ISN = 47041

PD-AAU-230

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: 527-0282

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

5. PROJECT TITLE (maximum 40 characters): Agricultural Technology Transformation

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 08 DD 31 YY 93

7. ESTIMATED DATE OF OBLIGATION (Under 'B' below, enter 1, 2, 3, or 4)
A. Initial FY 87 B. Quarter 4 C. Final FY 92

8. COSTS ($000 OR EQUIVALENT $1 = 20 Intis)

A. FUNDING SOURCE	FIRST FY 87 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	3,300	700	4,000	8,905	16,095	25,000
(Grant)	(3,300)	(700)	(4,000)	(8,905)	(16,095)	(25,000)
(Loan)	(--)	(--)	(--)	(--)	(--)	(--)
Other U.S. 1.	--					
Other U.S. 2.	--					
Host Country	--	3,100	3,100	--	27,000	27,000
Other Donor(s)	--	--	--	--	--	--
TOTALS	3,640	3,869	7,509	8,905	43,095	52,000

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ARDN	120	121	--			22,300	--	22,300	--
(2) EST						2,700	--	2,700	--
(3)									
(4)									
TOTALS				--	--	25,000	--	25,000	--

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 122 | 124 | 129 | 111 | 112 | 114

11. SECONDARY PURPOSE CODE: 110

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

A. Code	R/AG	968	978	EOTY	TNG	XIT
B. Amount	9,825	9,825	9,825	25,000	3,195	4,820

13. PROJECT PURPOSE (maximum 480 characters)

To expand the scope and improve the quality and relevance of agricultural technology being generated for agriculture, and of technology transfer services being provided to peruvian farmers, in order to increase rural incomes and reduce unit costs of agricultural production while increasing agricultural productivity and yields.

14. SCHEDULED EVALUATIONS
Interim MM 08 YY 90 | MM YY | Final MM 03 YY 93

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

Keith Romwall, Acting Controller

17. APPROVED BY
Signature: Donor M. Lion
Title: Mission Director
Date Signed: MM 09 DD 31 YY 87

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

AID 1330-4 (8-79)

PROJECT AUTHORIZATION

Name of Country: Peru
Name of Project: Agricultural Technology Transformation
Number of Project: 527-0282

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Agricultural Technology Transformation Project ("Project") for Peru involving planned obligations of not to exceed Twenty-Five Million United States Dollars ($25,000,000) in Grant funds ("Grant") over a six (6) year period from date of authorization, subject to the availability of funds in accordance with the A.I.D OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Project is seventy-two months from the date of initial obligation.

2. The Project consists of assistance to selected public and private sector entities involved in agricultural technology generation and transfer (ATG&T) and in agricultural education, to expand the scope and improve the quality and relevance of agricultural technology being generated for Peruvian agriculture and of technology transfer services being provided to Peruvian farmers.

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

a. Source and Origin of Commodities, Nationality of Services

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

b. Conditions Precedent to Disbursement

(1) Prior to the first disbursement under the Grant, or the issuance by A.I.D. of documentation pursuant to which disbursement will be made, 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 an official Project Representative has been designated.

(2) Prior to the first disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for each of the nine Project Activities (or where Activities are being implemented by more than one institution, Sub-Activities) in the calendar years (CY) below, other than for procurement of off-shore commodities, expatriate technical assistance, national advisors, Project support staff and logistical support thereof, the institution responsible for implementing that Activity/Sub-Activity 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., the following:

(a) CY 1988 -- A detailed implementation plan and budget to be executed for that Activity/Sub-Activity during CY 1988, and evidence that an official representative has been designated for that institution for purposes of its relations with A.I.D. and with other institutions participating in the Project;

(b) CY 1989 -- Implementation plans and budgets for the life of the Project by year which describe the Project Activity/Sub-Activity to be carried out and financed, and which details the specific actions to be carried out and financed in CY 1989;

(c) CY 1990 and each CY thereafter -- Annual implementation plans and budgets which detail Project actions under each Activity/Sub-Activity to be carried out and financed in that calendar year.

(3) Prior to the first disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for procurement of commodities under a specific Activity/Sub-Activity, the institution responsible for implementing that Activity/Sub-Activity shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D., a procurement list and specifications, a plan for use, repair and maintenance of such commodities during their useful life, and in the case of vehicles a specific plan for monitoring their use.

(4) Prior to the first disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for post-graduate training, FUNSIPA 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 time-phased post-graduate training implementation plan, including operating and candidate selection procedures, for the life of the Project.

c. Covenants

The cooperating country shall covenant that it will:

(1) Submit a semi-annual report not later than March 1 and September 1, or such other dates as A.I.D. may agree in writing, of each year during the life of Project regarding the actions implemented and progress as a result of the Activities financed under this Project.

(2) Provide sufficient annual budget allocations following completion of A.I.D. financing to ensure continuity and sustained levels of ATG&T system output, including resources for adequate maintenance and necessary replacement of physical facilities and equipment being utilized by the ATG&T system and that are under the control of public sector ATG&T institutions.

(3) By the end of CY 1988, take measures to establish pay and incentive systems for the major public sector ATG&T institutions' professional technical/managerial personnel specialized in agricultural technology generation and transfer and university level education that will permit these institutions to attract and retain qualified professionals.

Mission Director

3, Aug. 87
Date

Clearances:
OARD:ERupprecht
CD:BDoe

PROG:WRhoads
CONT:KRomwall
DD:RBonnaffon
Drafted by:RLA:ANewton

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LIST OF ABBREVIATIONS AND ACRONYMS

AID	Agency for International Development
AID/W	AID Headquarters in Washington, D.C.
APID	Agricultural Policy and Institutional Development Project
APRA	American Revolutionary Popular Alliance (Alianza Popular Revolucionaria Americana)
ATG&T	Agricultural Technology Generation and Transfer System
ATT	Agricultural Technology Transformation
CDSS	Country Development Strategy Statement
CEAC	Statistical and Economic Analysis Center (Centro de Estadística y Análisis Económico) of ONA
CIAT	International Center for Tropical Agriculture
CIMMYT	International Wheat and Corn Improvement Center
CIP	International Potato Center
CIPA	Center for Agricultural Research and Extension (regional research and extension center of INIPA) (Centro de Investigación y Promoción Agraria)
CONCYTEC	National Council for Science and Technology (Consejo Nacional de Ciencia y Tecnología)
CONFIEP	National Confederation of Private Enterprise Institutions (Confederación Nacional de Instituciones Empresariales Privadas)
COP	Chief of Party
CRSP	Collaborative Research Support Program
DDT	Departmental Degree Training
DEP	Economics and Planning Department (Departamento de Economía y Planificación) at UNA
DRAT	Land, Irrigation, and Drainage Department (Departamento de Riego, Avenamiento y Tierras) at UNA
ENCI	State Input Marketing Company (Empresa Nacional de Comercialización de Insumos) (State monopoly for agriculture inputs, food imports and distribution)
ENNSA	1984 National Nutrition and Health Survey of Peru (Encuesta Nacional de Nutrición y Salud)
ESF	Economic Support Fund of AID
FUNSIPA	Services Foundation for Agricultural Research and Promotion (Fundación de Servicios a la Investigación y Promoción Agropecuaria)
FDA/UNA	Agrarian Development Foundation of the National Agrarian University (Fundación para el Desarrollo Agrario de la Universidad Nacional Agraria)
GDP	Gross Domestic Product (Producto Bruto Interno)
GNP	Gross National Product
GOP	Government of Peru
IARCs	International Agricultural Research Centers
IBRD	International Bank for Reconstruction and Development, World Bank
IDB	Inter American Development Bank
IIT	Intensive Impact Training
INAF	National Institute for Agriculture Frontier Expansion (Instituto Nacional de Ampliación de la Frontera Agrícola)
INDDA	National Institute for Agro-Industrial Development (Instituto Nacional de Desarrollo Agro-Industrial)

INIAA	National Institute for Agricultural and Agro-Industrial Research (Instituto Nacional de Investigación Agraria y Agro-Industrial)
INIPA	National Institute for Agricultural Promotion and Research (Instituto Nacional de Investigación y Promoción Agropecuaria)
INP	National Planning Institute (Instituto Nacional de Planificación)
IPM	Integrated Pest Management
IRR	Internal Rate of Return
IRRI	International Rice Research Institute
ISNAR	International Service for National Agricultural Research
IVITA	Research Branch, Veterinary School of San Marcos University (Instituto Veterinario de Investigaciones Tropicales y de Altura, Universidad de San Marcos)
LOP	Life of Project
MEF	Ministry of Economy and Finances (Ministerio de Economía y Finanzas)
MIAC	Mid-America International Agricultural Consortium
MINAG	Ministry of Agriculture (Ministerio de Agricultura)
M.S.	Master of Science
NARCs	National Agricultural Research Centers
NCSU	North Carolina State University
NR	National Commodity Research Programs
NRS	National Research Support Programs
OARD	Office of Agriculture and Rural Development
ONA	National Agrarian Organization (Organización Nacional Agraria)
Ph.D.	Doctor of Philosophy
PLAN MERIS	Sierra Small and Medium Irrigation Development Project
PLOS	Project Linked Observation Study
PM	Person Month
PPM	Agricultural Production, Processing and Marketing System
PY	Person Year
REE	Research, Education and Extension Project
S&T/AGR	Office of Agriculture, Science and Technology Bureau of AID/W
UNA	National Agrarian University (Universidad Nacional Agraria)

GLOSSARY

Agricultural Production, Processing and Marketing (PPM) System:
All entities and economic activities related to the production, processing and wholesale and retail marketing of inputs and outputs used in and produced by the agricultural sector.

Agricultural Technology Generation and Transfer System (ATG&T):
All institutions, organizations and individuals involved in activities that result in the generation of improved agricultural technologies, and/or the transfer and adoption of such technologies to and by farmers.

Agricultural Technology Transformation:
The process of production technology change at the farm level as the result of adoption of technologies generated and transferred through the ATG&T system.

Campesino: Peasant, small farmer, subsistence farmer.

Ceja de Selva: The Peruvian High Jungle region.

Costa: The Peruvian Coast.

Extension Agent:
Variously used to describe anyone involved in the technology transfer process, but more specifically descriptive of a public sector technology transfer field person.

INTI(S):
Peruvian monetary unit. Unless otherwise stated, U.S. Dollar Equivalents in this document have been converted at 20 Intis per U.S. Dollar, the financial market rate at the time of the initial Project analysis in April, 1987.

Selva: The Peruvian Jungle region.

Sierra: The Peruvian Highlands region.

Technology Generation:
The research and development process which results in recommended technology for farm use.

Technology Retailers:
Those who perform the Technology Transfer Retailing function.

Technology Transfer:
The process of communicating recommended technology to farmers to achieve behavioral change the process is comprised of two components - "Technology Processing and Wholesaling" and "Technology Retailing".

Technology Processing and Wholesaling:

The process of preparing technology in readily communicable form, and training and otherwise assisting Technology Retailers to communicate this technology effectively to farmers. Technology transfer wholesaling includes that part of the research-extension continuum which may involve both researchers and extensionists in the performance of on-farm adaptive research. This wholesaling process is performed by Technology Transfer Specialists (sometimes called Extension Specialists), including both Technical Specialists and Communications Specialists. Technical Specialists are technically trained professionals who specialize in communicating information on a particular set of commodities or farming practices. Communications Specialists are trained in effecting behavioral change through communications practices, methods and media.

Technology Transfer Retailing:

The process of transferring technology directly to farmers by intermediaries called Technology Retailers, e.g., public or private sector extension agents, input or machinery salesmen, field men of agricultural processors, or mass media.

Technology Transfer Specialists:

Those who perform the Technology Processing and Wholesaling function.

Trapecio Andino:

A poor region of approximately 56 Provinces of the Sierra portion of seven Departments in Central and Southern Peru, with a population of approximately four million.

I. RECOMMENDATIONS AND SUMMARY

A. Recommendations

It is recommended that a grant (the Grant) be authorized in the amount of US$25,000,000 for the Agricultural Technology Transformation (ATT) Project (the Project). Grant funds will be obligated by a single bilateral Project Agreement. Implementing specific support grants will be issued committing funds to three (3) separate entities as follows: 1) an estimated US$7,296,000 to Fundación para el Avance de los Servicios de Investigación y Promocion Agropecuaria (FUNSIPA); 2) an estimated US$1,235,000 to the Fundación para el Desarrollo Agrario of the Universidad Nacional Agraria (FDA/UNA), and 3) an estimated US$1,249,000 to the Organización Nacional Agraria (ONA). The Instituto Nacional de Investigación y Promoción Agropecuaria (INIPA)* will administer an estimated US$3,200,000 which will be committed via Project Implementation Letters (PILs) in accordance with approved implementation budgets. An additional estimated US$8,695,000 will be administered directly by USAID/Peru for procurement of expatriate technical assistance, offshore commodities and offshore participant training. The remaining US$3,325,000 is reserved to cover increases in estimated costs due to inflation (US$2,267,000) and for contingencies (US$1,058,000). The grants, PILs and contracts will include funding for technical assistance, commodities, training, Project implementation support, competitive and matching research grants and other operating costs. The Project will have a life of six (6) years, and is expected to be incrementally grant financed over six (6) fiscal years beginning in FY 87.

B. Summary

1. Background

Peru is a rapidly growing poor country with diverse physical, population, social and economic characteristics. For two decades, it has experienced a high incidence of political turbulence and socio-economic crises, and more recently suffered the effects of an active and growing terrorist movement and drug trafficking. A massive land reform, world recession in the early 1980's, severe climatic distortions and inappropriate monetary and fiscal policies precipitated uncontrolled inflation and rapid deterioration of the economy in recent years. Although the Government of Peru (GOP) has successfully instituted various measures to control inflation and stimulate demand in the short term, the strategy raises serious questions concerning the prospects for longer run economic stability. Peru continues to seek, however, a policy mix capable of generating and sustaining growth and development.

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*The acronym, INIPA is used throughout this document. It should be understood to refer to the former INIPA or to the current INIAA (Instituto Nacional de Investigación Agraria y Agroindustrial) depending on the context within which it is used.

Peruvian agriculture faces serious problems, including severely limited arable land, scarce water, and more diversity and severe natural adversities than agriculture in most other countries. The diversity is evident in that Peru possesses more life-zones than any other country in theworld. The natural adversities include a lack of water on the Coast, leaving Coastal agriculture entirely dependent on irrigation for water, a Sierra agriculture which is widely dispersed with difficult access to markets, and adverse climatic conditions because of altitude, and Selva agriculture which is particularly susceptible to erosion.

Two-thirds of the national population earn their livelihood from the overall agricultural production, processing and marketing (PPM) system which produces, processes and markets 85 percent of nationally consumed foodstuffs, 20 percent of raw materials for industry, and earns 11 to 14 percent of total foreign exchange. Thus, the economic health of the agricultural PPM system deeply affects the entire economy of Peru. Nevertheless, yields for most major food crops in Peru have not increased significantly over the past two decades due to technological stagnation. In most cases, yields currently are significantly lower than are those in most Latin American countries.

The private and public sector institutional base serving the agricultural technology generation and transfer (ATG&T) system, input supply, and output marketing needs of this diverse agriculture is limited in scope, responsiveness and capability.

2. Problem, Rationale and Strategy

The GOP seeks more rapid equitable increases in agricultural output and rural incomes, which theoretically can come from: 1) incorporating more land into agricultural production; 2) increasing the efficiency of use of existing factors (land, water, labor, capital, management) utilized in the agricultural PPM system; or 3) some combination of these. Land expansion options for Peru are quite limited, generally high cost, and often are negative relative to returns; and agricultural production on existing land generally is highly inefficient in terms of factor productivity because of low levels of improved technology use. In contrast to the high cost of land expansion, the preponderance of evidence indicates that on a large proportion of existing farmland costs of increasing factor use efficiency through adoption of improved production technology potentially is quite low compared to returns. In summary, this Project will address the principal problem limiting more rapid agricultural output and rural income growth, which is inefficient factor use because of low adoption of improved production technology.

The Project rationale flows from the considerable technology transformation potential of Peruvian farmers to reduce production risks and

unit costs of production that will permit them to achieve and maintain a comparative advantage in a wide range of products through increased productivity and improved factor use efficiency. Strong agricultural output growth was achieved in 1986 through expanded resource use, though factor use efficiency improved little. In order to sustain a rapid rate of growth of agricultural output and rural incomes, that factor productivity must increase, principally through a more rapid adoption of appropriate improved technology. This will be accomplished through expanding science based agricultural production, flowing from improved research, education and technology transfer.

The ATT Project is designed to: 1) accelerate and improve the quality and magnitude of technology generation and transfer; 2) respond to a GOP top priority and sector goals; 3) utilize AID's unique position among donors to take leadership in this stage of ATG&T system development in Peru; 4) complement other USAID initiatives; and 5) further over-all USAID strategy in Peru.

The ATT Project and its strategy are premised on the conclusion that a reliable and responsive ATG&T system under Peru's conditions must include effective participation of the public sector, agricultural producers, agribusiness, agro-industry and agricultural universities. The overall Project strategy is to stengthen the capacity of these system participants by providing catalytic resources to precipitate greatly expanded contributions of financial resources and technical and professional human resources to the system by the participants themselves.

More specifically, the ATT Project strategy is to utilize lessons learned from prior experience to assist in development of an effective and dynamic ATG&T system by supporting the following activities: a) consolidate and enhance the capacity of the public sector research organization (INIPA) to generate appropriate productivity increasing technology and to develop internal capacity to make research results available in useable form to those who may be involved in transferring technology to the farmer; b) enhance the capacity of UNA and regional universities to produce suitably qualified technical and professional personnel for staffing both public and private agricultural technology transformation operations; and c) design and test innovative methods for involving the private sector in research generation, technical information production and technology transfer processes, and for strengthening linkages among private and public sector sources and users of technology.

3. Project Description

The USAID and GOP goal to which this Project contributes is to increase agricultural incomes, rural employment and on-farm capital formation in Peru, while increasing agricultural output for domestic consumption and

exports. In order to achieve the Project purpose of expanding the scope and improving the quality and relevance of agricultural technology being generated for Peruvian agriculture and of technology transfer services being provided to Peruvian farmers, the Project incorporates three closely interrelated components, as follows:

a) Technology Generation Component which relates to the function of carrying out applied and adaptive agricultural research in accord with accepted scientific research methods;

b) Technology Transfer Component which relates to the function of converting research outputs into communicable form for technology transfer purposes, as well as its actual dissemination and communication to those involved in technology transfer, and to the end user, the farmer; and

c) Human Resources Development Component which relates to the training and education function for preparing technical and managerial talent required to operate, expand and improve the ATG&T system.

Each of the three components have three discrete sets of activities. Under Component One, Technology Generation, two of the three activities involve INIPA which has major direct responsibility for the technology generation function in the Peruvian ATG&T system. One of these activities is consolidation and integration of INIPA's nine National Research (NR) Programs in crops and livestock, and its six National Research Support (NRS) Programs. The second activity is to strengthen INIPA administration and management through: (1) improving its capacity to plan, staff, manage, monitor and evaluate NR, NRS and other essential programs; (2) establishing at headquarters a research planning and design service to backstop regional stations and provincial research activities; (3) improving personnel management; and (4) developing and initiating implementation of a plan to consolidate the range of programs and services provided by INIPA and to stimulate greater participation of the private sector. The third activity is to expand research opportunities by providing funds for competitive research grants to individual researchers and to research teams and to provide complementary support through the private sector to the NR and NRS programs.

Component Two, Technology Transfer, will serve a catalytic role in expanding participation and resources from public and private sector sources to carry out technology transfer functions. One activity is to establish and operationalize a corps of Technology Transfer Specialists in INIPA to serve as the link between researchers and those who transfer technology to farmers. An aspect of this activity is to develop cooperative arrangements for stimulating Technology Transfer by producer associations, agribusinesses and consulting firms. A second activity, stimulating private sector technology transfer enterprises, will provide resources on a

competititive basis to implement pilot technology transfer enterprise models, and provide support to ONA for strengthening its backstopping services to its affiliated organizations and to the enterprises established through support from this activity. The third activity, stimulating an improved seed production and distribution system, is intended to promote investment in sustainable private commercial seed production, conditioning, quality control, certification and distribution activities.

The activities under Component Three, Human Resources Development, include one activity to strengthen UNA administration and teaching programs through: (1) improvement of capacity to plan, obtain and allocate resources, and to provide objective leadership to and through the Office of the Rector; (2) stimulate curriculum revisions to match the evolving science knowledge base; (3) create an incentive system to stimulate faculty concern for excellent and additional performance; and (4) expand faculty skills, knowledge, vision and understanding of the Peruvian agriculture sector. The second activity, improving research, teaching and extension materials, includes: (1) assistance to the National Agricultural Library; (2) production of national scientific publications; and (3) development and production of extension publications. The third activity, competitive graduate study fellowship and participant training, is directed at employees of the Ministry of Agriculture (MINAG), INIPA, UNA, regional universities, and private organizations to obtain advanced degrees and to participate in other training programs.

4. Financial Plan

Components	AID Grant (US$000s)	GOP Counterpart Contribution (US$000s)	AID and GOP Contribution (US$000s)	Estimated Private Sector Contribution	Grand Total
1. Technology Generation	9,825	17,080	26,905	400	27,305
2. Technology Transfer	7,450	2,550	5,980	6,850	15,850
3. Human Resources Development	4,400	2,650	7,050	350	7,400
4. Inflation and Contingency	3,325	4,720	8,045	1,400	9,445
TOTAL	25,000	27,000	52,000	8,000	60,000

C. DAEC Concerns and Project Design Issues

Several issues were raised during the DAEC review held on November 7, 1986 in AID/W as described in the PID approval cable (Annex I, Exhibit B). The Mission's response to these issues appear throughout the PP and in Annex II, Exhibit B. During the Mission intensive review, additional issues were raised and resolved. These also are addressed throughout the PP.

D. Summary Findings

The Project Development Committee has reviewed all aspects of the proposed Agricultural Technology Transformation Project and has concluded that the Project 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 Project be authorized.

E. USAID/Peru Project Development Committee and Contributors

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II. BACKGROUND AND JUSTIFICATION

A. Country Setting

Peru is a poor country with diverse physical, population, social and economic characteristics. According to the International Bank for Reconstruction and Development (IBRD or World Bank), Peru's average GNP per capita in 1985 was $960. That average belies the intensity of impoverishment of major segments of the population. For example, the 1984 National Nutrition and Health Survey of Peru (ENNSA) data indicate that nearly one million households (more than five million persons) have median household incomes of less than $30 per month (equivalent to an annual per capita income under $63.00). These primarily are rural families depending on agriculture for their livelihood, and the majority of them live in the Peruvian Highlands. The ENNSA survey also shows that one-quarter of all households in Peru, and more than half of highland households, have at least one malnourished child. This compares with 19 percent of Coastal households and 13 percent of Lima households.

Currently estimated at 20 million, Peru's population is high considering its productive land base. Formidable physical barriers (e.g., deserts, mountains, and humid tropics with difficult access), a relatively large unassimilated native population, a risk averse private sector, and a public sector with limited technical staff and leadership capability impide concensus about, and effectiveness in, implementing social and economic development initiatives.

For two decades, Peru has experienced a high incidence of destabilizing political turbulence and socio-economic crises, and more recently suffered the effects of an active and growing terrorist movement and drug trafficking. During the military dictatorship of the 1970's, widespread economic and socio-political changes were executed, including a massive land reform. These changes modified the structure and ownership of productive resources, and greatly increased the role of the State in the economy. In 1980, Peru elected a democratic government that set out to reverse the Statist oriented policies of the 1970's. The world recession of the early 1980's and the resulting sharp drop in prices of Peru's major traditional exports, combined with unprecedented and widespread climatic distortions and inappropriate monetary and fiscal policies, precipitated uncontrolled inflation and rapid deterioration of the economy. The "Shining Path" terrorist movement and drug trafficking activities have created social havoc, have destroyed peaceful and normal living conditions in many parts of the country, and have contributed to the deteriorated economic situation.

The American Revolutionary Popular Alliance (APRA) Government, elected in mid-1985, was the first democratically elected government to succeed another in forty years. It immediately instituted a short term "shock treatment" to control inflation and stimulate demand by freezing prices, declaring sharp wage increases, reducing interest rates, restricting imports,

controlling exchange rates and limiting external debt payments. This economic growth plan stimulated domestic demand and achieved an impressive supply response, while sharply reducing the inflation rate. An almost unprecedented 8.5 percent real GDP growth rate was achieved in 1986, and inflation was cut in half from 163 percent in 1985 to 78 percent in 1986. At the same time, this growth strategy has raised serious questions concerning the prospects for longer run economic stability. Net international reserves have fallen significantly, exports and capital inflows have declined, and the central government deficit rose from 2.3 percent of GDP in 1985 to 5.3 percent in 1986. Peru continues to seek a policy mix capable of generating and sustaining growth and development.

B. Agricultural Setting

Arable land in Peru is severely limited, averaging less than one-fifth hectare per capita, the lowest in South America. Water also is an extremely scarce resource. Less than one-third of annual cropland is irrigated, and rainfall on much of the remainder is inadequate, unreliable or poorly distributed. Even irrigated land often suffers from inadequate water supply during some part of the growing season.

Much of Peruvian agriculture also faces more severe natural adversities and diversity than agriculture in most other countries. For example, Peru has more life-zones than any other country in the world. Coastal agriculture is dispersed among 52 desert valleys between the Pacific Ocean and the Andes mountains, and is dependent for water entirely on irrigation from variable flow streams and limited ground water supplies. Sierra agriculture is widely dispersed in high mountain valleys of the Andes with difficult access to markets. These areas often are severely eroded and/or highly subject to erosion, and many suffer from adverse climatic conditions because of altitude. Climatic variability also affects many Coastal areas and jungle (Selva) slopes and lowlands east of the Andes. In addition, the Selva region is subject to rapid soil erosion and depletion, also with difficult access to markets.

Some two thousand worker-owned "associative enterprises" created by the land reform control 40 percent of total agricultural land, including much of the most productive on the Coast and in the Sierra, but produce only 25 percent of total agricultural output. An estimated 70 percent of Coastal associative enterprises now are parcelized into small (four to five hectares) individual ownership units. About 300,000 owner-operator commercial farms over five hectares in size produce 50 percent of agricultural output on 18 percent of total agricultural land. Another 1.4 million subsistence and landless laborer families also earn their livelihood from agricultural and livestock production activities. Approximately half of these are members of the estimated three thousand traditional "campesino", or peasant, communities in the Sierra.

Thirty-eight percent of the economically active population of Peru is employed in the agricultural production sub-system. Two-thirds of the national population earn their livelihood from the overall agricultural production, processing and marketing (PPM) system. This system produces, processes and markets 85 percent of nationally consumed foodstuffs, 20 percent of raw materials for industry, and exports enough to earn 11-14 percent of total foreign exchange. Thus, the economic health of the agricultural PPM system deeply affects the entire economy of Peru.

Yields for most major food crops in Peru have not increased significantly over the past two decades, and in most cases, currently are significantly lower than are yields in most Latin American countries. This yield stagnation has been caused largely by technological stagnation.

Shortly after freezing prices in mid-1985, the new APRA Government exempted agricultural foodstuffs prices. Perishable foods prices were permitted to fluctuate according to market forces, producer support prices (based on production costs, plus 20-40 percent profit) were introduced for basic food staples, and prices of selected agricultural production inputs were subsidized heavily. These price policies, combined with wage increases considerably above the rate of internal inflation and a massive urban public works program, generated a greatly increased demand for food, and sharply improved the terms of trade of the agricultural sector with the rest of the national economy. Domestically produced agricultural product wholesale prices increased 30 percent in 1986 relative to non-agricultural product wholesale prices. This relative price change contributed heavily to a 3.9 percent agricultural GDP growth rate during 1986, and resulted in agricultural production sub-sector income increases estimated at 25 percent.

To finance the cost of farm-level support prices and input subsidies, the GOP has been relying on low international market prices and on an artificially low exchange rate for traditionally imported food and feedstuffs (primarily wheat, edible oils and yellow corn). This has permitted the creation of a subsidy fund based on the differential of purchase and sales prices (e.g., 40 percent in the case of wheat) by the Empresa Nacional de Comercialización de Insumos-ENCI (the state monopoly for agricultural inputs and food imports and distribution). At the same time, controlled consumer prices for price-supported basic food staples have been increased selectively to keep subsidy levels within the limits of available resources in the subsidy fund.

The GOP recognizes that increased agricultural exports are needed to counteract the loss of reserves associated with current macro-economic policies designed to stimulate internal growth. Non-traditional exports are afforded the most favorable exchange rates while imported agricultural inputs also enjoy a highly favorable exchange rate and are free of tariffs. In addition, major fertilizers produced in Peru are sold to farmers at subsidized prices.

C. Project Setting

Peruvian agricultural production is characterized by wide diversity in the land base, types of farmers, agro-climatic zones, sizes of farms, market characteristics, and consumer preferences. It follows that demand for agricultural production services and technology also is broad and diverse. Each of the many types of production requires its own adaptation of technologies. Thus, improved seed, technological and farm management information, land improvements, water use improvements, improved agronomic practices, more profitable input combinations and marketing assistance must be sufficiently varied to accommodate a wide range of production characteristics.

The private and public sector institutional base serving the agricultural technology generation and transfer (ATG&T), input supply and output marketing needs of this diverse agriculture is limited in scope, responsiveness and capability. General characteristics of the ATG&T system institutional base are summarized below.

1. Private Sector ATG&T Organizations

Peruvian farmers have few organized channels through which to generate or receive ATG&T related services, or through which to express their technological needs effectively. In 1980, farmers were permitted and encouraged to organize after their organizations had been disbanded in the 1970's. Since then, thousands of farmers have organized in various ways at the local, regional and national levels: commodity groups of the major food staples (e.g., rice, corn, potatoes), major export crops (e.g., cotton, coffee), and major livestock products (e.g., poultry, beef, milk, pork, sheep, wool); irrigation water user associations; and special interest groups (e.g., small farmer groups, associative enterprise worker groups, parcelized associative enterprise groups). In addition, campesino (peasant) communities and associative enterprises have the potential to participate in providing organized ATG&T related services for a large number of small farm families.

The National Agriculture Organization (ONA) is the only broad-based farmers' organization of significant national scope in terms of types of farmers, type of production, and geographic areas represented. It is organized through affiliations of local, regional and national commodity and special purpose producer groups, with approximately 245 such groups currently affiliated. These groups represent producers farming nearly half of the crop area being cultivated in any one year.

As the only nation-wide representative farm organization, ONA is a member of the National Confederation of Private Enterprise Institutions (CONFIEP). A wide range of private firms also have an interest in agricultural output and producer incomes, as suppliers of agricultural inputs, or as purchasers and users of agricultural products acting in the capacity as either processors or exporters.

Except for a relatively small number of national distributors of international brand name agricultural and livestock chemical and pharmaceutical products, most input supply firms are small, dispersed and undercapitalized, generally reflecting a market characterized by imperfect competition. Little initiative has been taken either by public sector institutions or the private sector to promote the self-interest of these firms as vehicles for transferring technology to farmers. A relatively small number of agricultural product processing/exporting firms are of national scope. With one notable exception, these firms have not initiated serious efforts to expand the supply of new products or lower prices through technology transfer to farmers. Two major consultants reports (See Bibliography) provide additional detail about agriculture-related private sector firms and their actual and potential role in ATG&T.

2. Public Sector ATG&T Institutions

The public sector ATG&T sub-system is composed of: a) three decentralized institutes (Instituto Nacional de Ampliación de La Frontera - INAF; Instituto Nacional de Desarrollo Agro-industrial - INDDA; Instituto Nacional de Investigación y Promoción Agropecuaria - INIPA); and b) the Universidad Nacional Agraria (UNA) and twelve regional university agricultural faculties. In addition, some public ATG&T functions also are exercised by General Directorates of the MinAg and by IVITA, the research arm of the Veterinary School of San Marcos University.

INAF, a public works organization, is charged with expanding the land base, principally through irrigation works. This project focuses on increasing the productivity of the existing land base rather than on land expansion. INDDA, which is being absorbed by INIPA, focuses on agroindustrial processing methods and the development of new processed products. IVITA focuses on ruminants in high altitude animal health research.

INIPA, however, is the centerpiece of the public sector ATG&T sub-system. It was established in 1981 to consolidate and strengthen a number of disperse functions ostensibly being carried out by various offices and agencies in the public agricultural sector. It inherited the personnel from these offices and agencies, many of whom were untrained for their new roles.

INIPA is organized with its Headquarters Office in Lima, and with 24 regional research and extension centers (called CIPA's) corresponding closely to departmental boundaries. These CIPA's operate the research stations, on-farm trials and demonstrations, extension offices, and other related field services. Research is carried out on the 24 research stations, 36 sub-stations and on farms of cooperating producers. Current GOP reorganization plans call for Technology Transfer Retailing functions to be transferred from the INIPA organization to regional offices of the MinAg. Research and Technology Transfer Specialist functions are to remain with INIPA. (See Chapter III. D. for a definition and discussion of these functions.)

INIPA has a total staff of about 5,500, with 2,400 working in extension and related services, 1,500 in research, and 1,600 in administration. Of 5,500 employees, about 500 are directors, 1,000 are professional staff, 2,000 are technical staff, and the remainder are support personnel. During the period 1981-86, average annual financial support to INIPA from the GOP and external donors has averaged $30 million equivalent. Functionally, approximately one-third of this total was allocated to research and slightly less to administration and training.

Agricultural universities constitute a public sector ATG&T system resource of considerable magnitude and potential. Twelve regional university agricultural faculties and the National Agrarian University (UNA) at La Molina (a neighborhood outside Lima) have a combined faculty in excess of 1,200 agricultural professionals. UNA faculty conduct important seed research and carry out extension programs in corn, wheat and barley in cooperation with the private sector. Approximately 350 graduate students and 3,600 undergraduate students currently are enrolled at UNA in agriculture-related specialties. These graduates are the main source of supply for professional talent in national level public and private sector institutions and organizations that provide services to the agricultural PPM system. Regional universities also are important in training professionals for regional positions in agriculture.

Peruvian ATG&T institutions have established close working relationships with a number of International Agricultural Research Centers (IARCs), especially the International Potato Center (CIP) in Peru, the International Center for Tropical Agriculture (CIAT) in Colombia, the International Wheat, Corn and Grain Sorghum Center (CIMMYT) in Mexico, and the International Rice Research Institute (IRRI) in the Philippines. This relationship constitutes a very important resource to Peru basic crops research information, improved germplasm sources, training and technical assistance.

D. Problem Statement

The GOP seeks more rapid equitable increases in agricultural output and rural incomes. Such increases theoretically can come from: 1) incorporating more land into agricultural production; 2) increasing the efficiency of use of existing factors (land, water, labor, capital, management) utilized in the agricultural PPM system; or 3) some combination of the above.

Land expansion options for Peru are quite limited and generally high cost, and often are negative relative to returns. For example, major irrigation schemes currently under way cost from $7,000 to $15,000 or more per hectare of land brought under production. Potential returns are insufficient in most cases to amortize more than a small portion of these high development

costs. Some of the best new land areas in the high Selva that have been brought into production over the past decade apparently cannot cover costs of production at equilibrium prices (i.e., without subsidized product prices and transportation), or do so at great risk to the fragile environment.

As noted earlier, agricultural production on existing land generally is highly inefficient in terms of factor productivity because of low levels of improved technology use. Peruvian crop yields (with noted exceptions, such as rice) are among the lowest in Latin America, irrigation water use efficiency often is no more than one-third that which is technically feasible, and unit costs of production for most producers of major crops compare quite unfavorably with those of other countries and with efficient producers in Peru.

In contrast to the high cost of land expansion, the preponderance of evidence indicates that costs of increasing factor use efficiency through adoption of improved production technology on a large proportion of Peruvian farmland potentially is quite low compared to returns. For example, easily applied soil and water conservation measures on sloping Sierra land often double output with no other technological change. Simple, easily adopted on-farm water management techniques applied to irrigated land consistently increase yields by fifty percent and require few other changes. Clean and improved seed varieties for a number of basic crops (potatoes, wheat, corn) increase yields by 25 to 200 percent, requiring only minor changes in use of other inputs and cultural practices. Despite these demonstrated benefits of technological changes, few Peruvian farmers have adopted them. Less than five percent of all farmers use certified seed, and only one-fourth use chemical fertilizers or pesticides of any kind. Most Sierra farmers do not adopt or maintain soil and water conservation measures, and irrigated-land farmers continue inefficient on-farm use of water.

The inescapable conclusion is that a basic problem limiting more rapid agricultural output and rural income growth, which this project will address, is inefficient factor use because of low adoption of improved production technology. Not only current improved production technology be adopted, but new technology must be continually generated in an on-going process. Production technology, especially that embodied in improved seed, deteriorates and becomes outdated, inefficient and ineffective. Once halted, the technology generation process is slow and expensive to revive.

E. Constraints to Increased Adoption of Improved Production Technology

Resolution of the problem of low adoption of improved production technology is not unidimensional. Constraints are multi-faceted with closely interrelated elements. A thorough constraints analysis was carried out in 1983 for the Mission Country Development Strategy Statement (CDSS), and has been updated in subsequent programming documents.

The major constraints to increased adoption of improved production technology are:

1. Structural, Human Resource and Institutional Weaknesses within the ATG&T System
2. Limited and Deteriorated Land and Water Resource Base
3. Inappropriate Policy Environment, and
4. Inefficient Infrastructure for Both Domestic and Export Marketing.

This Project primarily will address the first two constraints. Other AID projects now address or will address critical elements of the two remaining constraints listed above.

The four principal weaknesses that constrain rapid development of a more effective national ATG&T system and which will be addressed by this project are summarized below:

1. Weak ATG&T Effective Demand-Supply Linkages Result in Weak Support for Research-Extension Activities

a. Given the uncertainties of the macro-economic situation and the likelihood of severe economic problems as inflationary pressures build and as foreign reserves decline, the willingness of the GOP to continue the level of support currently being provided to agricultural research and extension is uncertain. Agricultural research and extension have not been the highest priorities of developing countries in general nor of the GOP in particular, although the GOP has maintained real resource levels over the past several years for these activities. As resource availability pressures build, current levels of public treasury support tend to suffer.

b. There is a significant gap between technology needs and technology generation capability in Peru. The on-going INIPA national commodity programs (that in the past have focused primarily on seed improvement) do not provide a sufficiently broad range of research results or technical backstopping for the transfer function to be broadly responsive to farmers' needs. The private sector is only beginning to assert itself in research and extension. Farmer organizations now have an improved understanding of their member needs, and input suppliers are beginning to recognize that they must provide technological information with the sale of improved inputs if input use is to expand.

c. There is a lack of organized clientele support for INIPA ATG&T functions. Most farmers and their organizations are critical of public sector agricultural research and extension. Lack of support for public sector ATG&T activities has its roots in part in the generally poor performance of agricultural public sector institutions in the past, and INIPA suffers by association. At the same time, farmers tend to expect extension services to be provided without direct cost to them.

d. Agriculture related private sector entrepreneurs (e.g., producers, input suppliers) have not been successful in translating their felt needs into an effective demand for ATG&T services. Farmers do not always understand what are the underlying causes of their problems or which improvements in the production process could provide the highest net benefits, and input suppliers do not effectively seek out technological information for supporting input sales.

2. Lack of Logical Division of Public and Private Sector Roles

a. There is no orderly division of functions and roles of the public and private sectors in the ATG&T system. For example, public sector institutions such as INIPA and UNA are involved not only in the development of new seed varieties and production of foundation seed, but also in the commercial production and sale of certified seed. This discourages private sector firms from entering into commercial seed production. A similar confusion of public and private comparative advantage and roles exists for custom machinery rental and fertilizer distribution.

3. Organizational Weaknesses of Institutions in the ATG&T System

a. While there has been a significant improvement in the capacity of INIPA to organize, manage and execute research under the national commodity programs, its capacity compared to the magnitudes of the task is limited. Although INIPA cannot be expected even in the long run to supply all research and extension needs of the diverse agriculture of Peru, its capacity to fulfill the core functions of technology generation and information packaging for basic foodstuffs is hampered by inability to attract and retain qualified professionals within the limits of its pay scale.

INIPA also suffers from lack of institutional stability. While changes at the highest levels of leadership cannot be avoided, stability of a research and extension institution is expressed largely through stability and quality of professional staff. At the professional level in INIPA, stability is constrained by salary limitations, while quality is constrained by the level of graduate education at UNA and regional universities, as well as by the quality of in-service training available within INIPA and elsewhere.

b. The ability of agricultural universities to produce the quality of professional manpower required for a more dynamic ATG&T system is constrained primarily by the lack of adequate and effective linkages into the broader national and international agricultural scientific community and into the Peruvian agricultural production sub-system by both faculty and students.

c. Farmer organizations are relatively new and inexperienced. Their objectives, strategies, organizational forms, types of support services, and ability to serve farmer interests and needs are in an early process of

evolution. At the national level, the need to provide economic services often is confused with the desire to increase organizational membership to support the lobbying function. At the same time, both national and local level organizations, whether organized along commodity or geographic lines, have a significant interest in providing producer services. Lack of experience and knowledge about options, as well as limited human and financial resources, hampers the scope and effectiveness of these organizations in providing economic services to producers.

4. Inappropriate Resource Use

Inefficient and inappropriate use of limited productive agricultural resources, and under-utilization of land and water resources in the ATG&T system have been the major cause of low yields and low total factor productivity in the PPM system. The lack of a sufficient number of adequately trained professionals in all components of the ATG&T system has contributed to poor use of resources already in that system.

The nature of the activities under this ATT project, the activities currently being implemented under the APID Project and activities to be implemented under the proposed Export Promotion and Agribusiness Development Project are highly synergistic. Although each of these projects could be expected to generate cost-effective changes and improvements in the knowledge base, institutional capacities, and operating efficiencies that alleviate the constraints they are designed to address, a benefit multiplier is inherent in being able to make balanced progress toward achieving the project purposes in all three of these projects.

F. Lessons Learned

ATT Project design has the benefit of extensive GOP and USAID experience during the past five years in rebuilding and expanding public sector ATG&T activities under the Agricultural Research, Extension and Education (REE) Project, under the university components of the Agricultural Planning and Institutional Development (APID) Project, as well as contributions to the knowledge and experience base provided by the Sierra Small and Medium Irrigation Project (Plan Meris) and two Collaborative Research Support Programs (CRSPs) in Small Ruminants and in Tropical Soils. USAID also has been testing options for increasing the role of the private sector in ATG&T activities. Four private sector pilot projects have been under way for the past three years to determine private sector potential in carrying out: 1) adaptive research, and multiplication and distribution of improved plant material; 2) technology transfer linked to agricultural credit; 3) data collection and analysis for determining, and transferring information about, production profitability and farm management improvement; and 4) market analysis, technology selection and transfer for vegetables and fruit production and processing for export.

Intensive review of recent evaluations of relevant project experience in Peru and elsewhere in Latin America, along with contributions by international specialists in ATG&T systems, have led us to the following findings and conclusions used as guiding principles for ATT Project design:

1. An effective ATG&T system for Peru should include both public and private sector institutions, with a division of functions based on the nature of the benefits derived and the institution's comparative advantages. Public sector institutions should concentrate efforts on those functions that generate high social benefits in relation to cost but where individual economic benefits tend to be low or widely dispersed and time-lagged. Private sector organizations should be encouraged to carry out ATG&T functions that produce direct short-term economic benefits to adopters.

2. In accord with the above criteria, public sector ATG&T institutions in Peru should concentrate on: a) generation of improved technology for basic food staples; b) provision of effective technology wholesaleing services; c) provision of farm level extension services (technology transfer retailing) to subsistence and emerging market-oriented small farmers; and d) academic and non-academic training of technical, professional and managerial personnel for staffing the ATG&T system.

3. Public sector institutions responsible for ATG&T activities are most effective when they: a) are insulated from political influence and interference; b) have direct authority to adopt pay scales that allow them to compete with the private sector and with autonomous public sector institutions in recruiting and retaining technical, professional and managerial personnel; c) are closely linked upward to the international agricultural scientific community and downward to Peruvian farmers; and d) have access to significant and stable resources (financial and human) on a continuing basis from both conventional public treasury and private sector channels.

These conditions are most likely to be achieved when there is broad-based and organized clientele support for public sector ATG&T institutions. Such clientele support is not automatic nor easy to achieve. It is important that public sector ATG&T institutions develop strong clientele relationships with farmers, farmer groups and other private sector technology transfer agents (such as input supply, output marketing and processing firms) that can influence government officials responsible for public sector ATG&T budget and institutional structure decisions. It is equally important that they seek active financial and other participation by farmers and agriculturally related enterprises in ATG&T activities. In this way, mutual interdependence is developed, the ATG&T system will be more responsive and effective, and resource flows to sustain, improve and expand the ATG&T system will be greater and more reliable.

4. There are growing indications from Peru's own experience as well as from international experience that a sustained and responsive level of ATG&T effort can best be assured when direct public treasury appropriations to

public sector ATG&T institutions are supplemented by resources flowing from private sector sources. To achieve this, many ATG&T systems in other countries, including land grant universities in the U.S., have established or are in the process of establishing not-for-profit private sector entities that receive and administer resources from private or public sector sources to establish endowments or to defray current expenditures.

5. ATG&T systems quickly reach an intractible plateau of performance in the absence of in-country capacity to provide quality academic/non-academic training for upgrading the technical, professional and managerial capabilities of personnel in the system. For Peru, this includes academic training up to the masters level. Thus, a program of development of the ATG&T system must include support to improve the quality of in-country academic training in the agricultural sciences, as well as nonacademic training of personnel currently serving the ATG&T system.

6. A key element of a successful ATG&T system is the existence of effective seed programs, not only in terms of new varieties development (generally focussed in the public sector), but also in terms of effective private sector seed multiplication and distribution.

7. The private sector must play a major role in transferring improved technology especially to commercial farmers producing cash crops, if even modest technology transfer goals are to be achieved. In Peru, recent studies and consultants reports indicate that there are a number of promising models and considerable institutional potential for effective major expansion on a self-sustaining basis of private sector participation in the ATG&T system. A lack of incentives, encouragement and knowhow constrain rapid private sector expansion of these services. Catalytic and innovatively programmed resources to the private sector dedicated to removing these constraints can yield dramatic advances in technology adoption.

G. Relationship to GOP Policies and USAID Strategy

1. Current GOP Agricultural Development Objectives and Policies

The current GOP has made agricultural and rural development its highest priority, and has indicated it will give special emphasis to agricultural development in the Sierra and, more particularly, on the poorest Sierra region known as the "Trapecio Andino". This is a region of approximately 56 Provinces comprising the Sierra portions of seven Departments in Central and Southern Peru, with a population of approximately four million. For security and other reasons, the GOP has not been able to fully provide the desired attention to the Trapecio Andino. This Project provides assistance to agriculture development nationwide, including the Sierra. Should the GOP become able to provide increased emphasis to the Trapecio Andino, this Project also will be able to increase assistance to the area.

Announced GOP agricultural development objectives are to: a) increase output and yields of basic foodstuffs; b) assure profitability to producers of crop and livestock production; c) establish a system of supply response to permit a supply and demand equilibrium that is profitable to producers and affordable by the majority of consumers; d) protect and support agricultural development through sustained net transfers of total national income to rural Peru; e) guarantee property rights of owner-operators up to the maximum allowed by law; f) correct agrarian reform errors and distortions that discourage increased production and productivity, g) provide technical assistance needed to assure efficient and business-like management of farms.

In early 1986, the GOP adopted a series of emergency agricultural reactivation measures designed to reverse the severe decline in output that had been taking place during the last half of 1985 and into 1986. These measures included price supports for basic staples, subsidized credit terms, and subsidized fertilizer prices. The GOP has been flexible in permitting price adjustments of agricultural products, especially perishables. Food imports are being scrutinized closely, and recently more flexibility is being demonstrated in adjusting exchange rates for non-traditional agricultural exports.

Currently, the GOP is finalizing a longer-term agricultural development plan to substitute for emergency reactivation measures. There is greater recognition of the need for incentives for the private sector in agricultural production and marketing, and the need for more coherent domestic price and foreign trade policies. The GOP is presently providing increasing support to agricultural research and extension as evidenced by the 1987 INIPA budget, which is higher in real terms than in 1986.

The GOP has demonstrated an awareness of existing weaknesses in the public sector ATG&T system, and of the need to greatly expand the role of the private sector in that system. In order to accelerate improvements, the GOP is finalizing a major reorganization of public sector ATG&T institutions. This proposed reorganization recognizes the need for a substantially increased role of the private sector in technology transfer. It is expected that the reorganization will permit the revitalized INIPA to adopt pay scales more competitive with other institutions (such as private sector input supply and output marketing firms, the Agrarian Bank, and the state agricultural marketing companies) that are major employers of agricultural professional and technical personnel. Also, in 1986, INIPA joined with ONA in establishing a not-for-profit foundation (Fundacion de Servicios a la Investigación y Promoción Agropecuaria - FUNSIPA), for purposes of enhancing the ability of the ATG&T system to attract resources from the private sector and international donors, and to hire and retain high quality leadership for INIPA agricultural research supervision and management.

2. USAID Agricultural Development Strategy

In 1979, USAID began a major process of refocussing its agricultural development strategy. The strategy shifted from a focus on

physical infrastructure construction and new lands expansion to one of technology generation and transfer, human resource development and institution building. A major agricultural base-line study in 1979 prompted design of the REE Project to rebuild, reorient and improve the quality of the public sector ATG&T system. Recommendations of the 1982 US Presidential Agricultural Mission to Peru prompted: a) design and approval in 1983 of the APID Project to address agricultural policy, university training and public sector institutional development constraints; b) refocussing of the Sierra Small and Medium Irrigation Development Project (Plan Meris) from irrigation system construction to on-farm water management, and initiation of the pilot Soil Conservation Project to address problems of the deteriorating land and water base; and c) a number of pilot activities to test options for improved and expanded private sector participation in ATG&T activities, and in agricultural marketing, especially that related to actual and potential export markets.

USAID has played and will continue to play a leadership role among donors in agricultural development policy analysis and in ATG&T system improvement. Since the GOP is pleased and comfortable with AID in this position, and since no other donors have come forward to assume the leaderhip role in these areas, it is appropriate that AID continue as the leader. In this capacity, the Mission has taken the initiative in guiding the attention and resources of the GOP and other donors to priority needs for accelerating broad-based technology transformation within the agricultural production-marketing system. In order to provide an adequate policy and institutional base for this technology transformation process to be successfully achieved, the USAID strategy for the next six years calls for long-term public and private sector institution-building support in four critical areas: a) agricultural production research and extension; b) agricultural education; c) policy analysis, formulation and change relevant to agricultural growth; and d) agricultural marketing and agribusiness. This agenda complements and is consistent with priorities and programs of the GOP. The USAID policy dialogue agenda with the GOP for the next several years will focus on policies related to: (1) intersectoral pricing; (2) allocation of Public Sector Investment; (3) agricultural price policies and other policies to improve the efficiency of agricultural input and output markets; (4) allocation of resources to the agriculture PPM system by the financial system; and (5) mobilization into the agricultural PPM system of private sector risk capital and savings.

For the REE and APID projects, the USAID strategy timetable called for initial support to strengthen public sector agricultural institutions. Public sector institutional capacity and understanding now are at a stage where some resources should be shifted to private sector institutional enhancement, building on successful pilot efforts. For USAID's agricultural technology transformation strategy to be successful, public sector institution-building support must continue, and private sector involvement must be considerably expanded.

By the end of FY-87, the existing USAID agricultural and rural development pipeline is expected to be less than $10 million, a decrease of $53 million from the 1983 pipeline level of $63 million. To assure continuity, sustain momentum, and maintain AID's recognized role, new initiatives are called for. Over the next six years, USAID will continue to strengthen the performance of the public sector in planning, policy analysis and technology generation and transfer, and to expand the role of the private sector in these critical areas through both the on-going APID Project and this ATT Project. In addition, USAID now is synthesizing its pilot experiences and knowledge base in preparation for the design of a proposed Export Marketing and Agribusiness Development Project to be initiated in FY-88. Finally, USAID will continue to use policy dialogue under both the Title I and ESF Programs to promote macro and sector level objectives embodied in the above three projects. These activities, taken together, constitute USAID's proposed program through 1993 to assist Peru in addressing its agricultural development problems and constraints.

II. Other Donor Activities

Major donors, such as the Interamerican Development Bank (IDB) and IBRD, have been concentrating the major share of their resources on infrastructure construction and capital transfers, namely: 1) new coastal irrigation system construction and rehabilitation of existing systems; 2) high jungle integrated regional infrastructure development projects; and 3) agricultural production and investment credit to the State Agricultural Development Bank. No new agricultural projects have been initiated by multilateral donors during the past three years.

Less than ten percent of the overall multilateral donor agricultural development portfolio of approximately one billion dollars is dedicated to human resource improvement and institution building in research, education and extension. The design and implementation of the agricultural research, education and extension multilateral donor portfolio, initiated in 1981/82, was based on the conceptual framework and on-going leadership role already established by AID under the REE Project. Multilateral donor assistance to agricultural universities is limited to IBRD support for training of UNA professors and some local cost support to the graduate program. This complements the on-going technical assistance, training and academic development activities being supported by AID under the APID Project. AID currently is the only donor providing support to private sector research and extension. Bilateral donors other than AID provide relatively minor resources in the above areas.

The multilateral donors continue to look to AID for leadership in the areas of agricultural development policy, human resource improvement, institutional strengthening, land and water conservation and use, and technology generation and transfer. Expanding on the positive experience in research, education and extension coordination, one of USAID's first

activities with the new GOP in 1985 was to support a major agricultural research and extension assessment task force to assist in the formulation of a long-term agricultural research and extension institutional development strategy. This USAID-led team included representatives from the IBRD, IDB and the IARCs. The resulting report is serving INIPA management as a baseline document for future GOP and donor investment.

IDB is considering new support to INIPA to complement AID assistance under the ATT Project. In addition, when arrearages in GOP loan amortizations to IBRD are brought up to date, the IBRD will resume disbursing for complementary activities from its current pipeline for public sector agricultural research, education and extension of approximately $24 million.

I. Project Rationale and Strategy

1. Project Rationale

Two decades of stagnated production technology and of deterioration in the land and water resource base left Peru's agriculture virtually standing still while most of the worlds' agricultural production apparatus was increasing productivity at a rapid rate.

For Peru, yesterday's agricultural malaise is today's opportunity. The gap between existing productivity of factors and that possible through adaptation and utilization of known technology (i.e., the productivity growth frontier) is much wider for Peruvian farmers than for most competitors (both for exports and for import substitution). Peru's farmers have tremendous technology transformation potential for reducing production risks and unit costs of production that will permit them to catch up and then keep up with the rest of the world in increased productivity through improved factor use efficiency.

The strong agricultural output growth phenomenon experienced by Peru in 1986 was achieved through expanded resource use. Sharply increased foodstuffs prices, combined with input subsidies and increased amounts of subsidized credit, provided the economic incentives and the financial means for farmers to bring back into production lands that had been idled previously because of lack of profitability and financial resources. However, factor use efficiency improved little.

In order to sustain a rapid rate of growth of agricultural output and rural incomes, factor productivity must increase. More rapid adoption of appropriate improved technology is the primary mechanism by which such productivity increases can occur in Peru. Agricultural production must become science-based. Efforts to date under the REE Project to develop a science-based agriculture have concentrated on re-establishing and expanding a public sector capability to generate and transmit to farmers appropriate

technologies, and to produce the human resources needed for that public sector research, education and extension system. These efforts have by and large been successful, albeit incomplete, in a difficult and uncertain environment.

Much remains to be done in improving the quality of the research, education and technology transfer process. Furthermore, efforts to date have had little impact on the demand for technology. Generation of demand for technology is essential for continued progress in establishing a science-based agricultural system. In the absence of rapidly increasing demand for technology, growth of agricultural output and rural incomes will not be sustained, financial support for enhancing ATG&T system capacity and quality of performance will wither, and the opportunity to implant a dynamic and sustainable science-based agriculture in Peru will be lost.

To generate the needed demand for technology, the private sector must be drawn into the ATG&T system. Farmer organizations, input suppliers, marketing and processing firms, and private sector agricultural professionals all must be incorporated into the ATG&T system as active participants in the technology generation and transfer process. As contact with farmers increases from these expanded transfer sources, the technology adoption rate will increase. Successful accelerated adoption of more appropriate technology will lead to increased demand for even more technological improvements which, in turn, will lead to a sustainable, interdependent and mutually supportive public and private ATG&T system.

The ATT Project is designed to accelerate and improve the quality and magnitude of a development process already under way. Technology generation and transfer is taking place. Activities planned under ATT are an effective elaboration of this on-going process.

AID is uniquely positioned to take leadership in this next stage of ATG&T system development in Peru. Our involvement to date under the REE Project with a highly successful technical assistance component, and our pilot public and private sector contacts, knowledge of on-going activities, and understanding of strengths and weaknesses of key institutions and organizations. These give USAID a clear comparative advantage over other donors in launching a new initiative for further ATG&T system development.

This ATT Project is complementary to other AID initiatives in policy analysis under the APID Project, to efforts in the health sector to combat malnutrition through the Child Survival Project and, to numerous AID projects which seek to improve the status of women.

In short, this project focuses on the most critical constraint to increased agricultural production, builds on past and on-going activities, is an indispensable component of USAID's sector strategy, is logical and complementary in terms of other donor activities, is consistent with GOP sector goals and furthers over-all USAID strategy in Peru.

2. Project Strategy

The ATT Project is premised on the conclusion that a reliable and responsive ATG&T system under Peru's conditions must include effective participation, not only of the public sector INIPA, but also of private farmer and commercial organizations and of agricultural universities. The project strategy is to strengthen the capacity of these participants in the system by providing catalytic resources to precipitate greatly expanded contributions of financial resources and technical and professional manpower to the system by the participants themselves.

The ATT Project builds on experience, lessons learned and progress achieved in the REE Project, the university improvements activity of the APID Project, the pilot projects related to private sector ATG&T development, the Plan Meris Project, and pilot Soil Conservation Project as discussed earlier.

Its strategy to improve the status of women is to: a) recognize the integral role women play as sole decision-makers and as team decision-makers with other family members in the agricultural PPM system; b) target these women farmers to receive the equivalent assistance to that of their male counterparts; and c) train Technology Transfer Retailers and other professionals to be aware of the important role women farmers play in the agricultural PPM system and how to integrate them into the ATG&T system.

More specifically, the ATT strategy is to assist in development of an effective and dynamic ATG&T system by supporting the following activities: a) consolidate and enhance the capacity of the public sector research organization (INIPA) to generate appropriate productivity increasing technology and to develop internal capacity to make research results available in useable form to those who may be involved in transferring technology to the farmer; b) enhance the capacity of UNA and regional universities to produce suitably qualified personnel for staffing both public and private agricultural technology transformation operations; and c) design and test innovative methods for involving the private sector in research generation, technical information production and technology transfer processes, and for strengthening linkages among private and public sector sources and users of technology.

III. PROJECT DESCRIPTION

A. Goal and Purpose

The USAID goal to which this Project contributes is to increase agricultural incomes, rural employment and on-farm capital formation in Peru while increasing agricultural output for domestic consumption and exports. The Project purpose is to expand the scope and improve the quality and relevance of agricultural technology being generated for Peruvian agriculture, and of technology transfer services being provided to Peruvian farmers, in order to increase rural incomes and reduce unit costs of agricultural production while increasing agricultural productivity and yields. The Project purpose will be achieved through:

1. Increasing availability, reliability and use of a wide range of improved technologies, including improved seed.

2. Establishing and institutionalizing the capability to convert relevant research results into a form that permits Technology Retailers to effectively communicate productivity enhancing and profitable technology change opportunities to farmers. This includes the capability to disseminate information about improved technology to Technology Retailers to train them to effectively communicate it to farmers, and to backstop them in the on-going technology transfer process.

3. Consolidating and integrating activities of National Research (NR) Programs of INIPA, and strengthening core activities of National Research Support (NRS) programs.

4. Improving the quality and relevance of technical and university-level agricultural education, and increasing opportunities for both faculty and students to participate in ATG&T activities.

5. Strengthening management and administration in INIPA headquarters and field offices, and modifying INIPA personnel policies to improve competitiveness with other employers in recruiting and retaining specialized management and technical personnel.

6. Strengthening the administration and teaching program of the Universidad Nacional Agraria (UNA).

7. Increasing the overall level and sources of financial and human resources dedicated to ATG&T in Peru.

8. Expanding effective involvement of producer organizations, agribusinesses, other farm related organizations and independent agricultural professionals in ATG&T activities.

9. Strengthening linkages among persons and organizations with complementary interests in ATG&T in both the public and private sectors of Peru.

10. Facilitating linkages between the agricultural scientific community outside Peru with the agricultural scientific community within Peru.

11. Increasing the awareness and appreciation by Peruvian farmers, agri-businessmen, government officials and the general public of the importance of ATG&T to the economic and social well-being and progress of Peru.

B. End-of-Project Status

By the end of the Project, it is expected that INIPA will have established itself as a reliable and sustainable leader in the ATG&T system in Peru, and that private sector and agricultural university participation will be well established and expanding on a self-sustaining basis.

Agri-businessmen, GOP leaders and the general public will value the ATG&T system contributions to their individual and collective economic and social well-being, and support sustained levels of public funding to maintain ATG&T system capabilities. Farmers will be active and vocal in seeking improved technologies that are more reliable and profitable than that which they now are using and they will be contributing significant resources to ATG&T activities.

More specific conditions that are expected to exist by the end of the Project are:

1. A national ATG&T system is producing and disseminating new and relevant technologies in a form and manner that responds to the needs of a wide range of farmers in Peru, and adoption rates are increasing.

2. INIPA is effectively planning, managing, and evaluating Peru's agricultural research needs and priorities at both national and departmental levels, and sharing that information with other parties in the ATG&T system in a manner that results in the generation of increased and more relevant research outputs.

3. Improved legal and institutional structures are in place and functioning for more effective recruitment, placement and retention of adequately trained and experienced scientific and managerial personnel in INIPA.

4. Long-term institutional linkages have been established and are functioning between the Peruvian ATG&T system and a wide range of researchers and research institutions outside Peru.

5. Operational linkages are in place among public sector national and regional agricultural research and extension organizations, and the private sector and with agricultural educational institutions.

6. UNA and regional universities are producing higher quality graduates who are staffing the public and private ATG&T system.

7. Mechanisms are identified, tested, and replicated by private sector actors that increase activities of the private sector in identification, adaptation and dissemination of improved agricultural technologies.

8. Appropriate roles of the public and private sectors in improved seed production and distribution are defined and agreed upon by major institutions involved, and an improved seed supply and distribution system consistent with those roles has been initiated for selected crops.

9. Crop yields will be increasing and unit costs of production will be decreasing.

C. Project Beneficiaries

Four distinct population groups will benefit from the impacts of the Project:

1. Men and women farmers who learn about and are influenced and assisted to adopt technology changes through the ATG&T system will benefit from increased profits and capital formation.

2. Families whose livelihood depends on employment in agricultural PPM activities will benefit from increased employment opportunities generated by increased production factor use, and the resulting increased volume of production to be harvested, transported, processed and marketed.

3. Increased disposable incomes of farm families and of agricultural worker families will result in increased demand for goods and services in rural market towns. This increased demand will increase incomes of local businesses and will increase employment opportunities for service personnel. Rural non-farm families will benefit from this added income and employment.

4. Finally, improved production factor use efficiency, reduced unit costs of production and reduced production risks resulting from adoption of improved technologies will increase the supply of better quality, lower-cost foodstuffs in the urban marketplace, thereby benefitting urban consumers. Lower income consumers will benefit more from these lower food costs since they spend a larger proportion of their total income on food than do higher income consumers.

Annex II, Exhibit I, Detailed Social Soundness Analysis, provides a more detailed description of project beneficiaries.

D. Project Components and Activities

The Project is made up of three closely interrelated components. These three components correspond to and address the three major functions performed by the ATG&T system. For purposes of this Project Paper, these three major components are titled and defined as follows:

1. The Technology Generation Component relates to the function of carrying out applied and adaptive agricultural research in accord with accepted scientific research methods, including on-farm testing and farmer trials. This includes documentation of the technology, i.e., recorded technical description of the research carried out, the methodology used, the technology generated (in the case of improved seed or plant material, this includes production of breeder stocks), and the measured impact of the technology generated on output, production costs, factor use, incomes, risk, management, and/or other relevant production variables.

2. The Technology Transfer Component is divided into two functions: a) Technology Processing and Wholesaleing, and b) Technology Retailing. (See Figure A).

a. Technology Processing and Wholesaleing relates to the function of converting research outputs into communicable form for use by Technology Retailers (who work directly with the end users: farmers), as well as its actual dissemination and communication to Technology Retailers. The people who carry out this technology processing and wholesaleing function are Technology Transfer Specialists. These Technology Transfer Specialists include subject matter specialists (e.g., commodity specialists, seed production specialists), extension specialists and communication specialists. In the case of embodied technology such as improved seeds, this function includes production of foundation seed. In the case of technological information, it includes preparation of didactic and audio-visual materials that communicate information about the technology in a manner that Technology Retailers can understand. It also includes field demonstrations, field days, training programs and other methods of informing Technology Retailers about new technologies, as well as backstopping them to assist in resolving particular problems that arise on farms. This function also includes preparation and supply of didactic and audio-visual materials for use by Technology Retailers in transferring knowledge about new technologies to farmers, as well as in mass communications activities.

b. Technology Retailing is the function of transferring improved technology information and embodied technology to the end user, the farmer. Technology Retailers perform this function and include public sector extension agents, input and credit suppliers, output marketing and processing firms, technical consultants, farmer organizations and groups, and other commercial, civic and not-for-profit organizations interested in agricultural and rural development, and in improved social and economic well-being. This is the function in the technology transfer process that deals directly with the farmer as an individual or in groups. Methods used by Technology Retailers include direct oral communication with farmers supplemented by didactic and audio-visual materials, field days at research stations or on farmers' fields, incentives to farmers to use a particular product such as improved seed, a new pesticide or a different fertilizer product, as well as mass communications methods.

FIGURE A. Agricultural Technology Transfer Process

TECHNOLOGY PROCESSING & WHOLESALEING

What Is It?
Process of converting research outputs into communicable form for dissemination to and use by Technology Retailers.

Who Does It?
Technology Transfer Specialists

Who Are Technology Transfer Specialists?
1. Subject Matter Specialists (commodity specialists, seed production specialists)
2. Extension Specialists
3. Communication Specialists

How Do They Do It?
1. Production of foundation seed or other technology
2. Preparation of teaching materials; didactic and audio-visual (directed both at Technology Retailers and farmers)
3. Field demonstrations
4. Field days
5. Training Programs
6. Backstopping
7. Mass comunications

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TECHNOLOGY RETAILING

What Is It?
Process of transferring improved technology information and embodied technology to end users; farmers.

Who Does It?
Technology Retailers

Who Are Technology Retailers?
1. Public Sector Extension Agents
2. Input and Credit Suppliers
3. Out Marketing and Processing Firms
4. Technical Consultants
5. Farmer Organizations and Groups
6. Commericial, civic and not-for-profit organizatio s interested in agriculture and rural development

How Do They Do It?
1. Direct oral communications
2. Use of audio/visual and didactic materials
3. Field days
4. Incentives to use new products
5. Mass communication methods

→

ADOPTION

What Is It?
Trial and acceptance of new and improved agricultural technologies that lead to improved crop yields and lower unit production costs.

Who Does It?
End User

Who are End Users?
1. Men and women farmers; a individuals or as groups

3. The Human Resources Development Component relates to the training and education function for preparing technical and managerial talent required to operate, expand and improve the ATG&T system. It includes academic and non-academic, short-term and long-term training in all the disciplines and specialties required to manage, supervise and carry out agricultural research, technology processing and wholesaleing, technology retailing, and teaching at agricultural universities and technical schools. Foreign and Peruvian graduate and undergraduate university degree training, technical sub-professional training in-country, short-courses, conferences/ seminars/workshops, and in-service training all are a part of the human resources development function.

4. Three discrete sets of activities for each Component have been identified and designed for support under this Project. The three Project components and the nine associated activities as well as estimated Project costs and source of funds are shown in Table I.

E. Description of Components and Activities

Component 1. Technology Generation

INIPA has major direct responsibility for the technology generation function. The restructured INIPA is the only institution within the Peruvian ATG&T system that was created for the exclusive purpose of carrying out agricultural production research and technology processing and wholesaleing. Others also may do technology generation research, e.g., farmers and farmer organizations, agribusinesses, agricultural faculty members and students, and other commercial, civic and nonprofit entities.

INIPA, as a public sector institution, prioritizes the use of its available resources on the basis of criteria intended to generate cost-effective technology that will result in achievement of GOP development objectives, e.g., increased production of food staples; increased income to farmers in the Trapecio Andino; increased incomes to small farmers; cheaper food in the urban marketplace. Other researchers may be motivated by particular business or income benefits, or by personal and professional interests, while some primarily have humanitarian or religious motivations. All of these are actual and potential generators of technology useful to Peruvian farmers and thus are important elements in an effective ATG&T system. Yet, in Peru, many qualified potential technology generators are constrained from more effective involvement in research by the lack of available research opportunities, by the lack of understanding about how to seek out research opportunities or the lack of custom or practise on the part of INIPA and other public institutions to collaborate by providing facilities and other support.

TABLE 1. Summary Budget for ATT Project by Project Components and Activities, and Source of Funds. (US$000s).

Project Components and Activities	Primary Implementing Institutions	AID	GOP Counter-part 1/	AID & GOP Combined Total	Estimated Private Sector Direct Input 2/	Total Project Inputs
Component 1. Technology Generation		(9,825)	(17,080)	(26,905)	(400)	(27,305)
Activity a: Consolidation and Integration of INIPA Research Programs	INIPA	4,175	12,050	16,225	—	16,225
Activity b: Strengthening INIPA Administration and Management	INIPA	1,900	2,800	4,700	—	4,700
Activity c: Expanding Research Opportunities	FUNSIPA, FDA/UNA and CNA	3,750	2,230	5,980	400	6,380
Component 2. Technology Transfer		(7,450)	(2,550)	(10,000)	(5,850)	(15,850)
Activity a: Establishing a Technology Transfer Specialist Program	INIPA	1,675	1,750	3,425	250	3,675
Activity b: Stimulating Private Sector Technology Transfer Enterprises	FUNSIPA and CNA	2,750	400	3,150	2,850	6,000
Activity c: Stimulating an Improved Seed Production and Distribution System	FUNSIPA and CNA	3,025	400	3,425	2,750	6,175
Component 3. Human Resources Development		(4,400)	(2,650)	(7,050)	(350)	(7,400)
Activity a: UNA Administration and Teaching Program Strengthening	FDA/UNA	1,850	1,250	3,100	—	3,100
Activity b: Improving Research, Extension and Teaching Materials	FUNSIPA	600	1,000	1,600	300	1,900
Activity c: Competitive Graduate Study Fellowships and Participant Training	FUNSIPA	1,950	400	2,350	50	2,400
- Sub-Total		21,675	22,280	43,955	6,600	50,555
- Inflation and Contingency 3/		3,325	4,720	8,045	1,400	9,445
TOTAL		25,000	27,000	52,000	8,000	60,000

1/ US$ = I/.20.00.

In addition, the GOP Public Treasury will provide, through INIPA and UNA regular budgets, approximately US$50,000,000 equivalent in complementary resources related to the Project goal, and through INIPA and UNA, an additional estimated US$6,000,000 equivalent in use value of land, physical facilities and equipment directly employed in Project activities.

2/ Includes both cash and in-kind investment and operating capital, and includes re-investment from net earnings. Private sector beneficiaries will contribute an additional estimated US$12,000,000 during LOP in complementary cash and in-kind resources related to the Project goal.

3/ Inflation is calculated at 5% per year cumulative for all funds. Contingency is calculated at between 4% and 5% for AID inputs and between 6% and 7% for GOP counterpart and private sector inputs.

Project activities to be supported under this Component are designed to improve the quality and relevance, and increase the amount of INIPA'S research output, and to expand research opportunities for other actual and potential research participants.

Activity a: Consolidation and Integration of INIPA Research Programs

(1) Description. Current public sector ATG&T system reorganization plans call for transferring the public extension (Technology Retailing Function) service now in INIPA to the MinAg for subsequent incorporation into the regional government structure being established under the new Government Regionalization Law. The restructured INIPA (to be called INIAA - Instituto Nacional de Investigación Agropecuaria y Agroindustrial) will be responsible for carrying out public sector national agricultural research efforts and for providing leadership in making available in useable form the technology output from that research to Technology Retailers throughout the country, i.e., the Technology Processing and Wholesaleing function.

The proposed structural changes of INIPA present a timely opportunity to prioritize, consolidate and integrate the nine on-going national commodity/ecological zone specific research (NR) programs, and six national research support (NRS) programs, which are to receive support under this activity. These national programs have been prioritized, planned, and implementation has been taking place since INIPA was established in 1981. They have been receiving major support from the REE Project, which is scheduled to terminate in the third quarter of FY 1988.

