extraction and Transport Equipment Per Saw Mill		
	-One Rubber Tired Skidder	98	
	-3 heavy duty, double axled trucks	78	
	GRAND TOTAL FOR PROCESSING UNIT	946	
(4)	Logging Trails Equipment (PEPP)		
	-One Front Loader	60	
	-Two Dump Trucks	80	
	-One Bulldozer	70	
	Spare Parts (20%) + Operational Maintenance (50% AID on a declining basis)		
(5)	Training and Extension	180	
	-Training of Tech. and Admin.	60	
	-Training of Forest-unit Operators	100	
	-Office of Training and Extension	20	
(6)	Technical Assistance (See Annex II, Exhibit E)		
(7)	Personnel	400	
	- 8 Researchers		
	- 8 Extensionists		
	- Other specialized & Support		
	- Travel and Per Diem (Provided only by the GOP)		
(8)	Vehicles and Boats		159,000
	- 3 Four wheel drive pick ups with winch		348,000
	- 8 trail Bikes		20,000
	- 2 boats with outboard motor		6,000
	Spare Parts (0.20%) + Operation & Maintenance ($10,000/yr)		85,000
(9)	Research: Equipment & Materials		100,000
(10)	Credit Fund for Clearcutting Operations		
	- Ox-Team with implements	$2,200	
	- Ox-cart	300	
	- Tools	600	
	- Supplies	200	
		3,300 x 170 units = 561,000	

Component: Agricultural Development and Livestock

(1)	Technical Assistance (See Annex II, Exhibit E)	
(2)	Vehicles	149,000
	- 3 Pick ups	42,000
	- 4 Boats with motor	12,000
	- 3 Trailbikes	8,000
	Spare Parts (0.20%)	
	+ Operations and Maintenance ($10,000/yr)	87,000
(3)	Personnel	
	Extension: 4 Permanent Crop Specialists	945,000
	+ 4 Livestock and Pasture Specialists	
	+ 16 Agricultural Technicians	
	Research: 6 Agricultural Specialists +	
	+ 3 Agricultural Specialists	
	+ 9 Field Workers (Stations)	
	Travel and Perdiem	
(4)	Training	212,000
	- Livestock Management & Artificial Insemination: 8 Technicians to attend IVITA	
	Bulletins, training materials and on-farm demonstrations, farmer field days.	
(5)	Research Equipment, Tools & Materials	155,000
	- Back pack sprayers	
	- Motorized cultivators	
	- Wire fencing	
	- Farm hand tools	
	- 4 Electrical generators	
	Miscellaneous office equipment	
	- 4 Refrigerators	
	- 4 Portable generators	
	- Miscellaneous research/extension Supplies (seeds, fertilizers, etc.)	
	- ~~Operation + Maintenance~~	

Component: Protection

(1)	Technical Assistance (See Annex II, Exhibit E)	
(2)	Vehicles and Bikes	57,000
	- 1 Pick up-Four wheel drive	14,000
	- 5 Trail bikes	13,000
	Spare Parts (20%) + Operation & Maintenance ($10,000/yr)	30,000
(3)	Office Furniture, Equipment & Supplies	10,000
	- 2 desks with chairs	
	- 1 secretarial desk with chair	
	- 4 office chairs	
	- 1 typewriter	
	- 1 filing cabinet	
	- 1 drafting table with stool	
	- 1 drafting equipment	
	- 1 map/photo cabinet	
	- Office supplies	
(4)	Personnel	
	- 2 full time professionals for Park Management	80,000
	- Other support personnel	
	- Travel and Per Diem (provided by GOP)	

Component: Continuous Land Use Inventory

(1)	Technical Assistance (See Annex II Exhibit E))	
(2)	Vehicles	
	- 1 Pick-up	54,000
	- 4 Trail bikes	14,000
	- Spare parts (20%) + operation & maintenance ($10,000/yr)	10,000
		30,000
(3)	Office Furniture & Equipment & Supplies	12,000
	- 1 Cartographic drafting table & stool	
	- 1 standard drafting table w/stool	
	- 1 set cartographic drafting equipment	
	- 1 file cabinet	
	- 1 map cabinet	
	- 1 desk with chair	
	- 2 office stereoscopes	
	- 2 field stereoscopes	
	- 2 fifty meter measuring tapes	
	- 1 plain table with alidade	
(4)	Personnel	
	- 3 full-time professionals for field	85,000
	- work (2) and for cartographic drafting(1)	
	- Other support personnel	
(5)	Aerial Video Tape Equipment	
	- Camera, TV set, Video Tape & airplane rental	30,000
(6)	Satellite Imagery	
	- LANDSAT Tapes	15,000
(7)	Travel Per Diem (provided by GOP)	

Component: Road Maintenance

	Unit Cost (U.S.$000)	Total	
1. Equipment			
3 Dump Trucks	40	120	
1 Front Loader	60	60	
1 Roller	35	35	
1 Water Truck	25	25	
1 Grader	60	60	
1 Agricultural Tractor	30	30	
2 Stake Trucks	20	40	
3 Pick-ups	14	42	
1 Compressor	20	20	
1 Cement Mixer	5	5	
1 Grass Cutter	5	5	
1 Electric Generator	15	15	
1 Equipment Trailer	28	28	
1 Fuel Truck	25	25	
		510	
Plus: Spare parts, shipping and insurance		226	736
2. Equipment Maintenance Workshop			
2.1 Construction of Workshop		153	
2.2 Basic Equipment and Tools		80	233
3. Hand Tools for Road Maintenance			
3.1 Shovels, picks, sickles, wheel barrows, etc.			17
4. Operation of Maintenance			
4.1 Equipment (Excluding Depreciation)		423/yr.	
4.2 Labor		73	
4.3 Tools		15	
~~4.4 Workshop~~		~~47~~	
		558 x 5yrs.	2790
	Total		3776
5. Technical Assistance			218
6. Feeder Roads Location Studies			200
	Grand Total		4194

Component: Regional Development Policy Support

(1)	Technical Assistance (See Annex II, Exhibit E)	
(2)	Personnel	170,000
	-Salaries for 8 full time professionals	
	-Salaries for other support personnel	
	Travel and Perdiem	
(3)	Computer + Software + T.A. (Apple II)	10,000
(4)	Evaluation + Pre-Feasibility Studies	1,500,000
	-Evaluation of DPO's	300,000
	-Pre-feasibility Studies	1,200,000
(5)	Training	200,000
	- In-country Training	150,000
	- Observational Travel	50,000
(6)	Office Furniture , Equipment Supplies	40,000
	- 8 Executive desks with chairs	
	- 1 Conference Table with 12 chairs	
	- 6 Secretarial desks with chairs	
	- 8 Typewriters	
	- 8 Filing Cabinets	
	- 2 Library Desks	
	- 2 Library Tables	
	- 2 Library Shelves	
	- 2 Library Cabinets	
	- 8 Office tables	
	- Office Bookcases	
	- 16 Office chairs	
	- 2 bulletin boards	
	- 2 blackboards	
	- 1 drafting table with stool	
	- 1 set of drafting equipment	
	- 2 supply cabinets	
	- Office Supplies	
(7)	Office Rental	60,000

Annex II
Exhibit F-2
Page 1 of 2

Distribution of Pick-Ups, Trailbikes, and Boats

	Vehicles	Trailbikes	Boats
I. Project Management	5	6	4
II. Forestry	3	8	2
III. Agricultural Deelopment	3	3	4
IV. Protection	1	5	-
V. Continuous Land Use Inventory	1	4	-
VI. Health & Environmental Sanitation	1	5	5
VII. Road Maintenance (1)	3	-	-
	17	31	15

ANNEX G
HEALTH AND ENVIRONMENTAL SANITATION

Table 1
Summary Component Costs

		Loan Funds
I.	Training and Supervision	$ 43,000
II.	Equipment and Supplies	159,000
III.	Potable Water and Environmental Sanitation	263,000
		$ 465,000

Table 2
Training and Supervision

	Year 1	Year 2	Year 3	Year 4	TOTAL
I. Training and Supervision					42,700
A. Training Courses					21,900
1. Health Post Technicians	850	850	850	850	3,400
a. Per diem ($10/day x 7 days for 7 technicians)	(500)	(500)	(500)	(500)	
b. Transportation allowance (average $40 each)	(280)	(280)	(280)	(280)	
c. Materials ($10 each)	(70)	(70)	(70)	(70)	
2. Promoters and Midwives	3,900	5,200			9,100
a. Perdiem ($5/day x 20 days for 30 in the first year and 40 in the second year)	(3,000)	(4,000)			
b. Transportation Allowance (average $20 each)	(600)	(800)			
c. Materials ($10 each)	(300)	(400)			
3. Refresher Courses		1,700	3,850	3,850	9,400
a. Per Diem ($5/day x 5 days for 30 in the second year and 70 in years three and four)		(800)	(1,750)	(1,750)	
b. Transportation allowance (average $20 each)		(600)	(1,400)	(1,400)	
c. Materials ($10 each)		(300)	(700)	(700)	
B. Supervision					20,800
1. Health Post Technicians	3,500	3,500	3,500	3,500	14,000
a. Per Diem ($10/day x 3-day visits of 5 communities twice each year x 7 technicians)	(2,100)	(2,100)	(2,100)	(2,100)	
b. Transportation allowance (average $20/trip)	(1,400)	(1,400)	(1,400)	(1,400)	
2. Area nurse/doctor	1,700	1,700	1,700	1,700	6,800
a. Per diem($15/day x 5 day visits of 7 posts x 2 persons)	(1,100)	(1,100)	(1,100)	(1,100)	
b. Transportation ($40/trip x 14)	(600)	(600)	(600)	(600)	

