FEBRUARY 1988

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: 527-0321

4. BUREAU/OFFICE: Latin America and Caribbean — 05

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

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 90

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 88 B. Quarter 4 C. Final FY 88

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

A. FUNDING SOURCE	FIRST FY 88 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	2,078	1,832	3,910	2,078	1,832	3,910
(Grant)	(1,775)	(455)	(2,230)	(1,775)	(455)	(2,230)
(Loan)	(303)	(1,377)	(1,680)	(303)	(1,377)	(1,680)
Other U.S. 1.						
Other U.S. 2.						
Host Country	--	3,060	3,060	--	3,060	3,060
Other Donor(s)						
TOTALS	2,078	4,892	6,970	2,078	4,892	6,970

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) ARDN	120	121	122	--	--	2,230	1,680	2,230	1,680
(2)									
(3)									
(4)									
TOTALS				--	--	2,230	1,680	2,230	1,680

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 111 | 112 | 123 | 211 | 212 | 513

11. SECONDARY PURPOSE CODE: 110

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

A. Code	R/AG	TECH	ENV	COOP	BS	PART	
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

The purpose is: 1) to develop and test technologies for establishing environmentally sound and profitable forest and agricultural production/utilization systems in tropical forest areas which permit sustained production, increasing incomes, and preservation of biological diversity and soil and forest resources, and have applicability to other tropical forest areas in the Amazon Basin and the world; and 2) institutionalize a self-sustaining economic development process in the Palcazu Valley based on Project technologies and systems.

14. SCHEDULED EVALUATIONS
Interim MM 07 YY 89 | MM YY | Final MM YY

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

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

Mission Controller has reviewed and concurs with the methods of implementation and financing included herein.

Robert A. Bonnaffon

Robert Bonnaffon, Controller

17. APPROVED BY
Signature: Donor M. Lion — Donor M. Lion
Title: Director
Date Signed:

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

PROJECT AUTHORIZATION

Name of Country: Peru
Name of Project: Central Selva Resource Management, Phase-II
Number of Project: 527-0321
Name of Loan: 527-T-

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Central Selva Resource Management Phase-II (CSRM-II) Project for Peru (the "Cooperating Country") involving planned obligations of not to exceed One Million Six Hundred Eighty Thousand United States Dollars ($1,680,000) in loan funds ("Loan") and Two Million Two Hundred Thirty Thousand United States Dollars ($2,230,000) in grant funds ("Grant"), over a two month period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process to help in financing foreign exchange and local currency costs for the Project. The planned life of project is two years and two months from the date of initial obligation.

2. The project ("Project") consists of developing and testing, through an integrated research and demonstration program in the Palcazu Valley, appropriate technologies for establishing tropical forest and agricultural resource production and utilization systems in tropical forest areas that are environmentally sound and profitable and permit sustained production, while preserving the rich biological diversity and soil and forest resources. A complementary purpose is to install in the Palcazu Valley an economic development process that is self-sustaining, competently managed by Peruvian institutions, and based on environmentally sound technologies and systems generated and tested by the Project.

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, 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 Commodities, Nationality of Services (Loan)

Commodities financed by A.I.D. under the Loan shall have their source and origin in Peru or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. The suppliers of commodities or services, including ocean shipping, shall have Peru or countries included in A.I.D. Geographic Code 941 as their place of nationality, except as A.I.D. may otherwise agree in writing.

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

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

d. Conditions Precedent (Loan and Grant)

(1) Condition Precedent to First Disbursement of Loan Funds to Finance Road Maintenance Activities

Prior to the first disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of loan funds to finance road maintenance activities, 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 detailed operation plan, including a vehicle and equipment use plan for all vehicles and equipment purchased under both the original Central Selva Resource Management (CSRM) and CSRM-II Projects, for the road component within the project area.

(2) Condition Precedent to Subsequent Disbursements of Loan Funds to Finance Road Maintenance Activities

Prior to any disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of loan funds to finance road maintenance activities in 1989 and each calendar year thereafter of the project, 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 detailed operation plan, including a vehicle and equipment use plan, for the road component within the project area.

3

(3) Condition Precedent to Disbursement of Loan Funds to Finance Road Construction or Rehabilitation Activities

Prior to the first disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of loan funds for each construction or rehabilitation activity (i.e. construction of logging extraction roads), the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish plans of such construction or rehabilitation activities to A.I.D. for its environmental assessment and approval.

(4) Condition Precedent to Disbursement of Funds to Finance the Forestry Component after June 30, 1989

Prior to any disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of grant or loan funds for the Forestry Component after June 30, 1989, 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 it has transferred title and possession of project-owned wood processing equipment to the Yanesha Forestry Cooperative.

e. Covenants

The Cooperating Country covenants that it will:

(1) Through the National Development Institute (INADE), enter into an agreement with the National Planning Institute (INP) and the National Office of Natural Resources Evaluations (ONERN) to form a committee with representatives of each of the above organizations by no later than December 1988 which will provide policy guidance on a continuing basis, meeting at least quarterly throughout the life of the Project, assure the autonomy and independence of the Regional Development Policy Support Unit (APODESA), approve the Project's annual budgets and plans before they are submitted to A.I.D., and institutionally locate APODESA in INP as an integral part of the organization by August 31, 1990.

(2) Ensure that the Ministry of Agriculture and regional governments take any and all actions necessary to prevent illegal logging operations and other illegal uses of the property in the Yanachaga National Park and San Matías Protection Forest.

(3) Use road maintenance equipment purchased during the original CSRM Project (527-0240/527-T-0790) only in the Project area during the life of the CSRM-II, and provide quarterly reports on the adherance to the implementation of both the road maintenance and vehicle and equipment use plans.

(4) Develop a plan and set of implementable actions by June 1989 to transfer road maintenance responsibilities to the Ministry of Transport and Communications by the PACD.

(5) Through PEPP, evaluate the Project's personnel system, revise the technical and administrative scopes of work (particularly for key personnel), recommend adjustments in salary levels within the limits of Peruvian law governing investment projects, and recruit technically qualified personnel by the end of December 1988.

Simon E. Lin

DIRECTOR
USAID Mission to Peru

6/17/88

Date

Drafted:RLA:ANewton:2/5/88

Clearances:
RLA:ANewton ID, by Phone 2/19/88, 2/25/88, In Person 6/1/88
CD:BDoe ID BAD
RD:RWaldron ID
AOARD:TMiller ID
PROG:WRhoads ID
DD:ASilva ID

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- Exhibit A: PID Approval Document
- Exhibit B: Statutory Checklist
- Exhibit C: Environmental Assessment Decision
- Exhibit D: Congressional Notification of CSRM-II Project
- Exhibit E: GOP Letter of Request for Assistance

Annex II: Technical Exhibits
- Exhibit A: Logical Framework Matrix
- Exhibit B: Issues
- Exhibit C: Detailed Financial Analysis
- Exhibit D: Detailed Economic Analysis
- Exhibit E: Detailed Social Soundness Analysis
- Exhibit F: Environmental Assessment
- Exhibit G: Detailed Implementation Plan
- Exhibit H: Illustrative Research Plan
- Exhibit I: Institutional Details for Project Implementation-APODESA-July 15, 1988 to September 30, 1990
- Exhibit J: Project Development Contributors
- Exhibit K: Organizational Charts, INADE and PEPP
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LIST OF ABBREVIATIONS AND ACRONYMS

ABBA	Amuesha Bilingual Professors Association
APODESA	Regional Development Policy Support Unit (Apoyo a la Política de Desarrollo de la Selva Alta)
BAP	Peruvian Agricultural Bank
B/C Ratio	Benefit/Cost Ratio
CP	Condition Precedent
CY	Calendar Year
CSRM	Central Selva Resource Management
CSRM-II	Phase Two Central Selva Resource Management Project
EA	Environmental Assessment
ENTEL	National Telecomunications Enterprise (Empresa Nacional de Telecomunicaciones)
EOPS	End of Project Status
FECONAYA	Federation of Amuesha Native Communities
FY	Fiscal Year
GIS	Geographic Information System
GOP	Government of Peru
Has.	Hectares
INADE	National Institute for Development (Instituto Nacional de Desarrollo)
INFOR	National Forestry Institute (Instituto Nacional Forestal)
INIAA	National Institute for Agricultural and Agro-Industrial Research (Instituto Nacional de Investigación Agrícola y Agro-Industrial)
INP	National Planning Institute (Instituto Nacional de Planificación)
IRR	Internal Rates of Return
Km.	Kilometers
LOP	Life of Project
MOA	Ministry of Agriculture (Ministerio de Agricultura)
MOH	Ministry of Health (Ministerio de Salud)
MTC	Ministry of Transport and Communications (Ministerio de Transportes y Comunicaciones)
NFM System	Natural Forest Management System
NPV	Net Present Value
OARD	Office of Agriculture and Rural Development
ONERN	National Office of Natural Resources Evaluation (Oficina Nacional de Evaluación de Recursos Naturales)
PACD	Project Assistance Completion Date
PDR	Rural Development Project - Palcazu
PEPP	Pichis Palcazu Special Project (Proyecto Especial Pichis Palcazú)
PIL	Project Implementation Letter
PP	Project Paper
REMS	Regional Environmental Management Specialist
Selva	The tropical forest areas of Peru.
Sierra	The highlands of Peru.
TA	Technical Assistance
TSC	Tropical Science Center
UNA	National Agrarian University (Universidad Nacional Agraria)

I. PROJECT RECOMMENDATIONS AND SUMMARY

A. Recommendations

It is recommended that a two-year, one-month Phase Two Central Selva Resources Management (CSRM-II) Project be authorized for implementation from September 1, 1988 to September 30, 1990. It is further recommended that, to provide funding for CSRM-II:

1) a loan be authorized to the Government of Peru (GOP) for this purpose in the amount of $1,680,000, to be reobligated in FY-88 from deobligated loan resources originally authorized and obligated for Project No. 527-0240, "Central Selva Resources Management" (CSRM), under the same terms and conditions as the original loan authorization; and

2) a grant be authorized for this purpose in the amount of $2,230,000 to be reobligated in FY-88 from deobligated loan resources originally authorized and obligated for Project No. 527-0240, "Central Selva Resources Management".

The CSRM Project (No. 527-0240) Project Assistance Completion Date (PACD) was extended from June 30, 1988 to September 30, 1988 to allow time to initiate CSRM-II, maintain the needed connections between the two Projects, complete procurement under CSRM, and permit the CSRM Project to come to an orderly close.

B. Summary Description

1. Background

The original CSRM Project with its eleven components provided the principal knowledge and informational inputs into the design of CSRM-II. The CSRM Project, proposed as a traditional integrated rural development undertaking, acquired more of a natural resources management focus during the design stage, but actual implementation which began in mid-1983 was dominated by the traditional development orientation for several years. Implementation was slowed and negatively affected by this conflict between the two approaches, the growing evidence of the Project area's ecological unsuitability for the planned intensive agricultural use, internal delays such as the time needed for titling of native lands, effects of the El Niño natural disaster, and the change in government which resulted in less emphasis on selva development. Despite these problems and delays, considerable implementation progress occurred after 1985.

A major external evaluation occurred in early 1985 after two years of Project implementation. It concluded that the basic objectives were sound but the programmed outputs could not be achieved by the PACD and

recommended some activities be redesigned, resources reprogrammed, outputs redefined and the PACD extended. As a result, the CSRM Project PACD of September 30, 1987 was extended to June 30, 1988, and subsequently to September 30, 1988, and design of the new CSRM-II Project initiated to support more specifically the research and demonstration activities.

2. Problem, Rationale and Strategy

The problem was, and remains: how to manage fragile high-jungle areas, such as the Palcazu Valley, to permit sustained production while protecting the environment and biological diversity.

CSRM-II rationale includes: 1) the need to preserve the jungle ecology from the ruinous effects of uncontrolled development (including creation of conditions for entry of coca production); 2) the strong basis provided by the original CSRM Project for CSRM-II research and demonstration efforts; 3) the need to strengthen GOP capability to implement environmentally sound natural resources management to high jungle development; 4) the provision of a technical knowledge and experience base for incorporating selva native communities into the development process; and, 5) the support of both GOP and USAID agricultural and rural development strategies and policies.

The strategy is threefold:

a. Develop, test and initiate institutionalization of a research and demonstration process to stabilize and manage economic resources for sustained forestry and agricultural production in the Palcazu Valley.

b. Protect fragile natural resources and existing population groups to insure sustained productivity.

c. Institutionalize and strengthen a policy and planning entity with the ability to collect and analyze data, assess alternative high jungle development options, and present findings to GOP decision-makers and planners.

3. Project Description

The Project, comprised of eight components; project management, forestry production/utilization research, crops and livestock production research, environmental protection, extension and social development, road maintenance, and regional development policy support, will immediately benefit the inhabitants of the Valley that comprises the Project site. The results of CSRM-II will potentially benefit other high jungle inhabitants in not only the Amazon Basin, but other similar areas of the world.

4. Financial Plan

Table 1, below summarizes the financial plan for the life of Project (LOP) by Project components and sources of funds.

TABLE 1. Summary LOP Financial Plan for CSRM-II

COMPONENTS	AID GRANT (US$000's)	AID LOAN (US$000's)	GOP COUNTERPART CONTRIBUTION (US$000's)	TOTAL AID AND GOP RESOURCES (US$000's)
1. Project Management	418	98	398	914
2. Forestry	598	251	349	1,198
3. Crops/Livestock	258	271	397	926
4. Protection	114	38	117	269
5. Continuous Land Use Inventory	18	29	142	189
6. Extension & Social Development	389	155	413	957
7. Road Maintenance	170	327	676	1,173
8. Regional Development Policy Support by APODESA	184	350	113	647
9. Inflation/ Contigencies	81	161	455	697
TOTAL	2,230	1,680	3,060	6,970

C. Project Design Issues

Several issues were raised during the design process and are addressed throughout this Project Paper (PP) and in Annex II, Exhibit B.

D. Summary Findings of Project Analyses

The Project Development Committee has reviewed all aspects of the CSRM-II Project and has concluded that it is institutionally, financially, economically, technically, socially and environmentally sound and consistent with the development objectives of the GOP and with Mission strategy and objectives. The Project Development Committee recommends that the CSRM-II Project be authorized.

E. Project Development Contributors

See Annex II, Exhibit J.

II. BACKGROUND AND JUSTIFICATION

A. Original CSRM Project

Experience gained, progress made and lessons learned during implementation of the original CSRM Project (1982-87) have been the primary knowledge and informational inputs into the design of CSRM-II. The following sections provide a description of the development and implementation history of the original CSRM Project, a summary of the findings of a major external evaluation carried out in 1985, and a brief description of progress achieved in each of the activities supported under that Project.

1. CSRM Development and Implemention History

The original CSRM Project initially was proposed by the GOP as a traditional area development undertaking, based on conversion of tropical forest to intensive cropping or pasture systems with sustained production increasingly dependent on purchased inputs. It was one of several projects for development of areas accessed by the Carretera Marginal de la Selva,1/ and included routing the main highway through the Palcazú Valley, the Project site. Prior to this Project and beginning in 1980, the Special Project Pichis-Palcazú (PEPP) was working in the Palcazú Valley under a traditional area development approach to colonization and production. During design, the Project was given more of a natural resources management focus. However, even with this focus, the final Project design was overly optimistic in terms of the agricultural 2/ production potential of the area. The traditional development orientation continued to dominate Project activities for the first years after approval for A.I.D. funding support in 1982.

Subsequent field investigations conducted early in the Project implementation process revealed that the area, like much of the Peruvian high jungle, was ecologically unsuited to intensive agricultural use. Heavy rainfall, erodible, acid, infertile soils with aluminum toxicity, and rolling to steep terrain limited production activities primarily to forestry, with some agricultural production along the river alluvial plain and some cattle grazing of adjacent foothills. Valley Indians of the Amuesha tribe and some long-term colonists had already come to terms with the reality of the fragile environment and were essentially living and farming in balance with it, although pasture deterioration was leading colonists to convert additional forest to pasture in order to maintain output.

1/ The Carretera Marginal de la Selva is a road construction program proposed and initiated by the first Belaúnde government in the 1960's to provide a north-south highway along the eastern slopes of the Andes to connect all the east-west roads running from the coast through the Andes and to facilitate development along its route.

2/ Use of the term agriculture refers to both crops and livestock.

The Carretera Marginal was steadily advancing, and with it would come commercial logging, spontaneous or planned colonization and environmental degradation. It became increasingly clear that these negative effects of the Carretera Marginal would not be forestalled if the Project was implemented in accord with its original design, based on optimistic assumptions about the area's agricultural production potential. It soon became evident that a sustainable approach to natural resources management, based on achieving sustained production consistent with land capability through appropriate land use and environmentally sound methods would be required to avoid serious ecological and environmental degradation in the Valley. It also became clear that time and research were required to understand realistic production constraints in the Palcazú Valley. The original Project design for the agriculture and livestock development components was oriented towards increasing productivity through transferred technology involving conventional purchased inputs (such as fertilizer, chemicals, improved seed) and production of a surplus for an external market. This orientation failed to take into account significant transportation problems, the inability of Valley residents to purchase inputs even if they were available, and the precarious fragility of the Valley's land resources and environment. It took almost a year and a half of investigation by an exceptionally astute advisor before the agricultural objective of the Project was changed to one of stabilizing the principal existing agricultural enterprises (pasture-raised beef production and a bush fallow rotation for subsistence crop production) to seek to sustain yields, and eventually to improve them with minimum purchased inputs. A similar learning and reorientation period was required for the other Project components as well, and with the assistance of a resident anthropologist and several short term specialists, Project beneficiaries became more directly involved in Project activities.

Initial GOP Project leadership was reluctant to accept the natural resources management approach to development of the Palcazú Valley. This was exemplified by unwillingness to give necessary attention to social development questions, and to implement the forestry component of the Project, which traditional forest extraction industry interests viewed as a distinct threat. These initial traditional attitudes of GOP Project leadership and field technicians conflicted with the perspectives of the first forestry and land use advisors fielded in late 1983 who advocated a less traditional natural resources management approach. Considerable time was required to build a constituency within GOP Project management for testing a new environmentally sensitive natural resources management system. This constituency is now in place at both the central PEPP and field levels, but requires continuous nurturing to assure continued comprehension and commitment as personnel changes occur over time at the field and senior Project management level.

A variety of other internal problems arose during Project implementation which caused considerable delays. For example, Condition Precedent (CP) 5.2 of the Project Agreement related to titling of native lands was not met until a year after signing of the Project Agreement. This delayed construction of Project facilities in the remote Palcazu Valley which were necessary for technical assistance (TA) advisors to begin to function effectively. It similarly delayed the employment of counterpart professional staff, without which external TA was limited in its effectiveness.

These Project implementation delays were exacerbated by external events. The El Niño disaster of 1983 diverted both senior GOP attention and resources from development of the Selva to rehabilitation of the Coast and Sierra, and contributed to the economic crisis of 1983-85. These events forced continued austerity resulting in reduced availability of Project counterpart funds and subsequent delayed loan funding. Construction of the penetration road, a critical prerequisite for implementing all other Project components, was to be financed entirely with GOP counterpart funds. However, the lack of counterpart funding delayed road construction. It now extends about halfway into the Valley.

External complications also resulted from the electoral campaign in 1985, the resulting interregnum, and a new Administration. The new Administration focussed more on the Sierra rather than on the Selva. Its program priorities have emphasized social equity and development in situ, rather than expansion of the frontier. Nevertheless, the GOP has continued to consolidate investments already made along the Carretera Marginal, albeit with less emphasis than the former Administration. Despite these internal and external problems, considerable Project implementation progress occurred after 1985.

2. Evaluation Findings

Project technical staff, both resident and short term, have monitored, evaluated, and modified the on-going research and development program to adapt it to economic, ecologic, social and cultural reality. There is an extensive literature of resident and short term consultants' reports, program documents and analyses. An external evaluation of the Project 1/ was performed in early 1985. The Project Agreement had been signed in mid-1982, but actual implementation of activities did not begin until the second semester of 1983, and even then with only partial staffing. Thus, the evaluation took place approximately two years into Project implementation, when many activities were still being defined and consensus was developing to move from a traditional area production development to a natural resources management approach.

1/ A separate evaluation of the Regional Policy Development Support Unit (APODESA) and its implemention of the Regional Development policy support component was conducted in mid-1986. This Component was designed to provide a data base and policy analysis for the purposes of better GOP decision making and improved resource use in Peru's High Selva. APODESA currently is located in the Special Project Office of the National Institute for Development (INADE) (attached to the Ministry of the Presidency), which manages all special projects in this region. APODESA received generally good marks for its technical performance, given its limited funding and administrative environment. APODESA serves an important supporting function to INADE's high jungle projects by providing data and analysis on actual and potential land use which is used by field project staff to plan and implement project activities. However, APODESA needs to have greater influence on high jungle development policy decisions using the data and Geographic Information System (GIS) base that it has developed.

The evaluation team characterized as excellent the concept of sustained forest exploitation using rotating strip-cuts with natural regeneration. It was critical of the agricultural program, noting that there had been minimum production development in the agricultural and livestock development components. The team recommended massive trials of traditional crops. It considered the decision to limit production of livestock based on the fragility of the forest ecosystem to be excessively protectionist given national needs for basic foodstuffs. It was justifiably critical of the high cost purchased input technology swine program, enthusiastic about the introduction of hair sheep, and recommended more funding for pasture improvement. It also noted that the Health and Environmental Sanitation component was having some impact but, in general, found little improvement at the time in the wellbeing of the native population and none among colonists.

The evaluation concluded: 1) progress against Project objectives was very limited; and, 2) the basic objectives of the Project remained sound but the programmed outputs could not be achieved in the allotted time. It recommended that some Project activities be redesigned, resources reprogrammed, outputs redefined and the PACD extended.

Despite the team's mixed appreciation of the difficult environment and the potential for development in the Palcazu Valley, its recommendation for reprogramming helped to surface different viewpoints, and eventually led to a GOP and A.I.D. consensus to change from the traditional area development approach to one of research emphasizing sustainable forest and agricultural production and utilization through natural resources management. Also, in response to an evaluation recommendation, the PACD was extended from September 30, 1987 to June 30, 1988 to allow time to more carefully design the CSRM-II Project. The extended PACD was intended to provide time to initiate implementation of CSRM-II. However, a limited obligation "window" did not allow the Mission to conclude CSRM-II Project negotiations with the GOP and the PACD was further extended to September 30, 1988, now the current PACD.

3. Progress Achieved by Activity During CSRM Implementation

The eleven original Project activities were directed largely at developing sustainable and income-generating agricultural and forestry production activities and establishing protection systems in response to the fragile natural resource base encountered in the Palcazú Valley. There now is general agreement that sustainable low input production systems approaches being tested and developed are sound and economically feasible.

Progress achieved in each of the original Project components is summarized below.

a. Project Management (PEPP) - A fully staffed field office with technical, administrative and procurement units has been established in Iscozacin with research/extension sites in Iscozacin, Puerto Mayro, Laguna, and Loma Linda. Approximately 250 Project personnel are implementing the Project.

Administrative structures have been developed to respond to both GOP and A.I.D. procurement and financial management requirements. Institutional agreements exist but need to be more fully implemented with the Ministry of Transport and Communications (MTC) for road maintenance, the National Forestry Institute (INFOR) for forestry control activities, the National Institute for Agricultural and Agro-Industrial Research (INIAA) for agricultural and forestry research and technology transfer, the National Meterological Service, the Ministry of Health (MOH) and the Agrarian Bank.

b. Forestry - The Natural Forest Management (NFM) System is being implemented on 2,000 hectares (Has.) of production forest in the Palcazu Valley. This system involves selecting a given forested area and clear-cutting 20m-50m wide by 200m-500m long strips which are then allowed to regenerate naturally (although some high value species may be replanted). The advantages of the NFM system are that it preserves the diversity of wood species, is ecologically less destructive than high grading or traditional clear cutting, and it is less costly as a means to protect the environment than are traditional clear-cutting and reforestation methods. The social returns are higher and more sustainable in the long run. Under the NFM system, trial strips have been cut in Iscozacin for testing under controlled conditions.

A unique feature of the Forestry Component is the development of a Yanesha Forestry Cooperative (YFC) consisting of five native communities which control forested areas in the Valley. The cooperative organization is consistent with traditional social organization of the communities and also permits management of a wood processing facility. With the technical assistance of forestry and cooperative organization specialists, the YFC is operating a portable sawmill and is processing wood for the local market. A wood preservation facility has been constructed next to the sawmill and has initiated processing activities. This facility produces treated rot-resistant poles, posts, railties, and lumber, thereby increasing value-added at the site. The World Wildlife Fund is providing support to strengthen the cooperative's management and financial systems.

Ten PEPP technicians and 40 YFC members and non-YFC individuals representing seven of the ten native communities in the Valley, are receiving continuous training in the theory and practice of the NFM system. They have identified, inventoried and mapped appropriate forest blocks and have developed management plans for approximately 8,000 Has. of production forest1/. They also are extracting logs with oxen, operating the sawmill and wood processing plant and are applying financial management practices to the entire operation. The organization of this production oriented cooperative is the culmination of an intensive three year community development process which involved both native health promoters and project extension agents who worked with participating native communities to resolve both social and economic issues.

1/ While 8,000 Has. of production forest have been mapped, the Project is concentrating on management of 5,000 Has.

c. Agricultural Development and Livestock Development - An applied on-farm research and extension program is testing alternative production technologies for four annual and seven perennial crops. Improved production systems for sheep, swine, and guinea pigs also are being adapted to the environmental and socio-economic realities of the Valley. Sustainable production using limited inputs is the key focus of crops and livestock technologies being developed. Beginning in 1986, the Project introduced and distributed 58 tropical hair sheep modules (over 1,000 animal units) to small farmers. Two species of improved forages for pasture renovation, and three leguminous tree crops for timber, firewood, and ground cover have been tested to improve soil productivity and to provide additional marketable output. Integrated farming systems have been tested and developed for robusta coffee, peach palm, and leguminous ground covers in existing crop rotations. These systems are being tested by more than 100 farmers (approximately 15% of all local farmers).

d. Protection - The Yanachaga National Park (123,000 Has.) on the western upper watershed and the San Matias Protection Forest (145,000 Has.) on the eastern slopes of the Palcazu Valley have been officially established. Management plans have been developed for these two areas. These plans are being implemented from forestry control sites. Boundaries have been established and a proposal for communal reserves, covering 35,000 Has. adjacent to the park and protection forest, has been presented to the Ministry of Agriculture (MOA) to prevent uncontrolled settlement of the fragile lower slopes. A Forest Control Station has been constructed. Additional protection sites are being proposed with assistance from The Nature Conservancy and the Peruvian Foundation for Nature Conservancy.

e. Continuous Land Use Inventory - Land use capability classifications of the Valley were prepared and are being used by the agroforestry technicians to promote appropriate land use.

f. Health and Environmental Sanitation - This component is headed by a medical doctor who supervises four health posts and one medical center. The Project initiated the first and now continuing vaccination campaigns and primary health care program in the Valley. A revolving medical fund has been established which permits isolated Valley residents to purchase medicines from health promoters at a price covering the costs of the medicine and the promoter services. The program now covers all ten native Amuesha communities and colonists; an estimated 7,000 people.

An institutional agreement has been signed with the University of Cayetano Heredia to provide doctors and dentists for the primary health care program. Through the program, 20 native promotors have been selected and provided with continuous training in first aid, nutrition, dental hygiene and primary health care. According to A.I.D.'s health officer, this is one of the more successful field oriented primary health care programs in Peru.

The primary health care program provided an important entree into the community which "opened the door" to further work with the communities and farmers on agro-forestry production activities. As part of the environmental sanitation efforts, a water system was designed for the town of

Iscozacin, and construction will begin shortly to provide potable water to approximately 85 families.

g. Feeder Road Planning and Road Maintenance - This component provided for the construction of a depot in Villa Rica and currently operates approximately 25 pieces of road maintenance equipment to maintain 58 Kms. of road in the Project area. The road unit prepared the site for the wood processing center and constructed a 1.5 Km. trail for log extraction from the first YFC owned forestry strip. A dry season road and four of the six scheduled bridges in the Project area have been completed with GOP counterpart funds as planned.

h. Communications - An agreement was signed by PEPP and ENTEL-Peru for the design of a satellite communications system as proposed in the original design. Feasibility studies and design work were completed. These indicated that radios were more feasible under local conditions given the number of beneficiaries. Radios have been procured for use by project administrative and technical units.

i. Regional Development Policy Support by APODESA - This component provides data, analyses, and guidance to the GOP on high jungle development and conservation projects. Utilizing the Geographic Information System (GIS) developed for and implemented in APODESA, computer mapping is nearly complete which shows Palcazú Valley soils, rainfall, land tenure, land use and forest species. Staff training was conducted in tropical forest and natural resource management for all APODESA staff. APODESA has completed evaluations of four high jungle special projects. This information, available and used at the Project sites by field level technicians to target the agricultural and forestry production programs, is invaluable to plan, monitor and evaluate activities at the Project level. However, a broader high jungle development policy impact by this unit has not yet occurred.

j. Social Development - In early 1986, the Project added this component to better support and coordinate the extension activities of the technical production and health group, through the creation of a separate extension unit. This unit has been able to develop initial extension packages for project beneficiaries by coordinating previously fragmented extension activities carried out by individual units. It also has been instrumental in organizing the YFC and in obtaining the required legal status and permits for the Cooperative.

Other significant actions completed during five years of the original CSRM Project, with three years of active field implementation include: establishment of the Project camp at Iscozacin; road construction into the Valley; procurement of vehicles, equipment, and scientific supplies; and, the recruitment/placement of Project personnel. Thus, the Project has reached full implementation. Much has been learned by both the GOP and USAID about the development of appropriate, sustainable technologies and about how to transfer that technology in the Selva environment.

B. Problem Statement

The basic problem was, and remains: how to manage fragile high jungle areas, such as the Palcazú, to permit sustained production while protecting the environment and protecting biological diversity. The original CSRM Project was designed to approach this problem from an area development/rapid production expansion perspective. This approach has been determined to be inappropriate under Palcazú Valley conditions. CSRM-II design, as the result of lessons learned during implementation of the original CSRM Project, utilizes a research and development approach to resolving the stated problem. In this respect, CSRM-II responds to the economic, technological and environmental realities in the Valley. It focusses on applied and adaptive research and demonstration activities to develop and test appropriate, profitable production/utilization technologies that are environmentally sound and permit sustained production while preserving the rich biodiversity of the area. Even more important, CSRM-II, although physically located in the Palcazú Valley, is designed to develop production systems technologies applicable to many areas of the Amazon Basin and to other tropical forest areas of the world. In this sense, the Valley is serving as a testing and demonstration laboratory.

C. CSRM-II Project Rationale and Strategy

1. Rationale

A number of the major assumptions underlying the original CSRM Project rationale now are known to be invalid: namely that, a) the Palcazú Valley has considerable crop and livestock production potential; b) existing production technology from elsewhere can be adapted quickly to agro-ecological conditions in the Valley; c) the combination of considerable crop/livestock production potential and easily adapted production technology, when combined with agricultural investment credit, will result in widespread extablishment of productive agricultural enterpises throughout the Valley; and, d) extraction and processing technology for timber production will be easily adapted to Valley conditions, and within a period of five years if credit is made available, timber extraction processing enterprises will be established on a wide scale.

As the original CSRM Project was implemented, it became increasingly clear that the original rationale was not realistic for A.I.D. development assistance in the area. Nevertheless, there is a sound rationale for A.I.D. to continue to give high priority in its development assistance portfolio to project activities that address issues and problems related to high jungle development in Peru. The Mission proposes to respond to this priority by initiating the CSRM-II Project described in this Project Paper with its new orientation of research and demonstration activities. The rationale for CSRM-II is summarized below.

Given the scarce productive and resource base on the Peruvian coast and in the Sierra, combined with the high cost of expanding that base thorough irrigation, and given generally limited economic opportunities in the rest of Peru for much of the existing population, the Peruvian Selva will continue to be looked upon by Peruvian governments as a major opportunity for rapid agricultural production and economic growth and development. It also will attract increasing numbers of entreprenuers and families seeking economic opportunities.

Many areas of the more accesible Peruvian Selva already have experienced considerable growth and development as the result of government programs and individual initiative. Even though this development process has taken place to date primarily on less fragile lands and under agro-ecological conditions generally more favorable to conventional production systems, widespread environmental damage and forest destruction already has taken place in several areas. As the development process is pushed into more and more fragile and ecologically sensitive areas, even greater damage to the ecology, to renewable resources, and to long run productive potential will occur unless resource management alternatives, economic enterprise options and protection systems (and appropriate technologies for applying these) are developed, tested and made available. The process of rapid exploitation that depletes existing forest resources, and provides for no (or only marginal) alternative productive opportunities, creates conditions for entry of coca production. The Central Huallaga Valley area is stark testimony to this process.

Important lessons have been learned during implementation of the original CSRM. Progress has been made in developing alternative enterprises and in ecologically sound technology generation that permit sustained production. This establishes a solid base for undertaking a research and demonstration effort that will generate outputs applicable to vast areas of as yet undeveloped Peruvian Amazon Basin areas (an estimated 46,000,000 Has. of production forest), as well as to the Amazon Basin in neighboring countries and to areas with similar ecological characteristics in other parts of the world.

It also is reasonable to carry out this research and demonstration effort in the Palcazú Valley in order to fully utilize and take advantage of the the installation already constructed and progress achieved by the CSRM Project. The Palcazú Valley has the added advantages of being reasonably accessible, of having extensive areas of virgin forest not destroyed or altered by uncontrolled cutting and of being free of security problems related to coca traffic and/or terrorism.

Other underlying reasons for carrying out CSRM-II are: a) to strengthen the ability of the GOP to implement an environmentally sound natural resources management approach to high jungle development; b) to provide a technical knowledge and experience base for incorporating Selva native communities into the development process in a manner consistent with their social organization and cultural background; c) to assist in developing

a GOP capability to plan and execute rational development activities in the high jungle; and, d) to contribute to the GOP and USAID agricultural and rural development strategy of improving productive resource use efficiency while conserving the permanent resource base.

Finally, an important underlying reason for CSRM-II is its lead contribution (in continuing production forest management research and enterprise organization development initiated under CSRM) to preserving biological diversity while promoting sustainable tropical forest production. In this respect, the Project directly responds to U.S. Congressional and growing worldwide interest in learning how natural resource use for economic development can take place in third world tropical forest areas, while preserving the rich biological diversity of such areas.

2. Strategy

The original CSRM Project goal was "to increase and diversify agricultural production in the Peruvian high jungle," and the original primary purpose was to "plan and execute a development project for sustained production in the Palcazú Valley..." Thus, CSRM was essentially a "Palcazú Valley Development Project".

CSRM-II is not this type of development project. The goal of the new Project is "to institutionalize an agricultural and forestry technology research and demonstration program appropriate to the technological and ecological needs of tropical forest areas", and the primary purpose is "to develop and test, through an integrated research and demonstration program in the Palcazú Valley, appropriate technologies for establishing environmentally sound and profitable forest and agricultural production/utilization systems in tropical forest areas." Such systems should permit sustained production and increasing incomes, while preserving the rich biological diversity and soil and forest resources, following recommendations in the attached Environmental Assessment (Annex II, Exhibit F).

A secondary purpose of CSRM-II is to install in the Palcazú Valley a self-sustaining and competently managed (by Peruvian institutions) economic development process based on the environmentally sound technologies and systems developed and tested by the Project. Project goal and purposes will be achieved through implementation of three integrated sets of activities, described below.

a. Develop, test and initiate institutionalization of a research and demonstration process to stabilize and manage economic resources for sustained forestry and agricultural production in the Palcazu Valley.

This requires development and testing of production resource management alternatives that permit stabilization of the productivity of tropical forest, agriculture and livestock production systems. Stabilization of productivity should be at the highest productivity levels consistent with sustainability, soil and climatic factors and realistic input levels for the area.

This modest but difficult undertaking recognizes that existing systems in the Valley are unsustainable. It also takes into account the very limited technical and material resources of Valley inhabitants, the limited potential and fragility of the land base, the uncertain availability and high cost of purchased inputs, and the limited types of products that can be marketed from the Valley. Achievement of sustainable tropical forest, agriculture and livestock production systems with little increase in inputs would be a major contribution to stable settlement of the Palcazu and to other areas of the Amazon Basin. Institutional arrangements will be implemented to insure that research results are disseminated, and that continued monitoring of long term research and of the application of research results takes place. (See Annex II, Exhibit H, Illustrative Research Plan.)

b. Protect fragile natural resources and existing population groups to insure sustained productivity.

The Yanachaga National Park and the San Matias National Protection Forest established during CSRM implementation are essential to the environmental and ecological integrity of the entire watershed. Cutting or other disturbance of these steep slopes along the bounding ridges of the Valley floor will quickly lead to erosion and landslides with siltation in the rivers of the Valley floor and consequent flooding of land in the Valley (as well as downstream areas) potentially suitable for agriculture.

Based on progress made under CSRM, CSRM-II activities 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 and that will benefit them socially and economically.

c. Institutionalize and strengthen a policy and planning entity with the ability to collect and analyze data, assess alternative high jungle development options, and present findings to GOP decision-makers and planners.

CSRM-II will support APODESA to expand its current strong field oriented data collection and analysis capability to include effective presentation of its findings to high level GOP decision makers. To help assure a long-term GOP high jungle natural resource planning and development capacity, CSRM-II will assist INADE and the National Planning Institute (INP) to permanently institutionalze APODESA in a way to permit it to effectively conduct jungle development policy analysis, to objectively evaluate public/private jungle investment programs, and to effectively present findings to GOP decision makers involved in jungle development programs and projects.

D. Design Considerations Based on Lessons Learned from Original CSRM Project

Lessons learned from CSRM implementation experience contributed significantly to CSRM-II design, especially with regard to type and level of activities to be included in support of the primary research and

demonstration activities. Decisions about inclusion of the following supporting activities were based on CSRM lessons learned.

1. Road Maintenance: Because of past CSRM implementation difficulties, especially with regard to inappropriate utilization of road maintenance equipment, inclusion of a road maintenance activity in CSRM-II was a design issue. It was decided to include a road upgrading maintenance activity in CSRM-II because continuing road access to the Valley (only as far as Iscozacin) is critical to being able to effectively carry out the research program, and for marketing of forestry and agricultural products from demonstration enterprises. In addition, initiation of a self-sustaining development process in the Valley, including provision of government services, would not be possible without road access. Section D.7., of Chapter III, "Project Description", discusses planned improvements in monitoring and utilization of road maintenance equipment, while Sections B and C of Chapter V, "Project Analyses", discuss the economic and technical feasibility of road maintenance. Annex II, Exhibit F, "Environmental Assessment", discusses the environmental safeguards and limitations on road maintenance, rehabilitation and new construction.

2. Extension and Social Development: The Extension and Social Development Component in CSRM proved to be a major factor in facilitating demonstration of crops, livestock and forestry management technologies by coordinating what could previously be characterized as disparate outreach activities by Project technical staff. Activities under this Component were directly responsible for the formation of the YFC. See Section II.A.3, the Social Soundness Analysis (Section V.E.), and Annex II, Exhibit E, Detailed Social Soundness Analysis for further details on the mechanisms developed to involve the community in project implementation. The value of this approach and the need to work with the local communities in a logical and coordinated approach, led to the determination that this demonstration outreach activity should be continued under CSRM-II.

3. Health and Environmental Sanitation Component: The Health and Environmental Sanitation component under CSRM was designed as part of an integrated rural development approach to improve the availability and quality of social services which were non-existent in the Palcazu Valley. An innovative primary health service delivery system was established and is recognized as a very successful primary health care effort. This component also was instrumental in overcoming initial mistrust of the original Project by the native Amuesha population and colonists, and facilitated their participation in the Project. It served to bridge a gap that would have considerably reduced the impact of technology dissemination efforts and acceptance of the NFM system. Under CSRM-II, minimal assistance will continue to be provided to the health centers as part of the Extension and Social Development Component while the MOH fully takes over these functions (a process that already is well underway). The environmental sanitation activities of this component will be assumed by the GOP and funded with CSRM-II counterpart.

4. Communications: CSRM plans called for installation of satellite communications capabilities in the Valley. This subsequently was determined not to be cost-effective nor reliable under Valley conditions. High-frequency radio equipment was purchased instead. PEPP will operate, maintain and repair this equipment using counterpart funds. Thus, communications investments are not included in CSRM-II

5. Regional Development Policy Support by APODESA: An evaluation of this CSRM component in 1985 found that APODESA was providing field-level land use capability data to INADE's high jungle projects, but that its ability to influence GOP planners and decision-makers was minimal. The Project team carefully analyzed the pros and cons of continued support to this component and decided it should be included in CSRM-II for the following reasons: a) Peru has an ongoing need for this type of competent data collection and analysis; b) the GOP will move this unit into INP by the end of the Project to better institutionalize it and where it can have a much needed direct and important influence on policymakers 1/; c) this unit can continue to provide field level implementation support of several high jungle projects through supply of needed information to properly evaluate land use and demographic/migration patterns; and d) proposed initiatives in tropical forest conservation/utilization supported by international donors are expected to continue and will require an analytical capability to assist in their design and implementation. As described in the "Project Description", Section III.D.8; a plan to institutionalize this component will be implemented during CSRM-II.

In summary, the differences between the original CSRM and CSRM-II are substantial. The principle objective of the original CSRM Project, of production (in eight of ten activities), was found to be untenable in the Valley. This major finding of CSRM implementation experience resulted in a new project goal and purpose for CSRM-II, as well as a fundamental alteration and curtailment of the scope and composition of activities and level of resources. The production orientation was eliminated to be replaced with one of research and demonstration. For example, in CSRM-II, outputs are eliminated that relate to land being brought into agricultural/forestry production. The original land area targets, 20,000 Has. for crops, 10,000 Has. for pasture, and 120,000 Has. for forestry management, are limited to on-farm and other research demonstrations of 760 Has., 500 Has. and 5,000 Has., respectively. Other major changes in activities include: 1) total deletion of the satellite communications and extensive reduction in the credit for agricultural and livestock production; 2) reduction of the forestry production activity from six wood processing centers to one center to be financed with project credit funds; 3) assumption of nearly all

1/ To make the transition from APODESA's current situation to an integral part of INP by the end of LOP, the INP, National Office of Natural Resources Evaluation (ONERN) and INADE will form a committee to guide and manage APODESA until the relocation occurs. (See Annex II, Exhibit I for a description of this committee.)

health activities by the MOH; 4) financing of environmental sanitation activities by GOP counterpart funds; and, 5) a new emphasis on developing the ability of APODESA to effectively present findings to GOP jungle development policy makers.

III. PROJECT DESCRIPTION

A. Project Purposes

The primary purpose of this Project is to develop and test, through an integrated research and demonstration program in the Palcazú Valley, appropriate technologies for establishing environmentally sound and profitable forest and agricultural production/utilization systems in tropical forest areas. These systems should permit sustained production and increasing incomes, while preserving the rich biological diversity and soil and forest resources found in these areas. The technologies generated and tested in this Project are expected to have applicability to a wide range of tropical forest areas in the Amazon Basin and in similar areas in other parts of the world.

A complementary purpose is to install in the Palcazú Valley a self-sustaining and competently managed (by Peruvian institutions) economic development process based on the environmentally sound technologies and systems generated and tested by the Project.

B. End-of-Project Status (EOPS)

Specific EOPS to be met by the PACD include:

1. Project Management - PEPP. Cessation of PEPP's involvement by the PACD and assumption of relevant Project activities by GOP Ministries and other appropriate entities.

2. Forestry Production/Utilization Research. Completion of an operational demonstration that tests the technical, economic and social viability of the NFM system and utilization, managed by a native Indian cooperative. Physical, economic and social data on operating methods, yields, costs, returns and markets will contribute to promotion of the approach and its adaptation to other situations.

3. Crops and Livestock Production Research. Demonstration of the validity of low-input agricultural production systems to sustain increases in net agricultural incomes from crops and livestock. Specific elements include:

a. Demonstration of potential technical and economic feasibility of producing and marketing coffee and palm hearts.

b. Demonstration of relative profitability and acceptability to farmers of pasture renovation technology.

c. Demonstration of relative profitability and acceptability to farmers of bush fallow and pasture fallow rotations which maintain productivity.

d. Demonstration of the comparative advantage of hair sheep, swine and guinea pigs in production systems.

4. Protection. Increased protection of the environment by implementation of the Yanachaga National Park and San Matias Protection Forest development plans and establishment of communal forest reserves.

5. Continuous Land Use Inventory. The Forest District will be able to identify and control forest land misuse. The Agrarian Bank will review and approve Palcazu Valley agricultural loan applications based in part on land use capability.

6. Extension and Social Development. An effective, participative demonstration outreach program linking community self-help efforts with sectoral ministry and National Agrarian University (UNA) support in health, agriculture and education will have been established.

7. Road Maintenance. The MTC will have developed a maintenance capacity adequate to maintain the Villa Rica to Iscozacin road and forest logging extraction roads in good operating condition. This will assure continuous traffic during the dry season and minimal traffic interruptions during the most intense rainy periods.

8. Regional Development Policy Support. Transfer of APODESA to a permanent institutional base in the INP and a capability developed to contribute effectively to objective planning analyses and policy decisions on Selva development.

C. Project Beneficiaries

Palcazu Valley inhabitants will benefit from first round applicaton of improved technologies for production/utilization enterprise systems as a part of Project demonstration activities. They will continue to benefit after the PACD as recipients of an installed capacity to carry out self-sustaining economic development applying the new socially desirable technologies. Other inhabitants of tropical forest areas both in and outside Peru are potential beneficiaries as information about the technologies and systems are disseminated and applied outside the Palcazu. Peruvian society and world society will benefit as the result of application of the technologies and systems generated which result in environmental protection, sustained production and preservation of biological diversity in jungle areas.

D. Project Components and Activities

1. Project Management - PEPP

a. Objective

The objective of PEPP is to provide, through its Lima and field offices, the essential administrative and coordination functions for general administration, planning, technical assistance, procurement, logistics and financial management essential to the implementation of the Project, and the transfer of all continuing activities to other institutions during the life of the Project.

b. Activities

PEPP activities are: 1) staff recruitment and training; 2) coordination of research and extension activities; 3) organization of data collection and dissemination in the areas of meteorology, hydrology and land use; 4) coordination and monitoring of in-kind credit activities; 5) monitoring road maintenance and location studies; 6) monitoring of GOP National Park and Protection Forest activities; 7) periodic evaluation of Project activities; and, 8) coordination and monitoring through quarterly reports, of agreements with other GOP agencies to institutionalize continuation of specific activities after Project completion. By the end of December 1988, PEPP should complete an evaluation of the Project's personnel system, revise the technical and administrative scopes of work (particularly for key personnel), recommend adjustments in salary levels within the limits of Peruvian law governing investment projects, and recruit technically qualified personnel.

c. Inputs

For the Component, the Project provides US$418,000 in grant funds, US$98,000 in loan funds, and US$398,000 in GOP counterpart funds, for a total of US$914,000, distributed as follows:

	Inputs	(US$000) A.I.D. Grant	A.I.D. Loan	GOP	TOTAL
A.	Technical Assistance	213	--	--	213
B.	Commodities	--	--	--	--
C.	Training	25	--	--	25
D.	Research Support	--	--	--	--
E.	Operational Costs	100	98	398	596
F.	Construction	--	--	--	--
G.	Evaluation/Seminars	80	--	--	80
	Total	418	98	398	914

d. Outputs

The outputs are: 1) an appropriately maintained support infrastructure including office space, satellite rural development centers, residential and dining facilities, transportation, equipment and supplies; 2) an established and functioning qualified professional, technical, clerical and operational staff; and, 3) functioning and institutionalized arrangements with appropriate GOP agencies to assume and continue appropriate research, outreach, and road maintenance activities in the Valley after the PACD.

2. Forestry

a. Objective

The objective of this component is: 1) continue progress in field testing of the NFM and production system for sustained yield by systematic strip clear-cutting, involving the native communities; 2) field test a NFM system of high value timber species by small group selection in areas of white sand soils; and, 3) demonstrate the economic viability of these systems.

b. Activities

Forestry activities include: 1) field survey work; 2) further testing of an oxen team program; 3) continued development, use and revision of forest management plans; 4) technical assistance and training for YFC members in managing harvesting, extraction, processing and elaboration of forest products; 5) research activities to determine yields, markets and returns, and viable forestry management methods; and, 6) transfer of ownership of wood processing center equipment from the PEPP to the YFC.

During the LOP, arrangements with INIAA and the MOA will be developed and implemented to insure institutionalization on forestry research and transfer activities.

c. Inputs

The Project provides US$598,000 in grant funds, US$251,000 in loan funds, and US$349,000 in GOP counterpart funds, for a total of US$1,198,000 for the forestry component for the LOP, distributed as follows:

		(US$000)			
		A.I.D.			TOTAL
	Inputs	Grant	Loan	GOP	
A.	Technical Assistance	478	--	--	478
B.	Commodities	50	115	73	238
C.	Training	10	24	--	34
D.	Research Support	--	8	--	8
E.	Operational Costs	60	104	276	440
F.	Construction	--	--	--	--
	Total	598	251	349	1,198

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d. Outputs

Outputs include: 1) demonstrated economic and technical feasibility of the NFM system operated by a native Indian cooperative; and, 2) collection, analysis and publication of accompanying data on operating methods, yields, costs, returns, and markets for use in promotion and adaptation of the approach in other similar tropical forest areas.

Specific outputs are:

(i). Forestry Research - testing and demonstration of the NFM system on 5,000 Has. of production forestry class land owned by native communities, and analysis of species-specific wood properties and marketability.

(ii). Wood Processing - one fully operational and economically viable wood processing center, owned and operated by the YFC, producing forest products such as sawn lumber, treated poles, posts and rail ties.

(iii). Institutional Arrangements - institutionalization of responsibility for continued testing and dissemination after the PACD.

3. Crops and Livestock

a. Objective

The objective of this Project component is to stabilize productivity of existing high jungle agriculture and livestock production systems at sustainable productivity levels, taking into account the limited technical and material resources of producers, the limited potential and fragility of the land resource base, the uncertain availability and high cost of purchased inputs, and the limited marketability of Valley products.

b. Activities

Crops and livestock activities are: 1) provision of credit on an in-kind basis to finance on-farm desmonstration activities; 2) introduction of new crops and livestock for agro-industry expansion scaled to fit the Valley's environmental reality; and, 3) applied on-farm demonstration program to develop and test modifications to existing cropping and livestock production systems and to adapt them to the environmental, technological, infrastructural, and socio-economic realities of the Palcazú Valley. By specific mandate of the Environmental sections of the FAA and Regulations of AID, amendments to the EA of this PP will be required for any pesticide-related activities planned in the Project, including any purchase, use or recommendations of specific pesticides (see the EA for further discussion). Integrated Pest Management guidelines will be used in all programs for weed, insect and other pest control activities.

The Project agricultural activities will focus on:

(i). Introduction of new systems elements, e.g., new forages (*Brachiaria humidicola* and *Desmodium ovalifolium* for pasture renovation); new animal species (Barbados Blackbelly hair sheep); new tree crops (coffee,

spineless peach palm, achiote, copoazu and macamba), as well as better suited varieties of more traditional crops.

(ii). Incorporation of timber and firewood trees and leguminous ground covers to regulate land productivity and provide additional income, e.g., incorporation of Schizolobium, Jacaranda and Didymopanax or other appropriate tree species in pasture renovation.

(iii). Improvement of traditional bush fallow systems, e.g., adding leguminous groundcovers and shrubs within traditional cropping rotations to speed recovery and development of a grazed fallow system.

(iv). Expanding the benefits of new system components, e.g., manuring of land adjacent to sheepsheds to produce cut forage and garden vegetables.

(v). Development of an Integrated Pest Management Program to reduce both costs and environmental impacts of pest control methods.

During the LOP, arrangements with INIAA and the MOA will be developed and implemented to insure institutionalization of research and technology transfer activities after the PACD.

c. Inputs

For this component, the Project provides $258,000 in grant funds, $271,000 in loan funds, and $397,000 in GOP counterpart funds, for a LOP total of $926,000, distributed as follows:

		(US$000)			
		A.I.D.			TOTAL
	Inputs	Grant	Loan	GOP	
A.	Technical Assistance	213	--	--	213
B.	Commodities	10	5	78	93
C.	Training	10	17	78	105
D.	Research Support	--	29	0	29
E.	Operational Costs	25	220	241	486
F.	Construction	--	--	--	--
	Total	258	271	397	926

d. Outputs

The basic output is demonstration of the validity of the agricultural enterprise stabilization approaches based on low input use that result in sustainable increases in agricultural net incomes.

Specific outputs are:

(i). Production/Marketing Research: Demonstration of the feasibility of producing and marketing high value crops as well as subsistence crops that are ecologically viable through the establishment of:

- Combined coffee, peach palm, achiote, other tree crops and Desmodium plantations (600 Has.);

- Achiote production (60 Has.);

- Palm heart production (100 Has.); and

- Study of hair sheep commercialization.

(ii). Soil Rehabilitation: Demonstration of the feasibility of bush fallow and pasture fallow rotations to maintain productivity by:

- renovation of 500 Has. of degraded pasture through the use of forage mixtures with trees.

(iii). Livestock Management: Demonstration of comparative advantages of hair sheep in mixed production systems by:

- establishment of a core breeding flock of 116 ewes; and

- placement of demonstration porcine modules on 18 farms in the Valley.

(iv). Economic Data: Collection, analysis and publication of data on crop and livestock systems developed and tested.

(v). Institutional Arrangements: Institutionalization of responsibility for continued testing and dissemination after the PACD.

4. Protection

a. Objective

The objective of this component is to designate and protect those lands in the Palcazú watershed whose only sustainable use is for protection, and to undertake studies focussed on understanding and preserving the biological diversity of the Palcazú area.

b. Activities

Activities in this component are: 1) provide support for management of the Yanachaga National Park and San Matias Protection Forest; 2) provide support for establishment of a small ecological research center associated with forest protection areas and concerned with the study and preservation of biological diversity; 3) develop and implement an operational plan for both the San Matias Protection Forest and the Yanachaga National Park; and, 4) develop needed basic infrastructure in both, including offices, research camps, trails and observation posts.

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c. Inputs

For this component, the Project provides $114,000 in grant funds, $38,000 in loan funds, and $117,000 in GOP counterpart funds, for a LOP total of $269,000 for this component, distributed as follows:

Inputs	A.I.D. Grant	A.I.D. Loan	(US$000) GOP	TOTAL
A. Technical Assistance	44	--	--	44
B. Commodities	--	5	15	20
C. Training	10	--	--	10
D. Research Support	60	--	--	60
E. Operational Costs	--	21	87	108
F. Construction	--	12	15	27
Total	114	38	117	269

d. Outputs

Specific outputs for the LOP are:

(i). A functioning administration for the protection and development of the National Park and Protection Forest;

(ii). Completed park operational plan and a natural vegetation inventory;

(iii). A fully staffed Yanachaga National Park with an operating ecological research center;

(iv). Construction of eight forest ranger observation posts;

(v). 25 native forest rangers trained;

(vi). Four published bio-diversity studies on flora and fauna in the watershed; and

(vii). A control system established for 35,000 Has. of community reserves adjacent to the Yanachaga National Park.