Considerable implementation progress has been made since 1981 in establishing the NR and NRS programs, and in developing them into viable generators of appropriate production technology. However, because INIPA is a relatively new institution, the establishment and implementation of these programs involve considerable institution-building content. By its very nature, institution building is a long term process. The time frame for building a research institution is even greater because of the lag from the time of initiating a research effort to the time that useful technology output is available for widespread dissemination to farmers. Furthermore, all of the national programs were not initiated at once in 1981/1982. In fact, several of the NRS programs only now are getting under way. Thus, some of the NR and NRS programs are not yet fully operational, nor are any of them yet sustainable without continued external support. Since they are highly interactive, these programs will not be functioning as an effective integrated national research effort until all of them are in place and operating at sustainable levels.

Eight crop ecological zone specific NR programs, one livestock NR program, and six NRS programs will be supported under this activity. The crop NR programs focus on varietal improvements, agronomic

practices, crop protection and economic viability for selected major crops. Major domestic food crops selected are rice, corn, potatoes, cereals (including wheat and barley), seven types of grain legumes, oils crops, Andean crops (pastures and selected indigenous crops), and selva crops (coffee, cacao, pastures, selected native fruits). The livestock NR program, just being initiated, plans to concentrate on animal nutrition (pastures and crop residues), animal health and management practices.

The NRS programs are what the name implies: they are activities that provide supporting services to the commodity focussed NR programs. These six supporting services are: agro-economics, water and soil resources, integrated pest management, national laboratory services, genetic resources services, and computer services. Under the integrated pest management program, a buy-in with the S&T/AGR International Crop protection project will be established to permit ongoing capability to disseminate information on approved chemical inputs, their useage and handling, This information will be made available to public and private sector ATG&T insitutions and input suppliers.

Tables II and III (shown in Annex II, Exhibit G - Data Tables) summarize actual and projected data about each of these NR and NRS programs, their magnitudes in terms of human and financial resources and research sites.

Detailed information for each program is included in program planning and annual programming documents prepared by INIPA. These documents provide detailed information about specific research efforts that are underway or planned, personnel assignments and responsibilities, physical facilities and equipment in use and planned, plans for upgrading personnel, expected specific research results, monitoring mechanisms and evaluation plans. In addition, detailed logical framework matrices have been prepared by INIPA for each national program.

The national program planning and programming documents and the logical framework matrices prepared by INIPA and referred to above, contain information on existing and planned research efforts, expected results, and personnel, equipment and facilities requirements. These documents served as basic design information for this Project in selecting critical areas requiring external support for successful implementation, as well as for specifying expected outputs and required inputs. Because detailed documentation is too voluminous for inclusion here or in attached annexes, summary structural and operational information about one NR program has been summarized for illustrative purposes in Table IV (shown in Annex II, Exhibit G - Data Tables). This information illustrates the types of actions and resources involved in the fifteen national programs being supported. It also illustrates the information base used for projecting expected outputs and estimating inputs required.

(2) Expected Outputs. This activity will generate both general and specific outputs. General outputs are:

- Quality and cost-effectiveness of the nine NR and NRS programs will achieve internationally acceptable standards.

- The national NR and NRS programs will have reached their planned minimum levels of staffing and operations, and the flow of improved technologies from them will be sufficient in amount, quality, relevance and range of applicability to elicit the support required to sustain the level of effort achieved by the end of the Project Period.

Specific outputs relate to each program. These outputs are shown in summary form in Tables V, VI and VII (shown in Annex II, Exhibit G - Data Tables).

(3) Inputs Required. Table VIII illustrates the life of project inputs needed for this activity. Table IX illustrates the budget requirements by source for each of the NR and NRS programs.

Activity b. Strengthening INIPA Administration and Management

(1) Description. Internal studies as well as external evaluations of INIPA indicate the need to streamline administrative procedures and operations, and establish more effective means for planning, review and adjustments in research, research support and promotion programs. These studies and evaluations indicate that some on-going INIPA activities need to be strengthened while other activities should be shared with, or entirely absorbed by, other public sector institutions or by private sector organizations, and still others can be terminated.

Although resources from the REE Project have been dedicated to improving INIPA administration and management, progress has been limited. The restructuring of INIPA provides a timely opportunity for in-depth changes in administrative procedures and program management for INIPA Headquarters operations and regional offices, as well as for the new provincial research/extension offices which will be responsible for research and demonstration activities at stations and sub-stations transferred out of INIPA. (See Annex II, Exhibit H for an analysis of INIPA, including the reorganization.) Reducing the size of INIPA by half (as is expected under the re-organization) and removing the public extension service will make INIPA a more manageable enterprise, and provides the opportunity to retain only that personnel best suited to INIPA's redefined purpose.

This activity will support four initiatives intended to strengthen INIPA's administrative and management efficiency. These are:

(i) Strengthen capacity to plan, staff, manage, monitor and evaluate NR and NRS programs, through: (a) an annual meeting of INIPA and one for each program and (b) establishment of a research review committee to evaluate plans from each program.

(ii) Establish at headquarters a research planning and design service to backstop regional stations and provincial research activities.

TABLE VIII. LOP Inputs Required for Component 1, Technology Generation, Activity a, Consolidation and Integration of INIPA NR and NRS Programs by Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID & GOP Counterpart Total	Estimated Private Sector Total	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	44PM	575	—	575	—	575
b. National advisors	48PY	1,400	—	1,400	—	1,400
c. TA Logistic support		—	600	600	—	600
2. Commodities						
a. Off-shore procurement		700	—	700	—	700
b. Local procurement		—	1,600	1,600	—	1,600
3. Non-Academic Training 1/		—	1,000	1,000	—	1,000
4. Construction		—	1,000	1,000	—	1,000
5. Other Direct Costs		1,500	7,850	9,350	—	9,350
Sub-totals		4,175	12,050	16,225	—	16,225
Inflation and Contingency		650	2,550	3,200	—	3,200
Grand Total		4,825	14,600	19,425	—	19,425

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.

TABLE IX. LOP Project Inputs to Nine National Research (NR) Programs and Six National Research Support (NRS) Programs by Source and Use of Funds. (US$000).

National Programs	AID	GOP Counter - part	Project Total
A. Research (NR) Programs			
1. Rice	230	720	950
2. Oil crops	185	850	1,035
3. Corn	490	1,440	1,930
4. Potatoes	350	940	1,290
5. Livestock	360	980	1,340
6. Andean crops	240	650	890
7. Tropical crops	240	530	770
8. Grain legumes	330	940	1,270
9. Cereals	310	780	1,090
Sub-Total (amount)	2,735	7,830	10,565
%	26%	74%	100%
B. Research Support (NRS) Programs			
1. Soils & Water	160	510	670
2. Pest Management	260	840	1,100
3. Computer	210	700	910
4. Laboratories	185	540	725
5. Ag-Econ	460	720	1,180
6. Genetic Resources	165	910	1,075
Sub-Total (amount)	1,440	4,220	5,660
Total (A + B)	4,175	12,050	16,225
%	25%	75%	100%
Inflation and Contingency	650	2,550	3,200
Grand Total	4,825	14,600	19,425

(iii) Strengthen personnel management.

(iv) Develop and initiate implementation of a plan to consolidate the range of programs and services provided by INIPA, and to stimulate greater participation of the private sector.

The first initiative will support a general annual meeting of INIPA, and one for each NR and NRS program, to assess progress, discuss new problems, redesign research projects, and finalize the operations plan for the next year. It will activate an internal research committee to evaluate plans from each program, and will establish a capacity within the agro-economic NRS program for continuous assessment of research impact. It includes provision for external evaluations on a three year schedule, and funds a prioritization study to reassess the validity of existing NR and NRS research area priorities. All of these mechanisms are designed to increase the knowledge base flowing to INIPA leadership to permit them to make better decisions on priorities, shifts in emphasis, budget levels, etc.

The second initiative will assure quality control of regional research programs. Under the GOP decentralization plan, as many as a dozen of INIPA's former research stations and forty sub-stations will pass from INIPA control to a provincial entity. It is proposed to assist INIPA regional offices and the new provincial research offices in problem identification, regional advantages, project conceptualization, design and analysis statistical support, for identification of internal and external resource persons, and in the utilization of research results. This research planning and design service will improve the quality of the provincial research effort, minimize duplication of regional research efforts, and reduce costs of regional research projects.

The third initiative builds on efforts initiated under the REE Project and includes establishing an improved annual personnel evaluation system; establishing a system to compensate for additional work in administration, research and technology transfer; and continuing efforts to improve competitiveness of compensation levels to attract and retain key personnel.

The fourth initiative will focus on evolving appropriate roles and relationships of public and private sector services to producers. Initial efforts will be directed toward rationalizing the activities of INIPA, UNA, producers associations and private sector firms improving seed multiplication, distribution and certification.

(2) Expected Outputs

A planning unit, annual evaluations, and improved mechanisms for staffing, managing, and monitoring INIPA's NR and NRS programs will result in quality improvement, greater personnel stability, and increased research output.

Provincial research facilities transferred during INIPA restructuring will be operating on the basis of well-designed research programs that are complementary with INIPA NR and NRS programs and with each other.

A functional personnel evaluation and additional performance compensation system will be in place that provides criteria for rewarding staff based on additional performance under proper supervision against established standards. Compensation competitiveness problems with other public sector agencies will be resolved.

A seed multiplication, distribution and certification program plan will have been completed, with implementation well underway. Studies of laboratory services and mechinery services will have been completed and the role of INIPA in these services will have been defined.

(3) Inputs Required. Table X illustrates the life of project inputs needed for this activity.

Activity c. Expanding Research Opportunities

(1) Description. There is virtually no current practise in Peru of private and public support to agricultural research through channels other than public sector institutions charged with agricultural research responsibilities. Although agricultural universities customarily have received some research funds, as numbers of universities and numbers of students have multiplied, public budget support to universities has declined in real terms. In order to maintain teaching capacity in a situation of declining resources and increased teaching demands, university funds available for research have diminished dramatically. The concept that a high quality teaching faculty must be involved in research has lost much of its meaning among agricultural faculties in Peru.

INIPA has not been able to alleviate this situation. Although some collaborative research for university faculty through INIPA does exist, it is quite limited. Furthermore, although private sector businesses and farmer organizations participate in operational research, they are not accustomed to financing agricultural research. Faculty that do have on-going research programs generally must finance them primarily from income earned from the sale of production from the program.

Because of the lack of research opportunities, university faculty members and their students tend to be isolated from the practical problems of Peruvian agriculture. Thus, the ATG&T system does not have the benefit of contributions to technology generation that could be made by the numerous cadre of trained university faculties. Furthermore, because of the lack of research opportunities and experience, teaching content tends to be sterile and not responsive to Peruvian agricultural conditions. This, in turn, results in university graduates that are less than adequately prepared for effective work in the ATG&T system.

TABLE X. LOP Inputs Required for Component 1, Technology Generation, Activity b, Strengthening INIPA Administration and Management by Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID & GOP Counterpart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	47PM	625	-	625	—	625
b. National advisors	7PY	156	-	156	—	156
c. TA Logistic support	-	-	200	200	—	200
2. Commodities						
a. Off-shore procurement	-	100	-	100	—	100
b. Local procurement	-	-	1,082	1,082	—	1,082
3. Non-Academic Training 1/	-	200	-	200	—	200
4. Construction	-	-	-	-	—	—
5. Other Direct Costs	-	819	1,518	2,337	—	2,337
Sub-Totals	-	1,900	2,800	4,700	—	4,700
6. Inflation and Contingency	-	290	590	880	—	880
Grand Total		2,190	3,390	5,580	—	5,580

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.

In some cases, such as UNA, research facilities are available on-campus and at various other locations in Peru. Most regional universities have access to research facilities, either their own, INIPA's, those of other organizations, and/or they have access to cooperating farmers' fields. Usually, what is missing is the relatively small amount of operating funds required to carry out a research project (in order to acquire research materials, to pay transportation and travel expenses, labor, student assistants, and the like). In addition, without access to funds to pay these expenses, a researcher has limited leverage to access research facilities of other institutions. Furthermore, because of the lack of such resources, researchers are not accustomed to conceptualizing and preparing research proposals and budgets. With some exceptions, INIPA is not accustomed to plan, program and finance its NR and NRS programs jointly with the private sector. There is a need to supplement INIPA public budget funds with resources flowing from the private sector in order to encourage joint INIPA/private sector planning and programming of the research agenda to be addressed by the NR and NRS programs.

This activity will make funds available for competitive research grants to individual researchers or to teams of researchers who have obtained or can obtain access to research facilities and who will be carrying out applied and adaptive research in subject areas and/or commodities not covered by and/or with high complementarity to research activities being carried out by INIPA under the NR and NRS programs.

There is evidence that farmer organizations, agribusinesses and other sources are willing to provide funds for supporting certain kinds of research. Thus, a proportion of the funds available for this activity will be reserved for or priority will be given to proposals, that include a matching grant from such sources in order to encourage private sector participation in research funding. Also, the institution providing the matching grant may submit the proposal and subsequently make the award or awards to researchers they select.

This activity is expected to improve the relevance as well as the volume of research since it is more likely to be focussed on problems visualized by the supplier of matching funds. Mechanisms will be established to assure objective peer review in selecting proposals for funding. Participation by INIPA in the selection process will assure complementarity to national programs.

In addition to expanding research opportunities through competitive grants, this activity will also provide institution-building suppport to UNA for increasing research strength and relevance in four selected areas identified as needing special research attention, but not adequately provided for in the NR and NRS programs. These areas are: 1) farm management; 2) irrigation, drainage and soil/water conservation; 3) agricultural mechanization; and 4) transportation and marketing economics. These research areas have been identified as especially high priority because

of the nature and constraints of Peru's agricultural production and marketing system and UNA has been identified as have installed capacity and comparative advantage in leading research in these areas. In support of this initiative, UNA will seek to arrange a collaborative program through U.S. universities (especially through those providing technical assistance to this project) for bringing sabbatical professors and or U.S. Ph.D. graduate students (with "prelims" completed and only dissertation remaining - ABD) to UNA as visiting professors (instructors in the case of graduate students) to carry out collaborative research, to supervise UNA student research, to assist in teaching (team teaching) new and improved courses in the subjects, and generally to support the objectives of this initiative. Sabbatical professors for one semester would be provided only with round trip travel to and from Peru, while a one year sabbatical would include an allowance for furnished housing and internatioanl travel for the professor and his family. Graduate students would be provided the equivalent of a U.S. assistantship plus international travel. In-country research support costs also would be provided. The inclusion of ABD graduate students and sabbatical professors in this manner will help reduce expensive technical assistance while assuring high quality, up-to-date professional input to the Project and further strengthen and expand the ties between the Peruvian ATG&T system and the international scientific community.

The first three areas listed above have been receiving assistance under the APID Project through technical assistance, training and local cost support to UNA's Departments of Economics and Planning (DEP), Irrigation, Drainage and Soil Conservation (DRAT), and Agricultural Mechanization. In order to establish sustainable programs, support will be continued beyond the termination date of the APID Project. Thus this Project will complement and continue selected elements of the APID project and expand support to include transportation and marketing economics research in DEP.

INIPA research relevance and responsiveness to private sector concerns will be enhanced through grants to be provide to the INIPA NR and NRS programs by FUNSIPA under this activity. These grants will be based on joint research planning by INIPA and FUNSIPA for activities to be supported by FUNSIPA. Jointly planned, programmed and funded activities will be agreed to annually by INIPA and FUNSIPA, and that agreement will be formalized through a memorandum of understanding.

Faculty members of UNA and regional universities who present proposals will be encouraged to include in their proposals arrangements to invite U.S. graduate students (ABD) to collaborate in the research proposal in a manner that will permit the U.S. student to carry out research for his Ph.D. dissertation. Such an arrangement would include travel plus payment of an assistantship, as well as some trips by the student's major professor. The sponsoring Peruvian university would provide office space, logistic and computer support for their U.S. colleagues. In return for the reseach opportunity, the U.S. graduate student would agree to assist in teaching

courses (team teaching) and to collaborate with Peruvian students doing research in a related area for their Ingeniero title (or for their Masters' thesis). Both the U.S. graduate student and the major professor (in the event that he travels to Peru) also would agree to give a reasonable number of guest lectures and/or seminars while in Peru.

(2) Expected Outputs. This activity will increase the number of researchers working on agricultural technology problems, and can be expected to increase not only the quality and volume of research output, but also research relevance to resolve practical farm problems.

The quality of graduates will improve because of improved teaching by faculty with research experience, and because of involvement of the students in practical research.

Increased research opportunities also will increase faculty morale and ability to retain higher quality faculty. In addition, as the practise of competitive grants and matching grants becomes institutionalized, an element of entrepreneurship will be injected into research in general. This should help to upgrade the overall quality of research.

Effective research programs will be underway on a sustainable basis in the appropriate departments of UNA in Farm Management, Transportation and Marketing Economics, Irrigation and Drainage, and Agricultural Mechanization. The programs will be generating research that is complementary to INIPA national programs, improves teaching quality in these subject areas, and results in improved technology of direct use to farmers.

(3) Inputs Required. Table XI illustrates the life of project inputs needed for this activity.

Component 2. Technology Transfer

No single institution has the primary or lead responsibility for technology transfer functions in Peru. INIPA, as the primary institution responsible for agricultural research, also has an important responsibility to assure that the technology generated from that research is made available in communicable and accessible form to Technology Retailers, i.e., INIPA has an important role in carrying out the Technology Processing and Wholesaleing function.

UNA and regional universities have the installed capacity and human resource base to assume responsibility for a wide range of technology transfer functions. Because of their major educational responsibilities, they have a unique capacity to participate in preparation of didactic and audio-visual materials, for both technology wholesaleing and retailing purposes. In addition, UNA has on-going programs that supply embodied technology in the form of improved seed (especially for yellow corn, wheat and barley), both

TABLE XI. LOP Inputs Required for Component 1, Technology Generation, Activity c, Expanding Research Opportunities by Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID & GOP Counterpart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	70PM	950 2/	-	950	—	950
b. National advisors	4PY	90	-	90	—	90
c. TA Logistic support	-	-	100	100	100	200
2. Commodities						
a. Off-shore procurement	-	50	-	50	—	50
b. Local procurement	-	100	500	600	—	600
3. Non-Academic Training 1/	-	600	-	600	—	600
4. Construction	-	-	-	-	—	—
5. Other Direct Costs	-	1,960	1,630	3,590	300	3,890
Sub-totals		3,750	2,230	5,980	400	6,380
6. Inflation and Contingency		570	480	1,050	80	1,130
Grand Total		4,320	2,710	7,030	480	7,510

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.
2/ Includes costs of Chief-of Party for TA team.

foundation seed and commercially sold certified seed. Involvement of faculty and students in technology transfer functions both at the wholesale and retail levels will improve educational quality, and result in graduates better prepared to assume effective roles in the ATG&T system.

Finally, the private sector has considerable self-interest and potential for carrying out a wide range of technology transfer functions. Farmer organizations, agribusinesses, individual agronomists and non-profit organizations currently are involved to some extent in both Technology Processing and Wholesaleing and Technology Retailing, usually on a commercial basis. However, this existing involvement tends to be quite limited and ad hoc. There is a wide gap between the availability of such services and the apparent potential opportunities. Recent consultants' reports have documented a number of anecdotal cases of private sector commercial and socially oriented services in technology transfer. These reports also include a number of recommendations for models or mechanisms to greatly expand private sector technology transfer services.

This activity will serve a catalytic role in expanding participation and resources from public and private sector sources, and in integrating interests, capabilities and opportunities for enlarging the scope, improving the quality, and enhancing interactions in carrying out technology transfer functions.

Activity a. Establishing a Technology Transfer Specialist Program

This component has two main elements: (i) establish and operationalize a corps of Technology Transfer Specialists to serve as the link between researchers and Technology Retailers; and (ii) develop cooperative arrangements for stimulating technology transfer by producer associations, agribusinesses and consulting firms.

(1) Description

Technology Transfer Specialists perform the functions of technology processing and wholesaleing. They link new, adapted and borrowed technologies to other transfer agents, Technology Retailers and to producers. They collaborate with researchers in adapting and verifying technology, and they link identifiable problems of farmers to those who may help to resolve them.

INIPA has been the principal actor performing these functions in Peru, but many farmer groups, private firms and individuals, as well as other public institutions such as universities, also have personnel performing them. The change in INIPA's mandate and structure has deleted the role of Technology Retailing. It is imperative that the Technology Transfer Specialist role in INIPA be fortified in order to backstop a wide range of Technology Retailers who work directly with the diverse farm population. This activity will assist in that process.

INIPA plans to expand the number and quality of Technology Transfer Specialists. This involves changes in organization, training and financial support. The 1988-1992 organizational plan for INIPA envisions placing fifty-five trained Technology Transfer Specialists under the supervision of the fifteen Technology respective national program leaders. The Specialists will be stationed at headquarters and/or field locations of the respective national programs, or assigned to regions to work directly with producer associations and other Technology Retailers. Technology Transfer Specialists will be selected through a careful recruitment process from the existing research and extension staff of INIPA or from outside INIPA.

The clientele of INIPA Technology Transfer Specialists will be all those involved in technology retailing directly to farmers, including provincial and regional extension agencies, and private sector technology transfer institutions such as producer associations, agribusinesses, private consulting firms, suppliers who provide technical assistance to farmers, public and private banks that incorporate technical assistance into their credit programs, university outreach programs, and private volunteer groups.

To be effective, Technology Transfer Specialists, like researchers, must be skilled in performing functions which add value to knowledge directed at productivity change. The Technology Transfer Specialist must understand the research process and its products, methods for packaging and communicating research results, and motivational strategies to increase understanding and acceptance. They also must be sufficiently skilled to interface with the set of subject matter disciplines required to identify and resolve farmer's problems.

The success of this INIPA Technology Transfer Specialist effort is dependent on a number of factors. These include the continued concentration on priority commodities in priority locations, as well as the continuity of the effort. Equally important are the selection, reward and promotion policies applied to this group by INIPA leadership. Finally, although transfer specialists are assigned to national programs, they have special requirements for operational, transportation, communications and demonstrational resources which must be recognized and provided for.

Another essential factor for success of the technology transfer specialist program is support for technical communications units. These units should function as an integral part of the technology transfer group in each of the eleven INIPA experiment stations, as well as a central processing unit at INIPA headquarters, at UNA or at some other central location. These units need financial support to upgrade equipment and personnel, and to more adequately serve researchers, as well as technology transfer specialists.

INIPA will emphasize a Technology Transfer Special focus on the farm family. Traditionally, rural women and youth in Peru have been economically active in agriculture and livestock activities, in processing and marketing of food crops and in off-farm income generating activities. Women

dedicate a large portion of their productive lives to agricultural field work, planting, weeding, processing of agricultural products, livestock activities, food storage, marketing, and the like. Women also often participate actively in farm production decisions; either as part of a family team or as sole decision maker. In order to better promote technology improvement through rural women and youth, specialists will be specifically trained for responding to their information needs.

In order to stimulate, formalize and implement technology transfer activities with private sector providers of farm level technical assistance, INIPA will develop cooperative relationships with producer associations to stimulate them to: (i) provide technology transfer services to their members; (ii) establish continuing and sustainable links with research sources; and (iii) provide a continuing source of funds in support of research and technology transfer.

INIPA will commence this initiative with one national commodity producers committee (probably the National Rice Producers Committee or to such committees through ONA where they already have had some cooperative relationships. The Rice Producers Committee has indicated its interest in supporting research of the National Rice Research Program in return for direct and first choice access to research output from that program. The Rice Producers Committee also is interested in supporting and participating in location specific, demonstrational and adaptive research to better serve its membership, to continually enhance the capacities of its Technology Retailers, to have more direct links with the international scientific community, to enhance the on-farm problem feed-back process to the national program, and to support key researchers within the national program.

INIPA, in turn, needs credibility with client groups, thereby enhancing the rate at which technologies are accepted. The Rice NR program will benefit from closer links to producers for problem identification. Thus, the Rice Producers Committee and INIPA (especially the National Rice Research Program) will both further their objectives if they establish such a cooperative arrangement. The arrangement proposed will agree on the functions to be carried out by each institution, who is responsible for managing each function, financial responsibilities, what process will be used to respond to new problems, and how to resolve conflict.

The initial agreement will be treated as a pilot arrangement. Lessons learned will be applied in expanding cooperative relationships between other producer committees and INIPA programs. To operationalize contractual arrangements, INIPA will assign one or more Technology Transfer Specialists to work under the supervision of the Committee. The Committee will provide Technology Retailers to work with the Technology Transfer Specialists, and both parties will share costs of field demonstrations and tests, as well as the costs of mutually agreed research activities. Finally, the parties will

share the costs of preparing and producing technical and popular publications about the technologies and production results achieved, and of other related activities.

It is expected that at least one additional national commodity producers committee (perhaps potatoes) will establish a similar contractual relationship with INIPA to be supported by the Project. This is expected to occur in the second or third year of the Project.

(2) Expected Outputs. The technology transfer specialist program established under this activity will increase the rate of technological change by 10 to 20 percent and will result in the application of improved technologies on a larger proportion of cultivated land.

Linkages with producer associations established through cooperative relationships will have multiple benefits in addition to higher rates of technology adoption. Client identification with INIPA programs is an important morale factor for researchers and specialists within INIPA. In addition, the private sector will be motivated to sustain a greater proportion of technology transfer efforts. Private sector support also will provide mechanisms for attracting and retaining key public research and Technology Transfer Specialists.

Specific expected outputs are:

- Establishment of a regionally based corps of fifty-five Technology Transfer Specialists in INIPA, with the capacity to link with National Program researchers in the conduct of adapted research and demonstrations, to adapt research information for tranference, to transfer it through various mechanisms, and to improve and facilitate the on-farm problem feedback process. The capacity also will exist for improving transfer linkages and communications with rural women and youth.

- Cooperative arrangements with at least two producer associations (e.g., rice and potatoes), which provide for collaboration in research and technology transfer, and which will improve efficiency and results by combining producer association and INIPA resources will be formalized and implemented.

- The process of utilization of research results will be accelerated.

- Broaden and strengthen researcher-specialist-producer clientele relationship.

3. Inputs Required. Table XII illustrates the life of project inputs needed for this activity.

TABLE XII. LOP Inputs Required for Component 2, Technology Transfer, Activity a, Establishing the Technology Transfer Specialist Program By Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID & GOP Counterpart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	4MM	575	-	575	—	575
b. National advisors	5PY	100	-	100	—	100
c. TA Logistic support	-	-	300	300	—	300
2. Commodities						
a. Off-shore procurement	-	700	-	700	—	700
b. Local procurement	-	-	500	500	—	500
3. Non-Academic Training 1/	-	-	200	200	50	250
4. Construction	-	-	-	-	—	—
5. Other Direct Costs	-	300	750	1,050	200	1,250
Sub-Total		1,675	1,750	3,425	250	3,675
6. Inflation and Contingency		255	370	625	50	675
Grand Total		1,930	2,120	4,050	300	4,350

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.

Activity b. Stimulating Private Sector Technology Transfer Enterprises

(1) Description. Private Sector participation in technology transfer is not yet well developed in Peru. Private sector entities with actual and potential interest and capability to carry out technology transfer functions are quite diverse in terms of size, primary purpose, geographic coverage, and capability and interest in technology transfer.

Recent reports and assessments by consultants indicate that the potential for private sector involvement in technology transfer is enormous, and the experience base in Peru and elsewhere suggests that a considerable number of enterprise models can be established successfully. Models that have been analyzed for application under Peruvian conditions include: (i) Technology Transfer Facilitators; (ii) Technology Transfer Centers; (iii) Technology Transfer Consulting Firms; (iv) Credit-Linked Technology Transfer Services; and (v) Farm Management/Farm Records Services. Consultant reports describe the first two models, including their feasibility under Peruvian conditions; the third model has been proposed by the Peruvian Association of Agronomists for implementing enabling legislation by establishing valley level technology transfer consulting firms; the fourth model has been tested under an AID financed pilot project with the Instituto Rural de Valle Grande in the Canete Valley; and the last model is being tested on a pilot basis under an AID financed project with OEA.

Each of these models is described and its feasibility discussed in Annex III, Exhibit B, including cost estimates for implementing each of the models as well as expected outputs. This activity will provide resources to stimulate the implementation of up to ten of the technology transfer enterprise models listed above. Since all of the models described in the Annex have merit (and there likely are a number of other options as well), and it is difficult to predict that one model has clear superiority over another, project assistance will be provided for stimulation of technology transfer enterprises on a competititive basis. Proposals for establishing pilot technology transfer enterprises will be invited and evaluated for support. Criteria to be applied for selecting proposals for support are:

1. Extent to which and time required for the enterprise to become self-sustaining, and length of time it takes to reach that point.
2. Relative cost effectiveness of the proposed enterprise, and relative cost per client.
3. Degree to which the legal and organizational structure is already in place, and the experience base of the sponsoring entity in related activities.
4. In the case of proposals from for-profit institutions, the enterprise must be designed to generate sufficient returns to reimburse all Project costs, except for technical assistance. In appropriate situations, a for-profit institution may be contracted for establishing a technology transfer enterprise on a pilot basis without being required to reimburse establishment costs.

5. In the case of non-profit organizations such as farmer organizations, preference will be given to those proposals that show the highest proportional contributions of complementary resources and that require the least net resources to become self-sustaining.

These criteria will be refined further prior to implementation of the activity. In addition to stimulating private technology transfer enterprises, this activity also will provide support to ONA for strengthening its ability to provide backstopping services to its affiliated organizations and to the enterprises established through support from this activity. This initiative builds on support provided under a small AID Grant provided to ONA in 1985 to assist them to establish a Centro de Estadistica y Análisis Económico (CEAC)- Statistical and Economic Analysis Center. This Center is now established and is beginning to provide useful information and assistance to affiliated organizations and their farmer members related to costs of production, economics of alternative technologies, farm records and farm management analysis, price analysis, and the like. Newly established technology transfer enterprises and affiliated farmer groups will have a growing need for this type of backstopping information and analysis. With additional grant support, ONA will be able to strengthen its ability to provide this type of product, and, as the clientele group demanding these services expands, will be able to charge fees to make the Center largely self-sustaining. ONA also will study the feasibility of expanding on-going price analysis to include selected market conditions and news information and analysis that can serve as the basis for establishing a self-sustaining market news service.

(2) Expected Outputs. The strategy of stimulating the establishment of technology transfer enterprises will produce a stream of benefits recognizable not only by the farmers who will be the ultimate users of the technology transferred by these enterprises, but also recognized by both public and private participants in the ATG&T system as such enterprises begin to operate in a more articulated and efficient manner.

The definitional distinctions of functions of the ATG&T system as used in this document will become somewhat blurred under this Activity. The technology transfer enterprises established as the result of stimulation from this activity likely will be involved primarily in technology transfer at the retail level. However, some enterprises may well specialize in technology processing and wholesaleing, while others will participate in adaptive and applied research initiatives. Some enterprises likely will be involved in all of these functions.

As a direct result of this Activity, resources will flow to those institutions and people most able to effectively contribute to new technology development and transfer. Through the establishment of appropriate agreements, researchers and extension agents will have the incentives and the resources to be more dedicated and efficient.

- An additional specific output will be the existence of the Statistical and Economic Analysis Center (CEAC) in ONA that is providng production economics, farm records, farm management, price analysis and market news services to established technolgy transfer enterprises and to affiliated farmer groups on a fee basis. This center will be self-sustainable without outside subsidization.

- Adoption by farmers of technological changes as the direct result of activities by the enterprises established.

(3) Inputs Required. Table XIII presents the budget for this activity.

Activity c. Stimulating an Improved Seed Production, Distribution and Certification System

(1) Description. Breeder seed produced and released by the experiment station as a new, named variety, contains the germplasm or genetic material which has resulted from selection, breeding, and testing at IARCs and National Agricultural Research Centers (NARCs), embodies the factors of high yield, resistance to disease and pests, adaptation to environmental conditions, and other factors for which it was selected. As such, this seed is the essence of technology and will retain these characteristics as long as it remains genetically pure. These features make improved varieties of seed the single greatest technological innovation available to farmers, as epitomized by the "miracle" grains of The Green Revolution.

Nevertheless, the total effort of this genetic improvement has little value until the improved seed is used by farmers, and this requires a separate chain of actions by producers, processors, and distributors who collectively are called "seedsmen". Farmers cannot determine by observation the genetic composition and quality of the seed. Certification programs must be used as a means of assuring the buyer that seed is of high quality. Certification can be provided by the users, acting collectively through crop improvement programs, by the government, or by the seed industry, but there are good reasons for selecting the seed industry to perform this work.

Clearly, seed producers are just as interested as the farmer/client in assuring the quality of the seed sold. High quality seed helps increase the use of purchased seed and expands the market. When certification is identified by a recognized label known and used for only high quality seed by all seed producers, then all have a stake in assuring that only high quality seed is distributed. One lot of poor quality seed can affect the reputation and sales of all seedsmen.

The public and private components of the Peruvian seed industry have responded to regional variations and differential commodity demand. A number of medium to large firms, representing foreign and domestic seed sources, concentrate on lucrative markets in Coastal agriculture, where more than eighty percent of the area in cotton, hard corn and rice is grown with

TABLE XIII. LOP Inputs Required for Component 2, Technology Transfer, Activity b, Stimulating Private Sector Technology Transfer Enterprises by Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID & GOP Counterpart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	34PM	350 2/	-	350	—	350
b. National advisors	19PY	350 2/	-	350	—	350
c. TA Logistic support	-	-	100	100	200	300
2. Commodities						
a. Off-shore procurement	-	50	-	50	—	50
b. Local procurement	-	200	-	200	1,000	1,200
3. Non-Academic Training 1/	-	200	-	200	300	500
4. Construction	-	-	-	-	—	—
5. Other Direct Costs	-	1,600	300	1,900	1,350	3,250
Sub-Total		2,750	400	3,150	2,850	6,000
6. Inflation and Contingency		420	80	500	610	1,110
Grand Total		3,170	480	3,650	3,460	7,110

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.
2/ Includes costs of TA for FUNSIPA Institutional Strengthening

On the technology demand side, these enterprises will improve awareness by researchers of the practical problems of farmers, with determination and prioritization of specific technology needs, and the specification of responsive research and/or extension programs and priorities.

On the technology supply side, such enterprises will promote direct importation of new technology available from the general international agricultural research network. The technology will come in the form of genetic material (e.g., new crops and crop varieties), chemical and biological inputs, and know-how regarding modern agronomic practices, as well as the latest research and extension methodology. Where the demand for certain types of technology exists but supply is not forthcoming, these enterprises will be able to effectively articulate the needs of farmers and perhaps influence research priorities of the international agricultural research network.

The technology transfer enterprises established under the activity will establish formal and informal linkages with organizations and groups within the international agricultural research network in order to facilitate the flow of improved technology to Peru.

A series of technical reports will be published describing the production conditions of target commodities and farm types, including a listing and prioritization of problems potentially addressable via the development and adoption of new agricultural technology.

Working relationships and formal agreements with national and international agricultural researchers will be established. As well as a sustained flow of technology-embedded inputs and "know-how" which can be fed distribution into the local research and extension system for testing and eventual to farmers.

More specific outputs, depending on the particular type of enterprise supported will include the following:

- Analysis of primary production problems which might be solved by profitable technology in commercial use elsewhere.
- Technology which has been introduced, tested, adapted, and validated on the farms and demonstrated to others.
- Professional employees trained to extend the technology and follow up on related research.
- Linkages established with faculty and staff of UNA and regional universities or other research organizations to carry out research on problems not amenable to introduced technology.
- Documented improvements in the efficiency of use of public sector research and extension resources, brought about by significant private sector complementary inputs to public sector resources.
- Identification of priority private sector technology problems whose relative importance may be suggested by the contributions they are willing to make for their solution.

purchased seed. The Selva, which is rapidly becoming a major producer of rice and corn, also relies largely on purchased seed. In contrast, less than 15 percent of the wheat, barley, soft corn, and grain legumes in the Sierra are planted with purchased seed.

Several private firms and public agencies provide quality testing services within crop-specific programs. These programs are not formal certification, but come closer to internal quality control activities leading to distribution under a brand name. Recently, the MinAg began certifying seed, but certification has been interpreted more as regulation and taxation. Consequently, groups in Peru interested in developing seed production and distribution programs do not currently have a service to which they can subscribe to assist them in quality control and testing, or in differentiating their product through certification for distribution and sales.

The objective of this activity is to stimulate strengthening of the seed supply system, especially the phases of commercial multiplication, conditioning, storage, quality control and distribution, in order to gain widespread use of improved varieties. The activity initially will focus on improvement of plant materials for major crops. From this base, the activity will diversify to include all crops for which there is a commercial demand for improved seed. That is, the focus of the program is on seeds and not a particular set of crops or geographic regions.

The project proposes to establish complete seed programs in selected areas, as a solid base from which to grow into a national program, and as models to be adopted in neighboring areas. In Peru, the stage of development of different crop programs vary widely. It is important, however, to encourage improvement in all crops throughout the country. The crops which already have strong programs can be brought in with relative ease to establish the basic services which can then be extended to other crops.

The activity is intended to promote investment in sustainable private commercial seed production, conditioning, quality control, and distribution activities. It will strengthen and expand services that support such investments, both through private collective action and through farmer participation in decision making and financing of public programs.

The activity will be initiated in locations in each major region which have the greatest potential for assembling key elements of the seed supply chain within a short time. Such crops have been identified at selected sites in the Selva, Sierra, and Costa, and others offer the potential for expansion and diversification once the threshold operating level has been reached. An assessment of the state of the seed industry has been made in each area, and the necessary actions and resources for developing a complete seed program have been identified.

Expatriate and national specialist advisors required to implement this program include a resident agricultural economist with seed industry experience, and national specialists in seed system development in three

identified sites, one each in the Coast, Sierra and Selva. These specialists will assist seedsmen in these areas improve individual operations while also helping them to coalesce into an association which will sustain and extend services initially provided by the specialist. Among these services will be advice in the technical and business aspects of seed production, conditioning, storage and distribution, and assistance in implementing certification programs. Appropriate fees will be charged for certification services.

This activity will be closely coordinated with INIPA's restructuring and privatization of their seed program as discussed in Component 1, Activity b.

(2) Expected Outputs. The following outputs apply to each of the initial local seed programs. We also expect these to have coalesced into a national seed growers association or committee affiliated with ONA.:

- Formation of three local seed associations, with trained leadership represented through active boards, and capable of assisting the membership obtain the technical and managerial skills they need.

- Three local seed certification services established and contributing to the commercial image of the association membership.

- Significantly increased investment in seed enterprises, including more producers, new seed firms with additional conditioning facilities, moving a volume of certified seed sufficient to permit economic viability on a self-sustaining basis.

- Significantly increased use of certified seed by farmers.

(3) Required Inputs. Table XIV illustrates the required inputs for this activity.

Component 3. Human Resources Development

Agricultural technology generation and transfer is a professional field which requires suitably educated administrators and technical specialists for effective performance. Peru lost a high percentage of its best agricultural professionals during the twelve-year military government of the 1970's, and has been unable to recover most of them because of their alternative opportunities and of a continuing generally non-competitive professional and economic environment in Peru. The development of the ATG+T system depends very directly on the capacity of Peruvian educational institutions to improve the quality of its faculty, and to produce quality professionals for operating an efficient and effective ATG&T system.

UNA, with an enrollment of about 3,500 undergraduates and 350 graduate students, is the linchpin of professional agricultural education in Peru. It is noted for the quantity and quality of the agriculturists it

TABLE XIV. LDP Inputs Required for Component 2, Technology Transfer, Activity c, Establishing an Improved Seed Production, Distribution and Certification System by Source and Use of Funds. (US$000)

Project Inputs	Units	AID	GOP Counter - part	AID & GOP Counterpart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	49PM	575	-	575	—	575
b. National advisors	17PY	350	-	350	—	350
c. TA Logistic support	-	-	100	100	500	600
2. Commodities						
a. Off-shore procurement	-	200	-	200	—	200
b. Local procurement	-	290	250	540	300	840
3. Non-Academic Training 1/	-	385	-	385	300	685
4. Construction	-	-	-	-	300	300
5. Other Direct Costs	-	1,225	50	1,275	1,350	2,625
Sub-Total		3,025	400	3,425	2,750	6,175
6. Inflation and Contingency		465	80	545	590	1,135
Grand Total		3,490	480	3,970	3,340	7,310

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.

produces, and provides the only M.S. program of acceptable quality and diversification. It is the principal in-country facility for upgrading, specializing, and replacing MinAg agricultural sector personnel. It provides academic leadership to the agricultural faculties of the regional universities, and upgrades the latter through its M.S. program.

UNA faculty, as an adjunct to their teaching role, conduct research and guide student thesis research at La Molina and at four regional centers. They extend the results of this research through student practicums and consultation with farmer organizations and individuals, and produce seed of their own improved crop varieties. Some faculty members conduct collaborative research programs with INIPA and the regional universities. Despite its preeminent position in Peruvian agriculture, UNA has identified several institutional areas requiring improvements, e.g., administration curriculum requirements and departmental regulations, ratio of students to faculty, and academic and research supporting services.

Although UNA survived the military dictatorship in better condition than most sector institutions, it did lose talented staff and experienced a reduced operating and investment budget. As a result, it succumbed to a loss in quality and has not regained its former high international stature. Perhaps equally important to its regeneration, during this decade it lost contact with the international agricultural academic and technology generation community during a period when that community has been undergoing significant institutional change.

INIPA, as the primary public sector institution responsible for ATG&T that only began rebuilding in 1982, suffers from deficiencies in graduate level research and extension supervisors and specialists. These deficiencies were documented in the description of Component 1.

Activities to be supported under this Component are directed at improving the quality of graduate level agricultural education and graduate level professional support for the ATG&T system. These activities support the upgrading of INIPA personnel, UNA and regional faculty to the M.S. and Ph.D. level, as well as providing the essential information support services for the sector. They include stimulating improvements in UNA administration and teaching programs.

Activity a: Strengthening UNA Administration and Teaching Programs

(1) Description. Peruvian universities have found it difficult to maintain excellence. The past two decades have seen advanced education transformed from an opportunity for an elite to an avenue of upward mobility for many thousands of secondary school graduates. UNA's undergraduate enrollment has more than tripled since 1970 without a corresponding increase in faculty, which has remained just above 400. The result, inevitably, has been a decline in the quality of teaching.

The creation of new universities has relieved some of the numerical pressure on existing facilties without responding to the demands of the sector because teaching quality remains low. Sixty percent of Peruvian university students in agriculture are in programs ranked unsatisfactory in a recent World Bank evaluation; only two of the 20 regional universities had more than one program rated saisfactory.

The budgetary limitations of the military regime have continued under democracy. In constant dollars, support for university education declined from 1981 to 1984. Per pupil expenditures are down; faculty/student ratios are worse. Salaries for university faculty and administrators declined impressively, leading to the loss of many well trained scientists. Although UNA has a higher ratio of agricultural Ph.D.s (14 percent) and M.S.s (16 percent) on its staff than any other sector institution, these are few in comparison to the seventy percent of teaching staff with minimal academic attainment and experience.

The combination of increased enrollments, weak teaching staff and programs, and underfinancing has led to a sober assessment:

"The exodus of the best teachers, the lack of necessary scientific equipment and adequate space, and the pressure on remaining teachers to devote their time in teaching the ever increasing number of students, have ensured that Peruvian universities have for the most part ceased to be sources of new knowledge, and have forced them to rely on unassimilated knowledge generated in other countries." (World Bank Report, No. 5687-PE, Higher Education Subsector Memorandum, June 28, 1985, P.3.)

UNA has been severely weakened by these pressures, as well as by national and university regulations that have created a system of higher agricultural education that wastes much of its potential capacity to modernize Peruvian agriculture. These generalized problems have been exacerbated by the isolation of the remaining faculty from the mainstream of international agricultural science and technology. UNA's library services and the contacts of its faculties with international science declined precisely in tandem with the international explosion of scientific information and international agricultural research efforts. While U.S. universities have undertaken major changes in curricula and in teaching and administration methodology to meet these developoments, UNA retains a standard requirement of 200 semester hours plus thesis for a baccalaurate degree, inflexible departmental requirements, narrow and rigidly designed curricula, and deficiencies in course content, which together lead to an average seven-year undergraduate tenure.

Nonetheless, UNA remains the premier institution training agricultural researchers and extensionists in Peru. A program with the objective to develop a sustained source of agricultural expertise must necessarily begin with strenthening UNA's capabilities to provide that expertise.

AID currently provides support to UNA under the APID Project. This support includes: (1) resident and short term support for developing graduate specializations in farm management and irrigation and strengthening the farm machinery department; (2) administrative consulting support to the Rector's office; (3) establishment of an English language laboratory; (4) establishment of a scientific instrument maintenance and repair center; and (5) fellowship support for MAG and regional faculty to obtain M.S. degrees at UNA. These activities will be continued under existing APID financing until completed or phased out.

This activity is intended to improve the efficiency and effectiveness of education, primarily at the graduate level, through support for improvements in administrative leadership, curriculum revision, and revitalized faculty performance, to be achieved through four initiatives:

(i) Improvement of capacity to plan, obtain and allocate resources, and to provide objective leadership through the Office of the Rector.

(ii) Stimulate curriculum revisions to match the evolving scientific knowledge base.

(iii) Create a system to stimulate and reward faculty for undertaking new and additional initiatives in research, teaching, curriculum improvement, and/or thesis guidance.

(iv) Expand faculty skills, knowledge, and understanding of the Peruvian agricultural sector.

The first initiative (to improve capacity) seeks to provide a focus of leadership within a diverse and balanced university management structure, by assisting the Office of the Rector to articulate and gain support for needed change. This requires development of the capacity to select objectives, manage a participative planning process, secure consensus within the university system, obtain and allocate resources efficiently, and monitor their use against the desired objectives.

This activity is a continuation of the effort, currently funded under the APID Project, to improve UNA planning and management capabilities within the existing resource levels. With a strengthened administrative capacity, the Rector's Office should be able to provide dynamic leadership through participative planning to the traditional balanced university management structure of administration, faculty deans, department heads, and faculty. In the process, this should increase the efficiency of resource use and the quality of instruction, so that faculty and university facilities are used to their greatest advantage, and students receive the best possible education as cost-effectively as possible. The Office should be able, with collaboration of faculty, to develop workable incentive systems that will improve teaching and research, and to manage and evaluate these systems. Finally, it should develop the capacity to improve the university structure, including elements such as curriculum, organization, and admittance procedures, in light of changing needs in agricultural science and the university's capacity to respond to them.

The second initiative (curriculum revision) focuses on the essential but difficult problem of adjusting a traditional curriculum and its related standards and regulations to match the evolving science knowledge base. The faculty is responsible for the curricula, both their current state and possible future modifications. Change will occur only as they convince themselves of the desirability of change. There is no alternative to faculty action, so there is no assurance that the proposed process will in fact result in curricula modification. However, it is one which has been used successfully by several large U.S. educational institutions to achieve major curricula changes.

The objective of this initiative is to undertake a two-year process that involves faculty members from diverse departments in a comparative review of the current curricula and related standards and requirements which examines these against alternatives. This process addresses concerns at both the individual faculty and university levels, leading hopefully to a consensus on improvements. AID will support this process through project linked observation study (PLOS), short term consultants, and also provide short term consultation to strengthen the graduate program of individual departments, e.g., economics (farm management, marketing, transportation), engineering (soil conservation, irrigation and drainage), basic sciences (mathematics, statistics, physics, chemistry, biology).

The third and fourth initiatives (stimulate new initiatives; faculty conferences) introduce incentives for performance, and expose faculty to the challenge of alternative approaches. The UNA faculty is rich in numbers, and many have an understanding of quality, and an ability to anticipate changing needs. But long years of survival under restricted resources have left them with an acceptance of the status quo as something which cannot be altered by individual effort. This apathy is reinforced by the lack of individual reward for innovative and additional teaching, thesis guidance, curriculum improvement or independent research. This activity is focused specifically on the individual, and will assist in providing opportunity for development of teaching materials, developing course content for new or revised subject areas, such as communications methods and technology transfer systems, and similar scholarly activities.

The fourth initiative (agricultural conferences) seeks to improve faculty skills, knowledge, vision, and understanding of the Peruvian agricultural sector, and to stimulate faculty thinking about future needs and alternative means for meeting them. Agricultural research priorities in Peru have been based on national political priorities and on need defined by operating public sector agencies, with advice from producers associations. As such, they tend to be focused pragmatically on the near term. Perhaps more important to the goals of the ATT program, this process has failed to incorporate the thinking from scientific minds representing a wide diversity of backgrounds and associations, both national and international, including many important participants in the agricultural research process. Broadening

this process is important to the legitimization of goals and the active involvement of the full array of Peruvian agricultural scientists in their attainment. It also introduces large numbers of faculty to the stimulus of recent research and the people who perform it.

As in the case of specific research program strengthening under Component 1, Activity c "Expanding Research Opportunties", .UNA will seek appropriate arrangements with sabbatical professors and/or U.S. Ph.D. graduate student (ABD) to assist in achieving the objectives under this activity.

(2) Expected Outputs. Overall improvement in the quality of instruction and the quality of UNA students, particularly at the graduate level.

- An increase in effective use of resources due to improved planning, resource allocation and control.

- Improved leadership structure that recognizes the role of the Office of Rector in identifying changing needs in agricultural science and in guiding the faculty to develop the university's capacity to respond effectively to educational challenges.

- An awards program which rewards additional and excellent individual work performance in teaching, research, research supervision, and curriculum improvement.

- Significant curriculum revision, brought about by an orderly two-year process that addresses concerns of both individual faculty and the institution as a whole, leading toward consensus on improvements needed.

- Creation of a broader consensus among university professors about national agricultural research priorities and stimulation of greater imagination and iniative about broad, recent agricultural research developments that hold special promise for practical applications in Peru.

Inputs Required. Table XV illustrates budgetary requirements for the activity.

Activity b. Improving Research, Teaching and Extension Materials

(1) Description. Research, teaching and extension all require an up-to-date flow of recent technological information. Teaching requires modern textbooks, and access to up-to-date published research information. Research requires access to journals for publishing current research results, and researchers require an opportunity to publish their results. Extensionists require reports that present technical research results in a form comprehensible to them. Extensionists need a wide range of communication materials for transmitting information directly and through mass

TABLE XV. LOP Inputs Required for Component 3, Human Resources Development, Activity a, UNA Administration and Teaching Program Improvement by Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID & GOP Counterpart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	82PM	1,050 2/	-	1,050	-	1,050
b. National advisors	9PY	200	-	200	-	200
c. TA Logistic support	-	-	200	200		
2. Commodities						
a. Off-shore procurement	-	400	-	400	-	400
b. Local procurement	-	-	200	200	-	200
3. Non-Academic Training 1/	-	-	200	200	-	200
4. Construction	-	-	-	-	-	-
5. Other Direct Costs	-	200	650	850	-	850
Sub Totals		1,050	1,250	3,100	-	3,100
6. Inflation and Contingency		280	270	550	-	550
Grand Total		2,130	1,520	3,650	-	3,650

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.

2/ Includes Short Term TA for advising UNA activities under expansion of research opportunities, preparation of teaching and research materials, library management and participation by UNA in other activities. Also includes short term TA for UNA Foundation institutional strengthening.

communications media to farmers and farmer groups. Both extensionists and their clients need access to popularly written general information that provides a broad spectrum of farm financial and economic management and technical information.

These communications materials are made available through various mechanisms:

(i) Libraries maintain subscriptions to scientific journals.

(ii) National scientific societies and institutions publish journals in which their members present results of current research and give and receive criticism and confirmation.

(iii) Scientific research and teaching institutions publish separate reports and bulletins summarizing the recommendations that arise from interpretation of research results.

(iv) Magazine publishers combine these materials and farmer experiences, and edit them for publication in popular form.

This activity provides support to facilitate improvements in the quality, volume, availability and accessibility of communication materials for the ATG&T system, as follows:

(i) National Agricultural Library. Despite the obvious desirability of establishing an integrated National Agricultural Library, there does not yet appear to be a concensus or continuing committment in Peru to develop and sustain such an institution. The closest approximation of a National Agricultural Library is at UNA. The UNA library has serious management and financial deficiencies. The confidence of faculty members and departments, not to mention INIPA, is such that they will not delegate to the library the responsibility for maintaining their separate collections.

With modest assistance, the UNA library can become an effective catalyst to a National Library System. Assistance will be provided to professionalize management of UNA library operations, to update and consolidate the periodicals and Journals collection, to cull obsolete materials, and to explore adoption of improved library operation and management technologies. Key library personnel will receive training in the use of microfilm, computerization of library functions, inter-library networking, and the role of video materials in the library system. Funds are programmed for procurement of new books and Journals, conditioned on appropriate reduction in Journal subscriptions, establishment of a rigorous culling process and rebinding system, and a commitment to sustain the level established.

(ii) National Scientific Publications. The publication of research results in scientific journals is the only reliable method to assure

interchange among scientists and to preserve the results of research. The only currently extant scientific agricultural journal in Peru, "Peruvian Agricultural Sciences Journal," is published by UNA, exclusively for its staff members, and this is several years behind in its issuance. INIPA and regional universities must rely on their own internal publication series, which have no peer review, limited distribution and little professional status.

This activity will explore two options. One is to improve the current UNA sponsored "Peruvian Agricultural Sciences Journal", bring it up to date, greatly expand the distribution, make it available to more authors, and broaden its base of support. The second option is to initiate an entirely new journal. The end result of either option, is to produce a self-financing, highly respected and widely distributed professional and scientific agricultural journal for Peru.

(iii) Extension Publications. The lack of scientific publications makes it even more urgent to assure that the recommendations which arise from current research are documented, in a form that can be used by public and private sector extensionists at the wholesale, retail, and producer levels. Sporadic efforts by individual researchers or departments are inadequate; they lack both the scale and the sophistication to perform the specialized functions of editing text, illustrating it effectively, and arranging for printing and dissemination, or of preparing audio-visuals and other media communications materials. INIPA and UNA both have some unexploited extension publication capability which could be combined with that of private organizations to facilitate the transfer of information to farmers. This Project will provide a grant to FUNSIPA to examine publishing alternatives and to fund promotion and initial implementation.

FUNSIPA also will explore relationships between communications materials wholesaleing and retailing activities and improvement in the quality of farm magazines, agricultural sections of newspapers, and agricultural information broadcasts by radio and television. These popular publications and broadcasts often are targeted to a wide range of persons, from consumers to more sophisticated farmers and technology transfer agents. Such communications media provide a rapid means for getting good science out of the laboratory or off the research station and into the hands of those who can make quick use of it. The opportunity to prepare articles for such popular magazines is an important incentive for researchers to focus their research on matters of farmer interest. It also provides a forum to extend their technological expertise to a larger audience.

In pursuing its objectives under this sub-activity, FUNSIPA will explore the feasibility of sponsoring one or more U.S. professors (in a communications or extension related field) who are seeking a sabbatical opportunity to assist in developing an improved extension communications system in a developing country. FUNSIPA also will explore the feasibility of a similar sponsorship of one or more U.S. graduate students (who have completed coursework and prelims - ABD) who propose to do their thesis/dissertation work in an area that would generate a useful product for improving Peru's extension communication system.

(2) Expected Outputs. A professionalized UNA library staff and operations; an updated collection of essential journals; an established process for culling obsolete materials; active exploration and adoption of modern alternative library technologies; and a higher use level by all agricultural institutions.

- An Agricultural Sciences Journal published regularly with peer review and with international distribution.

- An effective method agreed to and being implemented for transforming research results into published articles, utilizing the combined resources of UNA, INIPA, and private publishers.

- Better technology information flowing to popular farm magazines, newspapers, broadcasts, and other popular communications media, aimed at a wide clientele spectrum such as consumers, advanced farmers and technology transfer agents.

(3) Inputs Required. Table XVI illustrates the activity budget.

Activity c. Competitive Graduate Study Fellowships and Participant Training

(1) Description. Graduate study prepares a professional agriculturist to perform at a level beyond that expected of a B.S. or Ingeniero Agrónomo. Graduate study, including post-doctoral and sabatic renewal, is particularly important for researchers because of the need for additional specialization and hands-on experience in the latest research methods, and for current knowledge of scientific journals and research documents. It is equally important for the university professor, who must have a deeper and broader knowledge than his students, both in the subject matter he dispenses and in the guidance he provides for student research. This same reasoning applies to the agribusiness professional and the agricultural technology transfer specialist.

Peru has not recovered from the tremenduous loss of professional resources of the 1970's. Only 30 percent of the teaching staff of UNA, the institution richest in human resources, have graduate degrees. Only 7 percent of the INIPA research staff have M.S. or Ph.D degrees. International training at the M.S. level is expensive and is not appropriate for Peruvian conditions. UNA has the capacity to provide appropriate training at the M.S. level for upgrading many professionals in the sector, e.g. for MinAg, INIPA junior researchers and technical specialists, regional university faculty and private sector specialists.

TABLE XVI. LOP Inputs for Component 3, Human Resources Development, Activity b, Improving Research, Extension and Teaching Materials by Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID and GOP Counterpart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	5PM	60	-	60	-	60
b. National advisors	3.5PY	100	-	100	-	100
c. TA Logistic support	-	-	200	200	30	230
2. Commodities						
a. Off-shore procurement	-	200	-	200	-	200
b. Local procurement	-	200	500	700	-	700
3. Non-Academic Training 1/	-	-	100	100	60	160
4. Construction	-	-	-	-	-	-
5. Other Direct Costs	-	40	200	240	210	450
Sub Totals		600	1,000	1,600	300	1,900
6. Inflation and Contingency		95	220	315	55	370
Grand Total		695	1,220	1,915	355	2,270

1/ Graduate training needs and costs for this activity are included in Component 3, Activity c.

Peru does not now nor will it for some time have the internal capability to sustain quality Ph.D. training programs. Peru must expand the number of externally trained Ph.D. trained professionals on their staffs in order to develop adequate levels and quality of agricultural research and undergraduate education, and to provide quality M.S. graduate training required by the ATG&T system. In addition, many professionals (especially university professors with graduate degrees obtained those degrees more than a decade ago and since have been isolated from the internationl scientific agricultural community. They need to update their skills and knowledge base. Ph.D. trained professionals will be absorbed almost exclusively by INIPA and UNA. However, some regional universities soon may be at a research and training level to require some Ph.D. faculty, and some private sector research and technology transfer undertakings, especially those related to high value export crops, may require Ph.D. level expertise in both production and quality control technology. Technical analyses indicate that demand for graduate level professionals for the life-of-project will be 200 additional UNA M.S. Graduates and 35 to 40 externally trained post-graduate academic level researchers and faculty, for post-doctoral and sabbatic study, for PhD degree training and for high priority specialized MS degree training not available at UNA.

This activity provides a grant to FUNSIPA to establish a competitive scholarship program:

a) to enable employees of the MinAg, INIPA, regional universities and private organizations to obtain M.S. level specialization at UNA. To be eligible, applicants will have to demonstrate that they have: (i) at least two years of appropriate work experience; (ii) appropriate current employment; and (iii) a sponsor who is willing to provide some support during graduate study and an appropriate position upon completion of the M.S. degree. In addition, the participant must sign an agreement to work in Peru for a period of at least three years after completion of training.

b) to enable employees and/or faculty of UNA and INIPA (and of regional universities and private sector organizations that show a justifiable need for external post-graduate academic training) as well as outstanding Peruvian graduates to obtain external Ph.D. (and special M.S.) level specialization, and to pursue specialized post-graduate academic post-doctorate or sabbatic studies. To be eligible, applicants must demonstrate: (i) appropriate work experience; (ii) current need for specialization at the post-graduate academic level; and (iii) commitment by sponsoring institution of support during graduate study and re-entry or employment rights at the end of study at a competitive salary level. In the event the sponsor is a for-profit private sector organization, training resources will be made available only on a re-imbursable basis. In addition, a participant must sign an agreement to work in Peru for at least five years after completion of training.

FUNSIPA will form a committee with representatives of UNA, the Association of Agricultural Univerity Rectors, MinAg and the private sector to establish more precise selection criteria, minimum norms and other program procedures, and will form a selection committee to review applications and rank those qualified for fellowships. FUNSIPA will examine alternatives such as a bonding system for assuming compliance with the commitment to work in Peru for a minimum period upon completion of training, and will implement a selected option.

(2) Expected Outputs. Creation of a mechanism which will award fellowships on a competitive basis: a) to upgrade to the M.S. level approximately 200 ATG&T sector professionals; and b) to upgrade to the PH.D. (or special M.S.) level, or to provide specialized post-doctoral or sabbatic study opportunities to approximately 35 to 40 professionals.

(3) Inputs Required. Table XVII illustrates the activity budget.

TABLE XVII. LOP Inputs Required for Component 3, Human Resources Development, Activity c, Competitive Graduate Study Fellowship and Participant Training by Source and Use of Funds. (US$000).

Project Inputs	Units	AID	GOP Counter - part	AID and GOP Counterart Total	Estimated Private Sector Direct Input	Project Total
1. Technical Assistance (TA)						
a. Expatriate advisors	5PM	60	-	60	-	60
b. National advisors	2.5PY	60	-	60	-	60
c. TA Logistic support	-	-	200	200	-	200
2. Commodities						
a. Off-shore procurement	-	20	-	20	-	20
b. Local procurement	-	-	-	-	-	-
3. Non-Academic Training	-	-	-	-	-	-
4. Construction	-	-	-	-	-	-
5. Other Direct Costs	-	1,810	200	2,010	50	2,060
Sub Totals		1,950	400	2,350	50	2,400
6. Inflation and Contingency		300	80	380	10	390
Grand Total		2,250	480	2,730	60	2,790

IV. IMPLEMENTATION ARRANGEMENTS

A. Setting

This Project is designed to impact on the multi-faceted and rather complex characteristics of Peru's actual and potential ATG&T system. Thus, innovative and somewhat unique implementation arrangements are required. ATG&T System characteristics that are important to recognize and accommodate in Project implementation arrangements are:

1. The Project is designed to provide interventions to and impact on an ATG&T system that includes several public and private sector actors. The ATG&T system of which each of these actors is a part will be fulfilling its potential when each actor's operations are effectively integrated and complementary, but within a competitive environment. Thus, implementation arrangements should promote a competitive spirit without being divisive, and should assure a high degree of complementarity and integration of actions promoted and initiatives catalyzed.

2. Actors in the ATG&T system are quite diverse in terms of economic power, legislative or charter authority, manpower base, primary objectives, motivations, etc. Many, if not most, are not accustomed to view themselves as a part of a system, nor are they accustomed to collaborating to achieve their diverse and higher common goals. Implementation arrangements need to promote the break-down of barriers to an integrated and well-articulated system, rather than exacerbate negative tendencies. Control by one or two dominant actors of resources that are intended to stimulate activities of a wide range of actors should be avoided. This could discourage innovation and new initiatives in the system.

3. Resources of the Project are quite limited when measured against the magnitudes and diversity of the tasks to be performed. Thus, the Project has been designed to be catalytic in expanding the quality, amount and application of other resources moving into or already in the ATG&T system.

4. The Project will not be implemented in a static ATG&T system environment. Significant changes precipitated by the Project should be noticeable from the first year of implementation. The rate and magnitude of changes are expected to grow each year. Implementation arrangements must be sufficiently flexible to permit Project resources to respond to changing opportunities within such a dynamic environment.

5. Experience under the REE Project clearly has demonstrated the need for a private sector mechanism for administering resources flowing into the ATG&T system from both within and outside of regular public treasury channels. In early 1986, INIPA and ONA became sufficiently interested in filling this need to join together in establishing FUNSIPA, a private sector foundation, for purposes of receiving and administering both public and private sector resources destined to develop and support the ATG&T system. FUNSIPA's organizational structure must be broadened to be more representative of the active forces in the ATG&T system in order for it to assume its intended

role. INIPA and ONA are undertaking a study to determine how the FUNSIPA representational base can be enlarged and strengthened, and how its role in stimulating the ATG&T system can be enhanced. Nevertheless, FUNSIPA already has developed into an effective institution with financial management capabilities that are quite beneficial to the ATG&T system, and can become more so in the future. (See the Institutional Analysis section for a more detailed discussion of FUNSIPA and its capabilities.) This Project has been designed in recognition of the need for and potential benefits to be realized from strengthening the ability of FUNSIPA to assume a broader-based role in the ATG&T System.

B. Host Country Arrangements

Host Country arrangements for executing implementation functions are described below.

1. Implementation Management and Coordination

Implementation management responsibilities include preparation of annual implementation plans, and budgets, cooperation and coordination with other implementing entities, supervisory and monitoring responsibilities, and preparation and presentation of progress reports. Implementating institutions will have the primary responsibility for timely and effective execution of their respective activities.

Although a number of public and private sector entities will be responsible for executing the actions involved in Project implementation, only four institutions will carry out major implementation management functions: INIPA, FDA/UNA, ONA and FUNSIPA.

INIPA will manage implementation of the following activities:

- Consolidation and Integration of INIPA National Research and Research Support Programs (Component 1, Activity a).
- Strengthening INIPA Administration and Management (Component 1, Activity b).
- Establishing a Technology Transfer Specialist Program (Component 2, Activity a).

FDA/UNA will manage implementation of Component 3, Activity a. - UNA Administration and Teaching Program Strengthening.

ONA will manage implementation of a portion of the Private Sector Technology Transfer Enterprises Activity (Component 2, Activity b).

FUNSIPA will manage implementation of the remaining activities as follows:

- A portion of the Private Sector Technology Transfer Enterprises Activity (Component 2, activity b).

- Expanding Research Opportunities (Component 1, Activity c).
- Stimulating an Improved Seed Production and Distribution Activity (Component 2, Activity c).
- Improving Research, Extension and Teaching Materials (Component 3, Activity b).
- Competitive Graduate Study Fellowships and Participant Training (Component 3, Activity c).

For off-shore participant training under the latter Activity, FUNSIPA will carry out all implementation actions related to selection and processing in Peru, including required commitments for participants to return to work in the agricultural sector of Peru, language examinations, medicals, Project Implementation Orders, and other administrative and logistical support services in Peru. The technical assistance contractor under this Project will provide off-shore support related to placement, monitoring and counselling of participants.

a. Project Implementation Managers

A Project Implementation Manager will be assigned to each major implementing institution (INIPA, UNA Foundation, ONA and FUNSIPA) and will work under the direction of the Chief Executive Officer of that institution. The Project Implementation Manager will be responsible for assuring proper implementation of those Project activities under the implementation management control of his institution. He is responsible for preparation and presentation to his institution of annual implementation plans and budget requests, and of financial and disbursement plans, and also will assist in carrying out monitoring and evaluation functions. Each implementation management institution is responsible for providing administrative support to its Implementation Manager.

b. Project Coordination Committee and Project Secretariat

Project Implementation Managers and the USAID Project Manager will meet together periodically as the Project Coordination Committee to discuss, and coordinate annual implementation plans, and to review budget requests and disbursement plans. The Project Coordination Committee also is responsible for identifying and resolving Project implementation bottlenecks, for reviewing technical progress and budget utilization, and, generally for resolving Project implementation problems as they arise.

The INIPA Project Implementation Manager will serve initially for one year as Chairman of the Project Coordination Committee. Thereafter, the Committee will elect one of its members (excluding the USAID Project Manager) to serve as Chairperson for one year. The position will be rotated each year to an elected Committee member who has not yet served as Chairperson, until all Committee members have so served.

A Project Secretariat will provide administrative support to the Project Coordination Committee and execute other administrative support and coordination functions required by the Project. The Secretariat will be responsible for preparing agenda items for Committee meetings, for receiving and transmitting information and communications between USAID and implementing institutions, and for providing other logistical, administrative and professional managerial support as directed by the Coordination Committee Chairperson in coordination with the USAID Project Manager. The Chief of the Secretariat will be nominated by the Committee and approved by USAID. He will serve as a member of the Project Coordination Committee with voice but without vote. Neither the Project Coordination Committee nor its Secretariat will have approval authority for annual implementation plans and budgets of implementing institutions. Approval authority rests exclusively with USAID for USAID financing, and will conform to the regular GOP budget approval and control system for GOP resources. USAID may request review and recommendations by the Committee to assist in making approval decisions. The Project Secretariat will be housed at FUNSIPA headquarters, and will receive logistic support from them.

c. Project Council

A Project Council, made up of the President of FUNSIPA, the Chief of INIPA, the Rector of UNA, the President of ONA and the Chief of the USAID/Peru Office of Agriculture and Rural Development (OARD), will oversee Project implementation progress from a senior management perspective. This Project Council will make decisions required to solve Project problems that cannot be resolved at lower levels, and will be informed of Project progress by the Project Secretariat on at least a quarterly basis. The Chief of the Project Secretariat will serve as the Executive Secretary of the Project Council, and his office will provide the Council with staff support.

The Chief of INIPA initially will serve for one year as chairperson of the Project Council. Thereafter, the position is elective on an annual basis and will be rotated each year to a Council member, (excluding USAID) who has not yet served, until all Council members, (excluding USAID) have so served.

Chart I A. in Annex II, Exhibit L, shows ATT Project Implementation Arrangements in Schematic Form.

d. Implementation Planning Guidelines and Plan Preparation

The Project Secretariat will prepare guidelines governing preparation of annual implementation, budget, disbursement and monitoring plans. These guidelines will be approved by USAID and implementing institutions will be required to follow these guidelines in preparing annual implementation plans.

Each Implementation Manager will prepare an annual implementation plan for each activity for which his institution has primary implementation

responsibility, in accord with the approved guidelines. This plan will specify actions to be undertaken and anticipated accomplishements, with specific objectives, benchmarks and targets. A budget and disbursement schedule keyed to the annual implementation plan, as well as monitoring and control procedures will be included in the Plan. Implementation plans will be submitted to the Project Secretariat and Project Coordination Committee for review and comment. Although the Project Coordination Committee and Project Secretariat have no approval authority, they may make suggestions and recommendations for adjustments and changes. Within 30 days of receipt, the Project Coordination Committee, through the Project Secretariat, must submit all such annual implementation plans to USAID, along with any observations and recommendations. USAID approval is necessary for disbursement for Project activities in accord with normal AID procedures.

2. Administration of Project Funds

Funds will be disbursed by USAID/Peru to INIPA, FDA/UNA Foundation, ONA and FUNSIPA in accord with their respective implementation responsibilities and approved annual implementation plans. AID Project resources to be administered by ONA, the UNA Foundation, and FUNSIPA will be obligated under the bilateral grant agreement and committed under separate implementing grant agreements with each institution, and will be disbursed in accord with USAID approved implementation plans. Funds to be administered by INIPA will be committed by PIL's in accord with approved implementation plans.

Counterpart Project resources will be administered by the respective implementing institutions in accord with approved annual implementation plans, budget requests and disbursement plans. Disbursement of counterpart funds will be made in accord with normal GOP procedures. Counterpart resources destined for support to the Private Sector element of the Project will be assigned under the terms of the particular local currency agreement between AID and the GOP from which resources are assigned, and will be deposited in a Fund for use by FUNSIPA in implementing private sector related Project activities. This Fund will be established in any one of several ways to be selected later. Disbursements from this Fund will be made in accord with the respective approved annual implementation plans, budget requests and disbursement plans, and also in accord with normal GOP financial oversight regulations.

All institutions responsible for receiving, disbursing and liquidating Project funds will prepare quarterly financial plans of projected financial needs on the basis of approved annual implementation plans and budgets. These financial plans will be approved by USAID.

3. Execution of Implementation Actions

Project Implementation Managers will be responsible for promoting and monitoring implementation actions based on the approved implementation plans.

Development (and USAID approval) of operating systems and procedures for implementing FUNSIPA managed activities must be completed prior to initial disbursement for implementation. This development process will begin as soon as the Project Agreement is signed. However, expatriate and national technical assistance plus local support costs for this task are contemplated in the Project Implementation Plan and schedules, and disbursements for these will be allowed prior to approval of annual implementation plans. (See Annex II, Exibit K.)

In order to assist the USAID Project Manager in monitoring the Project, Implementation Managers will provide the following reports:

a) A quarterly progress report detailing advances and expenditures by Activities, and detailing Activity implementation progress.
b) An annual report detailing accomplishments by Activity, and plans for the ensuing year.

C. AID Arrangements

OARD will be responsible for AID Project management. A direct hire USAID Project Manager will be assigned full time for that purpose. OARD will be assisted in Project management by the Program Office, and the Controller's Office. In addition, other AID offices in the USAID Mission and AID Regional Offices will be called upon as needed. Each of these offices will assign a liaison person to work with the Project Manager. Together, these liaison persons and the Project Manager will constitute the USAID ATT Project Implementation Committee, with the Project Manager as Chairperson.

1. Disbursement Procedures

Except for technical assistance and off-shore participant training financial administration services, for which USAID will act as procurement agent, and for off-shore commodities procurements for which USAID will contract a Procurement Services Agent (PSA), USAID will disburse AID funds for all Project activities directly to the implementing institutions. Each implementing institution will prepare plans for projected financial needs on a quarterly basis, in accord with approved annual implementation plans, and will submit them to the USAID Project Manager for approval and commitment through implementing grant agreements or amendments thereto in the case of UNA Foundation, FUNSIPA and ONA, and through PIL's in the case of INIPA. Once approved, disbursements and reimbursements will be made based on these plans.