TABLE 3: Equipment and Supplies

	Amount ($)
II. Equipment and Supplies	157,900
A. Equipment and Vehicles	116,000
1. Battery-run refrigerators (8 ea $100)	8,000
2. Small generators for refrigerators (8 ea $1000)	8,000
3. Cold chests (thermal units (10 ea $300)	3,000
4. Medical equipment including furniture (8 x average $3,750)	30,000
5. Locally made boats (5 ea $400)	2,000
6. Outboard motors, 18/25 HP (5 ea $2,500)	12,500
7. Motorcycles (5 ea $2,500)	12,500
8. Spare parts, operation, and maintenance	40,000
B. Supplies	41,900
1. Curative supplies ($300x8 facilities x 4 yrs)	10,000
2. Office supplies ($500x4 yrs)	2,000
3. Promoter kits ($100 x 35)	3,500
4. Midwife kits ($100 x 35)	3,500
5. Educational materials	
a. Donde No Hay Doctor (100 x $12)	1,200
b. Miscellaneous ($50/community x 33)	1,700
C. Other (miscellaneous supplies, driver training, travel to Lima and Huancayo) ($5,000/yr x 4)	20,000

Table 4
Potable Water and Environmental Sanitation

III. Potable Water and Environmental Sanitation			$263,000
	Unit Cost	Quantity	Total Cost
A. Gravity System	30,000	5	150,000
B. Wells	1,150	60	69,000
C. Latrines	150	200	30,000
D. Vehicle (Four-wheel-drive pick up)	14,000	1	14,000

TABLE 5: Gravity System with Sanitary Units
(Assuming 200 inhabitants)

UNITS	Cost (U.S. Dollars) GOP	Community	Loan	Total
A. Intake (concrete)	80	120	600	800
B. Conduction (1 km.0 1" to 2"	600	1,200	4,200	6,000
C. Reservoir (10 cub. mt.)	180	200	1,420	1,800
D. Distribution Net (1.5 km.0 1" to 2")	750	1,500	5,250	7,500
E. Sanitary Units (2)	600	900	4,500	6,000
	2,210	3,920	15,970	22,100
35% adm. costs	7,735			7,735
	9,945	3,920	15,970	29,835

Cost per inhabitant (without administration) $\frac{22,100}{200}$ =$111

Cost per inhabitant (with administration) $\frac{29,835}{200}$ $149

TABLE 6: Well with Manual Pump
(For approximately 100 people)

UNITS	Cost (U.S. Dollars) GOP	Community	Loan	Total
A. Digging		120		120
B. Pipe and Accaesories	20		120	140
C. Interior Walls	40	40	320	400
D. Hand Operated Pump (0.5 to 1.0 l.p.s.)			250	250
E. Concrete Slab	10	10	60	80
	70	170	750	990
15% adm. costs	150			
	220	170	750	1,140

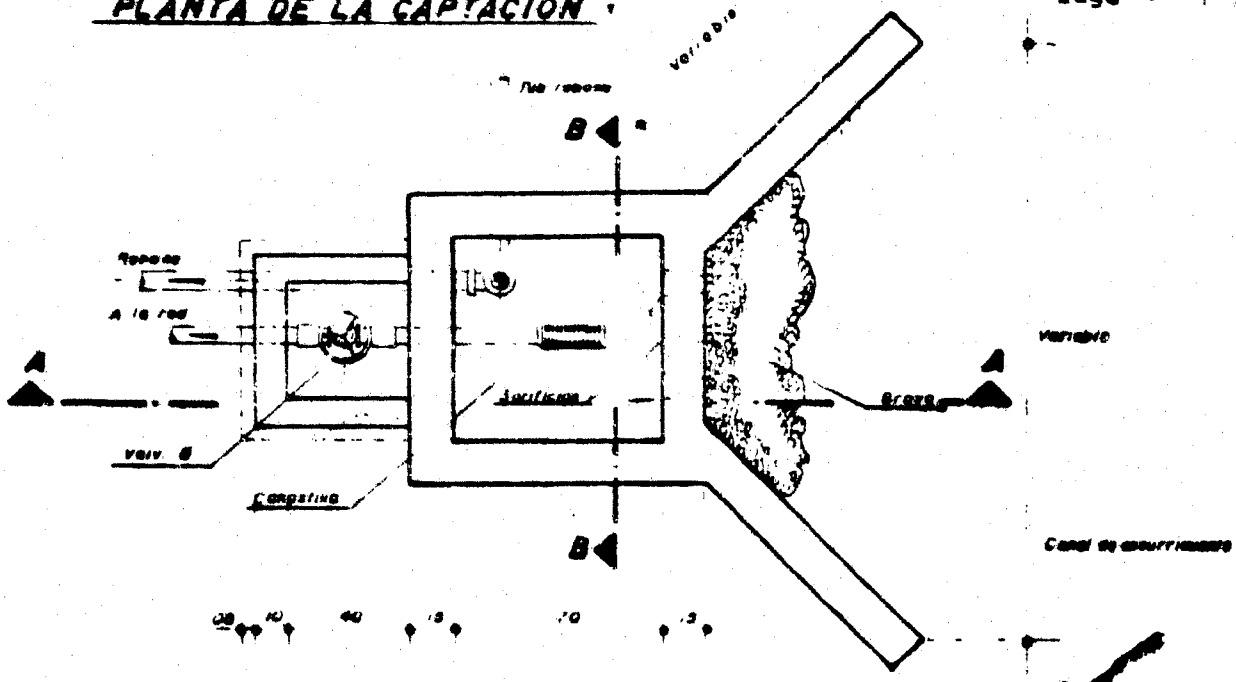
TABLE 7: Latrines

UNIT	GOP	Community	Loan	Total
A. Digging	-	10	-	10
B. Platform	3	3	9	15
C. Cabin	10	10	80	100
	13	23	89	125
15% adm. costs	19			
	32	23	89	144