5. Continuous Land Use Inventory

a. Objective

The objective of this component is to support preparation of land use capability and current land use maps of the Palcazú Valley in order to guide crops, livestock and forestry development.

b. Activities

Monitoring of land use by satellite imagery and aerial photographs will be used to strengthen the District Forester's ability to ensure adherence to appropriate land use principles within the Valley by matching actual land use to land use capability from the maps generated by this component and APODESA.

c. Inputs

For this component, the Project provides US$18,000 in grant funds, US$29,000 in loan funds, and US$142,000 in GOP counterpart funds, for a LOP total of $189,000, distributed as follows:

		(US$000)			
		A.I.D.		GOP	TOTAL
	Inputs	Grant	Loan		
A.	Technical Assistance	18	--	--	18
B.	Commodities	--	8	23	31
C.	Training	--	3	5	8
D.	Research Support	--	2	5	7
E.	Operational Costs	--	16	109	125
F.	Construction	--	--	--	--
	Total	18	29	142	189

d. Outputs

Specific outputs of this component are:

1) production of land use maps for 12 principal native communities and one colono area; and

2) a strengthened capacity by the District Forester to identify unauthorized users of forest lands in order to apply legal sanctions.

6. Extension and Social Development

a. Objective

The objective of this component is development and utilization of methods to insure incorporation of native communities and colonists with small land holdings into high jungle development as both beneficiaries and active participants.

b. Activities

The activities of this component are: 1) coordinating all demonstration and training activities; 2) providing some primary health

services, in close collaboration with technical units; 3) apply various extension techniques, including training and use of native promoters; 4) support technical school located in native communities in study areas on crops, livestock and forestry handling; 5) test and refine an in-kind credit program; 6) guide and assess various approaches to stimulation of entrepreneurial forms of organization among native communities, including the YFC in collaboration with the forestry component; 7) support social research; 8) support native organizations and native property protection activities; and, 9) coordinate the transfer of the remaining health activities to the MOH.

c. Inputs

In this component, the Project provides $389,000 in grant funds, $155,000 in loan funds, and $413,000 in GOP counterpart funds for a LOP total of US$957,000, distributed as follows:

	(US$000)			
	A.I.D.			TOTAL
Inputs	Grant	Loan	GOP	
A. Technical Assistance	309	--	--	309
B. Commodities	--	26	19	45
C. Training	20	19	13	52
D. Research Support	--	7	19	26
E. Operational Costs	60	103	362	525
F. Construction	--	--	--	--
Total	389	155	413	957

d. Outputs

Specific outputs are:

1) establishment of an agricultural, forestry, and cooperative extension service (a Native Central Cooperative with four branch Cooperatives) using village promoters operating from the various rural development centers in the Valley linked to GOP institutions such as INIAA and MOA; and

2) transfer of the remaining components of the system of primary health services, operated by a self sustaining Palcazú Valley paramedical unit linked to the MOH and the medical university system. After the PACD the unit will operate with paid and volunteer health promoters from Amuesha and colonist villages.

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7. Road Maintenance

a. Objective

The objective of this component is to ensure that adequate access is provided to the Project area for movement of people and transport of goods and services.

b. Activities

The Project will: 1) provide support to improve and maintain the primary access road from Cacazú to Iscozacin; 2) finance studies for the location, design and construction of logging extraction roads; 3) maintain the airstrip in Iscozacín in a condition consistent with safety requirements; 4) continue to support the road maintenance equipment depot in Villa Rica; 5) construct logging extraction roads in the Valley for timber extraction; and, 6) support Palcazú Valley villages with street maintenance and minior civic works.

Any new road construction or maintenance must include an amended Environmental Assessment before funding (see Environmental Assessment, Annex II, Exhibit F.)

During the LOP a plan will be developed to transfer road maintenance functions to the MTC.

c. Inputs

For this component, the project provides $170,000 in grant funds, $327,000 in loan funds, and $676,000 in GOP counterpart funds, for a total of $1,173,000 during the LOP, distributed as follows:

		(US$000)			
		A.I.D.		GOP	TOTAL
	Inputs	Grant	Loan		
A.	Technical Assistance	125	--	--	125
B.	Commodities	--	144	56	200
C.	Training	--	16	83	99
D.	Research Support	--	8	17	25
E.	Operational Costs	45	59	420	524
F.	Construction	--	100	100	200
	Total	170	327	676	1,173

d. Outputs

Outputs for this component are:

(i). Maintenance of the Cacazú to Iscozacín road and plans and conditions established for the MTC to provide maintenance after the PACD;

(ii). Construction of up to 12 Kms. o. logging extraction roads for the native cooperative, YFC; and,

(iii). Operationalization of a system to maintain the four Kms. of logging trails to clear-cut strip sites.

8. Regional Development Policy Support by APODESA

a. Objective

The objective of this component is to assist the GOP in planning and formulation of policies and strategies appropriate to rational exploitation, management and conservation of Peru's high jungle area.

b. Activities

APODESA's activities are: 1) develop and maintain a library and geographic data base on the jungle areas of Peru; 2) prepare planning and policy analyses on public and private sector investment, conservation of natural resources and socio-economic issues affecting high jungle conservation and development; 3) developing and strengthening its role in presenting findings to high level GOP decision makers; and, 4) plan and carry out workshops/seminars on forestry and agricultural production technologies with Peruvian and international researchers.

The APODESA office has been located to date in INADE at the national level. The GOP will take the steps necessary to move APODESA from INADE to the INP by the end of LOP to insure that this planning group will have sufficient operational autonomy to assume objectivity in its policy analysis activities and to facilitate development of its ability to effectively present its findings to high level GOP policy makers.

c. Inputs

For this component, the Project provides $184,000 in grant funds, US$350,000 in loan funds, and US$113,000 in GOP counterpart funds, for a LOP total of US$647,000, distributed as follows:

		(US$000)			
		A.I.D.		GOP	TOTAL
	Inputs	Grant	Loan		
A.	Technical Assistance	184	--	--	184
B.	Commodities	--	--	15	15
C.	Training	--	--	--	--
D.	Research Support	--	100	10	110
E.	Operational Costs	--	250	88	338
F.	Construction	--	--	--	--
	Total	184	350	113	647

d. Outputs

Specific Project outputs produced by this component are:

1) Program and Project Formulation, Monitoring and Evaluation - completion of three (3) studies on the feasibility of developing priority areas, a hydrological analysis, and a land use survey in high jungle areas; one (1) study of conservation and timber extraction legislation and one (1) study of the land settlement regulations or impacts of colonization for the high jungle; development of a methodology to improve the implementation and evaluation of integrated development projects; annual evaluation of one (1) high jungle project including an evaluation of the Rural Development Project (PDR) Palcazú;

2) Design of Development Policy and Plans - completion of the Development Strategy Document for the High Jungle of Peru;

3) Geographic Information System (GIS) Application - compilation and organization of information; expansion of the data bank and application of the system to the high jungle areas (Alto Huallaga, Huallaga Central, Bajo Mayo, Chanchamayo-Satipo, Jaen, San Ignacio, Bagua); preparation of production systems for the jungle in crops, livestock, agro-foresty and forestry, and,

4) Documentation Center - identification, compilation, evaluation, digitization and dissemination of bibliographic information about the Amazon and maintenance of current legal information about the jungle; development of a network of information available from various libraries and information centers on the Amazon; preparation and dissemination of eight publications, seven monographs and an Amazon lexicon.

5) Research Dissemination Seminars - plan and execute at least four seminars/workshops to disseminate forestry and agricultural research findings.

9. Environmental Assessment of Unplanned Activities

Any new activities or sub-projects not specifically covered in this PP and its annexes will require amended Environmental Assessments before these activities can be approved (see Environmental Assessment, Annex II, Exhibit F.).

IV. IMPLEMENTATION ARRANGEMENTS

A. Setting

The Pichis Palcazú Special Project (PEPP), created in October 1980, is responsible for the development of the Pichis, Palcazú, and Pachitea Valleys, as well as the Satipo-Chanchamayo, and Oxapampa areas and was the key implementing and coordination agency for the original CSRM Project. The principal Project Office is located in Iscozacín, with outreach offices in the Palcazú Valley in Puerto Mayro, Loma Linda, and Pozuzu. The PEPP central office is in Lima. PEPP will continue in this implementing and coordinating role in CSRM-II. The overall implementation arrangements of CSRM-II are a continuation and improvement of the original CSRM Project arrangements.

B. Host Country Arrangements

Host Country arrangements for executing implementation functions are described below.

1. Implementation Management and Coordination

INADE is the implementing agency for the Project which is carried out by two of its entities, PEPP and APODESA. PEPP will prepare an Annual Operational Plan and budget which will: a) specify actions to be undertaken and anticipated accomplishments with specific objectives, benchmarks and targets; b) contain a budget and disbursement schedule, as well as monitoring and control procedures; and, c) be submitted to A.I.D. for approval. PEPP will also coordinate the implementation of the Project activities directly and in collaboration with the appropriate GOP agencies through monthly coordinating meetings, including the Office of Special Projects in INADE, INIAA, INP, ONERN, and the Ministries of Transport and Communications, Agriculture and Health. Coordination with these institutions is necessary to insure that the applied research and demonstration objectives of the Project, road maintenance, and health services for Project beneficiaries are institutionalized in the GOP or other local entities. By the PACD, all of PEPP's Project activities should be transferred to other GOP or appropriate entities.

APODESA will prepare an Annual Operational Plan and budget under the policy guidance and direction of a committee composed of representatives from INADE, INP and ONERN. This committee, which will meet at least quarterly throughout the life of Project, will approve the Plan before submission to USAID for approval. APODESA will be managed by this committee through the life of Project and will be transferred to INP by one month before the PACD, or August 31, 1990.

2. Administration of Project Funds

Established A.I.D disbursement procedures will be followed for administration of local currency costs. These procedures are known by the implementing institutions through Implementation Letters (PILs) from the original CSRM Project, and will be reiterated in the first PILs of CSRM-II. Disbursement of counterpart funds will be made in accord with normal GOP procedures.

3. Procurement

The GOP will be responsible for procurement of local items and will follow standard A.I.D. procurement procedures. These procedures are known by the implementing institutions through PILs from the original CSRM Project, and will be reiterated in the first PILs of CSRM-II.

C. A.I.D. Arrangements

1. Disbursement Procedures

Table 14, "A.I.D Grant/Loan Methods of Implementation and Financing", outlines the planned methods of implementation and financing for CSRM-II. No deviation from A.I.D established disbursement procedures is anticipated.

2. Procurement Procedures

USAID will follow standard A.I.D procurement procedures for goods and services procured with grant and loan funds. Table 2, "Offshore Commodity Procurement for CSRM-II" provides an illustrative list of offshore commodities and estimated procurement costs. USAID will contract a Procurement Services Agent to procure all offshore commodities.

Table 2: OFFSHORE COMMODITY PROCUREMENT FOR CSRM-II

	COMPONENTS	US$
1.	Forestry	115,000
	- 1 Pick-up with spare parts	20,000
	- Lumber Dehumidifier	75,000
	- Spare parts for Wood Processing Equipment	20,000
2.	Crops/livestock	5,000
	- 2 Trail Bikes with spares	5,000
3.	Protection	5,000
	- 2 Trail Bikes with spares	5,000
4.	Extension & Social Development	25,000
	- 1 Pick-up and spare parts	20,000
	- 2 Trail Bikes with spares	5,000
5.	Road Maintenance	145,000
	- Front Loader	50,000
	- Road Grader	70,000
	- Spare parts for Road Maintenance Equipment	25,000
6.	Continuous Land Use Inventory	8,000
	- Photo Interpretation Equipment	3,000
	- Map Making Equipment	5,000
	TOTAL	303,000

3. Project Monitoring

USAID will coordinate closely with PEPP and other GOP institutions involved in Project activities to review and monitor overall Project performance and to assist the GOP in Project implementation. Detailed Project monitoring is the responsibility of the USAID Project Manager located in the Office of Agriculture and Rural Development Natural Resource Development Division (OARD/NRD).

D. Implementation Plan

A Detailed Project Implementation Plan is provided in Annex II, Exhibit G.

E. Technical Assistance (TA) Arrangements

USAID will contract the services of a long term Personal Services Contractor as Project Coordinator, a Project Secretary and a Financial Analyst. USAID will compete a contract for a Purchasing Services Agent for offshore commodity procurement, and enter into an institutional contract for long and short term TA services.

Upon authorization of this Project Paper and signing of the Project Agreement, funds will be made available to:

1. enter into a Personal Services Contract for a Project Coordinator and contract the local Project Secretary and Financial Analyst through the PACD, September 30, 1990, and

2. contract for long and short term TA throughout the LOP.

Estimated TA needed to implement the Project is shown in Table 3. A detailed technical assistance plan and financial costs by Project component and speciality is provided in Annex II, Exhibit L. USAID will consider an 8A contract with a Gray Amendment firm for providing technical assistance.

Table 3: ESTIMATED TECHNICAL ASSISTANCE REQUIREMENTS FOR CSRM-II

Project Component	Person Months			
	Long Term		Short Term	
	Expat.	Nat'l.	Expat.	Nat'l.
1. Project Management-PEPP	14	72	0	0
2. Forestry	32	48	10	10
3. Crops/Livestock	12	0	8	13
4. Protection	0	21	2	3
5. Continuous Land Use Inventory	0	12	0	6
6. Road Maintenance	12	0	0	5
7. Regional Development Policy Support (APODESA)	16	0	2	4
8. Extension and Social Development	21	63	0	30
TOTAL	107	216	22	71

F. Evaluation Plan and Financial Review/Audit

An interim evaluation, to be undertaken by A.I.D. and representatives of INADE, PEPP, APODESA, and other involved institutions, is scheduled for the fourth quarter of FY 89 to specifically evaluate progress in: 1) meeting planned objectives; 2) institutionalizing relevant Project activities and particularly the research components in order to insure continuation of key activities after the PACD; and, 3) measuring the dissemination of research results. The interim evaluation also will analyze whether either the Mission or AID/W should be prepared to continue to support selected activities beyond the PACD, in order to:

1) assure continued high quality of research;

2) provide TA to assure that institutional arrangements continue to evolve; and

3) assure that results are shared with a broad constituency. It is clear that dissemination of research results is critical to Project success. A final evaluation of the Project is not necessary, since success will be demonstrated by actual research results disseminated. An impact evaluation two to three years after the Project PACD would be useful for determining the advisability of additional future support to this type of research.

In evaluating the need for audits and financial reviews, the Mission Controller has concluded that the two implementing entities of INADE should be considered; the principal entity is PEPP. The GOP has closely monitored the PEPP financial activities and has conducted official financial audits through the auspices of the Contraloria (GOP audit agency). In addition, the USAID Controller's office has provided oversight through its Financial Analysis Division. Every indication is that the GOP will continue to take an active interest in the PEPP administration and will provide adequate audit coverage. Nevertheless, the Project budget has provided funding for a financial review of the Project activities in conjunction with the interim evaluation scheduled for the Fourth Quarter of FY 89, in order to verify the effectiveness and thoroughness of project financial systems. Project funding will also be available for an IQC non-federal financial and compliance audit (IQC-NFA) in the event A.I.D. determines that an audit is necessary or advisable.

The second affected entity is APODESA, which functions within the INADE framework and is subject to their oversight. Adequate funds have been budgeted to provide limited financial reviews as deemed necessary and the USAID Controller's office will continue to monitor this activity. The cost of including this activity in a broader audit (i.e. IQC-NFA) would be minimal and funds would be available within the Project budget for this purpose should it be deemed necessary or advisable.

Project funds will be used for the interim Project evaluations and the financial reviews and audits.

V. PROJECT ANALYSIS

A. Financial Analysis

1. Summary Cost Estimates and Financial Plan

Table 4 presents the total cost of CSRM-II from October 1, 1988 through September 30, 1990. CSRM-II will utilize $6,970,100, of which up to $3,910,000 will be contributed by A.I.D. through reobligation of deobligated loan funds previously obligated under the original CSRM Project. The GOP will finance 44% of the total cost, equivalent to $3,060,000. Table 4 also shows that 57% ($2.230 million) of the total CSRM-II cost is grant funding, and 43% ($1.680 million) is loan funding. The change in Project activities from a major expansion effort in agriculture production to principally a research and demonstration focus resulted in a larger proportion of grant to loan funding than in the original CSRM Project, which was 18% to 82%. This change in higher grant to loan funding reflects A.I.D. policy to grant fund research projects. The loan funds in CSRM-II will fund those activities and items which are usually loan funded.

Table 4: CSRM-II PROJECT BUDGET:
October 1, 1988 to September 30, 1990
(US $000's)

	Project Components	AID Grant	AID Loan	AID Total	GOP	Total	%
I.	Proj. Management	418	98	516	398	914	13
II.	Forestry	598	251	849	349	1,198	17
III.	Crops/Livestock	258	271	529	397	926	13
IV.	Protection	114	38	152	117	269	4
V.	Continuous Land Use Inventory	18	29	47	142	189	3
VI.	Road Maintenance	170	327	497	676	1,173	17
VII.	Regional Dev. Policy Support-APODESA	184	350	534	113	647	9
VIII.	Extension & Social Development	389	155	544	413	957	14
Subtotal		2,149	1,519	3,668	2,605	6,273	90
Inflation & Contingencies		81	161	242	455	697	10
	Grand Total	2,230	1,680	3,910	3,060	6,970	100
	%			56%	44%		

Table 4 presents the allocation of Project funds by components. Components receiving the majority of funds are Forestry, Crops and Livestock, Road Maintenance, and Extension and Social Development, totaling 61% of the budget.

Tables 2 and 3 indicate Offshore Commodity Procurement and Technical Assistance Requirements, respectively. Offshore procurement will cost $303,000 and the estimated 416 person months of short and long term expatriate and national TA will cost $1,584,000 (See Table 5). The cost of the expatriate TA under an institutional contract has been calculated at $10,000 per month for each long term advisor and $1,000 per month for each short-term consultant with the exception of the Project Coordinator calculated at $2,179 per month, Project Secretary at $208 per month, Financial Analyst at $667 per month, Cooperative Developer at $2,000 per month and Field Assistants at $500 per month. The Personal Services Contract has been calculated at $80,000 per year. In addition, the contract with a Procurement Services Agent will cost approximately $60,000, seven percent (7%) of the estimated cost of the goods procured.

Tables 5 through 12 present Sources and Applications of Funds, Requirement of Foreign Exchange and Local Currency, Expected A.I.D. Grant Expenditures by Fiscal Year, Expected A.I.D. Loan Expenditures by Fiscal Year, Expected GOP Counterpart Expenditures by Fiscal Year, Summary Budget by Project Component and Source of Funds, Summary of Commitments and Disbursements by Fiscal Year, and Project Detailed Budget Inputs by Fiscal Year and Source of Funds.

2. Recurrent Costs

Measures to be taken to assure GOP capability to meet recurrent costs after CSRM-II is completed are described in Annex II, Exhibit B. Total recurrent costs are estimated in Table 13 during five years after CSRM-II termination. In year one, recurrent costs are estimated at $1,080,000 of which approximately 9% is for policy support, 37% will be assured by MTC for road maintenace, and 46% will be absorbed into the INIAA research and technology transfer program. Subsequent yearly recurrent costs increase only slightly, from $1,096,000 in year two to $1,142,000 in year five. Since GOP Project counterpart funds during the LOP average more than this amount annually ($1,224,000), it appears reasonable to expect these lower recurrent costs to be absorbed by the responsible GOP institutions.

In order to encourage the GOP to assure that these recurrent costs be absorbed over time, it is proposed that GOP dependence on counterpart funds supplied from PL-480 local currency be limited to 75% of the total in FY 89 and 50% of the total in FY 90, thus helping assure the ability of the GOP to absorb recurrent costs from regular public treasury resources by the PACD.

3. Methods of Implementation and Financing

Table 14, "AID Grant/Loan Methods of Implementation and Financing", outlines the planned methods of implementation and financing for the Project as required by Policy Statement No. 1 of the Agency's Payment Verification Policy. The planned methods have been reviewed and approved by the Mission Controller.

TABLE 5 .- SOURCES AND APPLICATIONS OF FUNDS (US$000'S)

INPUTS	AID GRANT		AID LOAN		GOP COUNTERPART		AID & GOP TOTAL	
	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%
A. Technical Assistance	1584	71	0	0	0	0	1584	22.73
1. Expatriate Advisors	1484	67	0	0	0	0	1484	21
2. National Advisors 1/	100	4	0	0	0	0	100	1
B. Commodities	60	3	303	18	279	9	642	9.21
1. Off-Shore Procurement	60	3	303	18	0	0	363	5
2. Local Procurement	0	0	0	0	279	9	279	4
C. Training	75	3	79	5	179	6	333	4.78
1. U.S. & 3rd Country	50	2	0	0	0	0	50	1
2. In-Country Non-Degree	25	1	79	0	179	6	283	4
D. Research Support	60	3	154	9	51	2	265	3.80
E. Operational Costs	290	13	871	52	1981	65	3142	45.08
F. Construction	0	0	112	7	115	4	227	3.26
G. Evaluation/Audits/Seminars 2/	80	4	0	0	0	0	80	1.15
SUB-TOTALS	2149	96	1519	90	2605	85	6273	90
INFLATION 3/	81	4	85	5	325	11	491	7
CONTINGENCIES 4/	0	0	76	5	130	4	206	3
T O T A L S	2230	100	1680	95	3060	96	6970	100

1/ Includes Foreign Service National (FSN) Coordinator, Project Secretary, and Financial Analyst.
2/ Interim Evaluation, $50,000, and End-of-Project Seminars/Research Dissemination, $30,000.
3/ Inflation is estimated at 3%, 5-6%, and 10% per year cumulative for Grant, Loan, and GOP counterpart, respectively.
4/ Contingencies are estimated at 5 % per year.

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TABLE 6 .- REQUIREMENT OF FOREIGN EXCHANGE AND LOCAL CURRENCY (US$000'S)

INPUTS	AID GRANT			AID LOAN			COUNTERPART	AID & GOP
	FX	LC	TOTAL	FX	LC	TOTAL	LC	T O T A L
A. Technical Assistance	1484	100	1584	0	0	0	0	1584
1. Expatriate Advisors	1484	0	1484	0	0	0	0	1484
2. National Advisors 1/	0	100	100	0	0	0	0	100
B. Commodities Procurement	60	0	60	303	0	303	279	642
1. Off-Shore Procurement	60	0	60	303	0	303	0	363
2. Local Procurement	0	0	0	0	0	0	279	279
C. Training	50	25	75	0	79	79	179	333
1. U.S. & 3rd Country	50	0	50	0	0	0	0	50
2. In-Country Non-Degree	0	25	25	0	79	79	179	283
D. Research Support	50	10	60	0	154	154	51	265
E. Operational Costs	0	290	290	0	871	871	1981	3142
F. Construction	0	0	0	0	112	112	115	227
G. Evaluation/Audits/Seminars 2/	50	30	80	0	0	0	0	80
SUB-TOTALS	1694	455	2149	303	1216	1519	2605	6273
INFLATION 3/	81	0	81	22	63	85	325	491
CONTINGENCIES 4/	0	0	0	36	40	76	130	206
T O T A L S	1775	455	2230	361	1319	1680	3060	6970

1/ Includes FSN Coordinator, Project Secretary, and Financial Analyst.
2/ Interim Evaluation, $50,000, and End-of-Project Seminars/Research Dissemination, $30,000.
3/ Inflation is estimated at 3%, 5-6 %, and 10% per year cumulative for Grant, Loan, and GOP counterpart, respectively.
4/ Contingencies are estimated at 5 % per year.

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TABLE 7. - EXPECTED AID GRANT EXPENDITURES BY FISCAL YEAR
(US$000's)

INPUTS	FISCAL YEAR 89	FISCAL YEAR 90	TOTAL
A. Technical Assistance	850	734	1584
B. Commodities	60	0	60
C. Training	50	25	75
D. Research Support	30	30	60
E. Operational Costs	145	145	290
F. Construction	0	0	0
G. Evaluation/Audits/Seminars	50	30	80
SUB - TOTAL	1185	964	2149
INFLATION 1/	41	40	81
CONTINGENCIES	0	0	0
TOTALS	1226	1004	2230

1/ Inflation is estimated at 3 % per year cumulative.

TABLE 8. - EXPECTED AID LOAN EXPENDITURES BY FISCAL YEAR
(US$000's)

INPUTS	FISCAL YEAR 89	FISCAL YEAR 90	TOTAL
A. Technical Assistance	0	0	0
B. Commodities	303	0	303
C. Training	59	20	79
D. Research Support	77	77	154
E. Operational Costs	481	390	871
F. Construction	112	0	112
G. Evaluation/Audits/Seminars	0	0	0
SUB - TOTAL	1032	487	1519
INFLATION 1/	50	35	85
CONTINGENCIES 2/	47	29	76
TOTALS	1129	551	1680

1/ Inflation is estimated at 5-6 % per year cumulative.
2/ Contingencies are estimated at 5 % per year.

TABLE 9. - EXPECTED GOP COUNTERPART EXPENDITURES BY FISCAL YEAR
(US$000's EQUIVALENT)

INPUTS	FISCAL YEAR 89	90	TOTAL
A. Technical Assistance	0	0	0
B. Commodities	179	100	279
C. Training	90	89	179
D. Research Support	25	26	51
E. Operational Costs	800	1181	1981
F. Construction	65	50	115
G. Evaluation/Audits/Seminars	0	0	0
SUB - TOTAL	1159	1446	2605
INFLATION 1/	116	209	325
CONTINGENCIES 2/	58	72	130
TOTALS	1333	1727	3060

1/ Inflation is estimated at 10 % per year cumulative.
2/ Contingencies are estimated at 5 % per year.

TABLE 10.- SUMMARY BUDGET BY PROJECT COMPONENT AND SOURCE OF FUNDS (US$000's)

PROJECT COMPONENT	GRANT		LOAN		AID TOTAL		GOP COUNTERPART		TOTAL PROJECT	
	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%
1. Project Management - PEPP	418	19	98	6	516	13	398	13	914	13
2. Forestry	598	27	251	15	849	22	349	11	1198	17
3. Crops/Livestock	258	12	271	16	529	14	397	13	926	13
4. Protection	114	5	38	2	152	4	117	4	269	4
5. Cont. Land Use Inventory	18	1	29	2	47	1	142	5	189	3
6. Road Maintenance	170	8	327	19	497	13	676	22	1173	17
7. Regional Dev. Policy Support	184	8	350	21	534	14	113	4	647	9
8. Extension and Soc. Development	389	17	155	9	544	14	413	13	957	14
SUB - TOTALS	2149	96	1519	90	3668	94	2605	85	6273	90
INFLATION 1/	81	4	85	5	166	4	325	11	491	7
CONTINGENCIES 2/	0	0	76	5	76	2	130	4	206	3
TOTALS	2230	100	1680	100	3910	100	3060	100	6970	100

1/ Inflation is estimated at 3 %, 5-6 %, and 10 % per year cumulative for Grant, Loan, and GOP counterpart, respectively.
2/ Contingencies are estimated at 5 % per year.

TABLE 11 .- SUMMARY OF COMMITMENTS AND DISBURSEMENTS BY FISCAL YEAR (US$000's)

DESCRIPTION	AID FY-89	AID FY-90	AID TOTAL	GOP COUNTERPART FY-89	GOP COUNTERPART FY-90	GOP COUNTERPART TOTAL
1. Commitments	3089	821	3910	1333	1727	3060
2. Disbursements 1/	2355	1555	3910	1200	1860	3060
3. Balance						
Annual	734	-734		133	-133	
Cumulative	734	0		133	0	

1/ Includes Inflation/Contingencies

Table 12.- Project Detailed Budget Inputs by Fiscal Year and Source of Funds (US$000)

INPUTS	FY 1989 Financial Costs			FY 1990 Financial Costs			TOTALS		
	AID	GOP	Total	AID	GOP	Total	AID	GOP	TOTAL
A. Technical Assistance	1584	0	1584	0	0	0	1584	0	1584
B. Commodities	363	179	542	0	100	100	363	279	642
C. Training	109	90	199	45	89	134	154	179	333
D. Research Support	107	25	132	107	26	133	214	51	265
E. Operational Costs	626	800	1426	535	1181	1716	1161	1981	3142
F. Construction	112	65	177	0	50	50	112	115	227
G. Evaluation/Audits/Semina	50	0	50	30	0	30	80	0	80
SUB-TOTAL	2951	1159	4110	717	1446	2163	3668	2605	6273
INFLATION 1/	91	116	207	75	209	284	166	325	491
CONTINGENCIES 2/	47	58	105	29	72	101	76	130	206
TOTALS	3089	1333	4422	821	1727	2548	3910	3060	6970

1/ Inflation is estimated at 3-6 % and 10 % per year cumulative for AID and GOP, respectively.
2/ Contingencies are estimated at 5 % per year.

TABLE 13. - EXPECTED RECURRENT COSTS FOR PROJECT ACTIVITIES AFTER PACD
(US$000's)

ACTIVITIES	YEARS AFTER PROJECT TERMINATION				
	YR 1	YR 2	YR 3	YR 4	YR 5
1. Natural Forest Management 1/	200	200	200	200	200
2. Crops and Livestock Research and Extension (INIAA)	300	300	300	300	300
3. Protection	80	83	85	88	90
4. Road Maintenance (MTC)	400	413	426	438	452
5. APODESA 2/	100	100	100	100	100
TOTAL	1080	1096	1111	1126	1142

1/ Expanded funding over and above INIAA's current levels of funding in jungle forestry research and the selva agricultural research and transfer specialist programs.

2/ Net expanded funding by INP to continue these activities.

TABLE 14 .- AID GRANT/LOAN METHODS OF IMPLEMENTATION AND FINANCING (US$000's)

METHOD OF IMPLEMENTATION	METHOD OF FINANCING		APPROX. AMOUNT		APPROX. AMOUNT	
	GRANT	LOAN	GRANT	%	LOAN	%
I. PROJECT IMPLEMENTATION						
- HC Implementing Agency, Direct Implementation Local Cost Financing	--	Direct. Impl. Agency Reimb.	0		154	9
- AID Technical Assistance	Direct Payment	--	1584	71	0	
II. TRAINING						
- AID Contract	Direct Payment	--	50	2	0	
- HC Impl. Agency LC	--	Direct. Impl. Agency Reimb.	25	1	79	5
III. COMMODITIES						
- AID Contract	Ag. Reimb	--	50	2		
with (PSA)	--	BL/COM			303	18
- HC Impl. Agency LC	--	Direct. Impl. Agency Reimb.	10	0		
IV. CONSTRUCTION						
- HC Impl. Agency LC	--	Direct. Impl. Agency Reimb.			112	7
V. OTHER COSTS						
- AID Contract	Dir. Paym	--	100	4	0	
- HC Impl. Agency Contracts, L/C Financing	--	Direct. Impl. Agency Reimb.	330	15	871	52
	SUB-TOTAL		2149	96	1519	90
	INFLATION AND CONTINGENCIES		81	4	161	10
	AID TOTAL BUDGET		2230	100	1680	100

With regard to financial compliance, the USAID Technical and Controller Offices regularly monitor PEPP and INADE adherence to financial management procedures for requesting advances, disbursements and liquidations. In 1987, PEPP ordered an internal audit of all of its programs, including the original CSRM Project. Findings were shared with the Mission, which is working with PEPP to improve overall financial management.

B. ECONOMIC ANALYSIS

A detailed review of the economic analysis for CSRM-II is included in Annex II, Exhibit D.

1. Economic Analysis for Original Project

The original Project design was justified on the basis of the economic potential for expanded timber extraction and processing, and increased crop and livestock production. Road maintenance costs included in the original Project were determined to be feasible based on net value of incremental agricultural and forestry output made possible by an appropriately maintained road.

Original Project costs for environmental protection activities (establishment of a national park and protection forest) were assumed to be justified based on estimates of costs of reforestation of depleted land areas that would result in the absence of such protection. Land use planning and policy formulation costs were justified on the grounds that these investments would provide the GOP with the capability to select higher-return integrated regional development projects over lower return projects.

2. Original and Current Knowledge Base

The original Project economic analysis was based on limited data and knowledge about the Valley and about the availability of appropriate improved easily adopted technology for forest and agricultural production expansion and improvement. These limitations resulted in over-estimation of crop and livestock development potential, both in terms of magnitudes and returns per unit of output, as well as over-estimation of the rate of expansion of forest and agricultural production enterprises. The original Project programmed nearly half of Project resources for credit to be used to support agricultural and forestry production expansion.

In actual fact, Project implementation has involved a heavy focus of resources (40%) on agricultural and forestry production research and demonstration. Virtually no outreach (except on a trial or demonstration basis) has been attempted because profitable and reasonably reliable technologies that also protect the environment and permit sustained production are not yet available. Research to date has made considerable progress in developing forest extraction/processing technologies and selected crop and livestock production technologies that appear to be profitable and with high social value in terms of protecting the environment and permitting sustained production. Currently, these technologies are being tested and can be expected to be made available to Valley producers by the end of CSRM-II.

3. Economic Feasibility Analysis for CSRM-II

Analyses were carried out to provide estimates of:

a) Net Present Value (NPV) of social benefits projected to result from research investments (Returns to Research),
b) Profitability (Internal Rates of Return - IRR's and Benefit/Cost - B/C ratios) of proposed systems of timber extraction/processing, coffee production, and hair sheep production, in comparison with existing beef production enterprises.
c) NPV of benefits and B/C ratio resulting from primary access road upgrading and maintenance investments.

Each of these analyses indicates benefits that sufficiently exceed costs to justify the levels of resources proposed for use during CSRM-II.

a. Returns to Research

Approximately 55% of total CSRM-II Project resources are programmed for research and demonstration activities. (See Table E-2, Annex II, Exhibit D.)

The total social value of net benefits accruing to the Palcazu Valley from research and demonstration investments during CSRM-II, including the social value of environmental protection and sustained production, is estimated to have a NPV (at a 10% discount rate) of $1,405,000 using a "Pessimistic" scenario for rate of adoption, and $3,127,000 using a "Most Likely" scenario.1/

Expert opinion is that much of the technology (especially the forest extraction/utilization technology) to be generated under the Project has applicability to many tropical forest areas outside the Palcazu, especially to other areas of the Amazon Basin, but also to tropical forest areas in other parts of the world.

Limiting ourselves to the Peruvian Amazon Basin, it is estimated that if the new technology were to be applied to only one percent of this area over the next 20 years, and the adoption rate were similar to that specified in the first scenario above for the Palcazu, less than 10% of the Project forestry research costs should be charged to social benefits attributable to the Palcazu Valley. This would be $161,800 (or $296,800, if original CSRM Project sunk costs are included), generating the social benefits shown above for the Palcazu Valley. Applicability to important areas of Brazil, Ecuador, Colombia, and other tropical forest areas of the world makes this research even more valuable in terms of potential social benefits worldwide.

1/ "Pessimistic" and "Most Likely" scenarios are described on page 9 of Annex II, Exhibit D.

In conclusion, from the viewpoint of total social benefits anticipated, the proposed CSRM-II Project investment in production research is amply justified.

b. Enterprise Profitability

Enterprise profitability analyses for three production enterprises being tested for adoption in the Valley resulted in the following IRR's and B/C ratios, using a 10% discount rate:

	IRR (%)	B/C (Ratio)
1. Clear-cut strip Natural Forest Management (NFM) System & Wood Processing Center	37.08	1.27
2. Hair Sheep Production	23.75	1.18
3. Coffee Production	87.13	3.02

The B/C ratio for coffee production is excellent, it is acceptable for the NFM System/Wood Processing Center; for Hair Sheep production, it is marginal. When these B/C ratios are compared to the B/C ratio of 1.1 for existing beef production under traditional pasture management, all three of the enterprises analyzed appear to have potential for preferred adoption in the Valley.

Given the fragile nature of the environment and the importance of profitability of the new technologies and enterprises in inducing adoption by producers, research during the CSRM-II Project should focus heavily on reducing unit costs of production rather than focussing primarily on increasing output per hectare, in order that the new technologies and enterprises can compete favorably both in terms of profitability and social benefits.

c. Road Upgrading and Maintenance Feasibility

Investments in road upgrading and maintenance during and after the CSRM-II Project are justified by net economic and social benefits generated. The B/C ratio for CSRM-II Project investments in road upgrading/maintenance for the Valley is 1.49 (using a 10% discount rate). This B/C ratio is considered quite good for this type of project.

C. Technical Analysis

The Project is technically feasible. All of the technologies proposed for adaptation, testing and demonstration during the Project have been derived from available literature, screened and further adapted based on field experience over the past three year period in the original CSRM Project. Resident advisors and short term experts who have participated in this work are well-qualified by education and experience to recommend the research and demonstration program components included in this CSRM-II Project. Furthermore, each technology has been adapted with an understanding

of cultural conditions. Most have benefitted from direct participation of Amuesha natives and colonists in their development. The sections below briefly summarize the rationale for the design of various Project components based on experience with the original CSRM Project.

1. Forestry

The NFM System which is being tested and demonstrated was designed by the Tropical Sciences Center (TSC). It is based on a considerable literature on tropical forest ecology, but had not been tested under full field conditions either biologically or organizationally until initiated under the original CSRM Project. It requires clear-cutting of all trees in narrow strips, permitting penetration of light together with natural reseeding from the surrounding forest, to achieve rapid regeneration of the mixed natural forest, and staged harvesting based on a forest management/utilization plan.

Successful implementation of this system requires a long term, highly disciplined approach to natural forest management which is new both to traditional Peruvian forest industry practice and academic forestry training. The traditional system is exploitative and destructive, high grading the valuable species as an intermediate step to creation of pastures by burning the remaining woods. The new system seeks to utilize all the woods, as merchantable sawn lumber, boxes, ties and similar products, posts and poles, and charcoal. These gross differences between traditional and proposed practices require an alternative organizational and incentive structure linking the forest extraction program to the wood processing enterprise. Neither the organizational form nor the incentive structure were reflected in the original CSRM Project design. Both are now being devised and tested in the course of that Project implementation, and will be more fully tested in CSRM-II.

During 1986-87, trial strips were cut to test, under controlled conditions, the NFM System. Initial reproduction in these strips indicates that the system does lead to generation of a biologically diverse community of forest species characteristic of the original mixed stand. In this same period, the Amuesha have formed a multi-community cooperative to jointly manage their forests and the wood processing center. The participation of native communities will insure a long term commitment to the NFM System. CSRM-II will seek to strengthen the participation of native communities.

PEPP technicians and YFC members have been trained in the theory and practice of the NFM System and together have identified, inventoried and mapped appropriate forest blocks and developed management plans. YFC members have been trained in extraction methods as well as in the use of the machinery employed for the initial phase of the wood processing operation. In 1987, the first strips were cut in an Amuesha owned production forest area and the wood processed using a small sawmill as well as PresCap preservation equipment. In 1987-88, the first module of a full scale wood processing center was installed. Under CSRM-II, the wood processing center will be in full operation and its economic viability tested.

A major objective during CSRM-II will be the transfer of ownership of the wood processing center equipment from the GOP to the YFC. The wood processing center is a key element of NFM System viability. The native communities already have dedicated their forest resources and labor to the operation. As an unproved model, there is more than a normal business risk involved; the system should be tested before being advocated for wider application and the commercial risk shared by the public sector. By linking ownership of the forest resource to ownership of the wood processing center, an incentive to exercise discipline in forest extraction - a key element of the clear-cut strip, natural regeneration based management model the Project advocates - is introduced.

This incentive is important because there is nothing intrinsic to the processing center itself that argues for use of NFM System. If the forest itself is property of the owner(s) of the processing center, it is in their long term interest to practice a system which will guarantee sustained output in the form of permanent feedstock for a profitable enterprise. Without this link, the processing center owners have no incentive beyond that of seeking the largest, quickest profit attainable which would destroy the forest.

In the future, this NFM System should be applicable where forest owners have the capital and technical knowledge to finance and operate a wood processing center adequate to utilize a major portion of woody materials extracted from the forest. When the system itself has been tested and refined and its benefits proved to forest owners, it is expected that GOP forest management policy as well as private self interest will require use of the clear-cut strip extraction system. Demonstration of the economic viability of this improved system will provide proponents of sustained yield tropical forestry with information needed to alter current practice.

In summary, the CSRM Project implementation experience thus far indicates that the NFM System is socially and technically viable. Native communities can be trained in management and operation of the forest resource and the operation of the wood processing center. Under CSRM-II, ownership of the equipment will be transferred to the Cooperative in order to provide the incentive if they are to continue participating in the testing and development of this model. In addition, agreements will be developed with the National Forestry Institute, part of INIAA, to maintain a forestry research capability in the operation of the NFMS.

2. Crops and Livestock

A number of low input agricultural production technologies are being tested and disseminated to farmers under the original CSRM Project. These include introduction of new permanent crops such as coffee, peach palm, and other tropical tree crops, cross-bred sheep modules, improved pasture varieties and rotation systems.

These and other innovations are being tested both on the experiment station and on farmers' fields. This activity includes not only on-farm research but also training and technical support to the extension and in-kind credit program. As the apparent value of each innovation becomes evident to the investigators, the technology is transferred to farmers through periodic field days and the extension program of the rural development centers. Farmer acceptance will determine viable production systems that are economically, ecologically and culturally adapted to the high jungle.

The potential of the agricultural research can be seen from recent projections. By the end of 1990, modifications to agro-silvo-pastoral systems involving improved forage mixes, leguminous and other tree crops, shortened fallows combined with traditional subsistence crops and promising commercial crops could be widely established in the Valley. For example, the first commercial harvest of palm hearts took place on a five Has. test plot in 1987, 100 Has. of commercial quality palm hearts will be harvested in 1990 on land converted from low grade pasture. Based on one Ha. test results in 1985 and 10 Has. in 1986, Project generated forage crop mixes would be used to renovate 500 Has. of degraded pasture by 1990. One-hundred mixed fruit tree plantations in 1987, based on the results obtained in 25 Project test plots, will be expanded to 850 plantations in 1990. The core breeding flock of tropical hair sheep began with 40 animals imported by the Project in 1984, and a subsequent intensive breeding and culling program was conducted. Trial sheep modules, involving a total of 80 animals, have been tested on farms throughout the Valley starting in 1985. In 1987, the core breeding flock size reached 300. Using the core breeding flock as a source of stock and based on lessons learned from the trial sheep modules, there will be 100 modules, or 1,200 head of tropical hair sheep in the Valley by 1990. The introduction of these animals, the first in Peru, is proving to be very successful under the Valley's extreme environmental conditions.

In light of original CSRM Project implementation experience, original Project design assumptions about the agricultural production potential of the Palcazu Valley (supposedly sufficient to support a massive agro-industry effort) have proved to be overly optimistic. Acceptance of new technologies by farmers, on a scale more suitable to the Valley based on what we now know about the land capability and potential in the Valley, has been impressive. During CSRM-II, more critical attention will be given to determine the economic viability of these new technologies and the expanded research on additional new technologies. In addition, INIAA will become more closely involved to insure that new technologies can be disseminated on a wider scale in high jungle areas.

3. Protection

Land use capability classification of the Palcazú Valley determined that most of the Yanachaga mountain range to the west and the San Matías range to the east were too steep for productive use and should be designated as protection forest. These two mountain formations are critical

to the hydrological cycle of the more utilizable Valley slopes and floor. The Yanachaga range, in particular, includes extensive areas of essentially virgin ecotypes characterized by exceptional species diversity. Hence, its designation as a National Park was sought and obtained. The San Matías range is no less important as a protection forest, but less qualified for park status. Consequently, the Project sought and obtained its designation as a Protection Forest. This is not a legal reserve category, but one which determines that the forest should not be exploited, and requires protection by the District Forester.

The Yanachaga National Park and the San Matias Protection Forest are essential to the integrity of the entire watershed; cutting or other disturbance of these steep slopes along the bounding ridges of the Valley floor, will quickly lead to erosion and landslides with siltation in the rivers and consequent flooding of the only lands in the Valley potentially suitable for agriculture.

During the CSRM-II, a major focus of this component will be to operationalize the management of these areas. In addition, the establishment of the biological research center will permit expanded research on biological diversity including inventories of flora and fauna by Peruvian and expatriate conservation entities, such as the Peruvian Foundation for Nature Conservancy, The Nature Conservancy, World Wildlife Fund, and others that currently carry out these activities in the Project area.

4. Continuous Land Use Inventory

Two basic land capability maps (known as the Tosi and the ONERN maps) have been prepared for the Valley under the CSRM Project using somewhat different criteria and scales, and generating some controversy. The Tosi map is most commonly used in the Project area, but the ONERN map is more frequently used by other GOP agencies. Both are useful and little is to be gained by trying to achieve uniformity. The current land use map was developed from aerial photos which now are three years old. During CSRM-II, these will be updated with new photography. The APODESA Geographic Information System (GIS) is utilizing computerization to store this information and generate overlays to compare current land use with land use potential.

The original CSRM Project design contemplated that these land use maps would be utilized at the farm level to guide land use and production patterns. This has not been demonstrated as feasible since farm level planning requires more *in situ* information on agronomic characteristics of the farm. Under CSRM-II, these maps will be used at a more generalized planning level to assist in the inventory of agricultural and forestry production technologies.

5. Extension and Social Development

The original CSRM Project closely focused the major technical components on the Amuesha population both as beneficiaries and as collaborators in the implementation of this highly experimental set of

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activities. It became clear during CSRM Project implementation that a structured approach to working with the Amuesha needed to be developed, a single point of contact or coordination to insure that their views and priorities were communicated to Project leadership and vice versa, that their organizations were identified and involved in the implementation of the Project, and that methodologies for working with native communities were developed in a conscious and planned way so that lessons learned in this Project could be applied elsewhere in the jungle. Activities of this component are intended to ensure social soundness of activities in a structured, formalized way, ie., as an applied social science research effort.

Prior to the CSRM Project, colonists and Amuesha alike were almost completely dependent on their own resources and counsel. Government services were notably absent. With CSRM, government forces began to mobilize to bring health, education and extension services to the Valley. These services had to reckon with an entirely different set of circumstances than those of the more settled areas in which these services and service delivery mechanisms developed. Transportation was commonly on foot or by canoe rather than by road, with airplanes used for external access. Agricultural technology developed elsewhere was totally unsuited to the fragile environment, or to an economic situation in which profitability was determined primarily by cost limitation and family consumption requirements. Appropriate health services had to be mostly aimed at prevention (vaccination, health education) and implemented by paraprofessionals rather than licensed medical practitioners who generally shun the Valley's isolation and poverty. Education required similar adaptation, not only to the specific needs of the inhabitants, but in the use of bilingual teachers and materials for the Amuesha, who constitute a majority of the Valley's population.

These limitations changed development priorities and methods. To relate to natural transportation methods, field contact personnel were grouped in four rural development centers. Where possible, government personnel were recruited locally. Government-paid staff were supplemented by volunteer promoters recruited from Amuesha and colonist communities. Training became a continuous process of short courses and closely supervised on-job training. The initial emphasis on construction of schools and health posts was altered to emphasize provision of simple, essential instruments and equipment.

Early CSRM Project implementation emphasis on delivering government services was shifted to enabling colonists and Amuesha to better service their own needs, using government provided services when available, but not being entirely dependent on them. This shift is best illustrated by the health program which trains both village volunteer health promoters and those paid by the MOH in the same courses and facilities to create team solidarity. Both groups are given training in community health, in medical drug use and in simple surgery and dentistry. As they become proficient, they are supplied with necessary instruments and access to a rotating medicine fund which procures generic drugs from the MOH for resale to patients.

Under CSRM-II, some assistance will be provided to the health activities as the MOH assumes the provision of these services. This process is well underway. Extension and social development activities will emphasize dissemination of production technologies and development of viable organizational mechanisms for extension and social services delivery.

6. Road Maintenance

Only log extraction road construction is included in CSRM-II. During CSRM Project implementation, the major problem was to carefully monitor Project-financed road equipment for use in Project area road maintenance and upgrading activities consistent with technical capabilities of the equipment. Technical assistance provided to the road maintenance equipment pool under the original Project was important in assisting the GOP to procure and effectively utilize the equipment. In CSRM-II, emphasis will be placed on better planning and meeting of road maintenance targets.

7. Regional Development Planning Support by APODESA

Under CSRM-II, APODESA will focus more directly on planning and policy analysis with regard to the long term management of high jungle resources. The sharper focus on planning and policy analysis is intended to move beyond data collection and publication to actively influencing GOP policy decisions.

D. Institutional Analysis

The National Developmen. Institute (INADE) will administer the CSRM-II Project, primarily through its Pichis-Palcazu Special Project Management Unit (PEPP). PEPP is headquartered in Lima and is administratively responsible for all development project activities being carried out in the Central Selva Region of Peru. The Development Policy Analysis Office (APODESA), a staff support office of INADE, will administer the regional development support component of the Project.

The Palcazu Rural Development Program Management Unit (PDR - Palcazu), one of five field management units of PEPP, has administrative responsibility for field implementation of all INADE/PEPP development activities carried out in the Palcazu Valley. Thus, administrative responsibility for CSRM-II field operations will be assigned to this unit. PDR-Palcazu is headquartered at the base site for the project in Iscozacin. 1/

1. Organizational Structure

The organizational structure of INADE, and the place of PEPP in that structure, are shown in Chart A, Annex II, Exhibit K. INADE was established in 1983 by Legislative Decree, as a semi-autonomous legal entity responsible for administering major development projects that involve international funding.

1/ Administrative responsibility for implementing CSRM-II is the same as that for the original CSRM Project.

It is attached to the Ministry of the Presidency in order to assure administrative autonomy and a multi-sector scope in its program approach. PEPP, which originally had been established as a "special project" in 1980, subsequently was absorbed into INADE 1/. INADE approved the internal organizational structure and functions of PEPP in 1984, as one of five special project management units grouped under the Central Management Office for Special Projects.

The PEPP organization chart (See Chart B, Annex II, Exhibit K) provides a detailed breakdown of its organizational structure, and the place in that structure of PDR-Palcazu, the organizational unit that will be responsible for field administration and implementation of CSRM-II. The Lima headquarters of PEPP are organized into three staff offices and four support offices.

The PEPP headquarters offices provide logistic support and backstop services to the five development program field management units, including PDR-Palcazu.

Financial autonomy and flexibility are important attributes of INADE and its project administrative units. INADE is an independent budget entity under the GOP budget system. The PEPP budget appears as a line item in the INADE budget, and is disaggregated by each of the five field programs for which PEPP is administratively responsible. Because of financial autonomy and the decentralized administrative structure of INADE, once the annual budget law is approved, PEPP management has, with few exceptions, full authority to commit and disburse funds. Budgeting and expenditure procedures (including procedures for advances and liquidations of project funds) already are in place, having been used for administering funds of the original CSRM Project. Existing procedures in PEPP will be used for financial administration of CSRM-II.

The PDR - Palcazu field management unit also has a considerable degree of financial autonomy within the limits of its approved annual operating plan and expenditure budget. PDR - Palcazu Staff in Iscozacin control and account for budget expenditures in the field. It receives operating advances from PEPP, and these are replenished periodically upon presentation of liquidations.

The organizational pattern under which CSRM-II will be administered and implemented provides a large degree of operating independence. The ability of PEPP to effectively implement CSRM-II generally does not depend on approvals, or operational cooperation, from other organizational units of INADE or from other organizations. 2/

1/ The "special project" concept was used by the GOP prior to 1983 to provide more flexible and efficient administrative treatment for internationally funded development projects. PEPP had been established as a special project, and for budget purposes originally had been attached to the Prime Minister's Office.

2/ Cooperation required to achieve the end-of-project objective of institutionalizing the technology generation and transfer activities being funded by CSRM-II is discussed in a later section.

2. Management Structure

INADE is governed by a nine-member Board of Directors. The executive head (Chief) of INADE enjoys the rank of Minister and reports directly to the President of Peru. Operations management authority is vested in a General Manager.

INADE management is responsible for providing direction to major development undertakings and to coordinate these across sector lines. However, each project management unit is administratively independent in terms of implementation management and budget execution for programs that are under its administrative control.

For CSRM-II, management authority will be vested in the Executive Director of PEPP, who also will be named as CSRM-II Project Manager. The staff and support offices of PEPP will provide logistic support and backstop services to the PDR-Palcazu program Management Unit for project implementation activities in the Palcazu Valley.

Field implementation management responsibilities for the CSRM-II Project will be delegated to the Director of the PDR - Palcazu Program Management Unit (as also was the case for the original CSRM Project). Implementation of the regional development policy support activity will be managed by a Project Coordinator designated in APODESA.

Management responsibilities of the PDR-Palcazu Director and APODESA coordinator (for their respective project components), include development of annual operating plans and budgets for INADE and USAID approval, implementation of approved operating plans, proper budget execution, and evaluation of project progress towards annual life-of-project goals for those components. This management responsibility includes timely documentation and submission of requests to the PEPP Project Manager for tecnical assistance, commodities and training within the terms of approved annual budgets and operating plans.

Coordination between PEPP headquarters and the PDR-Palcazu Management Unit is handled by regular radio and written communications between the Project Site and the Lima Office, as well as by monthly coordination meetings in Iscozacin attended by the PEPP Executive Director and USAID Project Manager.

PEPP managed all construction, staffing, administration, procurement, training, research and extension activities during the life of the original CSRM Project from 1982 to 1988. Considering the remoteness of the Project area, lack of infrastructure and means of communication, and financial constraints, PEPP has done a commendable job. Since 1985, when the full complement of personnel for the PDR-Palcazu management unit were on board at the Project site in Iscozacin, and access by road first became possible, the amount of research, extension, and training implemented under the original CSRM project increased significantly.

PEPP and PDR-Palcazu staff have acquired considerable experience in the technical aspects of tropical forestry and agricultural development, as well as in the administrative and financial procedural aspects of development project implementation. Nevertheless, because of the remoteness of the project site and the resulting high personnel turnover, efforts must be continued to maintain a full complement of qualified staff at the project site.

3. Other Implementing Agencies

An important end-of-project objective of CSRM-II is to institutionalize the technology generation and transfer process being put in place. To assist in this process, formal agreements have been entered into between PEPP and GOP implementing agencies that will be taking over project operations at the end of the project. Formal agreements have been signed with the National Institute for Agricultural and Agro-Industrial Research (INIAA) for agricultural, forestry and agro-industrial research and technology transfer, with the National Forestry Institute (INFOR) for forestry protection and control activities, with the Ministry of Health (MOH) for primary health care, and with the Ministry of Transport and Communications (MTC) for road maintenance to Iscozacin. These agreements will be reviewed early in the implementation of the CSRM-II Project, and ways will be sought to initiate necessary steps to institutionalize Project activities during the implementation of CSRM-II. Annex II, Exhibit B, VI. provides a description of how these institutions will collaborate during the LOP and after the PACD.