Implementing institutions will draw down funds and account for them in accordance with the approved plans and normal AID procedures. (See financial Table F-5 for more detail of amounts of funds administered by each implementing institution).

2. Procurement Procedures

For the most part, technical assistance and commodities are anticipated to be of Host Country or U.S. source and origin. USAID will be responsible for procuring all expatriate technical assistance and all off-shore commodities; the latter through a long-term arrangement with a Procurement Services Agent (PSA). The PSA will be used for all AID-financed off-shore commodities procurement activities, in accord with the agency's usual procedures outlined in Handbooks.

FUNSIPA will offer services of local commodities procurement to all implementing institutions. Implementing institutions may elect to use FUNSIPA local commodity procurement services or may carry out their own local commodities procurement. FUNSIPA also will be responsible for contracting AID-funded national advisors and local hire Project support staff, including Project Implementation Managers who will be secunded to other implementing institutions (See Annex II, Exhibit D for a detailed discussion of these arrangements).

3. Project Monitoring

Regular and substantive monitoring is an integral part of the Project, and is essential for successful Project implementation. On-the-spot identification and rapid solution of logistical and other problems will prevent implementation delays. Detailed Project monitoring is the responsibility of the USAID Project Manager.

D. Implementation Plan and Schedule

The Implementation Plan and Schedule is attached as Annex II, Exhibit K. This Plan is based on the Mission's current best estimates of technical assistance, equipment, and supplies and training requirements. Since FUNSIPA is being reorganized, a revised detailed Implementation Plan and Schedule will need to be developed immediately upon completion of reorganization, but after signing of the Project Agreement. An illustrative list of needed equipment for each Activity was developed during Project preparation and is included in the Schedule.

E. Technical Assistance (TA) Arrangements.

An important element of achieving the Project purpose is to strengthen linkages among persons and organizations, both public and private, that have complementary interests in ATG&T. This is expected to lead to a well-articulated ATG&T system, operating in an environment that is collaborative, with a high degree of complementarity and interaction but at the same time that is professionally competitive. In order to promote the evolution of such an interactive ATG&T system, it is important that technical assistance under this Project be closely integrated and coordinated among components, activities and implementing institutions. This will be

accomplished by awarding a single TA services contract, or through establishing a joint contractor or prime contractor/sub-contractor arrangement that assures close integration and coordination.

Because of the close relationship to this Project of on-going NCSU Title XII TA to INIPA under the REE Project, and of on-going Title XII TA under the APID Project being provided by the Mid-America International Agricultural Consortium (MIAC) to UNA, USAID is seeking AID/W approval for less than full and open competition procedures pursuant to AIDAR 706.302-70 (B) (3) and the Administrator's memorandum to USAID Directors dated October 27, 1986. NCSU and MIAC have performed in a highly competent manner in providing TA to INIPA and UNA, respectively. The institutional relationships between NCSU and INIPA under the REE Project, and between UNA and MIAC under the APID Project, have been fruitful and reinforcing. INIPA, UNA and USAID are desirous of maintaining institutional continuity into and throughout the ATT Project period. Annex II, Exhibit N provides copies of letters of request from INIPA and UNA for a continuation of TA under the ATT project from NCSU and MIAC, respectively.

If approval for procurement of TA under less than full and open competition is approved, Mission proposes to negotiate directly with NCSU and MIAC to provide TA services for the ATT Project under a joint contract or prime/sub-contract arrangement. If such approval is not forthcoming and/or if direct negotiations with NCSU and MIAC are unsuccessful, USAID proposes to procure TA services under full and open procurement procedures. In order to achieve the desired integration and coordination of TA services for the Project, USAID will give preference to proposals for providing TA through a special consortium, joint contract or prime/sub-contract arrangement. Details of TA services and project support staff arrangements are provided in Annex II, Exhibit D. An organigram of project administration and technical assistance arrangements is provided in Chart I A, Annex II, Exhibit L.

F. Review/Evaluation Plan and Financial Review/Audits

INIPA, FDA/UNA, ONA, FUNSIPA and USAID will conduct joint Project progress reviews at the end of Project years 1, 2, 4 and 5. These reviews will be "formative" in nature and focus primarily on "process" issues; that is, whether activities are being implemented according to plan, what problems need to be resolved, and what mid-course corrections are called for.

In addition to these reviews, two special evaluations will be conducted. The first will be an in-depth examination of the extent to which the Project is achieving its higher-order objectives. Particular attention will be paid to progress in improving the efficiency of the NR & NRS Programs, effectiveness of FUNSIPA in fulfilling its functions, and the degree to which interaction and linkages have been achieved between and among institutions, and between the private and public sectors. The in-depth evaluation will be conducted at the half-way point of the Project's life, that is, after approximately 36 months of implementation. The second special evaluation will be an impact evaluation at or near the end of the Project. This evaluation

will assess the extent to which the Project has achieved intended general objectives, describe the unintended outcomes that have resulted, and document the lessons that have been learned.

The in-depth and impact reviews of the Project will be conducted with the assistance of outside consultant teams. The two evaluations will each require approximately 24 person-weeks of services. Together, they will cost approximately $200,000, of which $150,000 will be financed with AID Project grant funds, and $50,000 from counterpart funds.

In addition to joint project progress reviews and special evaluations, periodic financial reviews will be carried out by the USAID/Controllers's Office. It is anticipated that at least one external audit of the use of Project funds will be carried out during the LOP by the AID Inspector General (IG). The timing and nature of the external audit will be at the discretion of the AID/IG. US$100,000 in AID Project grant funds and $25,000 in GOP counterpart funds have been reserved to defray the costs of financial reviews conducted by USAID through its Certified Public Accountant Indefinite Quantity Contract (CPA IQC), and, if needed, of non-federal contract audit services managed by the AID/IG.

V. SUMMARY PROJECT ANALYSES

A. Summary Financial Analysis

1. Summary Cost Estimates and Financial Plan. The total cost of this six year Project is estimated to be US$60,000,000 of which US$52,000,000 will be financed by AID and the GOP, with the private sector providing Project inputs estimated at US$8,000,000. Total inputs by source are estimated as follows:

	FX (US$)	LC (US$ Equiv.)	TOTAL (US$ Equiv.)	%
AID	8,905,000	16,095,000	US$25,000,000	42
GOP COUNTERPART	-----	27,000,000	27,000,000	45
SUB-TOTAL (AID & GOP)	8,905,000	43,095,000	52,000,000	87%
PRIVATE SECTOR	---	8,000,000	8,000,000	13%
PROJECT TOTAL	8,905,000	51,095,000	US$60,000,000	100%

Thus, the GOP will finance 45% of the total cost from counterpart contributions, and private sector direct participants are expected to provide 13% of total Project inputs. Annual GOP counterpart needs for this Project (US$5,000,000 equivalent per year in local currency for the first three years and lesser amounts thereafter) are comparable to amounts consistently provided from PL480 resources under the REE Project and the UNA portion of the APID Project during the past four years. In addition to GOP counterpart contributions, the GOP, through INIPA, UNA and regional universities, will make available for Project purposes the use of installed capacity (land, physical facilities, equipment and services) at more than 50 sites throughout Peru for agricultural technology generation and transfer activities. The LOP use value of these supporting resources is estimated at US$6,000,000 equivalent. Further, private sector beneficiaries are expected to provide an estimated LOP cash and in-kind contribution of US$12,000,000 equivalent in complementary resources during the LOP. Finally, complementary regular budget resources of INIPA and UNA are expected to total at least US$90,000,000 during the LOP. The presence of these supporting and complementary resources demonstrates the catalytic nature of AID funding and the high degree of leveraging designed into the Project.

Tables F1 through F8 show Sources and Applications of Funds, Requirements of Foreign Exchange and Local Currency, Expected Expenditures by Project and Fiscal Year, Summary Budget by Project Component and Activity, Administration of Funds by Institution and Use, Estimated Distribution of Funds by Activity and Institution Benefitted, AID Grant Methods of Implementation and Financing, and Summary Obligations and Disbursements by Fiscal Year, respectively. 45% of AID Project resources are allocated to Technology Generation Activities, 35% to Technology Transfer Activities and 20% to Human Resource Development.

a. AID Funds

AID Project Grant funds will finance the acquisition of laboratory equipment for agricultural research, field and office equipment for agricultural experiment station and field use, communications/audio-visuals and duplicating equipment for agricultural technology communications purposes, library equipment and accessions for agricultural research and education purposes, and vehicles with spare parts for ATG&T uses. AID grant funds also will cover the costs of expatriate technical assistance and national advisors, Project support staff salary and operating costs, non-academic and graduate degree training both in-country and off-shore, a portion of non-academic training and other operating costs, competitive and matching research grants and other ATG&T support activities. Approximately 374 person months of expatriate technical assistance and an average of approximately 20 person years per Project year of national advisory assistance will be required in the areas of institutional development, technology generation and transfer program planning and implementation, agricultural educational strengthening, business management, seed system improvement, and private sector model pilot technology transfer enterprise stimulation. Cost of expatriate technical assistance has been estimated at an average of US$14,000.00 per person month. The average cost of national advisors has been estimated at US$26,000 equivalent in Intis per person year.

Cost estimates are based on USAID experience in implementation of the REE Project with INIPA as the implementing institution, and in implementation of the APID Project with UNA as the implementing institution: two major implementing institutions under this ATT Project. This prior experience provides the cost basis for Project administration, expatriate technical assistance and national advisors, off-shore and in-country graduate academic and non-academic training, and operating costs. Recent commodities purchases under the REE Project serve as the basis for estimating commodities costs for most items. Otherwise, local distributors and the USAID Procurement Office have provided estimates. Expatriate experts contracted to assist in Project design provided cost estimates for the competitive research grants and the private sector model pilot technology transfer enterprise assistance. A detailed examination of costs confirms that the Project financial plan is reasonably firm and meets the test under Section FAA611 (a) (1).

Table F7 presents a summary of the Methods of Implementation and Financing of AID Resources to the Project. These all are standard and approved AID methods of implementation and financing. Four institutions, in addition to USAID/Peru, will administer and be accountable for AID funds: INIPA, FUNSIPA, FDA/UNA and ONA. Amounts of AID and GOP counterpart funds to be administered and accounted for by each institution is estimated in Table FA.

Table FA - Administration of Project Funds by Institution and Sources*

	AID GRANT FUNDS (US$000's)	GOP COUNTERPART FUNDS (US$000's)	TOTAL AID & GOP COUNTERPART FUNDS (US$000's)	
			AMOUNT	%
INIPA	3,800	20,800	24,600	47%
FUNSIPA	8,300	1,300	9,600	19%
FDA/UNA	1,500	4,900	6,400	12%
ONA	1,500	----	1,500	3%
USAID/PERU	9,900	----	9,900	19%
TOTALS	25,000	27,000	52,000	100%

* Figures include inflation and contingency factors.

USAID has had satisfactory prior Project experience with all of the implementing institutions responsible for administering AID funds under this Project, except for FDA/UNA, with which USAID has no experience.

INIPA has administered approximately US$8.0 million of AID funds and US$12.0 million of GOP counterpart funds since 1982 under the REE Project. During this period, INIPA has put in place adequate accounting procedures and internal controls to administer the magnitudes of resources for which they will be responsible under this Project. ONA has been administering and accounting for AID grant funds since January, 1985 at the rate of approximately US$75,000 annually, in addition to administering other resources in excess of US$600,000 equivalent per year from producer check-off fees and commercial operations. Administrative performance under the AID grant improved during this period as ONA became familiar with AID financial procedures. ONA's administrative procedures and internal controls are satisfactory for administering the level of funds for which it will be responsible under the Project.

FUNSIPA is a relatively new institution, initiating operations in May, 1986. It administered a small AID grant in 1986 and also administers funds from other donors. At the time of the AID grant, the USAID/Controller reviewed FUNSIPA's accounting and internal control systems and found them to be satisfactory. During the first six months of 1987, FUNSIPA satisfactorily administered a total in excess of US$550,000 received from various sources (an average of approximately US$92,000 per month, up from US$31,000 per month during the period May-December, 1986). Under the ATT Project, FUNSIPA will be administering approximately double this amount. In order to assist FUNSIPA to

administer this increased level of funds, resources are provided in the Project for an expatriate business manager for the first two years, and for a local hire financial manager and a procurement assistant throughout the LOP. The Project Development Committee concludes that FUNSIPA has the administrative capability and procedures to properly manage Project funds.

Although FDA/UNA has not yet administered AID funds, it has been administering funds destined to UNA from other donors for several years. Approximately 80 funded activities currently are administered by FDA/UNA from fifteen different funding sources. FDA/UNA administered approximately one million US Dollars equivalent during 1986, and has been averaging about 50% more on a monthly basis in 1987. The USAID/Controllers Office will work closely with the FDA/UNA financial office to assure that their personnel are familiar with AID accounting and financial reporting requirements.

In order to assure adequate financial review and audit of administration and control of funds by implementing institutions, resources for this purpose have been included in the Project.

b. GOP Counterpart

GOP counterpart resources will provide for local procurement of supplies and materials, for the purchase of spare parts for vehicles and equipment, for specialized maintenance of field and laboratory equipment and vehicles, for logistic and administrative support and supervision, for physical facilities maintenance, repair and expansion, and for a portion of nonacademic training and other operating costs. In-kind contributions will include professional, supervisory and support personnel, installed capacity services for routine vehicle and equipment maintenance, physical facilities, equipment and personnel required to implement the NR and NRS programs and the competitive and matching research and research support grants, storage and protection of goods and equipment, and a part of expatriate technical assistance and national advisors' logistic support costs such as office space and office furniture, secretarial assistance and access to scientific and operating equipment and facilities.

c. Private Sector Contributions

Private sector cash and in-kind contributions will include capital and operating costs for private sector model pilot technology transfer enterprises. It also will include matching and supporting contributions to competitive research grants where private sector entities are involved, as well as physical facilities and personnel backstop support for service activities of producer organizations, and appropriate logistic, administrative and supervisory support.

2. Recurrent Costs. During the past several years, Peru has provided consistent allocations of budget resources to public sector ATG&T activities

and to agricultural education, despite severe and growing fiscal problems. The current GOP appears to be committed to the continuation of current levels in real terms of public budget support to ATG&T institutions.

One of the major objectives of the ATT Project is to increase cost-effectiveness in the use of public sector funds for agricultural technology generation and transfer, as well as for agricultural education activities. Thus, the primary objective with regard to public sector recurrent costs during the Project period is to maintain current real levels of resource allocations, achieve ATG&T quality improvements and expand technology generation and transfer volume through more effective use of existing levels of public sector resources. Increased real levels of resources dedicated to ATG&T and to agricultural education and training is expected to be generated from private sector sources. Private sector recurrent costs (as well as capitalization) in the ATG&T system will come from earnings from direct fees charged for ATG&T services provided from net returns from the sale of inputs with embodied technologies and from agricultural product check-off fees charged by producer organizations to their members. These all are methods currently used for financing recurrent costs and for capitalization by private sector firms and/or producer organizations.

In summary, this Project primarily is financing costs that do not have significant impacts on recurrent budget requirements. More than 80% of the costs to be financed by AID are of a developmental nature or for pilot transfer enterprise stimulation. Some on-going recurrent costs for equipment maintenance will be required at the end of Project, but these requirements are minor as compared to total public budget resources currently being dedicated to ATG&T activities.

The present GOP has provided assurances, and has demonstrated during its first two years in office, that it will continue to provide current real levels of public budget resources for ATG&T and agricultural education purposes, and that as effective absorptive capacity and increased demand for public sector ATG&T services is demonstrated, higher levels of real public sector resources will be allocated to these purposes. To illustrate, GOP direct public sector budget support (not counting REE Project or other donor counterpart contributions) to the NR and NRS programs in INIPA was US$19,550,000 equivalent in 1986 and has been approved for US$20,820,000 equivalent in 1987. Because of the reorganization of INIPA into INIAA (which spins off the farmer contact elements of the public extension service), an annual public sector budget of US$10,500,000 equivalent in 1988 reflects a ten percent growth in the real public sector level of support to the research and technology transfer wholesaling elements of the NR and NRS programs. This annual level of public sector support to INIPA throughout the LOP will permit achievement of Project objectives, and continued support at that level will permit INIPA to meet recurrent costs.

ONA, valley producer organizations and FUNSIPA also have provided assurances that they expect to make available increased levels of resources

from producers, agribusinesses and private industry for investing in ATG&T activities, while at the same time introducing effective methods for charging fees that represent a fair value for the direct technology transfer and embodied technology provided through ATG&T services.

It is the judgement of the Project Development Committee that the increased recurrent cost burden implied by this Project is negligible. Achievement of Project impacts will in fact significantly reduce the public sector recurrent cost burden relative to increased shares of agricultural incomes going to the public sector through increased fiscal collections. Increased fiscal collections will be one of the results of economic growth precipitated in part by the agricultural productivity and output growth impacts of this Project.

Even though the recurrent cost burden generated by this Project is expected to be minimal, AID will encourage the GOP to gradually rely on sources other than PL-480 and other similar currency sources for GOP counterpart needs. GOP counterpart resources initially will be supplied from PL-480 and similar local currency sources. In the third year of the Project, during PL-480 negotiations, USAID will encourage the GOP to agree that 20% of the current cost portion of the minimum GOP counterpart requirement (i.e., 25% of total Project costs) will be provided from sources other than PL-480 and similar U.S. derived local currency sources (alternative sources may include regular public treasury, earned income from INIPA product sales, donations or contracts providing resources from private sector sources). Each year thereafter, the minimum Project requirement portion of GOP counterpart for current cost expenditures coming from PL-480 and similar local currency sources will be reduced by 20%, so that, by year six of the Project, only 20% of the minimum required GOP counterpart will come from PL-480 and similar local currency sources.

3. Methods of Implementation and Financing

Table F7 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 of implementation and financing have been reviewed and approved by the Mission Acting Controller. The planned methods of financing conform to the preferred methods established by AID policy. As implementation progresses and contracting action is taken, some change in the method of financing may occur due to the profit/non-profit nature of the selected contractor or the FX/LC cost balance. Should the Letter of Credit method of financing be appropriate, it will be selected in lieu of direct payment. The only foreseen use of Bank L/Com is for the financing of commodities using the services for a PSA as outlined in HB 15, Chapter 4, Section 4E.

Project design has carefully addressed the Mission's objectives concerning several implementation issues, a) minimizing Mission logistic support for project implementation, and b) assuring financial compliance (payment verification) for the use of AID funds. In terms of minimizing

Mission logistic support requirements, the project is expected to be implemented with two USAID procurement actions. The reference to "AID Institutional Contractors" in Table F-7 under I. Project Administration, and II. Training, is to a planned single prime contract (with or without sub-contractors) to provide TA and off-shore training services.

Another procurement action would be required for the PSA contractor. With regard to financial compliance, Project design and development included a review of the administrative and financial capacity of organizations that will receive local cost financing to determine their capacity to properly control and account for USAID resources. While some needed improvements were identified, these were not serious. All the implementing organizations have previously successfully managed and accounted for external grants. All but one institution has managed AID funds previously.

4. Sources of AID Funds and Rationale for Assigned Funding Levels

The DAEC PID Guidance Cable raised the issue of consistency of proposed Project funding levels with the Mission's sector strategy. The DAEC suggested for Mission consideration a five year Project with US$15.0 million DA grant funding. The Mission considered this issue in detail.

After a thorough review, the Mission concluded that the substance and scope of the central role envisioned for ATT remains valid. In reaching this conclusion, the Mission took into consideration AID's and other donors' roles and comparative advantages, likely funding levels in the sector over the next five years, GOP agricultural and other priorities, and priorities within the ATGST System. The FY 88-89 Action Plan which was discussed and approved in AID/W reflected Mission conclusions in this respect.

The following rationale was applied in resolving the issue of ATT Project funding levels:

1) During Project design, the AID grant funding level of US$30.0 million proposed in the PID was reduced by one-sixth to US$25.0 million by reducing the scope of selected activities of the Project. For example, the seed system improvement program was reduced from a national scope program to a pilot effort. Additionally, grant assistance to INIPA was reduced and offset by increased GOP counterpart inputs.

2) The LOP was extended 1 year to 6 years, up from the PID and DAEC guidance proposal of 5 years. This permitted one more fiscal year of funding.

3) US$2.7 million is being committed to the Project in FY 87 from ESF funds. US$409,000 which is being re-obligated from de-obligations under the Plan Meris Project originally was programmed for inclussion in the initial obligation for this Project. Current plans are to utilize these funds for the APID Project, and to include an additional US$409,000 from FY-88 DA funding (that initially had been reserved for the APID Project) for this Project. In addition US$1.3 million will be committed from FY-87 DA grant funds. Thus, total FY-87 commitment of US$4,000,000, leaving a six year forward mortgage of US$21,000,000.

4) For FY-88, the Mission is programming US$3.69 million of DA funds and US$6.8 million of de-obligated Central Selva (CSRM) Project funds for grant re-obligation, to the ATT Project, making a total of US$10.409 million of planned FY-88 commitments, with an uncommitted obligation of US$10,591,000 to distribute over the next five fiscal years (FY-89 through FY-93)

Proposed levels of new ATT Project commitments planned for FY-89 through FY-93 are reasonable, based on straight line budget projections for DA funds of $5,000,000 annually from FY-89 through FY-93. This still permits the Mission to pursue its current sector strategy by funding a continuation of agricultural policy analysis activities through modest funding for an extension of the APID Project, as well as by initiating a modest new Project in Agricultural Export Promotion and Agribusiness Development (AEPAD) in FY-88, with an initial commitment of $500,000 grant.

TABLE F1 - SOURCES AND APPLICATIONS OF FUNDS (US$000's)

LINE ITEM	AID GRANT		G O P COUNTERPART		AID & GOP TOTAL		ESTIMATED PRIVATE SECTOR DIRECT INPUTS		PROJECT TOTAL	
	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%
A. Technical Assistance	(7,626)	(30.5)	(2,000)	(7.4)	(9,626)	(18.3)	(830)	(10.4)	(10,456)	(17.4)
1. Expatriate Advisors	4,820	19.3	—	—	4,820	9.3	—	—	4,820	8.0
2. National Advisors	2,806	11.2	—	—	2,806	5.4	—	—	2,806	4.7
3. Technical Assistance Logistic Support	—	—	2,000	7.4	2,000	3.8	830	10.4	2,830	4.7
B. Commodities	(3,210)	(12.8)	(4,632)	(17.2)	(7,842)	(15.1)	(1,360)	(17.0)	(9,202)	(15.3)
1. Off-Shore Procurement	2,420	9.7	—	—	2,420	5.6	—	—	2,420	4.0
2. Local Procurement	790	3.2	4,632	17.2	5,422	10.4	1,360	17.0	6,782	11.3
C. Training	(3,195)	(12.8)	(1,700)	(6.3)	(4,895)	(9.4)	(700)	(8.7)	(5,595)	(9.3)
1. Post-Graduate Training	1,810	7.2	200	0.7	2,010	3.9	50	0.6	2,060	3.4
2. In-Country Non-Degree Training	1,385	5.5	1,500	5.6	2,885	5.5	650	8.1	3,535	5.9
D. Competitive and Matching Research and Research Support	1,960	7.8	1,630	6.0	3,590	6.9	300	3.7	3,890	6.5
E. Project Implementation Management Logistics and Administrative Support	1,530	6.2	580	2.2	2,110	4.1	100	1.3	2,210	3.7
F. Evaluation	155	0.6	50	0.2	205	0.4	—	—	205	0.3
G. Financial Review/Audit	100	0.4	25	0.1	125	0.3	—	—	125	0.2
H. Other Operating Costs	3,899	15.6	10,663	24.0	14,562	28.0	3,010	37.6	17,572	29.3
I. Construction			1,000	3.7	1,000	1.9	300	3.7	1,300	2.3
SUB-TOTALS	21,675	86.7	22,280	82.6	43,955	84.6	6,600	82.4	50,555	84.3
INFLATION *	2,267	9.1	2,860	10.6	5,127	9.9	900	11.3	6,027	10.0
CONTINGENCIES **	1,058	4.2	1,860	6.8	2,918	5.5	500	6.3	3,418	5.7
T O T A L S	25,000	100.0	27,000	100.0	52,000	100.0	8,000	100.0	60,000	100.0

* Inflation is estimated at 5% per year cumulative for AID Grant, GOP counterpart and private sector resources.

** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

TABLE F2 - REQUIREMENTS OF FOREIGN EXCHANGE AND LOCAL CURRENCY (US$000's)

LINE ITEM	AID GRANT FX	AID GRANT LC	AID GRANT TOTAL	GOP COUNTERPART LC	AID & GOP TOTAL	ESTIMATED PRIVATE SECTOR DIRECT INPUTS LC	TOTAL PROJECT INPUTS
A. Technical Assistance	(3900)	(3726)	(7626)	(2000)	(9626)	(830)	(10456)
1. Expatriate Advisors	3900	920	4820	—	4820	—	4820
2. National Advisors	—	2806	2806	—	2806	—	2806
3. Technical Assistance Logistic Support	—	—	—	2000	2000	(830)	2830
B. Commodities Procurement	(2420)	(790)	(3210)	(4632)	(7842)	(1360)	(9202)
1. Off-Shore Procurement	2420	—	2420	—	2420	—	2420
2. Local Procurement		790	790	4632	5422	1360	6782
C. Training	(1200)	(1995)	(3195)	(1700)	(4895)	(700)	(5595)
1. Post-Graduate Training	1200	610	1810	200	2010	50	2060
2. In-Country Non-Degree Training	—	1385	1385	1500	2885	650	3535
D. Competitive and Matching Research and Research Support	—	1960	1960	1630	3590	300	3890
E. Project Implementation	—	1530	1530	580	2110	100	2210
F. Evaluation	155	—	155	50	205	—	205
G. Financial Review/Audit	50	50	100	25	125	—	125
H. Other Operating Costs	—	3389	3389	11263	14562	3010	17572
I. Construction	—	—	—	1000	1000	300	1300
SUB-TOTALS	(7725)	(13950)	21675	(22280)	(43955)	(6600)	50555
INFLATION *	800	1467	2267	2860	5127	900	6027
CONTINGENCIES **	380	678	1058	1860	2918	500	3418
T O T A L S	8905	16095	25000	27000	52000	8000	60000

* Inflation is estimated at 5% per year cumulative for AID Grant, GOP counterpart and private sector resources.

** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

TABLE F3A - EXPECTED AID GRANT EXPENDITURES BY FISCAL YEAR (AND PROJECT YEAR) (US$000's)

LINE ITEM	FISCAL YEAR (PROJECT YEAR) 1	2	3	4	5	6	TOTAL
A. Technical Assistance	1370	70	1950	1260	540	236	7626
B. Commodities	1450	25	680	150	125	80	3210
C. Training	180	750	860	660	480	265	3195
D. Competitive and Matching Research and Research Support	130	330	520	450	270	260	1960
E. Project Implementation	260	270	280	270	230	220	1530
F. Evaluation	-	-	70	—	-	85	155
G. Financial Review/Audit	-	5	10	35	10	40	100
H. Other Operating Costs	480	1110	620	690	630	369	3899
I. Construction	-	-	-	-	-	-	-
SUB-TOTALS	3870	5460	4990	3515	2285	1555	21675
INFLATION *		268	525	562	483	428	2267
CONTINGENCIES **	186	261	250	174	110	77	1058
TOTALS	4056 1/	5989	5765	4251	2878	2060	25000

* Inflation is estimated 5% per year cumulative for AID Grant, GOP counterpart and private sector resouces.

** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

1/ It is estimated that US$100,000 of this amount will be expended in Project Year Zero (between the time of signing the Project agreement in late August, 1987, and the beginning of Fiscal Year 1988, i.e., Project Year One).

TABLE F3B - EXPECTED GOP COUNTERPART EXPENDITURES BY FISCAL YEAR (AND PROJECT YEAR) (US$000's) EQUIVALENT

LINE ITEM	1	2	3	4	5	6	TOTAL
A. Technical Assistance	180	350	450	450	450	120	2000
B. Commodities	720	1100	920	930	560	402	4632
C. Training	190	380	380	380	190	180	1700
D. Competitive and Matching Research and Research Support	100	200	300	340	340	350	1630
E. Project Implementation	90	120	120	120	80	50	580
F. Evaluation	-	-	25	-	-	25	50
G. Financial Review/Audit	-	-	12	-	-	13	25
H. Other Operating Costs	1600	2300	2300	2100	1600	763	10663
I. Construction	-	250	250	250	250	-	1000
SUB-TOTALS	2880	4700	4757	4570	3470	1903	22280
INFLATION *		224	471	716	783	666	2860
CONTINGENCIES **	220	372	385	379	303	201	1860
TOTALS	3100	5296	5613	5665	4556	2770	27000

* Inflation is estimated 5% per year cumulative for AID Grant, GOP counterpart and private sector resources.

** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

TABLE F3C - ESTIMATED PRIVATE SECTOR EXPENDITURES BY FISCAL YEAR (AND PROJECT YEAR)
(US$000's) EQUIVALENT

LINE ITEM	FISCAL YEAR (PROJECT YEAR) 1	2	3	4	5	6	TOTAL
A. Technical Assistance	80	160	170	170	160	90	830
B. Commodities	15	70	200	300	350	425	1360
C. Training	25	50	100	150	175	200	700
D. Competitive and Matching Research and Research Support	20	30	50	60	70	70	300
E. Project Implementation	5	20	20	20	20	15	100
F. Evaluation	-	-	-	-	-	-	-
G. Financial Review/Audit	-	-	-	-	-	-	-
H. Other Operating Costs	60	120	300	600	800	1130	3010
I. Construction	-	25	25	50	100	100	300
SUB-TOTALS	(205)	(475)	(865)	(1350)	(1675)	(2030)	(6600)
INFLATION*	-	50	105	180	255	310	900
CONTINGENCIES**	15	26	57	98	137	167	500
TOTALS	220	551	1027	1628	2067	2507	8000

* Inflation is estimated 5% per year cumulative for AID Grant, GOP counterpart and private sector resouces.

** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

TABLE F4 - SUMMARY BUDGET BY PROJECT COMPONENT AND ACTIVITY (US$000's)

PROJECT COMPONENT AND ACTIVITY	AID GRANT AMOUNT	%	G O P COUNTERPART AMOUNT	%	AID & GOP TOTALS AMOUNT	%	ESTIMATED PRIVATE SECTOR DIRECT INPUTS 1/ AMOUNT	%	TOTAL PROJECT INPUTS AMOUNT	%
I. COMPONENT 1 - Technology Generation	(9825)	(45%)	(17080)	(76%)	(26905)	(61%)	(400)	(6%)	(27305)	(54%)
A. Activity a: Consolidation and Integration of INIPA National Research and Support Programs	4175		12050		16225		—	—	16225	—
B. Activity b: Strengthening INIPA Administration and Management	1900		2800		4700		—	—	4700	—
C. Activity c: Expanding Research Opportunities	3750		2230		5980		400	--	6380	—
II. COMPONENT 2 - Technology Transfer	(7450)	(35%)	(2550)	(12%)	(5980)	(23%)	(5850)	(89%)	(15850)	(31%)
A. Activity a: Establishing a Technology Transfer Specialist Program	1675		1750		3425		250	—	3675	—
B. Activity b: Stimulating Private Sector Technology Transfer Enterprises	2750		400		3150		2850	—	6000	—
C. Activity c: Stimulating Improved Seed Production and Distribution System	3025		400		3425		2750	—	6175	—
III. COMPONENT 3 - Human Resources Development	(4400)	(20%)	(2650)	(12%)	(7050)	(16%)	(350)	(5%)	(7400)	(15%)
A. Activity a: UNA Administrative & Teaching Program Strengthening	1850		1250		3100		—	—	3100	—
B. Activity b: Improving Research, Extension and Teaching Materials	600		1000		1600		300	—	1900	—
C. Activity c: Graduate Fellowship and Participant Training	1950		400		2350		50	—	2400	—
Sub Total	(21675)	(100%)	(22280)		(43955)	(100%)	(6600)	(100%)	(50555)	(100%)
Inflation and Contingency*	3325		4720		8045		1400	—	9445	—
GRAND TOTALS	25000		27000		52000		8000	—	60000	—

* Inflation is estimated at 5% per year cumulative for AID Grant, GOP counterpart and private sector resources.
** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

1/ Includes both cash and in-kind investment and operating capital and includes re-investment from net earnings.

Table F5 - ADMINISTRATION OF FUNDS BY INSTITUTION AND USE (US$000's)

Distribution	AID Grant Amount	%	GOP Counterpart Amount	%	AID & GOP Total Amount	%	Estimated Private Sector Direct Input Amount	%	Total Project Inputs Amount	%
A. USAID/Peru	(8695)	(35%)	(000)	(0%)	(8695)	(17%)	—		(8695)	(15%)
1. Expatriate Technical Assistance	4820		—		4820		—		4820	
2. Off-shore Procurement	2420		—		2420		—		2420	
3. Post Graduate Training	1200		—		1200		—		1200	
4. Evaluation	155		—		155		—		155	
5. Financial Review/Audit	100		—		100				100	
B. INIPA	(3200)	(13%)	(17170)	(63%)	(20370)	(39%)	—		(20370)	(34%)
1. Tech. Assist. Logistic Support	—		1300		1300		—		1300	
2. Local Procurement	200		3382		3582		—		3582	
3. In-Country Degree and Non-degree Training	500		1200		1700		—		1700	
4. Competitive and Matching Research and Research Support	—		800		800		—		800	
5. Other Operating Costs	2500		9113		11613		—		11613	
6. Construction	—		1000		1000		—		1000	
7. Evaluation and Financial Review	—		75		75		—		75	
8. Project Implementation	—		300		300		—		300	
C. FDA/UNA	(1235)	(5)	(4060)	(15)	(5295)	(10)	—		(5295)	(9)
1. Tech. Assis. logistic Support	—		700		700		—		700	
2. local Procurement	250		1050		1300		—		1300	
3. Matching Research Support	—		530		530		—		530	
4. Other Operating Costs	500		1100		1600		—		1600	
5. Project Implementation	—		280		280		—		280	
6. In-country Training	485		400		885		—		885	
D. ONA and other Private Sector Entities	(1249)	(5)	(000)	(0)	(1249)	(2)	(6600)		(7849)	(12)
1. local Procurement	50		—		50		1360		1410	
2. Other Operating Costs	299		—		299		3010		3309	
3. Tech. Assist. logistic/Support	—		—		—		830		830	
4. In-Country Training	300		—		300		700		1000	
5. Competitive and Matching Research and Research Support	600		—		600		300		900	
6. Project Implementation	—		—		—		100		100	
7. Construction	—		—		—		300		300	
E. FUNSIPA	(7296)	(29)	(1050)	(4)	(8346)	(16)	—		(8346)	(14)
1. Tech. Assis. - National Advisors	2800		—		2800		—		2800	
2. Tech. Assis. Logistical Support	—		—		—		—		—	
3. local Procurement	290		200		490		—		490	
4. In-Country Masters Degree Train.	610		—		610		—		610	
5. In-Country Non-Degree Training	100		100		200		—		200	
6. Competitive and Matching Research and Research Support Grants	1360		300		1660		—		1660	
7. Project Implementation Managem. Logistics and Admin'ts. Support	1530		—		1530		—		1530	
8. Other Operating Costs	600		450		1050		—		1050	
Sub-Total	21675	87	22280	82	43955	84	6600		50555	84
F. Inflation *	2267	9	2860	11	5127	10	900		6027	10
G. Contingencies **	1058	4	1860	7	2918	6	500		3418	6
Totals	25000	100%	27000	100%	52000	100%	8000%		60000	100%

* Inflation is estimated at 5% per year cumulative for AID Grant, GOP counterpart and private sector resources.

** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

TABLE F6 - ESTIMATED DISTRIBUTION OF FUNDS BY ACTIVITY AND INSTITUTION BENEFITTED (US$000's)

	AID GRANT AMOUNT	%	GOP COUNTERPART AMOUNT	%	AID & GOP TOTAL AMOUNT	%	ESTIMATED PRIVATE SECTOR AMOUNT	%	TOTAL PROJECT BENEFITS AMOUNT	%
A. INIA	(10,350)	48%	(18,600)	82%	(28,630)	65%	(250)	4%	(28,800)	57%
1. Component 1, activity a Consolidation and Integration of INIA NC and NS Program	4,175		12,050		16,225		—		16,225	
2. Component 1, activity b Strengthening INIA administration and management	1,900		2,800		4,700		—		4,700	
3. Component 1, activity c: Expanding Research opportunities (Research support contracts)	1,500		900		2,400		—		2,400	
4. Component 2, activity a: Technology Transfer Specialist Program	1,675		1,750		3,425		250		3,675	
5. Component 2, activity c: Improved Seed Production and Distribution System	500		200		700		—		700	
6. Component 3, activity b: Improving Research, Extension and Teaching Materials	200		400		600		—		600	
7. Component 3, activity c: Graduate Fellowship and participant training	400		500		580		—		500	
B. UNA	(4,650)	21%	(3,200)	14%	(7,850)	18%	(0)	0%	(7,850)	15%
1. Component 1, activity c: Expanding Research opportunities (matching research grants)	1,000		950		1,950		—		1,950	
2. Component 2, activity c: Stimulating improved seed productions distribution system	500		200		700		—		700	
3. Component 3, activity a: UNA administrative and teaching program strengthening	1,850		1,250		3,100		—		3,100	
4. Component 3, activity b: Improving Research, Extension and Teaching Materials	300		600		900		—		900	
5. Component 3, activity c: Graduate fellowship and participant training	1,000		200		1,200		—		1,250	
C. REGIONAL UNIVERSITIES	(900)	4%	(480)	2%	(1,380)	3%	(0)	0%	(1,380)	3%
1. Component 1, activity c: Expanding Research Opportunities	500		380		880		—		880	
2. Component 3, activity c: Graduate fellowship and participant training	400		100		500		—		500	
D. ONA	(2,250)	11%	(100)	1%	(2,350)	6%	(2,250)	34%	(4,600)	10%
1. Component 1, activity c: Expanding Research opportunities	500		—		500		300		800	
2. Component 2, activity b: Stimulating private technology transfer enterprises	1,050		100		1,150		850		2,000	
3. Component 2, activity b: Stimulating Seed Production and Distribution System	500		—		500		750		1,250	
4. Component 3, activity b: Improving Research, Extension and teaching materials	100		—		100		300		400	
5. Component 3, activity c: Graduate fellowship and participant training	100		—		100		50		150	
E. OTHER PRIVATE SECTOR ORGANIZATIONS 1/	(3,525)	16%	(300)	1%	(3,825)	8%	(4,100)	62%	(7,925)	15%
1. Component 1, activity c Expanding Research Opportunities (Matching Research Grants)	250		—		250		100		350	
2. Component 2, activity b: Stimulating private sector Technology Transfer Enterprises	1,700		300		2,000		2,000		4,000	
3. Component 2, activity c: Stimulating Seed Production and Distribution System	1,525		—		1,525		2,000		3,525	
4. Component 3, activity c: Graduate Fellowships	50		—		50		—		50	
Sub-Totals	(21,675)	100%	(22,280)	100%	(43,955)		(6,600)	100%	(50,555)	100%
F. Inflation * and Contingency **	3,325	—	4,720	—	8,045	—	1,400	—	9,445	—
Grand Total	$25,000	—	$27,000	—	$52,000	—	8,000	—	60,000	—

* Inflation is estimated at 5% per year cumulative for AID Grant, GOP counterpart and private sector resources.

** Contingencies are estimated at between 4% and 5% for AID Grant, and between 6% and 7% for GOP counterpart and private sector resources.

1/ May include ONA and its affiliates

TABLE F7 - AID GRANT METHODS OF IMPLEMENTATION AND FINANCING

METHOD OF IMPLEMENTATION	METHOD OF FINANCING	APPROXIMATE AMOUNT (US$000'S)	%
I. Project Administration			
- HC Implementing Agency, Direct Implementation Local Cost Financing Technical Assistance	Direct Implementing Agency Reimbursement	1,740	8%
- AID Institutional Contractors	Direct Payment	4,680	22%
- HC Implementing Agency Institutional and/or Personal Services Contractors, local cost financing	Direct Implementing Agency Reimbursement	2,700	12%
II. Training			
- AID Institutional Contractors	Direct Payment	1,600	7%
- HC Implementing Agency Institutional and/or personel services contractors/ grantees, and direct implementation, local cost financing	Direct Implementing Agency Reimbursement	3,680	17%
III. Commodities			
- AID Institutional Contract with procurement services agent (PSA)	Direct Payment	150	11%
	BL/COM	2,175	
- HC Implementing Agency procurement, local cost financing	Direct Implementing Agency Reimbursement	750	4%
IV. Other Costs			
- *HC Implementing Agency Institutional contracts/grants; personel services contracts/grants, and direct implementation, local cost financing	Direct Implementing Agency Reimbursement	4,200	19%
	Sub-Total	21,675	100%
	Inflation and Contingencies	3,325	
	AID Total Budget	25,000	

* Includes travel & per diem, subprojects operating expenses research grants and publishing expenses.

TABLE F8 – SUMMARY OF OBLIGATIONS AND DISBURSEMENTS BY FISCAL YEAR (US$000's)

COUNTERPART	AID								GOP COUNTERPART						
FISCAL YEAR (FY)/CALENDAR YEAR (PROYECT YEAR – PY)	FY-87 (PY-0)	FY-88 (PY-1)	FY-89 (PY-2)	FY-90 (PY-3)	FY-91 (PY-4)	FY-92 (PY-5)	FY-93 (PY-6)	TOTAL	CY-88 (PY-1)	CY-89 (PY-2)	CY-90 (PY-3)	CY-91 (PY-4)	CY-92 (PY-5)	CY-93 (PY-6)	TOTAL
1. Obligations	4,409	10,000	3,400	3,300	3,100	791	-0-	25,000	5,000	5,000	5,000	4,500	4,212	3,288	27,000
2. Disbursements 1/	100	8,000	6,400	3,700	2,900	2,200	1,700	25,000	2,900	5,100	5,437	5,600	4,675	3,288	27,000
3. Balance															
Annual	4,309	2,000	-3,000	- 400	200	-1,409	-1,700	——	2,100	-100	-437	-1100	463	-0-	—
Cumulative	4,309	6,309	3,309	2,909	3,109	1,700	-0-	——	2,100	2,000	1,563	463	-0-	-0-	—

1/ Includes Inflation and Contingency Factors

B. Summary Technical Analysis

Design of the technical aspects of this Project has had the benefit of a number of contemporary technical studies related to agricultural research, extension and education in Peru, beginning with the comprehensive Agricultural Research, Extension and Education Baseline Study carried out in 1979. Design of the REE Project approved in early 1980 was based largely on this Baseline Study. The design of this ATT Project has had the benefit of nearly seven years of experience since then under the REE and APID Projects, as well as under three USAID assisted private sector pilot projects undertaken since 1983 (described later in this Section).

The progress and lessons learned under the REE Project are described in a major assessment (carried out in 1985) of the viability and effectiveness of Peru's agricultural ATG&T system. Additionally, also in 1985, the International Service for National Agricultural Research (ISNAR), at the request of INIPA, carried out an in-depth study of the INIPA ATG&T model. Other important reports and studies relied upon in the technical design of the ATT Project include a mid-term evaluation of the REE Project carried out in late 1983, a Background Paper on the Peruvian national ATG&T system, prepared in 1985, and a 1985 study on collaboration between Peru and IARC's (See listing in the Bibliography).

This Project has been designed taking into account the relevant technical recommendations included in the various studies referred to above. This process was facilitated by a document prepared in late 1985, at the request of USAID. That document consolidated the findings of the various studies referred to above into a proposed AID REE program (See Annex II, Exhibit G, A Proposed AID REE Program, 1986-1995). The final design has been adjusted and refined based on subsequent private sector pilot project experience, and later studies related to the private sector role in ATG&T.

The remainder of this section does not attempt to repeat in detail the analyses and technical recommendations included in the referenced studies. Rather, it summarizes the context from which the technical dimensions of the Project flow. This section also addresses the issues of scope, focus and sustainability from a technical feasibility perspective, as well as technical feasibility issues of: 1) commodity vs farm management approach to the ATG&T process; and 2) relative roles of the public and private sectors in technology transfer.

The multi-donor assisted effort in Peru since 1981 to recapitalize the public sector ATG&T system has resulted in substantial progress in a relatively short time. Significant levels of human and physical capital have been organized into a functioning insitutional framework (INIPA), strong linkages are in place with IARC's, new technologies (especially improved seeds) have been developed and are being disseminated, and additional new

technologies are in the process of being developed. However, even though rapid progress has been made and strong momentum has been established in INIPA, much remains to be done to achieve a comprehensive and self-sustaining ATG&T system.

Conclusions of the various studies coincide in their assessment that the public sector ATG&T system is on track but must continue institution-building efforts in the following areas:

1. Improve the quality of the human capital base and improve personnel and remuneration systems in order to retain highly qualified scientists and technicians in the mainstream public sector ATG&T institutions;

2. Consolidate and integrate public ATG&T efforts in order to operate effectively within the limits of institutional capacity;

3. Expand and strengthen linkages and relationships among ATG&T institutions and to their client groups;

4. Enhance credibility and popular support; and

5. Stimulate an increased role for producer organizations and agribusiness firms in the ATG&T process.

The studies also agree that substantial improvement in these areas can be achieved by focussing development efforts on:

1. Consolidating INIPA NR and NRS programs to focus on high priority (and fewer in number) research sites and subject areas, limiting INIPA efforts to technology generation for major food crops and the transfer specialist functions (Technology Wholesaling), and improving the integration of commodity research (NR programs) with discipline research and services (NRS programs) in order to reduce overlap and duplication of effort.

2. Strengthening ability of UNA and regional universities to train high quality, problem oriented professionals through post-graduate training of faculty; and by increasing faculty and student involvement in relevant applied and adaptive research, as well as by expanding and making more accessible reference materials for research, teaching and extension.

3. Expanding the role of the private sector (producer organizations and agribusinesses) in all aspects of the ATG&T process, with special emphasis on adaptive research support, technology transfer and production/distribution of improved seed.

Each of these areas are addressed in the ATT Project in a manner that builds on progress already made under the REE Project, and that also incorporates experience gained by USAID and various private sector organizations under private sector pilot projects initiated by USAID in 1983

and 1984. Under these pilot projects, USAID provided assistance to a Valley Producers Organization (Ica Producers Association), the National Farmers Organization (ONA) and a not-for-profit training and technical assistance institute (Instituto Rural de Valle Grande) in a variety of agricultural research, technology transfer and producer/transfer agent training initiatives. ATT Project design also has had the benefit of various studies by national and expatriate consultants to provide further actionable activity specifications. These include studies for defining 1) private sector ATG&T entities and activities that lend themselves to Project support, 2) pilot technology transfer enterprise models adapted to Peruvian conditions, 3) high priority interventions to improve the effectiveness of UNA and regional universities, and 4) opportunities for strengthening producer organization and agribusiness participation in ATG&T activities.

The comprehensive scope and focus of the Project was selected after careful consideration of two alternative options. The first option was to limit the scope of the project to INIPA (i.e., an REE II type project). This option was rejected for three reasons. One, progress under the REE Project has been impressive in the research area, but has been disappointing in technology transfer. REE Project experience clearly demonstrates that technology transfer will continue to be a major limiting factor unless mechanisms in addition to the public sector extension service are mobilized for technology transfer. Pilot project experience with private sector organizations demonstrates clearly the effective and expanding role that the private sector can play in technology transfer.

Second, the breadth and range of research required by producers in Peru far exceeds the human resources and facility capabilities of INIPA. Considerable installed human and physical capacity exists in agricultural universitites and in producer organizations that can be mobilized at a relatively small marginal cost. Thus, a technically feasible project must seek to catalyze agricultural universities and producer organizations into efforts to expand and improve the effectiveness and reach of the ATG&T system.

Finally, the GOP has been in the process of reorganizing the public ATG&T system and, in June 1987, approved a law that spins off from INIPA the public field extension service activities that relate directly to farmers. This technology retailing function will be carried out through the Min/Ag and/or through regional government structures now being put in place. The net result of this change in legal structure of the public ATG&T system is that INIPA's functions now are limited to research and technology "wholesaling" (i.e., the packaging and the transfer of technology to Technology Retailers that work directly with farmers). INIPA functions no longer include transfer directly to farmers, except through on-farm tests and trails that have as their major objective field verification of technologies developed in the technology generation process. Thus, now included in INIPA's client groups are all Technology Retailers, i.e., those who have direct farmer contact mechanisms for transferring technology, e.g., public extension service,

producer organizations, agribusinesses, and not-for-profit civic and rural development organizations. Because all of these groups are a critical part of the ATG&T system, it would be technically unsound to exclude any of these Technology Retailers from the ATT Project scope and focus.

Another alternative for defining scope and focus that was considered and rejected was to conclude assistance to INIPA upon completion of the REE Project in 1987 and focus ATT Project assistance only on the private sector and agricultural universities. This alternative was rejected because even though the institutional development of INIPA to date has resulted in major improvements in administrative capability, overall management of systems and ability to generate more relevant research, it has not yet achieved adequate levels of performance of all of its functions and is unlikely to do without further outside assistance. Without continued external support to INIPA, the potential benefits to be realized from the investment in an progress achieved since 1981 will be compromised considerably. INIPA is a critical part of the ATG&T system. Without an institutionally strong and dynamic INIPA, the potential of the ATG&T system would be severely handicapped.

Financial and institutional sustainability of INIPA depends to a large extent on the technical validity of the interventions planned under the ATT Project. The redimensioned INIPA has a more manageable technical and administrative role. It has more focussed responsibilities, will have a smaller, and more focussed and manageable staff, and will have considerably reduced administrative obligations. This calls for more modest financial resource requirements (about 50% as much), which are more sustainable. Increased linkages and relationships with the private sector (now an express client group of INIPA) can provide the opportunity for more responsive private sector support to public sector ATG&T activities. Similar results are expected as agricultural universities forge more meaningful and direct relationships with farmers through expanded involvement in applied and adaptive on-farm research.

Once private sector technology transfer activities to be supported by the ATT Project are established, their operating costs will be covered by charges against the increased net value of production realized from adoption of the technologies being transferred. This includes covering (in the price of the products sold) costs of producing and distributing embodied technologies (mainly through improved seed). Thus, the comprehensive approach selected for this ATT Project, which includes support for both public and private sector activities in the ATG&T system, results in more rapid progress toward sustainability than would a piecemeal approach. It should be noted, however, that ATT Project design objectives do not purport to achieve complete self-sustainability of the entire ATG&T system by the end of the Project. The design fully recognizes the long term institution building and system development nature of the undertaking.

Two additional technical feasibility issues are of importance to the design of this Project. First, REE Project design in 1980 opted for a "commodity specialization" approach as opposed to a "farm management" approach to the ATG&T system in Peru, for a number of reasons that were valid at the time. However, both the 1979 Baseline Study, and the subsequent REE Project design technical analysis implicitly recognized the limitations of the commodity specialization approach in terms of total factor use efficiency and increased on-farm capitalization. Rather, the commodity specialization approach was selected as a more cost-effective method at that time for concentrating the efforts of a limited number of researchers and extensionists in a new institution. In the longer run, a more economically sound approach is the farm management approach that seeks to apply technologies to optimize net returns to all factors of production. Most observers agree that long-run viability of the ATG&T system, especially if it is to rely heavily on charges to producers to pay the costs of technology transfer, must develop a capability to offer technology options in the context of farm management efficiency and whole farm net returns. The USAID assisted pilot project with ONA has demonstrated that farmers are anxious to understand, measure and monitor the economic performance of their entire farm, as well as of individual crop or livestock enterprises, and that they desire specific information on the relative returns to alternative enterprises and on unit cost reducing technology combinations and options.

Thus, while the ATT Project will continue to support the commodity specialization approach for the INIPA NR programs, relatively more emphasis will be placed on the farm management dimensions of the NRS agro-economics program, additional support will be provided to farm management research and teaching at UNA and post-graduate training in farm management (especially for faculty members of regional universities), and continuing support will be provided to the farm records/farm management activities of ONA in their Economic and Statistical Analysis Center.

Second, the extension outreach (farmer contact) methodology applied in the REE Project focussed almost exclusively on the public sector extension service and the utilization of technology packages that could be extended through a more or less standardized extension plan (i.e., a technology supply-led approach) known as a "modified" T&V (training and visit) system first developed in Israel and promoted by the World Bank. This system has had discouraging results in Peru. Given the re-structuring of INIPA and the need to provide improved and greatly expanded technology outreach at the farm level on a self-financing basis, the ATT Project will shift the technology transfer focus to private sector transfer intermediaries. In contrast to the "modified T and V system the particular technology being transferred under this Project will depend on what the farmer wants (i.e., a technology demand-led approach).

The ATT Project also will give relatively greater emphasis to mass communications methods as an effective means of informing large numbers of farmers about their technology options. This will generate the farmer demand required for a demand-led system to function effectively.

C. Summary Institutional Analysis

The Agricultural Technology Transformation (ATT) Project is fundamentally a set of institutional development activities designed to create a national Agricultural Technology Generation and Transfer (ATG&T) system by strengthening its component parts, and improving the interfaces among them as well as between them and farmer users of technology. Major public and private sector institutions and organizations that make up the Peruvian ATG&T system are described in the Project Setting (Chapter II, Section C) of the Project Paper. Project activities designed to contribute to improvements in managerial and technical effectiveness, efficiency, quality and output of the ATG&T system are described in the Program Description (Chapter III) of the Project Paper.

During the 1970's public sector research and extension institutions were dismantled and reconstituted, while producer organizations were eliminated and their property expropriated. UNA retained its structure but also was affected severely by the loss of senior and well-trained faculty and administrators, by depreciation of physical capital and particularly by the long period of isolation from the international agricultural scientific community.

Both public and private sector ATG&T institutions have been in the process of rebuilding and/or reconstituting since 1981. They are in intermediate stages of recovery and still are somewhat fragile. Beginning in 1981, major efforts by the GOP and the international donor community were directed toward re-establishing in INIPA a public sector research and extension capability organized into national commodity research and research support programs and services. During this same period ONA, as the only truly representative farmer's organization, recovered the organizational form and property of the original private sector "Sociedad Nacional Agraria" (SNA), but has not yet reached its levels of influence nor capability. UNA has rebuilt its former student output levels, but still is rebuilding instructional quality, as well as amount, quality and relevance of research.

Currently, INIPA, UNA and ONA have acceptable planning, financial management and operating systems, and are producing many of the outputs for which they were intended, within the limits of the quality of professional personnel, their current levels of financial resources and their efficiency of use of those resources. A principal objective of each of these organizations is to consolidate and institutionalize their operations and ATG&TG functions by improving their ability to perform and by attracting financial support from diverse sources. The marginal resources which this Project provides are carefully targeted to catalyze more effective use of existing resources and resources to be obtained from other sources.

Despite similarity of institutionalization problems, each of the ATG&T organizations participating in this Project are different in role, scope and institutional strengthening needs. Private Sector Organizations, such as ONA, its affiliated national and valley commodity committees, as well as independent valley associations and other producer-based groups, lack the technical and managerial skills to develop self-sustaining services and innovative relationships with the public sector and with international sources of supply of technology. Project activities such as the Competitive and Matching Research Grants, Technology Transfer Enterprise Stimulation, and Seed System Improvement all are directed to this set of problems and are intended to trigger its resolution. Organized producers currently are too dependent on the public sector, and their organizations invest a disproportionate share of their efforts in seeking public sector services and dispensations. In the process, they neglect their own potential to provide services to members-services that directly can influence productivity by improving production and marketing technology, thereby lowering unit costs of production and marketing and increasing product volume in the marketplace. Such services not only enhance producer profit potential, but also can provide significant net incomes to the supplier of the services.

UNA's continuing challenge is the search for quality of institutional and professional performance. Nearly two decades of limited contact with the international agricultural scientific community and the loss of many of the better trained faculty have contributed to an erosion of the high academic standards achieved prior to 1968. University government is highly democratic, with change largely determined by faculty interests. The concern for job security (manifested by early tenure of modestly qualified faculty members) and the low number of faculty who are aware of or affected by international professional quality standards promotes continuation of the status quo. Such conditions will change only with increased exposure of faculty to international academic and research quality standards combined with the emergence of more effective administrative and personnel performance reward systems. The Project provides resources to UNA to facilitate positive change as internal willingness and opportunities permit.

Personnel and compensation regulations limit INIPA's and UNA's authority to dismiss or shift personnel in order to reallocate financial resources; personnel costs have become an excessively high proportion of expenditures, distinctly limiting efficient resource utilization. When combined with inability to reward exceptional performance, this negatively affects institutional innovation and quality improvement.

Inter-institutional linkages within the ATG&T system are vital to its development and mutual re-inforcement. These are difficult to promote at the institutional level. The ATT Project segregates funding for all institutions so that none dominate the others. At the same time that institutions resist dominance and control by other institutions, effective professional collegial inter-relationships do develop. This phenomena will be exploited in the Competitive and Matching Research Grants activity by encouraging the private

sector to collaborate with universities and INIPA, as well as through other activities within UNA and INIPA to encourage establishment of collegial relationships.

A detailed analytical description of the institutional and administrative characteristics and capabilities of the implementing institutions and their potential for fulfilling their responsibilities under the Project, is provided in Annex II, Exhibit H.

D. Summary Social Soundness Analysis

1. General Socio-Cultural Context

Peru, the fourth largest and fifth most populous country in Latin America, is characterized by extreme geographic and cultural variations. Its land area is approximately 1.28 million Km^2, with only a small percentage being arable. Its population in 1987 is estimated to be 20.7 million. Peru is divided into three clearly defined geographic regions: (a) the Coast, which includes approximately 45% of the population and 11% of the land; (b) the Sierra, with about 44% of the population and 26% of the land; and (c) the Jungle, with only 11% of the population but with 63% of the land. Each of these regions has its own ethnic groups and cultural characteristics.

Almost half of the Peruvian population is classified as indigenous. Approximately 10% are of European (primarily Spanish) origin. The remaining population includes a small population of Asian and African descent and a larger proportion of European/Indian mixture. Peruvians of European and Asian origin live primarily in Coastal cities (mostly in Lima), where they dominate much of the political and commercial activity of the country.

Rural communities are relatively isolated geographically from GOP services, including agricultural technology transfer services. In fact, the most important determining characteristics of these communities is their isolation, which keeps them out of the mainstream of national events. The bulk of the rural population is divided into outlying dispersed settlements that often are disconnected from activities of their municipal centers, except through participation in weekly market days.

Forty-one percent of the population are members of households that depend for their livelihood on farming. It is predominantly a young population with over 42% in the age group 0 to 14 years. The average size of the household is 4.9 members with some variation among the three major regions of Peru. Of the rural population in the age group 15-64, including rural dwellers in occupations other than agriculture, almost 28% can neither read nor write. Average net farm household income is low, with significant variations in household income and source among the three regions.

There are significant regional differences in the socio-economic and cultural characteristics of farmers. Generally, the farmer on the Coast is more commercially oriented and makes greater use of science-based technology; the Sierra farmer has the lowest rate of both commercial participation and science-based agricultural technology use; and the Selva farmer falls in between. Farmers in different regions have different native languages, types of organizations and levels of "integration" into the urban Spanish-speaking nationally dominant social, political and cultural system.

However, in each community or locality the internal differentiation is significant. Every community or locality includes farmers with different farm sizes, different levels of technology use and more importantly, farmers using different production strategies. This local internal differentiation is, in turn, related to society-wide factors of social stratification.

Prior to the Agrarian Reform of 1967, farmers in Peru were clearly distinguished between the large landholding, Spanish-speaking, urban oriented "hacienda" owner belonging to the upper stratum of Peruvian society, and the small landholding, generally Aymara or Quechua-speaking, rural-dwelling campesino. The Agrarian Reform eliminated the large landholdings, and although relatively affluent landowners still are found in Peru and campesinos still are at the bottom of the social hierarchy, the entire stratification system is changing. The characterization of farmers into affluent landowner and campesino is no longer an easy one to make nor does it have the same significance as in pre-agrarian reform times.

The social status of the campesino also is changing. More attention is being paid to the campesino and campesino communities by the nation and the GOP. Since 1982, resources have been transferred to the rural areas (via credit, price supports, grants) at unprecedented rates. Increasing numbers of rural development projects can be found throughout campesino areas. These are sponsored by national and international development agencies, PVO's, and the GOP. Also, urban Peruvians are increasingly aware of where their food comes from. As the result of rural-to-urban migration of the last thirty years, most urban Peruvians are migrants from the rural areas and view rural life and campesinos differently than did the majority of urban dwellers of pre-migration times.

2. Socio-Cultural Context for Agricultural Technology Transformation

A major challenge of this Project is to disseminate agricultural technologies to a socially and culturally diverse and geographically dispersed target population of men and women farmers. The remainder of this analysis examines the socio-cultural context; potential for community participation; socio-cultural feasibility; beneficiaries and anticipated socio-cultural impact of the Project.

Agriculture is characterized in Peru by the smallness of its farm units. Of the approximately 1,600,000 farm units, 84% are smaller than 10 hectares and 71% are smaller than 5 hectares. Farm units of less than 10 hectares occupy 57% of the total land under cultivation.

Peruvian agriculture is also characterized by its low exposure to and lack of use of technical assistance. Given the low user rates of agricultural production technology, great potential exists for improving agricultural production practices, increasing productivity and efficiency and increasing farmer incomes through technology adoption. However the Project cannot succeed without significant farmer participation. Participation of men and women farmers, farmers associations and organizations and others involved with agricultural technology generation and transfer is an integral part of the Project.

Traditional conservatism of peasants and indigenous people often has been cited as an explanation for unsuccessful outreach programs in all sectors. These characterizations are not entirely wrong, but like many

generalizations and partial truths, they often are exaggerated. It would be more accurate to describe the Project's target groups as pragmatic and opportunistic, anxious to improve their lives. They are receptive to practices which serve that purpose once they are shown to be effective.

People in rural poor communities seldom are irrational and invariably will respond positively to real benefits. All too often, the services and goods that the poor are expected to accept are faulty, inappropriate or insufficient. To improve the rates of adoption of agricultural production technology, ATG&T institution must 1) understand the role of women farmers and respond to their needs; 2) make effective use of existing farmers organizations as vehicles for communication; 3) take into account social stratification in Peruvian society; and 4) understand the "status quo trap" as well as the keys to effecting change in the status quo.

a. Role of Women

The role of women in agricultural production is extensive and important in the majority of farm households in Peru, especially for noncommercial small farms. Women participate in all aspects of production decision-making, and in the production process itself from field preparation to harvesting, processing, and marketing. Women contribute almost all decision-making and labor to produce livestock in the majority of Sierra households. Despite the obvious fact that women's participation in agricultural production plays a major role, there has been a persistent bias in agricultural development programs that treat agricultural production and farm work as an exclusive male domain. This bias is reflected in: 1) under-enumeration of women's role and degree of participation in agricultural work in censuses and surveys of the sector; 2) design of programs of technical assistance and promotion directed to men only; and 3) design of women's programs that reflect the cultural bias of program designers and not women's needs and their importance in agricultural production and processiong decisions adopt technologies. Design of specific technology transformation activities in the ATT Project has taken into account regional variations in male/female roles in agricultural production. For example, the improved seed production, distribution and certification activity will initiate one pilot program in each of the three geographic regions in order to take into account regional differences as these are replicated. In addition, training of the members of the Technology Transfer specialist corps will give special emphasis to methods for targeting technology messages to different types of farmers, especially women, and to non-mainstream cultural groups.

b. Farmer Organizations

Faced with few and limited agricultural production services, farmers have opted for a variety of forms of collective action to try to help themselves. Farmer organizations are plentiful in Peru. However, linkages are weak between costs and the benefits farmers derive from membership in organizations. The lobbying organization is the most prevalent form of farmer organization. Its main function and role is to lobby government for

agricultural related services, resources, concessions and privileges, and also for rural development services, such as roads, health, and education. To be effective, lobbying organizations do not require active participation or support from most of its members. A small and active minority can speak for them and so long as some benefits (higher prices, more credit, price supports, and assured markets) reach most farmers, lobby organizations are tolerated and passively supported. However, the direct relationship between cost of membership and benefits is not apparent. In Peru, this type of organization has the potential of becoming service oriented by using its income to develop needed economic services.

Fewer in number than lobbying organizations, but found throughout Peru, are farmer organizations attempting to provide agriculture related services. Their main chacteristic is the provision of competitive services to their members, who join voluntarily and support the services in the measure that they benefit from them. In these organizations, there is a direct connection between costs and benefits of the services.

Both types of farmer organizations will be assisted by the Project to strengthen economic services and also to foster competition among farmer organizations, as well as between them and other private sector agri-businesses providing economic services. See description in Chapter III of Component 2, activity b, "Stimulation of private sector technology transfer enterprises").

c. Social Stratification

There are three major levels of personnel involved in technology transfer to farmers within the public sector extension service: the "Sectorista", who works at the local level directly with farmers; the "Agente", who supervises a given number of Sectoristas, and the "Commodity Specialist and/or Researcher" who works at the experiment station and backstops the Agente and Sectoristas.

The Sectorista normally is a regional university graduate, but without an "Ingeniero Agronomo" (Agronomy Engineer) title. He usually is distinguished from the Agente who is a titled Ingeniero Agronomo. The Sectorista often is of campesino origin or socially very close. In the Sierra, the Sectorista frequently is a native language speaker. Rural residency, close ties to the farmer, a mid-level education, and commitment to their work are some of the reasons offered for their generally good reputation. The Agente, as well as the Specialist and/or Researcher are predominantly of somewhat "higher" social origins than the Sectorista. The Specialist/Researcher often is of urban background, comes from a non-peasant family and has graduated from UNA.

The social and cultural stratification among Specialist/Researcher, Agente, Sectorista and farmers negatively impacts the effectiveness of technology transfer activities. The Researcher looks down on the Agente, who

in turn does the same to the Sectorista who often looks down on the farmer. Technology transfer through private sector organizations will tend to obviate this problem. Project activities designed to stimulate private sector participation include: Expanding Research Opportunities; Stimulating Private Sector Technology Transfer Enterprises; and Improving Seed Production, Distribution and Certification System.

d. "The Status Quo Trap"

Public sector professionals frequently accept without much resistance the frustration of working without adequate means, and explain away their lack of results and notable inefficiency by blaming inappropriate working conditions. Often, little initiative is exhibited in seeking innovative ways to accomplish their jobs. There is little career advancement based on performance and accomplishments. This tends to be exacerbated by bureaucratic centralization, which is a major contributor to problems associated with accelerating the process of technological change. Little room for initiative and innovation reinforces the professional tendency to consider permanent employment as the ultimate personal objective, instead of the objective of improving economic performance and output of the agricultural sector.

The ATT Project addresses this issue by creating incentives to improve public sector professional performance through provision of training and research opportunities to enhance professional status, and by catalyzing private sector professional ATG&T opportunities as an alternative to public service.

4. Project Beneficiaries and Impact

Six distinct population groups will benefit from the impacts of the Project:

a. Men and women farmers who learn about and are influenced and assisted to adopt technology changes through the ATG&T system will benefit from increased profits and capital formation.

b. Families whose livelihood depends on employment in agricultural production, processing and marketing (PPM) activities will benefit from increased employment opportunities generated by increased production factor use as well as by the resulting increased volume and production to be harvested, transported, processed and marketed.

c. Rural non-farm families will benefit from increased demand generated by improved disposable incomes of farm families, which in turn increases incomes of local businesses and employment opportunities for service personnel.

d. A wide range of professional and technical staff and students in the ATG&T system will benefit from the institution building aspect of the Project through provision of training, equipment, and operating funds, thereby enhancing professional capacities, opportunities, incomes, and professional status, and subsequent increased job satisfaction.

e. Finally, improved production factor use efficiency, reduced unit costs of production and reduced production risks resulting from adoption of improved technologies will increase the supply of better quality, lower-cost foodstuffs in the urban marketplace, thereby benefitting urban consumers. Lower income consumers will benefit more from these lower food costs since they spend a larger proportion of their total income on food than do higher income consumers.

f. The status of women farmers and other women involved in the agricultural PPM systems will be improved through their direct participation in the Project.

Spread effects from the output of the Project are enormous. A less expensive, more abundant supply of higher quality foodstuffs will help reduce malnutrition and lower the incidence of diseases that are more easily spread and have more serious consequences among a malnourished population. In this way, the Project will contribute to improved health status of Peru, thereby alleviating a major development impediment.

5. Summary

In the judgment of the Project Development Committee, the Project is socially sound. The design of each Activity of the Project has taken place in close collaboration with counterparts and takes into account perceived needs on their part. The Project is compatible with their interests and GOP policy. In addition, project design had the benefit of extensive information on farmer characteristics, interests and felt needs from the 1984 National Rural Household Survey, as well as an in-depth casestudy socio-economic survey carried out in the three geographic regions of Peru in June, 1987. Likewise results of mass communications research activities under the REE Project and their implementation by INIAA have also been considered in the Project design. Benefits of the Project can reasonably be expected to impact not only on immediate beneficiaries, but also to catalyze a dynamic spread effect and to continue well beyond the end of the Project.

Annex II, Exhibit I provides a more detailed description of socio-cultural characteristics of the target population and their impact on the design of ATG&T activities.

E. Summary Economic Analysis 1/

Economic analysis for this Project focussed on two types of economic feasibility issues: 1) rates of return, factor use multipliers and issues of sustainability relating to public agricultural research and extension, including rates of return for investments in agricultural education; and 2) estimates on probable increases in adoption rates and consequent changes in magnitudes and relationships of yields, costs and benefits as the result of the Project, from both the perspective of benefits to the individual producer and internal social rates of return.

1. Returns to Agricultural Research, Extension and Education

a. Sources of Output Growth

The science-based agricultural growth strategy being pursued by the GOP since 1981 has produced three major types of technical change: varietal improvements, agronomic/cultural practises technology improvements and physical/mechanical improvements (i.e., improvements in the productivity potential of the permanent land and water resource base). The focus has been and continues to be on adaptive research and has concentrated on basic foods (rice, corn, potatoes, beans, oilseeds and cereals), selected Selva and Sierra crops, and (beginning in 1987) a national livestock program.

The average annual change in total agricultural output was 3.5% from 1980 to 1986. Excluding 1983, a year of wide-spread climatic disasters, the average rate of change in gross value of output at constant 1979 prices for the 1980-86 period exceeded 6% per year. The annual change in crops (3.46%) was about equal to the annual change in livestock and poultry (3.6%) for the period. Over 70% of the gross value of output comes from crop production.

Increased value of output has resulted from increased planted areas, more intensive use of cultivated land (e.g., more crops per year), increased use of non-land inputs resulting in increased per hectare yields and reduced post-harvest losses. Preliminary estimates by INIPA of the percentage of increased value product explained by each of the above factors suggests a 50-30-20% distribution for 1) increased amount and use intensity of land in production, 2) productivity increases of major crops, and 3) post-harvest loss reductions.

A comparison of actual and potential yields (yields on farmer demonstration fields) shows potential productivity gains from adoption of improved technologies to be in the range of 46% to 167%. A 1985 study by Victor Palma (see Bibliography) shows the limited potentials for continuing a natural-resource based growth strategy in Peru, both in terms of

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1/ The Detailed Economic Analysis is provided in Annex II, Exhibit J.

cost-effectiveness and availability of land and irrigation water for cultivated area expansion. This study concludes that future agricultural growth must come primarily from productivity/technological change.

b. Internal Rates of Return to Research and Extension

Many studies of a wide number of commodities in developed and developing countries, including Peru, report annual internal social rates of return ranging from 20% to more than 100% for public sector investments in agricultural research and extension. One impact of this work has been to highlight the magnitude of under-investment in the agricultural research and transfer process in most developing countries and in many developed countries. Estimates from 17 studies completed in Latin America report internal social rates of return that range from 11% to more than 100%. Two studies completed in Peru report annual internal social rates of return (IRR) from 23% to 42% for public sector investment in ATG&T.