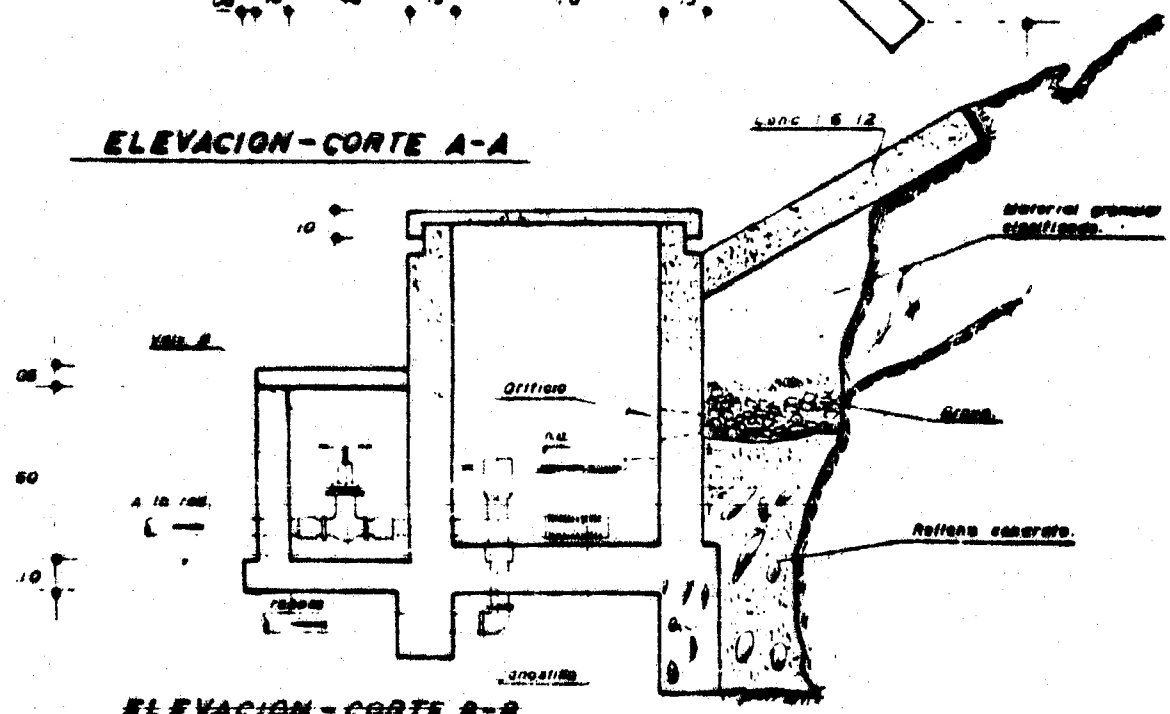
CAPTACION DE LADERA

ANNEX II
Exhibit G
Page

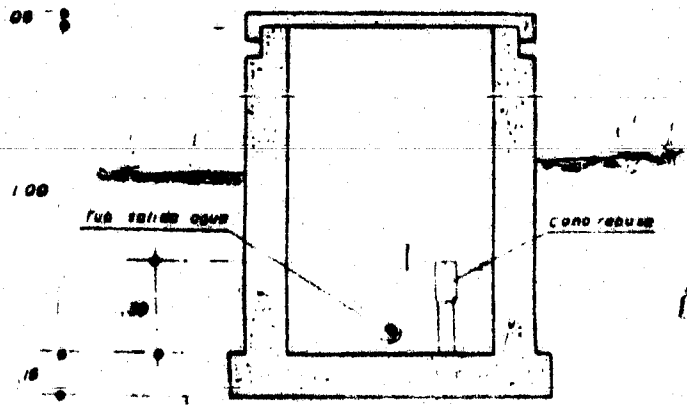
PLANTA DE LA CAPTACION



ELEVACION - CORTE A-A



ELEVACION - CORTE B-B

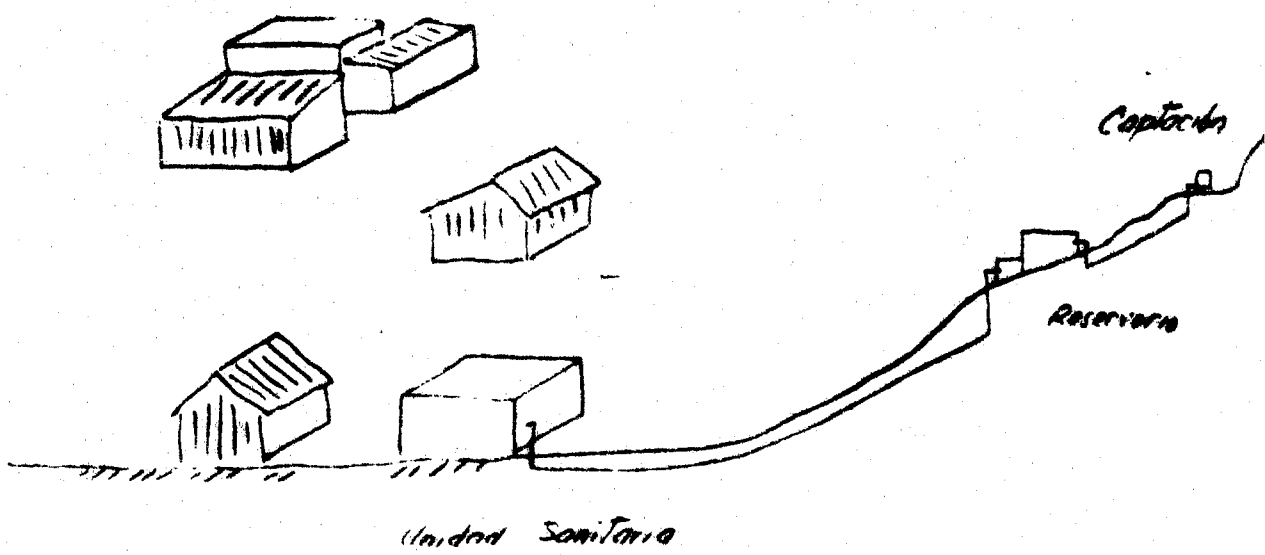


MINISTERIO DE SALUD

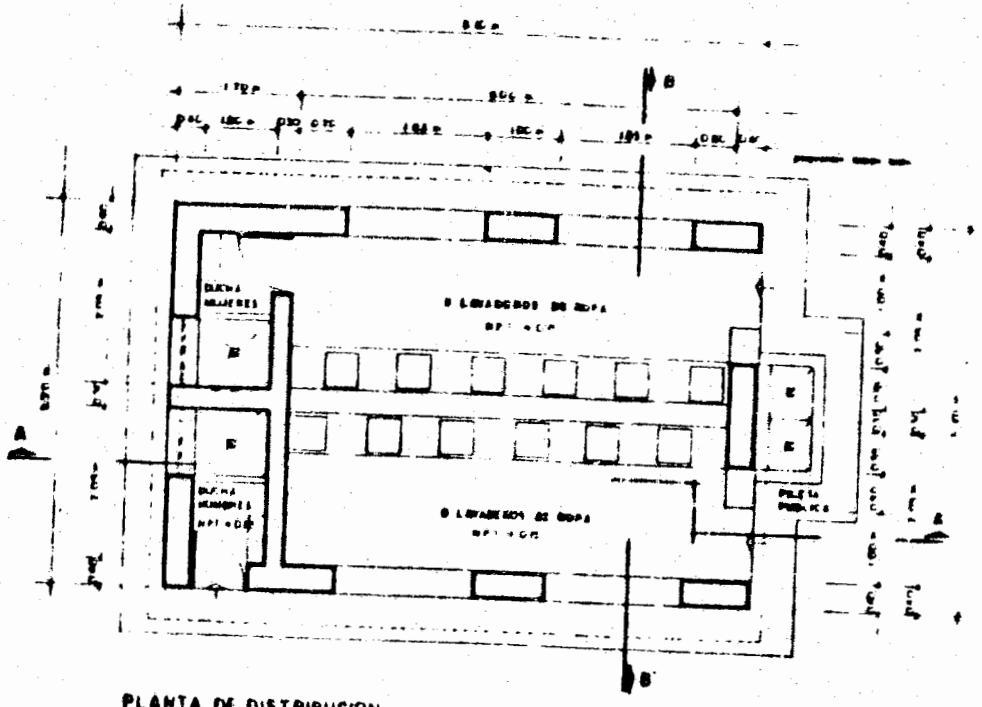
Dirección General de Programas Especiales de Salud

Dirección de Ingeniería Sanitaria

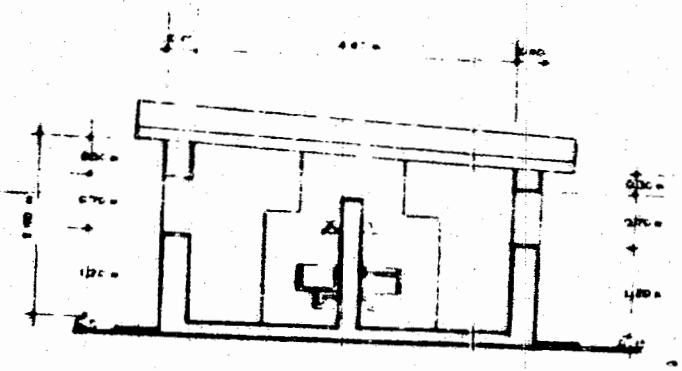
Proyecto : A. I. D.


Captación
Reservorio
Unidad Sanitaria

ANNEX II
Exhibit C
Page [illegible]



PLANTA DE DISTRIBUCION



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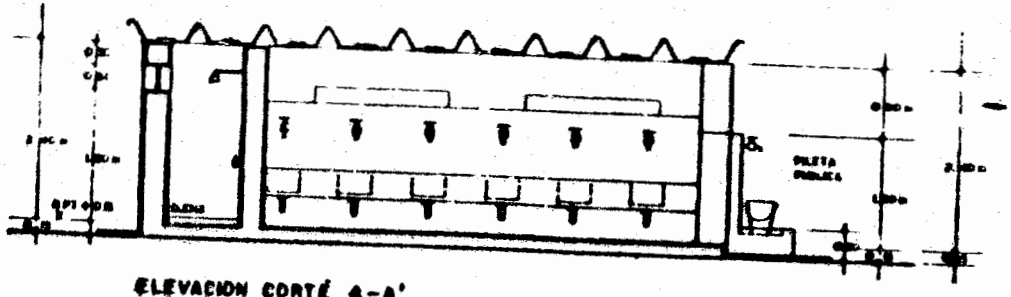

ELEVACION CORTE A-A'