Detailed descriptions of the organization and functions of INIAA, INFOR, MOA, and MTC are on file in USAID/OARD.

E. Social Soundness Analysis

This section summarizes the findings contained in Annex II, Exhibit E, Detailed Social Soundness Analysis. The Annex reviews: 1) the basic premises of the original CSRM social analysis; 2) how activities were structured to directly address social concerns during project implementation; 3) recommendations of social anthropologists involved in the CSRM Project; and, 4) how the CSRM-II Project activities, which are focused on achieving research and development objectives, will continue to utilize flexible participatory outreach mechanisms that take into account the social, economic, and environmental reality of the Palcazu Valley.

1. Social Profile of the Project Area

Approximately 11,700 inhabitants live in the Palcazu Valley; of which 45 percent are considered to be directly within the area of influence of Project research, demonstration and extension activities. These 5,300 beneficiaries are: 2,000 Amuesha Indians living within native communities, 700 natives residing outside the communities, 1,700 established colonists and 900 recent immigrants. Of the five population centers, Iscozacin capital of

the district and site of Project headquarters, has approximately 1,000 inhabitants. The remaining centers have between 200 - 400 inhabitants each. The average family size is 7.1 and the birth rate is 5.2 percent.

Three socio-economic strata exist in the Valley - large ranchers, native Amuesha and small colonists. Some immigration by Amuesha Indians from the nearby Villa Rica and Oxapampa area, as well as colonists from the highlands and coast, is occurring. The 12 native communities that were granted legal title to their lands carefully guard their lands against squatters. Valley residents of differing ethnic origin live side by side and interact with mutual interdependence with Amuesha providing labor to large ranchers. New economic enterprises, such as cooperative forestry operations and stores, in the Amuesha communities are now providing important alternatives to traditional wage labor opportunities.

2. Access to Services and Economic Activities

The opening and maintenance of the road into the Valley, part of the original CSRM Project, improved access to government offices. The severe shortage of health services has been alleviated by the health component of the original Project which trained native and colonist health promoters. The GOP services which were made available for the first time or existing services which were expanded are health, agriculture credit and road transport services.

Economic activities in the Valley have also been impacted by the road by improving access to regional market centers and permitting importation of raw materials and finished goods. Economic endeavors have traditionally focused on subsistence agriculture practiced by small colonists and Amuesha natives and hunting/fishing activities to supplement their diet. Large cattle operations, developed through the cutting down of forests and conversion to pasture, have gradually become less productive because of the adverse agronomic conditions; i.e. poor soil fertility and high rainfall. The crop/livestock alternatives that are being developed and tested in the CSRM Project and will continue more intensively in CSRM-II; i.e. the NFM System, sheep, improved pasture, and promotion of permanent crops such as coffee and peach palm, were chosen based on thorough assessment of agronomic, socio-economic production, and marketing conditions. These different systems have been adopted by the Amuesha communities to varying degrees with the NFM System most extensively put into practice.

CSRM-II will utilize the same extension mechanisms and participatory style that was developed under the original CSRM Project, incorporating natives and colonists into demonstration programs, assisting them to resolve land tenure and use issues, and supporting the preparation of bilingual extension pamphlets. Indicative of the support by the Amuesha of forestry, crop and social services outreach under the CSRM Project is the recent visit by a delegation from the native communities to the Mission requesting that CSRM-II be approved quickly to consolidate the implementation of these services and the resulting improvements in the Valley.

3. Role of Women

Among the Amuesha Indians, traditional gender roles are especially well defined and complementary. Women assume important tasks in cultivation and food processing/preparation, as well as in rearing and caring for children.

Within the Palcazu Valley, it could be argued that to the extent that the development of forestry and permanent crop technologies encourage greater market production - as is the case of The Yanesha Forestry Cooperative - the impact on gender roles may not be in the interest of women. As men become more intensively involved in market production activities, women must assume more of the agricultural tasks normally performed by men in addition to their traditional agricultural, domestic and income-generating activities. Meanwhile, the cash income men derive from market production activities is often monopolized by them and not shared with their families. To counter this potentially negative impact under CSRM-II, a greater number of Forestry Cooperative members, including women, will be trained. Women members will participate in the Cooperative work for cash income (which is more likely to be used for family benefit), and at the same time working members of the Cooperative - now mostly men - will be able to return to their communities for a longer period and personally assume more of their traditional agricultural activities.

The native communities have been encouraged to elect their own representatives to participate in Project training programs in forestry, agricultural development, health care, accounting, mechanics, and other practical skills. For cultural reasons, young men are usually selected for these training opportunities. However, some women are already members of the Cooperative where they participate on an equal basis with men in decision making and remuneration for their work and expect to also do so in future profit distributions. Also to attempt to improve the situation of Valley women, a special effort will be made in CSRM-II to ensure that agricultural extension training incorporates women who are involved in agricultural production activities.

4. Project Beneficiaries

The direct beneficiaries of the proposed Project are the native communities, small farmers, cattle ranchers, farm laborers, women and children in the Palcazu Valley. Appropriate forestry management, modified agricultural practices, and improved pasture and livestock management provide increased incomes for the area native residents and small farmers. Additional employment opportunities and higher wages result for day laborers from the labor intensive forest and pasture management practices introduced by the Project. The area residents also benefit as recipients, trainees and employees of support activities in education, health, and road maintenance sponsored by the Project. Through expanded and improved GOP services, sustained productivity, and protection and improvement of the environment, the quality of human life in the zone will be enhanced.

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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 their populations 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.

F. Environmental Analysis

After determination by the Project Development Committee of a probable Positive Threshold Decision (i.e., the Project could have a potentially significant effect on the environment), the Environmental Assessment (EA) for CSRM-II was conducted by the Andean Regional Environmental Management Specialist (REMS/SA). All recommendations from the EA have been fully incorporated into the CSRM-II Project. The EA was reviewed and cleared by the LAC/DR/EST Bureau Environmental Officer. (See Annex I, Exhibit D and Annex II, Exhibit F.)

VI. CONDITIONS PRECEDENT, COVENANTS AND NEGOTIATION STATUS

A. Conditions Precedent

1. Condition Precedent to First Disbursement of Loan Funds to Finance Road Maintenance Activities

Prior to the first disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of loan funds to finance road maintenance activities, 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 detailed operation plan, including a vehicle and equipment use plan for all vehicles and equipment purchased under both the original CSRM and CSRM-II Projects, for the road component within the project area.

2. Condition Precedent to Subsequent Disbursement of Loan Funds to Finance Road Maintenance Activities

Prior to any disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of loan funds to finance road maintenance activities in 1989 and each calendar year thereafter of the project, 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 detailed operation plan, including a vehicle and equipment use plan for the road component within the project area.

3. Condition Precedent to Disbursement of Loan Funds to Finance Road Construction or Rehabilitation Activities

Prior to the first disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of loan funds for each road construction or rehabilitation activity (i.e. construction of logging extraction roads), the Cooperating country shall, except as A.I.D. may otherwise agree in writing, furnish plans of such construction or rehabilitation activities to A.I.D. for its environmental assessment and approval.

4. Condition Precedent to Disbursement of Funds to Finance the Forestry Component after June 30, 1989

Prior to any disbursement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, of grant or loan funds for the Forestry Component after June 30, 1989, 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 it has transferred title and possession of project-owned wood processing equipment to the Yanesha Forestry Cooperative.

B. Covenants

The Cooperating Country covenants that it will:

1. Through the National Development Institute (INADE), enter into an agreement with the National Planning Institute (INP) and the National Office of Natural Resources Evaluations (ONERN) to form a committee with representatives of each of the above organizations by no later than December 1988 which will provide policy guidance on a continuing basis, meeting at least quarterly throughout the life of the Project, assure the autonomy and independence of the Regional Development Policy Support Unit (APODESA), approve the Project's annual budgets and plans before they are submitted to A.I.D., and institutionally locate APODESA in INP as an integral part of the organization by August 31, 1990.

2. Ensure that the Ministry of Agriculture and regional governments take any and all actions necessary to prevent illegal logging operations and other illegal uses of the property in the Yanachaga National Park and San Matias Protection Forest.

3. Use road maintenance equipment purchased during the original CSRM Project (527-0240/527-T-0790) only in the Project area during the life of the CSRM-II, and provide quarterly reports on the adherance to the implementation of both the road maintenance and vehicle and equipment use plans.

4. Develop a plan and set of implementable actions by June 1989 to transfer road maintenance responsibilities to the MTC by the PACD.

5. Through PEPP, evaluate the Project's personnel system, revise the technical and administrative scopes of work (particularly for key personnel), recommend adjustments in salary levels within the limits of Peruvian law governing investment projects, and recruit technically qualified personnel by the end of December 1988.

C. Negotiating Status

Project design has been conducted in close collaboration with executive and technical management personnel of the INADE, PEPP, APODESA and INP. The Project, including conditions precedent and covenants, has been fully discussed with and concurred in by appropriate GOP officials from INADE, PEPP, INP, APODESA, Ministry of Foreign Relations and the Ministry of Economy and Finance. The GOP supports the Project as designed, and no unresolved issues exist. Pre-project implementation will begin as soon as the project agreement is signed and full implementation initiated October 1, 1988.

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Annex I
Exhibit A
Page 1 of 4

ACTION: PROG (FIES)
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TAGS:
SUBJECT: PROJECT DOCUMENTATION REQUIREMENTS FOR CENTRAL SELVA RESOURCE MANAGEMENT (CSRM) PHASE TWO PROJECT

REF A) LIMA 1073, B) 87 LIMA 8846, C) 87 STATE 293508, D) ACTION MEMO FOR AA/LAC DATED SEPT. 2, 1987

1. PER REF A, MISSION IS CORRECT IN ITS UNDERSTANDING THAT REF B CONSTITUTES ABBREVIATED PID FOR A FOLLOW-ON TO THE SUBJECT PROJECT AND THAT REFS C AND D CONSTITUTE AID/W APPROVAL OF ABBREVIATED PID.

2. WE CONFIRM THAT DIRECTOR USAID/PERU CAN AUTHORIZE THE FOLLOW-ON PROJECT. WHITEHEAD
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INITIALS: BAD

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D C 20523

SEP 2 1987

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR (LAC)

FROM : LAC/DR, Terrence J. Brown

SUBJECT: Central Selva Resource Management Project (CSRM), 522-0240

Problem: To concur with the proposed project redesign/extension and funding reallocations.

Background: The project was authorized in FY 1982 at a $22 million level, of which $18 million was to be loan and $4 million grant, with a PACD of September 30, 1987. 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.

Considerable progress has been made by the project in developing, testing and implementing sustainable production methodologies, in natural resource protection activities, as well as establishing the necessary administrative capability and infrastructure to implement the project in a difficult logistical environment.

However, at the beginning of the project, the pace of implementation was slow due to the following factors:

1. Lack of readily available applied production methodologies to deal with the agronomic, climatological and environmental realities of the high jungle; and

2. To build a consensus and convince the Peruvian technicians and project managers that traditional agricultural/forest production technologies would lead to rapid adverse ecological and economic consequences took more time than was expected.

Discussion: According to the Peru Mission, to terminate the project on the current PACD would negate important progress made to date and would ignore the fact that the pace of implementation has been affected by the biological realities of working in the jungle. The Mission also argues that termination of the project would prevent the attainment of the project's purpose.

Based on an intensive internal review of the project carried out by USAID/Peru and on a consultant's recommendation, the Mission and the implementing agency, the National Development Institute (INADE), have informally determined that a three-year extension is required to achieve the project's purpose.

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In order to achieve that purpose it will be necessary to achieve two interrelated objectives: (1) development, testing and institutionalization of systems for the stabilization and management of economic resources for sustained production in the Palcazu Valley; and (2) protection of fragile natural resources and native population groups.

The Mission's strategy is to continue to support those activities which can meet these objectives and permit the Government of Peru to institutionalize this capacity during the three year extension.

Under the first objective, achieving sustainable agricultural production, the project will continue to support activities to:

1. Demonstrate the feasibility/transferability of sustained low-input agricultural and livestock production technologies; and

2. Fully implement the natural forest management and production system, involving the participation of a native Indian cooperative in the operation of a wood processing facility.

In addition, the Mission will assist the National Development Institute to strengthen institutional mechanisms with the National Agricultural Research and Promotion Institute (INIPA) and forestry agencies to permit continuity of the agricultural livestock production and the natural resource forest management systems after the A.I.D. resources end.

Under the second objective, protection of fragile resources and population groups, the project will support activities to:

1. Improve the management of the Yanachaga National Park and San Matias Forest by providing resources for infrastructure, training of native forest rangers and for establishing a continuing biological diversity research capability at the project site by Peruvian and foreign scientists; and

2. Maintain and institutionalize the activities of the Regional Development Policy Support Group (APODESA) within an institution such as the National Natural Resources Evaluation Office (ONERN).

The original Project Agreement foresaw a LOP of $18 million in loan and $4 million in grant. As of the current PACD, September 30, 1987, all of the grant funds and an estimated $6.7 million in loan funds will have been expended, leaving a balance of approximately $11.3 million in loan funds.

USAID/Peru estimates that $5.3 million would be required for a three year extension consisting of $2.6 million in grant funds to support technical assistance/training and a $2.7 million loan for infrastructure, material, equipment and operational costs. Therefore, of the estimated $11.3 million of loan funds available at the current PACD, $2.7 million would be used to finance loan costs during the three year extension. Consequently, $8.6 million will be available for deobligation.

USAID/Peru's intention is to seek PPC approval to shift these $8.6 million from loan to grant and reobligate them as follows:

1. $1.8 million in grant to cover the estimated technical/training costs of a three year Central Selva Management Resources extension,

2. $6.8 million in grant for the new Agricultural Technology Transformation Project (ATT).

The Mission intended to proceed with proposed deob/reob but due to internal changes in the Peruvian power structure (National Planning Institute and Ministry of Finance and Economy) a concern was raised about reaching the decision on time. The solution to this concern has been to propose an interim nine month project extension to June 30, 1988 which will permit USAID/Peru to negotiate the full extension period to September 30, 1990 and proceed with the deob/reob process.

In order to cover the costs of the technical assistance needed for this interim period, $800,000 will be required. USAID/Peru programmed this amount from its FY 1987 OYB.

Recommendation: That you approve the project redesign, the extension of the project until September 30, 1990, and the increase in LOP grant funding from $4 million to $6.6 million.

Approve: Dwight Ink

Disapprove: _____

Date: September 2, 87

5C(1) - COUNTRY CHECKLIST

Listed below are statutory criteria applicable to: (A) FAA funds generally; (B)(1) Development Assistance funds only; or (B)(2) the Economic Support Fund only.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FY 1988 Continuing Resolution Sec. 526. Has the President certified to the Congress that the government of the recipient country is failing to take adequate measures to prevent narcotic drugs or other controlled substances which are cultivated, produced or processed illicitly, in whole or in part, in such country or transported through such country, from being sold illegally within the jurisdiction of such country to United States Government personnel or their dependents or from entering the United States unlawfully?

   No.

2. FAA Sec. 481(h). (This provision applies to assistance of any kind provided by grant, sale, loan, lease, credit, guaranty, or insurance, except assistance from the Child Survival Fund or relating to international narcotics control, disaster and refugee relief, or the provision of food or medicine.) If the recipient is a "major illicit drug producing country" (defined as a country producing during a fiscal year at least five metric tons of opium or 500 metric tons of coca or marijuana) or a "major drug-transit country" (defined as a country that is a significant direct source of illicit drugs significantly affecting the United States, through which such drugs are transported, or through which significant sums of drug-related profits are laundered with the knowledge or complicity of the government), has the President in the March 1 International Narcotics Control Strategy Report (INSCR) determined and certified to the Congress (without

   Yes, President certified in 1988 INCSR, that Peru complied with Subsections (a) and (b) and Congress has not disapproved such certification.

Congressional enactment, within 30 days of continuous session, of a resolution disapproving such a certification); or has the President determined and certified to the Congress on any other date (with enactment by Congress of a resolution approving such certification), that (a) during the previous year the country has cooperated fully with the United States or taken adequate steps on its own to prevent illicit drugs produced or processed in or transported through such country from being transported into the United States, and to prevent and punish drug profit laundering in the country, or that (b) the vital national interests of the United States require the provision of such assistance?

Drug Act Sec. 2013. (This section applies to the same categories of assistance subject to the restrictions in FAA Sec. 481(h), above.) If recipient country is a "major illicit drug producing country" or "major drug-transit country" (as defined for the purpose of FAA Sec 481(h)), has the President submitted a report to Congress listing such country as one (a) which, as a matter of government policy, encourages or facilitates the production or distribution of illicit drugs; (b) in which any senior official of the government engages in, encourages, or facilitates the production or distribution of illegal drugs; (c) in which any member of a U.S. Government agency has suffered or been threatened with violence inflicted by or with the complicity of any government officer; or (d) which fails to provide reasonable cooperation to lawful activities of U.S. drug enforcement agents, unless the President has provided the required certification to Congress pertaining to U.S. national interests and the drug control and criminal prosecution efforts of that country?

No such report has been submitted to Congress on Peru.

4. FAA Sec. 620(c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government?

No.

5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including any government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

No. ENRON, owner of Belco's assets, and the GOP continue to work cooperatively to resolve the problem of compensation for expropriate assets. We are unaware that any U.S. citizen or entities have interests in those banks which may be affected by the GOP's law to nationalize the financial system.

6. FAA Secs. 620(a), 620(f), 620D; FY 1988 Continuing Resolution Sec. 512. Is recipient country a Communist country? If so, has the President determined that assistance to the country is vital to the security of the United States, that the recipient country is not controlled by the international Communist conspiracy, and that such assistance will further promote the independence of the recipient country from international communism? Will assistance be provided directly to Angola, Cambodia, Cuba, Iraq, Libya, Vietnam, South Yemen, Iran or Syria? Will assistance be provided to Afghanistan without a certification?

No.

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

No.

8. FAA Sec. 620(l). Has the country failed to enter into an investment guaranty agreement with OPIC?

Yes. However, the GOP is officially discussing signing the agreement. The GOP had two issues with signing it which are now resolved; one with the location of general dispute settlement and the other concerned the Andean Pact. The GOP has made known its willingness to sign it now; however, the USG requires the Belco Co. expropriation matter be resolved first.

9. FAA Sec. 620(o); Fishermen's Protective Act of 1967 (as amended) Sec. 5. (a) Has the country seized, or imposed any penalty or sanction against, any U.S. fishing vessel because of fishing activities in international waters? (b) If so, has any deduction required by the Fishermen's Protective Act been made?

No.

10. FAA Sec. 620(q); FY 1988 Continuing Resolution Sec. 518. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any loan to the country under the FAA? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the FY 1988 Continuing Resolution appropriates funds?

(a) As of 3/2/88, the GOP was more than 6 months in arrears on Loan No.527-W-08. Payment was due 9/1/87. (b) The GOP is under Brooke-Alexander sanctions which are triggered when the government is more than 12 months in arrears on Foreign Military Sales.

11. FAA Sec. 620(s). If contemplated assistance is development loan or to come from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget and amount of the country's foreign exchange or other resources spent on military equipment? (Reference may be made to the annual "Taking Into Consideration" memo: "Yes, taken into account by the Administrator at time of approval of Agency OYB." This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

The GOP budget does not break out all the military budget items. It does show the budget for the Ministry of Defense and Ministry of Interior, but not what portion is military.

12. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have relations been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

No.

13. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the A.I.D. Administrator in determining the current A.I.D. Operational Year Budget? (Reference may be made to the Taking into Consideration memo.)

The GOP is not in arrears in its obligatory payments of UN dues which must be paid in order to participate (vote) in the UN. Payments to the development assistance programs are voluntary; and thru 1985, the GOP paid $250,000 per year. Since President Garcia was elected in mid-85, these voluntary payments have not been made. However, the GOP plans to pay a symbolic amount for 1986 and 1987.

14. FAA Sec. 620A. Has the President determined that the recipient country grants sanctuary from prosecution to any individual or group which has committed an act of international terrorism or otherwise supports international terrorism?

No.

15. FY 1988 Continuing Resolution Sec. 576. Has the country been placed on the list provided for in Section 6(j) of the Export Administration Act of 1979 (currently Libya, Iran, South Yemen, Syria, Cuba, or North Korea)?

No.

16. ISDCA of 1985 Sec. 552(b). Has the Secretary of State determined that the country is a high terrorist threat country after the Secretary of Transportation has determined, pursuant to section 1115(e)(2) of the Federal Aviation Act of 1958, that an airport in the country does not maintain and administer effective security measures?

No.

17. FAA Sec. 666(b). Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. who is present in such country to carry out economic development programs under the FAA?

No.

18. FAA Secs. 669, 670. Has the country, after August 3, 1977, delivered to any other country or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards, and without special certification by the President? Has it transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device? (FAA Sec. 620E permits a special waiver of Sec. 669 for Pakistan.)

No.

19. FAA Sec. 670. If the country is a non-nuclear weapon state, has it, on or after August 8, 1985, exported (or attempted to export) illegally from the United States any material, equipment, or technology which would contribute significantly to the ability of a country to manufacture a nuclear explosive device?	No.
20. ISDCA of 1981 Sec. 720. Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Assembly of the U.N. on Sept. 25 and 28, 1981, and did it fail to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the Taking into Consideration memo.)	Yes, however this has been taken into account in the Administrator's 1986 Taking Into Consideration Memorandum.
21. FY 1988 Continuing Resolution Sec. 528. Has the recipient country been determined by the President to have engaged in a consistent pattern of opposition to the foreign policy of the United States?	No.
22. FY 1988 Continuing Resolution Sec. 513. Has the duly elected Head of Government of the country been deposed by military coup or decree? If assistance has been terminated, has the President notified Congress that a democratically elected government has taken office prior to the resumption of assistance?	No.
23. FY 1988 Continuing Resolution Sec. 543. Does the recipient country fully cooperate with the international refugee assistance organizations, the United States, and other governments in facilitating lasting solutions to refugee situations, including resettlement without respect to race, sex, religion, or national origin?	Not applicable.

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria

FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy?	No.
FY 1988 Continuing Resolution Sec. 538. Has the President certified that use of DA funds by this country would violate any of the prohibitions against use of funds to pay for the performace of abortions as a method of family planning, to motivate or coerce any person to practice abortions, to pay for the performance of involuntary sterilization as a method of family planning, to coerce or provide any financial incentive to any person to undergo sterilizations, to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilization as a means of family planning?	No.

2. Economic Support Fund Country Criteria

FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, has the President found that the country made such significant improvement in its human rights record that furnishing such assistance is in the U.S. national interest?	No.
FY 1988 Continuing Resolution Sec. 549. Has this country met its drug eradication targets or otherwise taken significant steps to halt illicit drug production or trafficking?	Yes.

5C(2) - PROJECT CHECKLIST

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

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 1988 Continuing Resolution Sec. 523; FAA Sec. 634A. If money is sought to obligated for an activity not previously justified to Congress, or for an amount in excess of amount previously justified to Congress, has Congress been properly notified?	A Congressional Notificatio for the Project was sent on February 11, 1988 and expired on February 26, 198:
2. FAA Sec. 611(a)(1). Prior to an obligation in excess of $500,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance, and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	(a) Yes. (b) Yes.
3. FAA Sec. 611(a)(2). If legislative action is required within recipient country, what is the basis for a reasonable expectation that such action will be completed in time to permit orderly accomplishment of the purpose of the assistance?	No further legislative action by Peru is required.

4. FAA Sec. 611(b); FY 1988 Continuing Resolution Sec. 501. If project is for water or water-related land resource construction, have benefits and costs been computed to the extent practicable in accordance with the principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See A.I.D. Handbook 3 for guidelines.)	Not applicable.
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and total U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability to maintain and utilize the project effectively?	Project involves constructio of several kilometers of feeder roads, but the budget is well under $1 million.
6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	The Project is not susceptible to execution as part of a regional or multilateral project.
7. FAA Sec. 601(a). Information and conclusions on whether projects will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	(a) Project may result in export lumber from special and exotic species; (b) Of 8 Project components 2 will encourage private initiative and competition in forestry and agricultural production; (c) Yanesha Forestry Coop, representing 5 native communities, will receive direct assistance including training to further development; (d) Project activities foster free enterprise, not monopolistic practices; (e) Project will directly improv technical efficiency of agriculture and forestry industry; (f) NA.
8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise)?	The Project will encourage private U.S. participation in the foreign assistance program through the use of U.S. technical assistance and procurement of specific U.S. commodities.
9. FAA Secs. 612(b), 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	The GOP will contribute the equivalent of US$3,060,000 in local currency counter-

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	No.
11. FY 1988 Continuing Resolution Sec. 521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	Any forestry products developed for export are not likely to be in surplus on the world markets, nor to cause substantial injury to U.S. producers.
12. FY 1988 Continuing Resolution Sec. 553. Will the assistance (except for programs in Caribbean Basin Initiative countries under U.S. Tariff Schedule "Section 807," which allows reduced tariffs on articles assembled abroad from U.S.-made components) be used directly to procure feasibility studies, prefeasibility studies, or project profiles of potential investment in, or to assist the establishment of facilities specifically designed for, the manufacture for export to the United States or to third country markets in direct competition with U.S. exports, of textiles, apparel, footwear, handbags, flat goods (such as wallets or coin purses worn on the person), work gloves or leather wearing apparel?	No.
13. FAA Sec. 119(g)(4)-(6). Will the assistance (a) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity; (b) be provided under a long-term agreement in which the recipient country agrees to protect ecosystems or other wildlife habitats; (c) support efforts to identify and survey ecosystems in recipient countries worthy of protection; or (d) by any direct or indirect means significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas?	(a) Yes. (b) Yes. (c) No. (d) No.

14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (either dollars or local currency generated therefrom)?	Not applicable.
15. FY 1988 Continuing Resolution. If assistance is to be made to a United States PVO (other than a cooperative development organization), does it obtain at least 20 percent of its total annual funding for international activities from sources other than the United States Government?	Not applicable.
16. FY Continuing Resolution Sec. 541. If assistance is being made available to a PVO, has that organization provided upon timely request any document, file, or record necessary to the auditing requirements of A.I.D., and is the PVO registered with A.I.D.?	Not applicable.
17. FY 1988 Continuing Resolution Sec. 514. If funds are being obligated under an appropriation account to which they were not appropriated, has prior approval of the Appropriations Committees of Congress been obtained?	Not applicable.
18. FY Continuing Resolution Sec. 515. If deob/reob authority is sought to be exercised in the provision of assistance, are the funds being obligated for the same general purpose, and for countries within the same general region as originally obligated, and have the Appropriations Committees of both Houses of Congress been properly notified?	The deob/reob authority which has been requested will obligate funds in the same country for the same general purpose. Congress has been appropriately notified.
19. State Authorization Sec. 139 (as interpreted by conference report). Has confirmation of the date of signing of the project agreement, including the amount involved, been cabled to State L/T and A.I.D. LEG within 60 days of the agreement's entry into force with respect to the United States, and has the full text of the agreement been pouched to those same offices? (See Handbook 3, Appendix 6G for agreements covered by this provision).	After the Project Agreement is signed these actions will be taken.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FY 1988 Continuing Resolution Sec. 552 (as interpreted by conference report). If assistance is for agricultural development activities (specifically, any testing or breeding feasibility study, variety improvement or introduction, consultancy, publication, conference, or training), are such activities (a) specifically and principally designed to increase agricultural exports by the host country to a country other than the United States, where the export would lead to direct competition in that third country with exports of a similar commodity grown or produced in the United States, and can the activities reasonably be expected to cause substantial injury to U.S. exporters of a similar agricultural commodity; or (b) in support of research that is intended primarily to benefit U.S. producers?	(a) No. (b) No.
b. FAA Secs. 102(b), 111, 113, 281(a). Describe 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, dispersing investment from cities to small towns and rural areas, and	(a) The Project will improve incomes of men, women and families in the jungle involved in agricultural and forestry production, processing and marketing by increasing resource use efficiencies, employment and marketable surplus. It seeks to increase use of appropriate agricultural and forestry technologies in the Project area with wider applicability to the Amazon Basin and other similar jungle areas in the world.

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insuring wide participation of the poor in the benefits of development on a sustained basis, using appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward a 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.	It includes a substantial involvement of the poor (local native communities) and a sustained improvement in level of living; (b) The Project will assist development of the Forest Cooperative thru technical assistance; (c) The Project will use Peruvian experts and training where possible, and contribute to institutional development; (d) Women farmers and women decision-makers who otherwise work in the agricultural and forestry systems are included in Project activities; (e) This Project will have a wider Regional application to the Amazon Basin and the world.
c. <u>FAA Secs. 103, 103A, 104, 105, 106, 120-21</u>. Does the project fit the criteria for the source of funds (functional account) being used?	Yes.
d. <u>FAA Sec. 107</u>. Is emphasis 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.
e. <u>FAA Secs. 110, 124(d)</u>. Will the recipient country provide at least 25 percent of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?	Yes. The Government of Peru will in fact provide approximately US$3.060 million of total Project costs of US$6.970 million, i.e. 44% of Project costs.
f. <u>FAA Sec. 128(b)</u>. If the activity attempts to increase the institutional capabilities of private organizations or the government of the country, or if it attempts to stimulate scientific and technological research, has it been designed and will it be monitored to ensure that the ultimate beneficiaries are the poor majority?	Yes, it has been designed and will be monitored to ensure ultimate beneficiaries are the poor majority.

g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage 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 to respond to the agricultural and forestry needs of the area to increase rural incomes and production of crops and livestock in an ecologically sound, cost-efficient manner, and to do so through appropriate institutional development and training. Peruvian technical assistance, expertise and other resources will be used to the fullest extent possible.
h. FY 1988 Continuing Resolution Sec. 538. Are any of the funds to be used for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?	No.
Are any of the funds to be used to pay for the performance of involuntary sterilization as a method of family planning or to coerce or provide any financial incentive to any person to undergo sterilizations?	No.
Are any of the funds to be used to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilization as a means of family planning?	No.
i. FY 1988 Continuing Resolution. Is the assistance being made available to any organization or program which has been determined to support or participate in the management of a program of coercive abortion or involuntary sterilization?	No.
If assistance is from the population functional account, are any of the funds to be made available to voluntary family planning projects which do not offer, either directly or through referral to or information about access to, a broad range of family planning methods and services?	Not applicable.

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

Yes.

FY 1988 Continuing Resolution. What portion of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, colleges and universities having a student body in which more than 20 percent of the students are Hispanic Americans, and private and voluntary organizations which are controlled by individuals who are black Americans, Hispanic Americans, or Native Americans, or who are economically or socially disadvantaged (including women)?

Full consideration will be given to small and minority and women-owned businesses for the provision of all goods and services.

FAA Sec. 118(c). Does the assistance comply with the environmental procedures set forth in A.I.D. Regulation 16? Does the assistance place a high priority on conservation and sustainable management of tropical forests? Specifically, does the assistance, to the fullest extent feasible: (a) stress the importance of conserving and sustainably managing forest resources; (b) support activities which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and help countries identify and implement alternatives to colonizing forested areas; (c) support training programs, educational efforts, and the establishment or strengthening of institutions to improve forest management; (d) help end destructive slash-and-burn agriculture by supporting stable and productive farming practices; (e) help conserve forests which have not yet been degraded by helping to increase production on lands already cleared

(a) Major component of Project is to test Natural Forest Management System, the primary purpose of which is to conserve and sustain resource base while establishing appropriate production levels; (b) Project provides employment in agricultural and forestry production activities, including a wood processing plant, designed to conserve, protect and manage the available natural resources on a sustained basis; (c) Project forestry component strongly supports improved forest management with, among other things, training to native community coop members and colonists, institutional development of agency in charge of environmental protection of National Park and Protection Forest, and establishment of ecological research center concerned with preservation of biological diversity; (d) Project strongly promotes agricultural practices appropriate to local ecology; (e) Project protects virgin tropical forest by establishing ecologically suitable agriculture and forest production practices to improve production on already cleared and degraded lands; (f) Project conserves area watershed; (g) Major Forestry Project component strongly supports environmentally sound practices for timber harvesting, removal, processing and natural regeneration; (h) Forest component is a research and demonstration activity to identify practices to prevent forest

	or degraded; (f) conserve forested watersheds and rehabilitate those which have been deforested; (g) support training, research, and other actions which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing; (h) support research to expand knowledge of tropical forests and identify alternatives which will prevent forest destruction, loss, or degradation; (i) conserve biological diversity in forest areas by supporting efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a worldwide basis, by making the establishment of protected areas a condition of support for activities involving forest clearance or degradation, and by helping to identify tropical forest ecosystems and species in need of protection and establish and maintain appropriate protected areas; (j) seek to increase the awareness of U.S. government agencies and other donors of the immediate and long-term value of tropical forests; and (k)/utilize the resources and abilities of all relevant U.S. government agencies?	(i) Project conserves biological diversity in forest areas by making establishment and honoring of protected areas a condition of support for activities involving forest clearance or degradation; (j) Project promotes awareness of immediate and long-term value of tropical forests via seminars which will present research results; (k) In addition to utilizing all relevant U.S. government agencies, Project involves U.S. environmental PVOs.
m.	<u>FAA Sec. 118(c)(13)</u>. If the assistance will support a program or project significantly affecting tropical forests (including projects involving the planting of exotic plant species), will the program or project (a) be based upon careful analysis of the alternatives <u>available to achieve the best</u> sustainable use of the land, and (b)/take full account of the environmental impacts of the proposed activities on biological diversity?	(a) Yes. (b) Yes.

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n.	FAA Sec. 118(c)(14). Will assistance be used for (a) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner and that the proposed activity will produce positive economic benefits and sustainable forest management systems; or (b) actions which will significantly degrade national parks or similar protected areas which contain tropical forests, or introduce exotic plants or animals into such areas?	(a) No. (b) No.
o.	FAA Sec. 118(c)(15). Will assistance be used for (a) activities which would result in the conversion of forest lands to the rearing of livestock; (b) the construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands; (c) the colonization of forest lands; or (d) the construction of dams or other water control structures which flood relatively undegraded forest lands, unless with respect to each such activity an environmental assessment indicates that the activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development?	(a) No. (b) Yes. The major road to be maintained only by Project resources is a public road that does not pass through relatively undegraded forest lands. It has been approved by the Project Environmental Assessment (EA). A few kilometers of temporary haul roads will be constructed pending an amended EA. (c) No. (d) No.
p.	FY 1988 Continuing Resolution If assistance will come from the Sub-Saharan Africa DA account, is it (a) to be used to help the poor majority in Sub-Saharan Africa through a process of long-term development and economic growth that is equitable, participatory, environmentally sustainable, and self-reliant; (b) being provided in	Not applicable.

accordance with the policies contained in section 102 of the FAA; (c) being provided, when conistent with the objectives of such assistance, through African, United States and other PVOs that have demonstrated effectiveness in the promotion of local grassroots activities on behalf of long-term development in Sub-Saharan Africa; (d) being used to help overcome shorter-term constraints to long-term development, to promote reform of sectoral economic policies, to support the critical sector priorities of agricultural production and natural resources, health, voluntary family planning services, education, and income generating opportunities, to bring about appropriate sectoral restructuring of the Sub-Saharan African economies, to support reform in public administration and finances and to establish a favorable environment for individual enterprise and self-sustaining development, and to take into account, in assisted policy reforms, the need to protect vulnerable groups; (e) being used to increase agricultural production in ways that protect and restore the natural resource base, especially food production, to maintain and improve basic transportation and communication networks, to maintain and restore the natural resource base in ways that increase agricultural production, to improve health conditions with special emphasis on meeting the health needs of mothers and children, including the establishment of self-sustaining primary health care systems that give priority to preventive care, to provide increased access to voluntary family planning services, to improve basic literacy and mathematics especially to those outside the formal educational system and to improve primary education, and to develop income-generating opportunities for the unemployed and underemployed in urban and rural areas?

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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.	Peru has been in and out of debt payment arrearages since 1985. The government continues to make sporadic payments to temporarily lift the sanctions, and appears capable of continuing to do so.
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 percent of the enterprise's annual production during the life of the loan, or has the requirement to enter into such an agreement been waived by the President because of a national security interest?	Not applicable.
c. FY 1988 Continuing Resolution. If for a loan to a private sector institution from funds made available to carry out the provisions of FAA Sections 103 through 106, will loan be provided, to the maximum extent practicable, at or near the prevailing interest rate paid on Treasury obligations of similar maturity at the time of obligating such funds?	Not applicable.
d. FAA Sec. 122(b). Does the activity give reasonable promise of assisting long-range plans and programs designed to develop economic resources and increase productive capacities?	Yes.

3. Economic Support Fund Project Criteria

a. FAA Sec. 531(a). Will this assistance promote economic and political stability? To the maximum extent feasible, is this assistance consistent with the policy directions, purposes, and programs of Part I of the FAA?

Not applicable. USAID/Peru did not receive any ESF funds in FY88.

b. FAA Sec. 531(e). Will this assistance be used for military or paramilitary purposes?

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

5C(3) - STANDARD ITEM CHECKLIST

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

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

A. PROCUREMENT

1. FAA Sec. 602(a). 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 marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company?	Peru does not discriminate against marine insurance companies.
4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If non-U.S. procurement of agricultural commodity or product thereof 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 be procured in U.S.)	Not applicable.
5. FAA Sec. 604(g). Will construction or engineering services be procured from firms of advanced developing countries which are otherwise eligible under Code 941 and which have attained a competitive capability in international markets in one of these areas? (Exception for those	No. Any construction and/or engineering services needed will be obtained from Peruvian firms.

countries which receive direct economic assistance under the FAA and permit United States firms to compete for construction or engineering services financed from assistance programs of these countries.)

6. FAA Sec. 603. Is the shipping excluded from compliance with the requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 percent 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 such vessels are available at fair and reasonable rates? — No.

7. FAA Sec. 621(a). If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? — Yes.
Will the facilities and resources of other Federal agencies be utilized, when they are particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? — Yes.

8. International Air Transportation Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available? — Yes.

9. FY 1988 Continuing Resolution Sec. 504. 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, all U.S. direct contracts will contain a termination for convenience clause.

10. FY 1988 Continuing Resolution Sec. 524. If assistance is for consulting service through procurement contract pursuant to 5 U.S.C. 3109, are contract expenditures a matter of public record and available for public inspection (unless otherwise provided by law or Executive order)? — Yes.

B. CONSTRUCTION

1. FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services be used?	A small portion of project support will be used to construct feeder roads, and Peruvian firms will provide engineering and professional services needed.
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	Yes.
3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million (except for productive enterprises in Egypt that were described in the CP), or does assistance have the express approval of Congress?	Yes.

C. OTHER RESTRICTIONS

1. FAA Sec. 122(b). If development loan repayable in dollars, is interest rate at least 2 percent per annum during a grace period which is not to exceed ten years, and at least 3 percent 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?	Not applicable.
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 assists the foreign aid projects or activities of the Communist-bloc countries?	Yes.

4. Will arrangements preclude use of financing:

a.	FAA Sec. 104(f); FY 1987 Continuing Resolution Secs. 525, 538. (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; or (4) to lobby for abortion?	(1) Yes. (2) Yes. (3) Yes. (4) Yes.
b.	FAA Sec. 483. To make reimbursements, in the form of cash payments, to persons whose illicit drug crops are eradicated?	Yes.
c.	FAA Sec. 620(q). To compensate owners for expropriated or nationalized property, except to compensate foreign nationals in accordance with a land reform program certified by the President?	Yes.
d.	FAA Sec. 660. To provide training, advice, or any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?	Yes.
e.	FAA Sec. 662. For CIA activities?	Yes.
f.	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.

g.	FY 1988 Continuing Resolution Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for prior or current military personnel?	Yes.
h.	FY 1988 Continuing Resolution Sec. 505. To pay U.N. assessments, arrearages or dues?	Yes.
i.	FY 1988 Continuing Resolution Sec. 506. To carry out provisions of FAA section 209(d) (transfer of FAA funds to multilateral organizations for lending)?	Yes.
j.	FY 1988 Continuing Resolution Sec. 510. To finance the export of nuclear equipment, fuel, or technology?	Yes.
k.	FY 1988 Continuing Resolution Sec. 511. 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?	Yes.
l.	FY 1988 Continuing Resolution Sec. 516; State Authorization Sec. 109. To be used for publicity or propaganda purposes designed to support or defeat legislation pending before Congress, to influence in any way the outcome of a political election in the United States, or for any publicity or propaganda purposes not authorized by Congress?	Yes.

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TAGS:
SUBJECT: CENTRAL SELVA RESOURCES MANAGEMENT PROJECT, PHASE II ENVIRONMENTAL ASSESSMENT APPROVAL

REF: CENTRAL SELVA RESOURCES MANAGEMENT PROJECT (CSRMP), PHASE II ENVIRONMENTAL ASSESSMENT, DATED APRIL, 1988

1. LAC CHIEF ENVIRONMENTAL OFFICER HAS RECEIVED REF DOCUMENT AND HEREBY APPROVES ENVIRONMENTAL ASSESSMENT FOR CSRMP, PHASE II. THIS APPROVAL IS SUBJECT TO INTEGRATION OF EA INTO PROJECT PAPER AND INCORPORATION OF EA RECOMMENDATIONS INTO PROJECT IMPLEMENTATION.

2. MISSION IS COMMENDED ON QUALITY AND THOROUGHNESS OF EA, AND COMMITMENT TO PIONEERING A SYSTEM OF SUSTAINABLE MANAGEMENT FOR FRAGILE, HIGH JUNGLE REGIONS IN LATIN AMERICA. SHULTZ
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CONGRESSIONAL NOTIFICATION TRANSMITTAL SHEET

DATE: February 11, 1988

We wish to inform you of proposed actions in the Agency's programs during Fiscal Year 1988:

Kenya - Corat Community-Based Child Survival/Family Planning Programs
Peru - Central Selva Resource Managment, Phase II

The attached notification was sent to the Hill on February 11, 1988. Obligation may be incurred on February 26, 1988.

Bette Cook
Program Presentation Division
Office of Legislative Affairs

12 FEB 1988

FEB 11 1988

AGENCY FOR INTERNATIONAL DEVELOPMENT
ADVICE OF PROGRAM CHANGE

Date:

Country	: Peru
Project Title	: Central Selva Resource Management, Phase II
Project Number	: 527-0321
FY 1988 CP Reference	: None
Appropriation Category	: Agriculture, Rural Development, and Nutrition (ARDN)
Life-of-Project Funding	: $1,680,000 (L) $2,230,000 (G) $3,910,000 Total
Intended FY 1988 Obligation	: $1,680,000 (L) $2,230,000 (G) $3,910,000 Total
Loan Terms	: 25 years, including a ten year grace period two percent interest during grace period, three percent thereafter

This is to advise that in FY 1988 A.I.D. intends to obligate $1,680,000 in ARDN loan and $2,230,000 in ARDN grant funds for a total of $3,910,000 in ARDN funds, for the Central Selva Resource Management, Phase II project in Peru. This is a new project which was not included in the FY 1988 Congressional Presentation. The loan portion of the project will be obligated from prior year funds which will be deobligated from the following project for which loan funds had not yet been disbursed:

Central Selva Resource Management (527-0240): $1,680,000.

The purpose of the project is to: (a) develop and test sustained yield natural forest management and crop/livestock technologies appropriate for humid tropical forest environments; and (b) institutionalize a long-range natural resource management system in Peru's Amazon Basin. This a follow-on to the Central Selva Resource Management (CRSM) project (527-0240) which primarily focuses on developing and field testing of technologies appropriate to humid tropical forest environments rather than on the expansion of production as in the CRSM project.

Annex: Activity Data Sheet

PROGRAM: DATA SHEET CP 81-05 (4-85)

TITLE	FUNDING SOURCE	PROPOSED OBLIGATION (in thousands of dollars)	
Central Selva Resource Management, Phase II	AID/W	FY 88 1,680(L); 2,230(G)	LIFE OF PROJECT (Auth) 1,680(L); 2,230(G)
NUMBER 527-0121 GRANT [X] LOAN [X] NEW [X] CONTINUING [ ]	PRIOR REFERENCE None	INITIAL OBLIGATION FY 88 / ESTIMATED FINAL OBLIGATION FY 88	ESTIMATED COMPLETION DATE OF PROJECT FY 91

Purpose: To: (a) develop and test sustained yield natural forest management and crop/livestock technologies; and (b) institutionalize a long range natural resource management/biological diversity conservation system in Peru's Amazon Basin.

Background: The Palcazu Valley, covering 190,000 hectares in Peru's Central High Jungle, is an extremely fragile humid tropical forest environment. Its population base of approximately 8,000 includes 3,000 Amuesha Indians. In 1982 the Government of Peru (GOP) initiated the A.I.D.-financed Central Selva Resource Management (CRSM) project to establish an environmentally sound area development program in the valley based on innovative sustained yield forest utilization technologies intended to allow rapid production increases. Under that project, 105,000 hectares have been set aside as protection forest and national park land. However, the project's production focus on the remaining 85,000 hectares, which relied on the application of untested technologies, proved more difficult to implement. As a result, the CRSM project evolved into one that has focussed on identification, development, and demonstration of sustained yield forest production and environmentally sound livestock technologies.

Project Description: The Central Selva Resource Management II project is a follow-on to the CRSM project. The GOP will continue to carry out applied research and field test tropical forestry management and crop/livestock production technologies. These efforts are expected to generate technologies which emphasize long-term sustainable agro-forestry production and preservation of biodiversity. Their successful development and dissemination have important implications for the rational development and conservation of extensive areas of the Amazon Basin, as well as of humid tropical forests in other parts of the world.

The CRSM II project will be carried out in the Palcazu Valley. It consists of a) renewable natural resource management/production research and testing in the Valley; b) institutionalization of the national park and protection forest operations in the area; c) institutionalization of the GOP's jungle regional development/renewable natural resource policy analysis and formulation capacity; d) institutionalization of a technology transfer and social development program in the Valley, with special emphasis on native populations; and e) road upgrading/maintenance into the Valley. Fifty-five percent of project resources are to be used for research to develop environmentally sound and sustainable technologies that will not deplete the natural resource base.

Relationship of Project to A.I.D. Country Strategy: The project directly supports A.I.D.'s development strategy in Peru by promoting economic growth and sustainable production in the high jungle. It also directly supports biological diversity preservation -- a key interest of the GOP and of the USG.

Beneficiaries: Direct beneficiaries are the twelve native communities, small farmers and ranchers and day laborers in the Palcazu Valley, comprising approximately 8,000 inhabitants. Indirect beneficiaries include populations living in tropical and sub-tropical forest areas such as the Amazon Basin who may benefit from the technologies developed under the project.

Host Country and Other Donors: The GOP will contribute $2,267,000 including in-kind contributions. Related other donor assistance includes $1.2 million from the Inter-American Development Bank for road maintenance in the Central Selva area and $3.5 million from Canada for a nation-wide forestry development program.

Major Outputs	Life-of-Project
Development of environmentally sound technologies for tropical forest areas	6
Production Forestry Management System Operational	5,000 hectares
Pilot Wood Processing Center	1
Permanent Crop Lands in Sustainable Production	1,100 hectares
Improved Sheep Pasture	500 hectares
Fragile Lands Protection System Operational	105,000 hectares
Road Upgrading/Maintenance	122 kilometers

A.I.D Financed Inputs	All Years Loan	All Years Grant
Technical Assistance	0	1,680
Training	150	150
Commodities	480	50
Research Support	100	150
Operational Costs	950	0
Evaluation/Audit/Seminars	0	200
Total	1,680	2,230

U.S. FINANCING (in thousands of dollars)

	Obligations	Expenditures	Unliquidated
Through September 30,	—	—	—
Estimated Fiscal Year	—	—	—
Estimated Through September 30, 1987	—	—	—
Proposed Fiscal Year 1988	1,680(L); 2,230(G)	Future Year Obligations —	Estimated Total Cost 1,680(L); 2,230(G)

PRINCIPAL CONTRACTORS OR AGENCIES

ACTION: AID-2 INFO AMB DCM ECON

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PP RUFHPE
DE RUEHC #0635 0500325
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E.O. 12356:56: N/A
TAGS:
SUBJECT: CONGRESSIONAL NOTIFICATION

1: THE FOLLOWING NOTIFICATION HAS BEEN SENT TO THE HILL:

PROJECT	NOTIF AMT	TO HILL	EXP DTE
0321, CENTRAL SELVA RES	1,680 (L)	2/11	2/25
0321, MGT, PHASE II	2,230 (G)	2/11	2/25

2. LOAN AMOUNT NOTIFIED WILL BE REC[illegible] FUNDS TO BE DEOBLIGATED FROM PROJECT 527-0240, CENTRAL SELVA RESOURCE MGT.

3. UNLESS MISSION IS ADVISED OF CONGRESSIONAL OBJECTION, DEOBLIGATION/OBLIGATION MAY BE INCURRED THE DAY FOLLOWING THE EXPIRATION DATE: SHULTZ
BT
#0635

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UNCLASSIFIED STATE 050635

Instituto Nacional de Desarrollo

Que dat. 4/13

ACTION COPY
ACTION TAKEN:
DATE:
INITIALS:

Lima, 30 MAR. 1988

OFICIO Nº553-88-INADE-1101

Señor
DONOR M. LION
Director de la Agencia
para el Desarrollo Inter
nacional de los Estados Unidos
en el Perú (USAID/PERU)
Presente.-

Asunto : Proyecto Manejo de Recursos de la Selva Central.

Tengo el agrado de dirigirme a usted en relación a su comunicación del 16 del presente mes sobre el Convenio de Proyecto Manejo de Recursos - de la Selva Central.

Al respecto, es muy grato manifestarle lo siguiente:

1. El Instituto Nacional de Desarrollo considera también de mucha - importancia el aprovechamiento y uso racional de los recursos na turales de la Selva Alta que son los objetivos que en particular tienen los Proyectos Palcazú y APODESA.

2. Lamentamos que las acciones emprendidas hacia la reformulación y extensión del Proyecto "Manejo de Recursos de la Selva Central" no pudieran culminar con la suscripción del documento pertinente, debido a las disposiciones dictadas por la Entidad Matriz de - vuestra representada sobre la conversión de fondos de préstamo a donación.

3. Sin embargo, es del caso resaltar la estrecha coordinación que ha existido entre las entidades relacionadas con el tema de la extensión de Selva Central como INP, MEF, AID e INADE incluyendo los Proyectos involucrados.

4. En vista de que será necesario presentar un nuevo documento deno minado "Proyecto Manejo de los Recursos Naturales de la Selva - Central - II Etapa" que permitirá a partir del 01 de octubre de 1988 y por 24 meses la utilización de fondos de donación, présta

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Instituto Nacional de Desarrollo

Oficio N°553-88-INADE-1101
Pág. 02

mos y contrapartida nacional por U.S.$. 2'230,000, U.S.$. -- 1'689,000 y U.S.$. 3'060,000 respectivamente; se han impartido las instrucciones del caso priorizando las acciones de preparación y seguimiento de la documentación pertinente que concluya con la firma del nuevo Proyecto de Convenio.

5. La referida documentación será presentada ante las autoridades peruanas alrededor del 15 de abril próximo para su tramitación y posterior expedición del Decreto Legislativo que apruebe el nuevo Convenio y autorice la firma correspondiente.

Finalmente, al haberse suscrito la Enmienda N° 7 que amplía el Plazo de Ejecución del Proyecto Original hasta el 30 de setiembre del presente año, debo manifestarle nuestra satisfacción por la disposición de la AID en dar su apoyo para concretar la realización de la II Etapa, acción que será correspondida por el INADE y los Proyectos Pichis Palcazú y APODESA.

Agradeciéndole su atención, hago propicia la oportunidad para reiterarle mis consideraciones.

Atentamente,

INSTITUTO NACIONAL DE DESARROLLO
INADE

ING. BIAGGIO ARBULU GALLIANI
Jefe
INSTITUTO NACIONAL DE DESARROLLO

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 88 to FY 90
Total U.S. Funding: US$3.910 million
Date Prepared: March 1988

Project Title & Number: Central Selva Resource Management Phase II Project (527-0321)

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
Sector Goals:	**Measures of Goal Achievement:**		
1. To contribute to increased sustainable rural incomes and employment in sub-tropical and tropical forest areas in Peru. through appropriate improved production systems that contribute to biological diversity protection and natural resources conservation.	1. Expansion by at least 10% anually of sub-tropical and tropical forest areas in Peru utilizing appropriate improved production systems developed under the Project. 2. Appropriate improved production systems developed under the Project are being tested in Peruvian jungle areas.	1. Periodic surveys and field observations. 2. Reports by international and Peruvian public and private organizations interested in biological diversity protection and natural resource conservation. 3. AID and GOP Project reports and evaluations. 4. Project related research reports. 5. Periodic reports by INIAA. 6. Project reports and periodic reports by NGO's, such as the Fundación Peruana para la Conservación de la Naturaleza. 7. Periodic overflights and reports by the Project and by the MOA General Directorate of Forest and Fauna.	1. GOP commitment to ecologically sound development of jungle areas continues. 2. Relative national financial and political stability continues. 3. Absence of major natural disaster continues. 4. Drug trafficking does not move into the area. 5. Terrorist activities do not move into the area.
Project Purpose:	**Conditions That Will Indicate Purpose Has Been Achieved (EOPS):**		
1. The primary purpose of this Project is to develop and test, through an integrated research and demonstration program in the Palcazú Valley, appropriate technologies for establishing environmentally sound and profitable forest and agricultural production/utilization systems in tropical forest areas and to install a self-sustaining	1. Technologies and systems developed and tested during the Project are being actively adopted by farmers and extended to additional Selva areas by INIAA and other appropriate Peruvian organizations.		

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
and economic development process in the Palcazú Valley.	2. The GOP, with continuing support from national and international biological diversity and conservancy organizations, is effectively managing Pichis-Palcazú Forestry Reserves and Protection Forests.		
	3. The GOP is effectively monitoring and regulating timber operations in the Palcazú Valley in a manner consistent with biological diversity protection and natural resource conservation.		
2. A complementary purpose is to install in the Palcazú Valley a self-sustaining and competently managed (by Peruvian institutions) economic development process based on the environmentally sound technologies and systems generated and tested under the Project.	4. Technologies and operating systems developed and tested by the Project are being adopted at an increasing rate by agricultural and forestry producers in the Palcazú Valley.		