In the 1985 Peru study by Ganoza and Norton (see Bibliography), the percent of cultivated land using new technology was forecast to exceed 50% by 1990 for rice and corn, and to approach 25% for cereals as compared to actual levels of 25% and less than 10%, respectively. This increase in technology adoption is expected to be even greater with the assistance of the ATT Project, because of private sector contributions to the ATG&T process. The same study projected changes in yields per hectare with new technology as compared to traditional technology for the period 1983-1990 that ranged from 23% for beans to 86% for potatoes, with 24% and 53% for rice and corn, respectively. Combined effects of increased yields and cultivated areas using new technologies resulted in estimated annual IRR on INIPA investments that range from 23% for corn to 42% for potatoes with an aggregate for five major basic food crops (beans, corn, potatoes, rice and cereals) of 33%.

c. Factor Use Multipliers from Technology Adoption

The Ganoza/Norton study estimates that a 10% increase in yields results in an average increase of 14% in rural labor use for yellow corn, rice and potatoes (with slightly decreased labor required for beans and white corn); increases of 10-12% in machinery use; decreases in the use of animal power; and very substantial increases in the use of fertilizer and chemicals (200 to 500%) as compared with traditional production systems. Other studies in Peru (Walters, 1986) report similar increases in labor and credit use for rice and corn producers using new technologies. Pomareda (1986) estimates an 8.6% increase in aggregate input use (3.6% in rural resource use, 17.1% in use of industrial products and 8.6% in credit) for every 10% increase in the area using new technologies.

d. Sustainability

The GOP can be expected to continue to provide resources needed to support the public sector ATG&T system at adequate levels after outside

donor support ends. Since 1984, approximately 70% of public ATG&T program expenditures have come from the public treasury. The ATG&T system has the potential to achieve internal efficiencies and adjust to unpredictable substantive changes. This, when combined with demonstrated results in the field in terms of productivity changes and output increases will be forceful grounds for continued adequate levels of GOP support. Sustainability will require substantial progress in resolving problems related to recruiting and retaining key professionals. Expanded participation by the private sector in the ATG&T system in partnership with INIPA and UNA not only will increase the range of mechanisms and coverage for accelerating technology change but also will marshall the forces and interests necessary to induce continued financial support for public sector ATG&T institutions, as well as to encourage flexibility in resource use to attract and retain high-quality professionals.

e. Returns to Agricultural Education

Recognition that human capital is a major factor in agricultural development was first analytically demonstrated by T.W. Schultz in 1963, who received the Noble Prize in economics for this work. His leadership has led to an array of studies related to investment in human capital formation. These studies quite consistently report high IRR for primary and secondary educational investments, as well as for university educational investments. Schultz reported 35%, 10% and 11% annual IRR for junior high, high school and universities. These same trends have been reported in other studies in Colombia, Mexico, Venezuela, Chile and Brazil.

The findings of a major study on returns to investment in human resources of EMBRAPA (Brazilian agricultural research and extension institution) in Brazil are appropriate to the conditions prevailing in Peru. EMBRAPA moved vigorously to provide advanced training from 1974 through 1983 with an average of 170 students per year studying abroad for Agricultural Science related PhD's (50%), M.S.'s (41%) and non-degree training (9%). The study found high annual IRR on this large and continuing investment, reporting a mean annual IRR of 22.4%, with sensitivity analyses resulting in upper limits of 28 to 30% per year.

The graduate program at UNA averages more than 300 students per year. INIPA enrolled 90 M.S. students in UNA during the period 1983-1986, and has programmed 80 M.S. students for the period 1987 to 1992. More than 40 regional university professors and 10 ministerial employees per year currently are studying for M.S. degrees at UNA. These numbers indicate implicit recognition not only by the GOP but also by ATG&T institutions and individual professionals of the increased rates of returns (Both socially and individually) from investments in graduate education.

2. Cost-Effectiveness and Benefit-Cost Analysis

a. Cost-Effectiveness

Where ATG&T activities generate sufficient economic surpluses to both the supplier and the adopter of technologies (i.e., surplus at levels that are competitive with returns in other economic pursuits), the private sector alternative for transferring technology almost always is more cost-effective than is the public sector alternative. Generally, private sector ATG&T activities focus on small to medium sized market-oriented farms for both generation and transfer initiatives. Technology generation activities appear to be feasible in the private sector primarily where an appropriate technology is available from other sources (often from other countries, such as California technology for horticultural crop production on the Peruvian coast) and requires only limited verification testing on-site in Peru. Most often this is the case for high-value crops adapted to coastal agriculture, such as tree crops (nuts and fruits), horticultural and ornamental crops, and specialty crops such as spices and coloring agents.

In the case of technology transfer, private sector alternatives are cost-effective and can be expected to become self sustaining and profitable in the short to medium term for a wide range of crops and livestock enterprises. A competitive environment, regardless of whether public and/or private sector enterprises are involved, will result in dominance by the most cost-effective alternative, especially where embodied technologies are involved in the transfer process. To promote cost-effective options among all alternatives, the Project has been designed to encourage competiton in the use of Project resources, thereby catalyzing transfer enterprise efficiency and resulting in cost-effectiveness. Five Project activities are designed specifically to promote competitiveness in technology generation and transfer:

a. Expanding research opportunities through competitive and matching research grants;
b. Stimulating private sector technology transfer enterprises;
c. Stimulating improved seed production, distribution and certification;
d. Improving availability and access to agricultural research: extension and teaching information materials; and
e. Competitive fellowships and post-graduate academic participant training.

As dicussed in the first section of this Economic Analysis, IRR to public sector ATG&T are quite high for small farm oriented activities. The most cost-effective use of external resources for stimulating public sector ATG&T activities generally is to use those resources to trigger a higher level and intensity of use of installed capacity and existing public sector resources dedicated to that purpose. In Peru, this leads to the obvious conclusion that external assistance for public sector ATG&T activities should

assist INIPA and agricultural universities. The Project also relies on competition for Project resources among public sector ATG&T institutions as a means of encouraging cost-effectiveness.

b. Benefit-Cost 1/

Nine crops were analyzed (some for different regions): rice (Coast and Selva), barley, pulses (Coast and Sierra), broad beans, yellow corn (Coast and Selva), white corn, potatoes, soybeans and wheat. Thus, twelve different crop situations were analyzed. Cost budgets were selected from INIPA and ONA data. Rates of adoption and rates of yield change co-efficients were selected by adjusting co-efficients used in the Ganoza/Norton study (1986) to account for additional impacts expected from increased private sector participation achieved in the ATG&T process as the result of the Project.

i. Producer Benefits

Producer benefits appear to be quite attractive for the crops analyzed. The producer costs and returns analysis showed average technology adoption income increases that ranged from 1.15 times added costs for soybeans to 14.00 times added costs for quinua. Other ratios were: rice (2.09 and 1.88); barley (1.42); beans (4.00); broad beans (1.62); yellow corn (4.53 and 4.63); and white corn (1.54), and wheat (13.25). All of these ratios, except possibly for white corn, broad beans and soybeans, are acceptable benefit/cost ratios under production conditions in Peru.

Producer acceptance of benefits in relation to costs (i.e., willingness to adopt a given technology) depends on the risk averseness of the particular farmer adopter. As a rule of thumb (with other things being equal, such as availability of improved seed or credit), Peruvian Sierra producers of potatoes, barley or wheat likely will adopt a new technology if they feel relatively certain that they can obtain a return of two to three Intis for each additional Inti they must spend for production, while the Coastal rice farmer can be expected to adopt if he is satisfied that he can obtain a return of 1.5 to two intis for each additional inti invested.

In conclusion, the analysis shows that producer profits resulting from adoption of technology made available as the result of the Project is sufficient to encourage farmer adoption of improved technologies for all crops analyzed except for soybeans (white corn and broad beans also are marginal), given availability of required technological information and embodied technologies (i.e., the improved seed or other required input), and the resources needed (e.g., credit) to pay added cash production costs.

1/ Detailed analytical tables for the benefit-cost analysis are shown in Annex II, Exhibit J.

ii. Social Benefits

The social returns analysis assumes a ten year stream of benefits from the Project. Returns were discounted at 8% per year and were calculated in constant 1979 U.S. Dollars. Project costs were valued in average 1986 U.S. Dollars. The resulting internal rate of return to the Project investment was 47%, with a benefit/cost ratio of 3.8, a quite acceptable level of benefits to costs. A sensitivity analysis that increased benefits by 20% provided a 4.6 ratio, while a 20% decrease in benefits resulted in a 3.7 ratio. Thus, the analysis does not appear to be highly sensitive to overestimation errors in either rates of adoption or rates of yield changes.

On the basis of both individual and social benefits, the Project is highly desirable in terms of returns to both individual and Project investments. It should be kept in mind that this analysis likely underestimates benefits because added returns to all crop and livestock enterprises to be impacted by the Project were not included nor were secondary and tertiary multiplier effects.

F. Summary Environmental Analysis

1. Identification and Evaluation of Environmental Impacts

Project activities involve research, technology transfer and other financial and technical assistance for institution-building purposes. These inputs ultimately will enhance the country's capability to utilize its resources in environmentally sound ways through the introduction of improved agricultural technologies. These activities have no appreciable direct environmental impact, and 22 CFR 216.2 (c)(2)(i) provides a "categorial exclusion" that excludes them from the need for further environmental review. It does not, however, exclude aspects of these activities that may directly affect the environment, such as facility construction. Construction under this Project will be limited in scope and located in previously developed areas and, therefore, will have negligible environmental impacts.

The Integrated Pest Management (IPM) Activity should lead to a reduction in the overall volume of pesticide use, decrease impacts on non-target populations, and result in fewer residuals found in run-off and ground water. IPM Activities also will include training to teach proper storage and application of pesticides and to warn farmers of the hazards of improper use. For the IPM Activity, small quantities of pesticides may be procured for laboratory research. This is permissible under the "Exceptions to Pesticide Procedures" without additional environmental review in accord with 22 CFR 216.3 (b)(2)(iii). The Project will adhere to the restrictions in that Section.

Pesticide procurement through this Project for purposes other than research and evaluation is not contemplated. The on-farm water management activity will have the positive environmental effect of promoting better irrigation practices. New irrigation systems will not be built under this Project; rather, improved water use practices will be promoted. This should result in more efficient water use, better control of water in gravity-fed systems and reduced erosion.

The Project will have a general environmental impact as farmers put into practice technology packages that are generated through research activities. INIPA has experiment stations in different ecological zones and seeks to develop packages appropriate to each zone. Improved technology packages should assist in promoting agricultural practices that are consistent with land capability. Technology transfer activities will encourage agricultural practices that maintain the environmental integrity of the site where they are used, supporting an objective of permanently sustainable agricultural production. For example, soil conservation activities will be advanced through the Project to reduce soil loss and improve soil productivity. Promoting agricultural practices that are consistent with land capability is important since production losses will result from site degradation. Also, private sector technology transfer activities will be

encouraged to promote agricultural technologies that are appropriate to the areas where they are to be used.

2. Environmental Impacts

The Project Development Committee considered the environmental impact of the Project based on a completed Initial Environmental Examination (IEE). The Committee has recommended a negative determination in which the USAID/Peru Mission Director and the LAC Chief Enrivonmental Officer have concurred.

VI. CONDITION PRECEDENT, COVENANTS, AND NEGOTIATING STATUS

A. Conditions Precedent and Disbursements

Upon designation of official representatives, Project Grant funds will be available for financing all short and long-term expatriate technical assistance and national advisors to be acquired under personal services or institutional contracts, for contracting project administration, management and logistic support personnel, and to cover other expenses related to pre-implementation activities. The most important of these pre-implementation activities will be development of administrative systems and procedures for implementation of Project activities, and development of RFTP's under which TA will be acquired.

1988 detailed annual implementation plans and budgets will be required for each Project Activity prior to disbursement of funds for that Activity during CY 1988. Thereafter, detailed life-of-project implementation plans and budgets for each Project Activity, as well as annual detailed implementation plans and budgets for each Project Activity will be required for disbursement for that Activity and that year. Procurement plans and specifications for each Project Activity will be developed by the respective implementing institution and technical assistance team prior to disbursement for commodities procurement. An illustrative commodities procurement list with estimated costs is included as Annex II, Exhibit C.

There is a concensus by the Board of Directors of FUNSIPA (INIPA, ONA and the International Potato Center-CIP) that its purposes and objectives, and the make-up of its governing body, should be broadened to better represent the interests and scope of the wide range of institutions, organizations and private firms that make up the public and private ATG&C system. A study has been contracted to determine the preferred manner to accomplish this change in role and representational scope of FUNSIPA. Although that study may not be completed (nor the changes completed) until after the ATT Project Agreement has been signed, the project Development Committee feels that it is not necessary to make these organizational changes a condition precedent prior to disbursement for implementation of project activities to be managed by FUNSIPA. However, except for costs of external technical assistance and of contracting for national advisors, and project support personnel, as well as costs directly related to developing Project and Activity administration and management procedures and to preparation of CY 1988 detailed annual implementation plans and budgets, FUNSIPA must provide a time-phased implementation plan and schedule, including candidate selection and operating procedures for post-graduate degree training, prior to disbursement for that Activity.

B. Covenants

The following covenants will be required of the cooperating country:

1. It will submit a report at least semi-annually (march 1 and September 1) regarding the actions implemented as a result of the activities financed under this Project.

2. It will provide sufficient annual budget allocations following completion of A.I.D. financing to ensure continuity and sustained levels of public ATG&T institutions' output, including resources for adequate maintenance and necessary replacement of physical facilities and equipment being utilized by the ATG&T system that are under the control of public sector ATG&T institutions, and,

3. It will establish by the beginning of CY 1989 for public sector ATG&T institutions, and more specifically for INIAA, UNA, and agricultural faculties in regional universities, pay and incentive systems to permit these institutions to compete favorably with peruvian private sector business firms, and other research and consulting organizations, in hiring and retaining professional technical/managerial personnel specialized in agricultural technology generation, technology transfer and university-level agricultural education.

C. Negotiating Status

Project design has been carried out in close collaboration with executive and technical management personnel of INIPA, UNA and ONA. Working groups and a group coordinator were designated by each of these institutions to develop the Project proposal in collaboration with PD&S funded consultants, and with consultants contracted by INIPA with AID grant funds provided for that purpose. Working groups began design activities in December, 1986. Early on in Project design, meetings were held by the Mission Director with the Minister of Agriculture to discuss the Project in general terms. Subsequent meetings were also held by the Chief of OARD with the vice-minister and other high level GOP agricultural public sector officials and private sector leaders. INIPA executive personnel kept the Minister and Vice-Minister of Agriculture informed during Project development. As Project design reached its final stages in July, 1987, the Chief of OARD met with appropriate INP personnel. In early August, the chief executives and managers of the implementing institutions met together to coordinate and reach mutual agreement on Project details, and also met with appropriate National Planning Institute (INP) officials. The Project had been discussed informally by the implementing institutions with relevant officials in the INP, the Ministry of Economy and Finance and the Ministry of Foreign Relations prior to mid-August, 1987. A formal proposal was submitted by the implementing institutions to the Minister of Agriculture the second week of August, 1987, and by the Ministry of Agriculture to the INP on August 17, 1987. As a result of earlier informal meetings, no significant unresolved issues appear to exist between the implementing institutions and the INP. INP formally has initiated coordination with the Ministry of Economics and Finance (MEF) and with Relaciones Exteriores (RREE). No difficulties are anticipated. PL 480 negotiations between the USG and the GOP in July, 1987 included discussions of local currency funding needs for this project.

PROJECT AUTHORIZATION

Name of Country: Peru
Name of Project: Agricultural Technology Transformation
Number of Project: 527-0282

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Agricultural Technology Transformation Project ("Project") for Peru involving planned obligations of not to exceed Twenty-Five Million United States Dollars ($25,000,000) in Grant funds ("Grant") over a six (6) year period from date of authorization, subject to the availability of funds in accordance with the A.I.D OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Project is seventy-two months from the date of initial obligation.

2. The Project consists of assistance to selected public and private sector entities involved in agricultural technology generation and transfer (ATG&T) and in agricultural education, to expand the scope and improve the quality and relevance of agricultural technology being generated for Peruvian agriculture and of technology transfer services being provided to Peruvian farmers.

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

a. Source and Origin of Commodities, Nationality of Services

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

b. Conditions Precedent to Disbursement

(1) Prior to the first disbursement under the Grant, or the issuance by A.I.D. of documentation pursuant to which disbursement will be made, 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 an official Project Representative has been designated.

(2) Prior to the first disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for each of the nine Project Activities (or where Activities are being implemented by more than one institution, Sub-Activities) in the calendar years (CY) below, other than for procurement of off-shore commodities, expatriate technical assistance, national advisors, project support staff and logistical support thereof, the institution responsible for implementing that Activity/Sub-Activity 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., the following:

(a) CY 1988 -- A detailed implementation plan and budget to be executed for that Activity/Sub-Activity during CY 1988, and evidence that an official representative has been designated for that institution for purposes of its relations with A.I.D. and with other institutions participating in the Project;

(b) CY 1989 -- Implementation plans and budgets for the life of the Project by year which describe the Project Activity/Sub-Activity to be carried out and financed, and which details the specific actions to be carried out and financed in CY 1989;

(c) CY 1990 and each CY thereafter -- Annual implementation plans and budgets which detail Project actions under each Activity/Sub-Activity to be carried out and financed in that calendar year.

(3) Prior to the first disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for commodities under a specific Activity/Sub-Activity, the institution responsible for implementing that Activity/Sub-Activity shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D., a procurement list and specifications, a plan for use, repair and maintenance of such commodities during their useful life, and in the case of vehicles a specific plan for monitoring their use.

(4) Prior to the first disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for post-graduate training, FUNSIPA 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 time-phased post-graduate training implementation plan, including operating and candidate selection procedures, for the life of the Project.

c. Covenants

The cooperating country shall covenant that it will:

(1) Submit a report not later than March 1 and September 1, or such other dates as A.I.D. may agree in writing, of each year during the life of Project regarding the actions implemented and progress as a result of the Activities financed under this Project.

(2) Provide sufficient annual budget allocations following completion of A.I.D. financing to ensure continuity and sustained levels of ATG&T system output, including resources for adequate maintenance and necessary replacement of physical facilities and equipment being utilized by the ATG&T system and that are under the control of public sector ATG&T institutions.

(3) By the end of CY 1988, take measures to establish pay and incentive systems for the major public sector ATG&T institutions' professional technical/managerial personnel specialized in agricultural technology generation and transfer and university level education that will permit these institutions to attract and retain qualified professionals.

Mission Director

3 Aug 87
Date

Clearances:
OARD:ERupprecht
CD:BDoe

PROG:WRhoads
CONT:KRomwall
DD:RBonnaffon
Drafted by:RLA:ANewron

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SUBJECT: AGRICULTURE TECHNOLOGY TRANSFORMATION PROJECT (527-0282)

1. THE DAEC REVIEWED THE SUBJECT PID ON NOVEMBER 7, 1986. THE PROJECT IS APPROVED FOR FURTHER DEVELOPMENT SUBJECT TO THE FOLLOWING GUIDANCE; THE MISSION DIRECTOR MAY APPROVE THE PP AND AUTHORIZE THE PROJECT. PROJECT WILL BE GRANT FUNDED WITH THE CAVEAT BELOW REGARDING PRIVATE SECTOR ACTIVITIES.

2. SECTOR STRATEGY. USAID/PERU'S FY 87 OYB OF DOLLARS 4.85 MILLION RESULTS FROM THE AGENCY'S CONTINUING SHORTFALL OF ARDN FUNDS. BECAUSE THESE LOW ARDN LEVELS ARE LIKELY TO PERSIST FOR THE NEXT SEVERAL YEARS, IT IS VERY DOUBTFUL THAT THE MISSION CAN ACCOMMODATE BOTH THE AGRICULTURAL TECHNOLOGY TRANSFER (ATT) PROJECT AT DOLLARS 30 MILLION AND OTHER KEY ELEMENTS OF THE MISSION'S AGRICULTURAL SECTOR STRATEGY.

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TO ACCOMMODATE THE PROJECT WITHIN CURRENT STRATEGY AND APPROVED ACTION PLAN, MISSION SHOULD PLAN ON A LOP CONTRIBUTION FOR A FIVE YEAR PROJECT LIMITED TO DOLS 15 MILLION. IN THIS CASE, MISSION SHOULD REASSESS

PROJECT'S PLACE IN THE MISSION'S AGRICULTURAL STRATEGY PRIOR TO CONTINUING WITH PP DEVELOPMENT IN ORDER TO DETERMINE HOW BEST IT CAN SUPPORT THE RESEARCH, EDUCATION AND EXTENSION (REE) SYSTEM WITHIN ANTICIPATED BUDGET LEVELS. THIS REASSESSMENT SHOULD TAKE INTO ACCOUNT A.I.D.'S AND OTHER DONORS' ROLES AND COMPARATIVE ADVANTAGES, LIKELY FUNDING LEVELS IN THE SECTOR OVER THE NEXT FIVE YEARS, INCLUDING GOP AND OTHER PERUVIAN INVESTMENTS AS WELL AS OTHER DONOR CONTRIBUTIONS, SECTOR PRIORITIES, AND PRIORITIES WITHIN THE REE SYSTEM. IT IS IMPORTANT THAT THIS CONFORM WITH THE SECTOR STRATEGY AND TARGETS ARTICULATED IN THE FY 88-89 ACTION PLAN WHICH WILL BE DISCUSSED DURING THE ACTION PLAN REVIEW IN MARCH.

ALTERNATIVELY, IF MISSION DETERMINES THAT A.I.D.'S ASSISTANCE LEVEL SHOULD BE MAINTAINED AT OR NEAR THE DOLS. 30 MILLION LOP LEVEL, THEN ANTICIPATED NEW STARTS,

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SUCH AS THE FY 88 AG. MARKETING AND AGRIBUSINESS DEVELOPMENT PROJECT, AND POSSIBLE AMENDMENTS TO THE APID AND CENTRAL SELVA PROJECTS IN ALL LIKELIHOOD WILL HAVE TO BE DEFERRED. THIS WOULD REPRESENT A MAJOR SHIFT IN THE MISSION'S SECTOR STRATEGY. ANOTHER OPTION WOULD BE FOR MISSION TO MODIFY THE COMPOSITION OF ITS OYB IN FUTURE YEARS TO PROVIDE A HIGHER FUNDING LEVEL IN THE ARDN ACCOUNT. HOWEVER, GIVEN CURRENT AGENCY FUNDING CONSTRAINTS, IT IS NOT LIKELY THAT SUFFICIENT INCREASES IN YOUR ARDN OYB CAN BE EXPECTED THROUGH 1991 WITHOUT CONCOMITANT DECREASES IN OTHER DA ACCOUNTS. THESE COURSES OF ACTION WOULD IMPLY SHIFTS IN SECTOR OR COUNTRY STRATEGIES WHICH WOULD HAVE TO BE DISCUSSED WITH AID/W IN THE ACTION PLAN, OR IF MISSION WISHES TO PROCEED EARLIER, BY CABLE.

3. POLICY ENVIRONMENT. CONCERN WAS EXPRESSED BY THE DAEC REGARDING TWO AREAS OF POLICY AFFECTING THE SUCCESS OF THE PROJECT, MACROECONOMIC AND SECTORAL POLICIES AND THOSE AFFECTING INSTITUTIONAL DEVELOPMENT. PROGRESS IN THE FORMER AREA UNDER THE AGRICULTURAL PLANNING AND INSTITUTIONAL DEVELOPMENT (APID) PROJECT AND THROUGH POLICY DIALOGUE WITH THE GOP WAS ACKNOWLEDGED AT THE DAEC, BUT BOTH AID/W AND THE MISSION RECOGNIZE THAT THERE IS NEED FOR FURTHER IMPROVEMENT. GIVEN THE LONGTERM COMMITMENT REQUIRED FOR INSTITUTIONAL DEVELOPMENT OF THE REE SYSTEM AND THE FAVORABLE DIRECTION OF THE CURRENT POLICY DIALOGUE, HOWEVER, PRESENT MACROECONOMIC AND FOOD PRICING POLICIES WERE NOT DEEMED SUFFICIENTLY SERIOUS IMPEDIMENTS TO PRECLUDE PROJECT INITIATION. A THOROUGH POLICY DIALOGUE AGENDA AND ITS RELATIONSHIP TO THE PROJECT SHOULD BE INCLUDED

IN THE PP.

POLICIES RELATING TO STAFFING PATTERNS, SALARIES, PROMOTIONS, INSERVICE TRAINING, RESOURCE ALLOCATION FOR AGRICULTURAL RESEARCH, EXTENSION, AND EDUCATION WITHIN THE COUNTERPART ORGANIZATIONS WERE VIEWED BY THE DAEC AS CRITICAL TO THE SUCCESS OF THE PROJECT AND TO THE SUSTAINABILITY OF PROJECT ACTIVITIES BY PERUVIAN INSTITUTIONS. THE MISSION SHOULD ANALYZE THESE POLICIES BY INSTITUTION IN THE PP, ESPECIALLY AS THEY RELATE TO SUSTAINABILITY, AND INCLUDE IN THE PROJECT AGREEMENT APPROPRIATE CONDITIONS PRECEDENT AND COVENANTS WHICH ARE NECESSARY TO ASSURE GOP COMMITMENT TO AN ON-GOING REE SYSTEM.

4. PROJECT SCOPE AND FOCUS. CONCERN WAS EXPRESSED DURING THE PROJECT REVIEW THAT THE PID DID NOT CLEARLY ELUCIDATE WHAT THE OUTPUTS OF THE PROJECT WILL BE, TO WHOM THE BENEFITS WOULD ACCRUE, OR WHAT ALTERNATIVE

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PROJECT ACTIVITIES AND DESIGNS WERE CONSIDERED. NOR WAS IT CLEAR WHAT CRITERIA THE MISSION USED TO DEVELOP THE MIX OF RESEARCH, EXTENSION AND TRAINING FOR THE PROJECT. THE ECONOMIC AND OTHER CRITERIA USED TO SELECT ALTERNATIVES SHOULD BE MADE EXPLICIT IN THE PP AND THE ESSENTIAL MINIMUM ACTIVITIES SELECTED TO FORM THE CORE OF THE PROJECT BE CLEARLY IDENTIFIED. THE SELECTION OF ACTIVITIES SHOULD BE MADE WITHIN THE FRAMEWORK OF THE TOTAL EFFORT IN THE REE SYSTEM, INCLUDING THOSE OF OTHER DONORS AND INDEPENDENT GOP INITIATIVES.

THE PROJECT LOGICAL FRAMEWORK NEEDS REVISION IN LIGHT OF THE ABOVE. THE EOPS PARTICULARLY WILL NEED TO BE MORE RESULTS-ORIENTED RELATIVE TO THE INSTITUTIONS AND BENEFICIARY GROUPS AND TO THE SECTOR AS A WHOLE. THE PROJECT EVALUATION PLAN SHOULD INCLUDE MORE FREQUENT EVALUATIONS AND A MONITORING SYSTEM TO DETERMINE IF THE PROJECT IS MEETING ITS INSTITUTIONAL AND SECTORAL TARGETS. ADEQUATE BASELINE DATA SHOULD BE PROVIDED TO SUPPORT THE EVALUATION AND MONITORING PLAN.

5. ECONOMIC ANALYSIS. AS INDICATED ABOVE, IT IS IMPORTANT FOR THE MISSION TO EXAMINE IN SOME DETAIL PROJECT DESIGN ALTERNATIVES AND THEIR IMPLICATIONS FOR MAXIMIZING THE NET PRESENT VALUE OF THE ULTIMATE INCREASE IN NET FARM INCOME WHICH WILL RESULT FROM THE INCREMENTAL INVESTMENT IN IMPROVED RESEARCH AND EXTENSION. THIS IS BOTH A COST-BENEFIT AND A COST EFFECTIVENESS ISSUE.

DETAILED ESTIMATES OF THE RATES OF RETURN TO VARIOUS FORMS OF RESEARCH AND EXTENSION HAVE ALREADY BEEN DEVELOPED IN A STUDY BY NORTON AND GANOZA UNDER THE NORTH CAROLINA STATE CONTRACT. WHILE THIS STUDY IS CROP ORIENTED, AND THUS WILL NOT PROVIDE ALL THE INFORMATION NEEDED, PARTICULARLY FOR RESEARCH AND EXTENSION ACTIVITIES IN A MULTICROP ENVIRONMENT, IT SHOULD PROVIDE A GOOD STARTING POINT. A COMBINATION OF THESE ESTIMATES, OTHER ESTIMATES FOR LIVESTOCK AND OTHER CROPS, TOGETHER WITH EASILY OBTAINED DATA ON CROP DISTRIBUTION AND OTHER FARM CHARACTERISTICS SHOULD PROVIDE A GOOD BASIS FOR ESTIMATING NET FARM INCOME GAINS TO BE ASSOCIATED WITH ALTERNATIVE DESIGN FOCI. CLEARLY THERE ARE LIMITS TO HOW FAR TO CARRY THIS ANALYSIS, BOTH BECAUSE OF THE COSTS OF FURTHER ANALYSIS, AND BECAUSE IN SOME CASES THE BENEFITS WILL BE DIFFICULT TO ESTIMATE. HOWEVER, BECAUSE OF THE LONG-TERM NATURE OF THESE ACTIVITIES AND THE HIGH RISKS ASSOCIATED WITH THE EFFORTS, IT IS IMPORTANT THAT MAJOR PROJECT DESIGN DECISIONS BE MADE WITHIN A COST-BENEFIT, COST-EFFECTIVENESS FRAMEWORK.

CLOSELY RELATED TO THIS IS THE QUESTION RAISED IN THE PID REVIEW OF POSSIBLE GROWTH/EQUITY TRADE OFFS IN THE PROJECT DESIGN COMBINING INFORMATION ON CROP DISTRIBUTION AMONG VARIOUS CATEGORIES OF FARMERS AND

TAKING INTO ACCOUNT SPECIFIC EXTENSION PROBLEMS ASSOCIATED WITH VERY POOR FARMERS (LANGUAGE BARRIERS OR GENDER ISSUES, FOR EXAMPLE) THE PROJECT ECONOMIST SHOULD BE ABLE TO ARRIVE AT AN ESTIMATE OF THE COSTS OF A MORE EQUITYORIENTED PROJECT DESIGN. (NOTE THAT WE ARE NOT SAYING THAT THE PROJECT NECESSARILY MUST HAVE A FOCUS ON VERY POOR FARMERS, MERELY THAT THE DECISION TO ADOPT SUCH A FOCUS OR NOT SHOULD BE BASED ON A CAREFUL EVALUATION OF THE COSTS AND BENEFITS OF THE ALTERNATIVES.)

DESIGN QUESTIONS RELATED TO A LONG-TERM VERSUS A SHORT-TERM ORIENTATION, ALSO DISCUSSED IN THE PID REVIEW, ARE MORE SUBTLE. IMPLICITLY, THE PROJECT APPROACH OUTLINED IN THE PID IS ORIENTED TO THE RATHER LONG TERM. IN TAKING THIS APPROACH, THE MISSION IMPLIES THAT THE ULTIMATE BENEFITS, IN TERMS OF GAINS IN NET FARM INCOME, WILL BE SUFFICIENTLY GREAT TO OFFSET THE VERY SUBSTANTIAL DISCOUNT TO WHICH BENEFITS 10 OR 15 YEARS IN THE FUTURE MUST BE SUBJECTED. THE POINT IS NOT WHETHER SUCH A LONGTERM APPROACH YIELDS GREATER ULTIMATE INCOME GAINS, RATHER WHETHER THERE ARE DESIGN ALTERNATIVES WHICH WILL YIELD BENEFITS SOONER, EVEN AT

SOME REDUCTION IN THE GAINS IN NET FARM INCOME TO BE ACHIEVED. IF IT IS NOT POSSIBLE TO SPECIFY AN ALTERNATIVE PROJECT DESIGN TO ADDRESS THESE CONCERNS, THE MISSION SHOULD EXAMINE THE POSSIBILITIES FOR ACCELERATING INCOME GAINS, EVEN IF THIS SEEMS TO INVOLVE SOME REDUCTION IN THE NET INCOME GAIN PER TIME PERIOD.

LAC WILL BE PLEASED TO ASSIST THE MISSION IN IDENTIFYING A CONTRACTOR OR DIRECT HIRE ECONOMIST TO ASSIST WITH THE ANALYSIS IF THE MISSION DESIRES. FOR SUCH ASSISTANCE OR ADDITIONAL CLARIFICATION, PLEASE CALL ECONOMIST, ROBERT BURKE, IN LAC/DP AT (202) 6475672.

6. SUSTAINABILITY. THE SUSTAINABILITY OF REB SYSTEM FOLLOWING THE PROJECT WAS THE MAJOR ISSUE OF THE DAEC REVIEW AND ENTAILS TWO TYPES OF CONCERNS, FINANCIAL AND
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INSTITUTIONAL. IT WAS AGREED THAT RECURRENT COSTS SHOULD BE MINIMIZED TO THE DEGREE POSSIBLE, WITHOUT TURTAINING THE EFFECTIVENESS OF THE RDE SYSTEM. THE MISSION WILL COMPLETE AN ANALYSIS OF RECURRENT COSTS BY INSTITUTION AND ACTIVITY FOR THE PROJECT, TO INCLUDE TO THE EXTENT POSSIBLE THE EFFECTS OF OTHER DONORS ACTIVITIES. THE FINAL PROJECT DESIGN MUST HAVE A REASONABLE SCOPE WHICH REFLECTS EXPECTED FUNDING LIMITATIONS IDENTIFIED IN THE RECURRENT COST ANALYSIS AND MUST BE CONSISTENT WITH A.I.D.'S RECURRENT COSTS POLICY. (AID/W RECOGNIZES THAT THE PROJECT IS PART OF A 10 TO 15 YEAR PROGRAM, BUT WE OBVIOUSLY CANNOT ASSURE THAT LENGTH OF COMMITMENT OR FUTURE LEVELS OF FUNDING. THEREFORE WE REEMPHASIZE THE NEED TO IDENTIFY AND SUPPORT THE MINIMUM CORE OF ACTIVITIES REQUIRED TO MAINTAIN THE SYSTEM.)

THE SECOND AREA OF SUSTAINABILITY CONCERNS THE ABILITY TO ADEQUATELY MANAGE THE RDE SYSTEM ITSELF. MISSION IS ENCOURAGED TO REVIEW THE PROGRAMS OF OTHER SUCCESSFUL COUNTRIES SUCH AS COLOMBIA AND BRAZIL FOR IDEAS AND TO INCLUDE MANAGEMENT OR PUBLIC ADMINISTRATION TRAINING OF APPROPRIATE PERSONNEL IN THE PROJECT. IT IS ANTICIPATED THAT THIS ANALYSIS OF SUSTAINABILITY WILL YIELD CONDITIONS PRECEDENT AND COVENANTS WHICH ARE NECESSARY TO SUPPORT PROJECT EFFORTS.

7. ADDITIONAL GUIDANCE. A) THE PP WILL ALSO INCLUDE A COMPREHENSIVE PROCUREMENT PLAN AND ANY WAIVERS ANTICIPATED FOR PROCUREMENT DURING THE PROJECT. B) AN ANALYSIS OF THE ROLE OF WOMEN IN THE SECTOR AND THE PROJECT'S EFFECTS ON WOMEN SHOULD BE MADE, EMPHASIZING WOMEN'S PARTICIPATION AS AGRICULTURISTS, NOT SIMPLY AS LABORERS. C) THE MISSION IS URGED TO REQUEST ASSISTANCE FROM LAC/DR/EST TO COMPLY WITH I.E.E. REQUIREMENTS AND TO PURSUE INITIATIVES IN INTEGRATED PEST MANAGEMENT. TO RECEIVE LAC APPROVAL OF THE PROJECT'S INITIAL ENVIRONMENTAL EXAMINATION, A DETAILED PLAN FOR USE OF PESTICIDES IN PROJECT FUNDED ACTIVITIES OTHER THAN IN A CONTROLLED RESEARCH ENVIRONMENT MUST BE SUBMITTED WITH SATISFACTORY LEAD TIME FOR REVIEW AND PREPARATION OF AN ENVIRONMENTAL ASSESSMENT, IF NECESSARY. D) THE MISSION WILL CONSULT WITH PPC PRIOR TO PP APPROVAL, SHOULD QUESTIONS ARISE REGARDING ELIGIBILITY UNDER THE TERMS OF AID FOR GRANT FUNDING OF PROJECT ACTIVITIES WITH THE PRIVATE SECTOR. IF THE PRIVATE SECTOR ACTIVITIES SUPPORTED BY THE PROJECT ARE OF A PILOT NATURE OF THE TYPE IN ANNEX A OF THE PID, THEN THE FUNDS MAY BE GRANTED. IF THE ACTIVITIES DEVIATE FROM THE CRITERIA SET FORTH IN ANNEX A, THE FUNDS MUST BE LENT. SHULTZ
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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 1987 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(b). (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 w[illegible] 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 1987 INCSR, that Peru complied with Subsection (a) and Congress did not disapprove 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.
6. FAA Secs. 620(a), 620(f), 620D; FY 1987 Continuing Resolution Secs. 512, 520. Is recipient country a Communist country? If so, has the President determined that assistance to the country is important to the national interests of the United States? Will assistance be provided to Angola, Cambodia, Cuba, Iraq, Syria, Vietnam, Libya, or South Yemen? Will assistance be provided to Afghanistan without a certification?	No.
7. FAA Sec. 620(i). 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 1987 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 o' year on interest or principal on any U.S. loan under a program for which t FY 1987 Continuing Resolution appropriates funds?	(a) No. (b) No.
11. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percent 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 th 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 r Budget can be the basis for an affirmative ans r during the fi yea unless signifi t changes in circumstances r.)	Yes, taken into account by the AID Administrator at time of approval of Agency OYB.
12. FAA Sec. 620(Has the country severe diplomatic re ons with the United States? If so, have relations been resumed and have new bilateral assistanc 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. Operating Year Budget? (Reference may be made to the Taking into Consideration memo.)	Yes, the payments to the UN are in arrears. It was taken into account by the AID Administrator in determining the AID Operating Year Budget.
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. 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.
16. 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.
17. 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.
18. 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.
19. 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 failed 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.

20. FY 1987 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.

21. FY 1987 Continuing Resolution Sec. 513. Has the duly elected Head of Government of the country been deposed by military coup or decree? No.

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria No.

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?

2. Economic Support Fund Country Criteria No.

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?

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 from 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 1987 Continuing Resolution Sec. 523; FAA Sec. 634A. Describe how authorization and appropriations committees of Senate and House have been or will be notified concerning the project.

   A Congressional Notification for the Project was sent on July 24, 1987 and expired on August 8, 1987.

2. FAA Sec. 611(a)(1). Prior to 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 basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

   No further legislative action by Peru is required.

4. FAA Sec. 611(b); FY 1987 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 effectively to maintain and utilize the project?	Not applicable.
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) The Project will increase agricultural production for export; (b) Of 9 Project activities, 3 will increase private sector involvement and competition in all aspects of agricultural production; (c) Agricultural cooperatives will participate in the Project; (d) Project activities foster free enterprise, not monopolistic practices; (e) The Project supports the generation, transfer, and adoption of a wide range of efficient agricultural technologies; (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 b utilyzing U.S. technical assistance, procurement of specific commodities, and providing U.S. - based training.
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$27,000,000.00 in local currency counterpart funds to meet the costs of carrying out the Project (i.e., 51% of total project costs).
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	No.

11. FY 1987 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 agricultural 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 1987 Continuing Resolution Sec. 558 (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.

13. FY 1987 Continuing Resolution Sec. 559. 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.

14. 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 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

Because this Project does not include activities with tropical forests, and because the environmental threshold decision was a negative determination for this project, points (a) thru (k) are not applicable.

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?

15. 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) No.
(c) No.
(d) No.

16. 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.

17. FY 1987 Continuing Resolution Sec. 532. Is disbursement of the assistance conditioned solely on the basis of the policies of any multilateral institution?

No

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. 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 rural men, women and families involved in all stages of the agricultural production, processing and marketing (PPM) system by increasing resource use efficiencies, employment and marketable surplus. It seeks to increase nation-wide use of appropriate agricultural technologies. It focuses on rural and small-town low-income populations working in the PPM

	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 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.	system, with clearly a substantial involvement of the poor and a sustained improvement in level of living; (b) The Projec will assist development of cooperatives thru technical assistance and will foster a ne level of cooperation and interaction between private and public agricultural sectors; (c The Project will use Peruvian experts and training where possible, and contribute to institutional development; (d) Women farmers and women decisio makers who otherwise work in th PPM system are included in all Project activities and will benefit the same as their male counterparts; (e) This Project has not been designed to have a regional impact.
b.	FAA Secs. 103, 103A, 104, 105, 106, 120-21. Does the project fit the criteria for the source of funds (functional account) being used?	Yes.
c.	FAA Sec. 107. 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.
d.	FAA Secs. 110, 124(d). Will the recipient country provide at least 25 percent of the costs of the program, project, or activity with respect to whch 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$27 million of total Project costs of US$52 million, i.e. 52% of Project costs.
e.	FAA Sec. 128(b). 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.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.	The Project has been designed to respond to the needs of the Agricultural Sector to increase rural incomes and production of major crops in a cost-efficient manner, and to do so through appropriate public and private sector institutional development. Peruvian technical assistance, expertise and other resources will be used to the fullest extent possible.
g. FY 1987 Continuing Resolution Sec. 560. 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.
h. FY 1987 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.
i. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.

j.	FY 1987 Continuing Resolution. How much of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, 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.
k.	FAA Sec. 118(c)(13). 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 available to achieve the best sustainable use of the land, and (b) take full account of the environmental impacts of the proposed activities on biological diversity?	Not applicable.
l.	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 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.
m.	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	(a) No. (b) No. (c) No. (d) No.

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?

2. Development Assistance Project Criteria (Loans Only) — Not applicable.

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan at a reasonable rate of interest.

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?

c. FY 1987 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?

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?

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?	Yes, it will contribute to economic stability through increased incomes and employment on a sustained basis in the agricultural sector.
b. FAA Sec. 531(e). Will this assistance be used for military or paramilitary purposes?	No.
c. ISDCA of 1985 Sec. 207. Will ESF funds be used to finance the construction, operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such country is a party to the Treaty on the Non-Proliferation of Nuclear Weapons or the Treaty for the Prohibition of Nuclear Weapons in Latin America (the "Treaty of Tlatelolco"), cooperates fully with the IAEA, and pursues nonproliferation policies consistent with those of the United States?	No.
d. FAA Sec. 602. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?	Not applicable.

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.
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	Not applicable.

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 technic[illegible] assistance is financed, will such assis[illegible]e be furnished by private enterpr[illegible] on a contract basis to the fullest extent practicable? 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. 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 1987 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 1987 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?	Not applicable.
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?	Not applicable.
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?	Not applicable.

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?	This project is wholly grant funded.
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.

Will arrangements preclude use of financing:

a.	FAA Sec. 104(f); FY 1987 Continuing Resolution Secs. 525, 540. (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 reimburse-bursements, in the form of cash payments, to persons whose illicit drug crops are eradicated?	Yes.
c.	FAA Sec. 620(g). 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 1987 Continuing Resolution Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel?	Yes.

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h. FY 1987 Continuing Resolution Sec. 505. To pay U.N. assessments, arrearages or dues? — Yes.

i. FY 1987 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 1987 Continuing Resolution Sec. 510. To finance the export of nuclear equipment, fuel, or technology? — Yes.

k. FY 1987 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 1986 Continuing Resolution Sec. 516. To be used for publicity or propaganda purposes within U.S. not authorized by Congress? — Yes.

3(A)2 - NONPROJECT ASSISTANCE CHECKLIST

Not applicable.

The criteria listed in Part A are applicable generally to FAA funds, and should be used irrespective of the program's funding source. In Part B a distinction is made between the criteria applicable to Economic Support Fund assistance and the criteria applicable to Development Assistance. Selection of the criteria will depend on the funding source for the program.

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

A. GENERAL CRITERIA FOR NONPROJECT ASSISTANCE Not applicable.

1. FY 1987 Continuing Resolution Sec. 523; FAA Sec. 634A. Describe how authorization and appropriations committees of Senate and House have been or will be notified concerning the project.

2. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

3. FAA Sec. 209. Is assistance more efficiently and effectively provided through regional or multilateral organizations? If so, why is assistance not so provided? Information and conclusions on whether assistance will encourage developing countries to cooperate in regional development programs.

4. FAA Sec. 601(a). Information and conclusions on whether assistance 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.

5. FAA Sec. 601(b). Information and conclusions on how assistance 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).

6. FAA Secs. 612(b), 636(h); FY 1987 Continuing Resolution Secs. 507, 509. Describe steps taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. are utilized in lieu of dollars to meet the cost of contractual and other services.

7. 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?

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

9. FAA 121(d). If assistance is being furnished under the Sahel Development Program, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of A.I.D. funds?

10. FY 1987 Continuing Resolution Sec. 532. Is disbursement of the assistance conditioned solely on the basis of the policies of any multilateral institution?

D. FUNDING CRITERIA FOR NONPROJECT ASSISTANCE Not applicable.

1. Nonproject Criteria for Economic Support Fund

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?

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

c. FAA Sec. 531(d). Will ESF funds made available for commodity import programs or other program assistance be used to generate local currencies? If so, will at least 50 percent of such local currencies be available to support activities consistent with the objectives of FAA sections 103 through 106?

d. ISDCA of 1985 Sec. 205. Will ESF funds made available for commodity import programs be used for the purchase of agricultural commodities of United States-origin? If so, what percentage of the funds will be so used?

e. ISDCA of 1985 Sec. 801. If ESF funds will be used to finance imports by an African country (under a commodity import program or sector program), will the agreement require that these imports be used to meet long-term development needs in those countries in accordance with the following criteria?

(i) spare parts and other imports shall be allocated on the basis of evaluations, by A.I.D., of the ability of likely recipients to use such spare parts and imports in a maximally productive, employment generating, and cost-effective way;

(ii) imports shall be coordinated with investments in accordance with the recipient country's plans for promoting economic development. A.I.D. shall assess such plans to determine whether they will effectively promote economic development;

(iii) emphasis shall be placed on imports for agricultural activities which will expand agricultural production, particularly activities which expand production for export or production to reduce reliance on imported agricultural products;

(iv) emphasis shall also be placed on a distribution of imports having a broad development impact in terms of economic sectors and geographic regions;

(v) in order to maximize the likelihood that the imports financed by the United States under the ESF chapter are in addition to imports which would otherwise occur, consideration shall be given to historical patterns of foreign exchange uses;

(vi)(A) 75 percent of the foreign currencies generated by the sale of such imports by the government of the country shall be deposited in a special account established by that government and, except as provided in subparagraph (B), shall be available only for use in accordance with the agreement for economic development activities which are consistent with the policy directions of section 102 of the FAA and which are the types of activities for which assistance may be provided under sections 103 through 106 of the FAA;

(B) the agreement shall require that the government of the country make available to the United States Government such portion of the amount deposited in the special account as may be determined by the President to be necessary for requirements of the United States Government.

f. ISDCA of 1985 Sec. 207. Will ESF funds be used to finance the construction of, or the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such country (1) is a party to the Treaty on the Non-Proliferation of Nuclear Weapons or the Treaty for the Prohibition of Nuclear Weapons in Latin American (the "Treaty of Tlatelolco"), (2) cooperates fully with the IAEA, and (3) pursues nonproliferation policies consistent with those of the United States?

g. 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?

h. FY 1987 Continuing Resolution. If assistance is in the form of a cash transfer to any country which receives in excess of a total of $5 million as cash transfer assistance in the current fiscal year: (a) are all such cash payments to be maintained by the country in a separate account and not to be commingled with any other funds? (b) will all local currences that may be generated with funds provided as a cash transfer to such a country also be deposited in a special account to be used in accordance with FAA Section 609 (which requires such local currencies to be made available to the U.S. government as the U.S. determines necessary for the requirements of the U.S. Government, and which requires the remainder to be used for programs agreed to by the U.S. Government to carry out the purposes for which new funds authorized by the FAA would themselves be available)?

2. Nonproject Criteria for Development Assistance

a. FAA Secs. 102(a), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by expanding access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b. FAA Secs. 103, 103A, 104, 105, 106, 120-21. Is assistance being made available (include only applicable paragraph which corresponds to source of funds used; if more than one fund source is used for assistance, include relevant paragraph for each fund source):

(1) [103] for agriculture, rural development or nutrition; if so (a) extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with efforts carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value;

improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people; and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserv with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

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

(3) [105] for education, public administration, or human resources development; if so, (a) extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, and strengthens management capability of institutions enabling the poor to participate in development; and (b) extent to which assistance provides advanced education and training of people of developing countries in such disciplines as are required for planning and implementation of public and private development activities.

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

(i)(a) concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and (b) facilitative of research on and development and use of small-scale, decentralized, renewable energy sources for rural areas, emphasizing development of energy resources which are environmentally acceptable and require minimum capital investment;

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

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

(iv) reconstruction after natural or manmade disaster and programs of disaster preparedness;

(v) for special development problems, and to enable proper utilization of infrastructure and related projects funded with earlier U.S. assistance;

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

(5) [120-21] for the Sahelian region; if so, (a) extent to which there is international coordination in planning and implementation; participation and support by African countries and organizations in determining development priorities; and a long-term, multi-donor development plan which calls for equitable burden-sharing with other donors; (b) has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of projects funds (dollars or local currency generated therefrom)?

c. FAA Sec. 107. Is special emphasis placed on use of appropriate technology (defined as relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?

d. FAA Sec. 281(b). Describe extent to which the activity recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

e. FAA Sec. 101(a). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D C 20523

LAC-IEE-87-25

ENVIRONMENTAL THRESHOLD DECISION

Project Location	:	Peru
Project Title	:	Agricultural Technology Transformation
and Number	:	527-0282
Funding	:	$30,000,000 (G)
Life of Project	:	5 years
IEE Prepared by	:	USAID/Lima
Recommended Threshold Decision	:	Negative Determination
Bureau Threshold Decision	:	Concur with Recommendation
Comments	:	Other than research as described in the IEE and covered under section 216.3(b)(2)(iii), no pesticides may be procured or used under the project without amending the IEE and receiving LAC Chief Environmental Officer approval.
Copy to	:	Donor Lion, Director USAID/Lima
Copy to	:	Erhardt Ruprecht, USAID/Lima
Copy to	:	Howard Clark, USAID/Lima
Copy to	:	Robert Jordan, LAC/DR/SA
Copy to	:	IEE File

James S. Hester Date JUL - 9 1987

James S. Hester
Chief Environmental Officer
Bureau for Latin America
and the Caribbean

ANNEX F. Initial Environmental Examination (IEE)

PROJECT LOCATION	: Peru
PROJECT TITLE	: Agricultural Technology Tranformation Project
LIFE OF PROJECT	: FY 1987 - FY 1992
FUNDING	: AID : $30,000,000 Grant GOP : $10,000,000 Private Sector: $10,000,000
IEE PREPARED BY	: Office of Development Resources/Capita Development Division and Regional Environmental Officer
ENVIRONMENTAL ACTION RECOMMENDED	: Negative Determination. No further environmental studies are required
MISSION DIRECTOR'S CONCURRENCE	: Signature _____ Mr. Donor Lion
	: Date 21 OCTOBER 86
ENVIRONMENTAL OFFICER BUREAU FOR LATIN AMERICA AND THE CARIBBEAN	: Approved _____
	: Disapproved _____
	: Date _____

1. Description of the Project

This is an institution-building project to improve the generation and transfer of appropriate agricultural technology in Peru. Support will be provided to INIPA to continue and expand its national production programs and national support programs. Assistance also will be provided for administrative improvement and human resource development. Financial resources primarily will provide technical assistance and training with some procurement of commodities and local cost support. The project also will assist the National Agrarian University to improve the quality of its graduate program and selected regional universities to improve the quality of their non-academic and undergraduate training. Funds also will be directed toward strengthening the private sector role in agricultural technology transfer and in seed multiplication and distribution activities.

2. Identification and Evaluation of Environmental Impacts

Many of the project activities involve education, training and technical assistance for institution-building purposes. These inputs will ultimately enhance the country's capability to utilize its resources in environmentally sound ways through the introduction of improved agricultural technologies. These activities have no appreciable direct environmental impact, and 22 CFR 216.2 (c)(2)(i) provides a "categorical exclusion" that excludes them from the need for further environmental review. It does not, however, exclude aspects of these activities that may directly affect the enviroment, such as facility construction. Additional laboratory units, cold storage facilities and improvements to experiment stations may be constructed under this Project. These will be limited in scope and located in previously developed areas and, therefore, will have negligible environmental impacts.

The integrated pest management (IPM) activity should lead to a reduction in the overall volume of pesticide use, decreased impacts on non-target populations, and fewer residuals found in run-off or ground water. IPM activities also will include undergraduate education to teach proper storage and application of pesticides and to warn farmers of the hazards of improper use.

For the IPM activity, small quantities of pesticides may be procured for laboratory research. This is permissible under the "Exceptions to Pesticide Procedures" without additional environmental review according to 22 CFR 216.3 (b)(2)(iii), which also states the following:

> "In such instances, however, A.I.D. will ensure that the manufacturers of the pesticides provide toxicological and environmental data necessary to safeguard the health of research personnel and the quality of the local environment in which the pesticides will be used. Furthermore, treated crops will not be used for human or animal consumption unless appropriate tolerances have been established by the EPA or recommended by FAO/WHO, and the rates and frequency of application, together with the prescribed preharvest intervals, do not result in residues exceeding such tolerances. This prohibition does not apply to the feeding of such crops to animals for research purposes."

The project will adhere to these restrictions. Pesticide procurement through this Project for purposes other than research and evaluation is not contemplated.

The on-farm water management activity will have the positive environmental effect of promoting better irrigation practices. It is not envisioned that new irrigation systems will be built under this project; rather old systems will be rehabilitated and improved practices promoted. This should result in more efficient water use, better control of water in gravity-fed systems and reduced erosion.

The project will have a general environmental impact as farmers put into practice the technology packages that are generated through the research activities. INIPA has experiment stations in different ecological zones and is attempting to develop packages appropriate to each zone. These technical packages should assist extension agents in promoting agricultural practices that are consistent with land capability. Extension agents will be encouraged to foster agricultural practices that maintain the environmental integrity of the site where they are used, supporting an objective of permanently sustainable agricultural production. For example, soil conservation activities will be advanced through the project to reduce soil loss and improve soil productivity. Promoting agricultural practices that are consistent with land capability is important since production losses will result from site degradation.

Private sector groups carrying out extension activities will coordinate their activities with INIPA and will be encouraged to promote agricultural technologies that are appropriate to the areas where they are to be used.

3. Recommendation for Environmental Action

This project will not have a significant adverse effect on the environment. The environmental effect that the project will have, such as the effects of different technology packages, will be evaluated and responded to as an integral part of project activities. Therefore, a "Negative Determination" is recommended.

MINISTERIO DE RELACIONES
EXTERIORES

RE-CTF-Nº

Lima, 24 de setiembre de 1987

Señor Representante:

Tengo el agrado de dirigirme a usted a fin de solicitarle, a título de cooperación técnica internacional, el apoyo de esa Agencia respecto al proyecto "Transformación de la Tecnología Agropecuaria", que ejecutará el Ministerio de Agricultura.

Al respecto, se acompaña a la presente Nota la documentación en donde se detalla la solicitud en referencia.

Al agradecer anticipadamente la atención que se sirva dispensar a la presente, hago propicia la oportunidad para reiterar a usted las seguridades de mi distinguida consideración.

AL señor Representante de la Agencia
para el Desarrollo Internacional (AID)
C I U D A D.-

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JUL 24 1986

AGENCY FOR INTERNATIONAL DEVELOPMENT
ADVICE OF PROGRAM CHANGE

Date:

Country	: Peru	
Project Title	: Agricultural Technology Transformation	
Project Number	: 527-0282	
FY 1987 CP Reference	: None	
Appropriation Category	: Agriculture, Rural Development & Nutrition (ARDN) Economic Support Fund (ESF)	
Life-of-Project Funding	: $25,000,000 Grant	
Intended FY 1987 Obligation	: $1,709,000	ARDN
	$2,700,000	ESF
	$4,409,000	TOTAL

This is to advise that A.I.D. intends to obligate $1.709 million in ARDN grant funds and $2.7 million in ESF grant funds for the Agricultural Technology Transformation project in FY 1987. This is a new project and was not included in the FY 1987 Congressional Presentation.

The purpose of the project is to expand and improve the scope and relevance of agricultural technology being generated for Peruvian agriculture and technology transfer services being provided to Peruvian farmers.

Annex: Activity Data Sheet

AGENCY FOR INTERNATIONAL DEVELOPMENT
ACTIVITY DATA SHEET

CP 81 05 (4 85)

PROGRAM Peru

TITLE	FUNDING SOURCE	PRIOR FUNDING OBLIGATION (In thousands of dollars)	LIFE OF PROJECT (Auth)
Agricultural Technology Transformation	ARDN and ESF	FY 87 1,709 ARDN 2,700 ESF	25,000
NUMBER 527-0282 NEW [X] GRANT [X] LOAN [ ] CONTINUING [ ]	PRIOR REFERENCE None	INITIAL OBLIGATION FY 87 / ESTIMATED FINAL OBLIGATION FY 91	ESTIMATED COMPLETION DATE OF PROJECT FY 92

Purpose: To improve the agricultural technology being generated for Peruvian agriculture and the technology transfer services being provided to Peruvian farmers.

Background: The Government of Peru (GOP) is seeking more rapid and equitable increases in agricultural output and rural incomes. Such increases can no longer come from farming more land. Agricultural production on existing land generally is highly inefficient because of low levels of technology. Major constraints to improved technology are structural, human resource, and institutional weaknesses of the agricultural technology generation/transfer system. Although the system was almost dismantled during the 1968-79 period, substantial progress in restoring it has been achieved by the GOP under the A.I.D.-financed Agricultural Research, Extension and Education Project (527-0192). To assure the long-run viability of that system there remains a critical need to: 1) support the National Agricultural Research and Promotion Institute (INIPA) to consolidate its national core research programs; and 2) significantly expand roles for the private sector and agricultural universities in the technology generation/transfer system.

Project Description: The project will promote and expand technology generation/transfer activities and will strengthen the ability of key elements of the system: INIPA in the development and packaging of adaptable basic commodity technologies; universities in providing trained human resources for the system, and the private sector in adapting and transferring technology.

The project will have three components: (1) technology generation which includes consolidation and improvement of administration of INIPA's commodity research programs, generation of new seed varieties, production of foundation seed for food crops, and dissemination of improved agronomic practices; (2) technology transfer which will establish a corps of technology transfer specialists within INIPA to package technology for technology transfer agents, promote private technology transfer activities, and stimulate an improved seed production/distribution system; and (3) human resource development which will improve the teaching program at the National Agrarian University, upgrade research, education and extension training materials, and establish a graduate fellowship program to produce trained human resources for the system.

Relationship of Project to A.I.D. Country Strategy: The project is an integral part of the Mission's strategy to achieve the goal of increased agricultural output and rural incomes.

Host Country and Other Donors: Approximately $24 million of the World Bank's agricultural portfolio is dedicated to agricultural research, education and extension. However, A.I.D. is the only donor planning to support private sector research and extension. The GOP local currency support for the National Technology Generation and Transfer System will be $60 million.

Beneficiaries: The project will benefit three population groups: (1) farmers who adopt technology changes; (2) families whose livelihood depends on agricultural production, processing, and marketing activities; and (3) urban consumers, particularly lower income consumers, who benefit from lower-cost foodstuffs.

Major Outputs	All years
Improved agricultural technologies	
- improved seed varieties	55
- foundation seed produced (MT)	20,550
- improved agronomic practices developed/disseminated	30
- improved livestock practices developed/disseminated	12
Additional university faculty and private sector scientists active in research	250
Technology transfer specialists trained	55
Improved university teaching program	X
Improved research, teaching and extension materials produced	X
Participants trained (M.S. and Ph.D.)	
- in-country	400
- overseas	25

A.I.D. Financial Inputs	Life of Project ($000)
Technical Assistance	9,250
Training	4,250
Commodities	2,750
Operating Costs	1,920
Competitive Research Grants	2,150
Private Technology Transfer Activities	3,180
Contingencies	1,500
TOTAL	25,000

U.S. FINANCING (In thousands of dollars)	Obligations	Expenditures	Unliquidated
Through September 30			
Fiscal Year			
Through September 81			

PRINCIPAL CONTRACTORS OR AGENCIES

National Agricultural Research and Promotion Institute (INIPA)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1988 To FY 1993
Total U.S. Funding: $25.0 million Grant
Date Prepared: August, 1987

Project Title & Number: Agricultural Technology Transformation (ATT) 527-0282

Narrative Summary	Objectively Verifiable Ind.	Means of Verification	Important Assumptions
Sector Goal:	Measures of Goal Achievement:		Assumptions for achieving goal targets:
Sector Goal: To contribute to increased agricultural incomes, rural employment and on-farm capital formation.	1. An average of 5% annual increase in rural per capita incomes. 2. An average of 2% annual decrease in rural under-employment levels. 3. An average of 10% annual increased in equity investment in agriculture . 4. Lower unit costs of production and increased yields for major crops. (See output magnitudes for specific crops) 5. Increased returns to land, water and labor (reflected in 1, above) 6. Increased percentage of agricultural production activities utilizing improved technologies (See output magnitudes for specific crops). 7. Adequate public sector budget allocations being provided on a sustained basis to science-based agricultural technology system institutions, including agricultural education institutions (allocations will not be reduced in real terms. 8. Private sector investment in ATG&T system activities and enterprises (including enterprises producing and/or marketing improved embodied technologies, such as improved seed nursery and breeding stock) will be increasing at an increasing rate.	1. National Agricultural Statistics and other published data. 2. Population mobilization reports from the Labor Ministry. 3. Census data and other basic socio-economic survey data. 4. AID and GOP planning and Project reports. 5. Continuing production data surveys and field observations.	1. Continued GOP commitment to the agriculture sector in general and to the Agricultural Technology Generation and Transfer (ATG&T) System in particular. 2. Required inputs for agricultural production under improved technology are consistently available at competitive prices. 3. Weather conditions are not abnormally unfavorable to agricultural production.

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Project Purpose	Conditions that will indicate purpose has been achieved	Means of Verification	Assumptions for achieving purpose:
To expand the scope and improve the quality and relevance of agricultural technology being generated for agriculture, and of technology transfer services being provided to farmers in order to increase rural incomes and reduce unit costs of production while increasing agricultural productivity and yields.	1. INIPA has established itself as a reliable and sustainable leader in the ATG&T system in Peru. 2. Private sector and agricultural university participation are well established and expanding on a self-sustaining basis. 3. Agri-businessmen, GOP leaders and the general public value ATG&T system contributions to their individual and collective economic and social well-being, and support sustained levels of public funding to maintain ATG&T system capabilities. 4. Farmers are active and vocal in seeking improved technologies that are more reliable & profitable than that which they now are using and are contributing significant resources to ATG&T activities. 5. A national ATG&T system is producing and disseminating new and relevant technologies in a form and manner that responds to the needs of a wide range of farmers in Peru, and adoption rates are increasing. 6. INIPA is effectively planning, managing, and evaluating Peru's agricultural research needs and priorities at both national and departmental levels, and sharing that information with other parties in the ATG&T system in a manner that results in the generation of increased & more relevant research outputs. 7. Improved legal and institutional structures are in place and functioning for more effective recruitment, placement & retention of adequately trained and experienced scientific and managerial personnel in INIPA. 8. Long-term inistitutional linkages have been established & are functioning between the Peruvian ATG&T system and a wide range of researchers and research institutions outside Peru.	1. Records and reports of Min. of Agriculture. 2. Scientific publications of researchers & professors. 3. Project evaluations. 4. Special surveys, studies and reports compared to baseline data. 5. AID and GOP Project records. 6. Continuing production data surveys and field observations.	1. GOP continues to place high priority on ATG&T activities through policy support and financial commitment. 2. INIPA's mandate in agricultural research and UNA's mandate in agricultural education are supported and reinforced at both the national and departmental levels. 3. Adequate numbers of qualified private sector entities agree to participate or expand their role in agricultural research and extension and to integrate their efforts with the public sector. 4. Price and marketing policies encourage technology adoption by farmers. 5. Technologies developed are economically and socially appropriate to farmers. 6. Adequate numbers of qualified research, teaching and support personnel are recruited, hired and retained.

Project Purpose (cont...)			
	9. Operational linkages are in place among public sector national and regional agricultural research and extension organizations, and the private sector and with agricultural educational institutions. 10. UNA and regional universities are producing higher quality graduates who are staffing the public and private ATG&T system. 11. Mechanisms are identified tested, and replicated by private sector actors that increase activities of the private sector in identification, adaptation and dissemination of improved agricultural technologies, and private sector role in these activities is increasing both in absolute terms and proportionally to the public sector role. 12. Appropriate roles of the public and private sectors in improved seed production and distribution are defined and agreed upon by major institutions involved, and an improved seed supply and distribution system consistent with those roles has been initiated for selected crops. 13. Crop yields are increasing and unit costs of production are decreasing at increasing rates. 14. At least US$8.0 million equivalent of private sector complementary resources will have been invested in activities receiving direct support from the project. 15. Each US Dollar equivalent of investment in project-assisted enterprises will have stimulated at least three additional US dollars equivalent of private sector investment in similar ATG&T activities (including enterprises producing and/or marketing improved embodied technologies, such as improved seed, breeding stock, etc.		

Outputs			
I. Component 1. Technology Generation Activity a. Consolidation and Integration A. Global Outputs 1. Quality and cost-effectiveness of NR and NRS programs will achieve internationally standards.	Nine NR Programs and six NRS Programs	1. Project annual reviews and special evaluations. 2. Special surveys, reports and studies. 3. AID and COP project records. 4. UNA and INIPA administration and research reports and records, annual program reports and scientific publications. 5. Field observations. 6. Published agricultural production data. 7. Annual reports of participating institutions	1. Project consultants are succestul in transfering skills and technology to their counterparts. 2. INIPA is not constrained by onerous governmeng regulations and controls and is permitted to adopt appropiate personnel and remuneration policies. 3. INIPA is successful in developing strong linkages with UNA, regional universities and the private sector. 4. INIPA will receive public Treasury Budget Allocations that do not decrease in real terms. 5. Sufficient qualified staff and complementary resources will be made available in other participating institutions. 6. University faculty members respond positively to research opportunities.
2. The national NR and NRS programs will have reached their planned minimum levels of staffing and operations, and the flow of improved technologies from them will be sufficient in amount, quality, relevance and mange of applicability to elicit the support required to sustain the level of effort achieved by the end of the Project Period.	Nine NR Programs and six NRS Programs		
B. National Commodity and Region Research Programs (NR) 1. Rice:			
a. New seed varieties will be released with tolerance to saline and alkaline soils in coastal areas and soil acidity/aluminum toxicity in jungle areas; with resistance to most prominent fungal diseases, i.e., Helminthosporium, pyricularia, Hoja Blanca, and Cercospora and incorporation of other characteristics i.e.; improved milling/grain quality, lodging and early maturing varieties for river banks sites.	5 to 10 new vaarieties		
b. Breeder and foundation of recommended varieties will be produced annually and sold for multiplication as certified seed by private growers to supply 90% of coastal area and increase from 10% to 50% in jungle areas planted to improved varieties.	224 MT of Breeder Seed; 11,540 MT of Foundation Seed		
c. New recommendations will be made related to seeding methods; improved phosphorus and nitrogen utilization; wed control; and mechanization with appropriate technology for small farmers with emphasis on harvesting and post harvest.	Several		
d. Research work will be consolidated.	16 sites.		

Outputs (cont..)			
e. Research personnel in the program will be stabilized.	47 professionals; 25 are rice researcher, 11 for seed production and 11 for rice extension specialist; and 20 technical support staff.		
f. Recommended varieties and agronomic practises for the Selva will be available that reduce unit costs of production.	20%.		
g. Increased number of Selva farmers adopting new technology by 1990.	50% for paddy rice farmers, 10% for upland rice farmers and 10% for river bank farmers.		
2. Corn			
a. New cultivars for the Selva will be released, including hybrids and the open pollinated varieties.	2 to 4.		
b. Breeder seed of recommended varieties will be produced and sold annually to increase area planted to corn and to increase coverage of area planted with new varieties in Selva.	250-300 MT; 25,000 has.; 25 to 50%.		
c. New recommendations will be made related to seeding methods, plant density, rotations and intercropping, weed and pest control, and optimum fertilization.	Several.		
d. Recommended varieties and agronomic practises will be available for hard yellow dent corn areas that reduce unit costs of production.	19%.		
e. Research personnel in the program will be stabilized.	67 professionals of which 32 are researchers, 17 in seed production, and 18 as extension specialists; and 26 technical support staff.		
f. Technology transfer process of the farmers in the coast, jungle and highlands who adopt new technology.	From 30%, 25% and 10% to 65%, 50% and 15%, respectively.		
3. Potatoes			
a. Virus free foundation seed of recommended varieties will be produced and sold annually.	5,000 MT.		
b. New varieties with improved resistance to nematodes and bacteria wilt and tolerance to frost will be released.	2-3.		
c. Use of diffused-light potato storage for small farmers expanded.	20,000 units with a capacity of 40,000 MT.		
d. New recommendations will be generated for each major producing region for the following agronomic practises; seeding; weed and pest control; fertilization.	Several.		

Outputs (cont..)				
e. Recommended seed and agronomic practises will be available that reduce unit cost of productgion for major Sierra producing sites and for major coastal areas.	Sierra 14%; Coast 10%.			
f. Research personnel in the program will be stabilized.	51 professionals of which 21 are researchers, 17 are in seed production, and 13 are extension specialists; and 16 technical support staff.			
4. Grain Legumes				
a. Improved seed varieties in seven different edible beans types will be released that increase yields above local varieties, that have resistance to the more common diseased and that are adapted to the dominant ecological conditions, i.e.; nematodes, root rot, high temperatures, water stress.	At least 15 varieties that increases yields at least 20%.			
b. New recommended agronomic practises will be available for the dominant ecological production areas related to soil & water use, weed control, fertilization, seed desinfection, planting density, rotations and intercropping.	Several.			
c. Research personnel in the program will be stabilized.	91 professionals in which 41 are researchers, 25 are seed production specialists, and 25 are extension specialists; and 33 technical support staff.			
d. Breeder seed of recommended varieties will be produced for multiplication and released to private seed producers which potentially can increase per capita consumption.	93 MT Breeder Seed. 7 to 10.5 Kg/capita consumption increase			
e. Recomended varieties and agronomic practises will be available that reduce unit costs of productgion for major production areas.	20% reduction of unit costs.			
5. Cereals				
a. New varieties of wheat and new varieties of Barley will be released incorporating increased yield potential, resistance to most common rust and bacterial diseases, tolerance to frost and drought.	6 for wheat (2 for the Sierra, 2 for the Coast and 2 for high Sierra) and 2 for Barley.			
b. New recommended agronomic practises will be made available for fertilization, weed control and seeding density for all important growing areas, and crop rotation, especially with potatoes, for residual fertilizer effect.	Several.			

Outputs (cont..)				
c. Improved recommended varieties of breeder seed will be produced and sold annually to meet projected production.	158 MTG of Breeder seed to produce 200,000 MT, a 100% increase.			
d. Recommended varieties and agronomic practises will be available that reduce unit costs of production.	12-15% reduction of unit costs of production.			
e. Research personnel in the program will be stabilized.	56 professionals of which 25 are researchers, 16 are in seed production, and 15 are extension specialists; and 19 technical support staff.			
6. Oil Seed Crops				
a. New varieties will be released.	4 of soybeans; 2 sunflower; 3 of peanuts.			
b. New recommended agronomic practises will be available for fertilization, water use efficiency and seed inoculation.	Several.			
c. Improved recommended varieties of foundation seed will be produced and sold annually.	3,175 MT sufficient to produce certified seed to meet 20% of Peruvian annual demand.			
d. Recommended varieties and agronomic practises will be available that reduce unit costs of production for soybean.	Reduction in 17% for unit costs			
e. Research personnel in the program will be stabilized.	35 professionals in which 16 are researchers, 10 are in seed production and 9 are extension specialists; and 13 technical support staff.			
f. Adoption rate of new technology will increase.				
7. Tropical Crops				
a. Improved recommended soil and water management technologies will be produced and adopted for tropical annual and permanent crops and for pastures.	Adoption will cover 60,000; 10,000 and 10,000 has., respectively.			
b. Improved management and agronomic practises will be developed and existing areas of production of coffee, cacao, avocado and papaya.	60,000; 12,000; 8,000; 1,000 and 54,000 has. respectively.			
c. Technologies will be developed and made available for commercial oduction of the following native crops; pijuayo; cami-cami; araza; castaña.	Several.			
d. Improved technologies will be developd and made available for pasture management .	Will improve minimum carrying capacity from __ 2 head/ha.			
e. Research personnel in the program will be stabilized.	54 Professionals of which 36 are researchers, 8 are in seed production and 10 are extension specialists; and 32 technical support staff.			
f. Recommended agronomic will be available that will reduce unit cost of production in banana, yuca and	1 reduction of unit costs of 18%, 10% and 34% respectively.			