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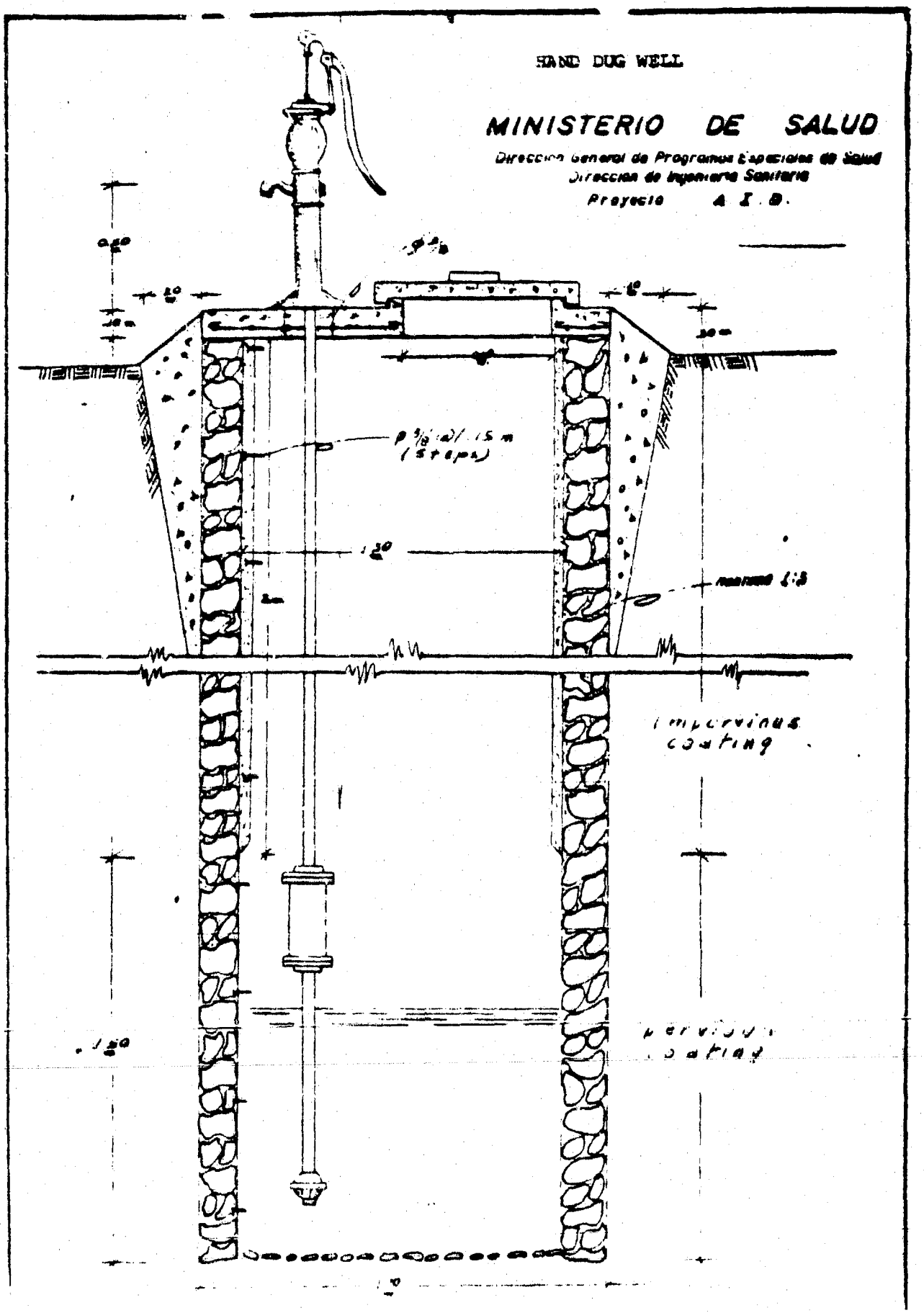
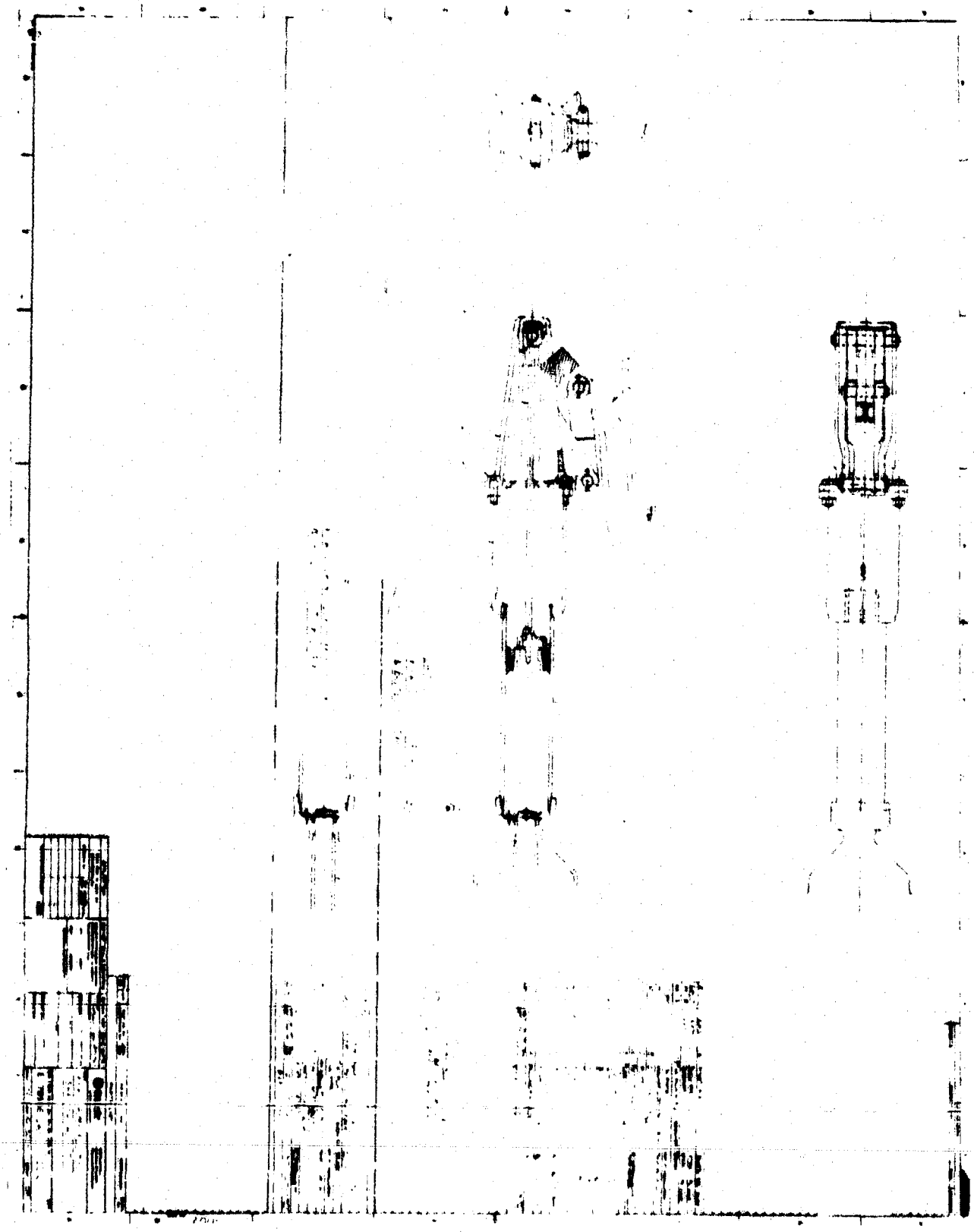
Direccion General de Programas Especiales de Salud
Direccion de Ingeniaria Sanitaria
Proyecto A I D


HAND DUG WELL
MINISTERIO DE SALUD
Direccion General de Programas Especiales de Salud
Direccion de Ingeniería Sanitaria
Proyecto A. I. D.
Impervious coating
Pervious coating



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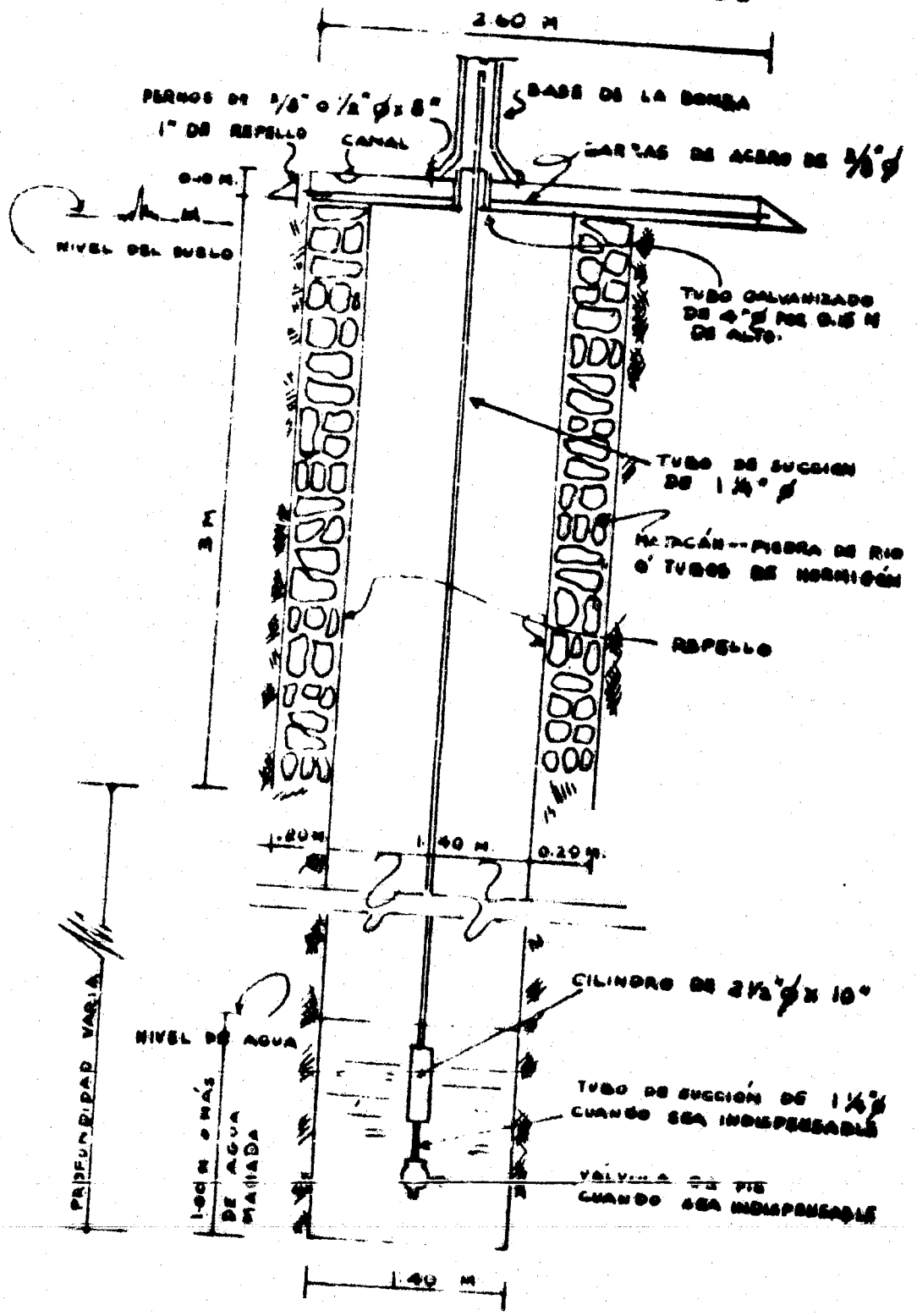
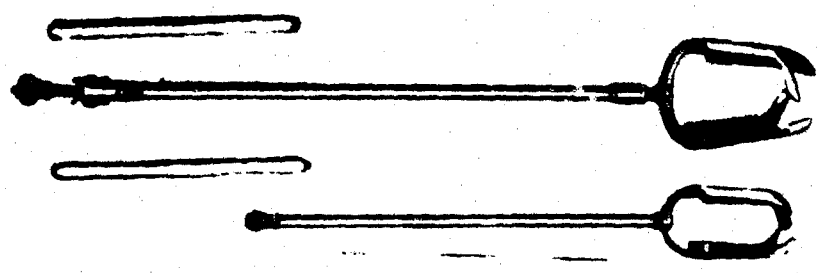
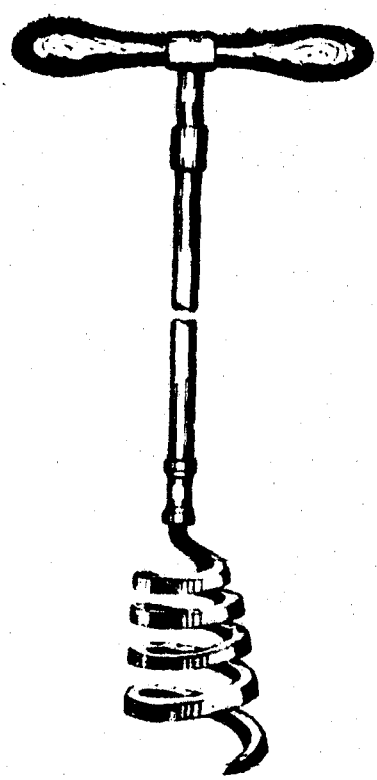