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
Outputs:	Magnitude of Outputs:		
A. Outputs in Project Management-PEPP			
1. Support infrastructure including office space, satellite rural development centers, residential and dining facilities, transportation, equipment and supplies appropriately maintained.	1.a. 1 central and 2 field offices maintained. 1.b. 3 satellite rural development centers maintained. 1.c. 11 residential facilities maintained. 1.d. 1 dining hall maintained. 1.e. 28 trucks and other vehicles maintained. 1.f. Utility, platform, dump trucks, bulldozers, front loader, road grader and back hoes maintained.	1. A.I.D. and GOP Project reports and documents. 2. Field observations. 3. Interim evaluation. 4. PEPP personnel records. 5. Legal agreements and records of MOH, CNERN, MOA, INIAA, MTC, INP.	1. Future GOP regionalization will not seriously disrupt operations. 2. Economic situation will permit GOP to assume costs of project related activities after PACD. 3. GOP will continue to support ecologically and environmentally sound development of the Selva.
2. A qualified professional, technical, clerical and operational staff established and functioning.	2.a. Personnel policies established and operating. 2.b. All job descriptions clearly defined in writing. 2.c. All staff positions filled. 2.d. All staff trained for their positions.		
3. Arrangement with appropriate GOP agencies to assume and continue appropriate research and outreach activities in the Valley after the PACD are institutionalized and funtioning.	3.a. MOH assumes all health care functions in the Valley. 3.b. MOA/INIAA assumes all forestry research functions. 3.c. All crops and livestock research assumed by INIAA. 3.d. All environmental protection activities assumed by MOA. 3.e. Continous land use inventory activities assumed by CNERN.		

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
	3.f. Extension activities assumed by MOA/INIAA. 3.g. All road maintenance work assumed by MTC. 3.h. APODESA moved to the INP.		
B. Outputs in Forestry			
1. Testing and demonstration of the Natural Forest Management (NFM) system on production forestry class land owned by native communities.	1. 5,000 has tested.	1. A.I.D. and GOP Project reports and documentation. 2. Field observations.	1. Project training for YFC members is successful in transferring specific skills.
2. Wood processing center, owned and operated by the YFC, producing forest products.	2. One center fully operational and economically viable.	3. Interim evaluation.	2. No natural disasters occur.
3. Arrangements to continue testing and disseminating results after PACD are institutionalized.	3. All agreements made, signed and operating by PACD.	4. Forest management plans. 5. Records of native communities. 6. Legal papers for wood processing center ownership by YFC.	3. YFC continues to function and represent unified native communities. 4. Native communities continue to support NFM system.
C. Outputs in Crops & Livestock		7. Marketing research reports.	
1. Demonstration of feasibility of producing and marketing high value crops and subsistance crops that are ecologically viable.	1.a. 600 has of combined coffee, peach, palm, achiote, other tree crops, and Desmodium plantations. 1.b. 60 has achiote production. 1.c. 100 has palm heart production.	8. YFC production, sales, and other records.	

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
	1.d. Study of hair sheep commercialization.		
2. Demonstration of feasibility of bush fallow and pasture fallow rotations to maintain productivity.	2. Renovate 500 has of degraded pasture through the use of forage mixture with trees.		
3. Demonstration of comparative advantages of hair sheep in mixed production systems.	3.a. Establishment of a core breeding flock of 116 ewes. 3.b. Placement of procine modules on 18 farms in the Valley.		
4. Collection, analysis and publication of data on crop and livestock systems developed and tested.	4. 5-10 reports and studies published annually.		
5. Arrangements to continue testing and disseminating results after PACD are institutionalized.	5. All agreements made, signed and operating by PACD.		
D. <u>Outputs in Protection</u>			
1. Functioning administration for the protection and development of the National Park and Protection Forest.	1. All parts of administration functioning effectively.		
2. Completed park operational plan and a natural vegetation inventory.	2. Plan and inventory written and approved.		
3. Yanachaga National Park staffed with an ecological research center.	3. Park fully staffed with appropriately trained staff, and center fully operational.		
4. Construction of forest ranger observation posts.	4. 8 posts completed.		
5. Native forest rangers trained.	5. 25 fully trained.		
6. Published bio-diversity studies on flora and fauna.	6. 4 studies published.		

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
7. Control system established for community reserves adjacent to the Yanachaga National Park.	7. System fully operational for all 35,000 has.		
E. Outputs in Continous Land Use Inventory			
1. Production of land use maps.	1.a. Maps for 12 principal native communities. 1.b. Map for 1 colono area.		
2. Strengthened capacity of District Forester to identify unauthorized uses of forest lands.	2. Appropriate legal sanctions applied to all identified unauthorized users of forest lands.		
F. Outputs in Extension and Social Development			
1. Establishment of an agricultura, forestry and cooperative extension service with village promoters.	1. Establishment of Native Central Cooperative with 4 branch Cooperatives, with activities linked to GOP entities such as MOA and INIAA.		
2. Primary health services provided by the MOH.	2. MOH manages and directs provision of all primary health services in Valley.		
G. Outputs in Road Maintenance			
1. Maintenance of the Cacazu-Iscozacin road.	1. 58 kms maintained.		
2. Logging extraction roads constructed.	2. 12 km constructed.		
3. System operationalized to maintain 4 km. of logging trails to clear-cut strip sites.	3. 4 km of logging trails continuously maintained.		

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
H. Output in Regional Development Policy Support by APODESA			
1. Studies and evaluation conducted.	1. 1 study on feasibility of developing priority areas, 1 hydrological analysis, 1 land use survey in high jungle areas, 1 study on conservation and timber extraction legislation, 1 study of the land settlement regulations or impacts of colonization for the high jungle, methodology developed to improve the implementation and evaluation of integrated development projects, and an annual evaluation of high jungle project, including PDR Palcazu completed.		
2. Development policy and plans promoted.	2. "Development Strategy Document for the High Jungle of Peru" finalized.		
3. GIS applied.	3.a. Information in compiled and organized. 3.b. Data bank established and applied to high jungle areas. 3.c. Jungle production systems for crops, livestock, agroforestry and forestry prepared.		
4. Documentation Center established.	4.a. Bibliographic information about the Amazon is identified, compiled, evaluated, digitized and disseminated.		
5. Research dissemination seminars conducted.	5. At least 4 seminars/ workshops to disseminate forestry and agricultural research findings conducted.		

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
	4.b. Network of information from various libraries and information centers on the Amazon developed and functioning. 4.c. 8 publications - 7 monographs and an Amazon Lexicon - are prepared and disseminated.		
Inputs:	Implementation Target (Type and Quantity):		
I. A.I.D.	I. A.I.D. US$000		
A. Short and long-term expatriate and national advisory technical assistance. B. Commodities and equipment: vehicles, trail bikes, wood processing equipment, front loader, road grader, photo interpretation equipment, map making equipment. C. In-country short-term training. D. Research Support. E. Operational Costs. F. Construction Costs. G. Evaluation/Seminars.	- T.A. 1,584 - Commodities 363 - Training 154 - Research Support 214 - Operational Costs 1,161 - Construction Costs 112 - Evaluation/Seminars 80 - Inflation/ Contingencies 242 TOTAL 3,910	1. A.I.D. and GOP Project records and financial documents. 2. Project audits and evaluations.	1. A.I.D. and GOP funding levels are approved and disbursements are made in a timely manner. 2. GOP meets CPs. 3. A.I.D. and GOP assign adequate members of qualified staff to manage and facilitate implementation of the Project.
II. GOP	II. GOP US$000		
A. Locally procured office supplies. B. In-country short-term training. C. Research Support. D. Operational costs including, staff salaries, operating	- TA 0 - Commodities 279 - Training 179 - Research Support 51 - Operational Costs 1,981 - Construction 115 - Inflation/ Contingencies 455 TOTAL 3,060		

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
expenses, supervision, monitoring and other support costs, vehicle and equipment operating and repair costs, and health clinic and lab facilities, agriculutral and forestry lab facilities.	For detailed inputs, are financial analysis, implementation schedule, and tables on commodity and TA needs in the PP.		
E. Construction costs.			

ISSUES

The following issues were discussed in a Mission review of the CSRM-II PP on December 16, 1987.

I. "Outreach and Dissemination" Component for the Revised Project

A. Background:

The CSRM Project is essentially a R&D Project on low-input, sustainable tropical agricultural and natural forestry management. Part of its success depends on the testing and development of appropiate technology, that could be extended and applied outside of the Palcazu Valley. Returns to Project expenditures are much lower if the only beneficiaries are those who live in the Valley. While the CSRM-II PP mentions dissemination of the results and lists at least some of the organizations that are responsible for dissemination and outreach, it discusses no specific plans for this, and no funds specifically are reserved for this activity. Further, it includes no discussion of testing practices worked out in the CSRM-II Project in places outside the Project area during the LOP. The recent Biological Diversity team report suggested "Dissemination of Progress on the Central Selva Resource Management Project" as an activity that would merit separate funding at $20,000 to $100,000 per year for three years.

B. Issue:

Should dissemination and outreach be included in the CSRM-II Project as a separate activity with a specific budget, and should not the PP include specific statements of the outreach and dissemination work to be done by the Project?

C. Response:

There is not enough time in the LOP of CSRM-II to mount an effective outreach program in other areas outside Palcazu. However, dissemination is important to expand benefits of Project expenditures. Therefore, during the LOP, research results must be well documented and committed to appropiate institutional memories for future dissemination.

The approach to be used to assure adequate documentation and communication of research results is to:

1) Involve and incorporate the National Selva Program of INIAA from the outset into project research and outreach so that INIAA is aware of the research methodology followed, and results achieved.

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2) Continue to use short-term technical assistance to maintain the quality of the research effort.

3) APODESA will carry out a series of seminars during the LOP, and particularly in the last year of CSRM-II, to present and disseminate research results to Peruvian entities and external researchers. Limited grant funding will be provided for Project researchers to present their results in international forums.

4) The CSRM-II PP states that quarterly reports will be prepared on progress to institutionalize Project activities, including applied research elements of the Project.

5) As the PACD approaches, the Mission will determine what post-Project activity is most suitable to dissiminate the Project's research results and will seek suitable funding.

II. Planning of Evaluations and Inclusion of Evaluation Funding in the CSRM-II Project

A. Background:

There is a need for specification of management decisions to be made as a result of both the proposed interim and final evaluations, the information required to be used in making these decisions, and how that information will be obtained from the evaluation. PD&S guidelines of August, 1987, state: "Evaluations and financial management audits: normally such activities are funded under project agreements". Nevertheless, it is proposed in the CSRM-II PP to use PD&S funds for the evaluations. Also, PD&S funding may be delayed until a window opens, while Project funded evaluations are not subject to similar delays. There is no justification presented in the PP for non-project funding of the evaluations.

B. Issue:

Should the evaluations be more carefully planned and described in the PP? Should the evaluations be Project funded?

C. Response:

1. The CSRM-II Project will fund the interim evaluation which will be held in the fourth quarter of FY89 to review progress in institutionalizing relevant Project activities and particularly the research components. This timing will permit USAID and the GOP to take the necessary management decisions to improve institutionalization if that should be necessary.

2. Another aspect of the interim evaluation will be to analyze before the PACD whether either the Mission or LAC should be prepared to continue to support the activities under way in this Project after the PACD, in order to:

a. Assure continued high quality of research.
b. Provide T.A. to assure that institutional arrangements continue to evolve.
c. Assure that results are indeed shared with a broad constituency.
d. It is clear that dissemination of research results is critical to the Project. A final evaluation of the Project is not necessary, since success will be demonstrated by actual research results disseminated by the PACD. Rather, an impact evaluation 2-3 years after the Project PACD would be useful for justifying additional future support to this type of research.

3. Project funds will be made available for the interim evaluation, as well as to finance a local-hire financial analyst at the Project site as part of the T.A. team. The Project will also fund an audit of the TA contract and GOP implementation agencies.

III. Counterpart Funds for the Project

A. Background:

The original CSRM Project did not include construction of the road into the Palcazu Valley as a Project funded activity. Construction was funded with GOP funds "outside the Project", and required considerable Title I counterpart. The road has been completed to minimal standard only to Iscozacin. The CSRM-II PP does not discuss whether there will be more main road construction within the Palcazu Valley, or other expenses which will have to be funded with Title I or other resources "outside the Project".

B. Issue:

Should all Title I and other local currency funded activities, particularly road construction, be included within the CSRM-II Project, and counterpart funding be specifically presented in the PP.

C. Response:

1. The success of the CSRM-II Project does not hinge on full completion of the road. The economic analysis was carried out only on the basis of the area served by the existing road. Furthermore, there is a strong current of opinion that further penetration of the road into the Valley without careful planning, social development, and qualified technical and administrative staff to supervise development activities would have serious detrimental environmental impacts.

2. Additional road construction, beyond logging extraction roads in the forest management area, will not be included within the CSRM-II Project, nor should local currency funds be allocated for that purpose during the LOP.

IV. Forestry Research and Demonstration Activities

A. Background:

The PP presents the Natural Forestry Management (NFM) System as a technically and economically sound system that needs only to be proved a bit more in the Palcazu before it is ready for wide adoption. The Biological Diversity Team quotes a paper by Bauer1/ which raises doubts about the NFMS system, both technically and economically. It will take some 30 years until the regrowth timber has been cut and its economic value determined. Could more be done now in a R&D mode to try out various alternate methods and explore significant variables.

B. Issues:

1. Should more attention be given to a scientific research design for the remaining period with the NFM System so that maximum knowledge of reforestry management will be gained from Project expenditures?

2. Are adequate economic feasibility studies going to be done during CSRM-II to compare the NFM System with existing systems, and to see how a persuasive outreach can be done to achieve wide adoption of the NFM System?

C. Response:

1. As stated under Issue I, maintaining quality research is critical to the success of the Project and subsequent dissemination of results.

a. Short term technical assistance will emphasize maintaining good records based on a thorough research plan. A well-designed research plan and implementation plan which will identify specific research issues to be addressed will be a necessary early activity of CSRM-II.

b. APODESA can compare research results from other systems and also disseminate findings through seminars, workshops and other dissemination activities.

2. Economic feasibility studies are critical. The PP includes a long-term local-hire natural resources economist and one long-term local-hire production economist to provide the necessary input to insure that adequate economic analyses are carried out.

1/ Bauer, G.P. Review of Forest Management Projects in the Central Selva of Peru, with Special Reference to the Palcazu -- Rural Development Project. 1987.

V. Institutionalization of APODESA

A. Background:

The Schreiner evaluation 1/ presented three alternatives for APODESA: 1) ending it, 2) autonomy within INADE, and 3) autonomy outside INADE. The PP promotes maintaining APODESA in INADE supervised by a committee of representatives from the National Planning Institute (INP), the National Development Institute (INADE), and the National Office of Natural Resource Evaluation (ONERN) and moving APODESA to INP by the end of the LOP of CSRM-II. The committee will provide policy guidance and monitor APODESA activities under CSRM-II. There is no discussion of how this relates to the Schreiner evaluation recommendations. Also, the establishment of this committee and the transfer of APODESA to INP is to be a Covenant, not a Condition Precedent (CP).

B. Issue:

How does the establishment of the committee respond to the Schreiner evaluation recommendation? Is INP the appropriate institution for APODESA? If institutionalization within INP is important, should not this process be a CP for future APODESA funding?

C. Response:

1. The Schreiner evaluation specified that APODESA needed autonomy if it was to have effective impact on high jungle related policy-making. The evaluation did not indicate where APODESA should be located. Schreiner does state that the need for a unit such as APODESA has existed in the past, exists now and will continue to exist in the future.

2. USAID initially proposed that APODESA be moved to ONERN under the CSRM-II Project, an organization with broad land use inventory capabilities. It is organizationally a part of the INP, and a move to ONERN would thus link APODESA to the National Planning System.

3. The proposed move to ONERN was discussed at length with representatives from INP, ONERN, INADE, and APODESA. Their response was to redefine APODESA's role in terms of its original objectives under the CSRM Project and propose a program of high jungle policy formulation, public investment strategy development, and legislative reviews for APODESA to be implemented under CSRM-II. APODESA would remain in INADE until the end of Project, at which time it would move to the INP. It would become part of the INP's General Directorate for Regional Planning.

1/ Schreiner, Dean. Evaluation of the Regional Development Support (APODESA) Component of the Central Selva Resource Management Report. June 13, 1986.

4. Autonomy of APODESA's activities is to be assured through the establishment of a Coordination Committee, which in addition to providing policy guidance, would approve APODESA's annual budgets and operational plans prior to their submission to USAID and would review quarterly APODESA's progress in carrying out its activities and in meeting specific targets.

5. The formation of the Coordination Committee and move of APODESA to INP by the end of the LOP for CSRM-II should be a Covenant and not a CP because it is a sensitive political issue. The move of APODESA to INP rather than to ONERN is acceptable and preferred because of the renewed emphasis on policy and strategy formulation, areas outside of the normal functions of ONERN, but which are a major focus of INP.

VI. Sustainability of Project Activities

On various occasions, an additional issue, of sustainability of Project activities, has also been raised, and discussion of it follows.

The feasibility of sustaining Project activities that should continue after CSRM-II termination has been a major element influencing Project design. As discussed in the Detailed Financial Analysis (Annex II, Exhibit C) both AID and GOP resource levels are the minimum required to achieve the Project purpose and assure sustainability of key Project activities that must continue after the PACD.

Grouping the various Project components into three general categories assists in analyzing the sustainability issue. These are:

- Components directed at the development and transfer of sustainable agricultural and forestry production systems. INIAA will have reponsibility for continuing NFM systems research, as well as further research activities in enviromentally sound sustainable and profitable crop/livestock production systems in tropical forest areas. In addition, INIAA is responsible for initial dissemination of new technologies generated from this research, through their technology transfer specialist activities. For this reason, the INIAA Selva Program will incorporate CSRM-II research activities during the LOP in a manner to assume full responsibility by the PACD.

- Data collection, mapping and analysis of actual and potential land use for field implementation and to influence policy making for future high jungle development efforts. Continuity will be achieved by transferring APODESA functions, responsibilities and installed capacity to the INP thereby providing a greater degree of permanency and a more direct link to GOP policymakers and planners.

- Infrastructure development activities including road maintenance, health, environmental sanitation and project infrastructure. Valley residents will assume maintenance of facilities constructed for social development and service delivery. Road maintenance will be incorporated into the MTC.

Currently, all jungle development projects are managed by the PEPP as Special Projects. The Special Project mechanism is intended to provide more effective coordination of inputs from various sectoral ministries. Several actions, as described below, will be taken to ensure that key CSRM-II Project responsibilities have been incorporated into the ongoing program of appropriate GOP institutions by the PACD.

1. Agricultural and Forestry Production Methodologies. Much of the validation of forestry and agricultural production systems will occur during the LOP. However, the impact of the NFM system in particular follows the biological cycle of tropical forest species which exceed 30 years. Therefore, special emphasis will be given to developing a formal agreement and working relationship with INIAA to continue to monitor and evaluate NFM system test plots and forestry production areas of the Yanesha Forestry Cooperative. Furthermore, INIAA will participate in carrying out crop and livestock production research during CSRM-II implementation in order to assure continuity of research and transfer activities after the PACD. It is expected that during the Project, several workshops will be held with the participation of INADE, INIAA and other institutions to disseminate research results. Project funds also have been budgeted to permit Project technical staff to present their findings at international symposia on sustainable low-input systems for the humid tropics.

The national research service, INIAA, has research stations and substations in the high and low areas of the Peruvian jungle. Furthermore, under the new reorganization law of the MOA all research, including forestry and silviculture, will be the responsibility of INIAA.

Despite the isolation of the Palcazu Valley, scientists from INIAA have visited the original CSRM Project facilities in Iscozacin on numerous occasions and participated in seminars, field days, and demonstrations of both research and extension results. Two particularly noteworthy events, the first National Seminar on Introduction of Barbados Blackbelly Hair Sheep and a Small Ruminants Seminar, were organized by APODESA, INIAA and one the Jungle Development Special Projects during the past two years, which involved scientists and extensionists from the INIAA, MOA, UNA, and jungle regional universities.

APODESA also organized an international conference on Tropical Forest Management and Silviculture in 1987, for a wide variety of participants and included visits to Iscozazin as part of the program to see first hand implementation of the NFM System.

Project strategy during CSRM-II will be to continue to strengthen existing ties with the MOA, as well as UNA, and increase institutional linkages to INIAA in tropical forestry and agro-forestry research. Project consultants' reports have always been shared with the MOA DGFF and INIAA. During the CSRM-II, short term TA will include in their activities technical presentations to INIAA senior staff and research personnel. They will collaborate on preparation of research plans, and where appropriate monitor implementation. Project TA and personnel also will work closely with university researchers to define thesis topics, and will collaborate in dissemination of results through publication of research papers and bulletins, and through seminar presentations.

INIAA's research functions are guided by a national/regional strategy which integrates geographically diverse and functionally decentralized research and transfer activities. The Selva Regional Program for example concentrates on low input agriculture in the humid tropics where there are special problems of infertile soils that affect the productivity of crops and pastures. Each program has a program plan that is up-dated annually for research, extension and training activities. USAID has determined that INIAA has acceptable planning, financial management and operating systems, and is producing many of the outputs for which it was intended. (See PP for Agricultural Technology Tranformation (ATT), No. 527-0282, pp 106-108, and Annex II, Exhibit H, September 1987).

2. High Jungle Development Data Collection and Policy Formulation. The objective is to achieve broad policy impacts on future high jungle development projects. During CSRM-II, Project management will work with INADE and the INP to relocate APODESA in a permanent institutional home in the INP by the end of LOP. This will enhance its capacity to influence high jungle development policy and to provide special projects with important field level support.

3. Infrastructure and Social Development - Road maintenance is key to continuation of research activities at Iscozacin, as well as to continued sustainable development of the Palcazu Valley. It will require agressive efforts to involve the MTC in assuming costs of road maintenance. By June, 1989, a plan and set of implementable actions will have been developed to insure a smooth transfer of responsibilities for road maintenance activities from the Project to MTC. The recurrent cost analysis in Section V.A.2, Project Analyses provides a basis for the transfer of road maintenance responsibilities.

Non-road related infrastructure such as multi-purpose rural development centers, potable water installations and environmental sanitation activities were put in place to permit implementation of original CSRM Project activities in the Palcazu Valley where minimal infrastructure existed. These installations were built with considerable participation of native community-labor and using local materials. Community commitment to maintain these installations is quite high. The MOH now is absorbing the primary health promoter activity initiated under the original CSRM Project and is

using and maintaining the Project constructed rural development centers to provide these services. The environmental sanitation installations are to be absorbed by the GOP. The Municipality of Iscozacin is now assuming responsibility for maintaining the Project funded water system.

In summary, because of the importance of the sustainability issue, the Project strategy is to stress in-depth involvement of all appropriate GOP entities from the very beginning of CSRM-II, and give special emphasis by Project management to carrying out actions and report on the status of arrangements to ensure timely incorporation of relevant Project activities into other institutions during CSRM-II. Quarterly meetings will be held with Project staff and other entities to monitor progress in implementing the institutional arrangements described above.

DETAILED FINANCIAL ANALYSIS

This annex provides background information and analysis for the reductions in the loan budget of the original Project and increases in grant financing CSRM-II.

The original loan budget included larger planned outlays for credit and capital goods than has proven feasible or even desireable, because of economic and agronomic conditions in the Valley. For example, the original Project planned to invest $3.0 million loan funds for modern wood processing centers, $400,000 loan funds for a satelite communications system and $2.35 million loan funds for agricultural production credit. In addition, the Project got off to a slow start, resulting in low disbursements during the first two and a half years. Thus, the estimated expenditures of loan funds by the Project after five years (to September 30 1987), is only 37%. However, all of the grant funds were spent by September 30, 1987.

Loan disbursements for 1985, 1986, and 1987 were $1.235 million, $1.619 million, and $2.0 million, respectively. CSRM-II loan disbursements will be less because a large portion (30%) of the disbursements to date have been for capital goods. Between 1985 and 1987, the Project purchased a total of $1.03 million in road maintenance equipment and $0.5 million in vehicles and other equipment. These capital outlays will not be repeated during CSRM-II.

The financial levels established for CSRM-II are based on projections from past CSRM disbursements, adjusted by the project management team to reflect proposed revisions in activities. USAID analyzed the CSRM-II budget by comparing CSRM budget levels for each component to their rates of expenditure and to estimated costs in future years. Tables 1, 2 and 3 show how the separate grant, loan, and counterpart budgets have changed from the original to the new LOP. Changes in total LOP cost of the Project are shown in Table 4. These tables also include USAID's estimates of the costs each component will have during CSRM-II.

As the tables show, the eleven original CSRM Palcazú activities have been combined into eight components 1/. This streamlines CSRM-II organization while preserving the relevant necessary inputs to achieve the Project purpose.

1/ The original CSRM Project components were: Project Management - PEPP, Forestry, Agricultural Development, Livestock Development, Protection, Continuous Land Use Inventory, Health and Environmental Sanitation, Feeder Road Studies and Road Maintenance, Communications, Regional Development Policy Support, and Social Development.

Table 1 shows the original CSRM loan budget and expenditures, the loan financing requirement during CSRM-II, the combined projects total loan funding requirement by component, and the increase or decrease from the original CSRM budget. Loan financing is significantly reduced for the following components: Forestry ($3,038,000), Crops/Livestock ($2,371,000), Extension and Social Development (formerly included Communications and Health/Environmental Sanitation Components) ($828,000), and APODESA ($962,000). These components as indicated above included financing for credit and capital expenditures that were determined not to be feasible during Project implementation. No component had an increase in loan funds. The new combined projects total AID loan amount is $9,770,000, reduced from the original CSRM $18,000,000.

Table 2 shows the original CSRM grant budget and expenditures, the grant financing requirement for CSRM-II, the combined projects total grant financing, and the increase or decrease from the original CSRM budget. Grant financing is used primarily for external and national long and short term TA. Grant financing is increased significantly during CSRM-II for the following Project components: Management ($538,000), Forestry ($598,000), Road Maintenance ($190,000), Crop/Livestock ($320,000), Extension/Social Development ($389,000) and Protection ($114,000). This is to insure that TA continues to be provided to the forestry research and development, low-input agricultural systems extension, road maintenance, and protection activities during CSRM-II. Grant financing under the Project Management component is used to contract a USAID Project Coordinator. In summary, the combined projects total AID grant amount is $7,030,000, compared to the original CSRM budget of $4,800,000.

Table 3 presents the original CSRM GOP counterpart budget, and expenditures, the counterpart requirements during CSRM-II, the combined projects total counterpart budget, and the increase or decrease from the original CSRM budget. Within an overall reduction of $1,964,000 of counterpart contributions, the GOP is expected to finance some local costs that originally were to have been loan funded.

Table 4 presents the total original CSRM AID and GOP budgets and expenditures, the counterpart requirements during CSRM-II, the combined projects total total budget, and the increase or decrease from the original CSRM budget. In summary, the total $30,800,000 original CSRM budget has been reduced to a combined projects total of $22,836,000.

Table 1: Project Loan Budget: Original CSRM Budget, Expenditures, CSRM - II Costs, and New Combined Projects Total by Component (US$000)

PROJECT COMPONENT	(1) ORIGINAL CSRM BUDGET	(2) CSRM EXPENDITURES 09/30/88	(3) CSRM II COST ESTIMATES	(4) = (2)+(3) COMBINED PROJECTS TOTAL	(5) = (4)-(1) INCREASE (DECREASE) OVER ORIG. CSRM
II. Project Management	1,026	925	98	1,023	(3)
III. Forestry	4,416	1,127	251	1,378	(3,038)
IIII. Crops/Livestock 1/	4,061	1,419	271	1,690	(2,371)
IIV. Protection	147	103	38	141	(6)
IV. Continuous Land Use Inventory	196	92	29	121	(75)
IVI. Road Maintenance	2,581	1,325	327	1,652	(929)
IVII. Regional Development Policy Support	1,980	668	350	1,018	(962)
IVIII. Extension & Social Development 2/	1,325	342	155	497	(828)
Inflation/Conting. 3/	2,268	2,089	161	2,250	(18)
TOTAL	18,000	8,090	1,680	9,770	(8,230)

1/ Combines Budget Originally Included in the Agriculture and Livestock Development Components.

2/ Combines budget originally included in the Health and Environmental Sanitation and Communications Components.

3/ Includes Overhead & Misc. and Commodities from original CSRM Project Budget.

Table 2: Project Grant Budget: Original CSRM Budget and Expenditures, CSRM-II Costs, and New Combined Projects Total, by Component (US$000)

PROJECT COMPONENT	(1) ORIGINAL CSRM BUDGET	(2) CSRM EXPENDITURES 09/30/88	(3) CSRM - II COST ESTIMATES	(4) = (2) + (3) COMBINED PROJECTS TOTAL	(5) = (4) - (1) INCREASE (DECREASE) OVER ORIG. CSRM
II. Project Management	1,305	1,425	418	1,843	538
III. Forestry	1,205	1,205	598	1,803	598
IIII. Crops/Livestock 1/	644	610	258	868	224
IIV. Protection	65	65	114	179	114
IV. Continuous Land Use Inventory	82	82	18	100	18
IVI. Road Maintenance	471	491	170	661	190
IVII. Regional Development Policy Support	592	642	184	826	234
IVIII. Extension & Social Development 2/	119	119	389	508	389
Inflation/Conting. 3/	317	161	81	242	(75)
TOTAL	4,800	4,800	2,230	7,030	2,230

1/ Combines budget originally included in the Agriculture and Livestock Development Components.
2/ Combines budget originally included in the Health and Environmental Sanitation and Communications components.
3/ Includes Overhead & Misc. from original CSRM Project Budget.

Table 3: GOP Counterpart Budget: Original CSRM Budget and Expenditures, CSRM - II and New Combined Projects Total by Component (US$000 Equivalent)

PROJECT COMPONENT	(1) ORIGINAL CSRM BUDGET	(2) CSRM EXPENDITURES 09/30/88	(3) CSRM - II COST ESTIMATES	(4) = (2)+(3) COMBINED PROJECTS TOTAL	(5) = (4)-(1) INCREASE/ (DECREASE) OVER ORIG. CSRM
II. Project Management	865	571	398	969	104
III. Forestry	854	283	349	632	(222)
IIII. Crops/Livestock 1/	2,144	764	397	1,161	(983)
IIV. Protection	158	62	117	179	21
IV. Continuous Land Use Inventory	173	40	142	182	9
IVI. Road Maintenance	1,395	828	676	1,504	109
IVII. Regional Development Policy Support	500	152	113	265	(235)
IVIII. Extension & Social Development 2/	183	225	413	638	455
Inflation/Conting. 3/	1,728	51	455	506	(1,222)
TOTAL	8,000	2,976	3,060	6,036	(1,964)

1/ Combines budget originally included in the Agriculture and Livestock Development Components.

2/ Combines budget originally included in the Health and Environmental Sanitation and Communications components.

3/ Includes Overhead & Misc. from original CSRM Project Budget.

Table 4: AID and GOP Combined Projects Budget: Original CSRM Budget and Expenditures, CSRM - II Costs, and New Combined Projects Total by Component (US$000)

	PROJECT COMPONENT	(1) ORIGINAL CSRM BUDGET	(2) CSRM EXPENDITURES 09/30/88	(3) CSRM - II COST ESTIMATES	(4) = (2)+(3) COMBINED PROJECTS TOTAL	(5) = (4)-(1) INCREASE (DECREASE) OVER ORIG. CSRM
II.	Project Management	3,196	2,921	914	3,835	639
III.	Forestry	6,475	2,615	1,198	3,813	(2,662)
IIII.	Crops/Livestock 1/	6,849	2,793	926	3,719	(3,130)
IIV.	Protection	370	230	269	499	129
IV.	Continuous Land Use Inventory	451	214	189	403	(48)
IVI.	Road Maintenance	4,447	2,644	1,173	3,817	(630)
IVII.	Regional Development Policy Support	3,072	1,462	647	2,109	(963)
IVIII.	Extension & Social Development 2/	1,627	686	957	1,643	16
	Inflation/Conting. 3/	4,313	2,301	697	2,998	(1,315)
	TOTAL	30,800	15,866	6,970	22,836	(7,964)

1/ Combines budget originally included in the Agriculture and Livestock Development components.
2/ Combines budget originally included in the Health and Sanitation and Communication Components.
3/ Includes Overhead & Misc. and Commodities from original CSRM Project Budget.

DETAILED ECONOMIC ANALYSIS*

A. Summary of Economic Analysis for Original CSRM Project Design

The original CSRM Project design was based on economic feasibility analyses for the following components:

1. Timber Extraction/Processing

This analysis included a) supply/demand projections for rough-sawn lumber, and b) economic feasibility of extraction and processing enterprises for saw timber, poles and posts. The latter analyzed costs and benefits over time (40 year, 30 year and 25 year cycles) under conditions of uncontrolled timber cutting compared with conditions of controlled cutting. Under conditions of controlled cutting, benefits accorded included values for environmental damage averted. Three options for these values were used ($100, $250 and $500 per hectare).

2. Crop and Livestock Production

Farm level costs and benefits were estimated for a) beef production under conditions of improved pasture management, and b) swine production based on a six-sow confinement farrowing/fattening operation. Costs and returns data used for these enterprises were quite tentative.

Existing cultivated crop area under production in the Valley was estimated at 5,214 hectares, and it was assumed that all of this area was used for subsistence production. Total land area with use capability for crop production was estimated at 21,000 hectares; 12,500 hectares for cultivated crops 1/ and 8,500 hectares for permanent crops 2/.

In the case of beef production it was assumed that the Project would improve production through improved pasture management and genetic improvement of the beef herd. Beef yields were to be increased from 31 kg/ha/yr under traditional production methods, to 56kg/ha/yr using improved methods. It was assumed that 10,000 hectares of pasture (of the 15,000 hectares of pasture estimated to exist in the Valley at that time) would be converted to improved production methods at the rate of 2,000 hectares per year beginning in the second year of the Project. The profitability analysis for improved beef production was found to be quite sensitive to the price of fencing wire (a

1/ Cultivated crops proposed for production were rice, corn, beans and cassava.

2/ Permanent crops proposed for production were bananas, cacao, citrus and pineapple.

NOTE: This economic analysis was carried out on the basis of a CSRM-II life of project (LOP) of two years and three months. Subsequently the original CSRM project was extended by three months and the CSRM-II LOP was reduced to two years. Thus, the project budget figures in the analysis are somewhat higher than in the final project. However, the analysis is equally valid for the final project.

major investment under the improved production system), assumed beef yieldsand beef prices. The Internal Rate of Return (IRR) was estimated at 22.7% with a Net Present Value (NPV) of $80.00 per hectare. A change in either prices or yields that reduced net returns by 23% reduced NPV to zero.

3. National Park and Protection Forest

No attempt was made in the original Project economic feasibility analysis to estimate social benefits of environmental protection investments. However, as indicated above, three estimates of value of environmental damage averted on forest land (based on a range of estimated costs of reforestation) were included as benefits in calculating net benefits of utilizing a system of controlled timber cutting in the area as compared to uncontrolled cutting.

4. Land Use Planning and Policy Formulation

The original Project design justified inclusion of a land use planning and policy formulation component on the basis of enhanced public sector capability to select (from among four hypothetical selva integrated regional development projects competing for limited investment funds) those projects with highest IRR's.

5. Road Maintenance

The original Project did not include resources for road construction, although it was assumed that a road from the then existing road head (at Cacazu) would be constructed by the GOP with non-project funds. During Project implementation, AID agreed to the use of considerable Title I, PL 480 local currency for this purpose.

The Project included resources for road maintenance. Feasibility of road maintenance costs was based on the estimated net value of incremental agricultural output (ie., net value added after deducting an estimated amount of production for local consumption) due to the existence of an appropriately maintained road. In addition to an initial capital investment in road maintenance equipment, construction and studies ($1,404,000), road maintenance costs (including equipment replacement every seven years) were estimated at $231,500 per year for 86 km of primary road and 60 km of feeder road, for an average annual maintenance cost of $1,600/km. Another estimate in the technical analysis of the original PP shows an estimated annual maintenance cost of $4,700 km/yr.

The estimated area of 21,000 hectares apt for cultivated and permanent crop production was assumed to come into production over a ten year period. NPV for road maintenance investments was calculated at $17.4 million. The IRR for road maintenance was estimated at 36%.

Economic analysis during original Project design also determined that the overall road construction program (86 km of main road and 60 km of feeder roads) in the Palcazu Valley was economically feasible. The overall IRR (considering increased value added from projected increased crop, livestock and forestry production, plus a value for passenger traffic) was estimated at 27%, with a benefit-cost (B/C) ratio of 1.85.

B. Comparison of Original and Current Data Base and Productive Potential of Project Area of Influence

Economic Analysis for the original Project design was based on the limited data and knowledge about the Project area that existed in 1980-81. Much more reliable data and information now are available for more realistically estimating the economic potential of the area, as well as for estimating investment levels, operating costs and time required for realizing that economic potential.

In the original Project design, it was assumed that appropiate improved technology already was known for crop and livestock production, pasture improvement, natural forest management and wood processing. It was assumed that adaptation of known technology to the Project area would require only minimal adaptive research and demonstration for a relatively short period of time (one to two years). On that basis, it was assumed that once the road provided access to markets (Project years two and three), production based on appropiate improved technology would spread rapidly (within 5 to 10 years) to a major portion of the potentially productive areas of the Valley.

Project implementation experience over time has demonstrated that original projections of production expansion were highly unrealistic. As the Project was implemented, it became apparent that not only was appropiate production technology not available for rapid adaptation to this type of tropical forest area, but that many of the crops originally thought to be appropiate could not be expected to be adapted for competitive commercial production in the area (e.g., rice, beans, corn). Thus, during Project implementation to date, proportionately much more time and resources than originally planned have been invested in applied and adaptive agricultural research to generate improved technologies for appropiate crops and livestock production. Proportionately much fewer resources have been spent on expanding the use of improved technology on existing production areas and on newly incorporated areas. Only when the on-going applied and adaptive research effort is substantially advanced (which requires significant additional time and effort) can improved technologies be widely adopted to increase commercial production in the Valley.

Table E-1 presents a comparison of original Project data estimates, estimates of progress as of 9/30/87, and estimates for the period of the CSRM-II Project.

C. Economic Feasibility of Activities Being Implemented During the CSRM-II Project

Although the Original Project design clearly planned major expenditures for forestry management and wood processing research and for agricultural/livestock production research, the original economic analysis did not attempt to measure returns to research. Project implementation since that time has dedicated a major portion of total Project costs to agricultural/livestock production and forestry management/ production/processing research and outreach activities, the purpose of which has been to develop and transfer technologies that permit optimum sustainable land-based production in the Valley.

TABLE E-1: SELECTED DATA ESTIMATES AND PROJECTIONS FOR AREA OF INFLUENCE OF ORIGINAL CSRM PROJECT (PLANNED AND ACTUAL TO 9/30/87) COMPARED TO THE CSRM-II PROJECT (IN HECTARES UNLESS OTHERWISE INDICATED)

Item	Original Project (Estimates/ Projections) 1/	Estimates or Actual as of (9/30/87)	CSRM-II Project (projections for end of Project)
1. Total Area of Influence			
a. Entire Valley	190,000	108,000	—
b. Valley Floor	95,000	85,000	—
2. Use Capability in Area Influence			
a. Protection Forest	14,800	22,800	—
b. Production Forest	43,800	39,600	—
c. Pasture	12,700	7,800	—
d. Puma 2/	5,000	4,400	—
e. Permanent Crops	13,700	10,800	—
f. Annual Crops	7,200	5,800	—
g. Riverbed (short season) Crops	2,800	50	—
3. Actual Land Use in Area of Influence			
a. Production Forest	no estimate	103	—
b. Pasture	15,000-18,000	15,600	—
c. Permanent Crops	430	370	—
d. Annual Crops	1,200 (including riverbed crops)	820	—
e. Riverbed Crops	no separate estimate	30	—
4. Areas impacted directly by Project			
a. Improved Pasture	10,000	N/A	N/A
b. Annual Crops	12,500	N/A	1,240
c. Permanent Crops	8,300	150 (coffee) 4 (Palm heart)	500 all
d. Production Forest			
(1) Area Managed	120,000 in yr. 5 400,000 in yr. 8	80	5,000
(2) Area Harvested	550 in yr. 5 2,870 in yr. 8	103 (3 influenced by Project)	92 additional
(3) Number of Production units (of 80 hectares each)	150 in yr. 5 500 in yr. 8	N/A	N/A
(4) Timber Processing Centers Established	2 in yr. 5 7 in yr. 8	1	1 in yr. 8
(5) Timber Harvested			
- lumber (M^3	30,000 in yr. 5 100,000 in yr. 8	N/A 4,800	N/A 19,800 annually by yr. 8
- Posts/Poles (number)	32,700 annually in yr. 5		
e. Swine Units Established (number)	500 units	0	N/A
f. Hair Sheep Modules Established (number)	0	58	120 in yr. 8
g. Land Use Maps Prepared	12 (one for each native community)	One colono area	(one for each community and for one colono area)
5. Population Estimates	Total Valley	Area of Project Influence	
a. Native Communities	12 with 3000 inhabitants	7 with 2,000 Inhabitants	
b. Natives Outside Communities	1,100 "	700 Inhabitants	
c. Colonists			
- Established	2,600 "	1,700 Inhabitants	
- Recent Immigrants	1,000 "	900 Inhabitants	

1/ For items 1, 2, and 3, figures are estimates made at time of original Project design. For item

Up to 9/30/87, nearly 40% of total cumulative Project expenditures were for research. During FY-87, 50% of total expenditures was for research. Approximately 55% of proposed funding for the CSRM-II Project is for forestry, agricultural and livestock research and demonstration activities (See Table E-2 for a breakdown). Thus, an analysis of returns to that research and demonstration (R and D) investment is perhaps the most important determinant of economic justification for the CSRM-II Project .

Another important determinant of the economic rationale for continued CSRM-II Project investment is potential profitability of production enterprises being tested for wider scale adoption. The major enterprise being tested is a wood processing center supplied with timber under the "clear-cut strip" natural forestry management (NFM) system. This NFM system is designed to protect the environment and permit sustained forest product extraction and processing without net depletion of forest resources. Major investments already have been made in a test center for wood processing.

Wood processing is the primary economic enterprise proposed for the Valley, especially for the population living in native communities since these control most of the production forest area of the Valley. The Wood Processing Center began pilot operations in 1987. Although testing of technical and operational options will continue throughout the period of the CSRM-II Project, research to date provides what appear to be fairly reliable indicators of the potential profitability of wood processing, using the extraction and processing technology now being tested as compared to profitability of traditional systems. The profitability analysis in the next section provides the economic rationale for the proposed investment under the CSRM-II Project in this research activity.

CSRM Project research resulted in selection for further technology improvement research of two agricultural production enterprises considered to have major economic potential. The application of improved technology to these enterprises appears to be consistent with environmental protection while at the same time providing sustained production enterprise opportunities for the Valley that are more profitable than traditional economic activities. These are 1) Hair Sheep production, and 2) Coffee production. These enterprises are projected to become significant economic activities in the Valley. Thus, their relative profitability and ability to compete with other less socially and environmentally desireable alternatives are important in determining the economic advisability of the CSRM-II Project.

Beef production is the major current economic activity in the Valley. An estimated 15,000 to 18,000 hectares of existing pasture are dedicated to beef production. The ability to sustain profitable production of livestock on at least a part of this pasture for the foreseeable future will have important economic consequences for the Valley. Of equal importance is the relative profitability of expanding pasture use for beef production to areas that should be left in production forest for environmental reasons, (i.e., relative to the NFM system and wood processing center alternative for sustained production forest exploitation).

TABLE E-2. DISTRIBUTION OF EXPENDITURES DURING CSRM-II PROJECT BY COMPONENT AND NATURE OF EXPENDITURES (US$000's)

PROJECT COMPONENT	NATURE OF EXPENDITURE			
	TOTAL	R & D	NON-R&D PUBLIC INVESTMENT	PRIVATE ENTERPRISE INVESTMENT
1. Production Forestry	2,140	1,618	---	522
2. Crop/Livestock Production	2,400	1,686	---	714
3. Environmental Protection	522	224	328	-----
4. Outreach	968	484	484	-----
5. Road Maintenance	1,574	271	1,303	-----
6. Land Use Planning	169	102	67	-----
7. Policy Support	616	206	410	-----
Sub-Totals	8,419	4,591	2,592	1,236
Inflation/Contingencies	955	520	294	141
Grand Totals	9,374	5,111	2,886	1,377
%	100%	55%	31%	14%

Research activities during the original CSRM Project period also have identified other promising, but economically less significant, lines of research (e.g., swine production, improved clean cultivation fallow rotations, improved production of selected native fruits), which will be continued. Since these Project research cost are low and relative economic impacts on the Valley as a whole of these production alternatives are not expected to be significant in the foreseeable future, these activities have not been included in the economic analysis.

Finally, road upgrading and maintenance costs are a significant portion of total CSRM-II Project costs (approximately 17%), amounting to about $500,000 annually. Thus, for economic feasibility purposes, it is important to determine if road upgrading and maintenance costs are justified by the increased value added projected to accrue to Valley residents and to society as a whole, as the result of having road access to the Valley. This, in turn, depends on Project research that generates more profitable technology than does that used in traditional production systems, but which is feasible to apply only because maintaining the road permits access to markets that generate the income flows.

Each of the economic analyses referred to above have been considered in the design of the CSRM-II Project. The results of each are discussed below:

1. Returns to Project Research

The research effort under the CSRM-II Project has as its purpose the development of a group of technologies that increase opportunity costs of environmentally sound (and thus socially desirable) uses of natural resources in economic activities carried out in tropical forest environmental conditions such as those found in the Palcazu Valley. Forestry management research, wood processing/utilization research, and crop/livestock production research all are being carried out during the entire CSRM-II Project period.

An ex-ante evaluation of benefits to CSRM Research was completed in early 1987 based on data and research results available from CSRM Project activities up to that time.1/ Following is a summary of relevant parts of this ex-ante evaluation.

a. Forestry Production/Utilization Research.

This research seeks to develop improved technologies for timber extraction that protect against environmental degradation and assure sustained yields through natural regeneration at a rate that results in no net forestry resource depletion, while at the same time providing profit potential at least equal to profits obtained under traditional systems of timber extraction. Forest production (harvest) research under the CSRM-II Project is based on the NFM system described in detail elsewhere in this document.

1/ Ganoza, Victor G. and Quintanilla, Luis, "Ex-ante Evaluation of Benefits of Central Selva Research" North Carolina State University Mission to Peru, 1987, 112pp, hereafter referred to as the "Ganoza Study".

The NFM system involves clear cut harvesting of timber from narrow (20-35M) strips of forest, with undisturbed forest remaining on both sides to allow natural regeneration in the clear-cut strip areas. The traditional timber harvest system involves selective cutting of high value saw timber, and, when this is exhausted, re-entry into the cutover area to harvest lower value saw-timber. Thereafter, the area normally is abandoned or burned off and used for pasture. Small areas sometimes are planted to permanent crops. Also, small plots often are planted to subsistence crops for one to three years, then abandoned as erosion makes the area uncultivable, fertility runs out and/or high weed infestation occurs.

The key output variable determining economic feasibility of the NFM system is maximum utilization of forest material resulting from clear-cutting of the strips, e.g., high-value and low-value saw-timber, as well as trees and branches too small for saw logs (under 12") that can be utilized to produce marketable poles and posts.

During the original CSRM Project implementation period, market studies were carried out for these products. Also, a pilot wood processing center was established to test technical and economic feasibility of:

(1) Supplying timber under NFM system harvesting methods;
(2) Sawing high-value and low-value timber together;
(3) Preparing and preserving poles and posts; and,
(4) Marketing of these products.

Sawmill operations for rough-sawing as well as pole and post preparation and preservation have been carried out on a test scale at the pilot center throughout 1987. Test marketings also have been made during that period. This experience largely confirms costs and returns data used in the Ganoza Study and the Simeone Study 1/ (the Ganoza Study draws upon the latter for costs and returns benchmarks).

Continuation of forestry harvesting and utilization research proposed for the CSRM-II Project is justified only if the following conditions are satisfied:

(1) NPV of social benefits from application of the new system reasonably can be expected to be greater than NPV of the opportunity cost of the research and extension required to develop and apply the new system. NPV of projected additional gross income of the new system as compared to the traditional system also is a useful indicator of economic feasibility since it represents the additional payment to factors, and as such, represents added income accruing to society.

1/ Simeone, Robert, et.al, "Propuesta para la Ampliación del Centro de Transformación Integral de Productos Forestales en el Valle del Palcazu", Iscozacin, Peru, June 1986, 28pp.

(2) Assuming that added NPV of social benefits is sufficient to justify the research and development investment, enterprise profitability also reasonably must be expected to be sufficiently greater for the new system as compared to the old system, to induce entrepreneurs to adopt the new system. Inducement also can be assisted by public policy, e.g., by mandatory licensing of timber extraction only to those operators who agree to adopt the new system.

Analysis of social benefits is discussed below. Analysis of enterprise costs and returns is covered in a later section.

The Ganoza Study provides two relevant NPV estimates. One is the NPV of projected gross income from the new system compared to the old. The other is NPV of added social benefits resulting from environmental protection and sustained yield without depletion.

(1) Net Present Value of Projected Social Income

The Ganoza Study estimated NPV of projected social income over a 30 year period for a 500 acre forest tract being operated under the new extraction/utilization system, and compared it with NPV of social income from the traditional system. Using a 10% real discount rate, NPV was found to be $83,371 for the new system compared to $78,658 for the traditional system, a difference in favor of the new system of $4,713 per tract. When aggregated to the entire production forest area of the Valley, the new system generates $415,000 more NPV of social income than does the traditional system. This is the added value that society would place on the new system due to increased returns to factors.

(2) Net Present Value of Other Social Benefits

To determine the value that society puts on forestry research that protects the environment and also permits sustained harvest without depletion, Ganoza carried out an opinion survey of government officials concerned with Selva development. The lowest quartile of respondents estimated that society would value benefits at approximately 48% additional to those benefits accruing to the enterprise whether or not these societal objectives were achieved.

Using profit figures estimated by Simeone, et. al., of $8,766 per harvested hectare per year under the new system, and applying the 48% additional social benefit estimate, results in a current social value of $4,172 per harvested hectare per year from application of the NFM System integrated with the wood processing center.

To estimate aggregate net present social value of the improved technology, Ganoza assumed two 20 year scenarios for rate of adoption of the improved technology.

(a) Most Pessimistic Scenario: Six hectares harvested per year from 500 hectare tracts with the first tract beginning operations in year one, the second in year five, and one each year thereafter;

(b) Most-Likely Scenario: Six hectares harvested per year from 500 hectare tracts with the first tract beginning operations in year one, two more in year two, and four each year thereafter;

NPV of social benefits related to environmental protection and sustained production is $990,000 under the first scenario, and $2,712,000 under the second scenario.

The combined values of NPV of projected social income under the new forestry production/utilization system applied to the Palcazu, plus the NPV of other social benefits accruing in the Palcazu, provides a proxy for the amount of investment in project research that would be justified if research benefits accrued only to the Palcazu. Under the first rate of adoption scenario, the total social benefits figure is $1,405,000, and under the second scenario $3,127,000.

The $1,618,000 proposed for forestry research during CSRM-II (see Table E-2) slightly exceeds the NPV of total social benefits under the "Most Pessimistic" scenario, whereas, it amounts to approximately 50% of total social benefits under the "Most Likely" scenario. In fact, under the latter scenario, NPV of benefits exceeds research costs proposed for the CSRM-II Project, as well as sunk costs in forestry research made during the original CSRM Project period ($1,350,000).

Expert opinion is that the forest extraction/utilization technology to be generated under the CSRM-II Project has applicability to many tropical forest areas outside the Palcazu, especially to other areas of the Amazon Basin, but also to tropical forest areas in other parts of the world.

Limiting ourselves to the Peruvian Amazon Basin, it is estimated that 45,000,000 hectares of production forest have environmental conditions that would benefit from the application of the new technology. If the new technology were to be applied to only one percent of this area over the next 20 years, and the adoption rate were similar to that specified in the first scenario above for the Palcazu, the NPV of total social benefits calculated for Palcazu would be multiplied by a factor in excess of ten. In other words, less than 10% of the Project forestry research costs should be charged to social benefits deriving from the Palcazu Valley. Thus, Project forestry research costs attributable to the Palcazu would be $161,800 (or $296,800, if original CSRM Project sunk costs are included), as compared to the social benefits generated in the Palcazu ($1,405,000 under scenario one and $3,127,000 under scenario two).

In conclusion, from the viewpoint of total social benefits projected from available data, the proposed CSRM-II Project investment in forestry production/processing research is amply justified.

2. Profitability Analysis of Proposed Economic Enterprises

Profitability analyses have been carried out for three economic enterprises for which the original CSRM Project has initiated research to

develop improved technology. These enterprises are considered by Project professionals to be those with highest promise for major application to the Valley. They are: a)Wood Processing Center, b)Hair Sheep Production and c)Coffee Production. The profitability analyses are based on the most recent research and test data available as of December, 1987.

Cost and income flows were estimated for a ten year period with assumed rates of adoption and at three discount rates: 10%, 12% and 15%. NPV's, IRR's and B/C ratios were calculated. Calculations were based on one Wood Processing Center. Thirty modules (of 10 breeding ewes each) were used for analyzing hair sheep production profitability and, in the case of coffee production, it was assumed that 150 hectares per year would be established over an eight year period for a total of 1,200 hectares.

The results of the analyses are shown in Tables E-3, E-4 and E-5. These results of the profitability analyses for the three enterprise programs are summarized below for the 10% discount rate:

Enterprise	NPV ($)	IRR (%)	B/C Ratio
1. Coffee Production	1,661,024	44.80	1.54
2. Hair Sheep Production	76,890	23.75	1.18
3. Wood Processing Center	1,298,061	37.08	1.27

The B/C ratio and IRR for coffee production are good. For the wood processing center, they are acceptable, and for hair sheep production, they are marginal. The profitability levels for the wood processing center research and the hair sheep production research suggests that this research should concentrate on activities that result in technology adjustments that reduce unit costs of production.

In order to predict whether or not farmers in the Valley will find it economically attractive to change to the proposed enterprises, the B/C ratio and IRR were calculated for a typical beef production enterprise being carried out in the Valley under traditional pasture management practises. NPV over a 15 year period for the typical beef production enterprise is only $30 per hectare with a negative IRR and a B/C ratio of 1.1 (See Table E-6). Comparing these figures with those of the new enterprises indicates that farmers can be expected to prefer the more profitable new enterprises, assuming a reasonable confidence level in the reliability of projected costs and returns.

An important challenge for Project research is to generate improved technologies that permit profitable use of the nearly 8,000 hectares of land in the Valley that is suitable for pastures. Nearly all of this land 1/

1/ In fact, an estimated 7,000-10,000 hectares of additional land that is apt for other uses also is in pastures and is used for traditionally managed beef production. It would appear that ruminant livestock research should be accorded high priority in order to make available profitable alternatives for existing producers, as the productivity of their traditional systems decline to the point of negative returns and possible eventual abandonment.