Outputs (cont..)				
coffee.				
9. Andean Crops	20 varieties			
a. Improved varieties will be released.	(4 Quinoa; 4 Kiwicha; 2 Canihua; 4 Tarhui; 3 Oca; 3 Mashua).			
b. New recommended agronomic practises will be available for each of the crops: fertilization, seeding, seeding density and pest control using the farming system concept adapted to campesino community ideology.	Several.			
c. Foundation seed will be produced to increase the area planted to andean crops by 62%	335 MT sufficient to increase area plants by 2%.			
d. Recommended varieties and agronomic practises will be available that reduce unit costs of production for all traditional andean crops.	20 % reductgion in unit costs.			
e. Research personnel in the program will be stabilized				
f. More farmers will be using improved farming practises for all crops.	20% increase.			
10. Livestock				
a. To improve animal nutrition: (1)improved forage and pasture management practises will be developed and made available: Coast: alfalfa and corn fodder production and use; Sierra: native pasture management, rehabilitation of degraded pastures, establishment and management of irrigated pastures; Selva: intensification of grazing, and (2)improved supplemental feeding practises for fattering and for milk production. (3)utilization of agricultural and industrial by-products, especially in Selva and Sierra.	Several.			
b. For genetic improvement: improved artificial insemination practises will be developed for cattle and sheep; improved breeding stock will be multiplied.	Several.			
c. Improved health management practises will be developed and made available for increasing fertility and birth rates; reducing death rates; increasing annual weight gain; reducing incidence of illness.	Significantly.			
d. Research personnel will be stabilized.	59 profesionals in which 10 are in pasture research, 13 are in animal husbandry, 4 in health labs., and 12 in promotion activities and 20 are veterinaries; and 45 in technical support functions.			

Outputs (cont..)			
C. National Research Support (NRS)			
Program Outputs			
1. SENARGEN-Germplasm Services			
a. Establish long-term National Germplasm Bank in Puno	One 25,000 introductions of 95 different species.		
b. Establish medium-term germplasm introduction center which will also serve as the program headquarters and coordinate flow of germplasm to the national network.	1		
c. Establish a national network of operational germplasm banks to support national programs.	7 sites at commodity Program Headquarters		
d. Reserach personnel will be stabilized.	43 professionals of which 27 are genetists and 14 are responsible for germplasm banks and 2 are biotechnologists and 43 technical support staff.		
2. SENAC-COMPUTER SERVICES			
a. Establish a computerized information and analysis service network on a national level for scientific and administrative purposes.	All sites.		
b. By end of project computers will be placed in research stations mainly for scientific and agroeconomic analysis, and in the regional headquarters for administrative and budgetary control.	37 in Research stations; 37 in regional Headquarters.		
c. Standardized software packages for scientific and agronomic analysis and accounting, personnel, and budget control will be in place and functioning.	All sites.		
d. Programmer/system analysis personnel in the program will be stabilized.	11 professionals and 11 technical support staff.		
3. SENALAB-LABORATORY SERVICES			
a. Additional regional laboratories will be implemented.	3		
b. Analysis services will have increased capacity to analyze samples of which 50% are expected to come from the farmers.	300,000 soil samples; 50,000 water samples; and 50,000 plant samples per year.		
c. Research suppor from fully equiped laboratories will be consolidated.	7 sites with other 10 sites doing routine analysis only.		
d. Research and service personnel in the program will be stabilized.	65 professionals of which 23 are soils researchers, 2 microbiologists, 4 analytical chemists, 6 plant physiologists, 16 in quality control, and 14 in agrometeorological research and 65 technical support staff.		
4. AGROECONOMICS-ECONOMIC RESEARCH			
a. Studies to determine priorities for each agroecological zone.	11		

Outputs (cont..)			
b. Economic evaluations of new technologies including risk factor.	Biannual.		
c. Special studies; 1) Impact of new technology at farmer level; 2) Price policy/cost of production analysis for each national commodity program; 3) mechanization/labor use analysis focused primarily on harvest and post harvest methods for rice and corn.	3		
d. Maintain and update data bank to support on-going commodity research.	Continuing		
e. Personnel in the program will be stabilized.	9 technical support staff; 46 professionals.		
5. SENAPIC-INTEGRATED PEST MANAGEMENT			
a. Integrated Pest Management programs will be established.	5 (Huancayo, Cusco, Chiclayo, Cañete and Tarapoto).		
b. Reserach work will be consolidated withi each national commodity program.	37 sites.		
c. Reserach personnel in the program will be stabilized.	93 professionals of which 20 are plant pathologists, 16 are entomologists, 13 are nematologists, 9 are virologists, 11 are weed scientists, 1 is a microbiologists, and 23 are crop protection extension specialists.		
6. SOILS AND WATER RESEARCH			
a. Research for water use management on the farmer level will be established.	8 sites on the coast (15% of the coastal valleys), 5 inter-andean valleys, and 3 sites in Selva.		
b. Research for soil conservation research will be established.	6 sites on the coast (10% of coastal valleys); 7 sites in the Sierra, and 2 sites in the Selva		
c. Research personnel in the program will be on board.	12 professionals and 2 technicians.		
II. Component 1. Technology Generation			
Activity b. Strengthening INIPA Administration and Management			
A. A planning unit, annual evaluations, and improved mechanims for staffing, managing, and monitoring INIPA's NR and NRS programs will be in place and result in quality improvement, greater personnel stability, and increased research output.	9 NR& 6 NRS Programs will be positively affected.		
B. Provincial research facilities transferred during INIPA restructuring will be operating on the basis of well-designed research programs that are complementary with INIPA NR and NRS programs and with each other.	24 CIPA's will be affected.		

Outputs (cont..)			
C. A functional personnel evaluation and merit-based compensation system will be in place that provides criteria for rewarding staff based on additional performance under proper supervision against established standards. Compensation competitiveness problems with other public sector agencies will be alleviated.	Professional administrative technical leadership positions occupied by personnel with graduate degrees will increase from __% to __%.		
D. A seed multiplication, distribution and certification program plan will have been completed, with implementation well underway. Studies of laboratory services and machinery services will have been completed and the role of INIPA in these services will have been defined.	3 feasibility studies will have been completed and 1 study will be in process of implementation.		
III. Component 1. Technology Generation Activity c. Expanding Research Opportunities. A. Number of researchers working on agricultural technology problems will increase quality and volume of research will increase and research relevance to resolve practical from problems will improve.	Number of universities faculty actively working on research has increased by 50 and of students by 250.		
B. Quality of graduates will improve because of improved teaching by faculty with research experience, and because of involvement of student in practical research.	Significant improvements.		
C. Faculty morale and universities ability to retain higher quality faculty will improve. As the practise of competitive grants and matching grants becomes institutionalized, an element of entrepreneurship will be injected into research in general, thereby helping to upgrade the overall quality of research.	Turnover of graduate degree faculty will be cut in half.		
D. Effective research programs will be underway on a sustainable basis in the appropriate departments of UNA in Farm Management, Transportation and Marketing Economics, Irrigation and Drainage, and Agricultural Mechanization. The programs will be generating research that is complementary to INIPA national programs, improves teaching quality in these subject areas, and results in improved technology of direct use to farmers.	At least 4 faculty members will have active research programs in Farm Management, one in transportation economics, one in marketing economics, 5 in irrigation and drainage and 2 in agricultural mechanization.		

Outputs (cont..)			
IV. Component 2. Technology Transfer Activity a. Establishing the Technology Transfer Specialist Program			
A. Technology transfer specialist program will increase the rate of technological change and will result in the application of improved technologies on a larger proportion of cultivated land.	Rate of technology adoption will increase by 10 to 20%.	Special surveys.	
B. Linkages with producer associations that are established through cooperative relationships will have multiple benefits in addition to higher rates of technology adoption. Strong positive client identification with INIPA programs will increase morale of researchers and specialists within INIPA. The private sector will be motivated to sustain a greater proportion of technology transfer efforts. Private sector support will provide mechanisms for attracting and retaining key public research and Technology Transfer Specialists.	Recruitment and retention rate of post graduate professionals increased significantly.		
C. A regionally based corps of Technology Transfer Specialist will be established and functioning in INIPA, with the capacity to link with NR and NRS Program researchers in the conduct of adaptive research and demonstrations, to adapt research information for transference, to transfer it thru various mechanisms, and to improve and facilitate the on-farm problem feedback process. The capacity also will exist for improving transfer linkages and communications with rural women and youth.	At least 55 specialists will be trained and actively incorporated into the corps.		
D. Cooperative arrangements will be in place with producer associations (e.g., rice and potatoes) to provide for collaboration in research and technology transfer, and to improve efficiency and results of technology transfer activities by combining producer association and INIPA resources.	Arrangements will be in place with at least 2 national commodity committees.		
E. The process of utilization of research results will be accelerated.	The full adoption cycle will be reduced from 8-10 years to 6-8 years.		
F. Researcher-specialist-producer clientele relationships will be broadened and strengthened.	For the 9 NR program activities.		

Outputs (cont..)			
V. Component 2. Technology Transfer Activity b. Stimulating Private Sector Technology Transfer Enterprises			
A. ATGNT resources will be flowing to those institutions and people most able to effectively contribute to new technology development and transfer. Through the establishment of appropriate agreements researchers and extension agents will have the incentives and the resources to be more dedicated and efficient.	At least 10 agreements will be in place and operating.		
B. Technology Transfer Enterprises will improve awareness by researchers of the practical problems of farmers, with identification and prioritization of specific technology needs, and the specification of responsive research and/or extension programs and priorities.	At least 10 enterprises will be assisted to perform this function.		
C. Technology Transfer Enterprises will promote direct importation of new technology available from the general international agricultural research network. The technology will come in the form of genetic material (e.g., new crops and crop varieties), chemical and biological inputs and know-how regarding modern agronomic practices, as well as the latest research and extention methodology. Where the demand for certain types of technology exists but supply is not forthcoming, these enterprises will be able to effectively articulate the needs of farmers and influence research priorities of the international agricultural research network.	At least 3 enterprises will be assisted to perform this function.		
D. Technology transfer enterprises will establish formal and informal linkages with organizations and groups within the international agricultural research network in order to facilitate the flow of improved technology to Peru.	At least 4 enterprises will be assisted to perform this function.		
E. Technical reports will be published describing the production conditions of target commodities and farm types, including a listing and prioritization of problems potentially addressable via the development and adoption of new agricultural technology.	At least 6 reports per year.		

Outputs (cont..)			
F. Working relationships and formal agreements with national and international agricultural researchers will be established, and a sustained flow of technology-embodied inputs and "know-how" will be made available and fed into the local research and extension system for testing and eventual distribution to farmers.	At least 3 such agreements will be in place and operating.		
G. Continuing analysis of primary production problems will be on going and profitable technology in commercial use elsewhere will be sought for their solution.	Continuing.		
H. Technology will have been introduced, tested, adapted, and follow up on related research.	Sustained Flow.		
I. Professional employees will have been trained to extend technology and follow up on related research.	At least 10 persons.		
J. Linkages will have been established with faculty and staff of UNA and regional universities or other research organizations to carry out research on problems not amenable to introduced technology.	At least 10 linkages will have been established.		
K. Measurable improvements will be apparent in the efficiency of use of public sector research and extension resources, brought about by significant private sector complementary inputs to public sector resources.	The public sector cost per hectare adopting new technology will be reduced by at least 50%.		
L. The Statistical and Economic Analysis Center (CEAC) in UNA will be providing production economics, farm records, farm management, price analysis and market news services to established technology transfer enterprises and to affiliated farmer groups on a fee basis. This center will be self-sustaining without outside subsidization.	Subscription information services will be provided to at least 100 subscribing firms and institutions.		
VI. Component 2. Technology Transfer Activity c. Stimulating an Improved Seed Production and Distribution System.			A. INIPA and UNA will divest themselves of certified seed production activities.
A. Local seed programs will have coalesced into a national seed growers association or committee affiliated with UNA.	1 national association or committee		B. Any required regulatory changes will be forth-coming to encourage self-regulatings private sector certification programs.
B. Formation of local seed associations, with trained	At least 3 local seed associations, one for each region esta-		

Outputs (cont..)				
leadership represented through active boards, and capable of assisting the membership obtain the technical and managerial skills they need.	blished and functioning.			
C. Local seed certification services established and contributing to the commercial image of the association membership.	3 such services established.			
D. Significantly increased investment in seed enterprises, including more producers, new seed firms with additional conditioning facilities, moving a volume of certified seed sufficient to permit economic viability on a self-sustaining basis.	Investment at least tripled during period as compared to previous period.			
E. Significantly increase use of certified seed by farmers.	See magnitudes of outputs shown for increased seed use under Component 1, activity a.			
VII. Component 3. Human Resources Development Activity a. UNA Administration and Teaching Program Strengthening.				
A. Overall improvement in the quality of instruction and the quality of UNA students, particularly at the graduate level.	Significant qualitative improvement.			
B. An increase in effective use of resources due to improved planning, resource allocation and control.	Significant qualitative improvement.			
C. Improved leadership structure that recognizes the role of the Office of Rector in identifying changing needs in agricultural science and in guiding the faculty to develop the university's capacity to respond effectively to educational challenges.	Significant qualitative improvement.			
D. An awards program which rewards on the basis of merit in teaching, research, research supervision, and curriculum improvement.	Significant qualitative improvement.			
E. Significant curriculum revision, brought about by an orderly two-year process that addresses concerns of both individual faculty and the institution as a whole, leading toward consensus on improvements needed.	Significant qualitative improvement.			
F. Creation of a broader consensus among university professors about national agricultural research priorities and stimulation of greater imagination and initiative about broad, recent agricultural research development that hold special for practical applications in Peru.	Significant qualitative improvement.			

Outputs (cont..)			
VIII. Component 3. Human Resources Development Activity b. Improving Research, Extension and Teaching Materials.			UNA, INIPA and ONA will be able to work out arrangements for sharing these responsibilities.
A. The following will be in place: A professionalized UNA library staff and operations; an updated collection of essential journal; an established process for culling obsolete materials, active exploration and of modern alternative library technologies; and a higher use level by all agricultural institutions.	At least 3 librarians will receive short-term training; a collection of 20 journals will be up-dated.		
B. An Agricultural Sciences Journal published regularly with peer review and with international distribution.	1 journal in publication for four years and continuing.		
C. An effective method agreed to and being implemented for transforming research results into published articles, utilizing the combined resources of UNA, INIPA and private publishers.	At least 3 organizations will have on-going fee-based publication series for AIG&T purposes.		
D. Farmer technology information flowing to popular farm magazines, newspapers, broadcasts, and other popular communications media, aimed at a wide clientele spectrum such as consumers, advanced farmers and technology transfer agents.	At least 1 organization will be preparing and supplying this type of information.		
IX. Component 3. Human Resources Development Activity c. Competitive Graduate Study Fellowship and Participant Training.			UNA, INIPA and ONA will be able to work out arrangements for sharing these.
A. Establishment of a private sector mechanism for awarding fellowships and scholarships to AIG&T system personnel on a competitive basis.	One mechanism.		Sufficient qualified candidates will present themselves.
B. Off-shore post-doctoral and Sabbatic Fellowships awarded to personnel in the AIG&T System and personnel re-incorporated in the system.	10 Fellows from UNA; 6 Fellows from INIPA; total of 8 person/years.		GOP will permit the program to operate as a private sector undertaking.
C. Off-shore specialized M.S. participants awarded scholarships, training completed and participants reincorporated in the AIG&T system.	3 participants from UNA; 5 participants from INIPA; total 16 person/years.		
D. Off-shore Ph.D. participants awarded scholarships; training completed (for all but 4 participants) and participants reincorporated into the AIG&T system.	7 participants from UNA; 6 participants from INIPA; total of 52 person/years.		
E. UNA M.S. scholarship training completed for AIG&T system personnel.	200 M.S. graduates trained in 12 disciplines.		

Inputs:	Implementation Target (Type and Quantity)			Assumptions for providing inputs:
I. A.I.D. A. Short and long-term external and national advisory technical assistance. B. Short and Long-term academic and non-academic off-shore training. B. In-country graduate and non-academic training. D. Vehicles, computers, agricultural machinery, research equipment and other commodities. E. Field studies/demonstration F. Local operating expenses. G. Research grants. H. Project Implementation Management and support costs. II. GOP A. Staff salaries and operating expenses. B. Vehicle and equipment operating and repair costs. C. In-country training D. Locally procured commodities. E. Field sites offices, laboratories, and other installations and physical facilities. F. Local costs associated with technical assistance and with activity implementation III. Private Sector A. Staff salaries and operating expenses. B. In-country training C. Farm and office equipment, computers. D. Local costs associated with technical assistance. E. Vehicle and equipment operating costs. F. Offices and other physical facilities.	I. AID - Technical Assistance - Commodities - Training - Research Grants - Implementation Support - Evaluation/Audit - Other Costs - Inflation/Contingencies TOTAL II. GOP - Technical Assistance logistic support - Commodities - Training - Research Grants - Implementation Support - Evaluation/Audit - Construction - Other Costs - Inflation/contingencies TOTAL III. Private Sector - Technical Assistance Logistic Support - Commodities - Training - Research Grants - Implementation support - Construction - Other Costs - Inflation/Contingencies TOTAL For detailed inputs, see detailed input tables by activity, financial analysis, implementation schedule, and commodity, technical assistance and training plans in the Project Paper.	US$ Millions 7.6 3.2 3.2 2.0 1.5 0.3 3.9 3.3 25.0 2.0 4.6 1.7 1.6 0.6 0.1 1.0 10.7 4.7 27.0 0.8 1.4 0.7 0.3 0.1 0.3 3.0 1.4 8.0	1. A.I.D., GOP and implementing institution project records and financial documents. 2. Project evaluations.	1. A.I.D. and GOP funding levels are approved and disbursement are made on a timely basis. 2. Appropriate overseas training programs are identified. 3. GOP meets conditions precedent. 4. Appropriate consultants can be recruited to provide required technical assistance. 5. A.I.D. and implementing institution assign adequate number of qualified staff to manage and facilitate implementation of the project.

(0990Y)

MISSION RESPONSE TO DAEC PID GUIDANCE CABLE 1/

This annex responds to issues raised in the DAEC PID Guidance Cable.

1. Sector Strategy and ATT Project Funding Levels: This issue is discussed in detail in the Financial Analysis, Chapter V, A, 4. As noted in the FY88-89 Action Plan and Lima 7439, the Mission reduced its proposed ATT Project funding level to US$25.0 million grant and maintained its on-going agricultural sector strategy intact. DA/ARDN funding for LOP is estimated at $16,091,000, very close to the $15,000,000 level suggested by the DAEC. Remaining funding will be from ESF and/or Central Selva (CSRM) Project deb-reob grant funds.

2. Policy Environment: Included in the PP (Chapter II, C,2. USAID Agricultural Development Strategy) is a discussion of the Mission's intended Policy Dialogue Agenda and its relationship to the Project. The Mission also has included at appropriate points throughout the PP and Annexes, a discussion of issues relating to staffing patterns, salaries, promotions, in service training, and resource allocation for agricultural research, extension and education within INIPA and UNA, the only public sector counterpart organizations for the Project. Many of these issues are addressed directly by activities to be implemented under the Project.

The Mission expressly has excluded use of AID grant and GOP counterpart funds for payment of public sector counterpart institution employee salaries or salary supplements. However, the Project will provide technical assistance and training to assist counterpart agencies in resolving these problems through improved personnel systems and through personnel and financial linkages with private sector ATG&T organizations. An appropriate covenant also has been included in the proposed Project Agreement.

3. Project Scope and Focus. The PP responds explicitly to concerns expressed by the DAEC with regard to clarity of outputs. Outputs are specified for each of the nine Project activities (See Chapter III, Project Description). Beneficiaries are discussed in the Social Soundness Analysis (Chapter V, D) and the Project Description (Chapter III, C). Alternative Project activities and designs are discussed in the Technical Analysis and Institutional Analysis (Chapter V, B and C), and in corresponding Exhibits (G and H) in Annex II.

1/ State 387959, dated Dec. 16, 1986 (See Annex I, Exhibit B).

The Mission developed the mix of public sector research, extension and training primarily by building upon the solid base developed during the REE Project. The primary criteria used for the mix shown in the PP are a) absorptive capacity of INIPA, and b) areas of demonstrated potential and obvious gaps that came to light during implementation of the REE Project. In order to avoid the rigidities of applying a priori detailed preconceived criteria to a decision area that does not appropriately lend itself to that approach, Mission considered general criteria of a) Project funding limitations, b) installed capacity, c) apparent potential of participating institutions, and d) comparison with the general mix of resources going to research and extension in other countries as reported by the University of Illinois Agricultural Extension Development Program (INTERPAKS). Then, to assure flexibility in the use of funds for specific purposes in order to permit funds to flow to support the most cost-effective alternatives, most activities were designed to establish a competitive environment within which funds will be allocated. In this manner, only superior proposals, measured against all proposals submitted at the time of actual funding, will be funded.

Economic criteria for selection of alternatives are relevant only to the extent that an economic analysis shows returns to the total effort under the Project to be satisfactory. No effort was made to do separate economic analyses of each expenditure nor of each activity as opposed to other possible expenditures or activities. Aside from the lack of available Project design resources for such a detailed disaggregated analysis, such an approach would be going too far in trying to apply ex ante economic feasibility tests to initiatives that have institution-building as a major purpose. This Mission is aware of no PPs for strengthening ATG&T systems and institutions that have carried out economic analyses at that level of disaggregation. The alternatives selected have the benefit of the experience that USAID and INIPA have gained in similar activities in Peru and, the economic analysis for the selected set of alternatives shows IRR's and Benefit/Cost ratios at the higher end of the worldwide spectrum. It would appear to be unnecessary and wasteful to carry out a series of high-cost, highly disaggregated economic analyses that are based on co-efficients that, at best, are shaped by subjective wisdom.

Project activities were selected considering on-going activities and initiatives throughout the ATG&T system. Activities of international donors are of questionable relevance since all IBRD and IDB programs have been suspended in Peru. Nevertheless, based upon past international donor activities this project continues the role which USAID has been playing in the agricultural sector.

The Project Logical Framework prepared during PID development has been revised. EOPs have been further elaborated and are included in the Project Description as well as in the Longical Framework. The PP includes baseline data

estimates to support subsequent evaluation and monitoring (see Output Tables for NR & NRS programs in Annex II, Exhibit G). These baseline data will be further refined early in the Project.

4. Economic Analysis. Considerable time and attention were expended in dealing with both the cost-effectiveness and benefit/cost issues raised by the DAEC. We believe these issues are adequately addressed in the Summary Economic Analysis (Chapter V, D) and the Detailed Economic Analysis (Annex II, Exhibit J).

5. Sustainability. This issue is addressed in some detail in the Financial Analysis (Chapter V, A) and the Institutional Analysis (Chapter V, C and Annex II, Exhibit H). Project design responds to all of the DAEC concerns on this matter in the analysis and discussion, including financial, institutional and ATG&T system nanagement sustainability. With respect to the latter, the Mission does not subscribe to the notion that centralized management and administration of the ATG&T system, as in Colombia and Brasil is either necessary or appropriate in Peru. Rather, we subscribe to the approach of assisting in the evolution of a competitive yet collaborative system that permits superior performance to be rewarded with relatively more professional opportunities and resources, both on an institutional and an individual level. It is interesting to note that Colombia and Brazil now are tending in this direction of more freedom of choice in a competitive ATG&T environment after initially embracing the more centrally directed and controlled approach.

The Mission did include a conventional covenant in the proposed Project Agreement whereby the GOP covenants to continue to fund public sector ATG&T activities at adequate levels. The Mission believes it is at least as important for sustainability of the ATG&T system to vigorously pursue the objective of incorporating the private sector into the ATG&T system as a full and dynamic partner, and this is a central theme of ATT design.

6. Other Issues

a. Procurement. A Procurement Plan has been included in the PP. No waivers are anticipated to be needed for procurement.

b. Role of Women. The Social Soundness Analysis examines the role of women, and the Project Description directly addresses the role of women farmers and professionals as participants in both technology supply and technology demand activities under the Project.

c. Environmental Analysis. In addition to input from the Regional Environmental Officer stationed in Lima, the Mission sought and received LAC/DR/EST assistance to comply with Initial Environmental Examination (IEE) requirements, and LAC approval of the Initial Environmental Examination was obtained of the IEE.

d. Private Sector Support. Where private sector for-profit entities are to be involved, PP design is based on support to activities only on a pilot basis. Therefore, no issue arises as to whether or not funds must be lent to the private sector, thereby obviating the need to consult with PPC (as proposed by the DAEC) prior to PP approval. If subsequent adjustment to Project activities involves provision of resources to private sector for-profit organizations on other than a pilot basis, the Mission assures compliance with all AID regulations for that purpose and will consult as instructed.

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CLASS: UNCLASSIFIED
CHRGE: AID 01/13/87
APPRV: D:DMLION
DRFTD: D:DMLION:BT
CLEAR: NONE
DISTR: AMB DCM AID
CHRON ECON

AIDAC

E.O. 12356: N/A
SUBJECT: AGRICULTURE TECHNOLOGY TRANSFORMATION PROJECT (527-0282)

1. AS AID/W SURELY APPRECIATES, MISSION FULLY UNDERSTANDS THE NEED TO CAREFULLY RECONCILE RESOURCE LEVELS WITH STRATEGY. SOME SECTOR STRATEGY DECISIONS, INCLUDING ATT SIZE AND NEW START OPTIONS COULD BE INFLUENCED BY THE OUTCOMES OF THE DE-OB/RE-OB EXERCISE.

2. WE HAVE STUDIED WITH GREAT CARE THE ISSUES RAISED IN THE GUIDANCE ON ECONOMIC ANALYSIS. OUR INTENTIONS ARE TO ADDRESS THE ISSUES AS FOLLOWS:

A) MISSION AGREES THAT COST-EFFECTIVENESS ISSUES ARE KEY TO PROJECT DESIGN AND TO ITS OPERATIONAL SUSTAINABILITY. WE PROPOSE TO BRING THE NEEDED EXTERNAL EXPERTISE TO BEAR, COMBINED WITH AVAILABLE ANALYTICAL INFORMATION IN PERU AND EXPERIENCE FROM OTHER COUNTRIES, TO IDENTIFY THOSE AREAS OF RESEARCH AND EXTENSION (IN GEOGRAPHIC, COMMODITY, TYPE OR NATURE, TARGET GROUP, ETC. TERMS) THAT CAN BE MORE COST-EFFECTIVE WHEN CARRIED OUT BY PRODUCER ORGANIZATIONS AND/OR AGRI-BUSINESSES, OR BY REGIONAL OR AREA-WIDE AGRICULTURAL SCHOOLS AND/OR UNIVERSITIES (ESPECIALLY THOSE WITH UNDERUTILIZED INSTALLED CAPACITY), AS COMPARED TO THE NATIONAL PUBLIC AGRICULTURAL RESEARCH AND EXTENSION INSTITUTION, INIPA. OUR VIEW IS THAT DEVELOPMENT OF A COST-EFFECTIVE, INSTITUTIONALIZED PUBLIC-PRIVATE AGRICULTURAL RESEARCH AND EXTENSION SYSTEM IS AN EVOLUTIONARY PROCESS; WE ESCHEW THE GOAL OF DESIGNING AT THE PP STAGE AN A PRIORI MODEL TO BE RIGIDLY APPLIED DURING PROJECT IMPLEMENTATION. WE INTEND TO FOCUS ON THE IDENTIFICATION OF DESIGN CRITERIA AND PARAMETERS TO BE APPLIED DURING PROJECT IMPLEMENTATION. WE PROPOSE TO PROMOTE THE EVOLUTIONARY PROCESS LEADING TO IMPROVED COSTS AND OUTPUT RELATIONSHIPS THROUGH WELL-TAILORED TECHNICAL ASSISTANCE, SHORT AND LONG TERM TRAINING AND OBSERVATIONAL TRAVEL. WE INTEND TO UNDERTAKE A COST-EFFECTIVENESS ANALYSIS THAT WILL PROVIDE SOLID MANAGEMENT DECISION-MAKING CRITERIA FOR ALLOCATION OF PROJECT RESOURCES AMONG COMPONENTS AND INPUTS.

B) WE WILL UTILIZE EXPERIENCED SPECIALISTS IN THE PP DESIGN TO ASSIST US IN EXAMINING PROJECT DESIGN ALTERNATIVES AND THEIR IMPLICATIONS FOR MAXIMIZING NET PRESENT VALUE OF THE ULTIMATE INCREASE IN NET FARM

INCOME RESULTING FROM THE PROJECT. AS REFTEL INDICATED, THIS IS BOTH A COST-BENEFIT AND A COST-EFFECTIVENESS ISSUE.

C) WE ALREADY HAVE A GOOD PERU-SPECIFIC RETURNS-TO-RESEARCH ANALYSIS (NORTON/GANOZA STUDY) FOR FIVE MAJOR INIPA COMMODITY RESEARCH/EXTENSION PROGRAMS. WHERE COST-BENEFIT GAPS REMAIN, WE WILL RELY ON A REVIEW OF THE CONSIDERABLE BODY OF USEFUL COUNTRY-SPECIFIC AND CROSS-COUNTRY ANALYTICAL STUDIES THAT HAVE BEEN CARRIED OUT BY QUALIFIED ANALYSTS OVER THE PAST DECADE. THE COST-BENEFIT INFORMATION THEN WILL BE WEIGHTED, ALONG WITH INSTITUTIONAL, SOCIAL SOUNDNESS, TECHNICAL, GOP INTEREST, AND OTHER CRITERIA FOR DEFINING PRIORITIES FOR PROJECT SUPPORT IN TERMS OF RESEARCH AND EXTENSION SUBJECT MATTER AND TARGET GROUPS. THIS PROCESS ALSO WILL TAKE INTO ACCOUNT THE TRADE-OFFS INVOLVED IN A SHORT-TERM VS LONG TERM ORIENTATION, ESPECIALLY WITH REGARD TO PROGRAM SUSTAINABILITY.

3. THUS, WITHIN OUR RESOURCE LEVELS FOR PP DEVELOPMENT, WE WILL CARRY OUT THE BEST ECONOMIC ANALYSIS POSSIBLE TO ENSURE THAT LIMITED PROJECT RESOURCES ARE DELIVERED TO HIGHEST PAYOFF ACTIVITIES. AS INDICATED, CONSIDERABLE ATTENTION WILL BE GIVEN TO THE COST-EFFECTIVENESS ISSUE, PARTICULARLY WITH RESPECT TO ALTERNATIVE TECHNOLOGY TRANSFER SYSTEMS.

4. REFTEL REFLECTS A FEW DECISIONS REACHED AFTER THE DAEC MEETING AND THE DEPARTURE OF THE MISSION'S REP. THIS HAS CREATED PROBLEMS FOR US, INASMUCH AS, FOLLOWING THE RETURN OF THE MISSION'S REP AND BASED ON HIS REPORT OF THE OUTCOME OF THE DAEC, WE UNDERTOOK DISCUSSIONS WITH THE MINISTRY OF AGRICULTURE, INCLUDING THE MINISTER. SOME POST DAEC DECISIONS DIFFER FROM WHAT WENT ON AT THE DAEC MEETING. OBVIOUSLY, MANY THINGS ARE EVOLVING BUT IT IS NOT HELPFUL TO RECEIVE SIGNIFICANT MODIFICATIONS OF DAEC DECISIONS THIRTY-NINE DAYS AFTER THE DAEC MEETING. WATSON
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Annex II
Exhibit C

Illustrative List of Commodities for Procurement

ITEM	QTY.	DESCRIPTION	UNIT PRICE ($)	TOTAL ($)
01	30	4 x 2 Reg cab. P.U. Trucks	10,000	300,000
02	30	4 x 4 Reg cab. P.U. Trucks	12,000	360,000
03	25	4 x 2 Doble cab. P.U. Trucks	11,000	275,000
04	10	4 x 4 Doble cab. P.U. Trucks	13,000	130,000
05	6	Suburban Type Vehicles	16,000	96,000
06	2	35-45 Passenger Bus	60,000	120,000
07	5	80-90 HP Tractors with Implements	25,000	125,000
08	5	30-35 HP Tractors with Implements	15,000	75,000
09	4	Small self-propelled combines	10,000	40,000
10	5	Stationary Threshers	6,000	30,000
11	10	Seed cleaners & Processing Equip.	8,000	80,000
12	Misc.	Field Laboratory Equip. Balances, seed counters, seed germinators etc;		150,000
13	Misc.	Service Laboratory Equip. Drying ovens, microscopes, glassware, chemicals		100,000
14	Misc.	Personal Computers	4,000	160,000
15	Misc.	Communication Equipment; Radios, Video Tape, Slide Projects, etc.		120,000
16	Misc.	Unspecified Commodities		259,000
		TOTAL		2,420,000

DETAILED TECHNICAL ASSISTANCE PLAN, SCOPES OF WORK AND PROJECT SUPPORT STAFF ARRANGEMENTS FOR ATT PROJECT

This annex describes in more detail the proposed implementation arrangements summarized in Chapter IV of the Project Paper.

A. Expatriate Technical Assistance Arrangements

1. Objectives and Nature

The expatriate technical assistance (TA) provided under the ATT Project serves both managerial and technical objectives. Resident expatriates work within the environment of public and private institutions performing highly technical agricultural technology generation and transfer and human resource development functions. They must understand both the technical imperatives of such institutions and the management systems which have been developed to satisfy these imperatives. Their function is to counsel with their institutional counterparts and to assist them in institutional planning and analysis, program planning and budgeting, operational decision analysis, implementation and monitoring, and other management activities whose effective functioning is essential to the objectives of this Project. These counterparts are scientists, but they function primarily as senior management advisors.

Resident expatriate advisors also are expected to know when a situation requires more specialized assistance, and to be able to bring such expertise to bear. Each expatriate advisor will be expected to define problems in his area of expertise and determine the kind of specialists needed to solve it, prepare terms of reference, identify local counterparts, and facilitate the work of the short term expert.

The ATT Project has been designed to give project implementation personnel, and the Peruvian and expatriate advisors a high degree of choice in program planning, consistent with general objectives. This flexibility is achieved by requiring approved Implementation Plans, effective procedures for implementation, monitoring and evaluation, and regular reporting. The resident expatriate advisors are expected to assist in the development of these plans and procedures, and, in the process, to serve as liaison between implementing institutions and USAID to achieve mutual understanding.

Short term advisors are brought in as required to fill particular needs, either technical or administrative, as they are identified. They are selected for their ability to satisfy the particular requirement, which usually involves a mix of professional expertise, interpersonal sensitivity, language competence and cultural understanding. Short term advisors may be of U.S. or Peruvian citizenry -- the primary criterion is the ability to perform

effectively. It is expected that the solution of many problems will require iterative inputs, which should be performed where possible by the same individual to take advantage of experience and contacts.

2. Institutional Relationships

The ATT Project has as its primary objective the promotion of a science-based agricultural system by assisting further development of the public-private ATG&T system. It pursues this objective by assisting in strengthening INIPA, UNA, FUNSIPA, ONA, regional universities and a wide range of other private sector enterprises and organizations.

TA arrangements have been designed both to encourage the development of a unified ATG&T system and to achieve economies of scale in the use of scarce and expensive expertise. It parallels the organizational structure of the Project. This program builds on prior AID assistance projects to INIPA (REE Project) and UNA (APID Project), both of which have been effectively implemented through Title XII contracts with NCSU and MIAC, respectively. Assuming a waiver of required full and open competition is obtained from AID/W, these contractors will be retained, both for their experience and because initiation of timing of this activity takes place while those two projects are still on-going with advisors on-board.

Technical assistance to INIPA will be provided by NCSU, and to UNA by MIAC, supplemented by the Chief of Party (COP) and other specialists of the expatriate TA team who will be headquartered at FUNSIPA. The COP will serve as program advisor to FUNSIPA and will provide coordination to assure inter-institutional utilization of all technical assistance specialists. For example, the NCSU Research Advisor, Technology Transfer Advisor and Institutional Development Advisor, all primarily assigned to INIPA, also will be a resource for FUNSIPA, UNA and ONA, while the MIAC Education Advisor, assigned to UNA, also is a resource for FUNSIPA, INIPA and ONA. Likewise, the Business Manager and the Seed System Specialist assigned primarily to FUNSIPA, also will advise INIPA, UNA and ONA.

3. The Resident Expatriate Advisory Team

Functions of the seven person resident expatriate advisory team are described below, together with their expected tenure and primary institutional base. In total, the ATT Project will provide 244 person months of long-term expatriate TA at a total estimated cost of $3.483 million (Table D-1).

a) FUNSIPA Program Advisor and Chief of Party (COP): (5 years). Serves as principal advisor to FUNSIPA management and to the Project Secretariat, located at FUNSIPA headquarters. Primary functions are: (1) Assist the

Project Secretariat to interpret AID regulations and program documents and establish procedures for meeting CPs; (2) assist Project Secretariat in designing Project Operating procedures and annual programming guidelines, (3) assist FUNSIPA in implementation of its program responsibilities; (4) create liaison mechanisms which facilitate inter-institutional use of the technical assistance team; (5) promote open communications among ATG&T institutions and between them and AID; (6) help develop monitoring procedures and report formats, and arrange for periodic evaluations; and (7) serve as COP to the expatriate TA team, including representation, policy guidance, coordination, supervision, and the provision of administrative support services.

b) Business Manager: (2 years). Serves as advisor to the FUNSIPA Project Implementation Manager; located at FUNSIPA headquarters. Primary functions are: (1) provide advice to principals involved in establishing private sector technology transfer enterprises; (2) assist INIPA, ONA, the UNA Foundation, and UNA in resolving business management problems; (3) assist FUNSIPA Project Implementation Manager to establish the procedures for safeguarding, managing and allocating Project funds; and (4) advise on organization of supporting services to expatriate TA team, including selection of an office manager.

c) Seed System Advisor: (3 years and 3 months; then intermittent for two years). Serves as principal advisor to the FUNSIPA managed Improved Seed Multiplication, Distribution and Certification Activity; located at FUNSIPA headquarters. He must have a graduate degree in agricultural economics, as well as have seed industry experience. Primary functions are: (1) backstop three national advisors in assisting seedsmen at selected sites to improve their individual operations; (2) advise on organizing Seed Improvement Associations; (3) advise on technical and business aspects of seed production, conditioning, storage, distribution and certification; (4) assist INIPA in redesigning and implementing its breeder and foundation seed programs; (5) assist UNA to develop an internal policy regarding its involvement in the Peruvian seed multiplication and distribution system; and (6) assist INIPA, UNA and Seed Improvement Associations to collaborate in establishing effective seed certification programs.

d) Institutional Development Advisor: (2 years and 3 months; then intermittent for 3 years). Serves as advisor to INIPA Director and his senior staff; located at INIPA headquarters. This position requires a senior advisor with extensive hands-on experience in managing large public sector research organizations, and in managing liaison with private sector research interests. The advisor's functions are: (1) assist the INIPA Director and his senior staff to identify and deal with major public sector research institution problems, e.g., salary scales, budget justification and defense; (2) introduce methods which improve liaison and promote closer understanding

and cooperative approaches to common problems with UNA, ONA and other ATG&T public and private institutions; (3) help to define and suggest ways of dealing with research program management problems (e.g., prioritization, research publication, technology wholesaleing, acquiring current scientific information, upgrading staff, etc.).

e) Research Advisor: (2 Years; then intermittent for 2 years) Serves as advisor to INIPA's Director and Director of Research; located at INIPA headquarters. Primary functions are: (1) assist with the prioritization, planning, design, implementation and monitoring of research; (2) assist in selection, development and assignment of staff; (3) assist in development and use of linkages with the international scientific community; (4) assist in budget allocation, justification, reprogramming and execution; and (5) assist INIPA's Director of Research explain these programs to the GOP, AID, and other sector institutions. Although Headquartered in INIPA, this specialist will advise the FUNSIPA Project Implementation Manager and selection committees on appropriate criteria for competitive research project selection, and also works with UNA faculty and administration on research matters.

f) Technology Transfer Advisor: (2 years). Serves as advisor to INIPA Director of extension and to FUNSIPA and ONA on matters related to Technology Transfer; headquartered in INIPA. Will assist in: (1) design, implementation and monitoring of technology transfer programs; (2) selection, development and assignment of technology transfer staff of INIPA; and (3) in budget development, allocation, programming and execution for technology transfer activities of INIPA, FUNSIPA and ONA.

g) Education Advisor: (3.5 years; then intermittent for 2 years). This is the only resident advisor to the UNA Foundation and UNA; located at UNA. As such, he is responsible for: (1) developing and maintaining relationships which permit him to interpret the needs and desires of the faculty and administration for short term advisors and to identify, coordinate, service, and continue a variety of activities initiated by short term advisors; (2) working closely with the UNA Project Implementation Manager and the Rector to help plan and coordinate implementation of UNA activities; (3) serving as the principal training officer on the expatriate TA team; (4) working with the FUNSIPA Project Implementation Manager and with the training selection committee to establish effective criteria for selecting fellowship and scholarship applicants; and (5) working with INIPA on design criteria for staff development programs.

4. Short Term Expatriate Advisors

The ATT program will provide 130 person months of short term expatriate TA at a total estimated cost of $1.69 million (Table D-1). Short term assistance has been allocated by program Component and Activity on an

illustrative basis, based on prior experience with similar programs. Short term TA will be programmed in Annual Implementation Plans. Requirements for short term expatriate advisory services will respond to the identification of problems needing solution or to opportunities to advance programs rather than attempting to fit a predesigned scheme. For this reason, flexibility is required in the use of this resource, based on needs identified by resident advisors.

5. Administrative Support Requirements for Expatriate TA Team

The Office of the COP will require the following local hire administrative support staff:

(a) Office Manager
(b) Senior Secretary (Bilingual)
(c) Clerk/Typist
(d) Messenger/Chauffeur.

In addition, COP will be authorized to contract, on a short term basis, local hire professional and/or administrative support personnel to carry out special studies, to provide logistic support to short-term consultants, and to permit orderly operations of the expatriate TA team.

The Office of COP also will be provided with two vehicles from AID Project Funds, one for use of the COP's office and the other for assignment by the COP for required field work of the expatriate TA team to the extent that counterpart institutions are unable to provide transportation. The COP Office is responsible for monitoring and insuring appropriate vehicle useage. AID Project funds also will be provided for office furniture and equipment required for effective operation of the office of the COP. Counterpart implementing institutions are expected to provide office space, furniture, equipment, transportation and logistical support for other expatriate members of the resident TA team and for short term advisors.

6. Summary of Expatriate Technical Assistance and Financial Costs

Monthly unit cost estimates for expatriate TA range from US$13,000 to US$15,000 depending on experience and seniority required for the position, and whether the position is long term or short term. These estimates are based on recent USAID cost experience with Title XII universities and US consulting firms carrying out TA in Peru, plus a projected average cost increase over the LOP for inflation adjustments and contingency factors (inflation calculated at 5% per year cumulative and contingency at 4% to 5%). Long term expatriate TA totals 244 person months and short term totals 130 person months for the LOP.

Total expatriate TA person months and costs by long term and short term, and by Project year are shown in Table D-1.

B. National Advisors

The ATG&T system in Peru is young. It will be several years before key public and private sector institutions in the system reach a level of maturity, viability, and income stability to be able to rely primarily on their internal personnel capacities for the technical and professional knowledge base and expertise required to manage that system at a level of efficiency and quality acceptable by international standards.

Broadly-based senior technical/managerial advisory input required for the ATG&T system during the Project period is being supplied through the expatriate TA program described in the preceding sections. Because of the diverse nature of the ATG&T system and the numerous areas of specialized training and expertise needed for assuring effective functioning of that system, a gap will exist for the medium term between the numbers and quality of professional technical/managerial personnel that ATG&T system institutions can mobilize internally, and the amount of expatriate TA that reasonably can be provided with the funding level available from the ATT Project. Thus, the ATT Project will provide AID grant resources to fund the cost of national specialists as advisors to bridge the technical/managerial gap during the LOP. These national advisors will have no employer/employee relationship with any public sector institution while serving as advisors.

During PP preparation, a review was carried out of Peruvian professionals with the types of advanced and specialized training and experience needed to fill the professional human resources gap while the Project brings about the attitudinal, institutional and resource availability changes needed for internally staffing the technical and managerial needs of the ATG&T system. The review identified approximately 100 qualified professionals. Six out of ten of these professionals who were queried indicated that they would be interested in professional opportunities as advisors in ATG&T type activities, were these to become available. Selected members of this group of professionals were interviewed in depth. These indicated that they would prefer to provide professional services in Peru. Two such professionals who recently had accepted international advisory positions indicated that if similar professional opportunities were available in Peru, they would prefer to remain in Peru and, further, that they would find Peruvian private sector professional salary levels to be acceptable, even though these are significantly lower than those of the international advisory positions they had accepted.

Given 1) the availability of qualified senior Peruvian professionals, 2) the initial need for professional exertise in the ATG&T system that cannot be supplied through personnel capacities within key ATG&T system institutions, and 3) the potential for advisors to be permanently replaced over time by

direct hire professionals who have either been up-graded from within or have been hired into the ATG&T system. National advisors will be contracted to fill the technical assistance gap between expatriate advisors and internal implementing institution capabilities as required to achieve project objectives. AID grant funds in the approximate amount of US$2.8 million will be made available to FUNSIPA to contract an average of 20 national advisors per year for the LOP to fill advisory positions required for advising in implementation of Project activities. FUNSIPA will establish a salary scale for national advisors based on a continuing system of surveying salary levels of equivalent personnel in Peruvian private sector business and firms, including Peruvian consulting firms. The salary survey plan and the method for establishing salary scales therefrom will be included as a part of the FUNSIPA Implementation plans approved by USAID/Peru. FUNSIPA may procure national advisors through personal services contracts or institutional contracts, or some combination of the two, at their election. National advisors cannot fill line positions in an implementing institution, except on an acting basis in accord with Peruvian law and practise.

The national advisor positions and costs are shown by Project year in Table D-2. Unit costs are based on experience with similar positions under the REE and APID Projects.

C. Project Support Staff

Certain professional, technical, managerial, and administrative support positions are required for Project management and monitoring purposes during LOP. These are not permanent line positions, nor are they required positions in a fully functioning ATG&T system. They are necessary as the result of the special financial, administrative and technical management and monitoring requirements of the Project. These positions will be financed from AID Project resources to be managed by FUNSIPA and will be implemented through local hire personal services or institutional contracts.

The projected Project support staff positions and costs are shown by Project year in Table D-3.

TABLE D-1 ILLUSTRATIVE STAFFING PATTERN AND FINANCIAL COSTS FOR EXPATRIATE TECHNICAL ASSISTANCE TO ATT PROJECT
(By Institutional Base, Specialty, Person Months and Project Year).

Institutional Base and Specialty	Person Months by Project Year							Monthly Unit Costs* (US$000's)1/	Total Costs by Year (US$000's)						
	1	2	3	4	5	6	TOTAL		1	2	3	4	5	6	TOTAL
A. FUNSIPA	(22)	(42)	(36)	(32)	(17)	(8)	(153)		(305)	(562)	(504)	(452)	(245)	(120)	(2,208)
1. Program Advisor and Chief of Party	8	12	12	12	12	8	60	15	120	180	180	180	180	120	960
2. Business Manager	8	12	4	0	0	0	24	13	104	156	52	0	0	0	312
3. Seed System Advisor**	3	12	12	12	0	0	39	14	42	168	168	168	0	0	546
4. Short Term Advisors	3	6	8	8	5	0	30	13	39	78	104	104	65	0	390
B. INIFA	(24)	(48)	(33)	(14)	(14)	(2)	(135)		(336)	(672)	(459)	(182)	(182)	(26)	(1,857)
1. Institutional Devel. Advisor**	6	12	9	0	0	0	27	15	90	180	135	0	0	0	405
2. Research Advisor**	6	12	6	0	0	0	24	14	84	168	84	0	0	0	336
3. Technology Transfer Adviser	6	12	6	0	0	0	24	14	84	168	84	0	0	0	336
4. Short-Term Advisors	6	12	12	14	14	2	60	13	78	156	156	182	182	26	780
C. UNA Foundation/UNA	(9)	(19)	(22)	(22)	(7)	(3)	(82)		(123)	(259)	(298)	(298)	(91)	(39)	(1,108)
1. Education Advisor**	6	12	12	12	0	0	42	14	84	168	168	168	0	0	588
2. Short Term Advisors	3	7	10	10	7	3	40	13	39	91	130	130	91	39	520
D. Expatriate Totals	(55)	(109)	(91)	(68)	(38)	(13)	(374)		(764)	(1,513)	(1,261)	(932)	(518)	(185)	(5,173)
1. Long Term	43	84	61	36	12	8	244		608	1,188	871	516	180	120	3,483
2. Short Term	12	25	30	32	26	5	130		156	325	390	416	338	65	1,690
E. Local Hire Staff	(25)	(48)	(48)	(48)	(48)	(32)	(233)		(14.6)	(26.4)	(26.4)	(26.4)	(26.4)	(17.8)	(138.0)
1. Office Manager	8	12	12	12	12	8	60	1.00	8	12	12	12	12	8	64
2. Senior Secretary	6	12	12	12	12	8	58	0.50	3	6	6	6	6	4	31
3. Clerk/Typist	3	12	12	12	12	8	55	0.40	1.2	4.8	4.8	4.8	4.8	3.2	23.6
4. Messenger/Chauffer	8	12	12	12	12	8	59	0.30	2.4	3.6	3.6	3.6	3.6	2.6	19.4
GRAND TOTAL									778.6	1,539.4	1,287.4	958.4	544.4	202.8	5,311.0

*Includes total personnel costs per person month, including salaries, fringe benefits, travel & transportation, allowances, other direct costs miscellaneous, overhead, commodities, G&A and Fixed Fee.

**Once these advisors complete residency period, they will return on an intermittent basis as short term advisors (included in short-term advisor line item.

1/ Inflation and contingency included in unit cost estimates.

TABLE D-2 ILLUSTRATIVE STAFFING PATTERN AND FINANCIAL COSTS FOR NATIONAL ADVISORS IN ATI PROJECT
(By Institutional Base, Specialty, Person Years, and Project Year).

Institutional Base and Specialty	Person Years by Project Year							Unit Costs (per person year) (US$000's)1/	Total Cost by Year (US$000's)						
	1	2	3	4	5	6	TOTAL		1	2	3	4	5	6	TOTAL
A. INIFA Advisors	(20)	(20)	(14)	(6)	(0)	(0)	(60)		(562.0)	(562.0)	(406.0)	(180.0)	(0)	(0)	(1,752.0)
1. NR & NRS program	15	15	10	5	0	0	45	30	450.0	450.0	300.0	150.0	0	0	1,350.0
2. Research Planning and Evaluation	1	1	1	1	0	0	4	30	30.0	30.0	30.0	30.0	0	0	120.0
3. Technology transfer Specialist program (one in manpower dev. and one in program dev.)	2	2	1	0	0	0	5	24	48.0	48.0	24.0	0	0	0	120.0
4. Business Management	1	1	1	0	0	0	3	30	30.0	30.0	30.0	0	0	0	90.0
5. Human Resources Training	1	1	1	0	0	0	3	24	24.0	24.0	24.0	0	0	0	72.0
B. UNA & UNA Foundation Advisors	(5)	(5)	(3)	(0)	(0)	(0)	(13)		(108.0)	(108.0)	(108.0)	(24.0)	(0)	(0)	(348.0)
1. Research Program Development and Implementation	1	1	1	0	0	0	3	30	30.0	30.0	30.0	0	0	0	90.0
2. Curriculum Development and Revision	1	1	1	0	0	0	3	30	30.0	30.0	30.0	0	0	0	90.0
3. Business Management	1	1	1	1	0	0	4	24	24.0	24.0	24.0	24.0	0	0	96.0
4. Non-Degree Training Program Development	1	1	1	0	0	0	3	24	24.0	24.0	24.0	0	0	0	72.0
C. Private Sector Advisors	(3)	(12)	(12)	(9)	(3)	(3)	(42)		(840.0)	(276.0)	(276.0)	(216.0)	(54.0)	(54.0)	(960.0)
1. Private Sector Technology Transfer Enterprises Dev.															
a. Tech. Transfer Specialist	0.5	1	1	1	0	0	3.5	24	12.0	24.0	24.0	24.0	0	0	84.0
b. Enterprise Dev. Specialist	0.5	1	1	1	0	0	3.5	30	15.0	30.0	30.0	30.0			105.0
c. Field Operations Spec.	0	3	3	2	2	2	12	18	0	54.0	54.0	36.0	36.0	36.0	216.0
2. Seed System Development															
a. Organization Specialist	0.5	1	1	1	0	0	3.5	30	15.0	30.0	30.0	30.0	0	0	105.0
b. Quality Control Spec.	0.5	1	1	1	0	0	3.5	30	15.0	30.0	30.0	30.0	0	0	105.0
c. Field operation Spec.	0	3	3	2	1	1	10	18	0	54.0	54.0	36.0	18.0	18.0	180.0
3. Technology Communications Specialist	0.5	1	1	1	0	0	3.5	30	15.0	30.0	30.0	30.0	0	0	105.0
4. Manpower Development and Training	0.5	1	1	0	0	0	2.5	24	12.0	24.0	24.0	0	0	0	60.0
GRAND TOTAL	28.0	37	29	15	3	3	115		774.0	966.0	792.0	420.0	54.0	54.0	3,060.0

1/ Inflation and contingency included in unit cost estimates.

TABLE D-3 ILLUSTRATIVE STAFFING PATTERN AND FINANCIAL COSTS FOR PROJECT SUPPORT STAFF TO ATT PROJECT
(By Institutional Base, Position Title, Person Years and Project Year).

Insitutional Base and Position	Person Years by Project Year							Unit Costs (per person year) (US$000's)1/	Total Cost by Year (US$000's)						
	1	2	3	4	5	6	TOTAL		1	2	3	4	5	6	TOTAL
1. Project Secretariat Office	(3	(3)	(3)	(3)	(3)	(3)	(18)		(47)	(47)	(47)	(47)	(47)	(47)	(282)
a. Office Chief	1	1	1	1	1	1	6	30	30	30	30	30	30	30	180
b. Assistant	1	1	1	1	1	1	6	12	12	12	12	12	12	12	72
c. Senior Secretary	1	1	1	1	1	1	6	5	5	5	5	5	5	5	30
2. FUNSIPA Project Implementation Management Support	(9)	(9)	(9)	(9)	(9)	(9)	(54)		(124)	(124)	(124)	(124)	(124)	(124)	(744)
a. Implementation Manager	1	1	1	1	1	1	6	30	30	30	30	30	30	30	180
b. Competitive Research Grants Activity Manager (1.c.)	1	1	1	1	1	1	6	18	18	18	18	18	18	18	108
c. Seed System Development Activity Manager (2.c.)	1	1	1	1	1	1	6	18	18	18	18	18	18	18	108
d. Library and Communication Materials, and Fellowship/ Scholarship Program Activities Manager	1	1	1	1	1	1	6	24	24	24	24	24	24	24	144
e. Financial and Procurement Manager	1	1	1	1	1	1	6	18	18	18	18	18	18	18	108
f. Secretarial Support	4	4	4	4	4	4	24	4	16	16	16	16	16	16	96
3. INIPA Project Implementation Support	(2)	(2)	(2)	(2)	(2)	(2)	(12)		(41)	(41)	(41)	(41)	(41)	(41)	(246)
a. Implementation Manager	1	1	1	1	1	1	6	36	36	36	36	36	36	36	216
b. Senior Secretary	1	1	1	1	1	1	6	5	5	5	5	5	5	5	30
4. ONA Project Implementation Support	(3)	(3)	(3)	(3)	(3)	(3)	(18)		(47)	(47)	(47)	(47)	(47)	(47)	(282)
a. Implementation Manager	1	1	1	1	1	1	6	30	30	30	30	30	30	30	180
b. Financial Manager	1	1	1	1	1	1	6	12	12	12	12	12	12	12	72
c. Senior Secretary	1	1	1	1	1	1	6	5	5	5	5	5	5	5	30
5. UNA Foundation Project Implementation Management Support	(2)	(2)	(2)	(2)	(2)	2)	(12)		(35)	(35)	(35)	(35)	(35)	(35)	(210)
a. Implementation Manager	1	1	1	1	1	1	6	30	30	30	30	30	30	30	180
b. Senior Secretary	1	1	1	1	1	1	6	5	5	5	5	5	5	5	30
GRAND TOTALS	21	21	21	21	21	21	126	--	294	294	294	294	294	294	1,764

1/ Inflation and contingency includes in unit cost estimates.

Detailed Post-Graduate Academic Training Plan and Schedule

All post-graduate academic fellowship and scholarship participants, whether for study in-country or off-shore, will be selected competitively. However, it is anticipated that the majority of the participants to study off-shore will come from UNA and INIPA, with the regional universities and the private sector providing most of the M.S. in-country participants. The in-country M.S. participants will enter the two year UNA Program in groups of approximately 50, 75 and 75 during years 2, 3, and 4 of the Project. Off-shore participants will be selected and processed for programs beginning in years one through five for post-doctoral and sabbatic study, and beginning in years one, two and three for Ph.D. and specialized M.S. participants. Tables PG-1 and PG-2 to this Annex provide illustrative distributions of participant training by specialty and sponsoring institution, while table PG-3 provides a projected training schedule.

Table PG-1: Illustrative List of Off-Shore Post-Graduate Academic Training, by Type of Training, Specialty and Sponsoring Institution

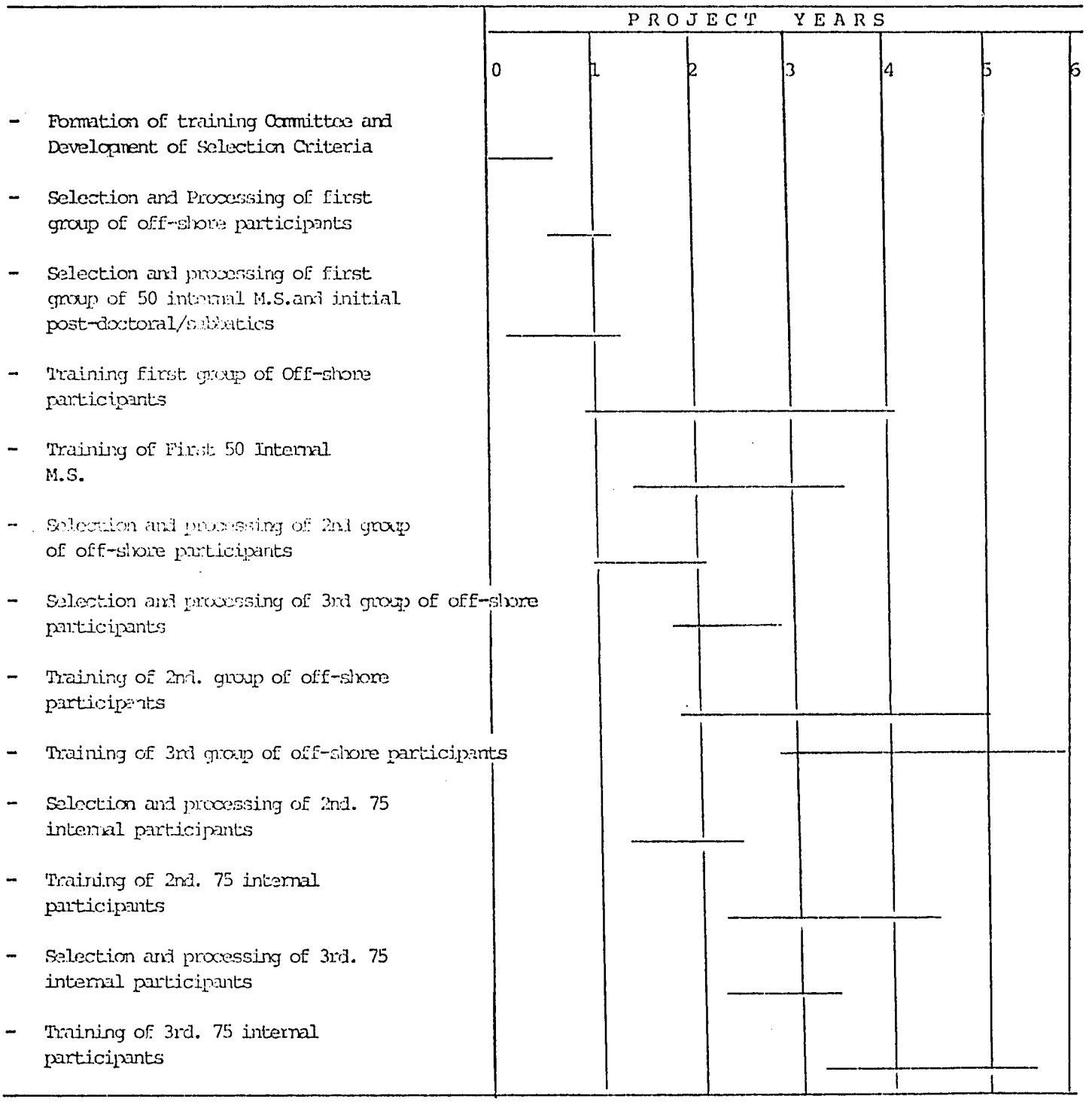
	Post-Doctoral and Sabbatic Study		Ph.D. (& Specialized MS Study		
	UNA	INIPA	UNA	INIPA	TOTAL
1. Plant Breeding	2	1	1	2	6
2. Entomology	1	1	1	1	4
3. Virology	1	1	1	1	4
4. Weed Science	1	1	1 (MS)	1 (MS)	4
5. Food Science and Nutrition	1	-	1	1 (MS)	3
6. Soil Fertility	-	-	1 (MS)	1 (MS)	2
7. Agricultural Economics	2	1	2	1	6
8. Animal Science	1	-	1 (MS)	1 (MS)	3
9. Range Science	-	-	-	1 (MS)	1
10. Plant Pathology	1	1	1	1	4
Total participants 1/	10	6	10	11	37
Person years	5	3	28 (Ph.D.) 6 (M.S.) 34 Total	24 (Ph.D.) 10 (M.S.) 34 Total	

1/ 16 Post-doctoral/Sabbatic fellows
8 Specialized M.S. Participants
13 Ph.D. Participants
37 (20 from UNA; 17 from INIPA)

Table PG-2: Illustrative List of In-Country M.S. Training by Specialty and Sponsoring Institution

	Regional Univ.	Ministry of Agriculture	INIPA	Other Public Institutions	Private Sector	Totals
1. Soils	15		2		4	21
2. Plant Pathology	7		2		2	11
3. Entomology	7		5		2	14
4. Agricultural Production			15			15
5. Nutrition	7					7
6. Agricultural Production & Extension		20			10	30
7. Animal Production	15		5	2		22
8. Agricultural Economics	18	10	10		10	48
9. Water & Soil Resource Engeneering	7	5			5	17
10. Feed Technology	4			2		6
11. Genetic Improvement			5			5
12. Agricultural Engineering				2	2	4
Total	80	35	44	6	35	200

Table PG-3: Post-Graduate Academic Training Schedule



ANNEX II

EXHIBIT F

DETAILED FINANCIAL ANALYSIS

TABLES AND BUDGETS

(NATIONAL RESEARCH AND RESEARCH

SUPPORT PROGRAMS)

TABLE F9 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: INIPA Headquarters.