HAND AUGERS



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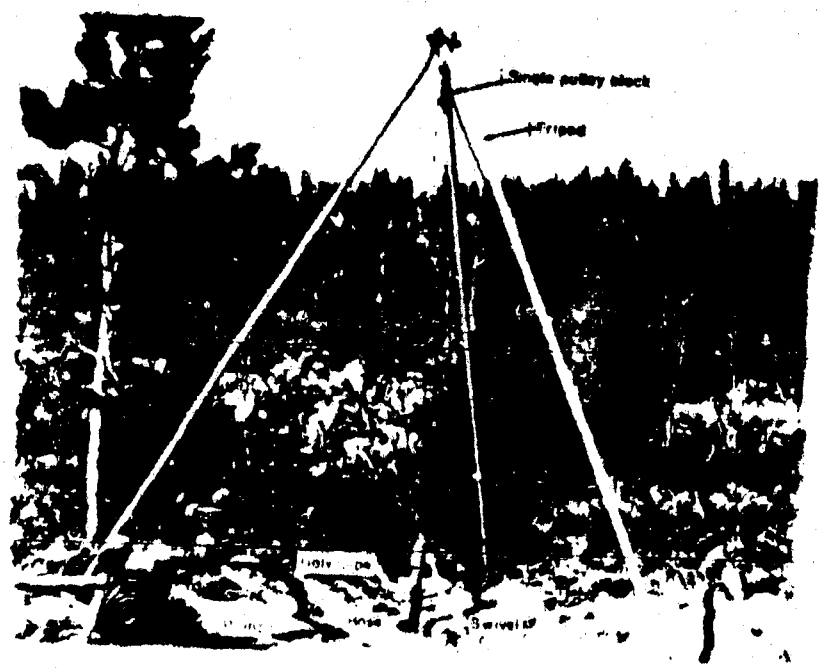


SIMPLE EQUIPMENT FOR JET OR ROTARY DRILLING.

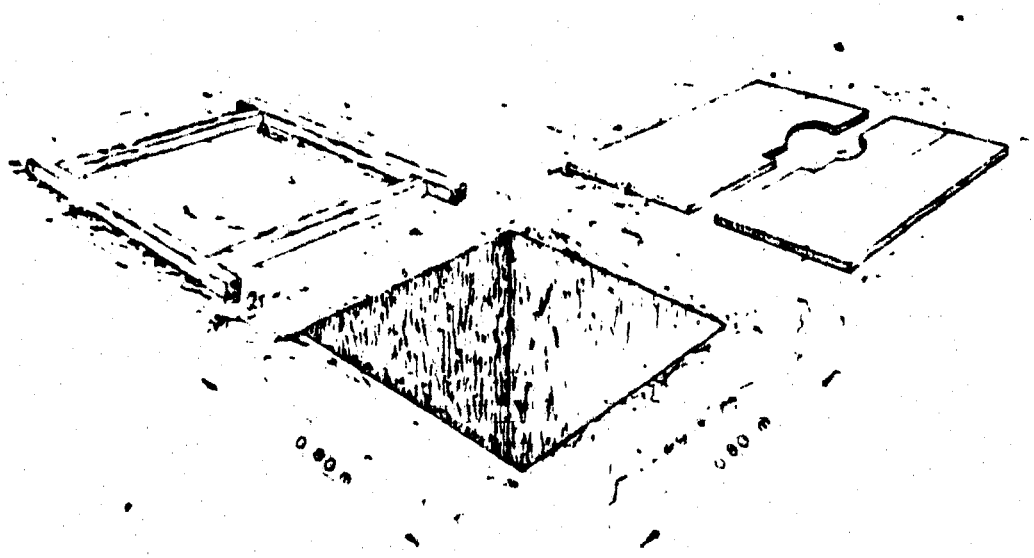
¿ Qué es la Letrina Sanitaria ?

ES UN LUGAR APROPIADO DONDE SE DEPOSITAN LOS EXCREMENTOS O DEPOSICIONES HUMANAS, PARA QUE LOS MICROBIOS QUEDEN ENCARCELADOS Y NO CONTAGIEN ENFERMEDADES.

¿ Cómo se construye ?

SE HACE UN HUECO U HOYO DE OCHENTA CENTIMETROS POR CADA LADO Y HASTA DOS METROS DE HONDO.

COMO VEREMOS EN LOS SIGUIENTES DIBUJOS :



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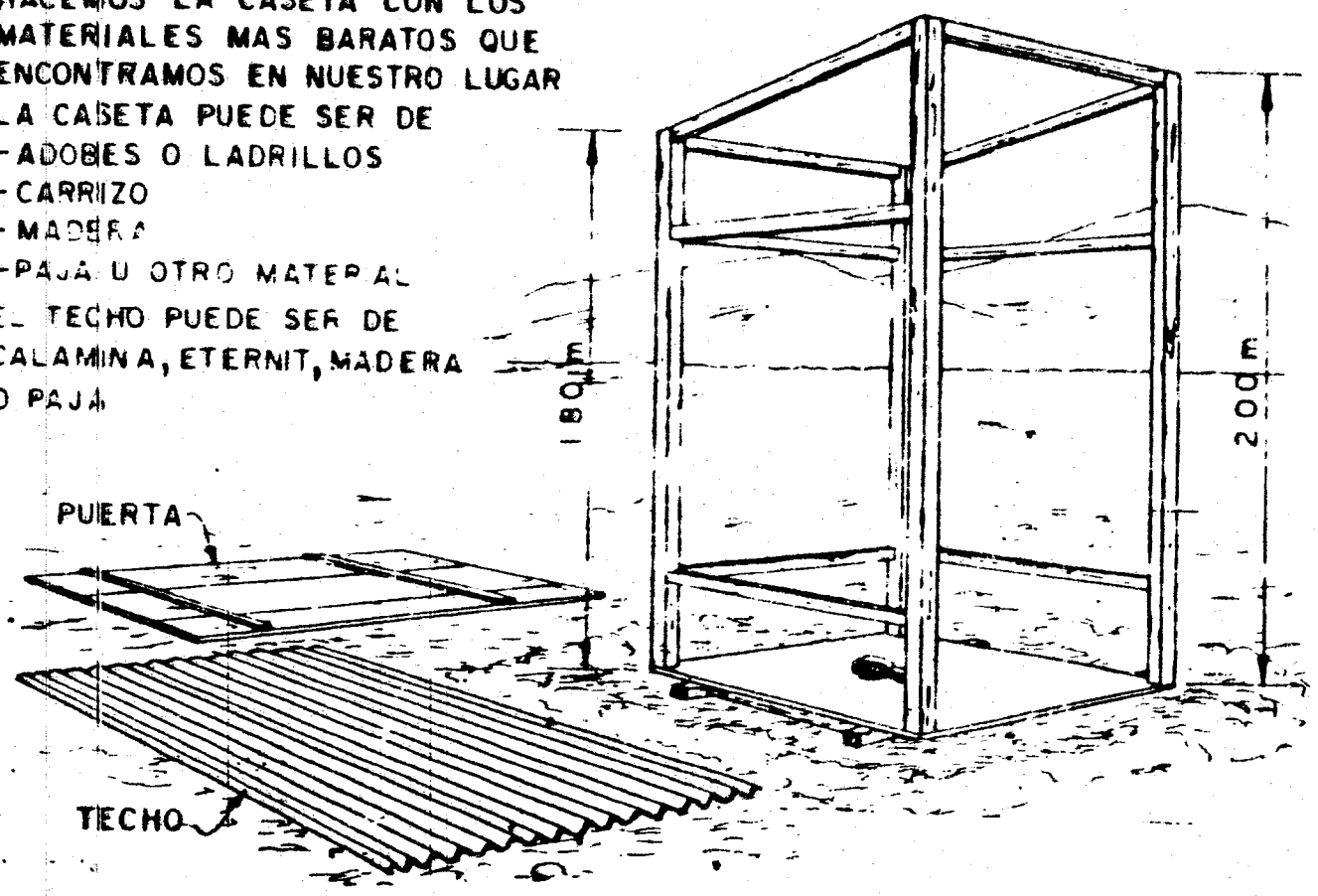
Proyecto A I D