Table E-3A Costs and Returns for One Hectare of Coffee over 15 Year Production Period, Palcazu Valley, (US$), (1987 estimates)

Source	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
A. COSTS								
Land Preparation	156				0	0	0	0
Planting	291				0	0	0	0
Weeding	127	145	145	145	145	145	145	145
Fert./Chemicals	18	64	64	64	64	64	64	64
Prunning			36	36	36	36	36	36
Harvesting/Transport			203	203	203	203	203	203
Total Cos.s	593	209	448	448	448	449	448	448
B. RETURNS								
Yield Per Ha. (qq)	0	0	8	12	10	10	10	10
Price per quintal	0	0	100	100	100	100	100	100
Total Returns	0	0	800	1000	1000	1000	1000	1000
Net Income (Loss)	-593	-209	352	552	552	552	552	552

Table E-39 Economic Returns to Coffee Program, 8 year projections, Palcazu Valley, (US$), (1987 estimates).

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Hectares Established:								
Annual	150	150	150	150	150	150	150	150
Cummulative	150	300	450	600	750	900	1050	1200
Costs	88909	120273	187500	254727	321955	321955	456409	523636
Returns	0	0	120000	270000	420000	570000	720000	870000
Net Income (Loss)	-88909	-120273	-67500	15273	99045	248045	263591	346364
Cumulative Balance	-88909	-209182	-276682	-261409	-163364	84682	348273	694636

		Discount Rates		
		10%	12%	15%
Net Present Value	NPV =	1661024	1340571	976187
Internal Rate of Return	IRR =	44.80%	44.80%	44.80%
Benefit/Cost Ratio =		1.54	1.51	1.47

TABLE E-4 Wood Processing Center Costs and Returns, Palcazu Valley
Based on 11 Year Projections
(US$), (1987 estimates).

	UNIT	QUANTITY	YR 0	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10	YR 11
Has. Harvested	Has.			6	12	24	24	24	24	24	24	24	24	24
Sog Volume	bdft/ha.	63450		300700	761400	1522800	1522800	1522800	1522800	1522800	1522800	1522800	1522800	1522800
Saw Wood Yield	bdft/ha.	38070		228420	456840	913680	913680	913680	913680	913680	913680	913680	913680	913680
Pole Trees Yield	bdft/ha.	38070		228420	456840	913680	913680	913680	913680	913680	913680	913680	913680	913680
Pole Trees Yield	poles/ha.	064		5184	10360	20736	20736	20736	207236	20736	20736	20736	20736	20736
A. COSTS		UNIT COSTS												
Investment Costs	US$		522000											
Extraction Costs	bd.ft.	0.03		17403	34807	69614	69614	69614	69614	69614	69614	69614	69614	69614
ransport Costs	bd.ft.	0.01		8702	17403	34807	34807	34807	34807	34087	34087	34087	34087	34087
irect Labor Sawmil	year			4320	8640	8640	8640	8640	8640	8640	8640	8640	8640	8640
Direct Labor PresCap	year			15840	31680	31680	31680	31680	31680	31680	3168	31680	31680	31680
Salaries (Sawmill and PresCaps)	year			14057	14057	14057	14057	14057	14057	14057	14057	14057	14057	14057
peration Costs (Sawmill)	year			14040	28080	28080	28080	28080	28080	28080	28080	28080	28080	28080
peration Costs (PresCap)	year			42120	84240	84240	84240	84240	84240	84240	84240	84240	84240	84240
epreciation	year			38510	38510	38510	38510	38510	38510	38510	38510	38510	38510	38510
mortization of Investment	year			115482	115482	115482	115482	115482	115482	115482	115482	115482	115482	115482
Sawn Wood Transp Isco-S. Ramon	bd.ft.	0.12		26995	53990	107980	107980	107980	107980	107980	107980	107980	107980	107980
Treated Pole Transp Isco-Lima	bd.ft.	0.21		47761	95521	191042	191042	191042	191042	191042	191042	191042	191042	191042
SUB TOTAL			522000	345230	522411	724132	724132	724132	724132	724132	724132	723142	723142	723142
ntingencies 15%				51785	78362	108620	108620	108620	108620	108620	108620	108620	108620	108620
TOTAL COSTS			522000	397015	600772	832752	832752	832752	832752	832752	832752	832752	832752	832752
B. RETURNS	UNIT	UNIT PRICE												
Sawn Wood Sales (San Ramon)	bd.ft.	0.36	0	83062	166124	332247	332247	332247	332247	332247	332247	332247	332247	332247
Treated Poles Gales (Lima)	poles	44.44	0	230400	460800	921600	921600	921600	921600	921600	921600	921600	921600	921600
TOTAL RETURNS			0	313462	626924	1253847	1253847	1253847	1253847	1253847	1253847	1253847	1253847	1253847
ANNUAL BALANCE			-522000	-83553	26151	421095	421095	421095	421095	421095	421095	421095	421095	421095
CUMULATIVE BALANCE			-522000	-05553	-579402	-158307	262788	683883	1104978	1526073	1947168	2368263	2789358	3210453

		Discount Rates 10%	12%	15%
NET PRESENT VALUES	=	1298061	1082955	821245
INTERNAL RATE OF RETURN	=	37.08%	37.08%	37.08%
BENEFITS COST RATIOS	=	1.27	1.25	1.22

TABLE E-5, a. Costs and returns to one Hair Sheep Module (3 has. for 10 Ewes and 1 Ram), 10 year production Horizon, Palcazu Valley (US$) (1987 estimates)

A. Costs	Yr.1	Yr.2	Yr.3	Yr.4	Yr.5	Yr.6	Yr.7	Yr.8	Yr.9	Yr. 10
Pastures	174	18	18	18	18	18	18	18	18	18
Fencing	299	27	27	27	27	27	27	27	27	27
Shelter	103	10	10	10	10	10	10	10	10	10
Livestock	257									
Equipment	29									
Vet. Inputs	175	177	183	189	194	194	194	194	194	194
Other	86	86	86	86	86	86	86	86	86	86
Total Costs	1121	319	324	330	336	336	336	336	336	336
Total Returns	0	514	643	771	900	900	900	900	900	900
Net Income (Loss)	-1121	196	441	564	564	564	564	564	564	564

Table E-5, b. Economic Returns to Hair Sheep Program, 10 year production Horizon, Palcazu Valley (US$) (1987 estimates)

Modules Installed	30	30	30	30	30	30	30	30	30	30
Pasture established (has.)	90	90	90	90	90	90	90	90	90	90
Cumulative modules	30	60	90	120	150	180	210	240	270	300
Cumulative pasture (has.)	90	180	270	360	450	540	630	720	810	900
Total Costs	33634	43191	52920	62820	72891	82963	93206	103106	113177	123249
Total Returns	0	15249	34714	57857	84857	111857	138857	165857	192857	219857
Net Income (Loss)	-33634	-27763	-18206	- 4963	11966	28894	45651	62751	79680	96609

	Discount Rates		
	10%	12%	15%
Net present values	US$ 218,085	171,114	117,649
Internal Rates of Return	23.75%	23.75%	23.75%
Benefit/Cost Rates	1.18	1.15	1.11

TABLE E-6 Beef Production Enterprise Under Traditional Management (US$)
(1987 estimates)

YEAR	Kg Meat/Ha.	Price/Kg.	Revenue	Cost	Income
1	30.00	1.43	43.00	34.00	8.57
2	29.50	1.43	42	34	7.86
3	29.00	1.43	41	34	7.14
4	28.50	1.43	41	34	6.43
5	28.00	1.43	40	34	5.71
6	27.50	1.43	39	34	5.00
7	27.00	1.43	39	34	4.29
8	26.50	1.43	38	34	3.57
9	26.00	1.43	37	34	2.86
10	25.50	1.43	36	34	2.14
11	25.00	1.43	36	34	1.43
12	24.50	1.43	35	34	0.71
13	24.00	1.43	34	34	0.00
14	23.50	1.43	34	34	0.71
15	23.00	1.43	33	34	1.43
16	22.50	1.43	32	34	-2.14
17	22.00	1.43	31	34	-2.86
18	21.50	1.43	31	34	-3.57
19	21.00	1.43	30	34	-4.29
20	20.50	1.43	29	34	-5.00
21	20.00	1.43	29	34	-5.71
22	20.00	1.43	29	34	-5.71
23	20.00	1.43	29	34	-5.71
24	20.00	1.43	29	34	-5.71
25	20.00	1.43	29	34	-5.71

10% Discount Rate

Net Present Value	30.18
Internal Rate of return	0.84%
Benefit/Cost Ratio	1.10

currently is in pasture for beef production under traditional management practises, and, as shown in Table E-6, profitability is quite low. In fact, income flows apparently become negative within 14 years after the pasture is established.

Project research activities are proposed to include work in pasture renovation and improved management alternatives. Technologies developed to date for pasture renovation do not appear to be profitable under existing cost and price relationships. This apparently is due primarily to the high capital costs for fencing required in the renovation technology (See pp.56-60 of the Ganoza Study). Continued research to develop lower cost pasture renovation technologies should be included in the CSRM-II Project.

3. Feasibility of Proposed Investment in Access Road Upgrading and Maintenance

During the CSRM-II Project period, it is proposed that $1,408,000 of Project resources be utilized to upgrade 56 KM of primary access road from KM zero (near Cacazu) to Iscozacin, and to maintain the entire 114 KM of primary access road from Villa Rica to Iscozacin. Some of these resources will be utilized to construct 12 km of feeder roads within the Valley and to maintain logging trails, as well as to maintain the Iscozacin Airport, but the majority is destined to permit all-season commerce by road between Iscozacin and the rest of Peru.

The following assumptions have been applied in carrying out the road upgrading/maintenance feasibility analysis:

a. Sunk Costs of Road Construction: Road construction investment during the original CSRM Project period is considered to be a sunk cost and its amortization is not charged to the Valley.

b. Annual Road Maintenance Cost: Cost estimates vary from $1,100/Km to $5,000/KM depending on the design standard to which the road has been constructed. It is assumed that annual maintenance costs, after the upgrading that is to be carried out during the CSRM-II Project(i.e., annual maintenance costs after Project termination) will be $2,500/Km.

c. Allocation of Road Maintenance costs to the Valley: Maintenance costs of the 56 Km from Km zero (the entrance to the Valley) to Iscozacin are charged entirely to output from the Valley. Fifteen percent of the maintenance costs for the 58 Km from Km zero to Villa Rica have been charged to the Valley. This latter is based on traffic count figures 1/ to and from Iscozacin and to and from Puerto Bermudez (also by that road), and attributing 10% of the road maintenance cost to areas benefited along the road from Villa Rica to Km zero.2/

1/ Engineer's Report, CSRM Project "Palcazu Project Planning Overview: Road Construction and Maintenance", 1987, Table 2, P.6.
2/ All calculations are based on the assumption that Project funds will not be used for road construction beyond Iscozacin.

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Thus, total annual maintenance costs charged to the Valley after 1990 are $140,000 (56 Km x $2,500) and $21,750 (58 Km x 2,500 x .15), for a total of $161,750 annually.

d. Allocation of Project Costs to the Valley: Project research and other public investment costs during the original CSRM Project period are considered as sunk costs and are not charged to future benefits. Costs of the CSRM-II Project (except for $1,230,000 of private enterprise investment costs that were included for amortization in determining profitability in the enterprise analyses) have been charged to the Valley as follows (Project cost allocation figures are from Table E-2):

COMPONENT	NATURE OF EXPENDITURE	PHASE II PROJECT COST ALLOCATION ($000's)	PERCENTAGE OF PROJECT COST CHARGED TO THE VALLEY	AMOUNT OF PROJECT COST CHARGED TO THE VALLEY ($)
1. Forestry	R&D	1,618	10%	161,800
2. Crop/Livestock	R&D	1,686	50%	843,000
3. Outreach	R&D	484	50%	242,000
4. Outreach	Non R&D	484	100%	448,000
5. Environmental Protection	R&D	224	10%	22,400
6. Environmental Protection	Non R&D	328	100%	328,000
7. Road Maintenance	R&D	271	10%	27,100
8. Road Maintenance	Non R&D	1,303	100%	1,303,000
9. Land Use Planning	R&D	102	10%	10,200
10. Land Use Planning	Non R&D	67	100%	67,000
11. Policy Support	R&D	206	10%	20,600
12. Policy Support	Non R&D	410	10%	41,000
Sub-Totals		$ 7,183,000		$3,514.100
Inflation/Contingencies		$ 814,000		$ 397,100
Private Enterprise Investment (Amortized in Production Enterprises Enterprises)		$ 1,377,000		----------
Grand Total		9,374,000		$3,911,200

e. Additional Social Benefits. Social benefits equal to 48% (from the Ganoza Study) of net economic benefits from valley production have been added to economic benefits made possible by road upgrading/maintenace. This is the social value of application of technologies that protect the environment and that permit sustained production without net depletion.

f. Period Covered and Discount Rate. Projections are made for costs and returns over 15 years at 10%, 12% and 15% discount rates.

g. Economic Returns in the Absence of an Appropriately Maintained Road. It is assumed that most production activities in the absence of an appropriately maintained road would be for subsistence purposes and that net returns from other production activities such as traditional beef production and logging for river-float to Pucallpa would be totally offset by the social cost of environmental damage caused by these traditional production methods.

NPV of total net benefits accruing to the Palcazu Valley, after charging all assumed costs for road upgrading and maintenance and using a 10% discount rate, is $2,681,403 (see Table E-7).

The B/C ratio for the Project investment in road upgrading and annual road maintenance costs during the 15 year period of measurement, using a 10% discount rate, is 1.27. This B/C ratio is considered to be acceptable in Projects of this type.

Table E-7 Economic Returns, Net Present Value and Benefit Cost Ratio for Road Upgrading/Maintenance Investment (US$) (1987 estimates)

Net Enterprise Returns	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8
Wood Processing Center	-522000	-83553	26151	421095	421095	-179205	842190	842190
Coffee Program	-88909	-120273	-67500	15273	98045	248045	263591	346364
Hair Sheep Program	-33634	-27763	-18206	-4963	11966	28894	45651	62751
Total Net Enterprise Returns	-644543	-231588	-59555	431405	531106	97735	1151432	1251305
Less Project Costs:								
Road Maintenance Costs	524667	524667	524667	161750	161750	161750	161750	161750
Other Allocated Costs	740000	740000	740000					
Total Net Returns After Project Costs	-1909210	-1496255	-1324221	269655	369356	-64015	989682	1089555
Added Social Benefit Value				129434	177291	-30727	475048	522986
TOTAL SOCIAL RETURNS	-1909210	-1496255	-1324221	399089	546647	-94743	1464730	1612541

	Discount Rates		
	10%	12%	15%
Net Present Value NPV =	2681403	1695952	592621
Benefit/Cost Ratio =	1.27	1.22	1.15

Detailed Social Soundness Analysis

The social soundness analysis is based on a review and analysis of the proposed CSRM-II Project activities as they may affect beneficiaries in the Project area. The Project design team has taken into account the lessons learned from implementation of the original AID-funded CSRM Project between 1982 and 1988.

The social analysis prepared for the original CSRM Project design (Miller and Martinez, 1982) concluded that that Project would 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 the native communities". This premise remains valid for CSRM-II.

1. Background

Various CSRM Project reports and a Project evaluation (Corporacion de Racionalizacion y Consultoria S. A., 1985) have summarized the results of Project activities and GOP decisions that addressed the traditional problem of jungle colonization projects - their tendency to generally focus activities around the construction of penetration roads, while only marginally addressing limiting factors such as the adequacy of the resource base, quality and potential of the soils, prior planning of physical infrastructure, carrying capacity of the zone, and effects of the degeneration or destruction of the ecosystem.

It is well known that Amazon development projects that begin with penetration road construction open the way to invasion of traditionally held native forests and displacement of natives. Slash and burn agriculture follows causing deforestation, ruin of natural habitat for wildlife, and high soil erosion. Often the exposure of previously isolated populations to outsiders produces epidemics causing lose of life and a general decrease in the inhabitants' health. The 1985 CSRM evaluation and subsequent reports by the long term CSRM Project anthropologists have documented the Project's concerns and actions for protecting the social fabric of the native communities and small colonists. The CSRM Project developed the means by which the Amuesha Indians and small colonists could be integrated into the development plans of the GOP in conjunction with USAID.

The following presents the principal constraints to development and a summary of the CSRM Project activities that demonstrate a successful, non-traditional approach to addressing these constraints through legal process, social organization and appropriate technology development and demonstration. The GOP constructed road into the Palcazu was not opened until late in 1985; fortuitous because it allowed the Project researchers to focus

on the existing land tenure situation, land use practices, health needs, social structures and farming systems without the pressures of invading colonists.

a. Constraint: Land Issues - One of the first activities the Project addressed was land titling, a major constraint. Prior to the Project, land titles could only be acquired by working through an extremely slow process with the Ministry of Agriculture. Furthermore, the process of land titling was impeded by the superimposition of claims and the ease of invasion and occupation of lands: factors which constituted sources of tension and conflict in the Valley.

At the beginning of the CSRM Project, cadastral work was completed in the Valley in order to provide land titles to the twelve native communities. The Continuous Land Use Inventory Component, Forestry Development Unit, and APODESA worked jointly to map land use capability and actual land use. The Project provided aid to the Federation of Amuesha native communities (FECONAYA) in order to register all twelve communities within the Project area. The land titling of native communities had the effect of preventing invasions of their lands: the same was true for the colonists. Part of the land-titling problem in the Valley was lack of knowledge by natives about their legal rights. The CSRM Project funded a legal course for Amuesha leaders in two communities. The course dealt with land rights and other legal issues and established a contact between the legal department of the institution carrying out the training and the local Amuesha. All needed land titling has been completed: it is no longer a constraint and does not have to be dealt with by the CSRM-II Project.

Appropriate land use in the Valley is a corollary land issue. Continuous land use studies have verified the areas suitable for permanent and annual crops in the Valley. The natives and colonists occupy virtually all of the available agricultural lands. The issue of land-use classification in general has not been resolved. Which map to use, who should do the classification or reclassification, and what to do about already issued "adjudication contracts", continue to be politically sensitive issues. The CSRM-II Project will complete the land-use classification for all twelve native communities. It will utilize the approach taken by the original CSRM Project continuous land use inventory and extension teams that directly involves Project area inhabitants in their own land-use planning. An appropriate technological package is being tested to enable beneficiaries to make better use of their land rather than continuing to cut forest for cattle or crop production.

A third constraint was the lack of legal status and protection for communal lands. CSRM also assisted the native communities obtain legal advice for application to the central government for establishing a communal reserve, 35,000 has., near their communities as a buffer zone to keep settlers out and prevent log extraction where the land use capability is strictly for protection forest. An important secondary benefit of this measure for the beneficiaries, principally the Amuesha Indian communities, is

protection of wildlife and flora which serve as food and medicinal sources in these areas. The constraint that will be addressed under CSRM-II is the enforcement of protection laws for these areas. The Project will provide training, TA and construction of ranger posts to enforce the protection laws.

b. Constraint: Lack of Health Services - The almost non existence of even basic health care was a major constraint, in bettering the lives of local inhabitants. To help address this need, establish a dialogue and gain some credibility in the Valley, CSRM health activities began almost immediately in 1984 with the organization of massive vaccination campaigns for all children in the Valley up to ten years old. During the latter part of 1984 and the first few months of 1985, the Project achieved approximately 80% coverage. The vaccinations included "triple", polio, TBC, measles, and tetanus. There have been no epidemics since, and most significantly not even after the opening of the first road into the Project area in 1985. After conducting a survey of the health problems of the Valley and an inventory of the equipment present in the various communities, the Project designed a program to equip health posts, train health promoters, and supply communities with low-cost generic medicines through a revolving medical fund based in the Indian communities.

The training methods for health promoters changed radically during the first two years of the health programs. It was originally conceived of as a once-a-year activity in which promoters were given two weeks of theoretical courses. This approach was found to be ineffective because of the educational level of the participants, low level of language literacy, and inadequate infrastructure for implementing proposed practices. The program eventually changed to provide frequent contextual training at the Project headquarters in Iscozacin and in the rural communities themselves.

The most innovative program was the creation of a team of local health promoters who spoke Amuesha and who were intensively trained to provide training to the other Amuesha promoters, to teachers, and to the wider community. The construction of health posts was de-emphasized in favor of training people and equipping existing health posts. The revolving medical fund, a source of low cost generic medicines, was supervised administratively by an accountant which was critical to the success of the fund. The functions of the accountant were expanded to work with local health committees in administration as well as with local health promoters. Nearly all health activities have been and will continue to be transferred to the MOH. It is a real measure of the success of the CSRM Project, that CSRM-II will not have to address the health services constraint to such an extent.

c. Constraint: Insufficient Education and Training Opportunities - The principal educational needs in the area are for upgrading the training for bilingual professors, for equipping classrooms, and for providing teachers for the new technical high schools the GOP has established

in the Valley. An unparalleled opportunity exists for the GOP to train an entire generation of Amuesha and colonists in appropriate land-use through the technical high schools. They lack equipment, however, and the teachers and the curriculum are of low quality from a resource management point of view.

The CSRM Project could not substitute for the Ministry of Education and has made only small, but effective, contributions to training through providing short courses and sponsoring the annual conference of the Amuesha Bilingual Professors Association (ABBA). The ABBA received funding from the Project to prepare and publish booklets in Spanish and Amuesha on land use and ownership, extension and conservation. Some building materials and supplies were provided to local schools. Scholarships have been provided to natives and small colonists to study at technical high schools within the Valley and at higher level technical institutes elsewhere in the region. The lack of sufficient training opportunities in these areas at these levels will continue to be a constraint that must be addressed by the Ministry of Education.

In training activities outside the Ministry of Education, the CSRM Project had more success. The key program was the creation of community businesses (tambos comunales). This program provides administrative training to native communities. Developing administrative capability requires intensive hands-on training which the Project is able to do. By the end of 1986, the first store had trained four accountants and had increased from a net worth of 2 million to 20 million soles, and three more stores were added by 1987. CSRM-II will build on these successful training experiences carrying out demonstration programs.

d. Constraint: Inadequate General Extension Activities - Prior to CSRM, agricultural and forestry extension services were almost non-existent. CSRM efforts suffered initially from a faulty notion of the nature of Amuesha communities' organization and functions. The Project staff assumed that extension techniques applied in the highland areas with individual farmers would work with dispersed native communities.

To overcome these limitations, a social development component was added to the Project to coordinate and strengthen extension activities within each of the technical units. Rather than employ a large number of forestry and agricultural extension agents and health promoters, the Project contracted TA professionals and Peruvian specialists to train natives and colonists as extensionists, health promoters and park rangers believing that local residents would best be able to communicate with, educate and be accepted by their neighbors. The approach has been successful, but given the magnitude of the need, CSRM-II will need to continue the use of interdisciplinary teams of specialists who are trained in these various technical areas and community-based planning.

e. Constraint: Lack of Appropriate Natural Forest Management - This key area is the most difficult single activity in the Project, and perhaps the most critical given the magnitude of potential deterioration of the areas and its spread effects due to lack of natural forest management knowledge and skills. The most serious problems that were encountered in this activity were organizational rather than technical, despite the formidable nature of the technical task. During the course of the CSRM Project, inexperienced staff of the forestry unit became increasingly involved with the Amuesha. The complications were enormous, particularly with regard to budgeting activities outside the forestry unit (road building, marketing arrangements, and forest extension).

During the past two years, the Project funded natural forest management and forest product marketing activities and assisted in the legal creation of the Yanesha Forestry Cooperative (YFC). The challenge of establishing a successful cooperative was to maintain continuity while transforming the traditional native community structure into an economically viable enterprise. A socio-linguistic study of Amuesha kinship and social categories was completed and the results used to adapt the forestry cooperative organization to the native community structure in a culturally compatible manner. The YFC is beginning to function in a manner that will preserve and protect the local forests while carefully utilizing them for economic purposes. Given the enormity and seriousness of the results should this effort not be successful, CSRM-II will continue to address this constraint. TA, training, equipment and research will continue to help the YFC achieve technical and financial independence in managing its forestry resources.

f. Constraint: Lack of Agricultural Credit - Although very low interest is charged on loans to establish pastures and raise cattle, the application procedures and distance from offices having authority to approve these loans still limit who actually can receive credit; with the larger colonists tending to receive better service. As a result of the CSRM Project coordination efforts, the native communities and small colonists now have access to credit from the Peruvian Agricultural Bank (BAP), which established an office in Iscozacin in 1986.

CSRM began a pilot credit-in-kind program to promote the new technological packages, which was well received by natives and small colonists. The CSRM Project effectively demonstrated to decision-makers and to the general public the limitations of agricultural and livestock production in humid tropical areas like the Palcazu Valley, and began research to develop economical and ecological alternatives appropriate to the Valley. CSRM-II will continue and emphasize research and demonstration of such techniques.

In summary, CSRM research on social organization, culture and traditional production systems helped eliminate or reduce some serious constraints to Project activity in the Valley, and revealed the need to refocus the Project and to take a more cautious approach to introducing change

into the lives of the Project beneficiaries. These refocused research and demonstration activities to be conducted under CSRM-II are built on a more solid base of information about Project beneficiaries and their behavior towards Project interventions, and will be able to operate with fewer constraints.

2. Social Profile of the Project Area

a. Population Profile

During CSRM implementation, demographic information for the Project area was gathered through various studies by the TA anthropologist, Project doctor in charge of the primary health care program, and by APODESA through the application of its Geographic Information System and a survey of all colonists in the Palcazu Valley. Approximately 11,700 inhabitants live in the Project Area, 45 percent are considered to be within the area of influence of the Project research, extension and service activities and in proximity to the road. These 5,300 beneficiaries are: 2,000 Amuesha Indians living within communities, 700 natives living outside of communities, 1,700 established colonists and 900 recent immigrants. The most prominent population centers are: Iscozacin (capital of the district - 1,000 inhabitants), Villa America (385 inhab.), Shiringamazu (300 inhab.), Loma Linda (209 inhab.), and Puerto Mayro (192 inhab.). A 1988 report on the health situation in the Valley by the Project doctor indicated a birth rate of 5.2 percent and in migration of 6.7 percent. The average family size is 7.17. (Detailed health data may be found in Tam, 1988)

b. Social Stratification

The three socio-economic strata - large ranchers, native Amuesha, and small colonists - continue to be the principal groups living in the Palcazu Valley. In migration has been estimated at 6.7 per cent per year: mostly by Amuesha Indians subject to severe pressure on their modest land holdings in the nearby Villa Rica and Oxapampa areas and small colonists coming from the highlands and coast. The natives are granted community membership by mutual consent, but this is not being encouraged by the Communities in the Valley.

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. The Amuesha constituted the labor force for rubber exploitation and subsequent opening up of pastures and farmlands.

The large ranchers, 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 cloth-weaving, 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-Connection Among Groups

The three socio-economic strata mentioned above are hierarchically related in a pyramidal system. The large ranchers control economic and social activities in the zone due to their earlier access to the area, appropriation of the best lands, development of significant livestock enterprises, and better access to other parts of the country. They own most of the cattle in the zone; they were 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 Amuesha do have) result in their marginalization.

e. Access to Services in the Palcazu

The administrative structure and functions of government are unchanged with only limited services reaching Project beneficiaries. The

opening of the road into the Valley has made it easier for inhabitants to conduct commerce with regional market centers and to access nearby government offices.

Basic health services in the Valley have been greatly improved by the Health Component in the original CSRM Project. The Primary Health Care program has trained native and colonist health promoters, who are now being hired by the Ministry of Health to continue the program in the Valley. CSRM also financed equipment for the Iscozacin Hospital and the health posts. The program is considered by many to be the best primary health care program in Peru. The health workers trained are Valley residents, both Amuesha Indians and colonists, who are likely to remain in their posts.

The central focus of the social development program has been to encourage new grass roots economic enterprises, principally in the Amuesha Indian communities. Training in accounting, business administration, mechanics and other practical skills, is tending to make Valley residents less dependent on outsiders and less susceptible to exploitive socio economic relationships. The YFC is the vehicle for a pioneering effort of integral sustained yield forestry production and is managed and operated by more than 100 Amuesha Indians from most of the communities of the Valley. Other grass roots economic development efforts include 11 communal stores, a revolving medicines fund, and the central agricultural marketing organization, Agro-Yanesha. All of these enterprises are owned and operated by the Indian communities or their regional Federation, FECONAYA.

f. Economic Activities

The small and medium-sized farmers and native communities in the Palcazu watershed have benefited from increased technical and financial assistance from the CSRM Project-sponsored agricultural and forestry credit, forest management, and the addition of new annual or permanent crops appropriate to the conditions in the Valley. Based on field tests of annual and perennial crops at the beginning of CSRM implementation, it became evident that the original objective to finance major expansion of agricultural production was inconsistent with the available production technologies, agricultural capabilities of the Valley, farmers practices, and access to markets. Neither native subsistence farmers nor cattle raising colonists were going to switch to extensive production of food crops on highly acidic soils and with precipitation averaging 6,000 mm per year.

The traditional system which removes tropical forest in order to create pastures and maintain the existing livestock enterprises is beginning to change as a result of to CSRM Project interventions. The native communities have greater control over their forests, have effectively prevented squatters from invading their land, and are enthusiastically adopting the Natural Forest Management System to manage their forests on a sustained basis.

The project's sheep credit-in-kind program offers Project beneficiaries an alternative to raising cattle. Both sheep and cattle are considered as emergency capital, i.e., saving, to be used in a crisis. Sheep have the advantage of being smaller units and therefore are easier to sell. There is always a local market for mutton, while frequently a whole cow cannot be consumed by potential buyers before the meat spoils.

The promotion of coffee and peach palm as cash crops is feasible on the less fertile lands, relieving pressure on the more fertile lands which are most needed for subsistence crops.

Access to agricultural markets has improved significantly for Valley residents since the opening of the road in mid-1986. The few large colonists who previously had control over access to markets and input supplies by way of their own air shipment operation, are now competing with open road transport. Cattle are now shipped live by truck to markets, rather than as beef in small aircraft. As the sheep modules, coffee, palm areas, and forest cooperative become commercially viable under CSRM-II, the Project road will be the principal link to markets.

g. Land Tenure and Use

Individual and communal ownership are the two types of land tenure in the Project area. The land areas are distributed among ranchers, small colonists, and communities approximately as follows:

Owner	Land Area Has.	Number of Families	Total Area	Area/Family
1. Ranchers	200	31	12,110	390
2. Colonists (Med.)	50 to 200	359	37,132	103
3. Colonists (Small)	0 a 50	61	1,828	30
4. Landless	0	53	0	0
5. Land Abandoned by Colonists		0	6,933	0
6. Native Communities		516	40,142	77
7. Others1/		0	274,551	
TOTAL:		1,020	372,700	

1/ Includes unoccupied, untitled, or unclaimed forest areas, including the portions of the Yanachaga National Park, the San Matias Protection Forest, and the Forest Reserve that are in the Project area.

Note: All figures on the ranchers and colonists are from the census of the colonists, collected by APODESA and the PDR Palcazu in 1986. Native community and other data are from the Geographic Information System, APODESA, May 1988.

The average native family community land holding in the area is 78 hectares compared to 87 hectares in 1982. Colonist' and rancher's holdings decreased from 234 hectares to 115 hectares during the same period.

Research on actual land use in the Valley within the area of influence of the Project has revealed the following land use patterns:

Owner	Land Area (Ha)	Forests	Purma	Pasture	Annual Crops	Perman. Crops	Other	Total
1. Ranchers	200	5,979	864	5,138	48	81	0	12,110
2. Colon.(Med.)	50-200	27,623	3,362	5,448	604	95	0	37,132
3. Colon.(Small)	0 -50	1,209	222	293	80	24	0	1,828
4. Landless	0	0	0	0	0	0	0	0
5. Land Abandon-ed by Colon.		n/a	n/a	n/a	n/a	n/a	n/a	6,933
6. Native Comm.1/	26,057	1,311	1,531	234	18	1,096	30,248	
7. Others 2/		n/a	n/a	n/a	n/a	n/a	n/a	274,551
TOTAL		60,868	5,759	12,410	967	219	1,096	362,805

1/ The information of land use, covers 75.3% of the community area (30248.7 Has of 40142.9 has), to estimate the Land Use in the entire community area, this should be multiply by the formula 1.327.

2/ Includes the National Park Yanachaga-Chemillen, Protection Forest San Matias-San Carlos, communal reserve and untitled lands.

Note: All figures on the ranchers and colonists are from the census of the colonists, collected by APODESA and the PDR Palcazu in 1986. Native community and other data are from the Geographic Information System, APODESA, May 1988.

The large ranchers have reduced their tropical forest holdings. Elimination of forest and over-grazing has continued at a slower rate during the past six years. Natives continue to maintain their forests and use their lands for subsistence agriculture.

During the course of CSRM, all 12 native communities were granted legal title to their lands. Several incidences of spontaneous settlement, particularly near the new road have been resolved by the communities excercising their rights to have the squatters removed or to prevent their attempts at settlement.

While the CSRM PP (pp.130) cited "overly intensive land use" as causing the destruction of tropical lands, the real cause was more extensive in nature. Traditionally, ranchers and natives have expanded the areas for cultivation and pasture because of the poor soil fertility. The hypothesis CSRM began to test on a modest level is whether agriculture and livestock can be sustained on a more intensive basis, through an appropriate mix of livestock, permanent and annual crops, and soil building trees and legumes.

CSRM-II will continue to test the technological package, "Chacra Integral," on small colonists' and natives' farms. This package recommends subsistence crops (yuca, platano, and cowpea), cash crops (coffee, palm heart), and livestock (Blackbelly sheep), which are appropriate for the conditions in the Valley and offer diversity of production and income generation.

h. Diet and Nutrition

The Palcazu Valley is self-sufficient in food production. Basically all groups produce their own food. Those who have access to better land or produce an excess on newly cleared land sell or trade their surpluses in order to buy food items and manufactured goods from outside the Valley. Large ranchers are able to import greater quantities of these goods because of their ability to produce and market cattle. They also have greater access to the airstrips in the Valley, but since 1986 have shifted transport to the road.

The number of small scale general stores increased during the 1986 - 1987 and it would seem more people in all groups are consuming food stuffs, such as noodles, canned fish, crackers, canned pastes/sauces, etc. There is no evidence, however, that the diet of the natives and the small colonists is inadequate. On the contrary, a study of the Health Program (Torres, 1987) found that nutrition levels of the Amuesha are nutritionally adequate, suggesting that either the native population has adjusted food production or earlier reports of malnutrition were incorrect.

i. Role of Women

Among the Amuesha Indians, traditional gender roles are especially well defined and complementary. In the traditional economy and social organization, women would not seem to be exploited by men in the usual Western socio-economic sense. Women assume important tasks in cultivation, food processing and preparation, as well as in producing and caring for children. Small children, male or female, accompany their mothers to the gardens and elsewhere, so that their early socialization is in a very natural context and they are taught their first skills by women.

In recent decades, many young women have migrated to Lima and other urban centers outside the Valley to work as domestic servants. Often they are encouraged by their families in order to take advantage of educational possibilities not available to them in the Palcazu Valley. Unfortunately, the demands of the domestic services they perform often make it impossible to pursue secondary or higher education. This practice has been culturally, demographically, and economically disruptive, as many of these young women do not return to their communities but form families with non native men in the urban center. Unfortunately, they are left frequently with children, no supporting male and must support themselves by means of more intensive low-wage labor. This leaves no time available to continue their formal education.

Within the Palcazu Valley, one could argue that to the extent the development activities of the Project encourage greater market production - as is the case in the YFC - the impact on gender roles is often not in the interest of women. When men participate more intensively in market production activities, women are left at home to assume a greater burden of agricultural tasks normally performed by men, in addition to their traditional agricultural, domestic, and income-generating activities. The men's contribution to weeding gardens, building or repairing houses, hunting and fishing, is less because they are occupied full time in wage earning or market activities elsewhere.

Meanwhile, the cash income derived from the market production activities is often monopolized by the men who tend to spend it on their own newly acquired "needs", rather than share its benefits with their wives and children. To counter this potentially negative impact, CSRM-II proposes to train a greater number of forestry cooperative members, including women. This would allow some cooperative members to stay home while others are trained or are working, in alternating fashion. Women members will participate in the Cooperative work for cash income (which seems more likely to be used for family benefit), and at the same time it would allow working members of the Cooperative - now mostly men - to return to their communities for more than a weekend and personally assume more of their traditional productive activities. This should relieve the women of some of that burden.

The native communities have been encouraged by the CSRM Project to elect their own representatives to participate in Project training programs in forestry, agricultural development, health care, accounting, mechanics, and other practical skills. For cultural reasons, which will be evident from the previous comments and economic reasons - the women are more urgently needed at home on a day-to-day basis because of the nature of their traditional food producing and child rearing functions - young men are usually selected for these training opportunities. However, some women are already members of the YFC where they participate on an equal basis with men in decision-making and remuneration for work performed, and expect to do so in future profit distributions. Also to attempt to improve the situation of

Valley women, as well as to improve agricultural work, a special effort will be made in CSRM-II to ensure that forestry and agricultural extension training incorporates women who are involved in forest management and agricultural production.

Although some women are trained in various activities such as forestry cooperative work, health promoter work, storekeepers, and traditional medicine garden program, they seem to be at some disadvantage to the men in terms of actually applying those skills. For example, in late 1987, the Ministry of Health hired seven CSRM Project trained health promoters as Infirmary technicians or assistants; all of these were men, although two women had been trained. Women are not able to compete equally for such positions because they are not provided the same general educational and Spanish language training as men. Recently, however, a woman was hired as a bilingual teacher in one of the community schools, at the insistence of the community itself, based on her ability.

Efforts by the CSRM Project to promote women's clubs have had variable results and acceptability. Among the positive results have been the encouragement of traditional weaving and basket making as handicrafts with some commercial potential. With almost year round access to the Valley by road it will be possible to develop markets for these items. CSRM-II will include efforts to utilize women's clubs to strengthen and better utilize women's status and role in the community.

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 Project will be the 12 native communities, small farmers, cattle ranchers, farm laborers, women and children in the Palcazu Valley. Appropriate forestry management, modified agricultural practices, and improved pasture and livestock 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 forest and pasture management practices introduced. The area residents

also will benefit from support activities in education, health, and road maintenance, 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. 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 credit-in-kind 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.

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

The CSRM-II Project was designed based on the lessons learned from the original CSRM Project to develop socially, ecologically and financially feasible and beneficial measures to develop and protect the natural resources in the Palcazu Valley and watershed. Conservation measures, including operation of the Yanachaga National Park, San Matias Protection Forest, and the Communal Reserve and special land titling, primary health care and cooperative development activities for aiding and developing native communities will be funded. The CSRM-II Project is sensitive to the socio-cultural nature of road access to the Valley, protection of land tenure rights and the introduction of new forest management systems and alternative subsistence and cash crop production technologies. Technological and organizational interventions will be introduced, based on careful scientific and social research. A full time social scientist will be assigned to conduct the research and monitor community reaction. The Project will be socially feasible and beneficial to the target groups.

Social Soundness

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ENVIRONMENTAL ASSESSMENT
The Central Selva Resources Management Project
Phase II
Project No. 527-0321
USAID/Peru

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ATTACHMENT A. CSRM Project Environmental Assessment, October 1981.

ATTACHMENT B. Final Report on the Field Visit to the Prescap Wood Preservation Plant in Shiringamazu, Peru, June 21-26, 1987.

ABBREVIATIONS:

AID	Agency for International Development, United States Government
APODESA	Regional Development Policy Support for Selva Region
CCA	copper chromium and arsenic salts solution (wood preservative)
CP	Condition Precedent
CSRM	Central Selva Resources Management Project
CSRM-II	Central Selva Resources Management Project, Phase II
EA	Environmental Assessment
EPA	Environmental Protection Agency, USG
FAA	Foreign Assistance Act
FPCN	Peruvian Foundation for Nature Conservancy
GIS	Geographic Information System
GOP	Government of Peru
ha	hectare
INADE	National Institute for Development
INFOR	Institute for Forestry and Fauna
INIAA	National Institute for Agricultural and Agro-Industrial Research
INIPA	(former name of INIAA)
INP	National Planning Institute
IPM	integrated pest management
JRB Report	The 1981 documents prepared by JRB Associates, Inc., a multifaceted study of the Project area, included as Appendices to the original CSRM Project Paper. (on file in AID and USAID/Peru)
km	kilometer
LAC/BEO	AID/Latin America and Caribbean Bureau/Bureau Environmental Officer
m	meter
mm	millimeter
MOH	Ministry of Health
MTC	Ministry of Transport and Communications
NFMS	Natural Forest Management System
ONERN	National Office for Natural Resources Evaluation
PACD	Project Assistance Completion Date
PEPP	Proyecto Especial Pichis Palcazú
PID	Project Identification Document
PL-480	United States Public Law No. 480
PP	Project Paper
REMS/SA	AID Regional Environmental Management Specialist/South America
TA	Technical Assistance
TNC	The Nature Conservancy
USAID/Peru	AID Mission in Peru
USG	United States Government
YFC	Yanesha Forestry Cooperative

ENVIRONMENTAL ASSESSMENT
The Central Selva Resources Management Project, Phase II
USAID/Peru, March 1988

I. EXECUTIVE SUMMARY

A. Introduction

The Central Selva Resources Management Project Phase II (CSRM-II), for the Palcazu Valley in the high-jungle (Selva Alta) region, Peru, requires an Environmental Assessment (EA) to be approved before implementation of the Project. Some planned Project components in agriculture and forestry could have adverse environmental impacts if not carefully managed within the context of the exceptionally fragile ecosystems and scarce natural resources in this tropical rainforest region. The Project area has relatively infertile soils minimally suitable for agriculture, and annual rainfall of 6000-7000 mm in the Valley floor (more on the surrounding mountain ridges). The region has been settled and cultivated intensively only in the Valley floor, and most natural ecosystems apparently remain intact.

The CSRM-II Project is a natural-resouces management project with a strong emphasis on the sustainable agricultural resource base of the area, recuperation of degraded ecosystems, increase in forest productivity through management of natural forests, and the protection of areas which have high biological diversity or which are critical for continuance of the balanced hydrological cycle of the watershed.

B. Environmental Consequences

1. Insignificant or Positive Impacts. Project activities will have minimal or no impact on the following components of natural ecosystems and human/social systems: 1) air quality; 2) social structure; 3) tourism and recreation; 4) archaeologic, historic and cultural resources; and 4) visual resources.

Positive impacts are foreseen in the following components: 1) biological diversity, 2) tropical forests and other natural vegetation, 3) soils, 4) water, 5) colonization, and 6) land use.

2. Areas of Controversy and Concern. Activities and areas with potentially negative impacts on the environmental resources of the Project area include the following:

Forestry - Primary concerns for adverse environmental effects are the wood processing facilities and the disposal of wastes from these facilities.

Agriculture - Recommendations of new cropping or other

agricultural systems must be reviewed for their potential environmental consequences.

Non-native Species - Some forestry and agricultural activities involve the introduction of non-native (i.e., exotic) plant or animal species. These species and sites chosen for planting them must be reviewed.

Pesticides - The use of pesticides in any activities requires careful monitoring and approval, with an amended EA to address all pest management practices being proposed.

Roads. - The rehabilitation or upgrading of existing roads and any new road construction will require an amended EA.

C. Other Project Activities

Continuous Land Use Inventory - This inventory of actual land use should be carried out periodically in areas considered critical or threatened because of possible colonization or other disturbance.

Hydrological Studies - Hydrological studies will include establishment of stream gauging, water and sediment sampling, and meteorological measurement networks.

Inventories of Biota and Geology - It is futile to discuss the diversity of species and habitats in the area, without knowing what actually occurs and what are the structures of the communities. Only partial inventories are available, with minimal information on potential non-lumber uses and commercial utilization.

Protection - The Yanachaga National Park and the San Matias Protection Forest have been established. Management assistance for these areas are being given through an AID grant for the Protection of Biological Diversity, with matching funds from The Nature Conservancy.

Biological diversity and protected area management - Appropiate management plans (including environmental education) are needed for areas of apparently exceptional biological diversity which have been identified within the project region.

Potable water systems - Improvement or construction of potable water systems will require careful consideration of water quality, particularly pesticides and other potential pollutants.

Technical Advisor in Ecology - Long-term technical assistance is needed in environmental monitoring and resource management, preferably an ecologist with particular expertise in hydrology and water quality.

D. Environmnetal Assessment Recommendations

This EA and its Attachments, with the PP, should provide the basis for the approval of the Project by the LAC Bureau Environmental Officer. Any sub-projects or other Project activities not specifically assessed in this EA will require Environmental Reviews and amended EAs before funding or implementation.

II. PURPOSE AND NEED FOR ENVIRONMENTAL ASSESSMENT

A. Introduction

USAID/Peru, in consultation with the AID Andean Regional Environmental Advisor (REMS/SA) and the Bureau Environmental Officer for the Latin American and Caribbean Bureau of AID (LAC/BEO), determined that the Central Selva Resources Management Project Phase II (CSRM-II), for the Palcazu Valley in the high-jungle (Selva Alta) region of Peru, required an Environmental Assessment (EA) to be approved before implementation of the Project could begin. The planned Project components in agriculture and forestry could have adverse environmental impacts in the high-jungle region. In accordance with Section 216.3 of the AID environmental procedures and recent congressional legislation (Sections 118 and 119 of the FAA), reflecting requirements of the Foreign Assistance Act, such potential impacts require the preparation of an EA.

The Environmental Assessment for the original CSRM Project, of October 1981, is included as Attachment A, below, for more details of the Project area environment and the original Project Assessment. The basic environmental factors relevant to development in this area have not changed, and the goals and purposes originally stated for the CSRM Project remain essentially the same, with the newly proposed CSRM-II Project having decreased emphasis on commercial agricultural production and increased emphases on sustainable management of natural forests and on the severe environmental constraints to increased production, including the socio-cultural components of the Project.

B. Background of Original CSRM Project Environmental Assessment, 1981

The Palcazu watershed lies about 274 miles northeast of Lima, in the Amazon Basin. It has a total area of approximately 190,000 hectares. The Valley is characterized by rather extreme environmental conditions, including heavy rainfall (6000-7000 mm measured in the Valley floor, with possibly as much as 8000-10000 mm in the adjoining Yanachaga National Park, although the original Project Paper (PP) estimated only about 3500 mm in the Valley floor), erodible, acid, infertile soils with high aluminum toxicity, and rolling to steep, rough terrain. Most of the watershed is forested, but considerable clearing has occurred in the valley floor, particularly on terraces of the Palcazu River. These factors limit sustainable agricultural pursuits to forestry, with some production of food crops along the river alluvial plain and some grazing of adjacent foothills.

The need for an EA of the original CSRM Project was determined by the fragile balance of the natural and agricultural ecosystems in this Valley. The area, like much of the Peruvian high-jungle, is ecologically unsuited to intensive use. In March of 1981, a Project Identification Document (PID) was prepared by the Government of Peru (GOP) and the USAID Mission in Peru (USAID) for this Project ("Central Selva Resources Management") and called for environmental analysis of the proposed Project. Social analysis of the project area accompanied the PID, as did a scope of work statement for environmental analyses.

In July of 1981, USAID contracted with JRB Associates of McLean, Virginia, to prepare a multifaceted study of the project area. The study (often referred to as the "JRB Report"), included as Appendices to the PP, consists of:

1. A report on prior experience with colonization of tropical lands;
2. An ecological baseline analysis and natural resources inventory of the Palcazu Valley;
3. A determination of land and natural resource capability and suitability for development in the project area;
4. An environmental assessment of the project (see Attachment A, below);
5. Project design assistance to the AID Mission in Lima.

The team fielded by JRB Associates, after discussions with AID and PEPP, proposed a group of projects which anticipated environmental impacts and which were designed to be environmentally and socially sound.

Work on the five-part study commissioned by AID was done between July and October, 1981. Teams of experts developed the baseline inventory first, followed by the land capability and suitability analyses, and ending with several synthesis reports. In general, each team member performed his part of the project by a combination of field inspections, interviews, and review of data and documents.

This original EA (copied as Attachment A of the present EA) was an annex to the Project Paper Synthesis for the original CSRM. The Synthesis drew its facts from the series of background reports comprising the baseline analysis and natural resource capability and suitability of the Valley for development.

III. PROJECT BACKGROUND AND JUSTIFICATION

This Section includes parts of the text of the Project Paper for CSRM-II, included here so that this Environmental Assessment can be analyzed as a separate document.

A. Original CSRM Project

1. Project Development and Implementation History

This Project was initially proposed by the GOP as another traditional area-development project, based on conversion of tropical forest to intensive cropping or pasture systems with increasing productivity dependent on purchased inputs. It was one of several projects associated with the Carretera Marginal de la Selva, and included routing the main highway through the Palcazú Valley, the Project site. (The Carretera Marginal de la Selva is a project proposed and initiated by the former Belaúnde government, which would construct a north-south highway along the east coast of the Andes (i.e., within the Amazon Basin) to connect all the east-west roads running from the coast through the Andes and to facilitate development along its route.)

Prior to this Project and beginning in 1980, the Proyecto Especial Pichis Palcazú (PEPP) was working in the Palcazú Valley with a very traditional area-development approach for Peruvian colonization and environmental exploitation. During the CSRM Project Design phase, the Project was developed with a focus on natural resources management. However, even with this approach, the final Project design was overly optimistic in terms of the agricultural (including both crops and livestock, throughout this paper, unless otherwise stated) production potential of the area. AID supported and approved the CSRM Project in late 1982, signing the Project Agreement in mid-1982, although actual activities (without full staffing) did not begin until mid-1983. However, the traditional development orientation continued to dominate Project activities for the first several years.

Subsequent field investigations conducted early in the Project implementation process revealed that the area, like much of the Peruvian high-jungle, was ecologically unsuited to intensive use. Heavy rainfall, erodible, acid, infertile soils with high aluminum toxicity, and rolling to steep terrain, severely limited agricultural developments. Valley residents of the indigenous Amuesha tribe, and some long-term colonists of primarily European origins, had already come to terms with the reality of the fragile environment and were essentially living and farming in balance with it, although pasture deterioration was leading colonists to convert additional forest to pasture in order to maintain output. However, the Carretera Marginal was steadily advancing, and with it would come commercial logging, spontaneous or planned colonization and environmental degradation. It became increasingly clear that these effects of the Carretera Marginal and the original Project design, with its optimistic assumptions on the area's agricultural production potential, could have an adverse impact on the fragile Valley environment.

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A sustainable approach, such as natural resources management based on achieving sustained production consistent with land capability through appropriate land use and environmentally sound methods, was required to avoid serious ecological and environmental degradation in the Valley. But time was required to understand the operational constraints that actually existed in the Palcazu Valley. The original Project (CSRM) description of the two agriculture and livestock development components was oriented towards increasing productivity through transferred technology involving purchased inputs and production of a surplus for an external market. This orientation still did not fully take into account the significant transportation problems, the inability of Valley residents to purchase inputs even if they were available, and the precarious fragility of the Valley's resources and environment. It took almost a year and a half of investigation before the agricultural objective was changed to stabilizing the principal existing agricultural enterprises (pasture-raised beef production and a bush-fallow rotation for subsistence crop production) to assure their sustained yield and gradual improvement with minimum purchased inputs. A similar learning and reorientation period also was required for the other Project components, and, with the assistance of a resident anthropologist and a variety of short-term specialists, the Project beneficiaries became more directly involved in Project activities.

Considerable time was required to build a constituency within Project management and the GOP for testing this new, and essentially experimental, orientation of the natural resources management system. This constituency is now in place at both the central PEPP and field levels, but requires continuous nurturing to overcome incomplete comprehension and commitment aggravated by personnel changes at the field and senior Project management level that have occurred over time.

A variety of other internal problems arose which caused long delays in Project implementation. For example, the Condition Precedent (CP) 5.2 of the Project Agreement, relating to titling of native lands, was not met until a year after the signing of the Project Agreement. This delayed the construction of project facilities in the remote Palcazu Valley, which were necessary for technical assistance (TA) advisors to begin to function effectively. It similarly delayed the employment of counterpart professional staff, without which external TA would not be effective.

These intraproject delays were exacerbated by external events. The El Niño disaster of 1983 diverted both senior Peruvian Government attention and resources from development of the Selva to rehabilitation of the Coast and Sierra, and contributed to the economic crisis of 1983-85. These events forced continued austerity, resulting in reduced availability of counterpart funds and subsequent delayed loan funding. Construction of the penetration road, a critical prerequisite for implementing all other Project components, was to be financed entirely with GOP counterpart funds. However, the lack of counterpart funding delayed the road construction to the point that it has only now reached the halfway mark in the Palcazú Valley (to the town of Iscozacin). Further, external complications resulted from the

electoral campaign in 1985, the resulting interregnum, and a new Administration. The new Administration identified more with the Sierra, rather than the Selva, its program priorities have emphasized social equity and development in situ, rather than expansion of the frontier. To date, however, it has continued to consolidate the investments along the Carretera Marginal. Despite these internal and external problems, considerable project implementation progress has occurred since 1985.

2. Evaluation Findings

CSRM Project technical staff, both resident and short-term, have monitored, reevaluated, and modified the on-going research and development program to adapt it to economic, ecologic and cultural reality. There is an extensive literature of resident and short-term consultants' reports, program documents, and analyses. A single external evaluation of the Project, except for the Regional Development Policy Support (APODESA) component (a separate evaluation of APODESA was conducted in mid-1986), was performed by a well-qualified Peruvian firm in early 1985. The Project Agreement had been signed in mid-1982, but actual activities did not begin until the second semester of 1983 and without full staffing. Thus, this evaluation took place just two years into the Project, when many activities were still being defined and consensus was developing to move from a traditional area development to a natural resources management approach.

Specifically, although the evaluation team characterized the concept of sustained forest exploitation, using rotating strip-cuts with natural regeneration, as excellent, it was critical of the agricultural program, noting that there had been minimum productive development, particularly in the two Agricultural and Livestock Development components. The evaluation concluded that, 1) progress against Project objectives was very limited, and 2) the basic objectives of the Project remained sound, but the programmed implementation could not be achieved in the allotted time. It recommended that some Project activities be redesigned, resources reprogrammed, outputs redefined, and the PACD extended.

Despite the team's mixed appreciation of the difficult environment and the potential for development in the Palcazu Valley, its recommendation for reprogramming helped to surface different viewpoints, and eventually led to a GOP and AID consensus to change from the traditional, area-development approach to an approach emphasizing sustainable forest utilization through natural resources management. Also in response to the evaluation's recommendation, the PACD was initially extended from September 30, 1987 to June 30, 1988 to allow time to more fully reprogramm the Project and negotiate a new Project Assistance Completion Date (PACD) to September 30, 1990 which will provide the time to implement and consolidate Project activities to achieve the Project purpose.