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS		COSTS			TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
HEADQUARTERS																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	200	200	-	-	-	200	200	-	-	-	600	600	-	-	-	1000	1000	
- S.T.	10	-	-	100	110	110	10	-	100	110	20	-	-	300	320	40	-	-	500	540	
b. National	15	-	-	100	115	15	-	-	100	115	30	-	-	300	330	60	-	-	500	560	
2. Payroll	-	600	1000	-	1600	-	600	1050	-	1650	-	600	3246	-	4046	-	2000	5296	-	7296	
3. Equipment		-																			
Office	-	200	-	200	400	-	200	-	200	400	-	219	-	100	319	-	619	-	500	1119	
Field	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vehicles	50	50	-	50	150	-	50	-	50	100					-	50	100	-	100	250	
4. Construction	-	50	-	-	50	-	50	-	-	50	-	-	-	-	-	-	100	-	-	100	
5. Training	47	40	-	72	159	59	40	-	84	183	69	120	-	44	233	175	200	-	200	575	U. Ph.D. (10) NS Int. 2 NS Ext. (11) SC Ext.
6. Over. Costs	30	100	-	160	290	30	100	-	160	290	90	300	-	480	870	150	500	-	800	1450	
7. Contingencies	40	200	-	200	440	40	200	-	290	440	119	600	-	601	1320	199	1000	-	1001	2200	
TOTAL	192	1240	1000	1082	3514	154	1240	1050	1184	3628	328	2039	3246	2885	8498	674	4519	5296	3601	13690	

TABLE F10 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Rice

	YEAR ONE					YEAR TWO					YEAR 3-5		TOTALS								GRAND TOTAL
	FINANCIAL COSTS					FINANCIAL COSTS					FINANCIAL		COSTS			FINANCIAL COSTS					
UNITS	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Rice																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	100	100	-	-	-	100	100	-	-	-	300	300	-	-	-	500	500	
- S.T	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	500	-	500	-	-	550	-	550	-	-	1763	-	1763	-	-	2813	-	2813	
3. Equipment																					
a. Lab	30	-	-	26	56	30	-	-	20	50	-	-	-	-	-	60	-	-	46	106	
b. Field	30	5	-	10	45	30	5	-	10	45	-	10	-	-	10	60	20	-	20	100	
c. Vehicles	80	-	-	30	110	-	-	-	-	-	-	-	-	-	-	80	-	-	30	110	
4. Construction	43	50	-	47	140	-	50	-	40	90	-	40	-	-	40	43	140	-	87	270	
5. Training	60	50	-	60	170	90	50	-	90	230	30	128	-	130	288	(180)	228	-	280	508	
6. Operational costs	25	70	-	10	105	25	70	-	10	105	50	210	-	30	290	100	350	-	50	500	
7. Imprevistos	-	45	-	-	45	-	45	-	-	45	-	136	-	-	136	-	226	-	-	226	
TOTAL	278	220	500	283	1281	185	220	550	270	1225	100	524	1763	360	2847	383	964	2813	1013	5173	

TABLE F11 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Corn

UNITS	YEAR ONE FINANCIAL COSTS AID	Counterpart	GOP Regular	Other sources	Total	YEAR TWO FINANCIAL COSTS AID	Counterpart	GOP Regular	Other sources	Total	YEAR 3-5 FINANCIAL AID	Counterpart	TOTALS COSTS GOP Regular	Other sources	Total	TOTALS FINANCIAL COSTS AID	Counterpart	GOP Regular	Other sources	Total	GRAND TOTAL
Corn																					
1. Technical Assistance																					
a. External																					
.L. T	-	-	-	100	100	-	-	-	100	100	-	-	-	300	300	-	-	-	500	500	
.S.T.	15	-	-	10	25	15	-	-	10	25	28	-	-	30	58	58	-	-	50	108	
b. National	10	-	-	-	10	10	-	-	-	10	30	-	-	-	30	50	-	-	-	50	
2. Payroll	-	-	950	-	950	-	-	990	-	990	-	-	3150	-	3150	-	-	5090	-	5090	
3. Equipment																					
Labs	18	20	-	107	145	-	20	-	100	120	-	60	-	-	60	18	100	-	207	325	
Field	94	20	-	50	164	-	20	-	50	70	-	60	-	-	60	94	100	-	100	294	
Vehicles	150	[illegible]	-	50	220	180	30	-	50	260	-	-	-	-	-	330	50	-	100	480	
4. Construction	125	80	-	100	305	-	80	-	100	180	-	240	-	360	600	125	400	-	560	1085	(1)Ph.D: (2) (10) (Int'l Ce
5. Training	73	10	-	48	131	85	10	-	60	155	76	10	-	57	143	(234)	30	-	165	195	
6. Oper.Costs	25	200	-	100	325	25	200	-	100	325	75	555	-	275	905	125	955	-	475	1555	
7. Contingencies	-	70	-	-	70	-	70	-	-	70	-	196	-	-	196	-	336	-	-	336	
TOTAL	510	420	950	555	2445	315	430	990	570	2305	209	1121	3150	1022	5502	800	1971	5090	2157	10018	

TABLE F12 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Potatoes

	YEAR ONE					YEAR TWO					YEAR 3-5					TOTALS					GRAND TOTAL
	FINANCIAL COSTS					FINANCIAL COSTS					FINANCIAL COSTS					FINANCIAL COSTS					
UNITS	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Potatoes																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	100	100	-	-	-	100	100	-	-	-	300	300	-	-	-	500	500	
- S.T.	5	-	-	-	5	5	-	-	-	5	10	-	-	-	10	20	-	-	-	20	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	530	-	580	-	-	620	-	620	-	-	1985	-	1985	-	-	3185	-	3185	
3. Equipment																					
Labs	20	25	-	50	95	-	25	-	-	25	-	50	-	-	50	20	100	-	50	170	
Field	95	25	-	50	170	-	25	-	-	25	-	50	-	-	50	95	100	-	50	245	
Vehicles	100	50	-	50	200	100	-	-	50	150	-	-	-	-	-	200	50	-	100	350	
4. Construction	60	50	-	100	210	58	50	-	100	208	-	100	-	100	200	118	200	-	300	618	
5. Training	73	5	-	17	95	85	5	-	29	119	54	10	-	34	98	(212)	20	-	80	100	Prog D (1) $ Int' Cent
6. Oper. Costs	25	120	-	60	205	25	120	-	60	205	75	360	-	148	583	125	600	-	268	993	
7. Contingencies	-	40	-	-	40	-	40	-	-	40	-	134	-	-	134	-	214	-	-	214	
Total	378	315	580	427	1700	273	265	620	339	1497	139	704	1985	582	3410	578	1284	3185	1348	6395	

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TABLE F13 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Cereals

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Cereales																					
1. Technical Assistance																					
a. External																					
-L.T.	-	-	-	100	100	-	-	-	100	100	-	-	-	300	300	-	-	-	500	500	
-S.T.	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	530	-	530	-	-	570	-	570	-	-	1838	-	1838	-	-	2938	-	2938	
3. Equipment																					
Labs	60	40	-	37	137	-	40	-	-	40	-	20	-	-	20	60	100	-	37	197	
Field	90	20	-	50	160	90	20	-	-	110	-	30	-	-	30	180	70	-	50	300	
Vehicles	90	30	-	50	170	-	30	-	-	30	-	-	-	-	-	90	60	-	50	200	
4. Construction	28	60	-	50	138	-	60	-	50	110	-	60	-	100	160	28	180	-	200	408	
5. Training	48	10	-	15	73	60	10	-	25	95	61	-	-	19	80	(169)	20	-	59	79	PH D (1) Int'l MS I (8) center MS (5) (4)
6. Oper. Costs	25	100	-	30	155	25	100	-	30	155	75	300	-	106	481	125	500	-	166	791	
7. Contingencies	-	25	-	-	25	-	25	-	-	25	-	70	-	-	70	--	120	-	-	120	
Total	351	285	530	332	1493	185	285	570	205	1245	156	480	1838	525	2999	523	1050	2938	1062	5573	

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TABLE F14 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Grain Legumes

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS		TOTALS COSTS			TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Grain Legumes																					
1. Technical Assistance																					
a. External																					
-L.T.	-	-	-	100	100	-	-	-	100	100	-	-	-	300	300	-	-	-	500	500	
-S.T.	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	820	-	820	-	-	860	-	860	-	-	2707	-	2707	-	-	4337	-	4337	
3. Equipment																					
Labs	40	20	-	51	111	40	20	-	-	60	-	60	-	-	60	80	100	-	51	231	
Field	50	60	-	40	150	50	-	-	-	50	-	-	-	-	-	100	60	-	40	200	
Vehicles	100	40	-	60	200	70	-	-	50	120	-	-	-	-	-	170	40	-	110	320	
4. Construction	75	60	-	80	215	-	60	-	80	140	-	180	-	120	300	75	300	-	280	655	
5. Training	73	10	-	49	132	79	10	-	55	144	48	10	-	42	100	(200)	30	-	146	176	Ph.D (2) Int'l MS E (1) Center MS
6. Oper. Costs	25	100	-	35	160	25	100	-	35	160	75	300	-	104	479	125	500	-	174	799	
7. Contingencies	-	50	-	-	50	-	50	-	-	50	-	164	-	-	164	-	264	-	-	264	
Total	373	340	820	415	1948	274	240	860	320	1694	143	714	2707	566	4030	590	1294	4337	1301	7572	

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TABLE F15 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Oil Seed Crops

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Oil Seed Crops																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	40	40	-	-	-	40	40	-	-	-	120	120	-	-	-	200	200	
- S.T.	10	-	-	-	10	10	-	-	-	10	30	-	-	-	30	50	-	-	-	50	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	400	-	400	-	-	440	-	440	-	-	1393	-	1393	-	-	2233	-	2233	
3. Equipment																					
Labs	35	20	-	60	115	-	20	-	54	74	-	20	-	-	20	35	60	-	114	209	
Field	40	20	-	50	110	-	20	-	50	70	-	20	-	-	20	40	60	-	100	200	
Vehicles	30	20	-	50	100	-	-	-	-	-	-	-	-	-	-	30	20	-	50	100	
4. Construction	25	25	-	70	120	25	25	-	70	120	-	50	-	210	260	50	100	-	350	500	
5. Training	53	10	-	20	83	71	10	-	40	121	56	10	-	40	106	(180)	30	-	100	130	Ex D.(1) (2) (4) (5) Int'l centers (6)
6. Oper. costs	20	120	-	65	205	20	120	-	65	205	60	360	-	170	590	100	600	-	300	1000	
7. Contingencies	-	55	-	-	55	-	55	-	-	55	-	171	-	-	171	-	281	-	-	281	
TOTAL	213	270	400	355	1238	126	250	440	319	1035	146	631	1393	540	2710	305	1151	2233	1214	4903	

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TABLE F16 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Tropical Crops

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS		TOTALS COSTS			TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Tropical Crops																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	100	100	-	-	-	100	100	-	-	-	300	300	-	-	-	500	500	
- S.T.	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	340	-	340	-	-	380	-	380	-	-	1227	-	1224	-	-	1944	-	1944	
3. Equipment																					
Labs	50	50	-	-	100	-	-	-	-	-	-	-	-	-	-	50	50	-	-	100	
Field	50	50	-	-	100	-	-	-	-	-	-	-	-	-	-	50	50	-	-	100	
Vehicles	60	100	-	-	160	-	-	-	-	-	-	-	-	-	-	60	100	-	-	160	
4. Construction	50	50	-	-	100	-	50	-	-	50	-	-	-	-	-	50	100	-	-	150	
5. Training	48	10	-	28	86	66	10	-	28	104	48	10	-	9	67	(162)	30	-	65	95	Ph D (1) MS (1) 6
6. Oper. Costs	30	60	-	25	115	30	60	-	25	115	90	180	-	83	323	150	300	-	133	583	S.S (Ex) 6
7. Contingencies	-	20	-	-	20	-	20	-	-	20	-	62	-	-	62	-	102	-	-	102	
Total	298	340	340	153	1131	106	140	380	153	779	158	252	1224	392	2026	400	732	1944	698	3774	

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TABLE F17 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Andean Crops

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS		TOTALS FINANCIAL COSTS								GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Andean Crops																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	40	40	-	-	-	40	40	-	-	-	120	120	-	-	-	200	200	
- S.T.	15	-	-	-	15	15	-	-	-	15	45	-	-	-	45	75	-	-	-	75	
b. National	-	-	-	10	10	-	-	-	10	10	-	-	-	30	30	-	-	-	50	50	
2. Payroll	-	-	380	-	380	-	-	420	-	420	-	-	1309	-	1309	-	-	2109	-	2109	
3. Equipment																					
Labs	15	20	-	30	65	-	20	-	30	50	-	40	-	-	40	15	80	-	60	155	
Field	20	10	-	30	60	-	10	-	30	40	-	20	-	-	20	20	40	-	60	120	
Vehicles	30	10	-	40	80	-	-	-	-	-	-	-	-	-	-	30	10	-	40	80	
4. Construction	30	50	-	50	130	30	50	-	50	130	74	150	-	150	374	134	250	-	250	634	
5. Training	59	10		24	93	77	10		41	128	53	10			63	(189)	30	-	65	95	Ph.D (1) M.S (1) (6) S.C. (ex) (4)
6. Oper. costs	25	60	-	40	125	25	60	-	40	125	75	150	-	125	350	125	300	-	205	630	
7. Contingencies	-	35	-	-	35	-	35	-	-	35	-	106	-	-	106	-	176	-	-	176	
	194	195	380	264	1032	147	185	420	241	993	247	536	1309	425	2487	399	856	2109	930	4324	

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TABLE F18 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Livestock

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
Livestock																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	120	120	-	-	-	120	120	-	-	-	360	360	-	-	-	600	600	
- S.T.	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	
2. Payroll	-	-	550	-	550	-	-	650	-	650	-	-	2109	-	2109	-	-	3309	-	3309	
3. Equipment																					
Labs	70	10	-	20	100	70	10	-	20	100	45	30	-	34	109	185	50	-	74	309	
Field	70	10	-	20	100	70	10	-	20	100	35	30	-	10	75	175	50	-	50	275	
Vehicles	50	50	-	50	150	50	-	-	-	50	-	-	-	-	-	100	50	-	50	200	
4. Construction	-	70	-	100	170	-	70	-	100	170	-	30	-	40	70	-	170	-	240	410	
5. Training	78	15	-	53	146	96	15	-	71	182	31	30	-	6	67	(205)	60	-	130	190	Ph.D (1) S.C. (1) MS (Ex) 2 ; MS
6. Oper. costs	25	140	-	30	195	25	140	-	30	195	60	390	-	90	540	100	670	-	150	930	
7. Contingencies	-	60	-	-	60	-	60	-	-	60	-	165	-	-	165	-	285	-	-	285	
TOTAL	303	355	550	393	1601	321	305	650	361	1637	191	675	2109	540	3515	610	1335	3309	1294	6548	

TABLE F19 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Agro-economics

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
AGROECONOMICS																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	20	20	-	-	-	20	20	-	-	-	60	60	-	-	-	100	100	
- S.T	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	80	-	80	-	-	85	-	85	-	-	290	-	290	-	-	455	-	455	
3. Equipment																					
Labs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	45	-	-	-	45	40	-	-	-	40	-	-	-	-	-	85	-	-	-	85	
Vehicles	60	20	-	-	80	-	20	-	-	20	-	40	-	-	40	60	80	-	-	140	
4. Construction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5. Training	67	5	-	70	142	70	5	-	73	148	64	10	-	59	133	(201)	20	-	202	222	(2) PhD (5 [illegible] (2) MS (5 [illegible])
6. Oper. Costs	20	50	-	12	82	20	50	-	-	70	60	150	-	-	210	100	250	-	12	362	
7. Contingencies	-	10	-	-	10	-	10	-	-	10	-	30	-	-	30	-	50	-	-	50	
TOTAL	202	85	80	102	469	140	85	85	93	403	144	230	290	139	783	285	400	455	314	1454	

TABLE F20 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Pest Management

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
PEST MANAGEMENT																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	40	40	-	-	-	40	40	-	-	-	120	120	-	-	-	200	200	
- S.T	10	-	-	-	10	10	-	-	-	10	30	-	-	-	30	50	-	-	-	50	
b. National	10	-	-	-	10	10	-	-	-	10	30	-	-	-	30	50	-	-	-	50	
2. Payroll	-	-	240	-	240	-	-	280	-	280	-	-	969	-	969	-	-	1489	-	1489	
3. Equipment																					
Labs	56	50	-	49	155	-	50	-	-	50	-	150	-	-	150	56	250	-	49	355	
Field	50	30	-	50	130	-	30	-	50	80	-	90	-	-	90	50	150	-	100	300	
Vehicles	100	40	-	50	190	50	30	-	50	130				50	50	150	70	-	150	370	
4. Construction	50	50	-	150	250	50	50	-	150	250	-	100	-	100	200	100	200	-	400	700	
5. Training	72	10	-	47	129	84	10	-	59	153	69	20	-	44	133	225	40	-	150	190	(1) Ph D (10) MS Int (2) MS (10) Sc Ext
6. Oper. Costs	125	60	-	40	125	25	60	-	40	125	75	180	-	120	375	125	300	-	200	625	
7. Contingencies	-	50	-	-	50	-	50	-	-	50	-	174	-	-	174	-	274	-	-	274	
TOTAL	373	290	240	426	1329	229	280	280	389	1178	204	714	969	434	2321	561	1254	1489	1249	4603	

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TABLE F21 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Soils & Water

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL		COSTS			TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
SOILS & WATER																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	20	20	-	-	-	20	20	-	-	-	60	60	-	-	-	100	100	
- S.T	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	5	-	-	-	5	5	-	-	-	5	14	-	-	-	14	24	-	-	-	24	
2. Payroll	-	-	100	-	100	-	-	140	-	140	-	-	588	-	588	-	-	828	-	828	
3. Equipment																					
Labs	50	20	-	52	122	50	20	-	-	70	-	60	-	-	60	100	100	-	52	252	
Field	60	20	-	25	105	60	20	-	25	105	-	60	-	-	60	120	100	-	50	270	
Vehicles	50	20	-	30	100	30	-	-	30	60	-	-	-	-	-	80	20	-	60	160	
4. Construction	-	25	-	50	75	-	25	-	50	75	-	-	-	50	50	-	50	-	150	200	
5. Training	41	10	-	13	64	44	10	-	16	70	19	20	-	13	52	(104)	40	-	42	82	(1) MS (Ext) (4) MS (Int) (2) sho
6. Oper. Costs	20	60	-	25	105	20	60	-	25	105	60	280	-	76	416	100	300	-	126	526	
7. Contingencies	-	20	-	-	20	-	20	-	-	20	-	46	-	-	46	-	86	-	-	86	
TOTAL	236	175	100	215	726	219	155	140	166	680	113	466	588	199	1366	464	696	828	580	2578	

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TABLE F22 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Genetic Resources

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
GENETIC RESOURCES																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	40	40	-	-	-	40	40	-	-	-	120	120	-	-	-	200	200	
- S.T	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	20	20	-	-	-	20	20	-	-	-	60	60	-	-	-	100	100	
2. Payroll	-	-	260	-	260	-	-	300	-	300	-	-	1012	-	1012	-	-	1572	-	1572	
3. Equipment																					
Labs	57	30	-	50	137	-	34	-	50	84	-	100	-	73	173	57	164	-	173	394	
Field	50	50	-	75	175	50	50	-	75	175	-	50	-	-	50	100	150	-	150	400	
Vehicles	60	30	-	50	140	-	20	-	-	20	-	-	-	-	-	60	50	-	50	160	
4. Construction	25	200	-	200	425	25	200	-	200	425	-	100	-	100	200	50	500	-	500	1050	(1) Ph D (2) NS (Ex
5. Training	72	10	-	44	126	75	10	-	50	135	44	20	-	22	86	(191)	40	-	116	156	
6. Oper. Costs	20	60	-	70	150	20	60	-	70	150	60	180	-	194	434	100	300	-	334	734	
7. Contingencies	-	30	-	-	30	-	30	-	-	30	-	90	-	-	90	-	150	-	-	150	
TOTAL	294	410	260	549	1513	180	404	300	505	1389	124	540	1012	569	2245	407	1354	1572	1623	4956	

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TABLE F23 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Laboratories

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
LABORATORIES																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	40	40	-	-	-	40	40	-	-	-	120	120	-	-	-	200	200	
- S.T	10	-	-	-	10	10	-	-	-	10	20	-	-	-	20	40	-	-	-	40	
b. National	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2. Payroll	-	-	150	-	150	-	-	190	-	190	-	-	694	-	694	-	-	1034	-	1034	
3. Equipment																					
Labs	100	60	-	94	254	50	50	-	50	150	40	50	-	50	140	190	160	-	194	544	
Field	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vehicles	12	11	-	20	43	-	-	-	-	-	-	-	-	-	-	12	11	-	20	43	
4. Construction	-	25	-	25	50	-	25	-	25	50	-	-	-	-	-	-	50	-	50	100	
5. Training	47	20	-	30	97	59	20	-	30	109	44	60	-	90	194	(150)	100	-	150	250	1 NS Ext 10 Sc Ext 10 Sc I.c.
6. Oper. Costs	20	90	-	60	170	20	90	-	60	170	60	270	-	150	510	100	450	-	300	850	
7. Contingencies	-	20	-	-	20	-	20	-	-	20	-	60	-	-	60	-	100	-	-	100	
TOTAL	189	226	150	269	834	139	205	190	205	739	164	440	694	440	1738	542	871	1034	914	3161	

TABLE F24 - ATT Project Detailed Budget by Year, Line Item and Source of Funds for INIPA NR & NRS Programs: Computer

UNITS	YEAR ONE FINANCIAL COSTS					YEAR TWO FINANCIAL COSTS					YEAR 3-5 FINANCIAL COSTS					TOTALS FINANCIAL COSTS					GRAND TOTAL
	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	AID	Counterpart	GOP Regular	Other sources	Total	
COMPUTER																					
1. Technical Assistance																					
a. External																					
- L.T.	-	-	-	40	40	-	-	-	40	40	-	-	-	120	120	-	-	-	200	200	
- S.T	10	-	-	-	10	10	-	-	-	10	30	-	-	-	30	50	-	-	-	50	
b. National	10	-	-	40	50	10	-	-	40	50	30	-	-	120	150	50	-	-	200	250	
2. Payroll	-	-	200	-	200	-	-	240	-	240	-	-	842	-	842	-	-	1282	-	1282	
3. Equipment																					
Labs	70	20	-	100	190	70	20	-	50	140	-	60	-	50	110	140	100	-	200	440	
Field	-	10	-	-	10	-	10	-	-	10	-	30	-	-	30	-	50	-	-	50	
Vehicles	10	30	-	50	90	-	20	-	-	20	-	-	-	-	-	10	50	-	50	110	
4. Construction	-	50	-	50	100	-	50	-	50	100	-	-	-	-	-	-	100	-	100	200	2 NS (Ext) 10 Sc Ext 10 Sc.
5. Training	47	20	-	47	114	59	20	-	59	138	44	60	-	44	148	(150)	100	-	150	250	
6. Oper. Costs	20	80	-	75	175	20	80	-	75	175	60	240	-	225	525	100	400	-	375	875	
7. Contingencies	-	60	-	-	60	-	60	-	-	60	-	163	-	-	163	-	283	-	-	283	
	167	270	200	402	1039	169	260	240	314	933	164	553	842	559	2118	350	1083	1282	1275	3990	

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A N N E X II

E X H I B I T G

D E T A I L E D T E C H N I C A L A N A L Y S I S

(Portions of Consultant's Reports)

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A PROPOSED AID REE PROGRAM: 1986-1995 1/

A. Introduction

This paper contains a proposed assistance program from AID for continued support to sustain, and further enhance and integrate the recapitalization of Peru's REE System. The program suggested herein for AID is an integral part of the overall REE development strategy proposed in the recent Assessment of Peru's REE system (referred to hereafter as the Assessment).[1]

The workplan for the preparation for the Assessment called for team recommendations for a proposed division of labor among the major donors in implementing the various elements of the Assessment strategy. Indeed, this paper was originally conceived and initially written and presented as the last chapter of the draft assessment. It was apparent during the initial review of the draft assessment that IDB and World Bank team members felt that an attempt to define the division of labor among the donors was not possible, or desirable at this preliminary stage. Consequently, it was decided among the team, AID, IDB and World Bank to present the team's recommendations to AID separately from the Assessment since identifying elements of the Assessment strategy for AID, implicitly relegated the balance of the strategy recommendations to other donors. Making a separate report to AID also permitted AID to avoid more public distribution of its preliminary planning documents.

The decision to not attempt to set forth the division of labor among donors reflects greater awareness by all of the nature of IDB and World Bank programming, where requests are originated by the government for assistance, and also reflects the uncertainty of current GOP plans regarding such requests. There are various ways in which our proposed program strategy and recommended program elements (in the Assessment) could be implemented in a coordinated donor effort, with many different variations in the actual division of labor among the major and minor donors. The eventual outcome will depend, of course, on needs as defined by the GOP in discussions with the various international funding agencies, and concurrence among them.

We note, however, that all the elements of strategy and the proposed recommendations made in the Assessment are important and should be implemented as a set in order to realize the greatest benefits and sustain the momentum realized to date. Moreover, the task at hand is clearly beyond the capacity of any single international funding agency to finance. Finally, INIPA has indicated its general agreement with the Assessment strategy which provides a preliminary expression of GOP concurrence.

The Assessment strategy and related program and policy recommendations are founded on the substantial successes realized in Phase I of AID

1/ Consultants i t - Experience Incorporated, Dec. 2, 1985

assistance to the REE system (in the highly collaborative and integral effort with IDB, the World Bank, and other minor donors). The Assessment program is directed toward the problems and issues identified in Section V of the Assessment which still constrain and restrict the institutionalization of a self-sustaining REE system. The principal foci of the REE assistance program proposed in the Assessment is on: (1) further recapitalization of the system, especially human capital; (2) consolidation and focusing of REE efforts; (3) coordination among the principal REE entities (especially INIPA, and the universities); (4) enhancement of technology transfer; (5) strengthened involvement of the private sector; and (6) a continuing policy dialogue.

The proposed program we recommend for AID comprises only part of these overall Assessment strategies, and reflects our judgement about priority areas for AID support. We believe, however, that it is imperative that AID continue to exercise leadership for development of the overall Assessment strategy and recommendations, and assure that all the strategic elements presented in the Assessment are addressed by the donor community. The eventual outcome of such coordination may well be a different subset and configuration of the major elements of the overall proposed strategy for AID's implementation, than the subset we propose below.

The substance and exposition of the team's program recommendations to AID, set forth below, are tied directly to the Assessment; indeed, references are made throughout this paper to data and concepts in the Assessment.

B. The Problem

The general problem of developing a science-base for Peru's agriculture has been discussed in great detail in the Assessment and will only be summarized here. The substantial decapitalization of the entire public and private agricultural sector during the 1968-1980 period has been the focus of much of AID's (and the rest of the donor communities') efforts to recapitalize the sector, with a special intensive effort directed toward the recapitalization of the REE system in an integral, multi-donor financed REE strategy based on the 1979 Baseline Study.[2]

This effort has borne fruit, with substantial progress in a relatively short time. Significant levels of human and physical capital have been put in place, strong linkages have been established with international agricultural research centers, development and dissemination of new technologies have occurred, and more new technologies are coming on stream.

Yet, while rapid and perhaps even remarkable progress has been realized, and there is strong momentum in the REE system, there are several constraints to continued growth and development, and movement toward a self-sustaining REE institutional system. Constraints directly affecting the REE system include: (1) insufficient human capital throughout the sector and the difficulty of retaining highly qualified scientists and

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technicians in INIPA, the uiversities, and similar institutions; (2) a set of macro policies which reduce and distort production incentives to small farmers; (3) a tendency to proliferate research and extension efforts and to over-extend the system relative to its capacity; (4) weak and tenuous linkages and relationships among peer REE institutions to their client groups, or to the policy formulation process, and (5) limited credibility or popular support, with inadequate financial support.

The program for AID support recommended below is intended to help address these problems while capitalizing on the successes realized to date. Once again, the AID effort is intended to provide the overall conceptual approach for other donors. Consequently, AID's program needs to be developed in strict coordination and in continued consultation with the other donors in order to assure that all the elements of the strategy and associated program recommendations in Sections VI and VII of the Assessment are fully addressed.

C. Criteria for Selecting AID Elements of the Assessment Strategy

There are several criteria which the team utilized to recommend elements of the overall Assessment strategy for AID's consideration. Each are considered, briefly:

1. Leadership and Experience

The Peru AID mission has provided the leadership to a whole series of activities in Peru's REE system, including the 1979 Baseline Study; the 1982 Presidential Task Force; the conceptual basis (in its PP for the AID REE project) for the broader multi-donor REE program; the 1984 REE Evaluation; and the Assessment including the four background papers, and the involvement of IDB, and World Bank. The substantial base of experience embodied in Mission personnel, and their long and successful leadership of support from international funding agencies to the REE system to develop an integral multi-donor financed REE program provide one basis for recommending future programming elements for AID's consideration.

2. Comparative Advantages in Technical Assistance, Training, and Institution Building

Two of four principal elements of AID's overall policy guidance emphasize U.S. comparative advantages in: (a) institutional development and training; and (b) technology research, development and tramsfer. The U.S. has shifted its development portfolio strongly toward these two policy obejctives. One aspect of U.S. comparative advantage is our long history of experience in training and technical assistance associated with institution building projects, especially in agricultural research, extension, and education. Our experience and comparative advantage is comprised among a host of public and private sector firms and agencies such as PVOs, universities, cooperative organizations, and consulting firms. In contrast, the U.S. has moved away from large capital transfer projects in

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which the international lending institutions appear to have a comparative advantage.

3. Influence on GOP Counterpart Funds

AID has considerable influence over the use of GOP-owned, local currency funds, generated through the sale of PL 480 commodities in Peru. In fact, AID must agree to proposed GOP uses of such funds. One problem in Phase I of the integral REE program is that GOP counterpart funds have not always been provided to meet commitments to IDB or World Bank loans. AID already has influenced the allocations of PL 480 generated counterpart to the World Bank REE loan. There may be opportunities for even greater use of this influence in Phase II.

4. Willingness to be Involved in Policy Dialogue

Another one of the four principal elements of AID policy is policy dialogue. The AID mission in Lima has been aggressive in implementing this element of AID's overall policy, and indeed, is the leader among donors in engaging the GOP at various levels, on a continuing basis, on the need for improved and more constructive policies for the sectors of AID interest, especially agriculture.

5. Mandate for Private Sector Concerns

The fourth element of overall AID policy is reliance on the private sector and market forces. Again, the AID mission has vigorously pursued this policy objective with a clear leadership record in assistance to private sector REE efforts.

6. Global Level of Funding Available for REE

The global level of AID funding for REE over the next ten years is estimated to be $40-50.0 million. This limit obviously constrains the level of direct AID support.

These six criteria are now applied to set forth a recommended AID REE program from the overall Assessment strategy and recommendations.

D. Sector Goal

The broad sector goal of the proposed AID program is to improve the resource productivity and production of Peruvian farmers, thereby increasing their income, and simultaneously providing an increased supply of better quality, lower-priced food for rural and urban consumers.

E. Program Purpose

The purpose of the proposed AID program is to increase and sustain the flow of new technical knowledge from Peru's REE system which meets the

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needs of Peru's farmers, and to enhance communication of farmers' problems back to the REE system.

F. Principal Program Elements

We recommend AID undertake the following program recommendations (see Assessment Section VII) (as qualified below):

(1) INIPA Consolidation;

(2) Regional University Strengthening; and

(3) Private Sector Development.

1. INIPA Consolidation

AID should continue its assistance to INIPA as a Phase II of its current assistance effort. This would be the centerpiece of AID and other donor efforts during Phase II. AID should take the lead in working with INIPA and other major donors to assure that all the elements of the Assessment's recommendations for INIPA are addressed. AID and the other major donors have been operating in this mode for nearly three years with leadership for the more integral effort coming from AID, INIPA, and NCSU. Thus, we believe AID has an imperitive to continue leading out in what we and others perceive as a relatively successful effort.[3] We recognize that it will be more difficult to develop separate projects for each donor, since, in essence, their funds are combined into an integral multi-donor program in Phase I. We suggest the same general division of labor along regional lines, and by classes of inputs (see below).

Assistance to INIPA in a Phase II effort from AID and other donors should emphasize further developing and strengthening of the institution, and on consolidating and focusing its programs. This assistance should:

(a) Continue with NPPs as a major basis for organizing and focusing research and extension efforts. We advise that NPPs be constrained to corn, rice, edible legumes, cereals, potatoes, the Sierra, the Selva (including Andean Crops), and Livestock, and that every effort be made to consolidate and focus the resources in each program with main emphasis on quality. For example, it may make sense to integrate various components of the Livestock Program with the Sierra and Selva programs or vice-versa. Similar comments may apply to the program for Andean Crops relative to NPPs especially in white corn, potatoes, edible legumes, and cereals;

(b) Continue with NSPs with principal emphasis on the agricultural economics program, quantitative services and human resources development. Emerging programs which appear especially important are the soils-water-plant, integrated pest management, and seeds and

livestock improvement programs. We believe emphasis on genetic resources should be reconsidered since so much genetic material is readily available from international centers. Also, we suggest the national service laboratory program be consolidated into major experiment station centers of excellence (see below);

(c) Consolidate programs, and concentrate and focus efforts on highest priority activities. Great care should be taken to avoid spreading the scarce human resources of INIPA too thinly into management of new NPPs or NSPs unless such new efforts are absolutely vital;

(d) Fortify and greatly strengthen one major experiment station for each of the 6-8 major agro-ecological zones of Peru (as an integral part of NPPs and NSPs, and in strict coordination with donor efforts to strengthen regional universities). Such centers of research excellence should be in as close as proximity to a progressive regional university as is possible;

(e) Locate one of the major experiment stations at La Molina to become the National Research Station as conceptualized in the initial AID project paper. This station should be linked closely to the graduate program at UNA;

(f) Encourage greater inter-institutional coordination and division of labor, especially with UNA and selected regional universities;

(g) Improve INIPA's management, and management information systems; and

(h) Provide research and extension support grants to UNA regional universities, and INAF.

AID should provide assistance to INIPA in accord with its comparative advantage in institution building in REE, through technical assistance and training. We suggest AID accept responsibility for long and short-term advisors to INIPA; for PhD and MS training abroad at at UNA, and for short-course training at the IARC's; for salary supplements and merit travel awards; and for funds for INIPA study and research grants to UNA, the regional universities, and its own Agro-economics unit. The total cost to AID for these inputs is $24.2 million, while other donors would provide $56.7 million, and the GOP $120.1 million, including $100 million for salaries (see the financial plan, Table 1, Part J below). Contingency and inflation factors are not included in these figures (see Assessment, Section VII, Table 13). The other donors would provide principally operations and capital support, internal short course training; and technical assistance for the co-leaders (continuing the same role as in Phase I). The GOP would provide principally salaries, plus nearly 25 percent of the non-salary operations and captial budgets.

We also recommend AID strongly support and obtain concurrence from the GOP to allocate funds from PL 480 to serve as counterpart to AID, IDB, and World Bank loans, in order to address one of the principal constraints to more effective use of loan funds in Phase I.

More detail on the AID inputs is given in Part I below.

(2) Regional University Strengthening

AID should accept responsibility for strengthening up to three selected regional universities, leaving up to three others to be assisted by the other major donors. Again, the U.S. and AID have a long and relatively successful history of assistance to agricultural universities, with a strong comparative advantage in this area. We wanted to recommend that AID accept responsibility for all six regional universities, but believe it may be beyond their funding capacity. In this regard, other donors may wish to consider using U.S. technical assistance and training for any World Bank or IDB funding support to the regional universities.

We suggest that regional universities be selected for strengthening that are in close proximity to a major INIPA experiment station; have some evidence of program viability in agriculture; are in representative agro-ecological zones; and are willing to contribute some of their own resources to the program.

Assistance to each regional university would:

(a) develop and strengthen the capacity of the university to participate in the regional, national, and international agricultural science networks;

(b) improve the quality of the university faculty and programs, and ultimately the quality of graduates;

(c) link the university strongly into the regional science network;

(d) improve the coordination and division of labor among the various actors in the REE, especially between INIPA and the universities;

(e) upgrade laboratories and equipment on a selected basis; and

(f) provide formal and informal training for faculty and research support for students.

Total AID support for strengthening three universities is estimated at $10.3 million dollars (see Part J, Financial Plan, Table 1). Training comprises more than one-half of this, while operations support is $2.5 million, and short-term technical assistance is $2.0 million.[4] Again, if AID has sufficient funds it may wish to accept responsibility for up to six regional universities. Also, the effort at each university could be

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expanded, principally through provisions of long-term technical assistance. We believe AID should proceed with some caution, however, and start more modestly. Regional universities have limited absorptive capacity, and also have a reputation for being somewhat volatile politically. Nevertheless, several of them are now contributing to regional development, and could do much more with strategically placed resources. AID should proceed with up to three, and as a base of experience is built, the program can be expanded as warranted and needed.

Again, AID should use its influence to allocate GOP owned funds guaranteed by PL 480 as counterpart to any loans by IDB and World Bank for regional university strengthening.

The regional university strengthening effort is quite discrete, and unlike INIPA consolidation, lends itself quite easily to AID programming and a separate project.

3. Support for Private Sector REE Activities

AID should continue support for private sector REE activities, especially in the principal valleys where nascent producer associations are attempting to mount and carry out applied research and extension efforts. These efforts appear to be principally in crops which are outside INIPA's principal thrust, and therefore, are highly complementary to INIPA. AID should assure that any support given to private REE efforts in the same crops and livestock as in INIPA's program, is provided in a fully coordinated manner, with no duplication of effort.

AID should also provide support to private sector firms to help augment the quality and quantity of improved seeds available to farmers. AID assistance to the private sector, generally, should recognize that private investments are made in REE efforts on the basis of expected profits. Great care should be taken that assistance from AID to private sector REE efforts is not captured and incorporated into the profits of just members of the associations, but is catalytic and produces more general economic and social benefits. Such assistance should:

(a) Provide small grants for basic recapitalization of private sector REE efforts, with the Ica and Chincha Producers Association being primary targets for such assistance. Any grants to these entities should be made on the basis of effective use of the initial grants, and of demonstrated further need. Other grants should be considered case-by-case for similar organizations in other valleys and regions;

(b) Provide small grants for continuation and replication of the training program in supervised credit carried out by the Instituto Rural Valle Grande, for the BAP, if justified by an ex-post study of the current training effort;

(c) Provide a revolving fund for venture capital for loan to producers of registered and certified seed for release to farmers;

(d) Finance studies of the utility and effectiveness of check-offs (autogravamenes) and income tax credits or deductions on funding support for public and private REE activities; and

(e) Finance studies and promotion of exports through the UNA Foundation.

AID is probably the only donor with a clear mandate ·o support and trengthen the private sector, and already has a limited history of nvolvement in assistance to private sector REE efforts, with some evidence f success.

The proposed AID assistance to the private sector REE effort is stimated to cost $7.0 million including $6.5 million for the revolving und and small grants, $.3 million for special studies, and $.2 million for echnical assistance (see Part J, Table 1, below).

G. Supporting Recommendations

We also recommend that AID:

(1) provide leadership in engaging the GOP in a continuing policy dialogue;

(2) obtain GOP agreement to provide PL 480 proceeds as counterpart to IDB, and World Bank loans for any integral Phase II effort; and

(3) provide leadership among donors for assuring all elements of the Assessment strategy and program recommendations are addressed in a coordinated manner, in Phase II.

Each of these recommendations are now considered, in turn.

Continue Policy Dialogue

AID should take the initiative among donors in carrying out a continuing policy dialogue with the GOP. While this element of our recommendations is not programmable, it is of fundamental importance since policy changes affect the program elements suggested above, so very directly. Moreover, AID has been at the forefront of policy discussion with the GOP in the past and is in a prime position to continue its leadership. The principal focus of the policy dialogue should be on:

(a) Increasing the level and sustainability of GOP funding and support for Peru's REE system, and especially for INIPA;

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(b) Increasing the remuneration of scientists and technicians who are part of an international labor market, to levels that will permit them to be retained as part of Peru's REE system; and

(c) Assuring that research and extension continue as part of INIPA, recognizing that they are part of a process or continuum, and not seperable, discrete functions.

In addition, AID also should include in its policy agenda discussion of macro-economic policies affecting agriculture, including: credit and interest rates; exchange rate policy; and trade policy.

2. Encourage Use of PL 480 Proceeds as Counterpart

AID should support the use of GOP-owned PL 480 funds as counterpart to AID, IDB, and World Bank loans. While this point has been made in F.1, and 2 above, it bears repeating here. The difficulty in obtaining GOP counterpart funds to match World Bank and IDB loans has been a major constraint to more progress in Phase I; indeed, the IDB disbursements have been held up for several months because of this problem, and development of CIPAs in the South Sierra is lagging.

AID influence has helped to resolve a similar problem with World Bank by encouraging the GOP to assign PL 480 as counterpart to the World Bank REE loan. Thus, AID already has a history of successful use of this mechanism. Moreover, it is the only major donor with this kind of comparative advantage. We believe it will be an effective use of AID's leverage if it can convince the GOP to assign PL 480 proceeds as counterpart to IDB and World Bank loans for a second Phase multi-donor effort.

3. Assure all Elements of "Assessment" Strategy and Recommendations are Addressed by Donors

AID needs to continue its role as leader and broker, to assure that all the elements of Strategy and program recommendations in the Assessment are addressed by donors in Phase II of the REE program.

We have already suggested how the division of labor might occur with AID taking responsibility for some parts of INIPA consolidation; strengthening three of six regional universities; and assisting private sector REE efforts for a total estimated cost of $41.5 million. This, of course, leaves the Assessment recommendations for research coordination; technology transfer; a significant share of INIPA consolidation; and strengthening of three regional universities completely in the hands of other donors. The total amount of estimated costs for these efforts by other donors is $81.2 million, with $168.7 million for the GOP.

The recommendations we have made herein suggest a division of labor among donors which they need to consider and discuss before a multi-donor

program along the lines suggested in the Assessment can become a reality. Our main point is that AID is in the best position to lead out in hosting such discussions, and that this needs to be done fairly early in order to provide appropriate lead time for program development.

For example, Dennis Purcell of World Bank has suggested the need for grant funding for part of the research coordination component, with an international bank loan financing the program implementation activities.[5] It may be that after discussion with IDB, and World Bank, and possibly other donors like Canada, that the proposed AID program we have suggested above may need to be modified.

H. Expected Outputs

(1) Up to eight principal research stations, one for each major agro-ecological zone, functioning as centers of excellence for agricultural research and extension efforts in the zone, in close coordination with a regional university, simultaneously strengthened with AID or other donor assistance;

(2) Up to six regional universities, each with a greatly strengthened faculty, with research and extension programs fully integrated into the regional, and national REE system; and producing well-trained graduates for employment in the REE system, and Peru's private agricultural sector;

(3) NPPs (for major crops and problem areas) which are consolidated, highly focused, and with resources concentrated on the highest priority crops and regions;

(4) A more efficient INIPA with a functional management information system capable of budgeting and evaluating by major program focus;

(5) Division of labor among the various entities in the REE system with full collaboration between INIPA, and the UNA, and regional universites with little (or no) duplication of effort;

(6) Emergence of "Coordinated Duality" in the REE system with both INIPA and the universities playing an important role in coordinating, as well as implementing research and related extension efforts;

(7) An INIPA with greatly increased popular and financial support;

(8) Integration of research and extension activities in the REE system, but especially in INIPA reflecting a smooth process of technology development and transfer, and feedback from farmers about their technical, economic, management, and family problems;

B. The REE System 1/

Peru's REE system can be characterized as emulating the Phoenix, a mythical bird which, although consumed by flames, arose from the ashes. Several major efforts have been made since the early 1900s to develop Peru's institutional capability in agricultural research, extension, and education. Although each effort resulted in some evidence of an emerging, viable REE system, this was always followed by a rapid decline. New efforts then were mounted to revitalize the REE system and help its rebirth, Phoenix-like, from the ashes of prior decapitalization.

The most recent initiative to rejuvenate the REE system was mounted and refined during the 1980-85 period, with the difficult task of attempting to breathe life into REE institutions practically devoid of human or physical resources after more than a decade of neglect. This important effort focused on integrating public sector research, extension and education into a unified national system, with strong linkages between the key institutional actors (INIPA and UNA).

The World Bank, IDB, AID and numerous smaller donors have played a major role in this post-1980 effort by assisting the GOP with its recapitalization of the REE system. The major donors have collectively committed $72.2 million in various loans and grants to INIPA for technical assistance, training, buildings, laboratory equipment, vehicles and other operational support, and $43.7 million of these funds are estimated to have been expended. The GOP committed $53.8 million of counterpart funding for operations and capital items, of which $10.5 million has been expended, and another $53.0 million for salaries, all of which has been expended.

The principal institutional actors in the REE system are: (1) The National Institute for Agricultural Research and Extension (INIPA); (2) The National Agrarian University (UNA); (3) the regional universities; (4) private sector REE efforts; and (5) other public institutions.

INIPA and UNA are the key institutions of the REE system. The regional agricultural universities are also potentially very important, and a few are contributing to the REE system both through research and by training professionals for the sector

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1/ From "Assessment of the Viability and Effectiveness of Peru's Research, Education and Extension System Serving Agriculture, Experience," Inc., December, 1985 (pp. 2-12)

1. INIPA

INIPA's target clientele are farmers with 1 to 20 hectares of land. The new GOP administration has placed additional emphasis on assisting the very small landholder and wants INIPA to pay considerably more attention to the Andean campesino communities and crops.

The leadership of INIPA is vested in a Director, a Deputy Director, and Executive Directors for research and for extension. INIPA's field operations are organized into 21 Research and Extension Centers (CIPAs) with CIPA locations corresponding closely to Peru's departmental boundaries. All research, extension and educational efforts are decentralized to the CIPAs, and more than 85 percent of INIPA's staff are located at these centers.

The 21 CIPAs are divided into 40 extension zones, 240 extension agencies, and 930 sector offices. Research programs are implemented at 24 experimental stations, 36 sub-stations, and on the farms of cooperating farmers. The sectoristas (agents) are the main link with farmers, using the training and visit (T & V) extension system modified to include farm demonstrations, field days, group meetings and some mass communications methods.

The principal mechanism for integrating this geographically disperse and functionally decentralized organization is the national/regional program strategy. INIPA has concentrated its program in three major problem areas: commodity specific, with National Production Programs (NPPs) in corn, rice, cereals, edible legumes, potatoes, and livestock; regional NPPs in the Selva and Sierra; and National Support Programs (NSPs) in agro-economics, quantitative services, human resources, national soils laboratories, and seeds and animal improvement. INIPA is planning an NPP in Andean crops, and three additional support services.

2. UNA

The National Agrarian University (UNA) is the premier professional agricultural education institution in Peru. It emerged from the 1970s with a high quality faculty and program because of its independence and esprit, and has been able to contribute effectively to the REE system, in planning as well as in education and research, and to a lesser extent in extension.

The UNA is organized into eight faculties. The Faculty of Agriculture, the largest, includes three Ingenieros Agronomos, 34 Masters and 31 PhDs. The UNA is training both undergraduate and graduate students. Its eight undergraduate faculties have averaged an enrollment of 3,200 students per year for the 1982-85 period. An average of 310 students have sought masters degrees in 15 disciplines, with 70 of these from INIPA. UNA has developed a new production/extension MS program, and is closely involved in INIPA's continuing professional education program.

3. Regional Universities

Fifteen public regional universities offer a degree in agriculture. Most date from the early 1960's and are quite varied as to physical plant, caliber of faculty and quality of their graduates. We judge only six-eight of them to have minimally satisfactory programs to train BS or Ingeniero Agronomos to staff the REE system and the private sector, and they could be strengthened fairly quickly. Clearly, Peru needs fewer but higher quality agriculturally oriented regional universities located in important agro-ecological areas.

Some of these regional universities have modest research programs that address priority local problems, and use research projects to provide practical training in scientific methods to students. An example is a good guinea pig breeding and selection program at University of the Center in Huancayo. Research appears to be a prestige function at the better regional universities we visited, just as at UNA. However, the regional universities have more difficulty in funding their research. Graduates from regional institutions are reported to have better rapport with the local agricultural community and understand local farming systems and limitations.

4. Private Sector REE Efforts

There are a few private sector REE efforts that have re-emerged following the near destruction by the agrarian reform of earlier, more robust efforts. Included are the Ica and Chincha producers associations, which focus on very applied research, extension and aquisition and sale of inputs. While expropriated experiment stations have been returned it may be years, if ever, before they achieve their former prominence. The principal problem is a substantially reduced financial base among the members, and the gloomy outlook for a more profitable agriculture.

Another important effort is that of the Instituto Rural Valle Grande to train employees of the Banco Agrario to function as agricultural change agents in a supervised credit program. Preliminary results indicate this approach may merit replication.

Check-offs (autogravamenes) are used by private producers associations to generate revenues for research and extension. Other important private sector efforts inlude FUNDEAL (cotton), APA (broilers), FONGAL (milk), and several other smaller efforts.

The major efforts in private REE are by processors of agricultural products who require an assured supply of quality products, and the suppliers of agricultural inputs. Producers of tobacco, beer, and fruits contract research from UNA, and provide their own extension services, as do suppliers of farm chemicals, and fertilizers.

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C. Accomplishments

Our principal conclusion is that the post-1980 REE system has shown remarkable progress and growth, which is all the more impressive given the fact that donor funds have only been flowing since 1983, and that the usual gestation period for producing viable research results is 5-10 years. The following more specific accomplishments lead us to this optomistic general conclusion:

1. Development and Implementation of Nationwide REE Strategy

The conceptualization, emergence, and implementation of a prioritized, focused, nationwide REE strategy has taken place, with major support from international funding agencies, a uniform organization and management structure, and involving two major entities -- INIPA, and the UNA.

2. Improved Technologies from the Public Sector

There is direct evidence that INIPA, with support from UNA and utilizing the strategy discussed above, is producing a substantial quantity of research results and improved technologies. A prime example is rice in the Selva where improved varieties released by INIPA have contributed to substantial yield and acreage increases.

3. Institutional Development of INIPA

INIPA has shown significant institutional growth as evidenced by well-organized and executed research and extension programs, and viable support programs. Approximately 400,000 farmer contacts were made in 1984, and estimates are for about the same number in 1985.

4. Increases in Human Capital

The successes realized to date are closely correlated with new infusions of human capital into the REE system, both through training and employment, with a significant increase in the number of trained people since 1981.

5. Physical Recapitalization of the System

Significant amounts of physical capital ($10.0 million of donor funds and $4.7 million of Peruvian funds) have been put in place during the last three years as programmed by INIPA and UNA as part of the strategy for developing the REE system. Included are: vehicles and farm equipment; buildings; laboratories; utilities; roads; and miscellaneous supplies and parts.

6. Enhanced and Strengthened International Linkages

Working relationships among agencies in Peru's REE system and entities in the international network of agricultural science have been greatly increased in number and scope. This is an extremely important innovation

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for Peru since such linkages are necessary to realize the high returns to public expenditures on research nationally.

7. Re-emergence of Private Sector REE Efforts

Fledgling efforts by private producer associations, are focused primarily on very applied research, seed multiplication, extension, and importation and sale of inputs. The principal participants are larger farmers and the focus is usually on commercial crops not covered by INIPA, such as cotton, coffee, cane, and tree crops.

8. Effectiveness of Donor Assistance

The international funding agencies have provided an estimated 41 percent of the total of $107.2 million spent on technical assistance; training; capital items; and operations budget support to implement the nationwide REE strategy. Technical assistance from various sources and kinds has played a major role in the growth and progress noted.

9. Rates of Return to REE Investments in Peru

A recently completed study by Norton and Ganoza shows relatively high returns to public investments in Peru's REE system ranging from 17 to 38 percent.[3]

D. Constraints and Problems

There are several interrelated problems which constrain more rapid progress toward institutionalization of Peru's REE system. Some constraints are similar to the accomplishments listed above; e.g., insufficient human capital is identified as a constraint, while development of human capital is listed as an accomplishment. The relatively short life of the current REE system explains the apparent contradiction: considerable amounts of human capital have been developed in only three years, but a major need still exists which constrains further development of the system.

The following are the principal constraints identified by the team:

1. Insufficient Human Capital

The most important single restriction to more rapid development of Peru's REE system is the lack of human capital at all levels, with a clear need for more high-quality scientists and technicians, especially in INIPA.

2. Unrealistic Salary Policy and Inadequate Salaries

Peru has continued an unrealistic salary and personnel policy for many years, and has maintained salaries of civil servants at relatively low levels compared to alternatives in the national private sector, and in the public and private sector internationally. This archaic policy fails to

recognize immutable market forces, and the relatively high returns that can accrue to a country from investing in human capital. The result is difficulty with personnel retention and a continuing "brain drain".

3. Overextended INIPA Research and Extension Efforts

The research and probably the extension efforts of INIPA are spread too thinly over the country with too many major research stations and substations, given the limited human capital and operations budget. Also, there is a tendency for proliferation of efforts at the national, and especially the CIPA level.

4. Independent, Uncoordinated and Duplicative REE Efforts

The REE system still is characterized, generally, by independent and uncoordinated actions and fragmentary communication among INIPA, UNA, the regional universities, and other actors in the system, except for the NPPs where some joint planning and implementation is in process. The result is duplication of effort, overlapping jurisdictions, destructive competition for funding, and ultimately, lower incomes for Peru's farmers, and higher food prices for Peru's consumers.

5. Tenuous Linkages to the International Network of Agricultural Science

Peru's REE system has only limited, and relatively tenuous linkages to international science institutions. For example, the linkage to IARCs is maintained through provision of co-leaders to the NPPs. If funding for the co-leader program were discontinued, INIPA's working relationship with CIP, CIMMYT, and CIAT would be weakened considerably.

6. Weak Linkages to Farmers, and to Firms in the Factor and Product Markets

The linkages and relationships between public sector REE institutions, especially INIPA, and farmers are still limited relative to the toal number of farmers. While farmer contacts are increasing, the magnitude of the effort is inadequate to the task at hand.

Even greater deficiencies exist in linkages between INIPA and private sector firms in both the factor and product markets.

7. Limited Interaction Among Public Sector REE Institutions, and Peru's Policy Formulation Process

INIPA and the UNA have only limited and relatively recent interaction with Peru's policy formulation process, and little or no influence on the formulation of policy for agriculture, or the REE system.

8. Limited Credibility, Financial Support, and Sustainability

The REE system generally, and INIPA particularly, lack credibility, recognition, and a stable funding base. This is translated, through the

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political process, into lower budget piority by top GOP policy makers despite popular government rhetoric about the importance of agriculture.

9. The Andean Focus -- A Possible Constraint

The recent emphasis by the new GOP administration on highland agriculture and people (Trapecio Andino) and the production of native, low-productivity Andean crops as substitutes for imported foodstuffs, could become a constraint.

Our concern is two-fold. One is that significant resources might be shifted away from existing NPPs and NSPs to a major import substitution effort in low-productivity Andean Crops. The second is that "integrated rural development" and "farming systems research" may be substituted as panaceas for absolutely necesary research in biological technologies.

10. Uncertain Macro-Economic Policy Milieu

The macro policy climate could be a continuing constraint to growth and development of the agricultural sector, depending on the medium to long-term policy stance of the new administration which still is being formulated. The most important elements of macro-economic policy that affect agriculture include exchange rate policies; trade policy including tariffs and non-tariff barriers and import controls; subsidies; price controls on agricultural products; and credit and interest rates.

E. A Long-Term Strategy

The main thrust of our proposed strategy is continued recapitalization of the REE system, with some adjustments to improve efficiency and division of labor, increase collaboration, and enhance sustainability of the system.

Guiding principles which undergird the proposed strategy are the following: (1) continued support from the GOP and donors is essential; (2) a long-term effort of at least 10-15 years is required; (3) resources should be directed as closely as possible to constraints; (4) investments in human resources are of highest priority; (5) quality should be sought above quantity; (6) coordination of donor assistance is vital; and (7) participation in planning and collaboration in research, extension and education are more desirable courses to program integration and concentration, than institutional egocentrism.

The successes to date provide a solid foundation for a second phase effort. The following elements of strategy continue the effort along the same course as in the past, but with some mid-course corrections, changes in emphasis, and increased program coordination, and integration.

1. Train and Retain Requisite Scientists and Technicians

On-the-job training, subprofessional training, and post-graduate education, are key components of this element of strategy as significantly more, and better trained scientists and technicians are needed in the REE

system. Equally important is an overt concern for retention through suitable remuneration and job enhancement.

2. Incorporate Regional Universities into the REE System

The regional universities have the potential to make a much greater contribution to Peruvian agriculture and rural people. Integration of these universities into the REE system can result in greater, and more efficient research output as underinvolved scientists are integrated into regional research networks, and as the quality of graduates improves.

3. Integrate and Correlate the Various Components and Programs of the REE System

This element focuses on eliminating duplication of effort and overlapping jurisdictions among REE institutions by promoting the simultaneous growth of a dual structure in research in INIPA, and in the university community. These two separate-but-equal systems would collaborate to focus and coordinate their respective resources on jointly agreed research programs. The proposed programmatic model suggested below is based on CIP's proven model for conducting research in Central America.

4. Focus and Consolidate INIPA's Programs

INIPA has tasted some success and there is now a need to be conscious of the dangers of program proliferation and to seek ways to use resources more efficiently with concentration and focus of effort. We believe INIPA must be concerned about concentrating its efforts at centers of excellence associated with major experiment stations in order to assure quality control.

5. Develop a Mutually Beneficial Relationship Between Public and Private Sector REE Institutions

The private sector can and should contribute to Peru's REE system, but this contribution will supplement, rather than supplant public sector efforts. There is now a clear division of labor between public and private REE efforts which should be enhanced. UNA's emergence as the preferred public sector adjunct of private REE efforts should be strengthened. Efforts should be made to ensure private REE efforts also are part of the correlation process described in E.3 above.

6. Promote a Broader Emphasis on Technology Transfer

The T & V traditional approach to technology transfer should be broadened to include a concern for strengthening the integration of research and extension as a continuum with two-way flows of information between farmers and researchers. Careful attention should be given to the interface of research and extension workers, and especially to increasing effective extension contacts with farmers. This technology transfer thrust should include the transfer of technology as inputs and as knowledge, and the general value of technology to Peru.

7. Develop an Appropriate Policy Matrix for Production Incentives

Research and extension will have their greatest impact on agricultural production and productivity, when there are incentives for the adoption of improved technologies. An appropriate macro-economic policy milieu must be formulated and implemented if the strategy elements suggested above are to make their maximum contribution to development of a modern, science-based, high-productivity agriculture. Donors should maintain a continuing dialogue with the new GOP administration on the relationships between agricultural growth and development, and appropriate macro-policies.

F. Program Recommendations and A Policy Agenda

The team has made five major program recommendations, and suggested an agenda for policy dialogue. The focus of our recommendations (to the GOP or to donors, or to both) is noted in parentheses after the main heading, as are estimated program costs for the next ten years in constant 1985 U.S. dollars.

1. Consolidate INIPA's Institutional Development
(Donors $80.8 million, and GOP $120.0 million)

Subrecommendations are to: (a) maintain research and extension functions within INIPA; (b) develop a second phase of current multi-donor efforts; (c) continue with current NPPs and NSPs, but emphasize consolidation and concentration of INIPA's programs by developing eight regional centers of excellence each associated with a major experiment station; (d) seek to encourage greater inter-institutional coordination and division of labor between INIPA, UNA, and regional universities; and (e) continue AID's role in providing core technical assistance to INIPA, and consider continuing with NCSU.

2. Strengthen and Articulate Six Regional Universities
(Donors $20.7 million, and GOP $48.6 million)

Subrecommendations are to: (a) strengthen their capability to participate more effectively with INIPA and UNA in regional research and extension; (b) strengthen their capacity to produce better trained graduates; and (c) develop donor project support to provide needed assistance, especially training and technical assistance.

3. Stimulate Collaborative Participation of INIPA, UNA and Regional Universities in REE Program Planning and Implementation
(Donors $6.2 million, and GOP -- costs included in F.1)

Subelements of this recommendation are to: (a) establish agreement for coordinating responsibility for problem or commodity specific research at INIPA, or at a University Consortium (of UNA and regional universities) through a base grant for a research inventory and planning process, and for setting up a peer review committee; (b) comprise a joint research program committee (RPC) for each research area identified in (a) and provide a secondary joint planning grant through INIPA, or the University Consortium

for each RPC to design an action program for the research area, and to prepare a proposal for funding additional costs of the joint research program; and (c) provide a program operations grant to INIPA, and to the university consortium for funding joint research programs upon recommendation of the peer review committee.

4. Accelerate and Enhance the Technology Transfer Process
(Donors $8.1 million, and GOP -- costs included in F.1)

Subrecommendations are to: (a) establish a Technology Transfer Unit in INIPA; (b) develop donor project support to provide necessary equipment, training, materials and supplies, and technical assistance; (c) access the mass communications resources from USAID's global project; (d) create greater public awareness of the REE system; (e) develop a functional division of labor with CESPAC; and (f) strengthen the capacity of INIPA's extension specialists.

5. Stimulate the REE Private Sector in the REE System
(Donors $7.0 million, and GOP)

Subrecommendations are to: (a) develop a mechanism for selected private firms to receive registered seed from all public entities in the REE system; (b) establish a revolving capital fund, or insurance fund for loans to private firms to produce certified seed; (c) continue and expand the small grants program in support of private sector research, extension and training activities, especially among valley producer's associations and the Instituto Rural Valle Grande; (d) provide support to the UNA Foundation for export promotion; and (e) carry out special studies of the utility of self-taxation (check-offs) and donations as a basis for funding private sector REE efforts.

6. Other Program Recommendations
(Donors and GOP -- no cost estimates)

(a) support a gradual shift from salary supplements to other employment perquisites such as merit awards that will enhance retention of scientists and technicians; (b) mount a public relations effort to inform a broader public of INIPA and university contributions; and (c) mount campaign to depoliticize INIPA's top management positions.

7. An Agenda for Policy Dialogue

We propose an agenda for policy dialogue within the new GOP administration, around the donors, and between the donors and the GOP. The four elements of policy we suggest for the policy agenda are external to the system, but impact it directly and substantially. The following are the elements we propose for discussion, stated as objectives of the discussions: (a) develop a science-based, market oriented agriculture, with appropriate budget and administration support; (b) develop more supportive and viable macro-economic policies, i.e., market-valued exchange rates, reduced barriers to trade, decontrolled product and input prices; and market interest rates for agricultural credit; (c) compensate human

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capital at its maket value in order to retain vitally needed scientists and technicians; and (d) provide sustained funding support for INIPA and the REE system.

EXECUTIVE SUMMARY 1/

Introduction

The National Institute for Agricultural Research and Extension (INIPA), Government of Peru, requested the International Service for National Agricultural Research (ISNAR) to assess the research, extension, and education model of INIPA in June/July 1985. This required ISNAR to examine not only INIPA and its functions, but the context within which INIPA functions. (See terms of reference in Annex 1.) The review method consisted of open-ended interviews with various persons in INIPA, the national university system, the Ministry of Agriculture, and many other agencies concerned with agricultural research, extension, and development; and review of many reports. (See Annexes 2 and 3 for members of the review team and their itinerary.) The team received full cooperation and generous support from all, and found widespread interest in and support for INIPA.

This report represents the views of ISNAR on the strengths and weaknesses of INIPA and how it might be strengthened to serve Peru even better in the future. The report is in two sections. The first contains this introduction, and an executive summary that includes the major recommendations. The second section contains a discussion of the country setting, the institutions involved in research and extension, the major research programs, the extension service, the human resources available, linkages with international organizations, a comparison of INIPA with similar organizations in other countries, and suggests how INIPA might more fully respond to the future demand for research and extension. Specific recommendations with a rationale are presented. The report assumes a comprehensive understanding of Peru and its agriculture. Readers who need more background information will find an abundance of reports on Peru's agricultural research (1).

Development of agriculture

It appears that Peru has not done well in its agricultural sector. Per capita agricultural production has fallen steadily since 1974, decreasing by 20%. Per capita food availability declined even more, with crop production leading the decline. Agricultural development, in terms of

(1) Detailed information on each national research program and on other INIPA units is published by INIPA. The report entitled "Mid-term evaluation of the USAID research, extension and education project in Peru" (M.D. Whitaker et al, 1984) includes a concise review of the major factors affecting INIPA from 1979 to 1984. The "Background paper on the national agricultural research, extension and educational system of Peru" (A.J. Coutu and K. Raven, 1985) presents a wealth of historical and current information, as does "Study on the collaboration between international agricultural research and Peru" (English translation) (Luis J. Paz, 1985).

1/ INIPA's Response to Peru's needs for Agricultural Research and Extension, ISNAR, July, 1985 (PP 1-10)

improved quality of life for Peru's poorer farmers and herders; in terms of greater productivity by the majority of producers, traders, and processors; and in terms of improved food availability for the majority of Peru's poor, will therefore be a major measure of the success of Peru's public and private sector institutions over the next several years. That development will depend on several factors; an important one will be continued and even greater support for technology generation.

Peru has had difficulty starting and maintaining the flow of improved technology essential for a science-based agriculture. Frequent reorganization of the research and extension system (8 or more times in 30 years), inadequate integration of the two major resources - funds from the Ministry of Agriculture and skilled researchers from the university system - and lack of sustained monetary support for public research have been, and remain, major sources of these difficulties.

Increased agricultural production will occur only when producers are motivated to increase production, and when there are efficient markets to supply essential inputs and receive increased outputs. Peru's farmers will increase production when they foresee a stable market environment where essential inputs will be available when needed, and where prices received will provide a reasonable profit margin, including consideration of the degree of risk, which varies among areas and products. These conditions require a coherent set of agricultural policies that seek to replace imports of major food commodities with internal production; make food available to all at an acceptable price (which may require a two-tier market); increase agricultural exports in accord with Peru's comparative advantages; and make available essential production-increasing inputs at fair prices, even if they must be imported.

Most of the needed increase in agricultural production (especially the much-needed increases by smallholders in the Sierra and the Coast), cannot come from increasing the cultivated area, but will have to come from increased productivity. That requires an additional element - improved technology (1). The research and extension system exists to develop and diffuse a flow of improved technology to producers, traders, processors, consumers, and policy makers. It does this by identifying and solving problems and taking advantage of opportunities to increase productivity. The flow of improved technology is one of three essential elements for improved agricultural productivity, the others being motivation to produce more or more efficiently, and stable and effective markets. Development and diffusion of the essential flow of improved technology is the responsibility of the national agricultural research system, of which INIPA is an important part.

(1) The flow of improved technology to increase productivity is not an option. The production system is dynamic, not static, and if technology is held constant, the productivity of the system tends to decrease, not hold constant. This results from changes in the system, especially increases in negative influences from diseases, insects, and sometimes soil conditions.

INIPA

INIPA seeks to combine research, extension, and education to serve its clients. In this, it compares favorably with similar institutions in other Latin American nations, and around the world. In Latin America, Argentina and Colombia are the other nations that have merged research and extension, which must be done at the producer level for both to be fully successful.

Combining research and extension at the producer level in a decentralized institution has produced substantial success, and promises more benefits in the near term. For example, the area sown with modern varieties of rice has increased continuously in recent years, with a progressive decline of traditional varieties. Semi-dwarf varieties account for 58% of cultivated area and 71% of production, while traditional varieties account for 41% of the area and only 28% of output. Rice production in the Selva increased sharply from 1980 to 1984, from 96,000 tons to 156,000 tons. As a second example, the substantial improvement in maize production in the Selva represents a success for technology. In 1964, the Selva accounted for 17% of production and 24% of area, whereas in 1983 the Selva's share had increased to 46% of production and 60% of area. Substantial yield increases of 2.2% per year have been obtained in the Selva. Valuable as these increases have been to Peru, they have not been enough to increase agricultural productivity.

INIPA's formation of its research programs on the basis of five major commodities, agroeconomics, and two geographic areas, brings a highly commendable concentration of resources to a few research efforts which are undoubtedly Peru's first-order priorities. INIPA's successes in developing and extending improved technology that has already led to increased production and yields, its demonstrated ability to concentrate its resources on Peru's priority problems and opportunities, and its response to many implementation problems, are sufficient evidence that INIPA is conceptually sound as an organization and should continue to serve as the national focal point for agricultural research in Peru.

As might be expected in a young organization emerged from a series of organizations having responsibility for components of research, extension, and related topics over the last 30 years; and having to build a staff capable of performing the functions expected of it, there are opportunities to strengthen INIPA so it can be even more effective and efficient in the years ahead.

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INIPA's mandate

While INIPA's mandate has not been described uniformly in all publications and is not uniformly perceived, INIPA has generally perceived itself as having responsibility for research and extension on food crops to serve small and medium landholders.

> The ISNAR review team (hereafter referred to as "the team") recommends that INIPA's program and activities reflect the role of the leading national institution for all agricultural research and extension and that INIPA accept as its mandate a responsibility to assure that the agricultural research to meet Peru's needs is well identified, planned and executed, the results demonstrated, published, and the technology made available to its clients.

With this perception of its national role, INIPA should then look outside itself for both the problems and opportunities that require research and extension, and for the resources available to do the needed work. Many research programs could then be planned and implemented by scientists from a number of institutions, in cooperation with INIPA, and the results diffused through available public and private agencies including, but not limited to, INIPA's extension service. INIPA would then lead the processes of research planning and technology diffusion, and support cooperative research efforts with various institutions whose scientists have agreed in the planning process to do certain work. In some cases, such as sugarcane, cotton, and grapes, INIPA's role could be to help growers and processors organize research and extension, with a small cess on production for funding.

National commodity programs

National commodity research programs are often the most efficient way of organizing adaptive and strategic research on major commodities that are widely distributed. Peru's programs are well linked into the international scientific community and regularly access available technological components. Each of these programs has produced improved technologies that either are already being adopted by producers or are at the intensive on-farm testing stage and can reasonably be expected to be adopted. The commodities addressed by the five current programs have been repeatedly identified as the more important ones for Peru.

> The team recommends that support for these national commodity programs be sustained and that they be expected to supply the essential flow of improved technology for these commodities over the years ahead.

Participation in planning and implementing each of these programs needs to be broadened to include all the required scientific talent, including scientists in universities and other public and private institutions. Funds to do the agreed research need to flow from INIPA to the institution accepting responsibility to do the work. The annual research

plan needs to be based on the problems and opportunities of the clients and to take advantage of research that has already been done, in Peru and elsewhere. Full credit must be given to the scientists who do the research, whether they are in INIPA or in cooperating institutions.

Additional national commodity programs can be added over time, as the need for each is identified, and resources, especially trained personnel and operating funds, become available. Animal science is the obvious next priority for a national program. However, most of the trained scientists and physical facilities needed to do this research are in other institutions, not in INIPA.

> In keeping with INIPA's suggested perception of its role, the team recommends that the animal science research program be developed and implemented by a lead institution (an institute or a university), using all available public and private resources.

The program would be provided guidance by a small steering group that would be chaired by a senior professional within INIPA. Key senior scientists from the three or four major institutions, and some representation of the producers, would form the small steering group. The steering group would determine the relative priority among research efforts, challenge the continuation of programs, and suggest new problems and opportunities. INIPA would provide funds for the research to the lead institution, which would sub-contract for specific components with other institutions. INIPA staff would do research in a few topics and geographic areas that are essential and would not otherwise be covered. INIPA would also supply much of the agroeconomics component, and incorporate livestock management into the extension program.

Agroeconomics

The agroeconomic research program in INIPA is quite exceptional, in that few countries have so well recognized the need to include social and economic research in the research and extension program. At the farm and community level this work needs to be sustained and expanded so farmers are routinely supplied information on the costs and benefits of each technological component as part of every commodity research program. The same information needs to be collected, summarized, analyzed, and presented to the various policy-forming entities in forms that will be used to formulate policies affecting agricultural production and development. INIPA is to be highly commended for the development of its agroeconomics research program. It needs to be sustained and support increased, especially in terms of training for present personnel. As with other research programs, linkage of this research program with the appropriate universities and other public and private sector institutions will bring more talent into the research program and enhance both the quality of the research and the current awareness of the professors and students.

Local bases for research and extension

Using the "departamento", an administrative subdivision, as a basis for organizing research and extension is considerably less efficient than using agroecological zones. Agricultural research is efficiently organized on the basis of major agroecological zones having relatively uniform soils, climate and agricultural enterprises. To the extent cultural factors are also uniform, and they often are, extension is also most efficiently organized on the same agroecological zones. An agricultural experiment station, with resources and programs that fit the zone to be served, then becomes the center for research and extension work for the zone. Much of the research, and most of the extension, is done off-station, but the experiment station is the focal point.

The major agroecological zones in Peru are well known to Peruvian soil scientists. The team was informed that about 14 major experiment stations would be needed if their locations were to be based primarily on agroclimatic zones. Many of the present stations and substations could then be used for basic seed production and similar services. Research and extension personnel would be attached to the major experiment stations, under a single director of research and extension, with an associate director. (No further subdivision of the research staff should be necessary for some time, since the national commodity and agroeconomic programs will focus much of the research planning.) The needed network of major experiment stations would be developed in response to need and availability of trained personnel and adequate operating funds. Each station would be developed and staffed according to the research needed for the specific agroclimatic zone. The term "CIPA" could be applied to the experiment station headquarters to retain identification of function with clients.

> The team recommends that Peru concentrate on the development of a minimum essential network of experiment stations to serve major agroecological zones as resources become available, and that these stations be used as the focal point for research and extension at the local level.

Career status of station directors

An adequate research and extension system continuously senses and responds to the needs and opportunities of its clients - the people of the region it serves. It seeks to understand the people, their problems and opportunities, as they relate to agricultural production and development. Research programs then respond to those problems and opportunities and produce technology, and the extension system diffuses the new technology to the clients. While the research and extension system is alert to national priorities, if it is doing its job well there should be only minor changes in emphasis in response to changes in the political party in control of government. The processes of technology development and diffusion are driven primarily by the problems and opportunities of the clients. These processes should be carried out in response to the needs of the people, regardless of what political party is in control of the government. The person in charge of research and extension in a region, or nation, needs to be a competent scientist or

extensionist and administrator. (In most countries, none of the persons directly in charge of research and extension are subject to political appointment - these tasks being recognized as technical, not political, in nature).

The team recommends that the directors of the experiment stations, which need to be the directors of research and extension at the local level, be selected on the basis of technical and administrative capabilities, and be appointed as career agricultural research civil servants, not subject to political appointment.

INIPA's organization

At the national level, INIPA's present direction under a three-person "jefatura" brings the counsel of the executive directors of research and extension to the chief of INIPA, but leaves authority for all decisions with the chief. Further, all three positions are subject to political appointment. Given the technical nature of research and extension, the national director of research and extension should be a senior civil servant. Considering the need for INIPA to cooperate with a number of external organizations and integrate activities, and the need to unify research and extension, INIPA should restructure its directorship. The chief of INIPA should look to the world outside INIPA and bring awareness of that world to a single technical director. The latter would be responsible for the internal working of INIPA. All experiment station directors would report to the technical director, who would have a minimum administrative staff unit and an assistant director for contract research and liaison with research organizations outside INIPA (see Figure 1).

The team recommends that the leadership of INIPA at the national level be vested in a chief and a single technical director.

INIPA's personnel

INIPA inherited staff from a number of organizations when it was formed and part of that staff does not have appropriate training and experience for the program of INIPA. While it appears that INIPA has more personnel than are required for its program in certain areas, in other areas INIPA needs more highly trained and qualified personnel. It appears that the current circumstances are a result of staff being transferred from previous organizations, bureaucratic procedures, and layering of organizational units. After a decision has been made to organize research and extension on the basis of a limited number of experiment stations designed to serve major agroecological zones, INIPA needs detailed analyses of the supply and demand for personnel. A survey is needed of all personnel available to do research and extension. This has started in INIPA but needs to be extended to include personnel in other public sector institutions, especially the universities. The result will be a comprehensive listing of personnel, their training, experience and research interests.

Each research program's objectives need to be used as the basis for estimating the minimum numbers of research personnel and their qualifications needed to do the work, with a projection for the next 5-10 years. The projection should be made with special concern for the present and near-term future availability of trained staff. (While INIPA has many effective researchers, most of the available qualified researchers may be in other institutions, not in INIPA.) A similar approach should be used to identify the needed extension personnel and their qualifications. If these analyses of personnel needs are done, the team expects that many fewer, but better qualified, people will be needed for both research and extension. INIPA may not be able to do the second analysis objectively.

> The team recommends that INIPA complete the survey of its personnel and extend that survey to research personnel in other Peruvian institutions. It further recommends that INIPA use an external entity to develop estimates of the minimum numbers of essential research and extension personnel (and their qualifications) needed over the next 5-10 years, using the specific research programs and objectives and the extension functions in each area as a departure point.

The next steps are obvious. Match the personnel needed with those available; adjust the immediate programs to available qualified personnel resources; train personnel as needed and possible; and shed personnel who are not needed or not productive. As INIPA concentrates on the cutting edge of its functions, many well-qualified people who are now in administrative positions will be freed to actually do research and extension, thus sharply enhancing the quality of INIPA's output.

Moving operating funds

The team was informed that in a number of cases operating funds have not been provided to local units on schedule. INIPA needs to develop its budget earlier in the fiscal year than at present and request the Ministry of Finance (MF) to approve it well before the beginning of the fiscal year, and to provide an advance of funds for 60 to 90 days.

> If MF does not agree or is unable to implement this procedure, the team recommends that INIPA be authorized to contract with a bank with national coverage to receive, disburse and account for INIPA operational funds with an MF-approved budget.

If the bank option were used, the bank could receive funds from and report expenditures to MF. Funds would be advanced by the bank on schedule according to the approved budget and recovered from MF, with interest if appropriate. INIPA will need to maintain high credibility with the MF through efficient operation and demonstration of its ability to develop and diffuse technologies that increase productivity.

Facilitating essential changes

It is the team's understanding that under the labor stability law INIPA is not now able to select out those who are unproductive or do not have the appropriate training for the posts they hold. It is also understood that they cannot transfer personnel as needed or pay wages and promote personnel on the basis of performance. The reduced number of INIPA staff (expected to follow from the analyses of personnel needs and availabilities) will require adequate facilities and incentives, accurate job descriptions, regular evaluation, opportunity for promotion, and appropriate salary scales.

INIPA has an opportunity to improve the definition of its research and extension personnel needs; to ascertain available research and extension personnel both within INIPA and in other relevant institutions; to adjust its work force to the minimum numbers of personnel required; and to adjust its administrative lines of authority and procedures to accord with the several above recommendations.

The team recommends that INIPA be given the necessary legal facility to make the proposed adjustments during a 3-4 month, period in 1985.

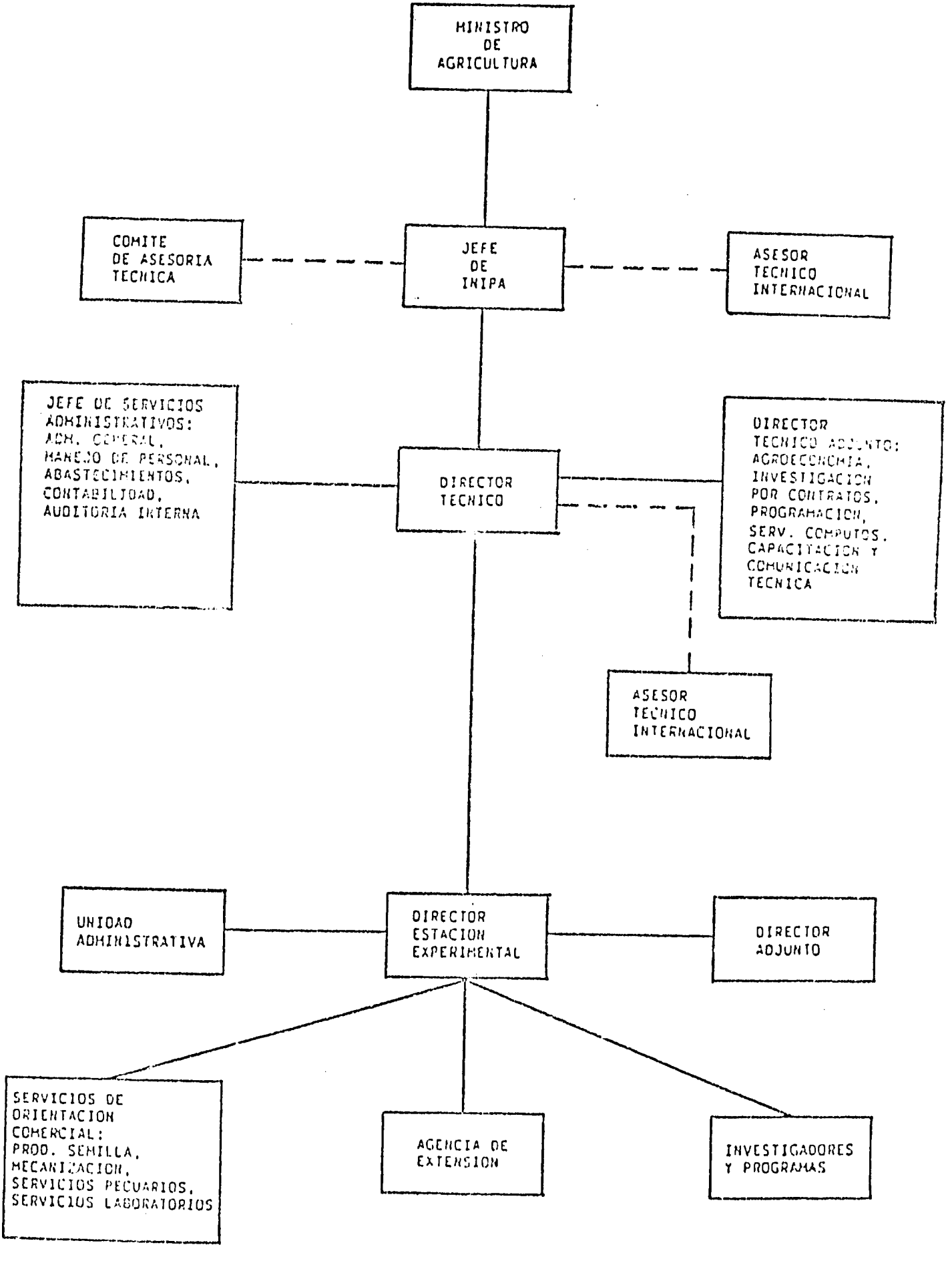
During that period, the adjustments recommended in this report could be implemented by the INIPA directors, assisted by an external high level management team to guide the personnel inventory, the definition of the minimum personnel needs, and essential administrative adjustments.

When the above has been accomplished, the team recommends that INIPA be granted the legal status (regimen laboral de empresa publica) under which the required personnel management, administrative procedures, pay scales, and operating methods are possible.

In the longer-term, Peru must replace donor funding of INIPA with internal financing. In the near-term, INIPA needs to be concerned about the complexity in its day-to-day operations and its priorities in relation to the four major donor projects. Each project brings an approach to development, a specific set of objectives and approaches to achieve them, a set of monetary and management procedures, and a view of what constitutes success.