HACEMOS LA CASETA CON LOS MATERIALES MAS BARATOS QUE ENCONTRAMOS EN NUESTRO LUGAR

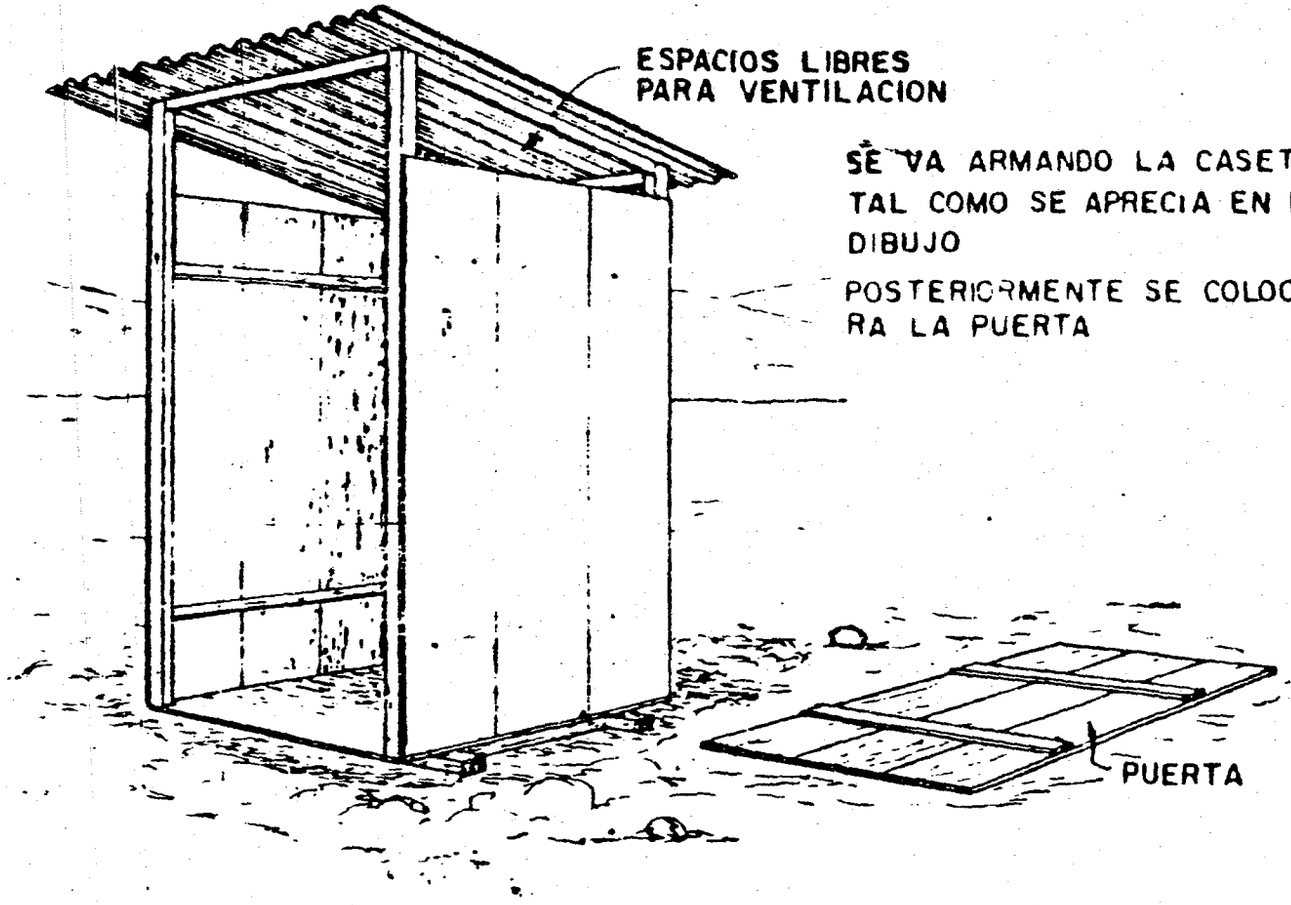
LA CASETA PUEDE SER DE
- ADOBES O LADRILLOS
- CARRIZO
- MADERA
- PAJA U OTRO MATERIAL

EL TECHO PUEDE SER DE CALAMINA, ETERNIT, MADERA O PAJA



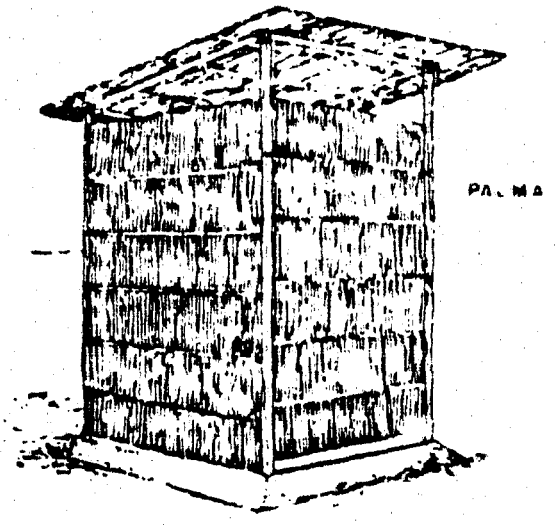
MINISTERIO DE SALUD

Direccion General de Programas Especiales de Salud
Direccion de Ingeniería Sanitaria

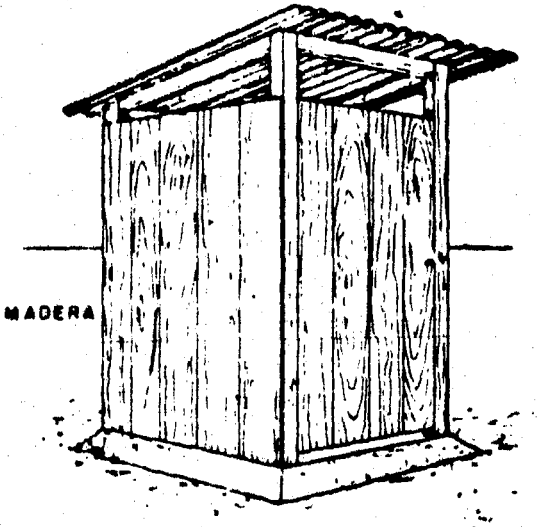


MINISTERIO DE SALUD

LETRINAS CONSTRUIDAS DE DIFERENTE MATERIAL



PALMA



MADERA

MINISTERIO DE SALUD

Direccion General de Programas Especiales de Salud
Direccion de Ingenieria Sanitaria
Proyecto A. I. D.

INSTITUTIONAL ANALYSIS OF ADDITIONAL IMPLEMENTING AGENCIES

National Agrarian Research and Promotion Institute (INIPA)

Research and extension activities in the Project area will be implemented through an agreement between the Special Project Office and the National Agrarian Research and Promotion Institute (INIPA). The process of combining agricultural research and extension in one decentralized governmental agency at the national level began in the final months of the Revolutionary Military Government (1979/1980). During the latter half of 1979, USAID/Peru financed a joint GOP/US Title XII University baseline study of the Peruvian agricultural research, extension, and education (REE) system. One of the principal conclusions of the REE baseline study was the recognition of the need to integrate, to the maximum extent possible, the functions of research and extension, especially at the field level.

Acting upon this conclusion, the outgoing Minister of Agriculture ordered the creation of an autonomous agricultural research agency (The National Institute for Agricultural Research - INIA) as a first step towards the creation of an independent institute which would combine agricultural research and extension. The Minister was convinced of the need to join research and extension, but decided that the outgoing military government should leave the implementation of that task to the incoming government.

One of the first orders of business of the Belaunde administration was to undertake an in-depth evaluation of the Ministry of Agriculture (including a through review of the REE baseline study) which resulted in the passage of a new organic law for the Ministry. A principal feature of the new law was the establishment of the National Agricultural Research and Promotion Institute (INIPA) which combined research and extension into a single semi-autonomous institution. The head of the new institute and key staff were named in March 1981, and the agency has now become fully functional. Field activities of INIPA are carried out by 18 decentralized units called Agricultural Research and Promotion Centers (CIPAs). INIPA and the Special Project Office will establish research and extension centers in the three valleys of Project area, the main center being located at Iscozacin. It will operate as a sub-station within the

Credit Institutions

1. The Agrarian Bank of Peru

The Agrarian Bank is a public sector banking institution which has been in existence since 1931. The Agrarian Bank has some 3,316 employees and operates 19 branch offices and 90 agencies country-wide. During 1981, the Bank made 127,000 loans totalling $660,000,000 at the average 1981 exchange rate.

The Agrarian Bank is now in the process of transition. During the period of the Military Revolutionary Government (1968-1980), the Bank concentrated on providing credit to the associative enterprises (production cooperatives and social interest societies) created under the Velasco government's agrarian reform program. Service to independent small- and medium-sized farmers dropped off markedly during this period. The Belaunde administration has made a major effort to reorient the Agrarian Bank's activities towards independent producers and has increased the Bank's authorized capital from $150,000,000 in 1980 to $250,000,000 in 1981.

The structure of active and passive interest rates adopted by the Bank is within the guidelines set up by the Central Reserve Bank of Peru. A strong campaign--via competitive interest rates--to mobilize savings has been pursued by the Bank since 1980, although the maximum rates to borrowers is only 32.520.

The Agrarian Bank is the main GOP outlet for channelling funds to the agricultural sector. International lending institutions have developed ample experience in dealing with the Bank, and AID has and is presently implementing credit programs for the selva region under the Huallaga/Bajo Mayo and Upper Huallaga loans.

2. The Industrial Bank of Peru (BIP)

Forty-five years have elapsed since the GOP created the Industrial Bank of Peru to provide credit in support of industrialization policies which would accelerate the socio-economic growth of the country. Obviously, given the span of time, the BIP has passed through innumerable reorganizations, reflecting the prevailing domestic political and economic conditions of Peru at large and of the industrial sector in particular. International lending institutions have also had, over time, an impact on the organizational structure of the BIP, and have accomodated their credit lines to what was judged to be as the best modus operandi for attaining their project goals and purposes.

Recently, the constitutional government of Peru approved the new Organic Law of the BIP by Legislative Decree No. 202, dated June 12, 1981. This decree defines the BIP as a public entity under the Ministry of Economy, Finance and Commerce, with its own capital and with administrative, economic, and financial autonomy. The fundamental purpose of the BIP, according to its new charter, is to provide credit support and

regular banking services, in order to promote the economic growth of the country. The BIP carries out the following economic activities: (1) handicrafts, (2) small enterprise, (3) industries, (4) fishing and pisciculture, (5) non-traditional exports, (6) tourism and cinematography, (7) electricity, energy, and transportation, (8) industrial land development and urbanization, and (9) others, indicated by its statutes. The BIP also gives special consideration to operations with a high incidence on employment generation, significant value-added, incorporation of domestic inputs, and generation of foreign exchange.