B. CSRM Project Activities To Date and CSRM-II Reprogramming

The eleven original Project activities were directed at developing sustainable and income-generating agricultural and forestry production activities and establishing protection systems in response to the fragile natural resource base encountered in the Palcazu Valley. There is now general agreement that the sustainable, low-input production systems approaches being tested and developed are sound and economically feasible.

1. Project Management by PEPP - A fully-staffed field office with technical units, administration and procurement has been established in Iscozacin with research/extension sites in Iscozacin, Puerto Mayro, Laguna, and Loma Linda. Approximately 250 Project personnel are implementing the CSRM Project, under the GOP Proyecto Especial Pichis-Palcazu (PEPP), and will generally continue in the same roles for CSRM-II.

Institutional agreements now exist, but need to be fully implemented, with the Ministry of Transport and Communications (MTC) for road maintenance, the Institute for Forestry and Fauna (INFOR) for forestry control activities, the National Institute for Agricultural and Agro-Industrial Research (INIPA), the National Meteorological Service, the Ministry of Health (MOH), and the Agrarian Bank.

2. Forestry - The Natural Forest Management System (NFMS) is being implemented on 2,000 hectares (ha) of production forest in the Palcazu Valley. This system involves selecting a given forested area and clear-cutting strips 20-50 m wide by 200-500 m long, which are then allowed to regenerate naturally (although some high-value species may also be considered for replanting). The advantages of the NFMS are that it preserves the diversity of tree species, is ecologically less destructive than high-grading or traditional clear-cutting, and is less costly than the regional systems of traditional clear-cutting and reforestation (usually with exotic species). The economic returns, therefore, are higher and more sustainable in the long term. Under the NFMS, trial strips have been cut in Iscozacin to test regrowth under controlled conditions.

A unique feature of the Forestry Component has been the development of a Yanesha Forestry Cooperative (YFC) consisting of five native communities which control forested areas in the Valley. The cooperative organization is consistent with the social organization of the communities and also permits the management of a wood processing facility which will generate income for its members. With the technical assistance of forestry and cooperative organization specialists, the YFC is operating a portable sawmill and is processing wood for the local market. A wood preservation facility has been constructed next to the sawmill and is scheduled to begin processing activities. This will produce treated, rot-resistant poles, posts, and railties, as well as sawn lumber, thus increasing the value-added for the community.

Ten PEPP technicians and 40 YFC members and non-YFC individuals representing seven of the ten native communities in the Valley, are receiving continuous training in the theory and practice of the NFMS and have identified, inventoried, and mapped appropriate forest blocks and developed management plans for approximately 8,000 ha of production forest (although present concentration is on 5,000 ha of production-class forest). They are also extracting logs with teams of oxen operating the sawmill and wood processing plant, and applying financial management skills to the entire operation. The organization of this production-oriented cooperative is the culmination of an intensive, three-year, community development process which involved both native health promoters and project extension agents who worked with the participating native communities on social and economic issues.

Additional assistance is being given to the Yanesha Forestry Cooperative through a grant from the World Wildlife Fund, with guidance and coordination of the Project.

3. Agricultural and Livestock Development - (These are two originally-separate components, but are described here jointly.) An applied on-farm research and extension program is testing modifications of four principal annual and seven perennial crops. Improved livestock production systems for tropical hair-sheep ("Barbados", or "African black-belly" sheep), swine, and guinea pigs are also being adapted to the environmental and socio-economic realities of the Valley. Sustainable production using limited inputs is the key element of the crops and livestock methodologies being developed. Beginning in 1986, the Project introduced and distributed 58 tropical-hair-sheep modules (over 1000 animal units) to small farmers. Two species of improved forages for pasture renovation, three agroforestry tree crop species for timber and firewood, and several leguminous ground cover species, have been tested to improve soil productivity, restore degraded agricultural lands, and provide additional income. Integrated farming systems have been tested and developed for robusta coffee, peach-palm, leguminous ground covers and shrubs in the existing cropping rotations. These systems have been adapted by approximately 109 farmers, or approximately 15% of the local farmers.

4. Protection - The Yanachaga National Park (123,000 ha) on the western, upper watershed and the San Matias Protection Forest (145,000 ha) on the eastern slopes of the Palcazu Valley have been officially established, as per the recommendations of the original PP and EA. Management plans have been developed for these two areas and are being implemented from forestry control sites. Park and Forest official boundaries have been established. A Forest Control Station was constructed. Additional protection sites are being proposed with assistance of The Nature Conservancy and the Peruvian Foundation for Nature Conservancy (FPCN), through an AID grant for the Protection of Biological Diversity, with matching funds from The Nature Conservancy. These grants are being used by the FPCN to develop and implement overall management plans for the National Park and the San Matias Protection Forest.

A proposal for communal reserves covering 34,744 ha of Protection forest, adjoining the Native Communities and the National Park, was approved in March 1988 by the Ministry of Agriculture (MOA) (now awaiting Presidential approval) to prevent uncontrolled settlement of the fragile lower slopes adjoining the Park. This area, the Yanesha Communal Reserve, is for hunting, gathering, and other non-commercial use by ten native communities in the Palcazu Valley.

5. Continuous Land-Use Inventory - Land use capability classifications of the Valley were prepared and are being used by the agroforestry technicians to promote appropriate land use. Continuous inventory of actual land use in the Valley, using aerial and ground surveys for determination of new settlement, disturbance of protection forests, etc., is incomplete, and will require increased emphasis in the Project second phase.

6. Health and Environmental Sanitation - The Health and Environmental Sanitation component was originally designed as part of an integrated rural development approach to improve the availability and quality of social services which were non-existent in the Palcazu Valley. An innovative primary health service delivery system was established and is recognized as one of the more successful primary health care efforts in the country. This component was also instrumental in overcoming initial mistrust of the Project by the native Amuesha population and colonists, and facilitated their participation in it. It served to bridge a gap that would have considerably reduced the impact of technology dissemination efforts and acceptance of the NFMS. Minimal assistance will continue to be provided to the health centers as part of the Extension and Social Development Component while the Ministry of Health (MOH) fully takes over these functions; a process that is already well underway. The environmental sanitation activities of this component will no longer be financed with AID Project funds, but rather will be assumed by the GOP and funded with counterpart.

7. Road Planning and Road Maintenance - This component operates approximately 25 pieces of road maintenance equipment to maintain 58 km of road in the Project area. The road unit prepared the site for the wood processing center and constructed a 1.5 km trail for log extraction from the first YFC-owned forestry strip. A dry-season road and four of the six scheduled bridges in the Project area have been completed with GOP counterpart funds as planned.

Construction of the access highway into the Valley was an activity of the GOP (partially supported by funds from PL-480 sources), with the CSRM Project only assisting in subsequent maintenance of the highway.

Access to the Project site is critical for marketing of forestry and agricultural products and for residents to reach economic and social services. Continuation of this component is recommended. The Technical and

Economic Analyses Sections of the PP address this issue and the Component Description Section contains a recommendation to strengthen monitoring and utilization of the road maintenance equipment.

8. Regional Development Policy Support by APODESA - This component provides data, analyses, and guidance to the GOP on high-jungle development and conservation projects. Utilizing the Geographic Information System (GIS) developed for and implemented in APODESA, a computer mapping of the Palcazu Valley showing the existing data on soils, rainfall, land tenure, land use and forest species is nearly complete. Staff training was conducted in tropical forest and natural resource management for all APODESA staff. APODESA has completed evaluations of four high-jungle special projects for use at the macro-planning level. This information, available and used at the Project sites by field level technicians to target the agricultural and forestry production programs, is invaluable to plan, monitor and evaluate activities at the Project level.

Proposed initiatives in tropical forest conservation/utilization by international donors are expected to continue and will require an analytical capability to assist in the design and implementation of these activities by the GOP. As described in the Project Paper, a plan to institutionalize this component will be implemented during the Project.

9. Social Development - In early 1986, the CSRM Project added this component to better support and coordinate the extension activities of the technical production and health group, through the creation of a separate extension unit. The Extension and Social Development Component has proved to be a major factor in facilitating the dissemination of crops, livestock and forestry management technologies by coordinating what could previously be characterized as disparate extension activities by Project technical staff. This component's activities were directly responsible for the formation of the YFC.

C. CSRM-II Project Rationale and Strategy

1. Rationale - The original rationale for the CSRM Project, as determined in 1981 during Project design, is still valid for the Project second phase. Although the GOP is less strongly committed to high-jungle development than the prior Administration, it still recognizes the need to control such development in an environmentally sound manner that results in sustainable productive natural resources. The Project continues to provide AID with opportunities to: 1) strongly influence high-jungle development in a rational and expert manner with the potential to impact the long-term productive base of the national economy; 2) apply lessons learned (including appropriate technology) from this Project to the Palcazu Valley and other development efforts in similar high-jungle areas; 3) foster an ability in the

GOP to implement a natural resources management approach to high-jungle development and a capability to design and execute the prefeasibility studies needed for each new development project, 4) protect and benefit native communities while drawing them into carefully executed development efforts, and 5) support both GOP and USAID rural development and productivity strategies.

In addition to the continuing validity of the original rationale, five years of Project implementation experience have provided additional reasons for the continuation of the Project. For example, serious delays in implementation, caused by both internal and external factors, have made it impossible as yet to achieve the original purpose or assess the full effect of the management systems developed. Several more years are deemed critical to do so. Larger-than-required resource allocations and immediately-expected outputs need to be corrected, and additional time provided for implementation of the revised project components. Also, much has been learned to date by both the GOP and USAID about high-jungle development, particularly the development, transfer and use of appropriate technologies. A strong need also exists to institutionalize the relevant Project components to insure sustainability after the PACD. The Project is in the forefront of increased worldwide and U.S. Congressional attention on preserving biological diversity and promoting sustainable development in tropical forests. Finally, to terminate the CSRM Project at its current June 30, 1988, PACD would result in the loss of a considerable human and financial investment, as few EOP outputs nor institutionalization will have yet been achieved.

2. Strategy - The Project's purpose continues to be 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 human and natural resources" within the significant environmental constraints to development that exist in this region, in conformity with AID Sector Strategy policy documents on the Environment and on Forestry (October 1983 and February 1984, respectively). To achieve the Project purpose, the Project activities will continue to focus on three interrelated objectives:

a. To develop, test and institutionalize systems to stabilize and manage economic resources for sustained production in the Palcazu Valley.

Develop and test management alternatives which permit stabilization of the productivity of existing high-jungle agriculture and livestock production systems at the highest productivity levels consistent with sustainability, soil and climatic factors, and low to medium input levels. This modest but difficult objective recognizes the existence of current systems which are unsustainable. It also takes into account the very limited technical and material resources of the inhabitants, the limited potential and fragility of the land resource, the uncertain availability and high cost of purchased inputs, and the

limited types of marketable Valley products. Achievement of sustainable agricultural production systems with little increase in inputs would be a major contribution to the stable settlement of the Palcazu as well as to other areas of the Amazonian high-jungle. Institutional arrangements will be implemented to insure that results are disseminated and that monitoring of relevant forestry research continues.

b. To protect fragile resources and population groups to insure sustained productivity.

The Yanachaga National Park and the San Matias National Protection Forest are essential to the integrity of the entire watershed, cutting or other disturbance of these steep slopes along the bounding ridges of the Valley floor will quickly lead to erosion and landslides with siltation in the rivers of the Valley floor and consequent flooding of the only land in the Valley potentially suitable for agriculture.

The Project will continue to take into consideration the special concerns and status of the Amuesha native communities located in the Palcazu Valley in ways that are compatible with their society and traditions and that will benefit them socially and economically.

c. To develop a Policy and Planning entity with the ability to collect and analyze data, assess alternative high-jungle development options, and present findings to GOP decision makers and planners.

The Project will continue to support APODESA to expand its currently strong data-collection and analysis capability to include the presentation of its findings to GOP decision makers. To help guarantee that the long-term Project purpose of establishing the GOP's high-jungle natural resource planning and development capacity is achieved, the Project will work with INADE, the National Planning Institute (INP) and the National Office for Natural Resources Evaluation (ONERN) to establish a permanent institutional base for APODESA which will permit it to effectively conduct policy analysis, objectively evaluate public/private investment programs, and present findings to GOP decision makers involved in jungle development programs and projects.

The original project did not complete inventories of potentially useful, endangered, or threatened biological and other natural resources that should have been used to develop management plans for these diverse resources. This could have given more flexibility in project design to allow for mid-term corrections.

CSRM-II

D. Project Sustainability

The purpose of this Project is to plan and execute a development project for sustained management of natural resources in the Palcazu Valley,

and thereby test and institutionalize a methodology for the long-range management of Peru's human and natural resources in the high-jungle region. The sustainability of the Project has been a major element influencing the analysis of which CSRM activities should be continued and the levels of resources required during for implementation of the CSRM-II Project.

Grouping the various Project components into three general categories, as follows, assists in analyzing the sustainability issue:

-- Components directed at the development and transfer of sustainable agricultural and forestry production systems. Sustainability will be achieved by the ability of GOP entities to disseminate crop and livestock activities to other high-jungle areas and to provide the research continuity required by the NFMS. To be sustainable, these activities must include protection of the natural resource bases of agriculture and forestry, such as through soil conservation and protection of upper watersheds.

-- Data collection, mapping and analysis of actual and potential land use, which will be used for field implementation and to influence policy making on existing and future high-jungle development efforts. A basic premise of the Project is that land use (e.g., colonization for agricultural production, types of crops and cropping systems, deforestation or protection of forests) will be based on the capability of the land to sustainably support the planned use (based on soil fertility, slope, rainfall and other factors), using the legally-required Peruvian system of "Capacidad de Uso Mayor de Los Tierras del Peru."

Sustainability will be achieved by locating the unit responsible for these activities in an institution with a greater degree of permanency, a responsibility for natural resources assessments, and a more direct link to GOP policymakers and planners.

-- Infrastructure development activities including road maintenance, health, environmental sanitation, and project infrastructure. Sustainability will be achieved by having Valley residents assume the maintenance of facilities constructed for social development and service delivery and shifting road maintenance to the appropriate sectoral ministry. The understanding of the environmental constraints to these activities, in this region of high rainfall and erodable slopes, is perhaps best achieved by educational programs directed to all levels of the local population.

The activities under each of these categories require a different approach to address the sustainability question. All of the Carretera Marginal projects are managed by the PEPP as Special Projects of the GOP. The Special Project mechanism is intended by the GOP to provide more effective coordination of inputs from various sectoral ministries. Several actions, as described below, will be taken to ensure that key Project activities and results will be transferred to other ministries by the PACD for continued implementation or dissemination.

1. Agricultural and Forestry Production Methodologies. - Much of the validation of the forestry and agricultural systems will occur during the life of the Project. However, the impact of the NFMS, in particular, follows the biological cycles of tropical forest tree species which exceed 20 years. Therefore, during the CSRM-II Project there will be a special emphasis in developing a formal agreement with INIAA to continue to monitor and evaluate NFMS test plots and forestry production areas of the YFC. Furthermore, INIAA will be involved in monitoring the results of crop and livestock production methodologies during Phase II and if necessary after the PACD so that the methodologies will be available for dissemination to other high-jungle projects. It is expected that during CSRM-II, several workshops will be held with the participation of INADE, INIAA and other institutions to disseminate these research results. Project funds have also been budgeted to permit Project technical staff to present their findings at several international symposiums on sustainable low-input systems for the humid tropics.

2. High-Jungle Development Data Collection and Policy Formulation - The APODESA component is critical to achieving a broad policy impact on future high-jungle development projects. During the Phase II Project, Project management will work with INADE and INP to relocate APODESA within ONERN by the end of CY 1988 where it can have a more direct influence on high-jungle development policy and continue to provide the INADE special projects with the important field level support which the evaluators concluded had a positive impact.

3. Infrastructure and Social Development - The road maintenance activity is key to the continued and sustainable development of the Palcazu Valley. It will require a more agressive effort by INADE and PEPP to involve the Ministry of Transport and Communications in assuming the cost of road maintenance functions once the Project terminates. Therefore, by the end of CY 1988 a plan and set of implementable actions will be developed to insure this smooth transfer of responsibility for road maintenance activities after the PACD.

The non-road related infrastructure such as multi-purpose rural development centers, potable water, and environmental sanitation activities were designed to carry out Project activities in the Palcazu Valley where minimal infrastructure existed. They were the necessary supporting infrastructure to carry out key Project activities. These structures were built with considerable participation of native community labor and using local materials. Community commitment to maintain these centers is quite high. The MOH is now absorbing the primary health promoter activity initiated under the Project and is using the Project constructed rural development centers to provide these services. The environmental sanitation works will be absorbed by the GOP and the Municipality of Iscozacin will assume responsibility for maintaining the Project-funded water system during the CSRM-II Project and afterwards.

IV. ENVIRONMENTAL ASSESSMENT

This report (including Attachments A and B) evaluates the environmental impacts of the development activities proposed in the CSRM-II Project in the Palcazu Valley, Peru. The EA of the original CSRM Project remains applicable as it relates to the affected environment and to Project activities, as these activities are only being reduced (not significantly altered) or eliminated within the CSRM-II Project. The new Project includes a strong emphasis on research and demonstration.

A. Project Design

The design of the CSRM-II Project includes the environmental and social conditions and constraints to development as integral parts of the design process, avoiding the common process of designing a project and subsequently analyzing the environmental and social impacts of the proposed Project. For the original CSRM Project Paper and EA, a project design team was formed of about seventeen specialists, including anthropologists, ecologists, geographers, agronomists, foresters, etc., as is discussed and listed in more detail in the original reports. Attachment A, below, is a reprinting of the EA for CSRM, included as an integral part of the present document.

This CSRM-II EA presents the environmental framework and the implementation strategy for the CSRM-II Project. Drawing upon continuous assessments and field verification of the actual environmental conditions and CSRM Project implementation in the Valley since 1981, the environmental strategy built into this second-phase project design emphasizes the sustainability of the development effort and minimizes adverse environmental impacts of Project activities, in conformity with AID Sector Strategy policy documents on the Environment and on Forestry (October 1983 and February 1984, respectively).

The inclusion of environmental analyses in the design stage of this development project insures not only that the development activities should be sustainable but also that the resource bases upon which they depend remain productive. Moreover, it must be recognized that traditional resource-utilization practices (e.g, overgrazing, deforestation) often may produce as much environmental degradation as new development activities. Therefore, this Project is designed to produce minimal environmental disturbance and, at the same time, improve the productivity of traditional resource exploitation methods and protect or restore the productive capacity of the resource base. Such an approach in project design is both advisable and effective in producing a better development effort, both in terms of its sustainable impact upon the population involved and in terms of preserving future development options.

Given the institutional and time constraints within which the Project activities will be carried out, the environmental strategy also focuses on producing tangible results within a reasonable time, while overcoming some of the limitations involved in executing resource management activities in the region, and gives a model for future, larger-scale interventions in the fields of resource management and environmental protection, particularly in management of natural forests, both in Peru and in other tropical regions.

B. Affected Environment

In general, the Palcazu Valley in eastern Peru is characterized as humid to wet tropical rainforest, with relatively infertile soils minimally suitable for agriculture. Excess water is a primary limiting factor in all activities in the region, with recorded rainfall of 6000-7000 mm annually in the Valley floor, and estimated annual totals well in excess of 8000 mm on the surrounding mountain ridges. This rain often falls as thunderstorms, with associated floods. The existing vegetation includes primarily forests. The region has been settled and cultivated intensively only in the Valley floor, and most natural ecosystems apparently remain intact.

Flora and fauna in the region exhibit great diversity. A few species of animals are rare and some are threatened by hunting. Fish are abundant in the rivers and are, apparently, an important food source.

The environment which will be affected by Project activities is detailed in Attachment A (the original CSRM Environmental Assessment) and in the original CSRM Project Paper, including its exhaustive preliminary reports (the "JRB Report"), as well as in numerous other documents (available in USAID/Lima) produced during the course of the CSRM Project.

C. Alternatives to Project Implementation

The alternative to this Project would be No Action. Because many of the components of the region's ecosystems will rapidly be encroached upon and degraded in the absence of completion of the CSRM-II Project (e.g., uncontrolled short-term utilization of lands only suitable for Protection or Production forests, with subsequent destruction of vegetative cover in critical areas and consequent erosion/siltation), this alternative would lead to potentially irreversible environmental degradation. Implementation of the proposed Project, carried out with protection or restoration of these systems as a constant goal, will have a positive environmental impact. It is recommended that the design of the CSRM-II Project and this EA be approved.

D. Environmental Consequences

1. Insignificant Impacts - Planned or proposed Project activities will have no significant impact, or no impact, on the following natural

ecosystem components and human/social systems:

- -- Air Quality (no planned activities directly affecting air quality)
- -- Social Structure (project activities are oriented to improving or rehabilitating existing social components)
- -- Tourism and Recreation (no significant amounts presently exist in the Valley, but may increase in the National Park under planned management)
- -- Archaeologic, Historic and Cultural Resources (none of significance are specifically known in the region)
- -- Visual Resources (insignificant changes to existing systems)

2. Positive Impacts - Positive impacts are foreseen from CSRM-II Project activities, including in the Yanachaga National Park and San Matias Protection Forest, in the following components:

- -- Biological Diversity (protection/conservation, or restoration, of communities, habitats and rare or endangered species)
- -- Tropical Forests and Other Natural Vegetation (as diversity, above)
- -- Wildlife (as diversity, above)
- -- Soils (restoration of degraded soils, protection from erosion)
- -- Water (protection of watersheds, control of water quality and quantity)
- -- Colonization (controlled to appropriate locations, through land titling and support of land-use capability classifications)
- -- Land Use (project studies designed to determine land use capacity and actual land use will be used to ameliorate misuse)

E. Areas of Controversy and Concern

The Palcazu Valley project (CSRM-II) is an exceptionally well-designed, natural resources management project with a strong emphasis on the improvement and protection of the sustainable agricultural resource base of the area, recuperation of degraded, but potentially productive, ecosystems, increase in utilization of forest productivity through management of natural forests, and the protection of areas and communities which have high biological diversity or which are critical for continuance of the balanced hydrological cycle of the watershed. The ecologically fragile nature of the resources and ecosystems in this watershed requires exceptional care in designing and implementing any projects which may change any components of the systems.

Environmental education, and protection or restoration of fragile or degraded natural or agricultural systems will continue to be included in all of these components.

Specific areas of controversy and concern relevant to potentially negative impacts on the environmental resources of the Project area include the following activities, all of which must be carefully monitored during implementation of the CSRM-II Project.

1. Forestry

The NFMS is being implemented on 2,000 ha of production forest in the Palcazu Valley. This system involves selecting a given forested area and clear-cutting strips 20-50 m wide by 200-500 m long, which are then allowed to regenerate naturally (although some high-value species may also be considered for replanting). The advantages of the NFMS are that it preserves the diversity of tree species, is ecologically less destructive than high-grading or traditional clear-cutting, and may be less costly than traditional systems or reforestation (usually with exotic species). The economic returns, therefore, are higher and more sustainable in the long term, presuming the availability of adequate transport to national markets at least part of the year. Under the NFMS, trial strips (now 2 and 3 years old) have been cut in Iscozacin to test regrowth under controlled conditions. The short-term results of forest regeneration in the narrow strips have been promising, both in terms of growth and establishment and in the diversity of species present. The long-term impact of this forestry management system should not have an adverse effect on the forest environment and, in comparison with any other known systems of forest management for extraction, is a critically important trial of a sustainably-productive forestry system. Careful, long-term monitoring of regrowth in cut strips, particularly through the harvesting of the second generation of trees, is essential for determining the long-term economic and biological viability of the NFMS and to provide the data base for early extrapolation and prediction of this viability.

Primary concerns for adverse environmental effects are the wood processing facilities and the disposal of wastes from these facilities (e.g., sawdust, used motor-oil) and the included PresCap preservation system (see below). To the present, the one installed facility (the YFC, at Shiringamazu) is being carefully managed, with waste oils being disposed of with other project wastes in landfills, and sawdust being used as fill on-site, during the so-far limited use of the sawmill in training and commercial production. As production increases, adequate management plans will be prepared for approval by GOP and USAID Project technical and administrative personnel and the AID Regional Environmental Advisor (REMS/SA).

A wood preservation facility has been constructed near the sawmill and is scheduled to begin processing activities in early 1988 (see Attachment B). This will produce treated rot-resistant poles, posts, and railties, as well as sawn lumber, by pressure injection (sap displacement) with a solution of copper chromium and arsenic salts (CCA salts) using the PresCap system. There has been considerable concern, and intensive study and planning, that these toxic materials be adequately handled by exceptionally well-trained workers during the production of treated wood. A study, with management and training recommendations, was done in 1987 by three toxic-waste specialists (from the U.S. Environmental Protection Agency, the Conservation Foundation, and Koppers Company -- producer of the salts) and the AID Regional Environmental Advisor (REMS/SA). This report is here included as Attachment B. The existing facilities are well-designed and constructed both to protect worker safety and to protect against accidental spills of salt solutions. The report concludes that the existing (and planned) facilities, and management

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and education plans, are environmentally safe. Baseline samples of soils and well-water have been taken in the area around the facility, before operations begin. Continuous monitoring of the facility and its activities will be under the responsibility of a permanent technical advisor, in residence throughout the life of the Project, with advisory oversight from the AID Regional Environmental Advisor (REMS/SA) or other individual(s) designated by the LAC Bureau Environmental Officer.

The recommendations given in Attachment 2, for the Prescap wood preservation plant, must be carefully followed, with continuous review of protocols and results of studies, with subsequent improvements in management of all aspects of this plant whenever necessary. Careful records must be kept of all aspects of management of this plant, including trials of methods or systems subsequently found to be inappropriate or inadequate. The following are some of the more important recommendations and observations extracted from Attachment 2 (preceded by their page numbers in that report).

p.2. "Because of the paucity of information on the viability of using CCA in the Prescap system, effectiveness of the system for treating the species in the Palcazu River Valley should be high on the list of research priorities for the Central Selva Project and should precede further investment in Prescaps and CCA."

p.3. "In addition to being an effective wood preservative, however, CCA is also a potentially dangerous chemical and is regulated in the U.S. by the Environmental Protection Agency (EPA)."

p.4. ". . . care should be taken to protect individuals from any possible airborne particles from sawing treated wood."

p.5. ". . . sheep are very susceptible to copper toxicity. The digestive tract is particularly vulnerable to copper. . . . Such knowledge should provoke measures to preclude local sheep from access to contaminated bark from the process operation." p.6. "It is also toxic to swine and somewhat less toxic to cattle" (EPA 1985).

p.5. "Human exposure to CCA is of greatest concern at the processing plant, particularly during mixing powder formulations, manual operation and maintenance of treatment equipment, handling freshly treated wood and chemical spills. . . . Exposure can occur during sawing, drilling and nailing of treated wood, although proper ventilation appears to minimize these risks. Burning of CCA-treated wood releases arsenic and cases of acute reactions have been reported from such burning (Peters et al. 1986). Finally, EPA prohibits direct contact of treated wood with food products and drinking water. EPA has determined, however, that the exposure to inorganic arsenic in houses built with CCA-treated wood is not significantly different from that in houses of untreated wood. EPA also allows the use of CCA-treated wood for constructing drinking troughs for domestic animals and livestock."

p.5. Chromium "is accumulated by numerous aquatic and marine organisms. It can pass through the food chain from prey to predator or from plant to animal" (EPA 1985).

p.6. The fact that arsenic "can be mobile and metabolized can cause arsenic to cycle through aquatic food systems . . ..

p.6. Copper "will adversely impact a very wide range of aquatic organisms, including algae, copepods, rooted aquatic plants, and fish. Very small amounts can effectively kill almost all of the higher forms of life in lakes and affected streams. . . . tends to be fairly immobile in aquatic ecosystems.

p.7. ". . . the control of contamination is a matter of reducing exposure, not eliminating exposure." p.8. "avoid CCA contact with skin, eyes and mouth and minimize inhalation of dust. . . . CCA, a water based preservative, has no vapor pressure, therefore, vapor inhalation is not a concern."

p.10. "To avoid ingestion of CCA, EPA requires that applicators not eat, drink or use tobacco products while mixing solutions and handling treatment equipment or freshly treated wood. . . . all workers wash their skin thoroughly before eating, drinking, using tobacco products or using the restrooms. . . . EPA also requires that protective clothing, workshoes, boots and other equipment be left at the treatment facility."

p.10. "The wastes from CCA treatment facilities include used solution, runoff from the treatment and drying areas, sludges from treatment solution, used filters, contaminated dirt, and worn-out protective clothing. All of these wastes must be treated as hazardous and disposed of in a controlled manner."

p.11. "The previous sections give general information on the use and handling of CCA and disposal of its waste products. . . . This section of the report, however, presents specific recommendation for operation of the Prescap facility in Shiringamazu.

p.12. "Although we commend the work already accomplished or planned, we have additional r commendations which we believe will improve environmental management of the facility.

2. Agriculture

Research and extension activities will continue to be carried out in the Project area, with increased emphasis on improvement of existing agricultural systems rather than production for outside markets as was envisioned in the CSRM Project. These will include natural resource management, recuperation of degraded pastures through improved ground cover and agroforestry practices, applied research and extension of technical

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packages for productivity and production improvement, and limited agricultural production credit (primarily in the form of seeds or livestock, with repayment in kind). Introductions of non-native species of plants or animals will require environmental review and assessment (see 3, below). Introduction, recommendation or use of pesticides will require inclusion within a system of Integrated Pest Management (IPM), which will be treated in a separate Amended EA when the design of this IPM system is drafted (see 4, below). Recommendations of new cropping or other agricultural systems not presently in the Valley must be reviewed for their potential direct or indirect environmental consequences before these systems are implemented, except in the specific cases of experimental study in small plots.

3. Non-native Species

Some planned forestry and agricultural activities involve the introduction of non-native (i.e., exotic) species, primarily in agroforestry. These species and the sites chosen for planting them must be reviewed by competent experts in ecology and soil conservation to assure that the plant species used are appropriate for the goals of the planned activities and are not potentially threatening to the existing natural and agricultural ecosystems in the Valley, as in plants which could escape and become destructive weeds.

4. Pesticides

The use of pesticides in yet-to-be identified agricultural and forestry activities requires, by specific mandate of the Environmental sections of the FAA and Regulations of AID, careful monitoring and approval for all planned activities. When project-related activities involving the purchase, use or recommendation of pesticides are identified, an amended EA will be prepared to address all pest management practices being proposed, based on a program of Integrated Pest Management.

5. Roads

The rehabilitation or upgrading of existing roads (including changes in drainage, ground cover, bridges, platform, erosion control, etc.) and any planned additional construction of roads (e.g., construction of new access roads, including forestry-related roads or trails) will require an amended EA, with an associated traffic/marketing study to determine actual need, considering the options of no action and of limited rehabilitation and improved maintenance of the existing road.

The original CSRM Project EA in 1981 considered six alternatives for construction and locating the then-proposed road into the Valley (actually constructed and finished to Iscozacin in 1986). The least desirable location for the road was considered to be the now-existing route, through the fragile

areas in the upper Valley down to Iscozacin. The final selection of the road route was a decision of the GOP, not subject to direct influence by USAID, as construction of the road was paid for by GOP funds, primarily from PL-480 sources (which are not required to conform to the FAA or AID regulations on the environment). Even though this route was the least desirable alternative, transport to the Project area was essential for achieving the goals of the Project and, thus, subsequent maintenance of the road was paid for primarily with Project funds.

Any roads in the Valley will go through tropical forests, where AID assistance in road building is specifically denied unless an Environmental Assessment is conducted, under the "Protection of Tropical Forests" bill (S.1747, H.R.2957), amending the Foreign Assistance Act (redesignates Section 118(a), (b) and (c) as new Section 117 of the FAA), passed by Congress in December 1986. The most relevant Paragraph is the following (underlining added):

> "(15) Deny assistance under this chapter for the following activities unless an environmental assessment indicates that the proposed activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development:
> (A) Activities which would result in the conversion of forest lands to the rearing of livestock;
> (B) The construction, upgrading or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands;
> (C) The colonization of forest lands;
> (D) The construction of dams or other water control substances [sic] which flood relatively undegraded forest lands."

USAID/Peru has indicated to the GOP that neither AID funds nor PL-480 funds would be approved for new road construction beyond Iscozacin. The GOP-proposed road completion from Iscozacin primarily concerns "15.B," and secondarily includes "15.A" and "15.C," since increased colonization and pasture formation inevitably will occur as a direct result of completion of the road. U.S. laws concerning AID assistance in tropical forests, and the bill on biological diversity, recognize these probable consequences and require rather extensive assessment, planning, review and approval before AID funds can be obligated.

Previous Project assistance for highway maintenance and logging-access road construction was prior to the date of this amendment to the FAA. Thus, any new road construction or upgrading and subsequent maintenance, including logging or other feeder roads, using Project funds or support, including use of Project vehicles or personnel, will require a specific Environmental Review and Amended Environmental Assessment of the road design (including maintenance) and its potential impact, requiring approval of the LAC Bureau Environmental Officer before funds or other Project support can be obligated. Continuing maintenance activities on existing roads will be

periodically monitored by the Regional Environmental Advisor (REMS/SA), or other specialist(s) designated by the LAC Bureau Environmental Officer, to ensure environmentally sound procedures are being followed.

It is recognized that the Natural Forest Management System cannot continue to be a viable alternative to existing forestry extraction practices without adequate transport for commercial sale of the wood products outside of the Valley and for ingress of necessary supplies and materials needed by the wood processing facilities. The same applies to many other components of the CSRM-II Project.

Maintenance of the existing road to Iscozacin will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner. Road maintenance is conducted with the Technical Assistance of a full-time Road Engineering Advisor, with regular monitoring by the REMS/SA and/or USAID engineers.

F. Essential Project Activities To Be Completed

The following activities were not completed during implementation of the CSRM Project, but are considered crucial to environmentally-sound development of the area. They are to be included in CSRM-II implementation.

1. Continuous Land Use Inventory

This component includes visual observation of actual land use, using any combination of aerial photography, overflight in a light plane, or on the ground. This activity should be carried out at least every six months in areas considered critical or threatened because of possible colonization or other disturbance, particularly in Protection-class forests in the upper watershed, along new roads or trails, and near recent colonizations. Information from this Inventory is not only essential in the Project goal of assuring utilization of lands according to their capability, but is needed for planning activities in health, extension, etc., when changes in population density or distribution are occurring. For example, there has been recent colonization and unauthorized road construction in Yanachaga National Park, with local political support, which could have been brought to the attention of relevant national authorities promptly, but was not recorded by any Project Inventory.

Implementing this activity may require short-term TA in land use determination.

2. Hydrological Studies

Hydrological studies will include establishment of stream gauging,

water and sediment sampling, and meteorological measurement networks in order to determine the amount of surface water available and its flow through the watershed, and the quantities and sources of sediments in the principal watercourses. This component was included in the original CSRM Project design, but never carried out. It can be considered part of the monitoring of basic parameters of ecosystem components required in the FAA and AID Regulations on the Environment. Regrettably, there are no baseline studies from the beginning of the CSRM Project for the determination of the sources of sediments or possible changes in streamflow or water retention, which would allow comparisons of Project activities with native and other systems for natural resources management; with implementation of CSRM-II such determinations will be feasible.

These studies will require the short-term TA of a specialist in watershed hydrology to establish the basic data-collection design (1-2 months of start-up TA) and to periodically interpret and report on the resultant data for use by the Project and by AID (2-4 weeks per year during LOP). Implementation of the data collection, and assistance in data interpretation and reporting, should be the responsibility of the TA specialist in Ecology.

3. Inventories of Biota

It is futile to discuss the diversity of species and habitats in the area, without knowing what actually occurs and what are the structures of the communities. As stated in the "AID Sector Strategy on the Environment" (October 1983. AID Sector Council for Energy and Natural Resources, Washington, D.C. p.2), ". . . assistance will be provided to identify and conserve wild plant and animal species which contain the genetic resources necessary to sustain and improve agriculture, forestry and fisheries production and which provide the raw material for future scientific and industrial innovation."

Partial inventories, in manuscript lists, are available for the flora and vegetation (primarily the woody species) and, in the Yanachaga only, the fauna. Some information is available on the plant species used by the native populations in agriculture, medicine, etc., from the excellent preliminary studies of Amuesha plant uses J. Salick (Salick, J. "Ethnobotany of the Palcazu Valley." USAID Grant 527-06-166-G-00-4047-00), but this is incomplete and has not been included in any planned components of the CSRM-II Project. There is no reliable information on hunting, fishing, deforestation or other pressures which may be threatening the integrity of these biotic communities. Inventories of the flora, fauna, and plant and animal communities should be completed, and be made available for use by Project and other personnel, as soon as possible after inauguration of the CSRM-II. The existing information must be compiled and areas needing additional studies determined.

Studies similar to the preliminary studies of Salick should be continued in the Project area for application of the information contained in

the biotic inventories. These studies should stress commercial and local utilization of the species in the natural forests, including non-woody plants, as well as those being harvested or discarded in the NFMS, which have potential value for non-wood uses, such as fruits, latex, gums, medicines, and crop genetic improvements or introductions.

Information on the wood properties, potential uses and commercial utilization of the tree species being extracted in the NFMS must be completed, to provide significant added value through the exceptional diversity of species and wood types which are not presently in demand because of a lack of knowledge of their potential utility for commercial applications.

The role of fish in local diets, the standing stock and fluctuations of populations of fishes as they affect catch, the species and their relevant life histories, seasonal fluctuations correlated with rainfall and river height/flooding, etc., are all essential information not available in the Valley but which can greatly affect protein consumption, diet, and agricultural practices. The effectiveness of fisheries as a source of protein will influence hunting pressures on terrestrial animals and may alter animal husbandry practices. Such basic information must be gathered for development of management plans for the potential fisheries resource. For a start, the use of dynamite in fishing by some residents of the Valley must be eliminated.

The inventories will require specific TA in each of the speciality areas, and should be under the general guidance of the TA specialist in Ecology and the REMS/SA. An estimate of the person-months of TA required for completing and interpreting these inventories is not now possible, but requires an immediate collation of the existing information and determination of needs to develop specific scopes of work.

These inventories (including the geologic inventories, below) also should be considered part of the monitoring of basic parameters of ecosystem components required in the FAA and AID Regulations on the Environment.

4. Inventories of Geological Formations

Geological formations of the Project area have not been studied in any detail, including such agriculturally important information as the locations of limestone deposits. Any existing information (e.g., a petroleum survey was previously carried out in the Valley) should be compiled and areas needing additional studies determined.

IV. MITIGATING MEASURES

A. Environmental Analyses and Reviews

Amendments to this EA will be required for any future project activities or sub-projects if these involve significant alteration of ecosystem components or will have potentially adverse environmental consequences. These will include any new sub-projects proposed in agriculture, forestry or related activities if they were not specifically covered in this EA or its Attachments. Multiple sub-projects involving similar implementation activities can be included within a single Assessment.

Examples of these types of activities are:

-- construction of physical structures of any type, including those to control erosion for protection of endangered habitats, or for other erosion control purposes;
-- introduction of non-native (i.e., exotic) plant or animal species as part of livestock and forestry management plans; and
-- significant alteration of existing agricultural systems, or introduction of new methods or crops, particularly those resulting in changes in erosion/sedimentation or in water flow or quality.

The need for Environmental Review and Amended EAs must be determined by consultation with the USAID/Peru Mission Environmental Officer or the Andean Regional Environmental Advisor (REMS/SA), and with the LAC Bureau Environmental Officer, with approval from the latter required before implementation of any activities determined to require an amended EA. These requirements must be stated in the bilateral agreement between the GOP and the USG, as either covenants or conditions precedent.

The requirements for delayed Environmental Review are detailed in the AID Environmental Procedures (22 CFR Part 216) in section 216.3(a)(7), part of which follows:

"(7) Environmental Review After Authorization of Financing.
(i) Environmental review may be performed after authorization of a project, program or activity only with respect to subprojects or significant aspects of the project, program or activity that are unidentified at the time of authorization. Environmental review shall be completed prior to authorization for all subprojects and aspects of a project, program or activity that are identified.

"(ii) Environmental review should occur at the earliest time in design or implementation at which a meaningful review can be undertaken, but in no event later than when previously unidentified subprojects or aspects of projects, programs or activities are identified and planned. . . ."

Examples of sub-projects or other Project activities not specifically assessed in this EA which may require Environmental Reviews and amended EAs before funding or implementation, include the following:

1. Forestry - Primary concerns for adverse environmental effects are the wood processing facilities and the disposal of wastes from these facilities (e.g., sawdust, used motor-oil) and the included PresCap preservation system. Construction of any additional wood processing centers, or major changes in the one existing center (Shiringamazu), will require Environmental Reviews and amended EAs.

2. Agriculture - Significant alteration of existing agricultural systems, or introduction of new methods or crops, particularly those resulting in changes in erosion/sedimentation or in water flow or quality, will require an Environmental Review and an amended EA. Many agricultural activities, including uses of pesticides, that will result from the implementation of this Project cannot be defined specifically until the necessary feasibility studies are completed.

3. Pesticides - By specific mandate of the Environmental sections of the FAA and Regulations of AID, amendments to this Environmental Assessment will be required for any pesticide-related activities planned in the Project, including any purchase, use or recommendations of specific pesticides. If the activities are all carried out as part of an IPM program, design of such a program will constitute the basis for an amended EA. The use of existing Peruvian organizations or assistance from AID projects in Integrated Pest Management is recommended for assistance in planning such subprojects, to reduce the negative impacts of any future pesticide activities. Under close supervision of an agricultural systems advisor within PEPP, and with prior approval of the AID/LAC Bureau Environmental Officer for all specific pesticides, activities in IPM are not expected to have significant environmental impacts.

4. Non-native species - The planned introduction of any non-native species (e.g., in forestry or agroforestry, biological control agents for pest management, or crop or livestock introductions) to the Project area will require an Environmental Review and Amended EA before obligation of funds for implementation.

5. Roads - The rehabilitation or upgrading of existing roads (including changes in drainage, ground cover, bridges, platform, erosion control, etc.) and any planned construction of roads, including logging roads, will require an Environmental Review and an amended EA.

6. Potable Water Systems - Improvement or construction of potable water systems in local communities is an ongoing activity. This will require more careful consideration of water quality, particularly pesticides and other potential pollutants which may be present in some systems. Baseline data on water quality in the region will be essential before specific feasibility studies can begin. Planned activities in agriculture (particularly involving application of pesticides, fertilizers, etc.), and potable water must be

carefully coordinated to avoid contamination, or reduction of supplies, of local or downstream water users.

7. Biological Diversity Studies and Protected Area Management - A number of areas of apparently-exceptional biological diversity have been identified within the project region, particularly in and near Yanachaga National Park. Detailed faunistic, floristic and habitat inventories are required for the development of appropiate management plans. These studies are designed to guide the selection of sites to achieve the maximum possible protection of diverse natural resources, either through passive or active protection. Detailed studies must be supported by the Project both within and outside of the National Park, where studies will be coordinated with the ongoing AID-supported activities managed by The Nature Conservancy and the Fundacion Peruana para la Conservacion de la Naturaleza. The studies should also produce specific environmental education packages as part of the management plans for protected areas. Positive environmental impacts should result from the implementation of these studies. Where management plans include any alteration of such areas, such as trails or encouraging tourism, an Environmental Review and EA must be prepared.

B. Project Evaluation

The Andean Regional Environmental Advisor (REMS/SA), and other environmental specialist(s) designated by the AID/LAC Bureau Environmental Officer, will participate in periodic technical and field evaluations of the Project to determine continued compliance with the conditions and recommendations of this EA and subsequent amendments.

C. Project Environmental Strategy

The environmental strategy built into this Project is essentially the Project's environmental assessment. Its integration into the Project's design helps to assure the proper implementation of environmental safeguards in developmental activities such as rural infrastructure and resource utilization.

The environmental strategy consists of the following major components:

1. Collection of baseline data on those resources and systems which are essential to planning, or may be altered by Project activities. Examples of these data types are water quality, flow rates and sediment loads related to forestry and agricultural activities; increasingly detailed land-use capability assessments for potential agricultural and natural resources protection activities; floristic, faunistic, and habitat distribution data for activities required to protect or restore endangered or critical ecosystem components.

2. During the life of the project, continuous or periodic monitoring of water, soils and biotic elements which may be adversely affected by project activities, or changes of which may adversely affect sustainable continuation of project activities. For example, erosion and consequent increased sediment loads and altered water flows will adversely affect planned subprojects, requiring changes in subproject designs, changes in livestock management systems may cause excessive grazing on slopes, resulting in increased erosion due to loss of vegetative cover, whereas other management practices may lead to the recuperation of presently over-grazed slopes.

3. Environmental education of local residents concerning the need for protection and careful utilization of resources in this zone, and the basic concepts of sustainable utilization of renewable resources to protect the functioning of natural and agricultural ecosystems upon which depend the social and economic livelihoods of the local residents. This education should include community participation in project activities and specific environmental education efforts through rural communications media, emphasizing the interdependency of all components, human and other, in the watershed.

4. Reforestation of degraded areas for production, soil conservation and water retention. These will include both plantations of native species and exclosures (where feasible, to allow the regeneration of native biotic communities), to protect and increase diversity in these forests.

5. Institutional support to develop the human resources specifically trained and qualified to plan and execute sustainable resource management activities in the future, based on an understanding of the environmental and social constraints essential to such development efforts.

D. Technical Assistance

1. Technical Assistance in Ecology

PEPP requires long-term technical assistance in environmental monitoring and resource management, preferably an ecologist with particular expertise in watershed management and hydrology, to coordinate the activities of this institution and supervise ecological and watershed-related components of the subprojects. This assistance should cover the duration of the Project and involve an ecologist with experience in planning and coordinating activities in a wide range of subjects and within an interdisciplinary context.

This assistance will be essential for participation in planning new subprojects and other activities, and in guiding preparation of required Environmental Reviews and Amended EAs for all new activities not specifically covered in this EA. This assistance is required to collect, analyze and assist in interpretation (with other specialists, as appropriate or necessary)

of the required baseline environmental data, some of the data collected during forestry activities (particularly water and soil data relevant to monitoring of the PresCap wood preservation facility), and to carry out all required continuous monitoring of environmental variables which may be affected by Project activities during the LOP. This technical assistance is also needed to orient the coordinating agency (PEPP) and the other local institutions in the utility and necessity of environmental concepts and the environmental framework built into the project design for sustainable development, and in the development of environmental education programs.

This assistance requires prior experience in US or AID-related Environmental Assessments. The specialist (in coordination with other Project personnel or TA specialists) will establish the methodologies for, and will interpret for Project application, the baseline data on soils, water, and biotic factors in potential project areas, and in the watersheds above and below these areas, in conformity with the requirements of the Foreign Assistance Act (particularly including the newly revised Sections 118 and 119) and AID Regulation 22 CFR Part 216 (and subsequent applicable Amendments). The specialist will use the baseline data, and consultation with other Project personnel, to determine, and establish methodologies and protocols for, the environmental parameters that will require continuous monitoring during the Project. These determinations will be based on demonstrable need and on applicability of the resultant data for the Project, and will be done in the simplest and most economical manner so that they will be able to continue after the LOP, according to the needs and expected financial constraints of GOP agencies that may undertake continuation. Whenever possible, laboratory analyses of samples should use local facilities, verifying reliability of the determinations by analyses of duplicate samples in laboratories approved for such analyses by the U.S. Environmental Protection Agency. This specialist will establish regular communications with the Regional Environmental Advisor (REMS/SA) and with the LAC Bureau Environmental Officer.

2. Technical Assistance in Hydrology

(see F.2., above, "Essential Project Activities to be Completed" "Hydrological Studies). These studies will require the short-term TA of a specialist in watershed hydrology to establish the basic data-collection design (1-2 months of start-up TA) and to periodically interpret and report on the resultant data for use by the Project and by AID (2-4 weeks per year during LOP). Implementation of the data collection, and assistance in data interpretation and reporting, should be the responsibility of the TA specialist in Ecology.

3. Technical Assistance in Biotic Inventories

(see F.3., above, "Inventories of Biota"). The inventories will require specific TA in each of the speciality areas, and should be under the general guidance of the TA specialist in Ecology and the REMS/SA. An estimate of the person-months of TA required for completing and interpreting these

inventories is not now possible, but requires collation of the existing information and determination of needs to develop specific scopes of work.

4. Technical Assistance in Inventory of Geological Formations

(see IV.F.4., above, "Inventories of Geological Formations"). Geological formations of the Project area have not been studied in any detail, including such agriculturally important information as the locations of limestone deposits. Any existing information (e.g., a petroleum survey was previously carried out in the Valley) should be compiled and areas needing additional studies determined.

5. Technical Assistance in Continuous Land Use Inventory

(see F.1., above "Continuous Land Use Inventory"). This component includes visual observation of actual land use, using any combination of aerial photography, overflight in a light plane, or on the ground. Implementing this activity may require short-term TA in land use determination.

E. Mitigations to Ensure Sustainability

A number of measures need to be taken for the Project's activities to achieve their objectives and sustain the development effect over and beyond the duration of the Project itself, including the following:

1. Activities should be planned and implemented only when the participating institutions have the proven capacity to carry out the activity both in terms of personnel and organizational structure, and have demonstrated an awareness of the fragile nature of the region's natural and agricultural ecosystems and the environmental constraints to development activities in the region. Short-term training and/or workshops in these areas may be appropriate for some institutions.

2. Field research activities should be coordinated with the resident population whose land could be used for demonstration areas or whose economic activities could benefit from the research results. As research activities are evaluated as a function of the application of results beyond the experimental plots, the participation of residents in the research activities is essential. The potential benefits of these activities need to be properly explained to the entire community, both indigenous and colonist, and related to the general environmental constraints which affect productivity and, thus, income in this watershed.

3. The TA advisor in ecology (part of the technical advisory team to PEPP) should monitor all the activities that are being defined and implemented during the course of the Project. Emphasis should be placed upon environmental impacts (positive and negative) of each activity and short

reports should be prepared whenever new or significant impacts are foreseen. These reports should be submitted to the Environmental Officer at USAID/Peru and forwarded to the Regional Environmental Advisor (REMS/SA). This will be in addition to guiding preparation of required Amended Environmental Assessments for all significant new activities not specifically covered in this Environmental Assessment. It is hoped that a qualified local counterpart can assume these responsibilities after a period of joint work with the Advisor. It is essential that local and national agencies be contacted that may utilize continuing data collection for their own needs after termination of the Project.

4. In order to be effective and achieve long-term benefits, the environmental/resource management strategy proposed for this project must involve not only experienced institutions but especially the rural population. Participation of the local community is essential in carrying out and maintaining the proposed activities.

Community and other local organizations should be immediately contacted (either directly or through the executing institution) and their participation in planning and design of any activity encouraged. Their participation will be required in the execution of many of the activities, but that will be assured only if the community and area residents have also contributed at the early stages of the proposed activities (e.g., reforestation, watershed management, animal husbandry, etc.) and understand the fragile nature of the Palcazu Valley ecosystems upon which these potentially renewable resources depend.

VI. ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS

This EA and its Attachments, with the PP, should provide the basis for the approval of the Project by the Bureau Environmental Officer. Any sub-projects or other Project activities not specifically assessed in this EA will require Environmental Reviews and amended EAs before funding or implementation, as discussed above.

Howard L. Clark, REMS/SA, 2 April 1988
-- 0057Z, disk 6Z

CENTRAL SELVA
NATURAL RESOURCES MANAGEMENT PROJECT
USAID PROJECT N0. 527-0240

VOLUME I
Project Synthesis Paper

Annex A - Environmental Assessment
(Annex B - Social Analysis)
(Annex C - Colonization Systems Analysis)

Lima, Peru
October 1981

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*retyped, Annex A only, USAID/Peru, January 1988
0045Z/6Z

Annex A

Environmental Assessment*

CENTRAL SELVA NATURAL RESOURCES MANAGEMENT PROJECT
USAID PROJECT NO. 527-0240

Dennis McCaffrey
Lima, Peru
October 1981

*retyped, Annex A only, USAID/Peru, January 1988

1. SUMMARY

1.1. Major Conclusions

1.1.1. Environment

The Palcazu watershed lies about 274 miles northeast of Lima. It has a total area or approximately 190,000 hectares. The watershed is presently nearly roadless but a road is planned to penetrate it, south to north, from its headwaters to its mouth. The first eight kilometers of this road are under construction.

The watershed is characterized by rough terrain, numerous large and small streams, and very little flat land. Climate is warm and wet, becoming cooler and wetter with increasing elevation. Annual rainfall exceeds 3000mm throughout the watershed and most places receive 4,000mm or more of rain per year.

Flora and fauna exhibit great diversity. Most of the watershed is forested, but quite a bit of clearing has occured in the valley floor. A few species of animals are rare and some are threatened by hunting. Fish are abundant in the rivers and are an important food source.

1.1.2. Land Use Capability

The major land use capability of the more rugged land in the watershed, which comprises over half its area, is protection forest. The land is so steep, receives so much rain, and has such thin, erodable soil that clearing or logging will seriously damage it.

About 44,000 hectares at lower elevations in the valley are suitable for forest production but are too poor and fragile to support grazing or any kind of agriculture. Of these, 24,000 have limited productive capacity because slope and erodable soil restrict harvesting methods.

Only 34,000 hectares in the valley have the capacity to support some form of agriculture. 14,000 hectares can support permanent crops, the least restricted use, 13,000 can support pasture, and 7,000 can support the most restricted use which is clean cultivation.

1.1.3. Productivity

Soils in the Palcazu Valley are highly acidic and infertile. The poor soils, together with high rainfall, limit productivity of row crops and pasture even on lands which are clasified as having the capacity for those uses. The productivity of lands for forest and permanent crops is not quite so limited by these factors but it is still low.

1.1.4. Capacity for Development

Capacity for development is limited by low productivity and the small amount of land available for agriculture and other productive uses, Nonetheless, there are opportunities for development. These consist of encouraging use of land in accordance with its best capability and improving productivity on lands that are well used.

1.1.5. Capacity for Colonization

There are somewhere between 4,500 and 15,000 people in the Palcazu Valley now, almost all of whom make their living from the land. A more precise figure for population should be available soon when the results of the 1981 national census are known.

The size of land holdings and the quality of those lands is difficult to determine now. However, a land titling and platting program is underway so that fairly soon maps showing ownership should be available.

After the tools are available to know who owns what kind of land, two things can be determined: wheter current residents need more good quality land to sustain a decent standard of living and whether there is any room for new settlers on land which has the capacity to support them.

Present data indicate that some of the Amuesha communities are land poor whereas others have sufficient lands.

1.1.6. Alternatives for Development

Development of the Palcazu centers around whether there will be a road in the valley, where the road will be, and what kinds of development programs will accompany the road.

If development is not directed toward good land use for sustained yield it will almost certainly lead to improper land use, degradation of the environment, reduced land productivity, and social misery.

Four of the alternatives discussed in the environmental analysis advocate a detailed natural resources development project. They differ in that two refer to two different road locations, one includes financing a road and one explores development without a road.