The projects have affected the form and function of INIPA in both desirable and undesirable ways. Each tends to pull INIPA's programs in particular directions. INIPA has done well in getting the projects to be mutually supportive, but as these projects are extended and renegotiated, INIPA has an opportunity to bring about a new level of integration of effort. The team suggests that INIPA make a renewed effort to restate the technology development and diffusion system it intends to develop, and form the essential assistance projects so they support that concept. The work plan should be more INIPA's, and less an amalgamation of the four projects.

Figura 1 PROPUESTA DE LA ORGANIZACION DE INIPA



Private Sector Technology Transfer Enterprises

Activity 2. b. Stimulating Private Sector Technology Transfer Enterprises provides funds for financing competitively selected, privately operated pilot projects which will establish the utility of different models for transferring technology by the private sector. There are at least five models (and probably more combinations) which have been demonstrated in other countries, or are under development in Peru. All of these models appear to have merit, and it is difficult to predict that one model has clear superiority over another. Two are summarized below. Detailed descriptions of five proposed models are included in unattached Annex III, Exhibit B.

A. Technology Transfer Facilitators

This model was developed in Ecuador under the AID project (Rural Development Support Services), and under the name of RELU (Research Extension Liaison Unit) was selected as AID's primary program support unit of the new Ecuadorean agricultural research foundation, FEDIA. A very similar model was used by USAID/Honduras in the highly successful Coffee Improvement project; a coffee improvement RELU, derived from the Honduras experience was included in FEDIA's program.

This program is based on five established premises:

1) A great deal of productive technology which could help resolve production problems in Peru is already in commercial use elsewhere but has not been adopted by Peruvian farmers.

2) The effective transfer of this technology requires the identification of problems and selection of appropriate technologies for their resolution by experts who understand both the technology which is available in the international science community and its commercial application.

3) The transplantation of this technology requires its testing and demonstration on commercial farms, and may require modification and iterative testing to adapt it to Peruvian conditions.

4) Farmers associations are enthusiastic collaborators in this process, and will provide counterpart personnel and arrange for cooperation by leading farmers, who will provide the resources needed to test these technologies and demonstrate them to other association members.

5) Commercial farmers are much more ready to adopt practices which have been introduced by international experts, accepted by leading farmers and demonstrated on their farms, than to accept the counsel of a (frequently) upprepared and (always) underpaid entensionist or input salesman.

This model is placed in practice by undertaking an agreement with a commodity producers association (crops or livestock) in which the association agrees to employee and support one or more Peruvian specialists as counterparts to one or more international experts to be contracted and supported by AID. The expert and his counterpart visit the farms of leading association members to identify factors constraining productivity, which they believe can be resolved by "borrowed" technology. In the process, they make arrangements with some of these farmers to test and adapt these technologies. When successful, these tests become demonstrations. They also provide data for economic analysis, and may suggest ways in which the technology (or the way it is presented) must be altered to meet local conditions. Not infrequently, this process identifies practical problems for thesis research.

The international experts employed under this program must be senior professionals with broad experience in the international science of the commodity and with strong commercial orientation. They are expected to be able to handle most of the common problems themselves, but some short term expertise, particularly in economics and pest and disease identification and management is included in program costs to deal with special problems.

The local counterpart personnel participate fully in this process and provide the continuity for the program. Agribusiness and PVO's who wish to extend the recommendations of this program to their clientele may also provide counterparts to work with the team, providing a good multiplier effect. Although the immediate beneficiary is the more affluent farmer who can afford to support the research and demonstration, profitable technology spreads rapidly throughout the association.

Support costs are estimated at two levels:

Standard Option
(Two Experts for Two Years)

Technical Assistance (two experts at $180,000/year*)	720,000
Short Term Experts (six months at $15,000)	90,000
Commodities (two vehicles, 1 computer, supplies)	50,000
Other Direct Costs	40,000
Total Costs	900,000

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* Includes salary, international transportation and allowances.

Least Cost Option
(One Expert for One Year)

Technical Assistance (one expert at $180,000/year*)	360,000
Short Term Experts (six months at $15,000)	70,000
Commodities (one vehicle, 1 computer, supplies)	25,000
Other Direct Costs	25,000
Total Costs	500,000

*Includes salary, international transportation and allowances

B. Technology Transfer Centers

Major problems with public sector agricultural services are the time required to obtain diagnostic information and inability to obtain good quality services from a single source. The Technology Transfer Center (TTC) solves both of these problems by providing timely laboratory testing of soils, plants, forage, seed, livestock feeds, water and materials required by agricultural communities. At the same time, it provides field services, such as topographic land surveys, irrigation and drainage system design, soil conservation plans, counsel on soil-crop interactions, crop rotation plans, and timely field inspections and counsel on crop and livestock problems.

The TTC concept grew out of the experience of a successful private agricultural consulting firm in Central America where these combined services were generated over time. This concept was developed into a model by the operator of that service, who has selected three prime sites (Tarapoto, Cusco, Ica) and a number of others where such Centers might profitably be established.

The development of an operating pilot model requires an initial investment budget to approximately $150,000, consisting of:

Laboratory Equipment	30,000
Office Equipment and Furniture	25,000
Field Vehicles (3)	45,000
Operating Reserve (operating costs, rent, supplies, communications, utilities and maintenance of entrepreneur)	50,000
Total	150,000

This budget assumes that the entrepreneur, a competent, broad gauge professional agriculturist with a strong private business orientation, will notg pay himself a salary. He will use a minimal start-up staff of an analytic chemist and a clerical assistant. Other professional and clerical staff will be hired as business develops to support them. An additional $50,000 for four months of intermittent expatriate assistance from an experienced TTC manager would increase the probability of success.

ANNEX II

Exhibit G - Data Tables

TABLE II. INIPA NATIONAL RESEARCH (NR) PROGRAMS, SELECTED INFORMATION AND CHARACTERISTICS AS OF JUNE, 1987.

National Research Support Programs	Date Initiated	Technical and Professional Program Staff: Classification	Actual	Planned	Research Sites: Actual	Planned	OPERATING BUDGET (US$000): 1986 Actual	1987 Approved ($000)	1988 Proposed	1989/1992 Proposed
Rice	Jan. 1983	Professional	50	47			1625	1731	1035	4138
		Technical	93	20	26	16				
		Adm. & Support	99	88						
		Total	242	155						
Tobacco	Oct. 1982	Professional	50	51			1840	1900	1279	5116
		Technical	93	16	22	14				
		Adm. & Support	99	77						
		Total	242	144						
Grain Legumes	Aug. 1983	Professional	87	91			2533	2593	1515	6057
		Technical	161	33	23	24				
		Adm. & Support	170	153						
		Total	418	257						
Cereals	Aug. 1983	Professional	50	56			1697	1807	1115	4458
		Technical	93	19	18	15				
		Adm. & Support	99	91						
		Total	242	156						
Oil Crops	Jan. 1987	Professional	32	35			1291	1374	931	3922
		Technical	59	13	-	10				
		Adm. & Support	63	57						
		Total	154	105						
Cotton	July 1983	Professional	82	67			2340	3131	2002	8016
		Technical	153	26	32	18				
		Adm. & Support	161	118						
		Total	395	211						
Annual Crops	Aug. 1985	Professional	32	33			1219	1293	855	3459
		Technical	59	13	14	11				
		Adm. & Support	63	59						
		Total	154	105						
Solid Crops	Aug. 1986	Professional	32	34			1123	1197	755	3019
		Technical	59	32	24	11				
		Adm. & Support	63	118						
		Total	154	204						
Livestock	Jan. 1983	Professional		59			1912	2036	1310	5238
		Technical		45	27	21				
		Adm. & Support		174						
		Total		278						
TOTAL NR Programs		Professional	415	493	538 TOTAL		16180	17232	10857	43423
		Technical	770	217						
		Adm. & Support	817	935						
		Total	2002	1645						

TABLE III: INIPA NATIONAL RESEARCH SUPPORT (NRS) PROGRAMS; SELECTED INFORMATION AND CHARACTERISTICS AS OF JUNE, 1987.

National Research Programs	Date Initiated	Technical and Professional Program Staff: Classification	Actual	Planned	Research Sites: Actual	Planned	Operating Budget (US$000): 1986 Actual	1987 Approved	1988 Proposed	1989/1992 Proposed
Soil and Water	Jan. 1988	Professional		12	—	12	—		513	2055
		Technical		2						
		Adm. & Support		2						
		Total	0	16						
Integrated Pest Management	Jan. 1987	Professional		93	—	37	860	916	921	3682
		Technical		71						
		Adm. & Support		93						
		Total	0	257						
National Laboratory Service	Jan. 1983	Professional		65	13	17	598	636	632	2529
		Technical		65						
		Adm. & Support		65						
		Total	0	195						
Germplasm Services	Jan. 1987	Professional		43	3	8	908	967	991	3965
		Technical		43						
		Adm. & Support		43						
		Total	0	129						
Agro Economics	Jan. 1984	Professional		46	14	25	263	280	291	1163
		Technical		9						
		Adm. & Support		51						
		Total	0	106						
Computer Services	Nov. 1984	Professional		11	10	37	741	789	798	3192
		Technical		11						
		Admin. & Support		11						
		Total	0	33						
Total NRS Programs		Professional		313						
		Technical		203						
		Admin.& Support		267						
		Total	0	783						
							3370	3588	4146	16586

TABLE IV. Example of National INIPA Commodity Research (NR) Program (Rice)

A. Program Location: 16 sites and 5 Agroecological zones.

B. 47 Professionals: 25 researchers
11 seed production specialists
11 extension specialists

C. Job description for 25 researchers (7 plant breeders; 18 agronomist)

1. 7 Rice Breeders:
   a. Two for coastal program headquarters (Vista Florida):
      Screen all introductory materials for northern and southern coasts for:
      - disease resistance
      - insect resistance
      - low temperatures
      - saline soils
      - water stress
      - akaline soils/water
   b. Five for Selva Program:
      1) One at El Porvenir, screening for:
         - blast resistance
         - lodging
         - direct seeding
      2) Two at Nuevo Cajamarca, screening all introductory materials for paddy and upland rice for:
         - blast resistance
         - Helmonthosporium resistance
         - Cercospora resistance
         - Soil acidity
      3) One at Huarangopampa
         - hoja blanca resistance
         - blast resistance
      4) One at Iquitos at Muyuy Station
         - 90 day rice selection for river bank farmers
2. Eighteen agronomists: six on the coast and 12 in the Selva.
   a. Six coastal agronomists to work on:
      - date of planting
      - fertilizer trials, especially N rates and Placement
      - transplanting methods
      - hand versus mechanized
   b. Twelve selva agronomists to work on:
      - date of planting
      - seeding rate and plant density
      - direct seeding vs transplanting
      - fertilizer trials; NPH and micro nutrients
      - small farm mechanization for planting, harvesting, post-harvest

D. Eleven seed production specialists to work at eleven sites providing technical assistance to seed production farmers in the surrounding area; responsible for multiplying genetic (Breeder) seed to produce basic (foundation) seed; also responsible for establishing on-farm verification (foundation) trials.

E. Eleven extension specialists to work at eleven sites implementing technology transfer through the extension system; also work with agronomists in on-farm verification trials.

F. Program costs.

TABLE V. EXPECTED OUTPUTS FOR INIPA NATIONAL COMMODITY AND REGIONAL RESEARCH (NR) PROGRAMS
(Component 1, Activity a of ATT Project)

PROGRAMS	OUTPUTS
Rice	a. Five to ten new seed varieties will be released with tolerance to saline and alkaline soils in coastal areas and soil acidity/aluminum toxicity in jungle areas; with resistance to most prominent fungal diseases, ie; Helminthosporium, pyricularia, Hoja Blanca, and Cercospora and incorporation of other characteristics ie; improved milling/grain quality, lodging and early maturing varieties for river banks sites. b. 224 MT of breeder seed and 11,540 MT of foundation seed of recommended varieties will be produced annually and sold for multiplication as certified seed by private growers to supply 90% of coastal area and increase from 10% to 50% in jungle areas planted to improved varieties. c. New recommendations will be made related to seeding methods; improved phosphorus and nitrogen utilization; weed control; and mechanization with appropriate technology for small farmers with emphasis on harvesting and post harvest problems. d. Research work will be consolidated in 16 sites. e. Research personnel in the program will be stabilized: 47 professionals of which 25 are rice researchers, 11 for seed production and 11 for rice extension specialists; and 20 technical support staff. f. Recommended varieties and agronomic practises will be available that reduce unit costs of production for the Selva by 20%. g. Technology transfer process estimates jungle farmers adopting new technology by 1990 is 50% for paddy rice farmers, 10% for upland rice farmers and 10% for river bank farmers.
Corn	a. Two to four new cultivars for the Selva will be released, including hybrids and the open pollinated varieties. b. 250-300 MT of breeder seed of recommended varieties will be produced and sold annually to increase area planted to corn by 25,000 has, and increase coverage of area planted with new varieties from 25 to 50% in selva. c. New recommendations will be made related to seeding methods, plant density, rotations and intercropping, weed and pest control, and optimum fertilization. d. Recommended varieties and agronomic practises will be available for hard yellow dent corn areas that reduce unit costs of production by 19%. e. Research personnel in the program will be stabilized at: 67 professionals of which 32 are researchers, 17 in seed production, and 18 as extension specialists; and 26 technical support staff. f. Technology transfer process estimates 65%, 50% and 15% of the farmers in the coast, jungle, and highlands respectively, will adopt new technology.

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TABLE V. (Continued)

PROGRAMS	OUTPUTS
Potatoes	a. 5000 MT virus free foundation seed of recommended varities will be produced and sold annually. b. Two-three new varieties with improved resistance to nematodes and bacteria wilt and tolerance to frost. c. Expand use of diffused-light potato storage for small farmer to 20,000 units with a capacity of 40,000 MT. d. New recommendations will be generated for each major producing region for the following agronomic practises: seeding; weed and pest control; fertilization. e. Recommended seed and agronomic practises will be available that reduce unit cost of production for major Sierra producing sites by 14% and for major coastal areas by 10%. f. Research personnel in the program will be stabilized at: 51 professionals of which 21 are researchers, 17 are in seed production, and 13 are extension specialists; and 16 technical support staff.
Grain Legumes	a. At least 15 improved seed varieties in seven different edible beans types will be released that increase yields at least 20% above local varieties, that have resistance to the more common diseased and that are adapted to the dominant ecological conditions, i.e.; nematodes, root rot, high temperatures, water stress. b. New recommended agronomic practises will be available for the dominant ecological production areas related to: soil & water use, weed control, fertilization, seed desinfection, planting density, rotations and intercropping. c. Research personnel in the program will be stabilized at: 91 professionals in which, 41 are researchers, 25 are seed production specialists, and 25 are extension specialists: and 33 technical support staff. d. 93 MT of breeder seed of recommended varieties will be produced for multiplication and released to private seed producers which potentially can increase per capita consumption from 7 to 10.5 kg/capita. e. Recommended varieties and agronomic practises will be available that reduce unit costs of production by 20% for major production areas.
Cereals	a. Six new varieties of wheat (2 for the Sierra, 2 for the Coast and 2 for high Sierra) and two new varieties of Barley will be released incorporating increased yield potential, resistance to most common rust and bacterial diseases, tolerance to frost and drought. b. New recommended agronomic practises will be made available for fertilization, weed control and seeding density for all important growing areas, and crop rotation, especially with potatoes, for residual fertilizer effect. c. 158 MT of improved recommended varieties of breeder seed will be produced and sold annually to meet projected production of 200,000 MT; a 100% increase. d. Recommended varieties and agronomic practises will be available that reduce unit costs of production by 12-15%. e. Research personnel in the program will be stabilized at: 56 professionals of which 25 are researchers, 16 are in seed production, and 15 are extension specialists; and 19 technical support staff.

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TABLE V. (Continued)

PROGRAMS	OUTPUTS
Oil Seed Crops	a. New varieties will be released as follows: 4 of soybeans; 2 sunflower; 3 of peanuts. b. The following new recommended agronomic practises will be available; fertilization, water use efficiency and seed inoculation. c. 3175 M.T. of improved recommended varieties of registrated seed sufficient to meet 20% of Peruvian annual demand will be produced and sold annually. d. Recommended varieties and agronomic practises will be available that reduce unit costs of production 17% for soybean. e. Research personnel in the program will be stabilized at: 35 professionals in which 16 are researchers, 10 are in seed production and 9 are extension specialists, and 13 technical support staff. f. Adoption rate of new technological is estimated at 65% on the coast and 60% in the selva for soybean.
Andean Crops	a. 20 improved varieties will be released: 4 Quinoa; 4 Kiwicha; 2 Canihua; 4 Tarhui; 3 Oca; 3 mashua. b. New recommended agronomic practises will be available for each of the crops: fertilization, seeding, seeding density and pest control using the farming system concept adapted to campesino community ideology. c. 335 M.T. of foundation seed will be produced annually, sufficient to increase the area planted to andean crops by 62%. d. Recommended varieties and agronomic practises will be available that reduce unit costs of production by 20% for all crops. e. Research personnel in the program will be stabilized at: 33 professionals of which 18 are researchers, 8 are in seed production, and 7 are extension specialists; and 13 technical support staff. f. Transfer of technology process estimate 20% of farmers will be using improved farming practises by 1992 and 16 model community center will be constructed.
Tropical Crops	a. Improved recommended soil and water management technologies will be produced and made available for tropical annual and permanent crops, and for pastures on 60,000; 10,000 and 10,000 has., respectively. b. Improved management and agronomic practises will be developed and made available for existing areas of production of coffee, cacao, citrius, avocado, papaya, yuca and bananas on 60,000; 12,000; 8,000; 1000 and 54,000 has., respectively excluding yuca and banana. c. Technologies will be developed and made available for commercial production of the following native crops; pijuayo; camu-camu; araza; castaña. d. Improved technologies will be developed and made available for pasture management with min. carrying capacity of 2 head/ha. e. Research personnel in the program will be stabilized at: 54 professionals of which 36 are researchers, 8 are in seed production and 10 are extension specialists; and 32 technical support staff. f. Recommended agronomic practises will be available that will reduce unit cost of production in banana by 18%; in yuca by 10% and coffee by 34%.

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TABLE V. (Continued)

PROGRAMS	OUTPUTS
Livestock	a. To improve animal nutrition: (1) improved forage and pasture management practises will be developed and made available: Coast: alfalfa and corn fodder production and use; Sierra: native pasture management, rehabilitation of degraded pastures, establishment and management of irrigated pastures; Selva: intensification of grazing, and (2) improved supplemental feeding practises for fattening and for milk production. (3) utilization of agricultural and industrial by-products, especially in Selva and Sierra. b. For genetic improvement: improved artificial insemination practises will be developed for cattle and sheep; improved breeding stock will be multiplied. c. Improved health management practises will be developed and made available for increasing fertility and birth rates; reducing death rates; increasing annual weight gain; reducing incidence of illness. d. Research personnel will be stabilized at: 59 profesionals in which 10 are in pasture research 13 are in animal husbandry, 4 in health labs, and 12 in promotion activities and 20 are veterinaries; and 45 in technical support functions.

TABLE VI. SUMMARY OF BASELINE AND PROJECTED DATA FOR INIPA NR PROGRAMS UNDER ATT PROJECT

COAST

	RICE 1985	RICE 1992	CORN 1985	CORN 1992	PEANUTS 1985	PEANUTS 1992	C. BEAN 1985	C. BEAN 1992	WHEAT 1985	WHEAT 1992	TROP. C. 1985	TROP. C. 1992	ANG. CROPS 1985	ANG. CROPS 1992	OIL SEED 1985	OIL SEED 1992
1. Number of new seed varieties	-	1-5	-	1-2	-	1-2	-	(1) 3-5 (2) 1-2 (3) 1-2	-	1-2	-	-	-	-	-	(1) 1- (2) 1- (3) 1-3
2. New characteristics of improved var.	-	Grain Qlty. Salinity, Early Maturity.	-	High Yielding	-	Res. to Nematodes Bacteria wilt	-	Res. to root Rot, water stress	-	High Yielding Milling Quality	-	-	-	-	-	-High Yielding -Res. res. -Oil Quality
3. Production (MT) of Breeder and foundation seed	7,760*	6,940 *	(✓) 1	(✓) 5	0.5	2,000	(1) 13 (2) 1 (3) 8	17 1 13	11	49	-	-	-	-	(1) [illegible] (2) - (3) [illegible]	[illegible] [illegible] [illegible]
4. Area (Ha.) planted to improved seed (1000)	55	76	3	65	14	19	(1) 9.9 (2) 4.4 (3) 1.3	20.4 4.4 4.4	0.5	14	-	-	-		(1) 22.8 (2) - (3) 0.5	18.1 [illegible] 2.1
5. Total Area planted (Ha) (1000)	110	90	95	100	19	22	(1) 22 (2) 2 (3) 2	37 8 8	2	35	-	-	-	-	(1) 4.8 (2) - (3) [illegible]	[illegible] [illegible] [illegible]
6. Yield Change - New adopters	3.5	5.5	3.0	4.8	14	19	(1) 0.8 (2) 0.6 (3) 0.6	1.3 1.3 0.9	3.0	4.3	-	-			(1) [illegible] (2) - (3) 1.5	[illegible] [illegible] [illegible]
-Continuing adopters	5.0	6.2	4.5	5.5	20	35	(1) 1.0 (2) 1.1 (3) 0.9	1.5 2.0 1.2	3.4	5.5					(1) 2.0 (2) - (3) [illegible]	[illegible] - [illegible]
7. % Adopting new technological practices	70	90	45	65	75	85	45	55	25	40	-	-	-	-	50	[illegible]

* Foundation seed

(✓) Breeder seed multiply by private sector

(1) Edible
(2) Lima
(3) Pinto

Wheat only

(1) Soybean
(2) Sunflower
(3) Peanut

TABLE VI. (Continued)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-	-	-	1-3	-	1-2	-	(1) 1-2 (2) 1-2 (3) 1-2	[illegible]	(1) 1-4 (2) 1-2	-	-	-	(1) 1-4 (2) 1-2 (3) 1-5	-	[illegible]
[illegible] of [illegible]	-	-	-	Early Mat. High Yielding Virus Res.	-	Res. to Bacteria Wilt, Frost tolerance	-	Res. to Nematodes and virus disease	-	-Dis.Res. -High Yield. -Wide adaptability -Direct con-	-	-	-	Frost Tol. Early Mat. Wide Adapt. High Yielding.	-	[illegible]
Production (MT) of breeder and foundation seed	-	-	3	27	4,500	18,000	(1) 13 (2) 14 (3) 19	17 19 23	(1) 147 (2) 75	199 150	-	-	(1) 30 (2) 15 (3) 30	100 50 50	250	[illegible]
[illegible] planted of improved seed (MT)	-	-	9	25	36	76	(1)2.9 (2)1.1 (3)1.4	4.0 5.0 6.0	(1) 4.5 (2) 5.3	24.5 22.5	-	-	(1).30 (2).35 (3).74	5 [illegible] 4.1	[illegible]	[illegible]
Total Area planted (Has) (000)	-	-	175	175	178	222	(1) 29 (2) 11 (3) 14	20 30 30	(1) 90 (2)107	190 150	-	-	(1) 18 (2) 7 (3) 14.8	25 8.5	[illegible]	[illegible]
Yield Change - New Adopters			0.8	1.1	4.5	7.0	(1) 0.6 (2) 0.0 (3) 0.1	0.9 0.4 1.0	(1) 0.8 (2) 0.7	1.4 1.2			(1) 0.5 (2) 0.5 (3) 4.0	0.9 0.9 2.5	1.5	[illegible]
- Continuing adopters			1.2	1.4	11	19	(1) 0.6 (2) 0.6 (3) 0.9	1.5 1.2 1.8	(1) 1.2 (2) 1.6	2.2 3.0			(1) 1.1 (2) 1.0 (3) 8.0	1.3 1.2 9.0	-	-
Adopting new technological practices	-	-	5	15	20	35	10	20	5	15	-	-	5	20	30	[illegible]
							(1)Millet (2)Peas (3)Rubis		(1) Wheat (2) Barley				(1)Quinua (2)Kiwicha (3)Oca			[illegible]

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TABLE VI. (Continued)

SELVA

	RICE 1966	RICE 1992	CORN 1966	CORN 1992	POTATOES 1966	POTATOES 1992	S. BEANS 1966	S. BEANS 1992	WHEAT 1966	WHEAT 1992	TROP. C. 1966	TROP. C. 1992	AND. CROPS 1966	AND. CROPS 1992	TUBERS 1966	TUBERS 1992
1. Number of new seed varieties	-	(1) 3-5 (2) 2-5	-	2-4	-	-	-	(1) 1 (2) 1-2	-	-	-	(1) 1-2* (2) 1-2* (3) 5-10	-	-	-	(1) 2-5 (2) 1-3
2. Characteristics of new seed var.	-	High Yield-ing, Dis. Res. Grain Qlty, Soil Acidity	-	Hybrid High Yielding Virus Res.	-	-	-	Tolerance to virus, high temp.	-	-	-	(1) - (2) Dis. Res. Highly Yield-ing (3) Soil Acidity	-	-	-	Highly Yielding Res. to Pot Rot, Virus
3. Production (MT) of breeder and foundation seed	(1) 2,450* (2) -	5,200* 500	45	250	-	-	(1) 1 (2) 1	1 2	-	-	-	-	-	-	(1) 22 (2) 22	270 400
4. Area (Has) planted to improved seed (1000)	(1) 11 (2) 2	30 15	30	87	-	-	(1) 1.20 (2) 0.50	2.5 0.9	- -	- -	(1) 0.6 (2) 20.0 (3) -	3.1 34.0 2.5	-	-	(1) 0.2 (2) 0.5	3.0 1.5
5. Total Area planted (Has) (1000)	(1) 28 (2) 100	60 150	120	175	-	-	(1) 11.5 (2) 2.4	12.5 4.5	-	-	(1) 5.5 (2) 82.0 (3) -	10.5 97.0 10.0	-	-	(1) 0.5 (2) 1.0	5.0 2.5
6. Yield Change																
- New adopters	(1) 3.0 (2) 0.8	4.5 1.5	1.6	2.8			(1) 0.5 (2) 0.6	0.9 1.5			(1) 400 kg (2) 480 (3) 0.5 head	550 kg 800 kg 1.2 head			(1) 1.2 (2) 1.2	1.9 2.0
- Continuing adopters	(1) 3.8 (2) 1.6	6.0 2.5	2.8	4.5			(1) 0.8 (2) 1.2	1.2 2.0			(1) 550 (2) 590 (3) 1 head	650 690 2 head			(1) 1.5 (2) 1.8	2.5 2.5
7. % Adopting new technological practices	(1) 40 (2) 2	50 10	25	50	-	-	40	20	-	-	(1) 10 (2) 25 (3) 10	30 35 25	- - -	- - -	45	50

(1) Paddy
(2) Upland
* Foundation seed

(1) Edible
(2) Cowpea

(1) cacao *imported
(2) cafe
(3) pastos

(1) soybean
(2) peanuts

CHART TA: AIT PROJECT INSTITUTIONAL AND TECHNICAL FLOW FRAMEWORK

System Components		Action Agencies	Resource Suppliers
National Agricultural Technology Generation Sub System		- INIPA - ONA - Regional Farmer Groups - SAIS/Camp. Communities - IARC/s	
	Tech. Supply ↓ Tech. Demand ↑		- GOP
National Agricultural Technology Transfer Sub-System	Research and Extension linkage Sub-System (Technology Wholesaling)	1. INIPA a. Personnel: Researchers and Subject matter Technology Transfer Specialist Corps. b. Activities: - On-farm trials - On-farm demonstration - On-farm field days - Station field days - Transfer agent continuing Education programs: workshops, seminars, short courses, internships, etc. - Communications program 2. ONA Commodity Groups Camp. Comm. Groups 3. UNIVERSITIES 4. AGRI-BUSINESS	- Farmer Groups - Agri-businesses - SAIS - Campesino Communities
	Techn. Supply ↓ Techn. Demand ↑		- Private Enterprises
	Farmer Technology Education (Technology Retailing)	- CIPAs - Producer groups - Campesino communities - Institutos Agropecuarios - Agri-businesses - Organizations affiliated with ONA - Banco Agrario - TA consulting firms	

TABLE VII. EXPECTED OUTPUTS FOR INIPA NATIONAL RESEARCH SUPPORT (NRS) PROGRAMS
(Component 1, Activity a of ATI Project)

PROGRAMS	OUTPUTS
SENARGEN	a. Establish one long-term National germplasm Bank in Puno containing 25,000 introductions of 95 different species. b. Establish one medium-term germplasm introduction center which will also serve as the program headquarters and coordinate flow of germplasm to the national network. c. Establish a national network of operational germplasm banks at 7 sites (commodity Program Headquarters) to support national programs. d. Research personnel will be stabilized at 43 professionals of which 27 are genetists and 14 are responsible for germplasm banks and 2 are biotechnologists and 43 technical support staff.
SEMAC	a. Establish a computerized information and analysis service network on a national level for scientific and administrative purposes. b. By end of project will have in place 48 PC computers of which 37 will be placed in research stations mainly for scientific and agroeconomic analysis and 11 placed in the regional headquarters for administrative and budgetary control. c. Standardized software packages for scientific and agronomic analysis and accounting, personnel, and budget control. d. Programer/system analysis personnel in the program will be stabilized at 11 professionals and 11 technical support staff.
SENALAB	a. 3 additional regional laboratories will be implemented. b. Analysis services will have the capacity to analyze 300,000 soil samples; 50,000 water samples; and 50,000 plant samples per year of which 50% are expected to come from the farmers. c. Research support from fully equiped laboratories will be consolidated at 7 sites, the other 10 sites will only do routine analysis. d. Research and service personnel in the program will be stabilized at 65 professionals of which 23 are soils researchers, 2 microbiologists, 4 analytical chemists, 6 plant physiologists, 16 in quality control, and 14 in agrometeorological research and 65 technical support staff.

TABLE VII. (Continued)

PROGRAMS	OUTPUTS
AGROECONOMICS	a. 11 studies to determine research priorities for each agroecological zone b. Bi-annual economic evaluations of new technologies including risk factor c. 3 Special studies; 1) Impact of new technology at farmer level; 2) Price policy/ cost of production analysis for each national commodity program; 3) mechanization/labor use analysis focused primarily on harvest and post harvest methods for rice and corn. d. Maintain and update data bank to support on-going commodity research e. Personnel in the program will be stabilized at 46 professionals and 9 technical support staff
SENAPIC	a. 5 Integrated Pest Management programs will be established. (Huancayo, Cusco, Chiclayo, Cañete and Tarapoto) b. Research work will be consolidated within each national commodity program in 37 sites c. Research personnel in the program will be stabilized; 93 professionals of which 20 are plant pathologists, 16 are entomologists, 13 are nematologists, 9 are virologists, 11 are weed scientists, 1 is a microbiologist, and 23 are crop protection extension specialists.
SENASE	a. 11 coordinators will be assigned, one to each agroecological zone to coordinate basic seed supply from national programs of INIPA and other sources, with the private sector for multiplication to produce commercial seed. b. 17 nurseries will be established to provide vegetative reproduction materials to farmers c. 15 sites will be fully implemented for processing of the various types of seed grains for quality control, purity, germination, etc. d. Research personnel in the program will be stabilized; 43 professionals of which 11 are seed multiplication coordinators, 17 are nursery specialists, and 15 are processing plant specialists.
SOILS AND WATER	a. 16 research sites for water use management on the farmer level will be established; 8 sites on the coast (15% of the coastal valleys), 5 inter-andean valleys, and 3 sites in the Selva. b. 15 research sites for soil conservation research will be established; 6 sites on the coast (10% of coastal valleys); 7 sites in the sierra, and 2 locations in the Selva. c. Research personnel in the program will be initiated with 12 professionals and 2 technicians.

Detailed Institutional Analysis

A. Institutional Setting of ATG&T System.

The Agricultural Technology Transformation (ATT) Project is a set of institutional development activities designed to create a national Technology Generation and Transfer (ATG&T) system by strengthening its component parts and by improving interfaces among them as well as between them and farmer users of technology. Major public and private sector institutions and organizations that make up the Peruvian ATG&T system are described in the Project Setting (Chapter II, Section C of Project Paper). Project activities are described in the Program Description (Chapter III of Project Paper).

A salient characteristic of the major public and private institutions in the present ATG&T system is that they once were participants in an effective system that was seriously damaged in the restructuring of Peruvian agrarian society in the late sixties and early seventies. These institutions suffered three major types of losses which still influence their capability and effectiveness:

- 1. Loss of technical/managerial skills and experience of professionals who left the sector for other pursuits in Peru or left Peru entirely.

- 2. Loss of contacts and working relationships with the international agricultural scientific and academic community during a period of profound and rapid technological advances and far-reaching changes in the organization and management of ATG&T systems in both developed and developing countries.

- 3. Loss of physical and institutional capital, the latter referring to organizational structure, management methods and norms, value systems, institutional goodwill and Esprit de Corps.

During this period, public sector research and extension institutions were dismantled and reconstituted, while producer organizations were eliminated and their property expropriated. UNA retained its structure but also was affected severely by the loss of senior and well-trained faculty and administrators, by depreciation of physical capital and particularly by the long period of isolation from the international agricultural scientific community.

Both public and private sector ATG&T institutions have been in the process of rebuilding and/or reconstituting since 1981. They are in intermediate stages of recovery and still are somewhat fragile. Beginning in 1981, major efforts by the GOP and the international donor community were

directed toward re-establishing in INIPA a public sector research and extension capability organized into national commodity research and research support programs and services. During this same period, ONA as the only truly representative farmers' organization recovered the organizational form and property of the original private sector "Sociedad Nacional Agraria", but has not yet reached its levels of influence nor capability. UNA has rebuilt its former student output levels, but still is rebuilding instructional quality, as well as amount, quality and relevance of research.

Currently, INIPA, UNA and ONA have acceptable planning, financial management and operating systems. and are producing many of the outputs for which they were intended, within the limits of quality of professional personnel, current levels of financial resources and efficiency of use of those resources. A principal objective of each of these organizations is to consolidate and institutionalize their operations and ATG&T functions by improving their ability to perform and by attracting financial support from diverse sources. Currently, they lack both effective use of existing resources and adequate human resources needed to be viable without external support. Lack of financial resources per se is less of a problem than is their lack of ability to allocate and utilize existing resources to maximize socio-economic impact. For this reason, the marginal resources which this Project provides are carefully targeted to catalyze more effective use of existing resources.

Despite similarity of institutionalization problems, each of ATG&T organization referred to above is different in role, scope and institutional strengthening needs. Private sector organizations, such as ONA, its affiliated national and valley commodity committees as well as independent valley associations and other producer-based groups, lack technical and managerial skills to develop self-sustaining services. They also lack innovative relationships with the public sector and with international sources of supply of technology. Project activities such as Competitive Research and Matching Grants, Technology Transfer Enterprise Stimulation and Seed System Improvement, all are keyed directly to this set of problems, and are intended to trigger its resolution. Organized producers currently are too dependent on the public sector. Their organizations invest a disproportionate share of their efforts in seeking public sector services and dispensations. In the process, they neglect their own potential to provide services to members. Such services directly can increase productivity and incomes by improving production and marketing technology thereby lowering unit costs and increasing product volume in the marketplace. Such services not only enhance producer profit potential but also can provide significant economic surpluses to the supplier of the services.

Personnel and compensation regulations limit INIPA's and UNA's authority to dismiss or shift personnel in order to reallocate financial resources. Personnel costs have become an excessively high proportion of

expenditures distinctly limiting efficient resource utilization. When combined with inability to reward exceptional performance, this negatively affects institutional innovation and quality improvement.

UNA's continuing challenge is the search for quality of institutional and professional performance. Nearly two decades of limited contact with the international agricultural scientific community and loss of many better trained faculty have contributed to the erosion of high academic standards achieved prior to 1968.

UNA government is highly democratic with change largely determined by faculty interests. The concern for job security (manifested by early tenure of modestly qualified faculty members) and the low number of faculty who are aware of or affected by international professional quality standards promotes continuation of the status quo. These conditions will change only with increased exposure of faculty to international academic and research quality standards combined with the emergence of more effective administrative and personnel performance reward systems. Such changes cannot be imposed from outside but must be generated from within the existing decision structure.

The Project provides resources to UNA to facilitate positive change as internal willingness and opportunities permit. To stimulate and accelerate the change process, the Project will assist in increasing availability of discretionary resources, providing both post-graduate academic and non-academic training opportunities, providing for research opportunities on a competitive basis and assist in developing other elements of a system that rewards quality performance.

Inter-institutional linkages within the ATG&T system are vital to development and mutual re-inforcement of this system. These are difficult to promote at the institutional level. A key lesson learned in both the REE and the APID Projects in their activities to promote closer relationships through financial resource control and contract relationships is that a high premium is attached to institutional independence. Thus, the ATT Project segregates funding for all institutions so that none may dominate the others. At the same time that institutions resist dominance and controlbly other institutions, effective professional collegial inter-relationships do develop. This phenomena will be exploited in the Competitive and Matching Research Grants activity by encouraging the private sector to collaborate with universities and INIPA, as well as through other activities within UNA and INIPA to encourage establishment of collegial relationships.

The remainder of this section provides an analytical description of the institutional and administrative characteristics and capabilities of the implementing institutions for this Project, and assesses their potential for fulfilling their responsibilities under the Project.

B. INIPA

1. Overview

The Instituto Nacional de Investigación y Promoción Agropecuaria - INIPA (National Agricultural Research and Promotion Institute) was created by Decree Law (D.L.) on January 19, 1981. A subsequent Supreme Decree of regulations in March, 1981 established INIPA'S objectives, functions and organizational structure. This law and regulations gave INIPA a primary responsibility to plan, direct, conduct, supervise and evaluate agricultural research, agricultural extension, agricultural supporting services, mechanization services and marketing services. None of these functions were new to the public sector. INIPA inherited staff and facilities from a number of public entities, e.g., the Research Service from the National Agricultural Research Institute (INIA) that had been created in 1979, and the Extension Service from the Ministry of Agriculture and Food (MAA) General Directorate of Crops and Livestock. INIPA operates with its own budget. The Chief Executive Officer (Chief) reports to the Minister of Agriculture.

In June, 1987 a new Agricultural Sector Organic Law reorganized the public sector ATG&T system. INIPA's responsibilities and organizational structure is being considerably altered under this Law, and its name is changed to Instituto Nacional de Investigación Agropecuaria y Agroindustrial - INIAA (National Agricultural and Agro-Industrial Research Institute). Organizational changes now are underway and will be finalized with the new budget year that begins January 1, 1988.

INIPA had been concentrating its research, extension and human resource development efforts on meeting sector goals for basic food crops. National level planning, implementation and evaluation for research and extension efforts to increase production of basic food crops are complemented by regionally specific research and extension efforts.

INIPA's target clientele groups originally were small and medium producers, (i.e., those holding from one to 20 hectares of land). In practise, INIPA has sought to serve most farm sizes and types. The new GOP administration (elected in 1985) places renewed emphasis on assisting the very small landholder and also seeks to focus more attention on Andean campesino communities. More concern also has been expressed by the new GOP for increasing production of native crops and toward support for livestock technology development, thereby reflecting an increasing concern for people in addition to production. Thus, emphasis currently is on a system-oriented approach that considers broad socio-economic implications of agricultural technology.

The old INIPA structure and the new INIAA structure are summarized briefly in the next sub-section.

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2. Management Structure

a) Present Structure of INIPA (now legally known as INIAA)

The leadership of INIPA (the Jefatura) is vested in the Chief (Jefe), a national Technical Director and four Regional directors. INIPA's leadership is assisted at Headquarters by offices of a General Secretary, Personnel, Legal, Planning and Administration, and the national programs of Human Resources, Computer Services and Agroeconomics, with advice from external consultants on research and extension. Most on-going external advisory assistance to INIPA is provided by IARC's and NCSU, with other support from small donors.

INIPA'S field operations are organized into 24 Research and Extension Centers (CIPAs), with CIPA locations corresponding closely to Peru's Departmental boundaries. All research, extension and education efforts are decentralized to the CIPA's, and more than 85 percent of INIPA's staff is located at these Centers. The administrative organization of the CIPA's parallels that of Headquarters.

The CIPA Director, who reports directly to INIPA Headquarters, is responsible for all INIPA programs within the boundaries of the CIPA. He is responsible for coordination and implementation of all national and regional research/extension activities. He also supervises operation of local experimental stations and of extension directors in his CIPA region. Personnel and physical facilities are segregated functionally into research, extension and administrative classifications.

As shown in Table I-1, the 1986 INIPA staff totaled about 5500 persons not counting small numbers of contracted farm laborers. The Headquarters administrative staff represents about 5% of this total, field administration 23%, extension 36%, research 27%, and fomento (or service) personnel about 9%. The personnel roster is made up of about 27% professionals (including administrators), 35% technical and 38% support personnel.

TABLE I-1: INIPA Staff Distribution by Location, Function and Category, 1986

POSITION	Administration		Extension		Research		Fomento		Total		Total
	Lima	Field	Lima	Field	Lima	Field	Lima	Field	Lima	Field	
	(Number of persons)										
Directors	53	123	4	220	10	78	25	5	92	426	518
Professionals	67	351	4	292	13	206	22	22	106	871	977
Technicians	85	376	2	998	25	377	2	79	114	1830	1944
Support	113	426	10	463	18	762	26	246	167	1897	2064
Total	318	1271	20	1973	66	1423	75	352	479	5024	5503

Source: Personnel Office INIPA

24 CIPA's are sub-divided into 240 Extension Agencies and these into 930 Sector Offices. Sector Offices are staffed with Sectoristas, who are the main link with approximately 900,000 producers with farm units of one to 20 hectares (INIPA's primary clientele). These Sectorists provide extension services under a "modified" training and visit (T&V) system. The modifications include farm demonstrations, field days, group meetings and use of mass communication methods. Agency and Sector level personnel, as well as some commodity specialists, participate in these extension T & V activities. The results of this "modified" T & V extension method have not been encouraging, and INIPA has begun to examine other methods.

The current extension program focuses sharply on transfer of technology generated by the research program. In the past, extension efforts have not sought to improve directly the social and economic well-being of rural people. INIPA recently has been assigning a greater focus on women, youth and rural households as a complementary vehicle to increase the rate of technology adoption.

Research programs currently are implemented at 24 experiment stations, 36 sub-stations, and on the farms of cooperating producers. Headquarters for national and regional programs are located at appropriate CIPA headquarters in conjunction with the major experiment station of the region. Secondary branch offices pre located at other cooperating experiment stations or sub-stations. For example, the potato program with headquarters at Huancayo has a branch at Cajamarca, but with other activities at other sub-stations; the rice program is divided between Chiclayo and Tarapoto, with some activities at sub-stations; the grain legume program conducts some research in each of the major agro-ecological zones of Peru. Given limited financial and human resources, the goal has been to concentrate research programs in selected priority locations keyed to the main agro-ecological regions (the Coast, Sierra and Selva) and in other important micro agro-ecological sites. This concentration process continues.

b) The New Structure (INIAA).

The GOP move toward regionalization affects activities of the new INIAA as reflected in the 1987 Organic Law of the Agricultural Sector (D.L. 424 of June 29, 1987). Extension functions of the 24 CIPA's (personnel, budget and physical assets) is being transferred to regional authorities. There also likely will be a transfer of 12 research stations and 25 sub-stations to regional authorities.

Headquarters stations for all NR and NRS programs and major sub-stations in various agro-climatic areas will be retained by INIAA. The new national research program network likely will include the station at La Molina, 11 headquarters stations throughout Peru, 10 to 12 sub-stations and 5 to 7 livestock research production units.

Concentration and focus through NR and NRS programs will continue. Priority will be placed on establishment of a technology transfer specialist corps in INIPA to link with public and private entities providing technology transfer services to farmers. INIAA will seek to consolidate research and transfer specialist functions, as well as to serve as research backstop advisors to public regional research efforts. Existing linkages with universities and private research groups will continue and ways will be sought to test and increase the number and strength of these linkages.

Organization charts for INIPA (INIAA) as it currently exists and for INIAA as it is proposed are included in Annex II, Exhibit N.

3. Program Strategy

Program strategy is not expected to change significantly for INIAA's research functions. The principal mechanism for integrating geographically diverse and functionally decentralized research and transfer activities will continue to be the national/regional programs strategy.

INIPA had been concentrating its programs in three major problem areas: commodity specific, region specific, and support functions. All national commodity, regional and support programs are planned by a committee consisting of representatives from INIAA, the Consultative Group for International Agricultural Research (CGIAR), UNA, regional universities and others from Peru and abroad. Each NR & NRS program has a base document plan that is up-dated annually for research, extension and training activities. All NR & NRS programs, all new or special programs and all of the operating plans for each CIPA are reviewed annually by the Headquarters office.

Each NR & NRS program has a national leader who is assisted by a co-leader usually from an IARC and made available through one of the donor programs. This co-leader not only provides program advice but also provides a needed linkage to the larger agricultural technology and professional scientific community. For example, the assignments of co-leaders from CIP, CIMMYT and CIAT have provided priority access to germplasm from their respective Centers. Such close linkages also allow varietal selection and adaptation work to advance rapidly without a large in-country basic genetics program. They also facilitate training of researchers and extension specialists at the IARCs and in Peru and facilitate joint research and continuous planning assistance.

(i) National Commodity-Specific Programs. There are seven NR programs (rice, corn, potatoes, grain legumes, cereals, livestock and oils crops). Together these comprise INIAA's primary focus on improving production of basic food crops. The basic objective of each NR program is to generate technology through research on varietal improvement and cultural practices, and to make this information available in a form useful and effective for transfer agents and farmers. Each NR program is intended to serve major commodity

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production areas. To this end, each program is headquartered at a research station where the commodity is of major importance, with other activities in other relevant locations.

(ii) National Region-Specific Programs. Regional programs attempt to solve major regional problems. For example, the Selva Regional Program, headquartered at Yurimaguas, concentrates on low input agriculture in the humid tropics where there are special problems of infertile acid soils. The Sierra Regional Program, headquartered at Huancayo, concentrates on farming systems resarch to improve the quality of life in the most depressed areas of the Sierra. Both of these regional programs focus on pasture/forage research, but also include crop research for native crops.

(iii) National Support Programs. The NRS programs provide economies of scale as well as quality support to the NR programs. Their respective functions include:

- National Laboratories (SENALAB): Twelve laboratories--one at UNA, one at the La Molina experiment station, and ten at CIPA locations--provide soil and water analyses for INIAA's research programs, and to farmers for a small fee.

- Agro-economics: A six person core staff in Lima guides sixty research/extension specialist personnel at twenty field sites, and provides analyses and appraisals for the INIPA Jefatura. This key NRS program also collects and analyzes economic information for dissemination to marketing firms and producers. In addition, it links credit and technology transfer assistance through a special INIAA/Agricultural Bank agreement and assists farmers in marketing and investment analyses, as well as in production economics and farm management. It provides economic assessments of new proposed technologies and farming systems changes, develops research activities, analyzes regional production opportunities and comparative advantage, and evaluates ATG&T system investment alternatives.

- Human Resources Development: This program is designed to improve personnel management, promote university linkages, evaluate training needs, manage non-academic training and academic scholarship activities and appraise rates of return on training investments.

- Computer Services (SEMAC): This program seeks to computerize INIAA's accounting, personnel, purchasing, and research/extension activities. A service to researchers for data storage and retrieval now is operational. Analytical services also are provided to all researchers within INIAA. One medium-sized major computer now is functioning and 50 microcomputers are being utilized in this service.

Seed/Animal Services (SENASE): This program expands the availability of improved genetic materials to the sector by producing registered and certified seed for all basic food crops. It also manages INIAA breeding farms and artificial insemination activities.

- Genetic Resources (SENAGEN): This program, centered at La Molina, evaluates, maintains and preserves genetic material. It focuses on non-conventional native Peruvian germplasm, with linkages to the international centers for crops of international interest.

- Integrated Pest Management (SENAPIC): This program, located at La Molina, serves all national programs in entomology, pathology and weed science. Plans provide for multi-disciplinary teams to be located at priority CIPA's.

- Soils, Water and Fertilizers: This program focuses on adaptive research and technology transfer information for on-farm water management, but also includes soil conservation and fertilizer use activities.

- Non-National CIPA Programs: In addition to the national commodity, regional and support programs managed by INIAA, most CIPA's conduct research and extension activities of local interest. These activities deal with livestock, perennial crops, export crops and a variety of vegetables and other lesser commodities. Some of these activities are sizeable and often are supported from private internal sources (e.g., cotton research at three CIPAs funded by FUNDEAL).

These latter programs no longer will be a part of INIAA under the reorganization.

4. Financial Summary

As shown in Table I-2, financial support for INIPA has averaged from $25 to $30 million per year for the period 1981-1986. Total support approaches $180 million for the five year period, with GOP support (including Project counterpart local currency funding) averaging 76%, World Bank 8%, AID 9%, BID 2% and other donors 5%. The allocation by function is shown in Table I-3, with 38% for extension and fomento, 33% for research and 29% for administration and training. Allocation by types of expenditures are shown in Table I-4. Salaries including pensions account for 49%, supplies and operational support for 27%, and construction and equipment (vehicles, laboratory, farm machinery, etc.) for 23%.

TABLE I-2: Sources of Support for INIPA, 1981-1986

Source	Years 1981	1982	1983	1984	1985	1986	Total
	(Thousands of US$)						
GOP Direct	19,911	24,137	20,889	20,112	12,006	14,681	111,736
World Bank		1,059	3,348	4,310	3,751	1,100	13,568
GOP (Contraparte)		10	1,071	1,325	412	756	3,574
BID		894	833	1,362	-		3,089
GOP (Contraparte)		596	555	231	1,082	1,024	3,488
AID		902	4,150	3,515	2,748	4,845	16,160
GOP (Contraparte)	222	949	1,293	1,066	1,194	1,520	6,244
Others	2,863	1,972	1,336	1,143	864	1,265	9,443
Total GOP Counterpart	222	1,555	2,919	2,622	2,688	3,300	13,306
Total GOP Direct	19,911	24,137	20,889	20,112	12,006	14,681	111,736
Total Gop Dir. & Count.	20,133	25,692	23,808	22,734	14,694	17,981	125,042
Total Donors	2,863	4,827	9,667	10,330	7,363	7,210	42,260
Grand Total	22,996	30,519	33,475	33,064	22,057	25,191	167,302
GOP Direct/Total (%)	87	79	62	61	54	58	67
All GOP/Total (%)	88	84	71	69	67	71	

Source: Accounting Office INIPA

TABLE I-3: Allocation of INIPA Resources by Function, 1981-1986

Source	Years 1981	1982	1983	1984	1985	1986	Total
			(Percent)				
Investigación	51	27	33	30	25	33	33
Extensión y Fomento	32	51	44	33	43	35	40
Administración 1/	17	22	23	37	32	32	27
			($000)				
Investigación	11,728	8,240	11,046	9,919	5,514	8,313	54,760
Extensión y Fomento	7,359	15,565	14,730	10,911	9,485	8,817	66,867
Administración 1/	3,909	6,714	7,699	12,234	7,058	8,061	45,675
TOTAL	22,996	30,519	33,475	33,064	22,057	25,191	167,302

1/ Includes internal and external training at post-graduate level.
Source: Human Resources Support Program of INIPA.

TABLE I-4: Summary of the allocation of INIPA Resources, 1981-1986

Source	Years 1981	1982	1983	1984	1985	1986	Total
	(Thousands of US$)						
Salaries	13,125	18,113	16,168	15,462	8,915	9,388	81,171
Supplies	3,509	3,687	2,548	2,653	1,981	4,777	19,155
Pensions	18	39	200	347	203	222	1,029
Operational Support	1,553	4,346	6,700	8,033	5,661		26,293
Construction	3,410	3,398	3,036	3,779	2,635	7,786	24,044
Equipment	1,381	567	4,124	1,903	1,662	3,018	12,655
Donations		369	699	887	1,000		2,955
TOTAL	22,996	30,519	33,475	33,064	22,057	25,191	167,302

Source: Accounting Office INIPA.

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2. UNA and the Foundation for Agricultural Development (Fundacion para el Desarrollo Agraria) of the National Agrarian University (FDA/UNA)

Project resources destined to assist UNA in technology generation, transfer and educational activities will be administered by the FDA/UNA. UNA will implement the activities.

a. FDA/UNA

UNA created FDA/UNA in 1983 to administer funds from non-regular budget sources destined to support UNA-related activities in agricultural research and education and in agricultural and rural development activities, in general. FDA/UNA is wholly controlled by UNA. Its governing body (The Administrative Council) is made up of five UNA delegates nominated by the UNA Rector and confirmed by a majority vote of full professors. The use of FDA/UNA by UNA as the vehicle for administering non-regular budget funds has grown significantly during the past decade. From an initial capitalization of 5,000,000 soles (about US$3,125 equivalent in 1983) provided directly by UNA, FDA/UNA administered a total of approximately US$90,000 monthly during 1986, and an average of $150,000 monthly during the first six months of 1987.

FDA/UNA was selected for purposes of administering project funds primarily for three reasons:

1. The strong preference of the UNA administration is to have funds destined to assist UNA in strengthening ATG&T activities administered through the Foundation. UNA administrators not only feel that funds administered by FDA/UNA are better controlled than are funds directly administered by UNA, but also, such funds are subject to less bureaucratic delays in effecting disbursements and liquidations. UNA's general policy is to administer all funds other than GOP regular budget funds through FDA/UNA, whether the funds are for general purposes or targeted.

2. Under the APID Project, funds destined for UNA-implemented activities have been disbursed to the Ministry of Agriculture under regular budget allocations and then are transferred to UNA to defray implementation costs. Experience under this arrangement has not been satisfactory. Considerable delays have been encountered both in the approval process and in the disbursement and liquidation process. Both UNA and USAID/Peru feel that disbursement of Project funds to FDA/UNA, given the long term and effective relationship that already exists between FDA/UNA and UNA for receiving and administering funds destined to UNA, will be a more cost-effective and administratively efficient means of assuring adequate financial accounting and control of use of funds than disbursement directly to UNA. The same is true for other alternatives, such as channeling the funds through another Public Sector institution.

3. The USAID Controller's Office has examined the financial operations of FDA/UNA and find them to be adequate to account for and control AID Project funds.

4. FDA/ONA is an integral part of the UNA ATG&T sub-system. Its role and relationship with UNA is well defined and has functioned satisfactorily (and at a rapidly expanding rate) for five years. FDA/UNA-administered Project funds destined for UNA implemented activities is consistent with existing policy and practice of UNA.

b. UNA

UNA has existed as an institution of higher education for agriculture since the turn of the century. In the 1960's, with strong external support from AID, IDB, IBRD and other international donors, UNA achieved the reputation of being one of the best agricultural universities in Latin America. During the period of the military government in the 1970's external support largely terminated, many of the best faculty left, salary scales and budget levels deteriorated, and the student body expanded rapidly while student quality deteriorated. This process took a serious toll on the quality of instruction, maintenance of physical plant and equipment, administrative capacity and institutional Espirit de Corps. Since 1980, with external assistance re-initiated (including a resumption of modest assistance from AID under the APID Project beginning in 1983), UNA is rebuilding its faculty and its academic standards, as well as rehabilitating its physical plant and equipment. UNA currently has eight faculties covering a broad spectrum of agricultural sciences, over four hundred faculty members and a student body in excess of 3,500. Currently, one-fourth of the faculty have Masters degrees and 13% have PH.D's or equivalent. A graduate school offers MS degrees in several disciplines. Some 140 faculty teach in the graduate school and student enrollment is about 350.

UNA has research laboratories and lands at its campus location in La Molina and at three institutes (plus other areas) located on the Coast, in the Sierra and in the Selva.

With few exceptions, lack of adequate specific operational support funds, unprepared faculty and absence of linkages with the international agricultural scientific community have resulted in limited quality and amount of research carried out by UNA faculty and students. However, the institutional analysis of UNA carried out by Consultants during project design indicates that both UNA administration and faculty have a strong interest and desire to expand research and outreach efforts as a means not only of contributing to improved agricultural technology generation and transfer in Peru, but also to enrich and increase the relevance of instruction both for undergraduate and graduate students (See Bibliography for a listing of consultant reports). The institutional analysis concludes that UNA clearly has the historical perspective and the current potential to effectively

implement Project activities related to (1) increasing faculty/student research involvement, (2) improvement of university administration, especially as related to expanding and improving the quality of research, and (3) expanding the availability of and access by faculty and other agricultural scientists to up-to-date, relevant technological information and international contacts for purposes of research and technology transfer, as well as for instructional purposes. These also appear to be the best vehicles for improving course content and teaching quality for both undergraduate and graduate students.

3. Regional Universities

Some 14 public and one private regional universities offer university level programs in one or more agricultural disciplines. All but four of these universities are less than thirty years old, most having been established in the 1960's. With a combined faculty of approximately 850, these universities graduate about 600 students annually out of a total enrollment of approximately 30,000. However, only about 250 of the enrolled students are in programs rated as satisfactory in a 1985 World Bank study.

Despite the problems related to quality of education, these universities attempt to fill an important training gap in the ATG&T system. They also are positioned to make significant contributions resolving regional level technological problems. These universities and their faculty are quite heterogeneous in quality of performance, academic preparation and academic standards. Within public universities, only five faculties in five universities were rated by the 1985 World Bank study as having satisfactory academic programs. These are located in Cusco, Lambayeque, Piura, Cajamarca and Tingo Maria. The private university in Piura also has a satisfactory program in agronomy.

Less than ten percent of regional university agricultural faculties have post-graduate degrees, and research is not only severely limited, but often is not problem oriented. For these universities to begin to exercise a more effective role in the ATG&T system, it is necessary to up-grade their faculty and to provide that faculty with relevant problem-oriented and appropriately guided research opportunities. Providing scholarships to regional university faculty for MS training at UNA is an effective means to up-grade faculty. Encouraging linkages of private sector organizations with regional university faculty members and between them and INIPA through the use of competitive and matching research grants can provide sorely needed marginal resources to faculty with the potential to carry out responsive problem-solving research of regional interest. Regional University faculty members also have the potential to participate effectively in outreach programs, thereby increasing the number of farmers receiving useful technological information.

4. The Agricultural Research and Promotion Services Foundation (Fundación para el Avance de los Servicios de Investigación y Promoción Agropecuaria) - FUNSIPA

FUNSIPA was established in May 1986 by INIPA, ONA and CIP for purposes of advancing the development of a national ATG&T system. Initially FUNSIPA has been functioning primarily as a pass-through mechanism for receiving and disbursing donations provided by national and international donors for supporting INIPA's ATG&T activities.

In this role, FUNSIPA received and administered approximately US$800,000 from May 1986, (when it was established) through June 1987, a period of 14 months. During the first half of 1987, monthly disbursements have been nearly US$100,000. After more than a year of experience with FUNSIPA, its organizers have reached the conclusion that FUNSIPA's potential benefit to the improvement of the ATG&t system is so great that its role should be expanded to include mutiple functions to enhance participation of Private Sector organizations and to further facilitate more effective Public Sector participation in improving the ATG&T system.

FUNSIPA is in the process of assuming an expanded role in the ATG&T system. Its clients and sponsors will involve all components (individuals and institutions) of an ATG&T system: researchers, technology tranferors, educational institutions, and other institutions and individuals that focus on research and transfer related not only to agricultural production but also to agricultural policy, factor and product marketing, agro-industry and other related fields. FUNSIPA interests also will include some basic issues such as resource concentration, public sector program and project continuity, retainability of scarce and well trained human resources, sustainability (indigenous public and private capacity to finance the ATG&T system), and a monitoring role to continually appraise the state of the national ATG&T system.

Thus, the mission of FUNSIPA is to involve all actors in the planning and implementation of ATG&T programs and to seek resolution of problems that constrain the degree to which science serves Peruvian agriculture. In this way, FUNSIPA explicity and implicitly supports the trend toward a science-based agricultural development strategy substituting for a natural resource based strategy.

Specific functions of FUNSIPA in the future are:

1. Provide leadership on difficult choices of concentration and continuity in public sector ATG&T programs;

2. Facilitate development of critical linkages between private and public sector ATG&T institutions in Peru;

3. Facilitate linkages between Peru and the international agricultural scientific community, including IARCs;

4. Address issues of attracting and maintaining essential human resources required in the public and private sector ATG&T system;

5. Develop mechanisms to continually assess the state of science-based agriculture in Peru.

The functions enumerated above are consistent with the planned role of FUNSIPA in this Project. FUNSIPA will administer and manage the use of Project resources and will provide professional specialist advisory support to INIPA, UNA and ONA in the implementation of the ATT Project until these institutions have the internal human resource capability to carry out their assigned ATG&T functions without outside advisory assistance. FUNSIPA also will administer and manage Project resources destined to up-grade the professional human resource base in INIPA, UNA, regional universities and private sector organizations. This will include resources to assist in increasing availability of opportunities and access to research, extension and teaching informational materials required for an effectively functioning ATG&T system.

Finally, FUNSIPA will administer and manage Project resources destined to catalize the private sector to become more involved in ATG&T activities, including improved seed production, distribution and certification.

In order to effectively carry out this expanded role, FUNSIPA will need institution-building support from Project resources to build its administrative and business management capacities. Nevertheless, it is apparent from the analysis carried out during Project design that the institutional purpose and base exist in FUNSIPA to permit it to assume the responsibilities assigned to it under the Project. No other institution analyzed, including CONCYTEC, FDN and FDA/UNA are as well suited as FUNSIPA for the work to be performed.

5. National Agrarian Organization (Organización Nacional agraria) - ONA

a. Background

Following the 1980 reelection of President Fernando Belaunde Terry, former properties of the Sociedad Nacional Agraria - SNA, The National Agrarian Society, which had been liquidated in the 1970's under the military government) were transferred to ONA, a new organization established in 1980 and patterned somewhat after the SNA. ONA is a national organization composed primarily of local commodity producer associations which join together in national commodity committees, the presidents of which form ONA's Asamblea (governing assembly). ONA gradually is forming regional branch organizations to consolidate commodity committees at the regional level.

At present, ONA is seen by its members and the GOP primarily as an active representational organization although its leadership believes that long run stability will depend much on member support generated by economic services which they believe it has the potential to provide. Currently, services which are provided to farmers primarily are those organized by national commodity committees operating at the local level.

Commodity committees were empowered by a 1976 Supreme Decree to collect a check-off fee of one-half of one percent on the marketed products of their producers. These commodity associations are in various stages of development as is their ability to collect the check-off fee. As a practical matter, base of collection is considered enhanced by a centralized processing or trading point. Thus, fees are collected easily for products which require processing (e.g., rice, coffee, cotton, sugar cane) and collection is difficult for commodities which are consumed directly (e.g., corn, potatoes, vegetables). ONA helps in the fee collection process. It retains 10%, turns 15% over to the Ministry of Agriculture for redistribution to campesino organizations, transfers 10% to the national commodity committee and the remainder reverts to the local committee in the geographic area where it was generated.

b. Institutional Strengths and Weaknesses

ONA's institutional strengths and weaknesses were analyzed in depth in late 1986. The analysis concluded the following 1/.

1) Strengths

ONA is recognized on a national scale as an open organization representing and defending the farmer. It has credibility in government and with its network of local and regional farmer's organizations. It represents producers of about a dozen key commodities of Peruvian agriculture.

Possibly the greatest strength of ONA in representing farmers lies in the fact that it is not identified with any particular political party or ideology. In this regard, ONA has taken precautions not to develop a negative or attacking posture on public policy in agriculture.

1/ See "assessment of the peruvian National Agrarian Organization", D. Fledderjohn and D. Butz, ACDI, November, 1986.

hand (and typified by rice growers), major political and economic battles have been fought (and usually won) through concerted action and support for ONA. The rice growers are interested in expanding check-off resources in technical assistance, commercial services and problem-oriented research. On the other hand, in nearly all other crop committees, with the possible exceptions of cotton and corn, the priority is to strengthen basic organization and resolve immediate issues such as how to collect payment of checkoffs.

Although mentioned as a strength previously in terms of experience, weaknesses also are apparent in staff skills and the administrative management apparatus in commercial operations. Policies and practices need to be defined further and profit motive, as well as the service motive, should be a key management determinant in future commercial operations. In the past, the main objective has been to provide products at the lowest net price. This is a laudible goal but is not feasible for longer run commercial viability. ONA needs income and capital generation capacity if it is to continue meaningful work and contribute revenues to its non-commercial activities.

There is not a clear unerstanding of proper Board of Directors to Management relationships in ONA. The Board appears to assume functions that quite properly should be the responsibility of management. It is not clear if this results from having a strong Board and president or if it is the result of a limited management staff.

c. <u>The Future of ONA Institutional Development</u>

The consultants found in the small sample of ONA component organizations visited, what appears to be a pattern of unusual strength and vigorous activity in some areas, inactive organizations in others and a greater or lesser degree of political ideology and issues running through most of the circuits of the system.

ONA depends heavily on the GOP for recognition and authority to generate income through the checkoff system. At the same time, the government is a prime target for ONA campaigns and issues, including price supports, subsidies and special favors aimed at improving the condition of producers. ONA has concentrated its activities on efforts to organize additional commodities and geographic areas as a means to enhance political clout. Mechanisms and resources must be found to provide meaningful economically viable programs and services to members if ONA is to maintain its membership and negotiating stature.

A major portion of the future strength and effectiveness of the ONA system lies in its capacity to provide continual, effective and economically viable services to its membership base. Maintaining and strengthening ONA in terms of interest and loyalty on the basis of performing lobby functions appears to be a tenuous proposition with the possible

exception of those cases in which government-fixed commodity prices are adjusted several times per year. ONA, in its forward planning and strategy definition needs to examine the demand for and economic feasibility of services such as dissemination of technical information on crop production and farm assistance in establishing more efficient and fair marketing alternatives, and programs that make producers' more aware of the economic and political environment in which they operate.

In early 1987, ONA carried out a major planning effort that included elaboration of a medium term Institutional Development Plan and a Project for developing private sector activities in the Peruvian ATG&T system. This Plan has been taken into consideration in designing ONA's role in the Project.

As alluded to above, since 1984 USAID has provided financial assistance to ONA for a pilot activity that established the Economic and Statistical Analysis Center. This activity has been quite successful, and has demonstrated ONA's capability to assume Project responsibilities and to successfully implement an AID assisted Project.

d. <u>The Future Role of ONA in the ATG&T System</u>

ONA, as the only truly representative farmers' organization of national scope, has a potentially key role to play in the ATG&T system. ONA participation in the ATT project is consistent with its own plans to develop expanded services to farmers, and to begin to develop a commercial seed enterprise. The recent affiliation with ONA of several strong Valley producer associations enhances the potential for achieving these objectives.

ATT Project assistance will allow ONA to accelerate its institutional development process and to expand services to farmers more effectively and more rapidly. More specifically, ONA is expected to be a major actor in developing private sector technology transfer enterprises, and in improving seed production, distribution and certification. ONA and its affiliated commodity committees also are expected to participate in the activity providing financial resources to expand agricultural research opportunities.

AGRICULTURAL TECHNOLOGY TRANSFORMATION PROJECT

PERU

SOCIAL SOUNDNESS ANALYSIS (Consultant's Report)

presented to:

THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Lima, Peru

April, 1987

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SOCIAL SOUNDNESS ANALYSIS

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Peru - Agricultural Technology Transformation Project (ATT)

Social Soundness Analysis

Introduction

Agricultural research and extension takes place within an economic, social, political, and cultural context. For the purposes of this report only a segment of this context will be examined. This segment is referred to as the agricultural community. Within it, the social, economic and cultural characteristics of the principal actors (individuals and institutions) will be briefly described and analyzed in order to point out their key characteristics that an extension and research effort must take into account. This analysis will also assess the compatibility between Project components and the social organization and structure of the Project clients.

The report is divided into two parts. Part I is a categorization, description and analysis of the major actors in the agricultural community. This first part examines the social basis for the ATT Project. Part II is an assessment of the social cost/benefits of the Project to the different clients and an estimation of the benefit incidence by client category. This second part is limited to a qualitative assesment. As the Project subcomponents reach final design, a quantitative estimation of beneficiaries could be added.

Part I. The agricultural community: Categorization and Description, and Analysis

The agricultural community includes many actors performing different roles and functions. For purposes of this report only a few key actors, directly involved in the research, transfer, and use of agricultural technology will be considered. These actors are: the farmer, the farmer organizations, private and public extension personnel, and the private sector agricultural services providers.

A. Farmers

1. Brief Profile of the Peruvian Farmer

The farmer Profile is derived from the results of the 1984 Encuesta Nacional De Hogares Rurales (ENAHR) and a series of papers based on this survey. The Profile focuses on those indicators that are related to the use of the technologies which are associated with a science based agricultural production system that allows farmers higher production and higher incomes This set of indicators provide information on the number of farmers using known technologies, which are translated into increased production and incomes. Although the list of indicators is a partial one, and does not provide details on sound technologically based agronomic practices, it does provide a picture of the degree to which Peruvian farmers are using already known and proven agricultural technologies.

The source of the data is indicated in parentheses at the end of each paragraph. The main source of information is ENAHR, and this is indicated by the table number or page number of the final results of ENAHR.

2. Number of Farms, Farm size, and Farm Households

Based on projections from ENAHR, there are an estimated 1,573,748 farm units in Peru. Of these 1,540,891 are farm units with land, the rest are farm units dedicated mostly to small livestock operations on land parcels of less than .10 of an hectare. (Table 1 - Farm Units are used as an equivalent to Explotaciones Agropecuarias in ENAHR's terminology).

The predominant size of the farm is small. Of all the farms, over 84% are smaller than 10 hectares, and over 71% are smaller than 5 hectares. Farm units of less than 10 hectares occupy 57% of the total land under cultivation (Cuadro 1, p LIII).

41.2% of the population of Peru or some 7,937,595 persons are members of the households that depend for their living on the exploitation of the farm units (Page XLIX).

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This population is predominantly young. Over 42% are in the age group 0 to 14 years (Page XVIL)>

The average size of the household is 4.9 member per household with some variation between the three mayor regions of Peru (Page L).

Of the rural population in the age group 15-64 (includes rural dwellers in occupations other than agriculture) almost 28% can not write nor read. The schooling level of this same age group is low with 71% not having more than some elementary education, 25% with some secondary education, and only 3.3% with some post secondary education (Page L).

Average net farm household income (July 1984) was I/. 3,065. US$).Of this income 68.2% was derived from the farm, and the remaining 31.8% from activities outside agriculture) public sector employment and small commercial operations). There are significant variations in household income and source between the three regions of Peru (Page LXVIII).

3.Farm units and the use of Technology

Nationally, of all farm units only 3.6% or 56,654 farmers declared to have received technical assistance form all sources. The main source of technical assistance was the Ministry of Agriculture with 75.7% of the total. This was followed by the Banco Agrario (7.8%),independent professionals (3.3), farm associations(1%) - (Table 85).

19.2% of those receiving technical assistance asserted not following the technical advise offered, principally, because they did not trust the validity of the advice (36.5%), the advice was untimely (30.5%),and the advice was uneconomic (19.4%) -(Table 91).

In 1984, only 8.64% (135,927) farmers declared to have received agricultural credit. Most of the credit (88%) came from the Banco Agrario followed by credit from individuals (8%), cooperatives and other institutions (1.3%), Commercial banking system,(.1%)- (Table 95).

In 1986, as result of the GOP policies supporting the sector, the Banco Agrario alone reports that it had made 206,000 loans to farmers in the country, a significant increase over the 1984 figure. However, even with this increase, credit still reaches less than 20% of all farmers. (1986 figures reported in Proceso Economico,Año 7 No.67 Marzo 1987, p.7)

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Other national indicators of technology use are as follows:

Technology	% of Farmers who use
certified seeds	4.7
chemical fertilizer	25.0
organic fertilizer	29.4
Pesticides	24.5
Tractors	5.9
Transport	11.4
Animal Traction	30.0

Taken as a set of indicators of farmer use of science based agricultural technologies, it is evident that majority of Peruvian farmers are not making use of known technologies to increase their production and incomes. Although no data was collected for sound and efficient practices in farm management, soil conservation and water management, it is generally known that on all scores, Peruvian farmers are also deficient.

What this profile also indicates is the great potential for improving agricultural production practices, increasing productivity and efficiency, and increasing farmer incomes through basic and well known agricultural production technologies, such as widespread use of certified seeds, soil conservation and water management practices, increased use of fertilizers, etc.

4. Regional Differences

There are significant regional differences among farmers living in the Sierra, the Selva and the Coastal regions. Generally, the farmer in the Coast is more commercially oriented and makes greater use of science based technology. He is followed by the farmer living in the Selva in both scores. In general the Sierra farmer has the lowest rates of both commercial participation and science based agricultural technology use.

Yet, the majority of the farmers live in the Sierra accounting for 61.5% of the total (21.3% in the Selva, and 17.2% in the Coast), and as a category have the largest number of farms under 2 hectares in size both in absolute and relative terms.(573,296 farms or 37.2% of the total number of farms in the country)

The Sierra, Selva and Coast farmers are also culturally

different. This difference is expressed in the language used, the type of organizations preferred, the degree of "integration" into the urban Spanish speaking nationally dominant social, political, and cultural system.