In regard to the schematic organization of the BIP, the new Organic Law basically established a decentralized structure, with regional offices throughout the country. The main office, located in Lima, has, inter alia, supervisory and normative functions. The BIP is managed by the Board of Directors, composed of seven representatives from the following Ministries: four from Economy, Finance and Commerce and one each from Industry, Tourism and Integration; Fisheries, and Transportation and Communications. The President of the Board is appointed by the Presisent with Cabinet approval from among the four representatives of Economy, Finance and Commerce; the other members are appointed by the respective Ministries.

The authorized capital of the BIP amounts to 100 billion soles wholly payable by the GOP. Being a public enterprise, the BIP is subject to the norms of the National Budget Law and to the periodic budgetary laws of the public sector. In order to attain its objectives, the BIP has been authorized to sign contracts with domestic and foreign financial institutions. Its new law indicates that the GOP may assume the repayment of medium- and long-term credit lines obtained or to be obtained by the BIP, with State guarantee from international agencies or foreign governments.

The structure of active and passive interest rates and commissions, adopted by the Board of Directors for the BIP, must follow the guidelines established by the Central Reserve Bank of Peru. Where preferential interest rates granted to certain sectors and regions-- e.g. handicrafts, small enterprise, non-traditional exports, jungle, etc.--have been established, the difference between these rates and ordinary interest rate levels will be contributed by the Treasury up to the amount consigned in the annual National Budget.

Promotional funds created by the GOP for industrial sub-sectors have traditionally been assigned to the BIP. Approximately nine such funds are currently being managed by the BIP: (1) FOPE (Small Enterprise Promotion Fund), (2) FDR (Rural Enterprises Development Fund), (3) FGT (Surface Transportation Guarantee Fund), (4) FCIP (Fishing Industry Contingency Fund), (5) FENT (Non-Traditional Export Fund), (6) FDP (Fishing Development Fund), (7) FOFIPEI (Fund for the Promotion of Industrial Enterprises, (8) FA (Automotor Fund), and (9) FODEM (Fund for Modernizing Fishing Vessels).

The BIP has supported credit assistance to small industry. Since 1960, when the BIP Board of Directors initiated a program of supervised credit for small enterprise. Over time, the form of this aid has changed but the basic intention has remained intact. Nowadays, the small enterprise and artisanship rank first on the BIP scale of preferences for the allocation of credit funds. Further, small enterprise and artisans receive credit on favorable terms compared to other borrowers, and this credit is coupled with technical assistance, especially in the area of training. For those small entrepreneurs lacking sufficient collateral, FOGAPI (Guaranty Fund for the Small Enterprise) was created to provide guarantees at reasonable cost. The BIP co-finances this program.

The BIP has been and continues to be a very innovative organization, absorbing new policies and techniques and discarding out-of-date concepts and procedures. The BIP shows a marked dynamism in so far as its operational and organizational structure is concerned. Changing times have been reflected, in one way or another, in the organization and functions of the Bank, and major operational changes were made by the BIP in 1981.

At the branch level, to expedite transactions, credit committees were organized and put into operation at the same time with good results. In an effort to further decentralize the authority to approve credits, the Board of Directors also established the Decentralized Credit Committees with a higher credit approval limit than the branch credit committee.

The present structure of the BIP is the by-product of years of implementation experience and reflects present needs and projected future orientation. This structure is organized by function with solid and clear-cut lines of authority and responsibility both vertically and horizontally. Effective internal and inter-division coordination is exercised, especially through the operational committees, where some individuals hold overlapping group membership and act as liaisons. A strong supportive relationship exists between the field offices and the Lima headquarters. The geographical coverage of the field offices has been well defined to avoid duplication. The computer center and the telex system adopted by the BIP are the best indicators of the modernization efforts introduced by Bank management to cope with efficiency needs.

Currently the BIP has a total staff of 1,588 employees of which 1,111 (70%) work in Lima and 477 (30%) work in the various branches and agencies. The staffing pattern by geographical region is the following:

Category	North	South	Center	East	Total
Executives	12	13	13	13	41
Technicians (professionals)	100(27)	80(23)	85(30)	30(10)	295(90)
Secretaries	23	17	22	6	68
Service	18	21	23	11	73
	153	131	143	50	477

Average per branch	26	33	20	17	24

The BIP operates through a network of twenty field offices. BIP's successful implementaton of the Rural Enterprises Development I and II projects with AID funding has demonstrated its ability to carry out new programs in previously untouched areas, compatible with AID goals and strategies.

Institutions Involved in the Development of Resource Information

1. National Office of Natural Resources Evaluation (ONERN)

ONERN was established in April 1962 as a division of the Ministry of Development and Public Works. Following intra-governmental transfer to the National Planning Institute (INP) and subsequently to the Office of the Presidency, ONERN became a decentralized public entity under the Office of the Prime Minister in 1973, where it remained until just recently (1980) when it was repositioned under the INP. ONERN employs 58 professionals, 30 technicians, and 66 administrative and support personnel--all located in ONERN's Lima office. Under the proposed Project, PEPP will enter into an agreement with ONERN to carryout land use capability mapping in the Project area.

The objectives of ONERN are: (a) to prepare integrated natural resource inventory studies oriented to the economic and social development of Peru; (b) to cooperate with the National Planning Institute in the formulation of policies for the use and conservation of natural resources; and (c) to study the inter-actions at the national level between man and his natural environment with the intention of proposing measures to preserve balanced ecological development.

ONERN has been an important institution in high jungle development; its resource studies have served as the basis for investment projects in such areas as Jaen/Bagua/San Ignacio, Huallaga Central/Bajo Mayo, and Upper Huallaga. The initial IDB colonization project (1965-70) in the Upper Huallaga area was based upon the first reconnaissance-level resource study prepared by the Servicio Cooperativo Interamericano de Fomento (SCIF), the predecessor organization of ONERN. Since that first venture, ONERN has completed over 50 resource studies and is recognized as one of the leading institutions in its field in Latin America. AID supported ONERN in the late 1960s with a $1.8 million loan to prepare resource inventories for key coastal river valleys. In addition, AID is currently financing a $1 million FY 1981-83 Grant project to assist ONERN to upgrade its technical capacity to use advanced technology for environmental planning and resource conservation.

2. The National Rural Cadaster Office (OGCR) and the Office of Public Registry (ORP)

The OGCR is a staff office of the Ministry of Agriculture

responsible for carrying out and maintaining a cadaster of the rural areas of Peru. The OGCR employs six professionals, 64 technicians, and 16 administrative and support personnel at its Lima headquarters. In addition, about 60 cadaster technicians are assigned to the regional office of the Ministry of Agriculture, including five technicians in the Huanuco office which serves the Project area.

The ORP was established as a public entity in 1880 with the specific function of guaranteeing the right of persons and institutions to property by virtue of public registration; later additional rights were incorporated. At the present time, the ORP is a decentralized entity under the jurisdiction of the Ministry of Justice. The Central Registration Office is located in Lima and, at the national level, ORP, has established one Registration Office in each departmental capital. Additional offices have been established in certain departments whenever it was considered appropriate. Registration is a revenue-producing service and by law 60% of the proceeds remain with the ORP and 40% is transferred to the Treasury. The ORP employs 320 persons of which approximately 120 work in Lima.

In general, the OGCR and ORP are considered technically competent institutions, although continual budgetary constraints have resulted in program shortfalls and inability to carry-out rural cadaster, titling, and registration activities in an effective manner.

3. Servicio Nacional de Meteorología e Hidrología (SENAMHI)

SENAMHI is a decentralized public entity established by Decree Law No. 17532 on March 25, 1969, in an effort to centralize in one institution the hydrologic and meteorologic functions being implemented up to that date by various GOP entities. The objective of SENAMHI is to plan, organize, and coordinate hydrologic and meteorologic activities conducive to the general growth of the nation in compliance with the GOP policy. Some of the specific functions of SENAMHI are: (1) to organize, operate, and maintain the network of national stations in accordance with the standards of the World Meteorological Organization, (2) to centralize and process hydrologic and meteorologic information for public use, (3) to organize and keep the National Meteorologic and Hydrologic Archive, and (4) to promote and execute studies and cost and research programs to satisfy the data needs of the country.

SENAMHI operates fifteen (15) Regional Centers country-wide. Two of these operate as agrometeorologic research posts, one located in Cajamarca and the other in Tulumayo (Huanuco). A total of 1,300 stations function under the Regional Centers. SENAMHI employs approximately 1,700 persons, of which 200 are stationed in Lima.

National Institute of Forestry and Wildlife (INFOR)

The National Institute of Forestry and Wildlife (INFOR), created by Legislative Decree No. 21 on January 19, 1982, is a public decentralized institution in the agricultural sector. It has the legal status of a

publicly owned company and possesses technical and administrative autonomy in accordance with current regulations.

The objectives of INFOR are: (1) to contribute to increasing the production and productivity of forestry and wildlife resources, as well as the management and rational use of same; (2) to increase the number of forested areas through forestation and reforestation, principally in areas of highest priority; and (3) to contribute to an increase in forested areas and rural forestation sites.

The functions of INFOR include: (1) Programming and evaluation of forest and wildlife research, extension, development and conservation; (2) Technical research and distribution of research results; (3) Extension programs in forestry and wildlife; (4) Distribution of rural forestation sites (tree farms) among inhabitants of the jungle areas as well as among the migratory populations of the country as a whole; (5) Inventory and evaluation of forestry resources; (6) Planning, programming, and implementation of projects in connection with forestry and wildlife; (7) Encouragement of industrialization and use of forest products and by-products; (8) Management of conservation areas and wildlife refuges; and (9) Implementation of programs on management of river basins and pilot programs jointly with the Office of Water, Soils, and Irrigation in conjunction with the National Institute for the Expansion of the Agricultural Frontier.