1.1.7. Preferred Alternative for Development

The project paper synthesis recommends a development plan based on a road into the valley from its mouth rather than from its headwaters as currently planned.

A six-part development project would accompany development. Zoning land use to match land capability is a central feature of the development project. The project would establish a national park and forest protection system for the valley uplands. A natural forest management plan is

proposed for forest production lands and crop and livestock improvement programs are proposed for permanent crop, pasture and clean cultivation lands. A regionally oriented management element would guide the project. Another part of the program would key development to the special circumstances of Amuesha native communities in the Palcazu.

1.1.8. Environmental Effects of No Development Project

If a road is built into the Palcazu Valley, especially a road coming from the south through its headwaters, it will bring rapid changes for land use in the valley. Unless deflected, there will probably be massive deforestation, partly to obtain timber, but mostly to clear land for crops and pasture.

Deforestation will occur on lands which do not have the capability to support non-forest uses. These lands will then erode, causing their own impoverishment, as will as silting of streams, disruption of stream flows, and depletion of fisheries. Loss of flora, wood products, wildlife habitat, and wildlife are other effects of deforestation.

Similar degradation will occur on lands which could be used for production forestry of permanent crops but on which pasture or agriculture are attempted.

1.1.9. Environmetal Effects of a Development Project

The preferred project is designed to avoid all the environmental ill effects that could accompany spontaneous development following a road. It would curb deferestaion except on lands which are suited to clearing. Those lands and forest production lands would be managed for sustained yield. From these measures flow protection of soil, water, flora, and wildlife, conservation of timber resources, and maintenance of land productivity.

1.2. Areas of Controversy

1.2.1. Road Location

The road on which the preferred alternative is based would come from the marginal highway between the Pucallpa Road and Puerto Bermudez and enter the Palcazu Valley at its mouth. It would then divide to give access to lands northward and southward in the valley.

The road proposed by the Peruvian government to penetrate the valley enters at its headwaters and proceeds about two-thirds of the way down the valley. It is presently under construction.

Penetration of the valley form the mouth rather than the headwaters has environmental advantages of avoiding fragile lands and giving access to the best lands. It is a longer route to Lima, however, than the road from the headwaters.

1.2.2. Land Capability

The land capability statements presented in this environmental analysis differ from statements on land capability from various sources in Peru. In general, earlier estimates have shown much larger potential for agriculture and pasture than those set out in the environmental analysis.

The statements in this analysis are supported by soil and climatic data for the Palcazu. They set a realistic basis on which to discuss such things as size of economic land management units and carrying capacity of the Palcazu.

1.2.3. Colonization

At one time, it was predicted that the Palcazu had a large capacity to absorb new population. The data in the environmental analysis show that the population which the land base can support is not large, although a precise figure on population capacity is not given.

When the exact existing population of the Palcazu is known and titled lands are mapped, vacant good land can be identified. Controversy over use of this land will surround competing needs of native communities with insufficient good lands, other current residents of the valley with not enough land, and the desire to settle new people in the valley.

1.3. Issues to be Resolved

1.3.1. Road Financing

The Project Identification Document that gave rise to this environmental analysis anticipated financing a road. That road was projected to enter the Palcazu Valley from its headwaters in the south and penetrate all but the northern third of the valley.

Only one of the alternatives discussed in the environmental analysis includes financing road construction or maintenance. The preferred alternative does not include it. That is because the road in itself has only minor environmental effects .

Nonetheless, U.S. AID is faced with deciding whether to finance a road in the Palcazu or not.

1.3.2. Road Location

The preferred alternative recommends serving the Palcazu with a road in a markedly different location from the road presently planned. A decision needs to be made on where a road will eventually be built.

1.3.3. Type of Development Project

U.S. AID needs to determine if it wishes to finance a development project in the Palcazu and what the thrust and scope of that project will be.

2P

The preferred alternative sets out a development project that should both conserve natural resources and enhance their productivity. The project could be expanded to include road construction. It consists of several separate elements so it could be contracted as well. However, the elements dealing directly with land use are all integrated so that no one element would be as successful singly as it would linked to the others.

The other alternatives set out in the analysis should also be considered and a decision made.

2. INTRODUCTION

1.2. Background

Construction of a highway, known as the marginal highway, along the eastern base of the Andes has been a long-standing goal of the Peruvian nation. One of the purposes of the highway is to open up the selva of the Amazon lowland and the upper selva of the eastern slopes of the Andes. When completed the highway will extend from the Ecuadorean border to the border with Bolivia.

One loop of the marginal highway is intended to penetrate the Palcazu valley in the eastern parts of the Departments of Pasco and Huanuco. The main stem of the marginal highway is planned to extend through the Pichis valley just east of the Palcazu. The two roads are to diverge in the upper Palcazu watershed and reunite near where the Pichis and Palcazu Rivers join to form the Pachitea. The highway then is to continue northward until it meets the Pucallpa-Tingo Maria highway at a point near San Alejandro.

This road network is currently under construction at four points:

- Southward from San Alejandro up the Pachitea River;
- Eastward toward the Pichis Valley from the end of the road east of Villa Rica;
- Southward in the Pichis Valley from Puerto Bermudez toward the road coming from Villa Rica;
- Northward into the Palcazu Valley from the junction with the road heading to the Pichis.

By the end of 1981, the road to Puerto Bermudez should be completed and about eight kilometers of the road into the Palcazu should be built.

Simultaneously with building these roads, the Peruvian Government wishes to develop the valleys which they penetrate. Toward this end Peru has established the Pichis-Palcazu Special Project known, by its acronym in Spanish, as PEPP.

PEPP's initial funding comes from a grant from U.S. AID agreed to in September of 1980. One of the objects of the grant agreement is to design a project for development of the Palcazu Valley.

An early step in reaching this objective was preparation, in March of 1981, of a Project Identification Document, PID, by the U.S. AID Mission in Peru. The PID identified a project entitled Central Selva Resources Management and called for environmental analysis of the proposed project. Social analysis of the project area accompanied the PID, as did a scope of work statement for environmental analysis.

In July of 1981, U.S. AID entered into a contract with JRB Associates of MC Lean, Virginia to prepare a multifaceted study of the project. The study consists of:

1. A report on prior experience with colonization of tropical lands.
2. An ecological baseline analysis and natural resources inventory of the Palcazu Valley;
3. A determination of land and natural resource capability and suitability for development in the project area;
4. An environmental assessment of the project;
5. Project design assistance to the AID Mission in Lima.

The team fielded by JRB Associates, after discussion with AID and PEPP, is proposing a group of projects which anticipate environmental impacts and which are designed to be environmentally sound. The proposed projects also take social impacts into account.

2.2 Methodology

Work on the five-part study commissioned by AID was done between early July and mid-October of 1981. Teams of experts developed the baseline inventory first, followed by the land capability and suitability analysis, and ending with several synthesis reports. The subject matter overlapped and so did the timing of the work so that there was much cross-contact and exhange of information among members of the teams.

In general, each team member performed his part of the project by a combination of field inspections, interviews, and review of data and documents. A report was prepared by each team member.

2.3. Format

This environmental analysis is an annex to the Project Paper Synthesis for the Central Selva Resources Management Project. It, in turn, draws its facts from the series of background reports comprising the baseline analysis and natural resource capability and suitability of the valley for development.

The background reports are set out as appendices to the project paper synthesis. Two other annexes accompany the project paper synthesis. One is a social analysis of the proposed projects and the other is a study of the history of land colonization in Peru.

2.4. Purpose

The purpose of this environmental analysis is to analyze, from an environmental point of view, the projects described in the Project Paper Synthesis for the U.S. AID Central Selva Resources Management Project in Peru, Project No. 527-0240.

The projects have been designed to be environmentally and socially sound in the Palcazu Valley. The central feature of the environmental analysis, then, is to describe how project design meets environmental constraints and opportunities for development in the Palcazu. The analysis also discussed alternatives to the project including predictions of the environmental effect of not having the project.

2.5. Need

The underlying need for environmental analysis of the Palcazu Valley stems from these facts:

1. The valley has a fragile environment characterized by:

- rough terrain
- rainy climate
- poor soils
- threatened wildlife
- limited capacity for development activities.

2. The valley is populated by several thousand people who tend to occupy the most productive lands and who engage in activities which cause some pressure on the environment.

3. The population of the valley is increasing by internal growth and by gradual immigration of new settlers, causing greater pressure on the environment.

4. The Peruvian Government intends to penetrate the valley, which is currently nearly roadless, with a road running the lengh of the valley. Construction and presence of the road itself affect the environment.

5. The road is almost certain to bring new settlers. These people, finding the best land already occupied, will be tempted to settle on poor lands where risk of environmental damage is high.

6. Presence of the road will probably also encourage current residents of the valley to expand land uses onto lands with high risk of environmental damage.

2.6. Collaboration

The teams who prepared the background papers worked closely with PEPP, the AID Mission in Lima, and numerous Peruvian agencies and institutions. PEPP and the AID Mission have been consulted regularly concerning this environmental analysis. As information for the analysis has accumulated it has been extremely helpful in exchanging ideas and information, thereby greatly assisting this analysis.

3. ALTERNATIVES

3.1. Synopsis of Alternatives

The alternatives for a natural resources management project in the Palcazu Valley center around whether there will be a road in the valley, where the road will be, and who will fund the road.

3.1.1. Upper Valley Road

Initially, it was assumed that there would be a road in the Palcazu Valley which followed current plans for that road. PEPP plans propose a road beginning near the headwaters of the Palcazu River at the south end of the watershed. The proposed road follows the river closely until it reaches the valley floor where it diverges from the rivers. Then the road continues down the valley parallel to the river, but several kilometers west of it, passing through a little of the better land in the valley. It ends near the Pozuzo River northwest of Puerto Mairo. A number of branch roads are planned to gain broader access in the valley. Neither the road nor its branches, however, will reach the area of the elbow of the Pozuzo River which is where the land with the highest capacity for agriculture and grazing is located.

3.1.2. Lower Valley Road

Building a road in the lower Palcazu Valley should be considered in preference to building the road proposed for the upper valley. A road into the Palcazu could begin at the marginal highway near where the Palcazu River joins the Pichis. It could ascend the Palcazu into the Palcazu valley near Puerto Mairo and then divide into two branches. One branch could go northwest to the good land in the elbow of the Pozuzo River. The other could go southward, perhaps following the course of the road planned by PEPP, through the lands drained by the Lagarto, Chuchurras and Iscozacin Rivers. Such a road would be approximately 100 km long, divided into three segments as follows:

30 km- Marginal highway to Puerto Mairo
30 km- Puerto Mairo to elbow of the Pozuzo
30 km- Puerto Mairo to Iscozacin River

This alternative road would have the following advantages over the road as currently planned:

- It would avoid the rough terrain and high rainfall of the southern end of the Palcazu watershed.
- It should reduce construction and maintenance costs.
- It makes the lands in the southern end of the watershed, whose principal use is protection forest, less accessible so that intrusion into them for logging and settling is less likely.
- It would give direct access to the best lands.
- It could be built in stages with some lands opened up first and others later.
- It could be linked to river transportation on the lower Palcazu rather than relying exclusively on highway transportation.
- It would reach native communities by a spur road rather than a through road so that disruption of the communities would be lessened.
- The road presently under construction in the upper watershed could still provide access to a proposed Yanachaga National Park.

The segment of the Maginal highway from the Pucallpa road to the Palcazu river and thence up the Pichis River to Puerto Bermudez is not yet completed. It is under construction, however, as is the section of the Marginal Highway from Puerto Bermudez to Villa Rica. Plans are to complete this entire segment of the marginal highway in the near future. It should be completed soon enough to give timely access to the lower Palcazu. Moreover, a short delay in access to the lower valley would provide valuable time to implant management plans for the valley.

3.1.3. Road Funding

The PID which preceded project design included a proposal to fund construction and mantenance of the road entering the Palcazu from the upper end of the watershed. The proposed projects, however, exclude funding any roads. Funding roads in the Palcazu is expensive and does not appear to confer sizeable environmental benefits. Major effects on the environment in the Palcazu will not come from road building but from human actvities that will occur after roads are built.

3.1.4. Presentation of Alternatives

Several possible combinations of projects with and without the road are set out below. Their order of presentation begins with the combination most closely resembling the present day situation in the Palcazu. It is followed by a combination which typifies what happens when roads are built into new lands in the upper selva without planning for the development which will follow. This alternative assumes that a road will be built according to present plans to penetrate the watershed from the upper end.

Thereafter, two alternatives are presented whose central feature is to anticipate and mitigate undesirable environmental effects of building a road in the Palcazu. The first, and preferred, alternative centers around a road into the lower valley with no through road from the upper watershed.

The second alternative assumes that the road proposed by PEPP will be built as planned.

Finally, there is an alternative which includes road financing and one which discusses a project in the absence of a road.

3.2. Alternative A: Do not Construct Any Roads, Do Not Have A Natural Resources Project

If no road were built into the Palcazu, migration into the valley and expansion of forest clearing would probably continue at a gradual rate. Cattle raising would probably continue to be the major economic activity along with subsistence agriculture and some harvesting of forest products.

Without any incentives to do otherwise, land use would probably follow the pattern of forest clearing, burning, cropping, pasture, poor second growth forest. These activities would occur on lands across the whole range of land use capability from those which could support intensive agriculture to those which should not be deforested.

The population would probably continue to hunt and fish for most of its protein. Education, health, and sanitation would probably not improve much.

Environmental effects of this alternative would be:

Loss of forest products.
Erosion and improverishment of fragile lands.
Increased threat to vulnerable species.
Increased irregularity of stream flows.
Increased silting of streams.
Competition for land and resources among native communities, other established residents and new settlers.
Long term depletion of fish and game.
Long term reduction of land use capability.

These environmental effects would spread fairly slowly. Less accessible parts of the valley, which tend to have the most restricted land use capability, would probably remain unsettled for a while.

This alternative is not likely to occur because Peru plans to build a road into the valley. It is already under construction and will probably be completed either with international financing or national financing. Even if the road were not completed, migration into the valley would probably accelerate, thereby-accelerating adverse effects on the environment.

3.3. Alternative B: Construct A Road, Do Not Have A Natural Resources Project

This is the worst alternative.

Construction of a road, especially one entering the watershed at its headwaters, will invite a rapid influx of new settlers. It will also provoke rapid and massive deforestation. One object of deforestation will be extraction of timber. This will not be complete deforestation because it will seek only the more valuable commercial woods. However, because logging opens penetration roads, it will lead to rapid conversion of logged lands to pasture and agriculture. Another object of deforestation, which will probably be quite widespread, is direct conversion of forest to pasture with little or no utilization of timber.

Massive conversion of forest to pasture can be expected from both current residents and newcomers because cattle raising will continue to be the major economic enterprise in the Palcazu. Its attractiveness will increase with a road that should make transportation more available at lower cost.

People will seek out good land, but good land is limited in the Palcazu so poor land will be used as well. When poor land can no longer produce it will be abandoned to low-grade, secondary forest. More land, probably poor, will be cleared and pasture again attempted but not sustained.

Over the course of time, virtually the entire watershed will be cut over. This will include much of the land in the San Matias and Yanachaga ranges whose only capability for sustained use is protection forest and whose function as protection land is essential to maintain the productivity of the watershed.

The environmental effects of this alternative are extreme. They include:

Massive loss of forest products.
Degradation of large amounts of land by putting it to uses beyond its capacity.
Massive erosion and soil impoverishment.
Serious reduction of wildlife and wildlife habitat.
Serious threat to fisheries from silting of streams, disruption of stream flow regimen, and fishing pressure.
Stream degradation by silting, increased flooding, and bank erosion.
Severe competition for land and resources among native communities, established residents and newcomers.
Unattractive social environment characterized by proverty, disease and malnutrition.

Although a penetration raod into the Palcazu will probably be completed soon, this alternative ought not to occur. The Pichis-Palcazu Special Project is expressly designed to accomplish sustained, sound

development. But if the special project is successful it will be a marked exception to the experience in other parts of the upper selva where roads have been followed by devastation and very low land use productivity over the long run.

The special project probably won't be entirely successful but it probably won't be a complete failure either. Its chances of success would seem to be enhanced by a natural resources management project funded by U.S.A.I.D.

3.4. Alternative C: Construct Road in Lower Valley, Have A Natural Resources Project

This is the preferred alternative.

It contemplates stopping construction on the present penetration road when the first eight kilometers are completed and then building a different road in the north end of the valley. The new road is described in Section 3.1.2. above.

This alternative anticipates and mitigates adverse environmental consequences of building a road into the Palcazu. Its principal objectives are:

Protect lands whose major land use capacity is protection.
Encourage use of land for its major land use capacity and discourage other uses.
Control erosion and protect streams.
Improve utilization of forests for sustained yield.
Improve agriculture and livestock production on suitable lands.
Protect fish and wildlife and their habitats.
Enhance scientific and recreational use of the watershed.
Insure access to adequate natural resources for native communities and other present residents of the valley.
Avoid road construction in rugged protection lands in the headwaters of the watershed.
Assure road access to the most productive lands in the valley.
Minimize disruption of native communities by reaching them with spur roads rather than through roads.

These objectives are met by the elements proposed in the Project Paper Synthesis as follows:

1. Establishment of a management program for the upper selva applicable to the Palcazu;
2. Zoning the Palcazu according to land use capability;
3. Creation of a national park in the Yanachaga range and protection of highlands outside the park;
4. Financing a project in natural forest management for sustained yield at high levels of utilization;
5. Developing a crop and livestock improvement program adapted to major land use capability;

6. Assisting native communities in good land use, production and marketing.

Although this alternative differs from the specific plan for road construction in the Palcazu which is currently under way, it does generally mesh well with the overall road network planned for the upper selva.

Its advantages over the proposed road under construction are set out above in Section 3.1.2. These advantages should encourage acceptance of this alternative.

3.5. Alternative D: Construct Road in Upper Valley: Have a Natural Resources Project.

This alternative contains most of the environmental benefits of the preferred project. However, penetrating the valley with a road from its headwaters, as called for in current plans, has these drawbacks:

- More road construction in steep, wet lands whose best use is protection forest.
- Failure to reach the most productive lands in the northernmost part of the valley.
- Greter exposure of fragile protection lands to incursion.
- Disruption of native communities by a through road.

This alternative is not as good as the preferred alternative from an environmental point of view. It may be less desirable than the preferred alternative from the points of view of engineering and economics as well. It should be carefully compared with the preferred alternative and plans for the road from the headwaters of the watershed should be withdrawn if the preferred alternative is shown to be superior.

3.6. Alternative E: Finance the Road; Have A Naural Resources Project.

This alternative would consist of a natural resources management project containing all the elements of the proposed project with all the environmental benefits that the project entails. In addition, it would include financing construction and maintenance of a road, preferably in the lower end of the valley.

Building a road in the Palcazu will involve some disruption of the environment. That disruption consists of removal of trees, cutting slopes and filling hollows, and diverting streams. Commercial trees which are removed con be sold; no harm is dome to vegetation or wildlife overall. Some damage is done to streams by filling and diverting channels and by introducing eroded material from road cuts and the road surface. This damage can be minimized by careful construction and good road maintenance.

Control over construction and maintenance would follow from assuming financing of the road. The benefits in improved environmental protection are small, however, for the size of the cost of financing.

Financing the road could also result in control over location of the road. Environmentally fragile areas could be skirted and the road routed through areas of least environmental hazard. Again the enviuronmental benefit is small for the cost expended.

Whether this alternative occurs seems to depend more on economic considerations than environmental ones.

3.7. Alternative F: Discontinue Construction of the Road, Have a Natural Resource Project.

This alternative contemplates halting road construction into the valley after the eight kilometers of road now under construction are completed and not building any other roads in the valley. A natural resource project would then be carried out in the roadless valley.

Such a project could readily incorporate the national park element of the proposed project. The other elements would have to be modified, however.

Absence of a road would mean continued difficulty in transportation of products which would continue to be, as now, by air and river. An inexpensive and simple cattle improvement project might be possible. So might a project to improve tornillo and rubber production using the river for transportation. Some work might also be dome with high value crops that could pay the cost of air or river freight. In general, though, forest management and crop and livestock improvement programs would be less sweeping and affect fewer people.

This alternative is not likely to occur because a road will probably be completed in the Palcazu fairly soon.

3.8. Comparison of Alternatives.

COMPARISON OF COMPONENTS OF ALTERNATIVES

Alternative	Natural Resources Project	No Natural Resources Project	Road from lower Valley	Road from upper Valley	No Road	Road Financed	Road Not Financed
A		X			X		
B		X		X		Z	Z
C	X		X			Z	X
D	X			X		Z	X
E	X		Z	Z		X	
F	X				X		

X = the component is expressly included in the alternative.
Z = the component could be included in the alternative.

FIGURE 2

COMPARISON OF ENVIRONMENTAL BENEFITS OF ALTERNATIVES

ENVIRONMENTAL BENEFIT 1/	A	B	C	D	E	F
Acquisition of data for environmental management			x	x	x	x
Training personnel in environmental management			x	x	x	x
Zoning land by land use capability			x	x	x	x
Protection of protection forest lands			x	x	x	x
Protection of Flora and Fauna			x	x	x	x
Natural forest management on forest production lands			x	x	x	z
Appropriate cultivation of permanent crop lands			x	x	x	z
Livestock management on pasture lands			x	x	x	x
Appropriate cultivation of clean cultivation lands			x	x	x	z
Avoidance of road construction in fragile lands	x		x		x	x
Direct access to most productive lands			x		x	
No disruption of native communities by through road	x		x		x	x
Possibility of linkage between road and river transport			x		x	
Controlled environmental impact of road construction					x	
Road maintenance to reduce environmental impact					x	

x = the benefit is conferred by the alternative
z = the benefit is partially conferred by the alternative

1/ Most of these might be termed primary environmental benefits expressed in terms of land use. From them flow secondary benefits such as erosion control and maintenance of soil fertility and tertiary benefits that include improved forest utilization, flood avoidance and similar benefits.

4. AFFECTED ENVIRONMENT

4.1 Location and Boundaries.

The Palcazu watershed is located about 275 kilometers northeast of Lima in the eastern part of the Departments of Pasco and Huánuco. It is bounded on the east by the San Matías range, on the south by the San Carlos range, on the southwest and west by the Yanachaga range and on the north by the Pozuzo River.

Just east of its juncture with the Pozuzo River, the Palcazu passes through a gap in the San Matías range. This analysis covers the Palcazu watershed to this point. The Palcazu continues eastward to join the Pichis River near Puerto Victoria, forming the Pachitea River. That portion of the Palcazu, however, is physically and environmentally more closely associated with the Pichis and Pachitea valleys than with the Palcazu Valley west of the San Matías range. Furthermore, the road currently planned for the Palcazu Valley is going to end west of the San Matías near Puerto Mairo. Future plans do envision connection of the Palcazu and Pichis roads along the lower Palcazu.

4.2 Physical Features

4.2.1. Mountains. The San Matías range is an abrupt, steep range that rises from the eastern edge of the Palcazu River to altitudes of more than 1100 m. It has virtually no foot hills or side ridges and the ridge crest is at an average distance of only 4 or 5 km from the river channel.

The Yanachaga range, on the other hand, is much higher than the San Matías, reaching altitudes of more than 3,000 m. The range has extensive side ridges and foothills spreading into the Palcazu Valley. The crest of the Yanachaga range, due west of Iscozacin in the widest part of the Palcazu watershed, is nearly 40 Km. west of the rivers.

4.2.2. Rivers. The principal river in the valley is the Palcazu itself which begins at the juncture of the Bocaz and Pichanaz Rivers in the southeastern part of the watershed. The Palcazu then flows slightly west of north to join the Pozuzo which originates on the west side of the Yanachaga range. The distance from the point of beginning to the confluence with the Pozuzo is a little over 60 Km. in a straight line. Elevation of the Palcazu is about 400 m.a.s.l. (meters above sea level) at its beginning, dropping to 270 m at the confluence with the Pozuzo.

The Palcazu is fed from the east by small streams at close intervals coming off the San Matías range. Its major tributaries come from the west. Chief among these are the Chuchurras and Iscozacin, which are navigable for small craft. The Palcazu is navigable for small craft up to Loma Linda. Larger craft can reach Puerto Mairo. The northern part of the Valley is narrow so that tributaries entering the Pozuzo are smaller than those further south.

4.2.3. Terrain. There is not much flat land in the Palcazu Valley. Most of what flat land there is forms terraces along the larger streams and rivers; some of this land is flooded periodically. Between the river and the main ridges and foot hills of the Yanachaga range, the land is broken. Although the hills are not all tall, even short slopes are often very steep and the land is cut frequently with small streams. The San Matías range and the main foot hills and ridges of the Yanachaga consist of long, steep slopes as do the high hills in the Valley floor.

4.2.4. Soils. Soils throughout the Palcazu tend to be highly acid and infertile with high concentrations of aluminum. Some of the alluvial soils are slightly more fertile than the upland soils. The soils on slopes tend to be thin and highly erodable.

4.3. Climate

The climate of the Palcazu Valley is warm and wet, becoming cooler and even wetter at higher elevations. Temperature is fairly constant throughout the year so that diurnal variations are greater than seasonal variations. Average daily high and low temperature are approximately 31 and 21°C, respectively, in Puerto Bermúdez in the Pichis Valley. Similar ranges may be assumed for the low elevations in the Palcazu Valley.

Rainfall, which averages from a little under 3,000 to about 4,500 mm per year in the Valley floor, varies seasonally. Wet months are October to May; June through September are drier.

There is only one meteorological station in the watershed, on the Bocaz River in the southern part of the watershed, elevation 1,050 m. It reports an average annual rainfall of 3,380 mm over a period of seven years.

4.4. Life Zones

Life zones, the expression of the relationship of rainfall, biotemperature, and evapotranspiration to plant and animal life, have been described and mapped for the watershed. In the absence of temperature and rainfall data, the life zones were determined by field inspection of vegetation and soil.

The life zones reflect the wet climate of the watershed. All of the life zones except for one are classified as wet forest or rain forest. The one exception, Tropical moist forest, including Tropical moist forest in transition to Tropical wet forest, covers about 15 percent of the Valley floor.

The wettest life zones occur in the southern and western part of the watershed. The Yanachaga side of the watershed is wetter than the San Matías side. The wetness of the region is an overriding ecological characteristic which over the course of time has influenced soils, landforms and biota and which restricts land use.

4.5. Biota

4.5.1. Wildlife

The Palcazu watershed comprises two zoogeographic provinces, the Amazonic in the lowlands and the Yungas at medium and high elevations, and thus it has an exceptionally large number of species of animals. The high diversity of species is accentuated by the fact that the Palcazu is probably part of a Pleistocene refugium in which many endemic species have evolved.

The animals of the Amazonic province include a goodly number of large species whereas the animals of the Yungas province tend to be smaller. The Yungas is particularly rich in birds.

There are several rare species in each province and also a few which are being hunted to the point of threatened extermination. River turtles, several species of monkeys, and the spectacled bear are among the threatened species. Some species which are not threatened generally are becoming scarce locally because of heavy hunting.

4.5.2. Fisheries

The Palcazu River system has ample populations of a large number of species of fish. Some of the species are sedentary but many are migratory, moving up and down the river seasonally.

The fisheries are well fished by the local population and probably are a more important source of protein for many people than is game or domestic meat. At present the fisheries are not being over exploited. Virtually all of the current exploitation is for subsistence in the Palcazu, but downriver on the Pachitea some of the stocks are harvested commercially.

Although fisheries in the Palcazu do not appear to have commercial potential for the national market, they should continue to be an important social source of food on a sustained yield basis.

4.5.3. Flora

The vegetation in the Palcazu exhibits a wide variety of form and high diversity of species. Forest is the natural vegetation of the entire watershed. In the lowlands it tends to be tall forest, whereas at upper elevations cloud forest predominates. On the highest slopes of the Yanachaga, diminutive trees form elfin forest. There are some rare species of plants and a number of endemic species.

Besides the major forest types which tend to reflect climate, there are some formations that reflect edaphic conditions. Examples are swamps of aguaje palm and the association on white sand soils typified by tornillo and rubber trees.

4.6 Land Capability

4.6.1. Protection Forest Land

Because of its rugged terrain, fragile soils, and high rainfall, most of the land in the Palcazu watershed is best suited for use as protection forest. This is true of virtually all of the San Matías range and all of the main ridges and foothills of the San Carlos and Yanachaga ranges. Much of the high hill areas in the Valley floor should also be retained in protection forest.

Although protection forest land will not support either harvesting of forest products or cultivation of any kind, it has economic uses. These include recreation, watershed protection, and shelter for wildlife.

4.6.2. Production Forest Land

Nearly half of the land at low elevations in the Palcazu watershed is suitable for production forestry, that is, the extraction of forest products while generally retaining forest cover on the land. This land is not suitable for any form of cultivation, however, and it should not be cleared.

More than half of the forest production land is so steep and wet that extreme caution should be used in timber extraction to avoid erosion. The rest of the land is less susceptible to erosion and a wider variety of harvest methods are appropriate.

4.6.3. Permanent Crop Land

Land use for permanent crops is use in which a continuous cover of perennial plants is maintained and harvested with infrequent cultivation. Examples are tree crops, such as fruits and nuts, and other long-lived plants like plantains.

Land may be used for permanent crops if it is too easily erodable or too infertile to support pasture or clean cultivation and yet not so delicate as to prohibit deforestation.

4.6.4. Pasture Land

In the wet climate of the Palcazu, pasture is a more restricted land use than permanent cropping. Cattle compact the soil and their trails invite erosion. Their production by grazing is only appropriate on gentle terrain with fairly fertile soil. Even though land may be physically capable of supporting pasture, the wet climate affects nutrition and quality of the pasture adversely.

4.6.5. Land Suitable for Clean Cultivation

Clean cultivation, the production of crops such as corn or

beans on bare soil with frequent cultivation, is too demanding a use for most of the Palcazu Valley. Less than ten percent of the land in the Valley floor has good enough soil and gentle enough terrain for clean cultivation. Again the wet climate limits crop suitability and production levels.

4.7. Social Setting

An Annex to the PID for the Central Selva Resource Management Project, by Miller and Martínez, describes the social setting of the Palcazu Valley. The Palcazu population consists of three groups - Amuesha native communities, people of European origin who have gradually settled the area over several generations, and recent colonists from other parts of Peru.

The circumstances of the Amuesha are described in detail by Richard C. Smith in an Appendix. In general, the rest of the population is poor although some of the large, established ranchers are reasonably well off economically. Education, health, and sanitation facilities are inadequate for all social strata.

Most of the population engages in some subsistence farming, hunting and fishing, and cattle raising. Cattle is the principal product of the Valley. A little commercial logging for outside markets also occurs.

Estimates of current population of the Valley vary from PEPP's estimate of 4,500, to 15,000 estimated by Miller and Martínez in their Annex to the PID. A more exact figure on population should be available when the results of the national census of July 12, 1981 are known.

4.8 Current Land Use

The most common type of land use in the Palcazu consists of deforestation in which little or no timber is harvested, followed by a cycle or two of crops, and then conversion to pasture. On many holdings, conversion to pasture often occurs directly after deforestation. Sometimes crops are not followed by pasture but by second-growth forest known as "purma." Some pasture is also overgrown and becomes "purma."

Much of the better land in the Valley, especially between Loma Linda and Puerto Mairo, has already been cleared. It is used for pasture even if it is suitable for clean cultivation, probably because there are no markets for agricultural products and also because cattle raising is the preferred activity of the landholders.

Much land which is not suitable for pasture, but which could be used for permanent crops or forestry, is also in pasture. This land often shows signs of erosion and its productivity for grazing tends to be low. Long term use of the land for pasture degrades it, reducing its suitability for permanent crops or forestry.

5. ENVIRONMENTAL CONSEQUENCES

5.1 Environmental Impacts of the Alternatives

All of the alternatives described earlier entail some form of development of the Palcazu Valley. Development is almost certain to occur and it is almost certain to center around the presence of a new road in the Valley. Unguided development of the Valley will bring serious environmental impacts. Guided development can mitigate those impacts and enhance environmental and social benefits. Therefore, environmental impacts and mitigation of the alternatives will be discussed in terms of constraints and opportunities of the Palcazu environment for development.

5.2 Environmental Constraints on Development of the Palcazu Valley

5.2.1. Limited Land Use Capability

The Palcazu watershed contains roughly 190,000 hectares of land. About 95,000 hectares in the valley floor have been studied and classified according to land use capability. The lands in the San Matías, San Carlos and Yanachaga ranges have not been classified. However, these lands are so rugged and have such wet climate that virtually all of them can only serve as protection forest. Small amounts of land with forestry or agricultural potential probably occur in parts of the Iscozacín, Chuchurras and Lagarto watersheds which were not classified. But these lands would probably make only a small addition to Valley lands with some development potential for forestry or agriculture.

FIGURE 3

LAND CAPABILITY OF 95,000 HECTARES IN PALCAZU VALLEY FLOOR 1/

CAPABILITY CLASS	AREA IN HECTARES	PERCENTAGE AREA
Clean cultivation	7,200	7.6%
Pasture	12,671	13.3
Permanent Crops	13,653	14.4
All agriculture	33,554	35.2
High production forestry	19,150	20.3
Low production forestry	24,646	25.9
All production forestry	43,796	46.2
Protection Forest	14,841	15.6
Riverbed	2,839	3.0
TOTAL:	95,000	100.0

1/ Taken from Appendix by Joseph A. Tosi, Jr.

5.2.2. Low Productivity

The land available for agriculture, livestock or forestry cannot be expected to give very high yields. Pool estimated that land classified for clean cultivation can yield $278 per hectare per year from a ten hectare parcel planted to a variety of crops using traditional technology. For permanent cropland, Pool estimates an initial annual income of $2,165 from 30 to 35 hectares planted to a variety of crops. Income would increase in later years as more area came under cultivation and pig production peaked.

Grazing of cattle by current methods in the Palcazu yields 31 kg/ha/year according to Staver for a value of approximately $50 per hectare per year.

Hartshorn estimates standing volume of commercial timber to average 25 to 35 m^3/Ha. Forest lands of this capacity would yield one m^3/Ha./year if managed on a 30 year rotation.

These low productivity levels are atributable to the basically infertile soil of the Palcazu. Crop and livestock productivity are further depressed by the excessively wet climate.

5.2.3. Low Adaptability of Other Production Systems

Most production systems for agriculture, livestock production, and forestry in the tropics have been designed for drier climates and more fertile soils. Sometimes they use temperate zone plant materials and usually they apply temperate zone technology regarding fertilizers, mechanization and so on.

There are some instances of good success in such high technology systems. An example from Peru is occurring at Yurimaguas in the Central Huallaga Valley where North Carolina State University has an agricultural program.

Yurimaguas is very different from the Palcazu however. It is a good deal drier with fertile soils that are not too acidic. Moreover, the fertile soils occur on large expanses of fairly level land. None of these conditions are present in the Palcazu so it probably will not be possible to repeat the Yurimaguas success story there.

5.2.4. Low Carrying Capacity

The three factors noted above combine to make the carrying capacity of the Palcazu very low. The poor, dissected, heterogenous land of the Palcazu must be worked in fairly large parcels to yield even modest incomes to those who work it. Several of the background reports taken together can give a rough idea of how large a farm, ranch, or forest tract would have to be to support a family.

The small total amount of useful land in the Palcazu will not

support too many families and there is a sizeable population in the Valley now although estimates of its number vary widely.

Fairly soon data from the 1981 census should be available for the Valley. Aso a land titling and platting project contracted for by PEPP from the Ministry of Agriculture should be completed soon. This information should show how many people are in the Valley and where they are. Comparison of these data with land capability data will give a better approximation of carrying capacity and whether and how the Valley can hold increased population.

5.2.5. High Environmental Vulnerability

Improper land use, primarily deforestation of protection forest lands, improper harvesting of forest production lands, and attempting pasture on lands which do not have the capacity to sustain them, will cause severe environmental damage in the Palcazu.

In the wet climate, forests must be maintained on protection lands or those lands will erode. This will decrease their capacity to support useful vegetation and will cause excessive silting of streams plus greater irregularity in stream flows. This, in turn, damages fisheries, agricultural lands and human settlements.

Other inappropriate land uses have the same general effects as deforestation of protection lands. Deforestation also involves waste of forest resources, impoverishment of vegetation, and loss of wildlife habitat.

5.3. Environmental Opportunities for Development in the Palcazu Valley

All of the environmental constraints in the Palcazu are counterbalanced by a group of environmentally sound development opportunities. These opportunities are based on land use in accordance with land use capacity. They are embodied in the project elements proposed in the Project Paper Synthesis for the Palcazu Natural Resource Management Project.

5.3.1. Regional Development Strategy

This project element is aimed at the entire upper selva. Much of it is intended to be directly useful in the Palcazu however. Principal aspects of this element that will protect the environment are increased data on the environment and environmental education of technicians and land owners in the Valley.

5.3.2. Land Capability Zoning

Application of land use capability to actual land use by zoning means to insure that land is not put to uses that it cannot sustain. If it works, it will prevent deforestation of protection lands, improper harvesting of forest production lands and establishment of pasture on unsuitable lands. If these land uses are avoided, all their secondary adverse environmental effects such as erosion are also avoided.

5.3.3. Upper Watershed Protection

Upper watershed protection will consist of establishing a Yanachaga National Park and protected lands in the San Matías range. This should prevent deforestation of upper slopes and the consequent ill effects there and downslope. It will also be a refuge for flora and fauna enhanced by a lowland corridor for protection of lowland species. Its environmental benefits are complemented by social and economic benefits of tourism, recreation, and scientific study.

5.3.4. Forest Management and Agricultural Research and Extension

These project elements aim to 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 management. This should be the best way to sustain productivity in the Valley with minimal environmental damage. In fact, it is probably the only way to sustain productivity.

5.3.5. Other Project Elements

The Project Paper Synthesis relates two other project elements: native communities assistance and highway construction.

Native Communities assistance would mould land use in accordance with land capability to the special circumstances of Amuesha native communities.

Highway construction, emphasizing a road in the lower rather than the upper Valley, is treated at length in section 3 above on alternatives.

5.4. Unavoidable Adverse Impacts

The entire thrust of the Project described in the Project Paper Synthesis is to avoid adverse environmental impacts of building a road into the Palcazu without taking measures to prevent environmental damage.

5.5. Relationship Between Short term Uses and Long term Productivity

By tying land use to land capability and then enhancing productivity, the Project expects that short term uses will maintain and enhance long term productivity of Palcazu lands.

5.6. Irreversible or Irretrievable Commitments of Resources

The resources proposed for use in the Project are the land of the Palcazu Valley and its soil and vegetation. When land is used within its capacity, that use can be sustained on it. Such land can also be converted to less demanding uses. But when land use that exceeds land capability is attempted, land capability is depleted, often irreversibly. Because the Project proposes to use land in accordance with its capability it does not have irreversible or irretrievable commitments of resources.

5.7. Direct and Indirect Effects

Direct effects of the proposed project in natural resource management should be environmentally sound land use that can be sustained by the capability of the land. Indirect effects are preservation of flora and fauna, control of erosion, maintenance of good hydrologic balance, and maintenance of land productivity.

5.8. Conflicts Between the Proposed Action and Land Use Plans, Policies and Controls

The proposed action described in the Project Paper Synthesis does not conflict with land use plans, policies and controls. It meshes with them very well. Peruvian law requires that land use harmonize with land capability. It calls for protection of forests and wildlife, integrity of native communities, and soil conservation. All these goals of the law are also goals of the proposed action.

5.9. Energy Requirements and Conservation

The project elements in the proposed action are specifically designed to be labor intensive. They do not recommend introduction of high levels of new technology so their energy requirements are fairly low. This low level of energy input is the principal energy conservation aspect of the program. If the proposed action succeeds in imposing good watershed management on the Palcazu it will simultaneously succeed in conserving its potential for hydroelectric power generation.

5.10 Natural Resource Requirements and Conservation

The natural resource requirements of the proposed action are virtually all of the lands of the Palcazu. The object of the action is to manage those resources expressly for their conservation.

5.11 Urban Quality

The proposed action affects only rural environments, urban quality is not affected.

5.12 Historic and Cultural Resources

The subject of historic and cultural resources is treated in the social analysis that accompanied the PID and in the papers by Richard C. Smith annexed and appended to the Project Paper Synthesis.

5.13 Mitigation Measures

Mitigation Measures are discussed above in sections 5 - 1 and 5 - 3.

(VS-0045Z, d.84N, hlc-18jan88)

The Conservation Foundation

FINAL REPORT ON THE FIELD VISIT TO THE PRESCAP WOOD PRESERVATION PLANT IN SHIRINGAMAZU, PERÚ, JUNE 21-26, 1987

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INTRODUCTION

An integral component of the Central Selva Resources Management Project in Peru is the treatment of poles and posts with Chromated Copper Arsenate (CCA). The proposed treatment process is a high pressure sap displacement system called Prescap. The USAID Mission in Lima asked The Conservation Foundation to gather information on environmentally sound handling and disposal of CCA and its waste products, organize a team of experts to review the Prescap facility in Shiringamazu, and prepare recommendations for the environmentally sound operation of the facility. The results of these efforts are presented in this paper.

On May 19, 1987 The Conservation Foundation presented its preliminary findings to the Mission in Environmental Considerations for the use of CCA in the Prescap Wood Preservation Plants of the Central Selva Resources Management Project. Subsequently, Lane Krahl, an Associate with the Foundation, led a team of experts on a visit to the Shiringamazu facility on June 21 through 26, 1987. The team consisted of Mr. Krahl, Richard Brunker, Ph.D., a toxicologist with the U.S. Environmental Protection Agency, and Geoffrey Gill from Koppers Company, Inc., a major producer and user of CCA for wood preservation. Mr. Krahl is an environmental policy analyst with over six years of experience in assessing domestic and international environmental programs. Dr. Brunker is an environmental toxicologist with 12 years of experience in assessing the health and environmental risks posed by the use and disposal of toxic chemicals including wood preservatives. Mr. Gill is the Export Manager for Koppers Company, Inc. and has over 20 years of experience in wood preservation in the United States and abroad.

This paper consists of five sections. The first four sections present general information on the viability of using CCA in a Prescap system, potential health and environmental hazards posed by the use of CCA, control measures to avoid contamination during handling of CCA solutions, and the disposal of CCA and its waste products. Much of the information presented in the May 1987 report is incorporated into these sections of the report. The final section presents the specific recommendations of the team of experts for the operation of the facility in Shiringamazu.

VIABILITY OF CCA IN THE PRESCAP PROCESS

The Prescap system is not currently in commercial use in the United States, however, during the 1970s a plant was operated in Avenger, Texas (Gjovik 1987). It has apparently been used commercially in Papua New Guinea and New Zealand; however, we have not been able to locate written materials on its effectiveness in these areas. The information on the viability of CCA in Prescap systems in this report comes primarily from

U.S. industry representatives who have heard of the system, but have no direct experience with it. These include personnel at the Osmos Wood Preserving Co., Inc. and Koppers Company, Inc. Lee Gjovik, at the U.S. Forest Products Laboratory in Madison, Wisconsin, however, has conducted some research at the Avenger plant and provided us with some of his information. A list of contacts made while collecting the information in this report is attached as Appendix A.

The industry representatives are concerned that the chromium (fixing agent) in the CCA will react prematurely with the sugars in the sap thereby fixing the copper (fungicide) and arsenate (insecticide) before full penetration is achieved and causing sludge buildup on the exterior of the wood. The extent of the problem will vary with each species because of variances in sap sugar content. An additional problem is sludging of the treatment solution and equipment as a result of recycling the sap to the treatment vats, a desirable practice for both economic and environmental reasons.

To avoid these problems, U.S. companies dry wood to below 30% moisture content before treatment with vacuum pressure impregnation. Unfortunately, this practice is not viable for Prescap which treats green wood.* In addition to drying wood below 30% moisture content, Koppers Company recommends in-line filtration of recycled solution and diluted work tank solutions to help prevent sludge build-up in the treatment solution and equipment.

These limitations of CCA are generally accepted for low pressure sap displacement and diffusion processes for which other chemicals have been developed. However, the only two articles we could locate on high pressure sap displacement processes (Hudson 1968 and Hudson and Shelton 1969) did not mention this problem and report successful treatment of southern yellow pine, red oak, red and black gum, and poplar with a CCA solution. Furthermore, Lee Gjovik did not not encounter a sludging problem in his studies at the Avenger plant, nor did he find insufficient penetration in his investigation of preservative penetration behind knots in logs treated at the plant (Gjovik 1987).

Because of the paucity of information on the viability of using CCA in the Prescap system, effectiveness of the system for treating the species in the Palcazu River Valley should be high on the list of research priorities for the Central Selva Project and should precede further investment in Prescaps and CCA. Specific recommendations for the type of analyses which should be performed are presented in the Recommendations section of this report.

* Vacuum pressure impregnation was not originally thought possible in the Central Selva project; however, Appendix B presents a discussion of the use of this process and its possible application in the Central Selva project.

HEALTH AND ENVIRONMENTAL EFFECTS OF CCA

Chromated Copper Arsenate (CCA) is a highly effective wood preservative protecting wood against both rot and insect damage. When properly applied, the copper and arsenate precipitate and are fixed in the wood becoming highly leach resistant. The finished product is clean, oil-free and odorless and can be painted or stained. In addition to being a effective wood preservative, however, CCA is also a potentially dangerous chemical and is regulated in the U.S. by the Environmental Protection Agency (EPA).

HEALTH EFFECTS

In regulating the use of CCA, the EPA has focussed on the inorganic arsenicals. The EPA regulations are based on epidemiological studies of carcinogenic risks to copper smelter workers exposed to airborne arsenic and residents of a community in Taiwan exposed to arsenic in their drinking water (USEPA 1984). Industry scientist and some academics have disputed applicability of these studies to carcinogenic risks at wood preservative plants because of differences in the valence states of inorganic arsenicals in these different settings. Furthermore, because of concerns about the quality of the studies done in Taiwan, the Superfund Office at EPA recommended in November 1985 that risk assessments for arsenic should only use toxic effects (reference doses) which are significantly higher than the "allowable" doses derived using carcinogenic risks.

Chromium There are several reports concerning the effects of industrial exposures from hexavalent chromium (Cr^{6+}). The International Association of Research on Cancer (IARC) has taken the position that there is sufficient evidence that industrial exposures to chromium has caused lung cancer in workers (USEPA 1985). There are also animal studies that provide compelling evidence that hexavalent chromium can cause tumors from the inhalation of chromium dusts. The inhalation of particulates generated from sawing treated wood must be avoided (Friberg et al 1979).

Tannery workers exposed to hexavalent chromium (as chromic acid) have developed skin ulcers (USEPA 1985). There are also reports of acute irritative dermatitis and allergic dermatitis reactions from hexavalent chromium exposures. Skin contact with any solutions containing hexavalent chromium (such as CCA) should be avoided (Friberg et al 1979). There is no evidence, however, that the ingestion of chromium compounds has ever caused cancer in humans or laboratory animals but this may be due to insufficient test data. The EPA, therefore, does not consider chromium in the environment to constitute a cancer threat (USEPA 1984a).

Hexavalent chromium has also been demonstrated to be mutagenic (modifies DNA) in short term microorganism test systems

(USEPA 1984a). It is also clastogenic (it can break genes) in other test employing bacteria as tested organisms. These test suggest a cancer-causing capacity for this element.

Hexavalent chromium can also cause subchronic toxic impacts to those subjected to indusrial inhalation exposures. These effects include ulcerated and perforated nasal septa (USEPA 1984a).

Arsenic Arsenic is a notorious systemic toxin that blocks specific metabolic reactions. It is highly toxic by both the inhalation and oral routes. Curiously, however, there is compelling evidence that it is an essential element in the nutritional requirements of vertebrates (USEPA 1985).

Although arsenic is classified as a known human carcinogen this classification is currently under review and considerable controversy. This classification resulted from an epidemiological study of the cause of an epidemic of skin cancer in Taiwan, but this study and its conclusions are currently being restudied. This is because numerous studies using laboratory animals subjected to high oral doses of arsenic over an extended interval of time have failed to elicit increased numbers of cancerous tumors. Also, many public water supplies contain relatively high levels of arsenic but studies indicate no increased cancers in the consuming communities. In any case, if ingested arsenic does cause cancer it only causes skin cancer (USEPA 1984a).

However, the inhalation of particulates containing arsenic has caused lung cancer in humans exposed in industrial settings. This exposure route has also been reported to cause birth defects in laboratory animals (USEPA 1985). Considering this possible threat from such particulates, care should be taken to protect individuals from any possible airborm particles from sawing treated wood.

There have also been reports of polyneuropathy (nerve damage) involving sensory and motor neurons from chronic occupational inhalation exposure to arsenic compounds. The extremities and myelinated long-axon neurons have been particularly affected. Contaminated foods have also been reported to cause these affects. The most common effects include numbness and tingling effects in the hands and feet as well as difficulties in making coordinated movements (Friberg et al 1979).

Copper There is no evidence that copper is particularly toxic or that it is carcinogenic to humans. It is, in fact, an essential element. Extremely high levels of copper in the diet can elicit toxic effects to humans, but such impacts are not a realistic exposure scenario at this facility. Such very high doses have been reported to cause vomiting, diarrhea, nausea, and gastritis eliminating this element from the affected person (Friberg et al 1979).

However, sheep are very susceptible to copper toxicity. The digestive tract is particularly vulnerable to copper. Effects include gastroenteritis, shock, and death (USEPA 1985). Such knowledge should provoke measures to preclude local sheep from access to contaminated bark from the process operation.

Solutions containing copper salts act as irritants producing an itching eczema. Conjunctivitis, ulceration, or turbidity of the cornea of the eyes can result from the accidental contact with copper solutions (USEPA 1984a). Appropriate eye protection is warranted in handling solutions such as CCA.

Human exposure Human exposure to CCA is of greatest concern at the processing plant particularly during mixing powder formulations, manual operation and maintenance of treatment equipment, handling freshly treated wood and chemical spills. There are not many studies of actual CCA wood preservation plant worker exposure to arsenic; however, a study done in California did find elevated arsenic levels in workers' urine (Rosenberg et al 1980).

Human exposure can also occur during the use of CCA-treated wood. Exposure can occur during sawing, drilling and nailing of treated wood, although proper ventilation appears to minimize these risks. Burning of CCA-treated wood releases arsenic and cases of acute reactions have been reported from such burning (Peters et al 1986). Finally, EPA prohibits direct contact of treated wood with food products and drinking water. EPA has determined, however, that the exposure to inorganic arsenic in houses built with CCA-treated wood is not significantly different from that in houses of untreated wood. EPA also allows the use of CCA-treated wood for constructing drinking troughs for domestic animals and livestock.

ENVIRONMENTAL CONSIDERATIONS

Chromium Chromium is known to be an essential element. It is accumulated by numerous aquatic and marine organisms. It can pass through the food chain from prey to predator or from plant to animal (USEPA 1985).

Practically all soil chromium is in the trivalent form which is only slightly toxic and relatively immobile. It is possible, however, but very unusual for chromium to be in the hexavalent form in soils. This situation requires highly oxidative conditions in the soil that it usually caused by the presence of high levels of manganese (Leeper 1978).

Conditions that affect the toxicity of chromium in aquatic ecosystems include water hardness, temperature, dissolved oxygen, age of affected individuals and the species impacted. Curiously, trivalent chromium is more toxic to fish than hexavalent chromium (USEPA 1985).

Although some root systems of plants will accumulate chromium, none of the plants normally used as food by humans or animals feed will accumulate high levels of this element (USEPA 1985).

Arsenic If arsenic is released into the environment it can become mobile but this depends upon which of the oxidation states it attains. Under specific conditions in aquatic environments it can be methylated to form methylarsenicals or can be converted to arsine gas; both of which are volatile (USEPA 1985). The fact that it can be mobile and metabolized can cause arsenic to cycle through aquatic systems eventually reaching the deep ocean floors. Fish contain fairly high levels of arsenic (USEPA 1984a).

All inorganic states of arsenic have similar levels of toxicity to environmental receptors in aquatic systems. Vertebrates can metabolize moderate levels of inorganic arsenic in their livers. Because of this, arsenic does not bioaccumulate in these organisms and arsenic toxicity does not appear to incease with chronic exposure to low levels of this element (USEPA 1984a).

Poisoning by the ingestion of higher doses of arsenic is not particularly uncommon among domestic animals. Arsenic can cause edema of the digestive tract, pulmonary congestion, hemorrhage of the cardiac serosal surfaces, and liver cell damage. Local domestic animals, particularly ruminants, should be precluded from exposures to substances such as bark that may be contaminated with arsenic (CCA) (USEPA 1985).

Copper As previously mentioned, copper is very toxic to sheep by direct action on their digestive tract. It is also toxic to swine and somewhat less toxic to cattle (USEPA 1985).

This element will adversely impact a very wide range of aquatic organisms including algae, copepods, rooted aquatic plants, and fish. Very small amounts can effectively kill almost all of the higher forms of life in lakes and affected streams. Algae will bioaccumulate copper to a great extent. It also damages the gill surfaces of fish. However, bivalve mollusks such as oysters can bioaccumulate copper up to 28,000 times background levels with no evident adverse effects (USEPA 1985).

Copper has a strong propensity to bind to manganese oxides, clays, hydrous iron, carbonate minerals, and organic matter and, therefore, tends to be fairly immobile in aquatic ecosystems. Organic acids can mobilize copper but sorption processes and nutritional requirements within the biota limit the scope and extent of any releases (USEPA 1985). Levels of copper in solution, and therefore mobile, depend upon the chemistry of the water with ionic copper being more soluble in relatively acidic regimes.

p

Copper is accumulated by plants in soil regimes but is not generally biomagnified as it is an essential element and is readily utilized in metabolic processes (Leeper 1978).

The mobility of copper in soils is limited by its adsorption to organic matter, clays, sulfides, and other soil ligands although some copper compounds are soluble and, therefore mobile. In general, however, most soils will immobilize ionic copper spills of aqueous solutions (Leeper 1978).

Environmental Contamination: Environmental contamination from CCA is most likely to occur from inadequate control of runoff from the treatment facility, uncontained drips from freshly treated wood, and improper disposal of wastes. Any of these situations could lead to contamination of surface waters and potential for fish kills. The potential also exists for contamination of ground water.

REDUCING EXPOSURE FROM PLANT OPERATION

As the title of this section states, the control of contamination is a matter of reducing exposure, not eliminating exposure. On the surface this difference may appear trivial, but the difference in the decision process under these two approaches is significant. If a society opts to eliminate contaminants it has assigned an infinite value to the absence of contaminants, i.e., elimination at any cost. The decision to reduce rather than eliminate contamination acknowledges the tradeoffs between the use and non-use of processes which produce contamination. The decison-makers must determine how much of a reduction is enough, i.e., what cost of reduction is acceptable. The point of this digression is to highlight that the information we can provide on process and disposal controls comes from EPA's determinations of risks and acceptable risks. The determination of acceptable risks for the Central Selva project could be quite different. For that reason we have included not only information on the requirements set by EPA, but also on the risk estimates they used to set the requirements and the risks associated with alternative control approaches.

EPA regulates CCA in the workplace under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). In January 1986 EPA promulgated rules governing the labeling of CCA which contain use restrictions (USEPA 1986) Excerpts from these rules pertaining to the use of CCA are attached to this report as Appendix C. EPA's rules are based on an assessment of carcinogenic risks from long-term (30 year) exposure to the inorganic arsenicals in the CCA. The risk estimates used in this assessment are conservative; that is, the true risks are not likely to be higher than the estimates but they could be considerably less. The risk estimates made by EPA are shown in Appendix D of this report.

EPA does not state a risk reduction goal for the regulation of arsenical wood preservatives, but an examination of the "acceptable" risks (i.e., those remaining after required protective measures are taken) indicates that they are generally geared to reducing risks below the one in a thousand probability range (less than 1 x 10exp-3) although for ambient air exposure 4.1 x 10exp-3 is considered "permissible".

Although these rules were written for plants using pressure cylinders, the basic control prescription is applicable to Prescap operations: avoid CCA contact with skin, eyes and mouth and minimize inhalation of dust.* Another general prescription offered by the industry is that employees be educated about the potential hazards of working with treating solutions, freshly treated wood and wastes generated by the treatment process. This section contains general observations on reducing risks at CCA wood preservation facilities. The information in this section comes primarily from EPA (USEPA 1984b and USEPA 1986). Specific recommendations for reducing risks at the Prescap operation in Shiringamazu are presented in the Recommendations section of this report.

Inhalation Hazards CCA solutions are aqueous and pose little or no threat of volatilization of inorganic arsenicals. The concern with inhalation is associated with arsenic in a dry form which occurs as dust at the facility. The small particles can be absorbed in the lungs and larger particles can be ingested. Workers are exposed to some arsenic particles throughout the plant as a result of leaching, drying and flaking of the CCA solution. Higher concentrations are associated with the mixing of powder formulations outside of closed systems.

EPA addresses the inhalation threat through two avenues. First, they require that the treatment process leaves no visible surface deposits on the wood, thus reducing the sources of arsenic dust. This requirement can be met by: using oxide formulations instead of salt formulations, treating "dry" wood, maintaining a clean facility, draining excess solution from the wood before final drying, and avoiding treatment solution sludging by minimizing contamination of solution and maintaining the proper chemical balance. EPA cites three industry standards for clean wood. Copies of these standards are on file in the USAID Mission in Lima. If the use of CCA in the Prescap processes produces surface sludging, as discussed above, the result would be not only an unsightly product, but also increased worker exposure.

Although EPA requires a clean product surface, its primary control mechanism for reducing inhalation is facility air monitoring and the use of respirators if the air contamination

* CCA, a water based preservative, has no vapor pressure, therefore, vapor inhalation is not a concern.

exceeds the Permissible Exposure Limit (PEL) of 10 micrograms per cubic meter.* A facility with airborne arsenic levels above the PEL is required to provide workers with MSHA/NIOSH approved respirators. Copies of the MSHA/NIOSH standards are on file in the USAID Mission in Lima.

The respirators are estimated to reduce the inhalation exposure by 99%. EPA also investigated the use of dust masks to reduce inhalation exposure. They estimated that dust masks would reduce exposure by 80%. Although EPA promulgated the respirator requirement, the 80% reduction estimated for dust masks would reduce the risks to within the same range (8.2 x 10exp-4) as EPA deemed "acceptable" for other control requirements (see Appendix D, "Handling freshly treated wood," "Brush-on Applications" and "Sawing/fabricating treated wood").

Skin Protection Skin contact is most likely to occur during mixing solutions, and handling treatment equipment and freshly treated wood. To reduce these exposures at treatment facilities EPA requires that mixing be conducted in closed systems (discussed below), impermeable gloves be worn when handling freshly treated wood and opening treatment cylinder doors, and that impermeable gloves, boots, overalls and jackets be worn when entering a treatment cylinder. When involved in brush-on applications of CCA, EPA requires that impermeable gloves and coveralls be worn to avoid contact with hands, arms and legs due to spilling and splattering.

EPA estimates that when only the hands will be in contact with the CCA, impermeable gloves can reduce the exposure by 90%; likewise, during brush-on applications, coveralls and gloves will reduce exposure by 90%; but when entering a treatment cylinder, full protective clothing will only reduce exposure by 80%. One other point to consider is that EPA based its exposure estimates on standard industry practices at U.S. facilities, i.e., workers are assumed to be dressed in long-sleeved shirts, long pants and shoes.

The application of these standards is complicated by the fact that impermeable coveralls can cause heat stress, an additional risk to the worker. This issue has not been raised in the U.S. in regards to the use of CCA, but it has come up in regards to EPA's original proposal to require coveralls for outdoor use of creosote and pentachlorophenol wood preservatives. In response to this concern EPA dropped the requirement for impermeable coveralls and in its place required "long-sleeved shirts, long pants, and impermeable apron." (USEPA 1986, p. 1336). It is interesting to note that EPA's estimated

* Koppers Company has conducted air monitoring at all of their vacuum pressure impregnation facilities using CCA and found virtually all samples to be below the PEL with most being below 5 micrograms per cubic meter during an 8-hour workday exposure.

cancer risks from dermal contact of equal amounts of pentachlorophenol and CCA wood preservative solutions are relatively similar. Thus one can speculate that where heat stress is a concern, the use of long-sleeved shirts, long pants and impermeable aprons could replace impermeable coveralls in CCA applications.

Mixing Solutions Exposure during mixing results primarily from suspension of powder formulations. To address this problem, the Koppers Company has been marketing only CCA liquid concentrates for over a decade. The risks associated with mixing liquid formulations are small. If powder formulations are used, EPA requires that they be mixed in a closed system where no arsenic can be released to the surrounding environment. This requires an automated system which pneumatically unloads powder from trucks into closed mixing tanks. In 1984 EPA estimated such a system would cost $10,000.

Personal Hygiene To avoid ingestion of CCA, EPA requires that applicators not eat, drink or use tobacco products while mixing solutions and handling treatment equipment or freshly treated wood. In explaining its position, EPA raised a general concern about even eating, drinking or using tobacco products around stacks of freshly treated wood. In addition, EPA requires that all workers wash their skin thoroughly before eating, drinking, using tobacco products or using the restrooms.

EPA requires that protective clothing be changed when it shows signs of contamination, thus reducing undue contact with the preservative. EPA also requires that protective clothing, workshoes, boots and other equipment be left at the treatment facility. This reduces exposure to workers' family members. Although such exposure has not been documented for CCA workers, risks to family members from exposure to work clothing has been documented in other industries where this route has been studied (e.g., the asbestos industry).

WASTE MANAGEMENT AND DISPOSAL

The wastes from CCA treatment facilities include used solution, runoff from the treatment and drying areas, sludges from treatment solution, used filters, contaminated dirt, and worn-out protective clothing. All of these wastes must be treated as hazardous and disposed of in a controlled manner.

EPA regulates waste from CCA wood preservation plants as hazardous wastes under the Resource Conservation and Recovery Act (RCRA). RCRA is a comprehensive waste management program, often described as "cradle to grave" waste management. It includes requirements for waste analysis, plant operation, disposal, location and design, record keeping, environmental monitoring, emergency preparedness, corrective action in the event of a release, facility closing, and post-closure environmental monitoring. At the risk of oversimplifying, the program's

primary objective could be described as containment of hazardous waste.

At wood preservation facilities in the U.S. containment is achieved by controlling and collecting all runoff from the treatment and drying areas, storing chemicals in contained areas, stabilizing wastes and disposing of wastes in contained landfills. Runoff control is achieved by installing contiguous, diked concrete pads under the process area, the drying area and connecting passageways. The runoff is collected for reuse in solutions or disposal. Likewise, drums of chemicals are stored on diked concrete pads which can hold at least 10% of the total storage volume or 100% of the largest tank, whichever is greater. Often storage area pads and dikes are coated with a chemical resistant epoxy to provide a greater margin of protection. All of the concrete containment structures must be inspected regularly for cracks so that their impermeability can be maintained.

According to Koppers Company, the most commonly used waste management method for CCA wood preservative facilities involves collecting and reusing as much liquid waste as possible and placing the residual wastes in 55 gallon, non-leaking drums and adding cement to the drums as they are filled to stabilize the wastes. When the cement has hardened, the drums are closed with tight-fitting lids and placed in hazardous waste landfills. The landfills must comply with RCRA requirements, which means they must have two impervious liners and a ground water monitoring system.

RECOMMENDATIONS

The previous sections give general information on the use and handling of CCA and disposal of its waste products. To supplement this information we have attached as Appendix E a report on the safe use of CCA prepared by Canadian industrial and governmental agencies This section of the report, however, presents specific recommendations for operation of the Prescap facility in Shiringamazu. These recommendations represent the views of all three members of the expert team.

Before listing our recommendations for the facility in Shiringamazu, we want to commend the advisors from the Tropical Science Center who designed the facility and developed the initial operating plans. We were impressed with the pollution control features already designed and in some cases constructed when we arrived at the site. We fully endorse these design and operation features including:

- cement pads under the treatment and fixing areas with a drainage system designed to contain any releases and direct them into a recovery tank,

- roofs over the treatment, fixing and drying areas,

- the use of liquid concentrates instead of powder formulations, their storage in a secured and diked area and the plans to maintain restricted access to the storage area,

- a decontamination room with an emergency high volume shower and storage area for work clothes,

- the provision of protective clothing to workers including coveralls and impermeable boots, gloves and aprons, as well as respirators for use in dusty areas,

- a fenced perimeter with controlled access, and

- the provision of information signs on the premises to remind the workers of the potential dangers of CCA and the need to maintain safe working conditions.

USAID has been fortunate in having such skilled advisors as Michael Krones and Guillermo Gonzalez working on this project. In addition, we were impressed by the quality of workmanship on the facility under the direction of the Peruvian construction advisor and the awareness of the Indian cooperative manager for the need for health and environmental controls.

Although we commend the work already accomplished or planned, we have additional recommendations which we believe will improve environmental management of the facility. We have divided our recommendations into seven categories: bark, sap, hazardous waste, facility design, employee training, facility management, and product testing.

Bark The operating plan for the Prescap facility calls for treating the logs with the bark on. Although their is reason to believe that the CCA will not cross the intact cambium, we believe that the cambium will not remain intact due to damage during felling and transportation as well as subsequent bark removal. Therefore, we believe that bark removed after treatment will have to be treated as contaminated waste. The environmental management goal of facility should be to reduce the amount of contaminated waste. To this end, we make the following recommendations concerning bark.

1. During the initial months of operation tests should be conducted to determine the feasibility of treating logs after bark removal. Treating logs without bark would be preferable to treating with bark because uncontaminated bark can be treated as normal sawmill wastes.

2. Bark removed after treatment should be tested to determine if it has been contaminated with CCA. In the short-term, bark contaminated with CCA should be disposed of in a secure landfill.

APPENDIX G

SECTIONS FROM STANDARD METHODS
SAMPLING METHODS FOR CHROMIUM, COPPER AND ARSENIC

3. A secure landfill is one located on a hilltop or a topographic rise so that runoff does not enter the site. The site should have clay soils to a depth of at least one meter below the bottom of the landfill. During the filling of the landfill a temporary roof should be constructed over the site to prevent rainfall from entering the excavation. Before the temporary roof is removed, the landfill should be capped with a 250 cm layer of clay contoured to shed rainfall and planted with a vegetative cover to prevent erosion.

4. One of the greatest health risks from contaminated bark would be associated with burning the bark and subsequent inhalation of the smoke; therefore, all precautions should be taken to insure that bark with CCA is never removed from the facility to be used as fuel.

5. In the long-run, if the CCA is penetrating the bark and not sludging on the surface areas, the Project may be able to identify markets for treated bark, such as ground cover. Similar markets may also exist for untreated bark, and should be investigated.

Sap The Prescap process involves forcing the sap out of the log with the treatment solution. This process creates the potential for generating large volumes of hazardous wastes. Ideally, the sap should be separated from the treatment solution allowing disposal of the sap as a non-hazardous waste and recycling of the sap contaminated with CCA. Because of differential travel time through the log, however, the interface between the sap and the treatment solution will not be clearly delineated making separation difficult. We believe that a simple, litmus paper test can be used to segregate uncontaminated sap from CCA contaminated sap. This system relies on the fact that the CCA solution has a pH of less than 3, while sap has a pH of 6-7. For sap separation and disposal we recommend the following.

1. Two color coded containers should be kept at the discharge end of each log, one clearly marked for sap and the other for contaminated sap.

2. Litmus paper should be purchased and kept at the facility which is capable of identifying a drop in pH from 6 to 5. (In the early months of operation a study should be conducted to determine the pH of the saps for the species being treated so that a more refined calibration of litmus paper can be used as the project proceeds.)

3. When a log is to be treated, the sap container should be placed under the discharge end of the log and the litmus paper should be attached to the lowest point of the log's circumference (that point where the sap will drip off the log into the container). After the operator has cut the

disk from the log and reattached the Prescap, he should go to the discharge end of the log and watch the litmus paper. When it turns colors, indicating a drop in pH, he should replace the sap container with the contaminated sap container.

4. It is our belief that the sap collected under this system will be sufficiently free of CCA components so that it can be treated as a non-hazardous waste and disposed of by land application.

5. The contaminated sap should be recycled into the CCA solution.

Hazardous Waste The Prescap plant at Shiringamazu has been designed to reduce the amount of runoff which must be treated as a hazardous waste. The proposal to recycle contaminated sap also will greatly reduce the amount of hazardous waste. Of course, rainfall and runoff control and reuse of solutions will not remove the need for ultimate disposal. Treatment solutions will eventually reach a point where they can no longer be recycled and will have to be disposed of along with sludges and discarded filters and work clothing. The goal of disposal program should be to convert the waste into a usable product. Where this cannot be accomplished, the wastes should be converted to a form which is not readily leachable and disposed of in a secure landfill. Our recommendations for the disposal of hazardous wastes are as follows.

1. Liquid wastes (i.e., any liquids containing CCA which are not being recycled into the treatment solution) should be stabilized by mixing with sawdust until the sawdust has absorbed the liquid.

2. The stabilized waste (i.e., sawdust/waste mixture) can be mixed with cement and gravel to form bricks for use in construction. The mixture for the bricks should be made in the following proportions: GILL INFO ON BRICKS The resulting bricks will have the CCA fixed by the sawdust and encapsulated by the cement.

3. The bricks can be used for building foundations and walls and other uses where they will not be subject to abrasion (e.g., in floors or roads) or come in contact with potable water.

4. In the initial phases of the project the bricks can probably be used for construction in the project; however, a market study should be conducted to determine if there is a market for the bricks which could cover the costs of purchasing cement and making the bricks.

5. In the event that bricks cannot be made, the sawdust/waste mixture should be disposed of in a secure landfill as

described in the above recommendations for disposal of contaminated bark.

6. Used work clothing, used filters, and other contaminated solids should be disposed of in a secure landfill as described in the above recommendations for disposal of contaminated bark.

Facility Design The facility design already contains many features for protecting human health and the environment. Our recommendations on facility design are limited to reducing the amount of accidental releases, monitoring releases from the drying area, and providing capability for on-site chemical analysis.

1. All high pressure lines in the plant should be fitted with valves which will automatically shut off flow into the line with a sudden drop in pressure.

2. The plant should have an emergency alarm system with ready access throughout the plant, so that in the event of an accidental release, any worker can sound a general alarm.

3. The main compressor should have a clearly marked shut-off valve so that it can be immediately shut down in an emergency.

4. A runoff control system should be constructed around the drying area to prevent runoff from entering the area and eroding the soils under the poles.

5. During the initial months of operation, soil samples should be taken from the drying area and analyzed for the presence of CCA. If CCA is present in the soils, a concrete pad with drainage containment should be constructed beneath the drying area.

6. The plant should have a laboratory equipped with a drying oven, an analytic balance and an X-ray Fluorescence Analyzer for determining wood density and conducting chemical analysis of treatment solution and treated wood.

Employee Training As mentioned above, we concur with the plan to place information signs in the facility to remind the workers of proper handling of CCA. In addition, we have the following recommendations for employee training.

1. One plant employee should be appointed as a safety officer. In addition to his other duties the safety officer would be responsible for educating the other employees about safety practices, maintaining the advisory signs and chairing weekly safety meetings.

2. All plant employees should attend weekly safety meetings held during operating hours. At these meetings the safety officer should present safety information and the employees should identify safety problems they have noticed during the week.

3. USAID should consider contracting an industrial health and safety education specialist to work with the project staff and safety officer to develop a safety education program. To assist in this effort, the Koppers Company has provided as Appendix F of this report a Spanish language correspondence course on wood preservation, which includes sections on safe plant operation.

Facility Management In addition to the operation procedures already identified by the project staff, we recommend the following.

1. A substance control system should be instituted to track the life of chemicals at the facility including: 1) the quantity and date of arrival, 2) dates and location of storage, 3) dates and quantities mixed, 4) dates, quantities and types of wastes generated, 5) dates, disposal methods and location of disposal of wastes, and 6) in cases where wastes are used in products, the dates of manufacture, quantities and disposition of those products.

2. The water from the well at the plant should be used only for industrial purposes. Drinking water at the plant should come from a potable source other than the well.

3. Soils down gradient from the plant should be tested for the presence of chromium, copper and arsenic at six month intervals to ensure that contaminants are not moving off of the site.

4. The well at the plant should be tested for the presence of chromium, copper and arsenic at six month intervals to ensure that contaminants are not reaching the ground water. Appendix G contains sections from Standard Methods describing the analytic procedures for conducting these tests.

5. Chemicals should be transported to the plant on a truck which carrying no other items which could become contaminated and be a source of human exposure (e.g., food, clothing, household items). The chemicals should be transported in their original containers and secured to a shipping pallet.

6. The barrels in which the chemicals are shipped should be rendered unusable after the chemical is removed and disposed of in a secure landfill as described in the above recommendations for disposal of contaminated bark.

7. USAID should hire a long-term advisor (at least one year) to oversee the operation of the treatment plant and to train Peruvian counterparts from the project staff and the cooperative.

Product Testing The efficacy of the CCA retained in wood is predicated on not only a properly balanced proportion of the CuO, CrO_3 and AS_2O_3 in the cell cavities, but also retained in the cell walls to adequately protect the wood against fungal and termicital activity. There is some evidence to indicate that in the press-cap method, selective absorption of copper in green (fresh sawn) timber could throw the balance out in both the treated wood and the solution as well. Also, it would be anticipated that instantaneous reaction of the CCA with the sugars in the sapwood might generate substantially more "fall out" or sludging than would be realized with the vacuum/pressure impregnation method. Certainly it could be said that treatment by press cap should allow for a service life of the timber many times greater than utilizing the timber without treatment. If, in fact, selective absorption of CuO does occur, it may be necessary to obtain a 'specifically formulated' (fortified in extra CuO) CCA for use with the Prescap method.

Consequently, it is important that careful documentation of procedures, and results be undertaken. To this end we recommend the following:

1. An approximately 5 MM diameter x 4 CM length increment borings should be taken at approximately 1.9 meters from the butt end of each pole and a second at 1 meter from the tip of each pole. These constitute a set. Five poles, same species, five sets should be composited in sawdust form together to make an analysis by the ASOMA LCA (X-Ray spectographic method). Target retention for the groundline (1.9 M from butt) should be a minimum of 16 kg. of CCA oxides per M^3 of wood assayed. Target retention for the upper section of the pole (1 meter from tip) should be 12 kgs. of CCA oxides per M^3 of wood. This procedure should be followed carefully for the first two months of operation.

2. From the third month of operation and onward each pole should continue to be sampled as above except composite analysis should be for 20 poles.

3. Individual retentions for CuO, AS_2O_5 and CrO_3 should be noted and compared with standard retention values found in AWPA Standards.

4. In the case of fence posts, 10 posts (representing a lot of 60) should be composited and analyzed. Only one boring from each at approximate groundline would need to be taken. Retention in fence posts should be no less than 10 kgs./M^3.

5. Periodically, random samples should be tested, both at the plant and at an outside laboratory such as that at Koppers Company, Inc., so analytical procedures performed plantside can be compared with an outside analysis.

6. After having identified ten properly treated poles, these should be set aside to be planted in a test plot (graveyard) site situated in Peru, and a second internationally recognized site such as the one in Costa Rica. These should be monitored and evaluated every two year for sign of fungal and insect attack.

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APPENDIX A

LIST OF CONTACTS

LIST OF CONTACTS

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APPENDIX B

VACUUM PRESSURE IMPREGNATION

VACUUM PRESSURE IMPREGNATION

Koppers Company, Inc. recommendation for the Palcazu project would initially have been to pursue the vacuum/pressure impregnation system based on simplicity of operation and control of personal safety and protection of environment, and of course, superior efficacy.

Vacuum/pressure impregnation involves initially drying (artifically of by air) the wood to less than 30% M.C. which the Palcazu project considered difficult and expensive. In Colombia, the wood treaters are using low-cost solar dry kiln which could be considered for future use in Palcazu. Pre-dry is necessary to vacuum/pressure impregnation and precludes the need (as in the prescap method) to dispose of large amounts of sap fluid. Further, low-cost vacuum/pressure impregnation plants are now often built in third world countries without always the need for costly import.

Vacuum/pressure impregnation is simple to learn, simple to operate, easier to control and involves virtually zero discharge to the environment as it is a closed system. The prescap method is much more complex to implement and monitor and the potential for injury to personnel and environment is certainly greater; to treat 50 poles involves 50 pressure-hookup connections and 50 sets of discharge apparatus. In vacuum-pressure impregnation systems 80 or 100 or more poles can be handled simultaneously without exposure to operator and environment. My observation of the Palcazu prescap project indicates effluent and sludges to be greater in volume per M^3 of wood treated than vacuum/pressure impregnation treatment.

Efficacy and service records for vacuum/pressure impregnation treatments are well documented and accepted throughout the world and long and reliable life is experienced. On the other hand, detailed and documented prescap service records are not , to my knowledge, available.

APPENDIX C

EXCERPTS FROM THE FEDERAL REGISTER

EXCERPTS FROM THE FEDERAL REGISTER
vol. 51, no. 7; Friday, January 10, 1986

ENVIRONMENTAL PROTECTION AGENCY
Creosote, Pentachlorophenol, and Inorganic Arsenicals;
Notice of Intent to Cancel Registrations; Notice

"2. For all products labeled for pressure treatment of wood and containing inorganic arsenicals, the following language must appear on the labels:...

Applicators must wear gloves impervious to the wood treatment formulation in all situations where dermal contact is expected (e.g., handling freshly treated wood and manually opening cylinder doors).

Individuals who enter pressure treatment cylinders and other related equipment that is contaminated with the wood treatment solution (e.g., cylinders that are in operation or are not free of the treatment solution) must wear protective clothing, including overalls, jacket, gloves, and boots, impervious to the wood treatment formulation...

Applicators must not eat, drink, or use tobacco products during those parts of the application process that may expose them to the wood treatment formulation (e.g., manually opening/closing cylinder doors, moving trams out of cylinders, mixing chemicals, and handling freshly treated wood).

Wash thoroughly after skin contact, and before eating, drinking, use of tobacco products, or using restrooms.

Protective clothing must be changed when it shows signs of contamination. Applicators must leave protective clothing and workshoes or boots and equipment at the plant. Worn-out protective clothing and workshoes or boots must be left at the plant and disposed of in a manner approved for pesticide disposal...

Processes used to apply inorganic arsenical formulations shall leave no visible surface deposits on the wood, as defined by AWPA Standard C-1 and AWPB Standards LP2 and LP22. (Visible surface deposits means a surface residue or crystallization on the treated wood. Small isolated or infrequent spots of chemical on otherwise clean wood shall be allowed).

Individuals in the work area of an arsenical wood treatment plant must wear properly fitting, well-maintained high efficiency filter respirators, MSHA/NIOSH-approved for inorganic arsenic, if the level of inorganic arsenic in the plant is unknown or exceeds 10 micrograms per cubic meter of air (10 ug/m^3) average over an 8-hour work period...

For powder formulations of inorganic arsenicals: A closed emptying and mixing system must be used for all powder formulations of the inorganic arsenicals. A closed system is defined as any containment which prevents the release of subject chemicals into the surrounding external environment, except that the release of incidential [sic] amounts of chemical during equipment loading and periodic clean-out or maintenance operations shall not be deemed a breach of containment.

Note to User: Examples of acceptable materials for protective clothing (e.g., gloves, overalls, jackets, and boots) required during application and handling of inorganic arsenicals are vinyl, polyvinyl chloride (PVC), neoprene, NBR (Buna-N), rubber, and polyethylene."

"9. For all products labeled as wood preservatives for brush-on treatment which contain inorganic arsenicals, the following language must appear on the labels:

Applicators must wear gloves (e.g., rubber, vinyl or neoprene) impervious to the wood treatment solution in all situations where dermal contact is expected (e.g., during the application process and handling freshly treated wood).

Applicators must wear disposable coveralls (e.g., vinyl or polyethylene) or other similar impermeable clothing during the application process where dermal contact is expected.

Applicators must not eat, drink, or use tobacco products during those parts of the application process that may expose them to the wood treatment formulation.

Wash thoroughly after skin contact, and before eating, drinking, use of tobacco products, or using restrooms.

Protective clothing must be changed when it shows obvious signs of contamination. Launder non-disposable protective clothing separately from other household laundry. Dispose of worn-out protective clothing in a manner approved for pesticide disposal..."

APPENDIX D

RISK ESTIMATES (USEPA 1984b)

APPENDIX E

CANADIAN REPORT ON USE OF CCA

APPENDIX F

KOPPERS COMPANY, INC.
CORRESPONDENCE COURSE ON WOOD PRESERVATION

DETAILED IMPLEMENTATION PLAN

DATE	ACTIVITY
1988: May	- Project Paper approved for CSRM-II.
1988: June	- Project Agreement for CSRM-II signed. - RFTP prepared for TA contracts. - Covenant met on evaluation and revision of PEPP's personnel system.
1988: July	- Preparation of PIO/C based on specifications for additional road maintenance equipment and spare parts for USAID procurement. - Covenant met on policy guidance by GOP interagency committee. - TA proposals received, reviewed, and selection made.
1988: August	- PIO/C prepared for forestry, crops/livestock and other components equipment. - Condition Precedent met for first disbursement by provision of legal opinion and representative's specimen signatures by GOP to USAID. - Negotiation of TA contract.
1988: September	- Conditions Precedent met for first disbursement of loan funds for road maintenance. - TA contract awarded. - 1989 Draft Operation Plan reviewed by Project beneficiaries.
1988: October	- Continuous Land Use Inventory overflight. - Financial analyst recruited and hired. - PSC Project Coordinator replacement hired. - 1989 Draft Operation Plan joint review held with USAID and Project.
1988: November	- Financial Review of 1989 Loan/Counterpart needs completed and recommendations made. - Arrival of TA Team. - Construction of two park ranger observation posts initiated in the Yanachaga. - Coordination initiatied between APODESA and continuous land use inventory staff to develop data processing program for inclusion in GIS based land use planning guidelines for the Palcazu valley. - Log extraction road design begun for amended EA.

1988: December	- Amended EA for log extraction road construction completed and sent to LAC/DR/EST for review. - 1989 Operation Plan submitted to USAID. - Covenant for Administration of APODESA met by information of committee of INADE, INP and ONERN to provide guidance to APODESA. - PEPP prepares Research Plan assisted by TA Team. - Training of 5 Native forest rangers initiated. - Condition Precedent met for disbursement of funds for construction or rehabilitation activities. - Covenant met for providing quarterly reports in adherence to implementatin of road maintenance, vehicle and equipment use plans.
1989: January	- GOP authorizes 1989 Budget levels for Project. - Amended EA for log extraction road approved by LAC/DR/EST. - 1989 Operational Plan approved by USAID. - Formation of Pre - Cooperative to encompass four branch cooperatives under a Native Central Cooperative. - Condition Precedent met for subsequent disbursements of loan funds for road maintenance activities in 1989.
1989: March	- Completion of construction of two forest ranger observation posts, in the Yanachaga. - Completion of studies on conservation and timber extraction legislation. - First biodiversity study on flora/fauna in the Palcazu watershed published. - Covenant met for providing quarterly reports in adherence to implementation of road maintenance, vehicle and equipment use plans.
1989: April	- Delivery of road maintenance equipment and spare parts at site. - Complete data processing program for use in preparing land use maps for 12 Native Communities and one colonist area.
1989: May	- Native forest rangers assigned to 2 observation posts. - Ecological research center completed. - Control systems established for monitoring 35,000 Has. Communal Reserve adjacent to Yanachaga National Park. - Additional training for 20 Native forest rangers initiated. - Construction begun log extraction road in Alto Iscozacin.
1989: June	- Condition Precedent met for disbursement of funds for forestry activities. (Transference of ownership of forestry equipment to Yanesha Forestry Coop.) - Plan for transfer of road maintenance activities by MTC developed. - Harvest of forest production strips in Alto Iscozacin initiated. - Covenant met for providing quarterly reports in adherence to implementatin of road maintenance, vehicle and equipment use plans.

1989: July	- Additional 6 forest ranger observation post sites identified and construction initiated in Yanachaga.
1989: August	- Continuous Land Use Inventory overflight. - Construction initiated on 4 Km. log extraction road near Siete de Junio. - Second biodiversity study on flora/fauna in the Palcazu watershed published.
1989: September	- Interim Project Evaluation conducted. - APODESA organized seminar on GIS as a tool for High Jungle Resource Management in Peru. - Evaluation of one high jungle development project completed. - Covenant met for providing quarterly reports in adherence to implementation of road maintenance, vehicle and equipment use plans.
1989: October	- 1990 Pre-Operation Plan joint review by Project, USAID and beneficiaries. - Construction of log extraction road in Alto Iscozacin completed.
1989: November	- 1990 Operation Plan submitted to USAID for approval. - Completion of study on land settlement regulations and impacts of colonization on the Peruvian high jungle.
1989: December	- 1990 Project Budget approved by GOP. - 1990 Operation Plan approved by AID. - Completion of 6 forest ranger observation posts. - Third biodiversity study on flora and fauna in the Palcazu watershed published. - Condition Precedent met for subsequent disbursements of loan funds for road maintenance activities in 1990. - Covenant met for providing quarterly reports in adherence to implementation of road maintenance, vehicle and equipment use plans.
1990: January	- Native forest rangers assigned to remaining 6 observation posts.
1990: February	- Seminar "Research Findings on Black Belly Sheep" presented in Project Area.

1990: March	- Harvest of forest production strips in Siete de Junio initiated. - Finalize plan for transference of health activities to MOH, road maintenance activities to MTC, agricultural and forestry research activities to INIAA, and APODESA to INP. - Socio-economic evaluation completed on research activities carried out in Palcazu Valley. - Native Central Cooperative approved by National Institute for Cooperatives. - Covenant met for providing quarterly reports in adherence to implementation of road maintenance, vehicle and equipment use plans.
1990: May	- Evaluation of results of production/marketing research initiated.
1990: June	- Seminar held on "Agroforestry Research Results". - Covenant met for providing quarterly reports in adherence to implementation of road maintenance, vehicle and equipment use plans.
1990: July	- Construction of log extraction road near Siete de Junio completed.
1990: August	- Completion of evaluation and publishing of results of production/marketing research. - Fourth biodiversity study on flora and fauna in the Palcazu watershed completed. - Completion of land use maps for twelve principal native communities and one colonist area. - Evaluation of one high jungle rural development program completed.
1990: September	- Begin implementation of all transferred activities approved in March 1990 plan. - Regional seminar on GIS applications to sustained High Jungle Resource Management in The Amazon Watershed. - Seminar "Natural Forest Management System". - PACD September 30, 1990. - Covenant met for providing quarterly reports in adherence to implementation of road maintenance, vehicle and equipment use plans.

ILLUSTRATIVE RESEARCH PLAN

I. Forestry Research

A. Objective

The Project will continue testing the Natural Forest Management (NFM) system in the Palcazu Valley, started in 1985 under the CSRM Project. The research objectives are to test the ecologic and economic feasibility of the NFM system under semi-controlled conditions at the CSRM-II Project site in Iscozacin and under actual production conditions by the Yanesha Forest Cooperative (YFC). The thrust of the research involves three areas: (1) maximum utilization of wood in the cut strips, (2) transportation of cut timber using animal traction rather than machinery, and (3) insuring sustained yields through natural regeneration, while at the same time protecting the environment.

B. Background

During the last decade, researchers working independently in Southeast Asia and in tropical America discovered that tropical forests are very dynamic. Rapid renewal of the forest generally occurs with the fall of large trees and their replacement by young, fast-growing trees. One of the fundamental components of this natural renewal is a surprisingly high degree of dependency of the arboracieus species of the canopy on the existence or creation of natural gaps for satisfactory regeneration. As many as 63% of the arboraceous species that make up the forest canopy may be light-gap species. The shade-intolerant species that colonize the gaps are fast-growing trees that populate the gap in a few years and form part of the canopy within 20 to 30 years.

The dynamics of forest renewal through gaps is the principal pattern of natural regeneration in most tropical forests. It is the key to the plan for managing natural forests in the Palcazu Valley. The natural regeneration process is applied in a planned way in the sense that it must be applied in the natural forest itself and it is long term. The natural regeneration necessary to make the NFM system work will require a 30-40 year rotation, meaning that final regenerated forest yields will not be determined until that period has elapsed.

C. Research Plans

The Project will continue the research on natural regrowth in strips cut by the CSRM Project. Training and advisory assistance in tropical forestry management and dendrology will be provided to GOP researchers and technicians on the Project staff as well as to researchers of the National Agricultural and Agroindustrial Research Institute (INIAA) and the Forestry Faculty of the National Agrarian University.

Research will be conducted by the Project's Forestry Development unit with support from the Forest Research advisor in order to determine the following:

(a) recommended width of clear-cut strips and diameter of group selection openings in high canopy to obtain desired species regeneration;

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

(c) initial comparison of burned and unburned strips viz-a-viz regeneration, subsequent growth rates, and the species composition of natural regeneration; effects on seedling and a stump-sprout vigor;

(d) stump height in relation to sprouting from established root-stocks; control of species composition in regeneration by selective height of stumps in felling;

(e) species-specific wood properties, including hardness, density and strength. For marketing purposes macro description of coloration, grain, machining characteristics and general utilization, drying requirements and preservation will be analyzed.

The research plan also includes silvicultural treatments. Once the young trees have formed a closed canopy (beginning at three meters), the competitive equilibrium can be adjusted to favor particular desirable individuals, with the elimination of undesirable individuals, because they are not jeopardizing regeneration of the trees. Through hands-on training and application of forest inventory and growth monitoring techniques during the Project, GOP researchers will learn the skills necessary to continue the long term research required to fully test the NFM system.

Harvesting and utilization of wood are integral components of forest management. In order to foster natural regeneration of shade-intolerant arboraceous species, the gap of the canopy should be sufficient to allow sunlight to penetrate to the forest floor. Thus the management plan requires clear cutting and use of almost all of the cut biomass. All trunks and large branches should be extracted, leaving only the small branches and leaves on the ground to provide nutrients for the regenerating forest.

During CSRM, it has been demonstrated that oxen can be trained to extract logs, posts, and fuelwood from the strips, and that extraction of logs is considerably cheaper with oxen than with articulated tractors or skidders. In addition, the negative impact of extraction on the soil is much less with draft animals than with heavy machinery. During the Phase Two CSRM Project (CSRM-II), research and training will continue in the use of oxen on a production scale as the YFC enters full production.

The cooperative has prepared an operational plan for implementing the NFM system starting in early 1988. The Project will provide long and short term TA to the cooperative in business adminstration, inventory, personnel

management and marketing. A long-term natural resources or forestry economist will be contracted locally to design and assist the GOP to prepare economic analyses on costs and returns of the NFM system.

Much of the wood of lesser dimensions (under 20 cms.) is marketable as treated posts for agricultural use and/or for supporting power lines. There is also a considerable demand for treated railroad ties. Many of the softwoods will also be treated with preservatives so they can be used in construction. CSRM-II will utilize the Pres-Cap wood conversion system installed at the YFC for wood treatment. Research begun in CSRM on preservation techniques, suitable compounds, and necessary measures to protect workers and the environment from contamination will be continued. CSRM-II will install and operate the chemical laboratory purchased under CSRM, which due to delays in delivery did not arrive in time for installation prior to the PACD.

II. Crops/Livestock Research

A. Objective

The Project will test the validity of low input, sustainable farming systems for application to tropical forest areas. These will be tested in the Palcazu Valley. Stabilization of productivity at low to medium levels is expected to be achieved with little increase in inputs. Such technological improvements would make a major contribution to stable settlement of the Palcazu, as well as to the development of other areas of the Amazon Basin.

B. Background

Given the ecological constraints of the Palcazu, options for agricultural development are limited. Existing subsistence crop and cattle production are suffering from declines in productivity. The development strategy initiated under CSRM is based on stabilizing productivity of subsistence crops and pastures at sustainable levels, and introducing high value crops adaptable to local agro-ecological conditions.

C. Research Plans

The Project will continue applied research with annual/perennial crops, pasture renovation trials, and small ruminants. Specific elements will include: (1) demonstration of the feasibility of producing and marketing coffee and palm hearts, (2) preparation of acceptable packages for pasture renovation, (3) examination of bush fallow and pasture fallow rotations which appear to accelerate recuperation from cropping and maintain productivity, and (4) demonstration of the comparative advantage of hair sheep in small farm production systems.

Long and short term TA will support the Crops/Livestock component of the Project to conduct the research trials at Iscozacin and at on-farm demonstration trials. A long-term local hire production economist will develop economic studies of production and marketing costs and returns for the interventions tested and extended by the Project.

INSTITUTIONAL DETAILS FOR PROJECT IMPLEMENTATION

APODESA (From 7/1/88 to 9/30/90)

1. CRITERIA TO BE CONSIDERED

1.1 APODESA operations should be continued in a broader context than the "Central Selva Resource Management Project" (PDR-Palcazú), determined basically by the regionalization process in the country and by the increased need of improving the efficiency in the use of selva resources considering its potential and diversity.

1.2 APODESA should orient its efforts and activities to assume the national and regional operations designed in other PDR Palcazú components. These efforts and activities should be concentrated in the formulation, follow-up and evaluation of programs and projects.

1.3 APODESA operations and management should be linked with institutions specialized in the development of data base studies for natural resources research and in the conduction of national/regional planning for the purpose of improving formulation of the Amazon development strategy.

2. COORDINATION COMMITTEE

According to the above paragraphs and to improve project implementation, a Coordination Committee will be established including a representative from each of the following institutions:

- National Planning Institute - General Directorate for Regional Planning (NPI/GDRP).

- National Office for the Evaluation of Natural Resources - Information Office (ONERN/01).

- National Development Institute - Special Projects Management (INADE/SPM).

In addition, a representative from AID and the APODESA coordinator will form part of the Coordination Committee.

3. FUNCTIONS OF THE COORDINATION COMMITTEE

3.1. To orient Project activities, in coordination with Project Management, and establish appropriate criteria by considering such priorities as stated in established goals.

3.2. To approve program and/or reprogrammed activities submitted by the Project based on established goals.

3.3. To approve and authorize the annual operating plans.

3.4. To approve project and/or budget modifications needed for the completion of established goals.

3.5. To follow-up technical and financial programs consistent with submitted quarterly plans.

4. MANAGEMENT OF FINANCIAL RESOURCES

INADE will be responsible for the formulation and execution of Project budget according to established regulations, and will direct appropriate measures for an efficient management of the financial resources assigned to the Project. The budget plan should establish adequate operating channels for APODESA administrative and budgetary actions.

5. PROJECT OPERATION

Pursuant to a Coordination Committee resolution, INADE will head the Project through the Special Project Management Office.

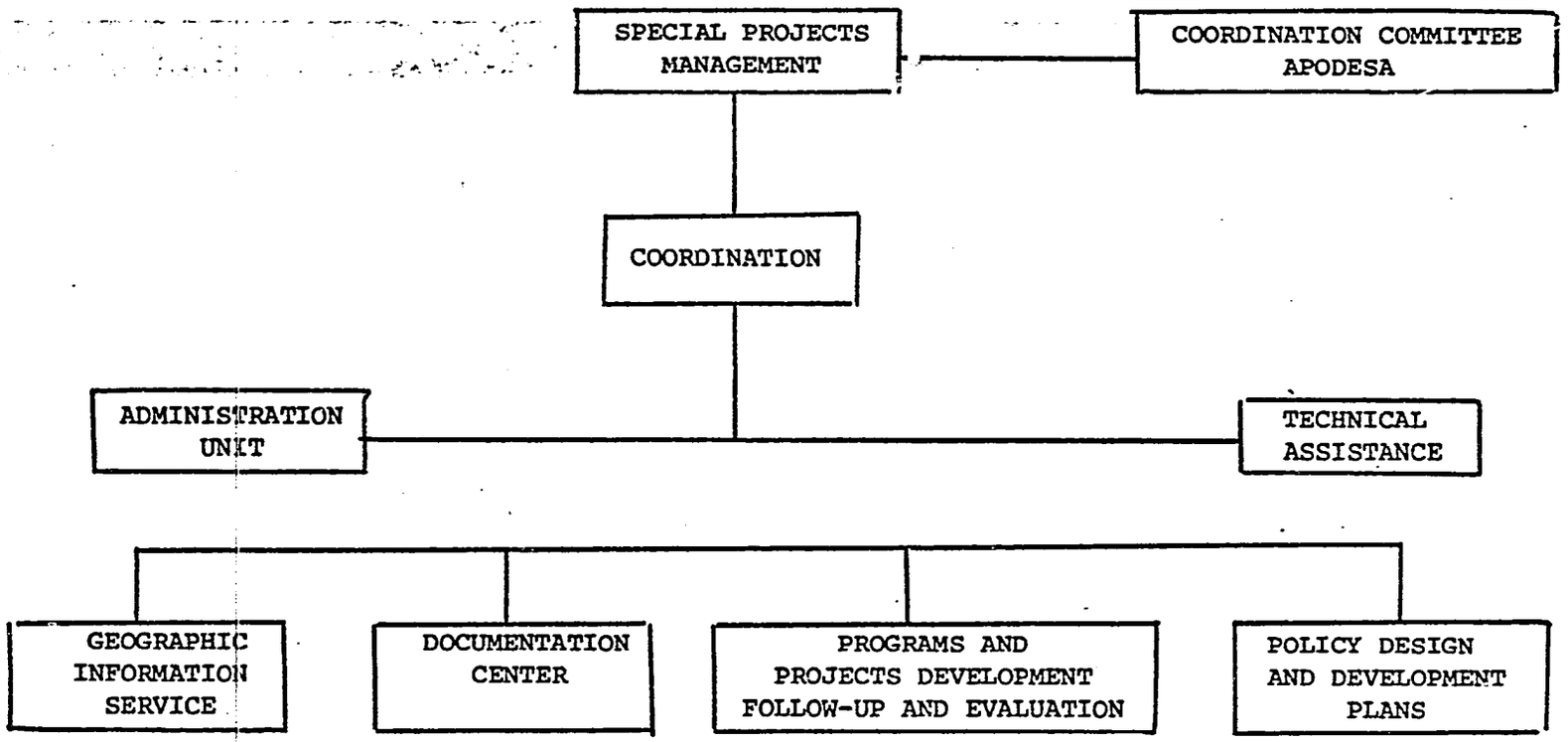
The Project will have a coordinator who will be responsible for the execution of all programmed actions as well as for the assigned resources which will be operated by the following units:

- Geographic Information Service,
- Documentation Center,
- Programs and Projects development, follow-up and evaluation, and
- Policy design and development plans.

(See Organization Chart attached).

Prior to termination of the AID Project Agreement, the equipment, the Documentation Center, all information produced, and APODESA functions and staff will be transferred to the INP/DGPR.

ORGANIZATION CHART



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b. Proyecto Especial Pichis Palcazu (PEPP)
Luis Llanos de la Mata
Witsen Barreto
Eduardo Paucar
Cesar Castañeda

c. Instituto Nacional de Planificación (INP)
Erwin Castañon

CHART A: INADE ORGANIZATIONAL CHART

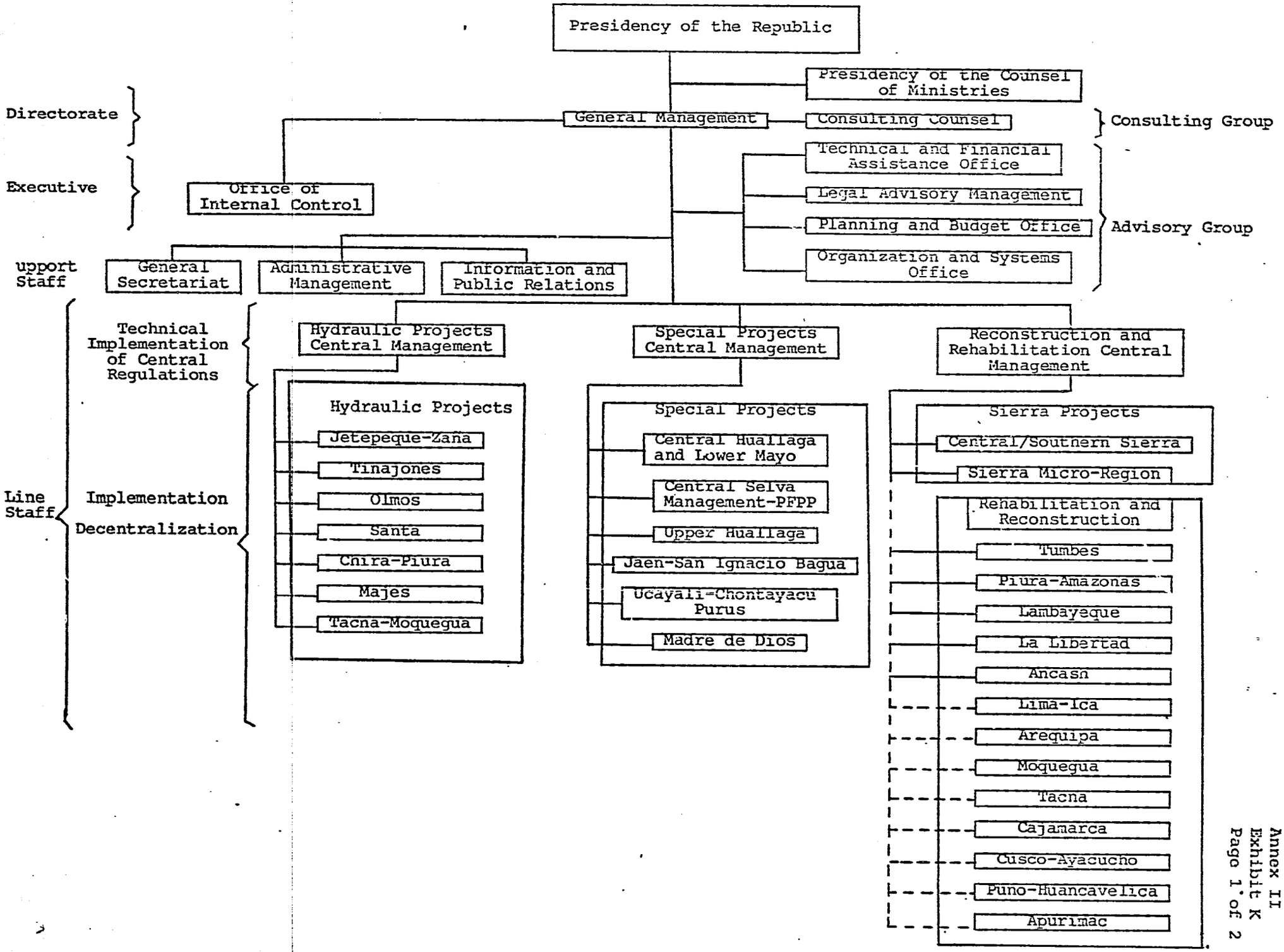
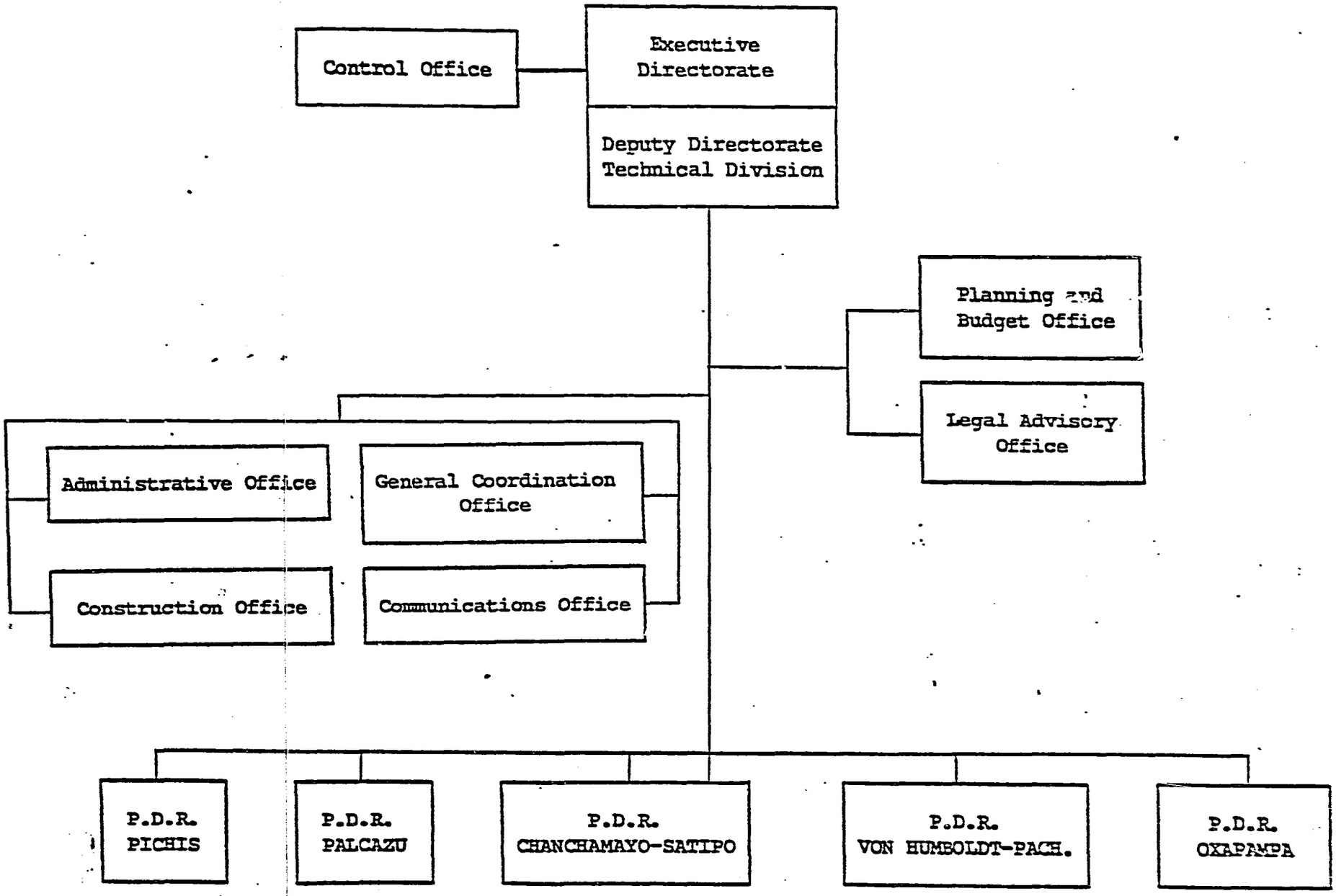


CHART B: ORGANIZATIONAL CHART OF THE PICHIS-PALCAZU SPECIAL PROJECT (PEPP)



DETAILED TECHNICAL ASSISTANCE PLAN AND FINANCIAL COSTS
BY PROJECT COMPONENT AND SPECIALTY

PROJECT COMPONENT/SPECIALTY	LONG TERM * EXPAT.	LONG TERM * NAT'L.	EST. COST ** EXPAT.	EST. COST ** NAT'L.	SHORT TERM * EXPAT.	SHORT TERM * NAT'L.	EST. COST ** EXPAT.	EST. COST ** NAT'L.	TOTAL COST (US$000)
1. Project Management - PEPP									
-Project Coordinator		24		52					
-Secretary		24		5					
-Financial Analist		24		16					
-Ecologist***	14		140						
SUBTOTAL	14	72	140	73	0	0	0	0	213
2. Forestry									
-Forestry Research	20		200						
-Wood Preservation	12	16	120	16					
-Natural Forest Mgmt.		12		12	4		40		
-Industrial		20		20	3		30		
-Animal Traction					1		10		
-Extraction/Log Roads					2		20		
SUBTOTAL	32	48	320	48	10	10	100	10	478
3. Crops/Livestock									
-Applied Research Agron.	12		120						
-Agric. Extension			0		6		60		
-Coffee Production						6		6	
-Peach Palm Production						7		7	
-Tropical Sheep Prod.					2		20		
SUBTOTAL	12	0	120	0	8	13	80	13	213
4. Protection									
-Ecologist***		21		21					
-Biodiv. Res./Mgmt.***			0		2	3	20	3	
SUBTOTAL	0	21	0	21	2	3	20	3	44
5. Cont. Land Use Invent.									
-Land Use Inventory		12		12					
-Hydrologist/meteorologist***				0		6		6	
SUBTOTAL	0	12	0	12	0	6	0	6	18

6. Road Maintenance									
-Road Maint. Engineeer	12		120	0		5		5	
SUBTOTAL	12	0	120	0	0	5	0	5	125
7. Region. Dev. Policy Support									
-Regional Planner	16		160						
-Geo. Info. Systems						4		4	
-Programmer				0	2		20		
SUBTOTAL	16	0	160	0	2	4	20	4	184
8. Extension and Soc. Dev.									
-Anthropologist	21		210						
-Natural Resource Econ.		21		21					
-Production Econ.		21		21					
-Cooperative Dev.		21		42					
-Field Asst. Soc. Res.						10		5	
-Field Asst. Econ. Res.						10		5	
-Field Asst. Prod. Res.						10		5	
SUBTOTAL	21	63	210	84		30		15	309
T O T A L	107	216	1070	238	22	71	220	56	1584

* Person Months

** Long term costs @ US$10,000 per person month and short term costs @ US$1,000 per person month with the exception: Proj. Coord. (US$2,179/mo.), Proj. Sec. (US$208/mo.) Financial Analyst (US$667/mo.), Cooperative Dev. (US$2,000/mo.) and Field Assistants (US$500/mo.).

*** General Terms of reference for these positions are described in ANNEX II, Exhibit F. pp. 33-35.