At the regional level, INFOR currently has five Forest and Fauna Centers (CENFORF) in Puno, Cusco, Huanuco, Cajamarca, and Huancayo. In other areas, INFOR is presently working closely with the Agrarian Regions of the Ministry of Agriculture until specific CENFORFs are established. At the present time, INFOR is executing seven reforestation programs, three conservation sub-projects, three research programs, and one forestry management plan. INFOR employs permanently 160 persons, 45 of whom are professionals, 90 agricultural technicians, and 25 administrative and service personnel. Additionally, INFOR employs 1200 contract personnel, including professionals, technicians, and other support personnel for the implementation of its programs.

The Ministry of Health (MOH)

The MOH was established almost a hundred years ago and has undergone multiple reorganizations. At the the present time, the MOH is organized in four major General Directorates: (1) Dirección General de Administración, (2) Dirección General de Atención a las Personas, (3) Dirección General de Servicios de Salud, and (4) Dirección General de Atención al Medio Ambiente. The MOH has established nationwide 16 health regions, each of which has been sub-divided in hospital areas. The health centers and health posts operate under the hospital areas. There are 60 hospital areas, approximately 600 health centers, and 1800 health posts in Peru. The MOH employs approximately 30,000 persons, of which 22% are health professionals, 26% health technicians, 18% administrative, and 34% general service personnel.

Health services are provided to the Project area by the Iscozacin center and seven health posts of the Centro Medio health region through the hospital area of Chanchamayo.

The Ministry of Transportation and Communications (MTC)

The Project is located within the area served by the MTC Departmental Directorate of Roads of Junin. Although the Project roads are geographically located in the Department of Pasco, the GOP has provided by Supreme Decree 010-82-TC dated March 24, 1982, that the roads Puente Paucartambo-Puerto Bermudez and Puente Paucartambo-Pozuzo of the Project area be maintained by the Junin Directorate of Roads. This decision of the GOP is rational since at the present time there are no road connections between the MTC maintenance centers of the Departmental Directorate of Pasco and the Project area. The 1982 budgetary allocations to serve the road network of the department were insufficient to finance an adequate level of personnel and to maintain a continuing supply of spare parts to keep the machinery operational. As a consequence, the road network of the zone is inadequately maintained.

When the Ministry of Transportation and Communications was reorganized under the Military Revolutionary Government, a semi-autonomous new agency called the Mechanical Equipment Service (SEM) was created. SEM's function was to rent the heavy equipment needed for road construction and maintenance to the MTC regional offices. The rationale for this arrangement was that if part of its income were dependent upon equipment rental, SEM would be more likely to keep the equipment in satisfactory operating condition. Unfortunately, this reasoning did not work and SEM's record of equipment availability and maintenance was very poor, in large part because SEM did not have adequate maintenance facilities and did not had sufficient liquidity to purchase the spare parts necessary to keep the machinery operational. Thus, SEM has been abandoned and its scarce facilities and machinery have been turned over to the Departmental Directorate of Road.

The current MTC practice is to contract for most major road construction and upgrading jobs. Some smaller jobs, such as the upgrading of parts of the feeder road network, have been done by force account, although this work has been extremely limited due to the lack of operating equipment and budgetary resources.

In the Huallaga Central/Bajo Mayo Project area, the Special Project Office has entered into an agreement with the Ministry of Transportation and Communications to review and approve all road design and construction contracts and also to assist the Special Project in supervising the construction of roads and bridges financed under the Sub-Tropical Lands Settlement Project. The Special Project has then contracted directly with private firms for road design, construction, and supervision. The system has worked well and has allowed road design and construction to move at a faster pace.

The maintenance portion of the Sub-Tropical Lands Development and Upper Huallaga Agricultural Development Projects operates on the basis of

an agreement between the Special Project and the MTC under which road maintenance equipment is purchased by the Special Project Office and then turned over to MTC along with supplementary budget support for maintenance of the road system in the Project Area. It became clear fairly early in Project implementation of the above mentioned Projects that the lack of an adequate equipment maintenance capability was a major constraint to keeping Project area roads well maintained. With the heavy seasonal rainfall in both areas, the major trunk roads were frequently in very bad condition. Based upon this experience with road maintenance, emphasis has been placed upon providing for adequate road maintenance in the Palcazu area through provision of technical assistance, equipment, a maintenance workshop to be built at Iscozacin and personnel costs.

T A B L E I

MECHNICAL EQUIPMENT REQUIREMENTS

RIO PICHINAZ - RIO POZUZO ROAD (80 Kms).

ACTIVITY	DUMP TRUCK	FRONT LOADER	ROLLER	WATER TRUCK	GRADER	AGRICULTURAL TRACTOR
- Slide Removal	40 d	40 d	-	-	-	-
- Filling of Potholes	240 d	60 d	120 d	-	-	-
- Grading	-	-	40 d	40 d	40 d	-
- Clearing of Ditches	80 d	-	-	-	40 d	-
- Culvert Maintenance	-	-	-	-	-	-
- Vegetation Control and Slope Protection	40 d	-	-	-	-	40 d
- Replacement of Surfacing Material	80 d	20 d	20 d	20 d	20 d	20 d
- Bridge Maintenance	-	-	-	-	-	-
T O T A L (T)	480 d	120 d	180 d	180 d	100 d	60 d
1.25 (T)	600 d	150 d	225 d	225 d	125 d	75 d

TABLE II

MECHANICAL EQUIPMENT REQUIREMENTS

FEEDER ROADS (70 Kms).

ACTIVITY	DUMP TRUCK	FRONT LOADER	ROLLER	WATER TRUCK	GRADER	AGRICULTURAL TRACTOR
- Filling of Potholes	94 d	24 d	47 d	47 d	-	-
- Grading	-	-	18 d	18 d	18 d	-
- Clearing of Ditches	35 d	-	-	-	18 d	-
- Culvert Maintenance	-	-	-	-	-	-
- Vegetation Control and Slope Protection	27 d	-	-	-	-	27 d
- Replacement of Surfacing Material	56 d	14 d	14 d	14 d	14 d	14 d
- Bridge Maintenance	-	-	-	-	-	-
TOTAL (T)	212 d	38 d	79 d	79 d	50 d	41 d
1.25 (T)	265 d	48 d	99 d	99 d	63 d	52 d

TABLE III

MECHANICAL EQUIPMENT REQUIREMENTS

UNIT	RIO PICHINAZ-RIO POZUZO ROAD		FEEDER ROADS		TOTAL	
	Days per Year	No Units	Days per Year	No Units	Days per Year	No Units
Dump Truck	600	(2)	265	(1)	865	(3)
Front Loader	150	(0.5)	48	(0.2)	198	(0.7)
Roller	225	(1)	99	(0.3)	324	(1)
Water Truck	225	(1)	99	(0.3)	324	(1)
Grader	125	(0.4)	63	(0.2)	188	(0.6)
Small Tractor	75	(0.3)	52	(0.2)	127	(0.5)
SUPPORTING EQUIPMENT						
Stake Truck		1		1		2
Equipment Trailer		1		1		1
Pick Up Truck		2		1		3
Fuel Truck		1		1		1
Compressor		1		1		1
Concrete Mixer		1		1		1
Grass Cutter		1		1		1
Electric Generator		1		1		1
Outboard Motor		1		1		1

TABLE IV

LABOR REQUIREMENTS

RIO PICHINAZ - RIO POZUZO ROAD (80 Kms)

ACTIVITY	PERSONNEL		WORKDAYS PER YEAR	MAN-DAYS PER YEAR	
	FOREMAN	LABORER		FOREMAN	LABORER
Slide Removal	1	10	40	40	400
Grading	1	4	120	120	480
Filling of Potholes	1	2	40	40	80
Cleaning of Ditches	1	8	80	80	640
Culvert Maintenance	1	10	60	60	600
Vegetation Control and Slope Protection	1	10	40	40	400
Replacement of Surfacing Material	1	4	20	20	480
Bridge Maintenance	2	16	20	40	320
			TOTAL:	440 Man-days	3,400 Man-days

TABLE V

LABOR REQUIREMENTS

FEEDER ROADS

ACTIVITY	PERSONNEL		WORKDAYS PER YEAR	MAN-DAYS PER YEAR	
	FOREMAN	LABORER		FOREMAN	LABORER
Grading	1	4	47	47	188
Filling of Potholes	1	2	18	18	36
Cleaning of Ditches	1	8	35	35	280
Culvert Maintenance	1	10	27	27	270
Vegetation Control and Slope Protection	1	10	27	27	270
Replacement of Surfacing Material	1	4	14	14	336
Bridge Maintenance	2	16	18	36	288
			TOTAL:	204 Man-days	1,667 Man-days

TABLE VI

ROAD MAINTENANCE EQUIPMENT

(US Dollars, excluding taxes)

TYPE	NUMBER	UNIT COST	TOTAL
Dumptruck	3	40,000	$ 120,000
Front end loader	1	60,000	60,000
Roller	1	35,000	35,000
Water Truck	1	25,000	25,000
Grader	1	60,000	60,000
Tractor (Agr)	1	30,000	30,000
Stake Truck	2	20,000	40,000
Pick up	3	14,000	42,000
Compressor	1	20,000	20,000
Cement Mixer	1	5,000	5,000
Grass Cutter	1	5,000	5,000
Generator, electric	1	15,000	15,000
Equipment Trailer	1	28,000	28,000
Fuel Truck	1	25,000	25,000
		Sub Total:	$ 510,000
		20% Spare Parts:	102,000
			$ 612,000
		20% Freight and Insurance	123,000
			$ 735,000