Although, the regional differences are important in characterizing the farmer population in each region, and in indicating overall trends, it is also important to recognize the limitations of this type of categorization. They are gross indicators presented in terms of regional and national averages.

In each community or locality in the Sierra, Selva, and Coast, the internal differentiation is significant. Every community or locality includes farmers with different farm sizes, and different levels of technology use, and more importantly, farmers using different production strategies.

In the Coastal region for example, the majority of the farmers are small (less than 5 hectares) producers with levels of technology use that are as low as the ones found in the Sierra. What is most visible in this region, however, are the small number of highly technological farmers engaged in commercial production whose high production levels tend to define the region as a "modern" one. (32.8 % of all farms on the coastal region are less of 1 hectare in size, 49,4 of all farms are less than 5 hectares in size - ENAHR Table 20).

This local internal differentiation is, in turn, related to society wide factors of social stratification. Prior to the Agrarian Reform of 1967, farmers in Peru were clearly distinguished between agricultores and campesinos. Agricultores were large land holders, Spanish-speaking, urban-oriented, members of the upper stratum of Peruvian society. Agricultores managed farms employing large numbers of farm laborers and frequently produced crops for export. Campesinos were small land holders, Quechua-speakers, and rural dwellers. They worked for the large land holders, or on their own small parcels of land, producing principally for their own subsistence and secondarily for the local market.

The Agrarian Reform eliminated the large land holdings and along with it the category of individuals known as hacendados. What is left in their place are much smaller farms, some of which are still run by members of this old group of farmers or their descendants. It is a much smaller category, found mostly in the Coastal region.

Agricultores and campesinos are still found in Peru. Although campesinos as a social category, are still at the bottom of the social hierarchy, the entire stratification system is changing, and the characterization of farmers into agricultor and campesino is no longer an easy one to make, nor does it have

the same significance of pre-agrarian reform times. For example, the growing numbers of migrants to the Selva are known as "colonos" and "agricultores" although the majority are of Sierra and campesino origin. It seems that for them geographical mobility and socioeconomic mobility are simultaneous. Farming in the Selva is also characterized by its commercial orientation. Most settlers produce or seek to produce a commercial crop.

The social status of the campesino is also changing. More attention than in earlier times is being paid to the Campesino, and the campesino communities by the nation as a whole. Since 1985, the Government has been transferring resources to the rural areas,(increased credit, price supports, grants, etc) at unprecedented rates. Increasing numbers of rural development projects can be found throughout campesino areas sponsored by national and international development agencies, PVO's, and the government. Urban Peruvians are increasingly aware of where their food comes from and how much it costs. Also, as a result of the rural to urban migration of the last thirty years, most urban Peruvians are, in fact, migrants from the rural areas themselves, and view rural life and campesinos differently than the old urban costeno individual.

5. Basis for a Typology of Farmers

The objective, goal and purpose of the ATT Project provide the basis for a farmer typology.

The Project aims to increase farmers productivity by making available to them known and proven productivity enhancing agricultural technologies.

The "ideal" farmer that the Project seeks to promote is the farmer who produces at or approaches crop yields known to be possible for the type of soils, climate and altitude in which the farm is found. Using this criterium, a typology can be constructed between high and low yield farm units. Low yields farm units in a given geographic area can then be studied to determine what is needed to increase yields.

Crop yields can also serve as an indicator of the commercial orientation of the farm unit. Producing a crop for the market is related to productivity enhancing technologies, since higher yields are usually translated into higher incomes for the farm unit. Crop yields and market participation varies throughout each region and the country indicating again the highly heterogeneous composition of the farming population.

At one extreme are what can be called the "<u>commercial</u>" farmers whose production strategy is determined by the market and

who seek to maximize their incomes by increasing production through the use of improved technology, greater efficiency, and cost and risk reduction. At the other extreme are the "subsistence" farmers whose strategy is to produce with minimum risk and investment sufficient food for the household and to employ the family labor.

In between these two extremes are the "transition" farmers, who are by far the largest category and include farmers who are in a process of transition from a subsistence farming strategy to a commercial farming strategy. These transition farmers are the principal clients, which the ATT Project seeks to assist in becoming proficient users of a science based technology.

From the review of the national statistics provided by the ENAHR (see A.1 above), it is evident that the commercial and subsistence farmers are small minorities in Peru. The commercial farmer can, however, be found throughout Peru. He tends to be most visible in the Coastal Region, primarily because of the agricultural tradition of this region (Commercial, export oriented farming with a good communications network). The commercial farmer is a growing factor in the Selva Region, where the main problems are those of communications, markets, and availability of technology including inputs. The commercial farmer can also be found in the Sierra Region, usually in or near towns and cities, and in rural areas with good communication to markets.

A set of statistics from ENAHR (table 41) provide some gross indicators of the distribution of all types of farmers within Peru. The statistics presented are of two nationally very important commodities that characterize the regions in which they are the principal crops: rice and potatoes.

Rice

6.5% of all farmers produce rice. 38% of the rice farmer are on the Coast, 60% are in the Selva and 2% in the Sierra.

91.3% of the total production of rice is destined to the market.

The average annual yield for RICE in Kg./Ha is as follows:

Coast	Selva	Sierra	National
4,835	2,538	4,928	3,725

These yields vary considerably between irrigated and rain-

fed farms, as well as by smaller areas (dominios in ENAHR) within each region. For example in what is called by ENAHR, the urban Cost, the average yield in rice is 5,700 Kg./Ha or 35% above the national average. The number of farmers in this category is estimated to be 1,500 farmers (out of a total of almost 38,000 farmers in the entire Coast).

Potatoes

35 % of all farmer produce potatoes. 98.3 % of all potatoes producing farms occupying 97 % of the total surface are in the Sierra. The Selva follows with 1.2%, and the Cost with .5 % of all the potatoes farm producing units.

Only 39.9% of the total production of potatoes is destined to the market.

The average annual yields for POTATOES in Kg./Ha are as follows:

Coast	Selva	Sierra	National
13,652	6,355	3,734	3,877

Only 1% of all farms producing potatoes used certified or improved seeds. 74% used some form of fertilizer (Organic and chemical), and only 41% used any pesticides.

By simply comparing yields within Peru itself, this set of indicators point out the potential for significant increases in yields through the use of known and proven agricultural production technologies. The transition farmer, as measured by almost all indicators of efficient agricultural techniques, can be objectively shown to make little or no use of basic known and proven agricultural techniques.

Furthermore, most Peruvian farmers, regardless of where they live, have retained little of previously developed technologies, such as the sophisticated mountain farming technology developed by pre-Columbian Andean cultures. Technological innovations, social, political, and economic changes through the past centuries have affected all farmers in Peru. Today, they can only be described as farmers in transition to a commercial type of agricultural production system, and assessed by how well or bad they make use of known and proved agricultural technologies.

The main constraints to increased farmer productivity have been amply documented by ENAHR and numerous other studies. The can be summarized as follows:

- limited knowledge and use by farmers of known and proven agricultural production technologies.

- lack of sound agronomic practices know-how among farmers

These two factors are related to the very limited agricultural technology diffusion of information in the farming community of Peru, compounded by the low schooling levels of most farmers and the very limited reach of all extension services (public and private). In fact, agricultural technology information is simply not available to most farmers.

To this lack of technology information, the unavailability of, or difficulty in, obtaining science based and commercially distributed inputs (certified seed, fertilizers, pesticides, appropriate farm machinery, etc) are added as a second set of factors contributing to the present low productivity of Peruvian farmers.

The limited reach of extension services, the equally limited coverage of agricultural credit, and the sparsity of a private sector agricultural production support services, make it difficult for all farmers to improve and increase their productivity even when they actively seek to do so. The ATT Project addresses this problems by promoting a series of activities that will facilitate the work of farmers by making available to them services and technologies currently too difficult to obtain or simply not available. These services and technologies will benefit primarily the "transition" farmer by facilitating the rapid and economic adoption of known and proven agricultural production enhancing technologies.

6. Male/Female Roles in Agriculture

The role of women in agricultural production is very important in the majority of farm households in Peru. They participate in all aspects of the production from field preparation to harvesting, processing, and marketing. Women contribute almost all the labor needed to produce livestock in the majority of the Sierra households.

As with every other generalization of the rural and agricultural population of Peru, the above generalization has to be qualified to take into account the heterogeneity of Peru's social, economic, and cultural systems. Women's role and participation is greater in noncommercial small farms. Women generally play a greater role in farm management and work, among Quechua speakers in Sierra communities. Women are a greater part

of the farm workers in commercially oriented farms on the Coastal Region. Among the natives of the Selva, women and men jointly operate their farms along traditional patterns of labor division. In the Selva, among the recent arrivals (colonos), their role and participation varies, and tends to be more restricted than among the native households, or the Sierra pattern.

Despite the obvious fact that women participation in agricultural production varies from region to region and among the different types of farm system, there has been a persistent bias in treating agricultural production and farm work as an exclusive male domain. This bias is reflected: in the underenumeration of women's role and degree of participation in agricultural work in censuses and surveys of the sector; in the design of programs of technical assistance, promotion, etc directed to men only; in the design of women's programs that reflect the cultural bias of the program designers and not women's needs and importance in agricultural production, adoption of technologies, and decision making contribution to the farm family.

Extension programs, for example, segregate extension work among women from the regular extension program directed to transferring agricultural technology to farmers. Women's programs emphasize household chores, such as cooking, sewing, etc. The extensionist work rarely if ever includes women in the field trials and demonstrations. Women are never invited to meetings, held by government officials to announce community projects and programs, despite the fact that in Sierra communities it is traditional for women to show up , sit separately from the men, and listen carefully.

Although, the promotion of women issues has begun to change the traditional neglect of women, and women are increasingly included as part of rural and agricultural development programs and projects, the bias persists and is thoroughly ingrained in the social and cultural make up of the change agents, (extensionists, promoters, decision makers, etc).

The change agents are either of urban "middle class" backgrounds, or aspire to become members of it. Their cultural and social orientation is towards the spanish-speaking-urban culture. One of the characteristics of this orientation is the relegation of women to the role of hememaker (Ama de Casa), while men are expected to be the bread winners, and the decision makers of community affairs. This urban cultural vision of female/male roles and domains has been imposed on the rural and agricultural population, and has resulted in programs, projects, regulations, and work patterns that tend to constantly reinforce it.

As was mentioned before, the discussion of women issues in Peru has begun to introduce changes to this traditional approach to rural and agricultural development efforts. Most change agents are aware of the importance of women's contribution to agricultural production, and increasingly efforts are made to include women in development efforts.

The design of specific technological transformation sub-projects will take into account regional variations in male/female roles in agricultural production and in the training and formation of extension personnel. Given the heterogeneity of Peru's farming population, the most appropriate strategy is flexibility to adapt extension and research programs to the specific characteristics of each region, category, or group of farmers.

B. Farmer Organizations

Faced with few and limited agricultural production services, farmers have opted for a variety of forms of collective action to try to help themselves. Farmer organizations are plentiful in Peru. They exist at the local, regional and national levels.

They are organized on the basis of territory (comunidades campesinas), commodity (producer committees and associations), occupation (ligas and federations), perceived similarities and common interest(Valley Associations, and by Government decree (cooperatives, SAIS, etc).

There are significative differences between all types of farmer organizations in terms of their roles, functions, and goals. However, one of the key differences, and one that relates directly to its effectiveness as technological transfer mechanism and provider of agricultural production services, is the relationship or lack of it of a link between the cost and benefits the farmer derives from membership in the organization.

1. Farmer Organization as a Lobby

The Lobbying organization is perhaps the most prevalent form of farmer organization in Peru. Its main function and role is to lobby government for services, resources, concessions and privileges. Given the degree of Government control and monopoly of agricultural services and resources, it is not surprising that most farmers should expect the government to solve their problems. This organization often takes on a bigger role and function. It lobbies the government not only for agriculture related services, but for rural development services (roads, health, education, etc).

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With a different emphasis but using the same organizational principles, this type of organization also includes the commodity committees and associations. Their primary function is lobbying government for prices, services, and resources related to the a specific commodity.

This type of organization has the potential of evolving into a service oriented organization, if it uses its income appropriately to develop services. The Government's license to tax producers can not be taken for granted, but should instead be seen as a short term capitalization opportunity. (a sort of windfall). What is more, factors other than Government's concurrence, can quickly dissipate their tax generated income. The most obvious is the break down of the control point where the tax is applied. For example, delays in paying farmers in an inflationary economy can quickly lead farmers to look for alternative marketing channels, as farmers realize that they loose more by waiting for payment,than, they would if they are paid lower prices in exchange for immediate payment.

The lobbying organization does not require the active participation or support of most of its members to be effective. A small and active minority can speak for most of them, and as long as some benefits (higher price, credit, price support, and markets) reach most farmers, they are tolerated and passively supported.

This type of organization recruits its "members" through compulsory means. Example, all farmers of a crop are taxed to support the organization, or all farmers of a community are pressed to contribute. There is little or no direct connection between the services they offer and the voluntary support of the "members". All benefits are usually dependent on the Government willingness (for political purposes) to grant. Not surprisingly, politics are normally a integral part of the organization. The organization is frequently used for partisan politics, where the small and active leadership bargain with politicians for their"members" vote.

These organizations have existed for a long time and will continue to exist,with lobbying as their main function, and as long as the government is a cheap source of services and resources for the agricultural sector. Since the Government's resources are scarce, there will always be allocated on the basis of politics. The strength of this type of organization is related and dependent on the Government's control and capacity to control a resource or service. Thus, the Rice Producer Association is a strong one, principally, because the Government's monopoly of rice commercialization gives the Association the perfect mechanism to collect a tax (contribution) from most rice producers.

The relationship between "members" and their organization's supplied services replicate the relationship between the organization and the government. Only those best organized and most vocal receive services. Services are rewards for support or for not making trouble.

The quantity, quality or appropriateness of the services is not directly tied to the members financial support for these services. Therefore, it is up to the leadership to decide what their members need. A frequent solution to the distribution of benefits among members is some common good, such as a school, a health post, a sports field, etc. The common good that benefit everyone are usually not directly related to the farmer agricultural production needs. He frequently looses his enthusiasm for the organization and if able withdraws his financial support.

There are legitimate and needed functions that the lobbying organizations can and will perform. However, it is important to understand the limitations of this type of organization. They generally lack a mechanism to proportionally distribute cost and benefits among their members. Their strength is related to being able to represent all farmers, and to obtain benefits that are common to all. They have no mechanisms to assess the cost of a members contribution, nor allocate benefits proportionally.

2. Service oriented Farmer Organizations

Fewer in number than the lobbying organization, but found throughout Peru is the farmer organization that exists to provide its members with agricultural related services. The best and clearest examples are the Valley Producer Associations of Canete and Ica. However, this type of organization can also be found in the Sierra and the Selva under different names and guises, and with varying degrees of organizational purity. Examples that can be cited are: the Valle Grande Institute with community technicians and community committees, The Soil Conservation Project near Cuzco with its emphasis on technology, and numerous examples of campesino groups, and communities throughout the country, learning how to run their organizations on a more technical and business-like manner.

Their main characteristics is the provision of competitive services to their members, who join voluntarily, and support the services in the measure that they benefit from them. There is direct connection between the cost and the benefits of the services. The organization can only exist if the benefits are greater than the costs, and are proportionally distributed. Members are treated as business clients, who if not satisfied,

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can take their business elsewhere. This forces the leadership, and management to offer competitive services. It also reduces their actions to the problems and tasks related to agricultural production and/ or commercialization. It forces management and leadership to serve their clients.

This type of organization deals more with discrete and tangible benefits, and less with common goods, though it may also act as a lobbying group on occasion. Membership can be territorial based, or by commodity. They can be closed or open organizations, depending on the type of services they offer, and on their managerial capacity.

This organization is usually formed out of the need of the farmers for services, and the lack of them from alternative sources, such the Government or private firms. Its sustainability depends on its capacity to continue delivering competitive services and its flexibility to adapt to changes.

3. Farmer Organizations and the Transfer of Technology

The typology of organizations presented above deals with extremos cases. Most farmer organizations in Peru probably have a bit of both. However, the fundamental difference should not be ignored. The direct relationship between cost and benefit, and the proportional distribution of both, among the members, are probably key to the organization's sustainability and effectiveness as a technology transfer mechanism.

The service oriented organization aims to provide services that increase the members income through increased production and cost and risk reduction.

What is important to both types of organizations as mechanisms to transfer technology to farmers, is to clearly understand the source of support for the organization, and its cost/benefit distribution mechanism, as well as the functions it is best structured and organized to fullfil.

Both types of organizations have legitimate roles to play in the agricultural community, and in a way, they are complementary. It is a good strategy for service oriented organizations to stay away from politics, and most will do if there are other channels, such as a lobbying organization. Lobbying organizations, can on the other hand, provide effective services in the areas of representation, information collection and dissemination (market information), training for member organizations, etc.

Finally, it should also be pointed out that most farmers

would rather farm that run organizations (that is unless the salary in the organization is greater than his farm income). Most farmers are pushed into organizations by the lack of services. Farmer organizations are a second best alternative, and they tend to reduce their role as soon as competitive services are available in the market. Those services are market transactions, where the farmer buys what he needs. They do not require endless meetings and continuous support of an organization's activities, which despite the best of intentions tend to proliferate and grow.

C. Private Sector Agricultural Services

The private sector agricultural services have been covered by other membersof the team. In this report, four private sector activities are mentioned because of their impact on the farmers. These are: the local distribution of inputs by small businesses, the rental of farm machinery, the commercialization of crops, and ingenieros agronomos as consultants.

1. Local input suppliers

Stores selling agricultural inputs are found throughout Peru. They are usually run by ex- extensionists (ingenieros and sectoristas), who as part of their business dispense a lot of technical advice. They are an important factor in the transference of technology, and in the introduction and adoption of new inputs (technologies). This stores are linked to the major distributors, and it is not clear how much technical assistance support they get from them..

The technical advice that the seller of inputs extends is limited by the lack of any type of scientifically based analysis and testing. He is referred to as a "Empirico", someone who learns through experience.

INIPA Technology Transfer Unit should give consideration to the local input suppliers role as technology transferrers, and seek ways to upgrade the quality of their knowledge.

2. Farm Machinery Rental

There is no data available on how widespread this service is, but there are examples throughout the country. One example is the Cuzco Cervecoria del Sur. With assistance (credit) from the Brewery, individuals have acquired farm machinery used primarily to support the brewery's barley production program.

The services are provided to farmers, and supervised by the Brewery. The machinery is owned and operated by individuals, who also offer their services to other farmers and crops.

Farm machinery operations create new jobs, allow small farmers to buy a service, otherwise not available, and contribute to farmer productivity and income., as well as facilitate the transfer of technology.

3. Commercialization

Commercialization is perhaps one of the most important activities in the agricultural community. Buyers of commodities are important in aiding or blocking some technological innovations in crop production. They have a close and highly influential relationship with the farmer. Frequently, they sell or exchange inputs for commodities. They also frequently buy in advance, and thus have a stake in the outcome of the crop.

4. Ingenieros Agronomos (consultants)

Approximately 56,000 farmers or 3.6% of the total number of farmers in the country declared to have received technical assistance in 1984. Of this total, only 1,869 farmers reported receiving technical assistance from :Independent Professionals". (ENAHR, Table 85). This form of technical assistance was more prevalent in the Coastal region (5.7% of all cases), followed by the Sierra (3.2% of all cases) and the Selva (1.1% of all cases).

There are two modalities of technical assistance extended by ingenieros agronomos (independent professionals). The first one is where the ingeniero agronomo sells his services to a farmer. The second one is a compulsory one, where the farmer who takes credit is forced to pay for the services of an ingeniero agronomo. There is no information available that indicates which form is more prevalent.

The second modality introduces a series of potential problems, and is being resisted by farmers in different regions. (we were informed that in Tarapoto, farmers unanimously rejected this modality of providing technical assistance). Nevertheless, ingenieros agronomos are backed by a law authorizing this modality and forcing banks to enforce it. To date, as the data indicates, it has had little success.

What is important about this forced technical assistance are some social and cultural factors that reveal the attitude and approach of ingenieros agronomos to their work.

The approach taken by the ingenieros seems to be the

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opposite of any sound business practice. Ingenieros seem to feel, they are owed compensation by the farmers for having graduated from school. The stance taken by the ingenieros through this law is one of guild protection, which may or may not benefit the farmers, who are asked to pay for services that are not related to performance. This law also seem to imply that farmers are just not capable of knowing what is good for them, which seem to be related to the social status of the campesino and ingeniero, as will be shown below (page 19).

Banks, who are reported to care only about loan recovery, have so far not enforced the existing loan. This is due primarily to farmer resistance to both paying for technical assistance, and to not having the employer's prerogative of choosing the the service provider and services. However, as the commercial banks are forced to make more agricultural loans, the potential is there for this law to be widely implemented, as banks perceive the benefits of having the farmer pay for loan recovery services.

Further interpretation of the this unique approach to technical assistance by the ingenieros agronomos will be made below in the section dealing with the public sector extension service.

C. Public Sector Extension Services: Extensionists (Agentes) and Sectoristas.

Agricultural research and extension in the public sector are the responsibility of the Instituto Nacional de Investigacion y Promocion Agricola (INIPA). INIPA recreated in 1980 by the REE Project is currently in the mist of a reorganization that will separate research and extension into two or more different institutions.

This section deals with some of the social and cultural characteristics of the technology transfer agents of the public sector, as a contribution to understanding the human element of this institution. It does not deal with institutional issues, nor, the degree of preparation of the individuals. These issues are dealt by other members of the team with the appropriate expertise in the subject.

There are three mayor actors involved in the technology transfer to farmers within the public sector system. They are the sectorista, who works at the local level and with the farmers; the agente, who works with a given number of sectoristas, and the Crop specialist/ and researcher who works at the experimental stations, and assists the agente.

The sectorista used to be graduate of the Colegios Agropecuarios (High School equivalent and no longer in

existence), and is currently a regional university graduate, who has the degree of Bachelor. He is distinguished from the agente who normally is an ingeniero agronomo) because he has not completed a dissertation to qualify for the Ingeniero Agronomo Diploma.

The sectorista is usually of campesino origin or socially very close to that level. Because of his origin, he is also culturally close to the campesino, and in the Sierra, he is frequently a Quechua speaker. The old sectoristas (graduates of the now extinct Colegios) are widely recognized as having been the most effective change and extension agents in the history of extension in Peru. Rural residency, close ties to the farmer, a mid-level education, and commitment to their work are some of the reasons offered for their good reputation.

The ingeniero agronomo, extensionist (agente in peruvian terms), and researcher (if a crop specialist of stationed at an experimental station) are predominantly of slightly higher social origins than the sectorista, though many ingenieros came from the same stock as the sectorista. The crop specialist, and the researcher are often of urban background, come of non peasant families, and tend to be graduates of the Universidad Nacional Agraria.

The profession for all of these actors, as many others in other fields, is primarily a means to upward social and economic mobility. The goal is to become a professional and to preferably reside in a urban center. The greatest accomplishment for those professionals seem to be then, to obtain the Diploma, to be a certified professional, and to live the "middle class" life style of the cities. The Diploma is perceived as a prerogative to the type of employment that will permit them the life style they aspire to. A job is treated as a right. The public sector has been the main employer of these agricultural professional, and within it INIPA. However, the supply of professional is far above the capacity of the public sector to absorb them. Consequently, the approach taken by the "Independent" Professionals through the law mentioned in the previous section. Forced hiring of their services is equivalent to permanent tenure in a public sector institution. The goal and results are the same.

A related factor is the social and cultural stratification among researcher, agente, sectorista, and farmer, which is part of the society wide stratification. The researcher looks down on the agente, he in turn does the same with the sectorista, and the new crop of sectoristas take their turn by looking down on the farmer.

The effects of this social hierarchy can be summed up in the often repeated story of the researcher's attitude towards a campesino's reaction to a new technology:

> Researchers are reported to claim that if a campesino does not adopt the technology developed in the controlled and ideal experimental station environment, it is because the campesino is an illiterate and ignorant lower class individual.

Public sector professionals accept without much resistance the often repeated frustrations of working without adequate means. They explain away, their lack of results and notable inefficiency as a result of inappropriate working conditions. However, very few resign their post, or search for innovative ways of accomplishing their jobs. This state of affairs is again related to their goal, which is permanent employment. There is little career advancement by performance and accomplishments. What is rewarded is living with the system, not rocking the boat, and repeating, to international donors a litany of reasons why they can not do their jobs.

This in no way is intended to diminish the impact of the real lack of resources within the public sector, and the problem that this causes. But, one can not stop from wondering, why so little initiative to get things done. After all, lack of "ideal" resources has been, is, and will probably be, for a long time to come, the only real constant of life in the Public sector.

Bureaucratic centralization has been identified as a mayor contributor to the problems of the change agents. Little room for initiative and innovation has reinforced the professional tendency to consider being permanently employed as the ultimate goal. Currently, there are government actions oriented to breaking this state of affairs. Most notably, the push towards a decentralization of the public sector is intended to create the conditions where regions, institutions, and people can take a more active role in solving some of their problems.

This situation creates an opportunity for the ATT Project to experiment with nobel solutions to some very old problems. It also creates an opportunity to use some of the considerable talents that sectoristas, agentes, and other agricultural professionals in the public sector have, in solving technology transfer constraints in more effective, productive and innovative ways.

Part II. The Agricultural community and the ATT Project

The heterogeneity of the agricultural community with farming production strategies that range from production for subsistence to production for export, with a population of farmers that include the illiterate and the university graduate, with a highly unevenly developed agricultural support services industry (public and private sectors), and with a great diversity of crops grown in three mayor geographical regions, requires a multifaceted and flexible approach.

The demand for technology and services within the agricultural community is too diverse to be amenable to a single national response. In the design of the ATT Project, this diversity of demand and heterogeneity of the agricultural community have been taken into account. The ATT Project is designed to satisfy diverse needs through a series of sub-components that deal with each of the mayor actors in the agricultural community. Each of the Project sub-components is designed to ultimately help the farmers increase their incomes and production. The ATT Project will help the generators of technology, the transferrers of technology and the agricultural services providers. The ATT project deals with the key actors (individuals and institutions) that directly affect the technology used by the farmers in their daily work on the farm.

By focusing on the technology generation and transference individuals and institutions, the ATT Project is designed to impact on the majority of the farmers in Peru. The ATT Project will also promote agricultural support services that are sustainable and long lasting.

The following is an analysis of the different sub-components of the ATT Project by client category. This report deals only with the qualitative benefits of the Project. Once each of the Project sub-components has been designed in its final form, a quantitative analysis of benefit spread and incidence will be possible.

(Note: When this component is formulated in its final form, numbers of extensionists, faculty, etc can be included.)

A. Extension Personnel: Research and Extension

1. Education: Forming Extension Personnel

The education sub-component includes the Universidad Agraria Nacional, the Regional Agrarian Universities and the Institutos Superiores. All of these institutions form the extension personnel (Agentes, sectoristas and researchers) of both the

public and private sectors.

The ATT Project will benefit these future extensionists by contributing to:

- Upgrading faculty technical knowledge in each participating institution, and programs to keep faculty current with developments at the national and international planes.

- Active participation of faculty and students in agricultural research in the public and private sectors.

- revise and improve curricula and courses, improve technology information sources, and promote international exchange.

The number of beneficiaries of this sub-component can be estimated to reach (# of students in agriculture in the Institutions to be helped).

The faculty in the Departments of Agronomy reaches (#). They will also be direct beneficiaries of this sub-component.

Given the key role that the extension personnel has in transferring technology to the farmer and in promoting sound agronomic practices, adequately formed extensionists are an essential part in the agricultural community of Peru.

The benefit incidence of well trained extension personnel are all farmers that receive technical assistance. Currently, the percentage of farmers receiving technical assistance reaches less than 4% of all farmers. The potential to expand the provision of technical assistance is enormous. In the past, most of this assistance has been provided by the Government through INIPA and other agencies. The public sector will continue to employ large number of extension personnel, however, the greater potential for employing extension personnel lies with the private sector (Farmer organizations, consulting firms , and agroindustry).

2. Renewing the extension personnel

As part of this sub-component, the ATT will contribute to the renewal, retraining, and updating existing extension personnel.

This will done by breaking the isolation and lack of communication among the agricultural professionals and

technicians through the publication of a journal, magazines, and the sponsorship of scientific workshops and seminars for different groups of the extension personnel.

Through this effort, the ATT Project will generate a performance and results oriented environment where extensionists are rewarded by recognition, professional status, and better incomes. This will influence a change away from the current dominant preoccupation with guild protection, and job security at all costs, among all extension personnel in the country.

A second benefit of this sub-component is the diffusion of new technological know-how (research, extension methods and experience, etc) among the extension professionals, sorely lacking in the country today.

3. Agricultural Library and Data Bank

All extension personnel are again the focus of this sub-component. It reinforces the two previous efforts by making available in one central place the information necessary for forming agricultural professionals, keeping them informed, and facilitating research. However, this will also be available to other actors within the agricultural community. such as farmer organizations. consulting firms, and other agricultural support companies.

B. Agricultural Support Services

The second set of actors that influence farmers use of technology are the providers of agricultural support services. This category includes a wide variety of institutions and individuals in the public and private sectors.

1. Farmer Organizations

The ATT Project will assist farmer organizations in conducting research, providing extension services, producing seeds, and providing its members agricultural support services.

Farmer organizations that show an interest in one or more of the above activities will be requested to submit a proposal demonstrating the feasibility of the project and their capacity to undertake it. An assessment of the organization's structure, as well as capacity to undertake the project will be the determining factor for qualification for assistance.

Assistance provided by the Project will vary from that of referral to consultants in specific fields, to overall organization management strengthening. Each organization will be assisted by matching grants that emphasize self help and

sufficiency. The matching grants will request organization contributions that range from cash to in-kind depending on the type of organization.

Farmer organizations can benefit large number of member and non-member farmers. Where no other source of agricultural support services exists, farmer organizations will play and important role in technology transfer and provision of services.

2. Agricultural Support Services

Technical assistance, supply of inputs, support services in machinery rental, laboratory analysis, etc are some of the areas that the ATT project will help promote and in some cases support.

This types of services will be promoted by upgrading the knowledge level of the providers through the information dissemination sub-component of the Project, and by making available technological information in the data bank and library centers.

A small number of wide impact enterprises will be assisted by facilitating technical assistance in the preparation of projects and proposals for submission to financing institutions.

Promoting a private sector agricultural support services industry will not only benefit the farmers as the final users, but will generate employment among agricultural professionals that is based on ability to offer a needed service and on a entrepreneurial basis.

C. Urban and Rural Food Consumers.

The final category of beneficiaries include all food consumers, who through increased farm output will enjoy greater supplies of food, higher in quality and with better value, than the current supply.

ECONOMIC ANALYSIS 1/

The economic analysis is presented in two parts. The first part focuses on rates of return, factor use multipliers and issues of sustainability relating to public research and extension. This first part also reports information from secondary sources on rates of return for investments in education.

The second part provides estimates from primary sources on the probable increases in adoption rates and consequent changes in magnitudes and relationships of costs and benefits from an improved technology generation sub-system and a shift in technology transfer strategy to include private sector as well as public modes of technology transfer, as the result of increased activities stimulated by the ATT Project.

Part I Returns to Agricultural Research, Extension and Education

A. The Strategy for Agricultural Growth in Peru

Since 1981, the public sector ATG&T strategy has focussed on redevelopment of agricultural growth based on science and technology change rather than a major dependency on increased cultivated areas based on land and irrigation expansion. Recent productivity changes (3.5% to 3.8% annual agricultural growth rates from 1984 through 1986) are associated with recapitalization (human and physical) of the public ATG&T system. For the period 1981-86, about $180 million was invested in its recapitalization. About 67% (75% from GOP direct and counterpart sources) of the total investment has been directly from the GOP public treasury. The distribution by function has been 33% research, 40% technology transfer and 27% administration and human capital investment (degree training). Approximately 23% of the total investment has been for physical recapitalization. Of total investment in the public sector ATG&T system for the period 1981-86, AID project investments (including GOP counterpart) represent 13% (9% without GOP counterpart). The two other major donors (IBRD and BID) invested 14% (10% without GOP counterpart).

The science-based agricultural growth strategy being pursued by the GOP since 1981 has produced three major types of technical change: varietal improvements, agronomic/cultural practises improvements, and physical/mechanical improvements (i.e., improvements in the permanent land and water resource base). The focus is on adaptive research and has concentrated on basic food (rice, corn, potatoes, beans and cereals), selected Selva and Sierra crops, and (beginning in 1987) a national livestock program. Investments since 1981 in the public ATG&T system, combined with improved policies affecting agriculture plus favorable climatic conditions (except for 1983), have resulted in a steady recovery of Peruvian agricultural output (again except for 1983).

1/ Complete citations of references are included in the Bibliography.

The average annual change in total agricultural output was 3.5% from 1980 to 1986. Excluding 1983, the average rate of change in gross value of output at constant 1979 prices for the 1980 - 86 period exceeded 6% per year. The annual change in crops (3.46%) was about equal to the annual change in livestock (3.6%) for the period. Over 70% of the gross value of output comes from crop production. (See Table E1, below).

Table E1. Gross Value of Agricultural Production by Sub-Sector, 1980-1986 (constant 1979 prices)

	Agriculture		Livestock and poultry	
YEARS	Value (US$ billions)	Annual Change (%)	Value (US$ billions)	Annual Change (%)
1980	1,361	--	0.520	--
1981	1,508	10.8	0.567	8.9
1982	1,536	1.8	0.590	4.2
1983	1,323	13.9	0.600	1.7
1984	1,565	18.3	0.570	- 5.0
1985	1,581	1.0	0.601	5.4
1986	1,626	2.8	0.644	7.3

Source: USAID/OARD Data Bank, April, 1987

Increased value of output has resulted from increased planted areas, more intensive use of land areas (e.g., more crops per year), increased use of non-land inputs resulting in increased per hectare yields, and from reductions in post-harvest losses. Preliminary estimates by INIPA of the percentage of increased value product explained by each of the above factors suggests a 50-30-20% distribution for 1) increased amount and use intensity of land in production, 2) productivity increases of major crops, and 3) post-harvest loss reductions. An estimate for 1986-1990 by the Agricultural Policy Analysis Group - GAPA (supported under the APID Project) forecasts a 6.3% annual increase explained by a 65-35% distribution between increases in amount and intensity of cultivated area and increases in per hectare productivity. This study also forecasts reduced annual losses from improved post-harvest practices at 1-2% per year.

Table E2 shows potential productivity gains from adoption of improved technologies by comparing average farmer demonstration yields with average actual yields.

Table E2. Peru: Actual Yields and Potential Yields of Principal Crops (kg/ha)

Crops	Average of National Experiments	Verification: Average of on-farm Research Test Plots	Verification: Average of Farmer Demonstrations	Average of Actual Yields 1971-1982	% Change for Demonstrations VS. Actual
Rice	9,000	7,796	6,349	4,336	46
Yellow dent corn	8,000	2,676	2,481	1,007	146
Amilaceo Corn	6,500	3,606	4,076	2,767	47
Wheat	3,500	--	--	986	
Potatoes	47,000	24,179	18,179	6,794	167
Beans	1,300	--	--	837	
Soybeans	2,700	--	--	1,627	
Cotton	2,927	--	--	1,729	
Sugar Cane	234,000	--	--	153,557	
Coffee	2,500	--	--	598	

Source: Pomareda (1986).

A forecast of expected rates of annual change in total output for selected crops during the period 1987-1990 are shown in Table E3. These optimistic forecasts that assume favorable weather and continued heavy public sector emphasis on the agricultural sector.

Table E3. Production Forecasts for Selected Crops: 1987-1990

Commodity	Annual Change in Total Output (Percent)
Rice	11 - 12
Soft corn	7 - 8
Potatoes	8 - 9
Wheat	11 - 12
Beans	12 - 14
Hard Corn	8 - 9
Sugar	6 - 7
Andean Products	12 - 14
Coffee	5 - 6
Poultry	6 - 8
Pork	8 - 10
Beef	3 - 4
Milk	5 - 6

Source: GAPA, 1987

A 1985 study by Victor Palma reports limited potentials for continuing a natural-resource based growth strategy in Peru, both in terms of cost-effectiveness and availability of land and irrigation water for cultivated area expansion. The study and concludes that future agricultural growth must come primarily from productivity/technological changes.

A. Internal Rates of Return

Many studies of a wide number of commodities in developed and developing countries, including Peru, report annual internal rates of return ranging from 20% to more than 100% for public sector investments in agricultural research and extension. One impact of this work has been to highlight the magnitude of under-investment in the agricultural research and transfer process in most developing countries and in many developed countries. Estimates from 17 studies for Latin America report internal rates of return that range from 11% to more than 100%. Two studies completed in Peru report annual internal social rates of return from 23% to 42%.

Table E4 Internal Rates of Return to Agricultural Research/Transfer in Latin America

Source	Country	Product	Period	Annual Returns (%)
Hines (1972)	Peru	Corn	1954-1967	35-40
Barletta (1970)	Mexico	Wheat	1943-1964	69-104
		Potatoes	1943-1964	69
		Corn/Sorghum	1943-1964	26-50
		Grains	1943-1964	45-93
Ayer & Schuh (1972)	Brasil	Cotton	1924-1967	50-55
Monteiro (1975)	Brasil	Chocolate	1958-1965	60-79
Hertford, Ardila,	Colombia	Rice	1957-1972	60-82
Rocha & Trujillo		Soybean	1960-1971	79-96
(1977)		Wheat	1953-1973	11-12
Wennergren & Whitaker (1977)	Bolivia	Sheet	1966-1975	44
Mangeon et al (1978)	Brasil	Coffee	1933-1975	17-26
Scobie & Posada (1978)	Colombia	Rice	1957-1964	79-96
Irarrazabal, Navarrete & Valdivia (1979)	Chile	Corn	1940-1977	32-34
Moricochi et al (1981)	Brasil	Citrus	1933-1978	18-28
Avila (1981)	Brasil	Irrigated Rice	1959-1977	87-119
EMBRAPA (1982)	Brasil	Aggregated	1964-1992	22-43
EMBRAPA (1983)	Brasil	Regional Aggregates	1977-1991	20-38
EMBRAPA (1983)	Brasil	Aggregates (human capital)	1964-1996	22-30
Roessing (1983)	Brasil	Soybeans	1975-1981	28
Pinazza et al (1984)	Brasil	Sugar	19072-1982	35
Norton & Ganoza (1985)	Peru	Corn	1972-1982	35
	Peru	Rice	1981-1986	23
	Peru	Wheat	1981-1986	35
	Peru	Potatoes	1981-1986	28
	Peru	Grain Legumes	1981-1986	42
	Peru	Aggregated	1981-1986	33

Source: USAID/Peru summary from citations in Bibliography

The Ganoza/Norton (1985) study also forecasts changes in the proportion of cultivated land using new technologies and estimated changes in yields per hectare, assuming continuation of current levels of public sector investment in the ATG&T system. The percent of cultivated land using new technologies is expected to exceed 50% by 1990 for rice and corn and approach 25% in cereals, as compared a current levels of 25% and less than 10%, respectively. Projections for 1986, 1988 and 1990 are shown in Table E5:

Table E5 Projections of Percent of Cultivated Land Using Improved Technologies for Selected Years by Crop

Crop	1986	1988	1990
Rice	37	56	56
Corn	19	36	50
Potatoes	8	12	15
Beans	0	10	19
Cereals	5	12	25

Source: Ganoza/Norton (1985)

Finally, the Ganoza/Norton study projects changes in yields per hectare with new technology as compared to traditional technology for the period 1983-1990. These projection range from 23% for beans to 86% for potatoes, with 24% and 53% for rice and corn, respectively. Combined effects of estimated increases in yields and cultivated areas using new technologies results in annual internal rates of return (IRR) on INIPA investments that range from 23% for corn to 42% for potatoes with an aggregate for five basic food crops (beans, corn, potatoes, rice and cereals) of 33%.

B. Factor Use Multipliers

Actual and projected increases in total agricultural output of 3.5% to 4.8% annually have had and will continue to have substantial income consequences on agricultural and rural sectors and on agribusinesses of Peru. Evaluations of these consequences in Peru (Evenson and Ganoza; Walters; and Pomareda), and in other countries e.g., Brazil and India (Evenson), and in other countries by other investigators (Dalrymple, Palma, Hanumantha), provide the data base for estimating multiplier effects from agricultural growth through productivity changes.

The Evenson/Ganoza (1985) study for Peru estimates that a 10% increase in yields results in an average increase of 14% in rural labor use for yellow corn, rice and potatoes (with slightly decreased labor required for beans and amilaceo corn); increases of 10-12% in machinery use; decreases in the use of animal power; and very substantial increases in the use of fertilizer and chemicals (200 to 500% as compared with traditional production systems). The study by Walters (1986) reports similar increases in labor and credit use for rice and corn producers using new technologies. Pomareda (1986) estimates an 8.6% increase in aggregate input use (3.6% in rural resource use, 17.1% in use of industrial products and 8.6% in credit) for every 10% increase in the crop area using new technologies. Evenson's study in Brazil (1982) estimates a 1.5% increase in labor use along with slightly higher increases in machinery and chemical uses for every 10% increase in research investments. These estimates of increased resource use indicate high economic multiplier effects from a science-based technology-driven agricultural growth strategy.

C. Sustainability

The issue is whether the GOP can be expected to continue to provide resources to support the public sector ATG&T system at adequate levels after outside donor support ends. The history since 1984 is encouraging with approximately 70% of public ATG&T program expenditures coming from the public treasury. This favorable history suggests a growing acceptance by peruvian authorities of the relatively greater economic benefits to be derived from a productivity-focused science-based agricultural growth strategy as compared with major dependency on increasing cultivated area to achieve increased output.

Continuation and increases in GOP support in the future and the success of the ATG&T system in filling its intended role will depend heavily on the following factors:

1. Expectations are enhanced if the annual rate of change in the real national GDP, and in GDP from agriculture, continue at 4% to 6%, and 3.0% to 3.5%, respectively. Such a rate of growth permits strong demand in order to maintain food prices at a level sufficient to sustain reasonably stable agricultural terms of trade with the rest of the economy.

2. A continuation of national research and technology tranfer programs with technically sound prioritization will result in increased rates of return to investment in ATG&T and in increased output at lower unit costs of production.

3. Enhanced credibility will be achieved through greater client identification as the result of increased real net farm incomes and stronger links between public and private sector ATG&T institutions;

4. An increasing role for productivity increases in shifting internal food supplies (increasing 10-40% for the 1982-1986, period and 30-50% for the 1987-1992 period, depending on the crop).

5. Sustainability also is a function of increased administrative efficiencies and increases in technical capacities of INIPA professionals; and

6. Demonstration of a continuing capacity to coordinate external donors based on a coherent development strategy.

There are reasonable grounds for favorable expectations with regard to GOP support to the public ATG&T system, but there are definite uncertainties on the sustainability of the recent relatively high growth rates. The system must be able to achieve internal efficiencies and adjust to unpredictable substantive changes, often dictated by political rather than technical and economic criteria. Sustainability also requires substantial progress in resolving problems related to recruiting and retaining key professionals. Finally, a not yet fully operational private sector will need to be responsive to opportunities to exercise a larger role in the ATG&T system, in partnership with INIPA and UNA.

D. Education

Recognition that human capital is a major factor in agricultural development was first analytically demonstrated in 1963 by T.W. Schultz and his colleagues at the University of Chicago. Professor Schultz received the Noble Prize in economics for this work. His leadership has led to an array of studies related to investment in human capital formation. Some of these studies, summarized in Table E6, quite consistently report high rates of return for primary and secondary educational investments, as well as for university educational investments. An original article by Schultz, reported 35%, 10% and 11% annual social rates of return for junior high, high school and universities. These same trends have been reported in other studies in Colombia, Mexico, Venezuela, Chile and Brazil.

The findings of a major study by A. Flavio Dias, et al (1983) on returns (Brazilian Agricultural Research and Extension Institute) to EMBRAPA for investments in human resources are appropriate to the conditions prevailing in Peru. The assumptions on overall economic and agricultural sector growth rates, public commitment to a science-based strategy, and the status of ATG&T institutions at the beginning of the data base period in Brazil are reasonably comparable to current conditions prevailing in Peru.

Table E6. Summary of Studies on Social Rates of Return to Investments in Education by Country and Level of Education

Level of Education	Annual Social Rates of Return (percent)										
	United States								Brasil		
	a/Schultz	b/Becker	c/	d/Col.	e/Mex.	f/Ven.	g/Chi	h/India	i/Lang.	j/Castro	Castro& Mello Souza
Primary	-	-	22	15	37	82	24	17	32	20-40	-
Junior High	35	-	16	-	14		29	14	19	12-45	11-14
High School	10	14	16	27	12	17	17	12	21	37-43	18-35
Univ.	11	9	10	3	25	23	12	10	12	9-14	-

Source: a/ Schultz (1961); b/ Becker (1960); c/ Hanoch (1967); d/ Schultz (1968); e/ Carnoy (1967); f/ Shoup (1959); g/ Harberger e Selowsky (1966); h/ Gouden (1967); i/ (1974); j/ Castro (1973); k/ Castry & Mello e Souza (1974). (Complete citations are included in the Bibliography).

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EMBRAPA moved vigorously in advanced training from 1974 through 1983 with an average of 170 students per year studying abroad for PhD's (50%), M.S.'s (41%) and in non-degree training (9%). The study found high annual social rates of return on this large and continuing investment. The methodology applied estimated total costs (salaries, direct and indirect training investments) and benefits from this human capital investment (increases in rates of productivity change, reductions in per unit costs and rates of increase in achieving viable adaptive technologies associated with the professionals trained). The study reports mean annual social rates of return of 22.4%, with sensitivity analyses resulting in upper limits of 28 to 30% per year.

Other studies, such as Castro (1973 and 1974) and Langoni (1974) for Brasil report generally similar results from educational investments in graduate training for other sectors of the Brazilian economy. Brasil has been steadily moving to develop indigenous graduate programs with expectations of lower costs and continued benefit streams. There is the same expectation with the UNA graduate program in agricultural sciences.

The graduate program at UNA averages more than 300 students per year. INIPA enrolled 90 M.S. students in the UNA program during the period 1983-1986, and has programmed 80 M.S. students for the period 1987 to 1992. More than 40 regional university professors and 10 ministerial personnel per year currently are studying for M.S. degrees at UNA. These numbers indicate implicit recognition not only by the GOP but also by ATG&T institutions and individual professionals of the increased rates of returns (both socially and individually) from investments in graduate education.

Part II Cost-Effectiveness and Benefit-Cost Analysis

A. Cost-Effectiveness

To assure that the most cost-effective alternatives will be applied to ATG&T activities, Project design was oriented toward establishing a competitive environment for obtaining prospect ATG&T resources and toward stimulating a wide range of public and private sector options for carrying out both technology generation and technology transfer. The literature reviewed, reports of consultants and the experience of USAID technical and management staff consistently reaffirm that in those cases where technology generation and transfer activities generate significant economic surpluses to both the supplier and the adopter of the technologies (surpluses that are competitive with returns in other economic pursuits), private sector supply of technology supply almost always is more cost-effective than is the public sector alternative.

Consultant reports prepared during Project design suggest a number of private sector options for carrying out both generation and transfer activities. Generally, private sector ATG&T activities will be focussed on small to medium sized market-oriented farms for both generation and transfer initiatives. Technology generation appears to be viable in the private sector primarily where an appropriate technology is available from other sources (often from other countries, such as California technology for horticultural crop production on the Peruvian coast), and requires only limited verification testing on-site in Peru. Most often this is the case for high-value crops adapted to Coastal agriculture, such as tree crops (nuts and fruits), horticultural and ornamental crops, and specialty crops such as spices and coloring agents. In the case of technology transfer, private sector alternatives are cost-effective and can be expected to become self-sustaining and profitable in the short to medium term for a wide range of crops and livestock enterprises. For major food and high-value export crops, such enterprises likely will be crop specific. A whole farm, farm management, approach appears to be most cost-effective in many cases. Also, private enterprise technology transfer alternatives often will include the production and/or sale of embodied technologies, especially improved seed.

A competitive environment, regardless of whether public and/or private sector enterprises are involved, will result in dominance by the most cost-effective alternative, especially where embodied technologies are involved in the transfer process. Transfer of technological information generally is more cost-effective when carried out in combination with the sale of embodied technologies (i.e., input supplies such as improved seeds, pesticides, fertilizers, farm machinery). However, information about production technology improvements also can be provided profitably by the private sector in connection with financial and resource management (i.e., a farm management service), and/or when linked to credit supply.

To promote cost-effective options among all of these alternatives, the Project has been designed to encourage competition in the use of Project resources, thereby catalyzing transfer enterprise efficiency and resulting in cost-effectiveness. Also, in this way a wide range of types of technology suppliers can be encouraged to experiment in the provision of technology transfer services, thereby also promoting operational efficiency through competition. Five Project activities are designed specifically to promote competitiveness in technology generation and in technology transfer:

a. Expanding research opportunities through competitive and matching research grants;
b. Stimulating private sector technology transfer enterprises;
c. Stimulating improved seed production, distribution and certification,
d. Improving availability and access to agricultural research, extension and teaching information materials; and
e. Competitive fellowships and post-graduate academic participant training.

Cost-effectiveness for ATG&T activities that are not expected to provide the supplier with individual returns sufficient to attract private sector participants must be achieved in public sector institutions. This generally will be the case for basic food crops research, for much of livestock research, and for technology transfer activities focused primarily on subsistence producers, producers in isolated areas of low productivity or on producers whose decisions are not motivated necessarily by increased profits (e.g., production cooperatives and other associative production enterprises). As discussed in parts of this Economic Analysis, internal social rates of return are quite high for these types of public sector technology generation and transfer activities. However, because these returns accrue to society rather than to the technology supplier, the public sector generally must assume responsibility for them (except for limited private sector activities with charitable and philanthropic motivations).

The most cost-effective use of external resources for stimulating public sector ATG&T activities generally is to maximize use of installed capacity and existing public sector resources dedicated to that purpose. In Peru, this leads to the obvious conclusion that external assistance for public sector ATG&T activities must assist INIPA and agricultural universities. Most of the public sector ATG&T installed capacity and existing public sector resources are in these institutions.

The REE Project limited its assistance to INIPA. Experience during the more than six years of that Project has shown clearly that agricultural universities also have considerable installed capacity that presently is being under-utilized. INIPA and agricultural universities need to work together to achieve synergistic benefits in terms of increased and better quality ATG&T output while improving the quality of university graduates (these are the professionals who will improve the quality of output from the ATG&T system). Again, consultant's reports and the experience of USAID/Peru agricultural technical and managerial staff reaffirm this conclusion. The Project also relies on competition for project resources among public sector ATG&T institutions as a means of encouraging cost-effectiveness.

B. Benefit-Cost 1/

In order to carry out a benefit-cost analysis of the Project, co-efficients were estimated for adoption rates of newly generated and verified technologies, and for yield impacts expected from adoption of these technologies. Additionally, reliable enterprise budget cost estimates were selected for producers using traditional ("before adoption") technology and for producers who have adopted the technology.

1/ Detailed analytical tables for the benefit-cost analysis are shown in Annex II, Exhibit J.

For the analysis to be manageable within the resources and time frame available, 10 crops were analyzed (some for different regions): rice (Coast and Selva), barley, pulses, broad beans, yellow corn (Coast and Selva), white corn, potatoes, quinua soybeans and wheat Thus, twelve different crop situations were analyzed. Cost budgets were selected from INIPA and ONA, with the choice being made on the basis of opinions of crop specialists for that crop and that region. Rates of adoption and rates of yield change co-efficients were selected by adjusting co-efficients used in the Ganoza/Norton study (1986), to account for additional impact expected from increased private sector participation in the ATG&T process as the result of the Project. These adjustments were, based on expert opinions of NR program leaders and REE Project technical assistance personnel.

1. Producer Benefits.

Producer benefits appear to be quite attractive for most of the crops analyzed. In the calculation of producer benefits, it was assumed that the producer will need to invest additional resources only for cash inputs (i.e., any required long-term capital investments were not accounted for). This assumption is considered reasonable since most of the technologies being generated and transferred rely on existing installed production capacity of the producer's land, water and equipment to realize projected productivity increases. 1/

The producer costs and returns analysis carried out for this Project resulted in an average technology adoption income increase that ranged from 1.15 greater benefits than costs for soybeans to 14.00 times for potatoes. Other ratios were: rice (2.09 and 1.88); barley (1.92); beans (4.00); broad beans (1.82); yellow corn (4.53 and 4.63); and white corn (1.54) and wheat (13.25). All of these ratios, except possibly for white corn, broad beans and soybeans, are highly acceptable under production conditions in Peru.

Producer acceptance of benefits in relation to costs (i.e., willingness to adopt a given technology) depends on risk averseness of the particular farmer adopter. Generally, smaller under-capitalized near-subsistence farmers are more risk averse than are larger better-capitalized commercial farmers. Also, farmers producing a crop under unstable climatic or market conditions are more risk averse than are farmers who farm irrigated land with stable climate and assured markets. For example, under Peruvian conditions, the Sierra farmer is more risk averse than the Coastal farmer (because the Sierra farmer's climatic conditions are more variable, he generally practises rain-fed agriculture and he generally is

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1/ In the case of land and water management improvement technologies that require long-term labor and capital investment, reliable economic studies based on results of two AID-assisted pilot programs (Soil Conservation and Plan MERIS) consistently show high producer returns for these investments.

smaller and less well-capitalized). Another example, the Sierra potato farmer is more risk averse than the Coastal rice farmer because the price of potatoes is highly variable from season to season and from year to year, while rice marketing is a state monopoly and farm gate prices are fixed at a stable, usually subsidized, price.

As a rule of thumb (with other things being equal such as availability of improved seed or credit), Peruvian Sierra producers of potatoes, barley or wheat likely will adopt a new technology if they feel relatively certain that they can obtain a return of two to three Intis for each additional Inti they must spend for production, while the Coastal rice farmer can be expected to adopt if he becomes satisfied that he can obtain a return of 1.5 to 2.0 Intis for each Inti invested.

In conclusion, the analysis shows that producer profitability under the Project is sufficient to encourage farmer adoption of improved technologies for all crops analyzed except for sofbeans (white corn and broad beans also are marginal), given availability of needed technological information and embodied technologies (i.e., the improved seed or other required input), and of additional resources needed (e.g., credit) to pay added cash production costs.

2. Social Benefits

The social returns analysis assumed a ten year stream of benefits from Project investment. Returns were discounted at 8% per year. Returns were calculated in constant 1979 U.S. Dollars and Project costs were valued in average 1986 U.S. Dollars. The resulting internal rate of return for Project Investment was 47%, with a benefit/cost ratio of 3.8, a quite acceptable level of benefits to costs. A sensitivity analysis that increased benefits by 20% provided a 4.6 ratio, while a 20% decrease in benefits resulted in a 3.7 ratio. Thus, the analysis does not appear to be highly sensitive to overestimation errors in either rates of adoption or rates of yield changes.

On the basis of both individual benefits and social benefits, the Project is highly desirable in terms of returns to investment. It should be kept in mind that this analysis likely understimates benefits since all crops and livestock enterprises that will be impacted by the Project were not covered by the analysis, nor were secondary and tertiary multiplier effects considered.

Statistical Tables showing the aggregated Benefit/Cost and Internal Rates of Return analysis follow. Individual crop tables are included in Annex III, Exhibit E.

TABLE J-1 : PRODUCER COST AND INCOME CHANGES FROM ADOPTION OF IMPROVED TECHNOLOGY, BY CROP (FOR YEAR 6 OF THE PROJECT) IN INTIS PER HECTARE

	Total Income Increase (I/Ha)	Total Cost Increase I/Ha	Net Income Increase (I/Ha)	Return on Investment (%)	Income Increase/ Cost Increase
Rice (Coast)	73	35	38	109	2.09
Rice (Selva)	90	48	42	88	1.88
Barley	25	13	12	92	1.92
Beans	84	21	63	300	4.00
Broad Beans	34	21	13	62	1.62
Yellow Corn (Coast)	86	19	67	353	4.53
White Corn	37	24	13	54	1.54
Potatoes	182	60	122	203	3.03
Quinua	14	1	13	1,300	14.00
Soybeans	23	20	3	15	1.15
Wheat	53	4	49	1,225	13.25
Yellow Corn (Selva)	88	19	69	363	4.63

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TABLE J-2

VALORES EN DOLARES

(beneficios en dolares del 79. costos en dolares 86)

RUBROS	AÑOS 1	2	3	4	5	6	7	8	9	10	TIR	VALOR PRESENTE NETO (i = 8.0 %)	BENEFICIO / COSTO
ALTERNATIVA 1													
COSTOS ($)	7376000	11836000	12405000	11545000	9501000	7337000	0	0	0	0		46400276	
BENEFICIOS ($)	-472571	12440	5241056	12672304	20742912	26264928	40609233	55711291	73029682	92204493		176577967	
BENEFICIOS - COSTOS	-7848571	-11823560	-7163944	1127304	11241912	18927928	40609233	55711291	73029682	92204493	0.47	130177687	3.8
ALTERNATIVA 2 (Aumento del beneficio 20%)													
COSTOS ($)	7376000	11836000	12405000	11545000	9501000	7337000	0	0	0	0		46400276	
BENEFICIOS ($)	-567086	14928	6489268	15206764	24891495	31443913	48731085	66872549	87635619	110645232		211892556	
BENEFICIOS - COSTOS	-7943086	-11821072	-5915732	3661764	15390495	24106913	48731085	66872549	87635619	110645232	0.54	165492280	4.6
ALTERNATIVA 3 (Disminucion del beneficio en 20%)													
COSTOS ($)	7376000	11836000	12405000	11545000	9501000	7337000	0	0	0	0		46400276	
BENEFICIOS ($)	-453669	11943	5127414	12165411	19913196	25156721	38984868	53498859	70108495	88516310		169514844	
BENEFICIOS - COSTOS	-7829669	-11824057	-7277586	620411	10412196	17819721	38984368	53498859	70108495	88516310	0.46	123114569	3.7

TABLE J-3

INCREMENTO DEL INGRESO DEBIDO AL PROYECTO ATT, SEGUN CULTIVOS ($)

PROGRAMAS	AÑOS 1	2	3	4	5	6	7	8	9	10
A. GRUPOS PRINCIPALES										
ARROZ (costa)	-1536	39292	135750	258595	38247	262993	653909	1211990	1949658	2880162
ARROZ (selva)	94286	191679	1116818	2208062	3466051	3882788	8273768	10695301	13458874	16588009
CEBADA	-208290	129693	576296	1037005	1468384	1801873	2040299	2335884	2579763	2836384
FRIJOL	5465	-257603	-214268	-19805	273347	696018	1224742	1854250	2592002	3445951
HABA GRANO SECO	5015	522	12387	22223	29090	31704	42984	93713	138822	194254
MAIZ AMARILLO (costa)	-35874	-166928	38611	487634	1172062	1248943	2376645	3798799	5932361	8050820
MAIZ AMARILLO (selva)	-88693	-190255	298181	1316344	3189789	4010913	5235103	6814400	8639134	10141820
MAIZ AMILACEO	-219906	5808	264607	609845	1288125	1832642	2668639	3839789	4984209	6274509
PAPA	1153	339229	2967147	6247970	8447163	9776367	14025874	19169651	25272456	32403286
QUINUA	2409	11877	32491	72893	153933	186231	244471	328262	406127	493281
SOYA	2728	-283	451	4520	5340	7300	31487	50957	81824	119291
TRIGO	-29329	-90591	112587	427017	1211380	2468056	3789317	5118295	6994454	8776723
INCREMENTO TOTAL DEL INGRESO NETO	-472571	12440	5341056	12672304	20742912	26204929	40609238	55311291	73029682	92204490

1/ Este rubro representa del incremento en ingreso total, menos incremento del costo debido al uso de la tecnologia con proyecto ATT

TABLE J-4

INGRESOS MARGINALES COMO EFECTO DEL PROYECTO ATT. SEGUN CULTIVOS

CULTIVO	A R O S									
	1	2	3	4	5	6	7	8	9	10
ARROZ (costa)										
Incremento por hectarea ($/ha)	-1	98	128	141	153	165	223	284	348	414
# de ha con nueva tecnologia (ha)	1600	400	1060	1840	250	1590	2930	4270	5610	6950
Incremento del ingreso neto ($)	-1536	39292	135750	255595	38247	262993	653909	1211990	1949653	2880162
ARROZ (selva)										
Incremento por hectarea ($/ha)	-38	64	98	115	132	163	228	275	324	376
# de ha con nueva tecnologia (ha)	-2460	3000	11400	19200	26250	21200	36300	38900	41500	44100
Incremento del ingreso neto ($)	94296	191679	1116812	2208062	3466051	3832788	8273763	10695301	13458374	16588009
CEBADA										
Incremento por hectarea ($/ha)	-20	10	32	42	46	50	54	59	63	67
# de ha con nueva tecnologia (ha)	10338	12848	17998	24848	31798	35248	37508	39863	41048	42228
Incremento del ingreso neto ($)	-208290	129693	576296	1037005	1468384	1801873	2040299	2335884	2579763	2836384
FRIJOL										
Incremento por hectarea ($/ha)	-2	90	181	226	254	272	303	336	370	407
# de ha con nueva tecnologia (ha)	-3204	-2874	-1184	-84	1076	2556	4036	5516	6996	8476
Incremento del ingreso neto ($)	5465	-257603	-214268	-19305	273347	696018	1224742	1654250	2592002	3445951
HABA GRANO SECO										
Incremento por hectarea ($/ha)	-27	12	42	47	52	56	76	97	119	142
# de ha con nueva tecnologia (ha)	-186	44	294	474	564	564	564	964	1164	1364
Incremento del ingreso neto ($)	5015	522	12387	22223	29090	31704	42934	93715	138322	194254
MAIZ AMARILLO (costa)										
Incremento por hectarea ($/ha)	11	86	161	217	273	290	340	392	446	503
# de ha con nueva tecnologia (ha)	-3200	-1940	240	2250	4300	4300	7000	9700	13300	16000
Incremento del ingreso neto ($)	-35874	-166928	38611	487634	1172062	1248943	2378645	3798799	5932361	8050820

TABLE J-5

INGRESOS MARGINALES COMO EFECTO DEL PROYECTO ATT, SEGUN CULTIVOS

CULTIVO	AÑOS 1	2	3	4	5	6	7	8	9	10
MAIZ AMARILLO (selva)										
Incremento por hectarea ($/ha)	13	89	166	223	280	298	337	377	420	464
# de ha con nueva tecnologia (ha)	-6830	-2130	1800	5910	11400	13440	15340	18060	20590	21840
Incremento del ingreso neto ($)	-88693	-190255	298181	1316344	3189789	4010013	5235103	6814460	9639134	10141820
MAIZ AMILACEO										
Incremento por hectarea ($/ha)	-52	1	30	35	40	57	78	100	123	148
# de ha con nueva tecnologia (ha)	4252	6572	8882	17422	32052	32652	34142	38322	40412	42502
Incremento del ingreso neto ($)	-219906	5508	264607	609845	1288125	1832642	2668639	3839789	4984209	6274509
PAPA										
Incremento por hectarea ($/ha)	-0	259	423	492	512	531	632	737	843	964
# de ha con nueva tecnologia (ha)	-2492	1308	7008	12708	16508	18408	22208	26008	29808	33608
Incremento del ingreso neto ($)	1153	339229	2967147	6247970	8447163	9776367	14025874	19169651	25272456	32403286
QUINUA										
Incremento por hectarea ($/ha)	6	19	36	43	50	56	70	84	98	113
# de ha con nueva tecnologia (ha)	430	620	900	1700	3100	3300	3510	3930	4140	4350
Incremento del ingreso neto ($)	2409	11877	32491	72893	153953	186231	244471	328262	406127	493281
SOYA										
Incremento por hectarea ($/ha)	-35	16	21	25	20	14	44	75	107	142
# de ha con nueva tecnologia (ha)	-78	-48	22	152	272	522	722	682	762	842
Incremento del ingreso neto ($)	2728	-283	451	4520	5340	7300	31487	50957	81624	119291
TRIGO										
Incremento por hectarea ($/ha)	17	64	124	171	192	214	237	261	287	313
# de ha con nueva tecnologia (ha)	-1770	-1420	910	2500	6300	11550	16000	19600	24400	28000
Incremento del ingreso neto ($)	-29329	-90591	112587	427017	1211380	2468056	3769317	5118295	6994454	8776723

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DETAILED PROJECT IMPLEMENTATION PLAN

The Project will be implemented over a six year period. Project negotiations will be initiated in July, 1987, and the Project will be authorized and signed in August 1987. Final Conditions Precedent (CP's), will be met by the end of January 1988. In addition to meeting CP's, this period will be used by the implementing institutions for Project planning, and for putting in place the Project management and coordination mechanisms. FUNSIPA will contract the Project support staff and will initiate procurement of national advisors. AID will carry out procurement of expatriate technical assistance and contract with a PSA for off-shore commodities procurement. The PSA will have initiated off-shore commodities procurement. Project activities will begin to be implemented in January, 1988 and continue through August 31, 1993. Initial CPs will be met by October 31, 1987, at which time the Project Secretariat will submit to AID a list of commodities to be procured offshore for the first year of Project activities.

AID will have contracted with a PSA by December 31, 1987, and the PSA will immediately initiate first year equipment procurement. To meet final CPs, each of the implementing institutions will develop a detailed time-phased operational plan for the life of the Project, with sufficient operational detail to provide the basis for initial commitment of funds through issuance of Project Implementation Letters (PIL's) and specific implementation support grants. This plan will be submitted to the Project Coordination Committee and Project Secretariat for review and then forwarded by the Project Secretariat to USAID for approval by January 31, 1988. Initial Project-funded short-term techical assistance may be used to assist the institutions in the preparation of these plans, once initial CPs have been met. The plans will provide detailed information for the first year, including a quarterly schedule of activities, a detailed financial plan, a plan for supervision of Project activities with projected personnel requirements, and a local purchase procurement plan. Information for subsequent years will be more general, with plans being updated on a yearly basis. The plans will be reviewed by USAID and the Project Coordination Committee and Project Secretariat each year, and approved by the Mission prior to beginning disbursement for the ensuing Project year.

Disbursements are expected to be initiated in January, 1988 for the following activities:

Component 1:

- Activity a: Consolidation and Integration of INIPA Research Programs
- Activity b: Strengthening INIPA Administration and Management

Component 2:

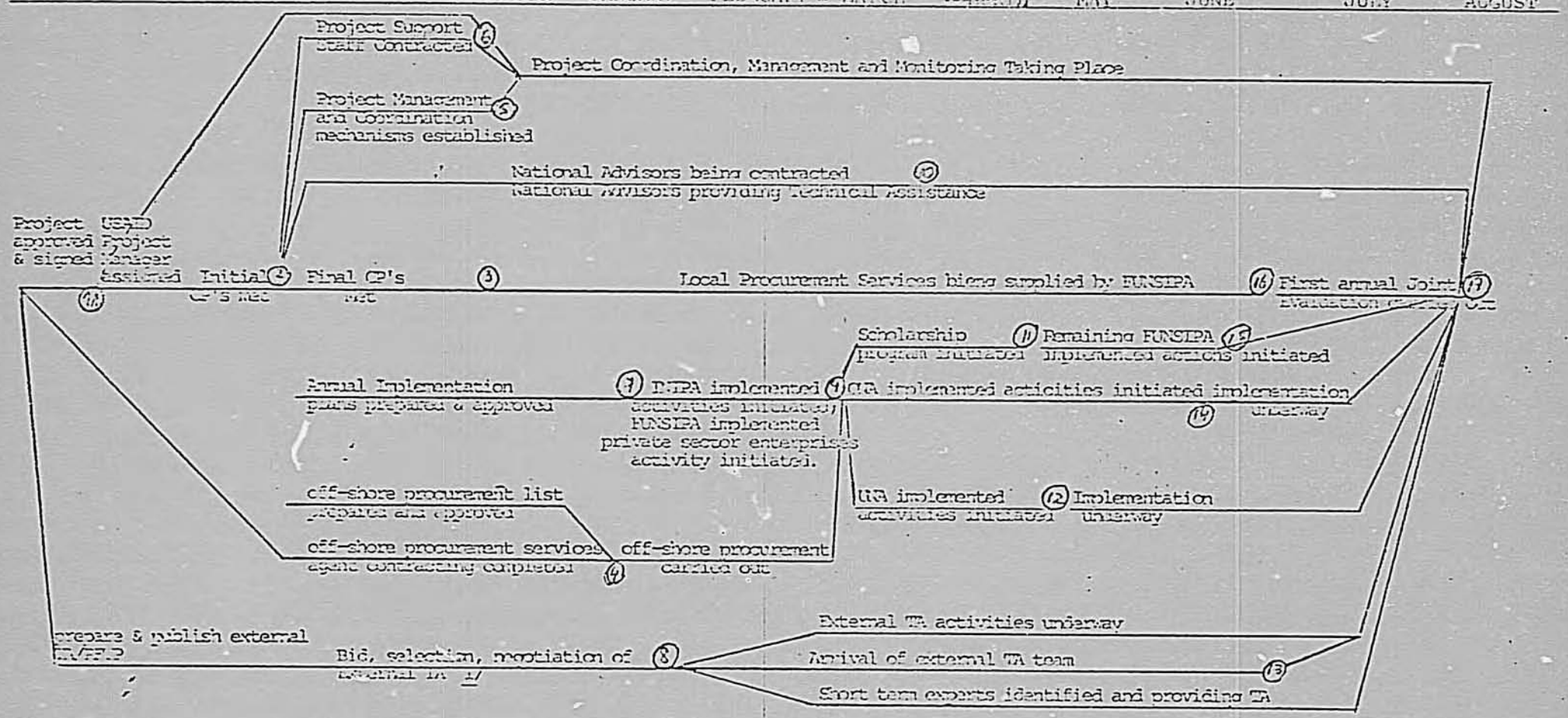
- Activity a: Establishing the Technology Transfer Specialist Program
- Activity b: Stimulating Private Sector Technology Transfer Enterprises.

Disbursements are expected to be initiated by March 1, 1988 for the Competitive Graduate Academic Fellowship and Participant Training Activity, by April, 1988 for the UNA Administration and Teaching Program Strengthening Activity (Component 3, Activity a), and by June 30, 1988 for the remaining activities. Chart K-1 provides an illustrative LOP Implementation Schedule, and Chart K-2 provides a detailed illustrative first year Implementation Schedule.

CHART K-1 - ILLUSTRATIVE LIFE-OF-PROJECT IMPLEMENTATION SCHEDULE

PROJECT ACTIVITY	CY 1987		CY 1988				CY 1989				CY 1990				CY 1991				CY 1992				CY 1993		
QUARTER:	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
1. Project Approved	A																								
2. Project Agreement Signed	A																								
3. USAID Project Manager Assigned	A																								
4. Primary Conditions Precedent Met		O																							
5. Project Support Staff Contracted and Project Management and Coordination Mechanisms established		O—D																							
6. Expatriate Technical Assistance Contracting carried out	A	D																							
7. Procurement Services Agent Selected and Contracted		D																							
8. Off-shore commodities procurement list approved		D																							
9. National Advisors Contracting carried out		D		J																					
10. Off-shore Commodities Procurement initiated by PSA			J																						
11. Final Conditions Precedent Met			J																						
12. Preparation of Annual Implementation Plans carried out		O	J																						
13. Annual Implementation Plans Approved			J				J				J				J				J				J		
14. [illegible] Activities Implementation initiated (Component 1, activity a, activity b; Component 2, activity a)			J																						
15. Funding initiated for UNA activities in Statistical & Economic Analysis (Component 1, activity c)			J																						
16. UNA Activities Implementation initiated				A																					
17. Local Procurement Carried Out			J																				J		
18. FUSIPA Initiates Competitive Research Grants Program (Component 1, activity c)					J																				
19. UNA and FUSIPA initiate Technology Transfer Enterprise Activity (Component 2, activity b)			J																						
20. FUSIPA Initiates Competitive Post-Graduate Study Fellowship & Participant Training Program (Component 3, activity c)	M																								
21. Improved Seed Production, Distribution & Certification System Development Program Initiated (Component 2, activity c)					J																				
22. FUSIPA Initiates Research Extension & Teaching Materials Development Program (Component 3, activity b)			J																						
23. Activity Implementation Carried Out			J																						J
24. Monitoring	A																								J
25. Evaluation						D			S	N				D				D						A	J
26. Project Completion Date																									J

CHART K-2: ILLUSTRATIVE FIRST YEAR IMPLEMENTATION SCHEDULE



1/ Mission prefers less than full and open competition pursuant to AIDAR 706.302-70 (B) (3) and the AID Administrator's Memorandum to USAID Directors dated October 27, 1985.

ANNEX II

Exhibit L

ORGANIGRAMS AND MAPS

CHART L1- ORGANIGRAM FOR INIPA, 1986

ORGANIGRAMA ESTRUCTURAL DEL INIPA

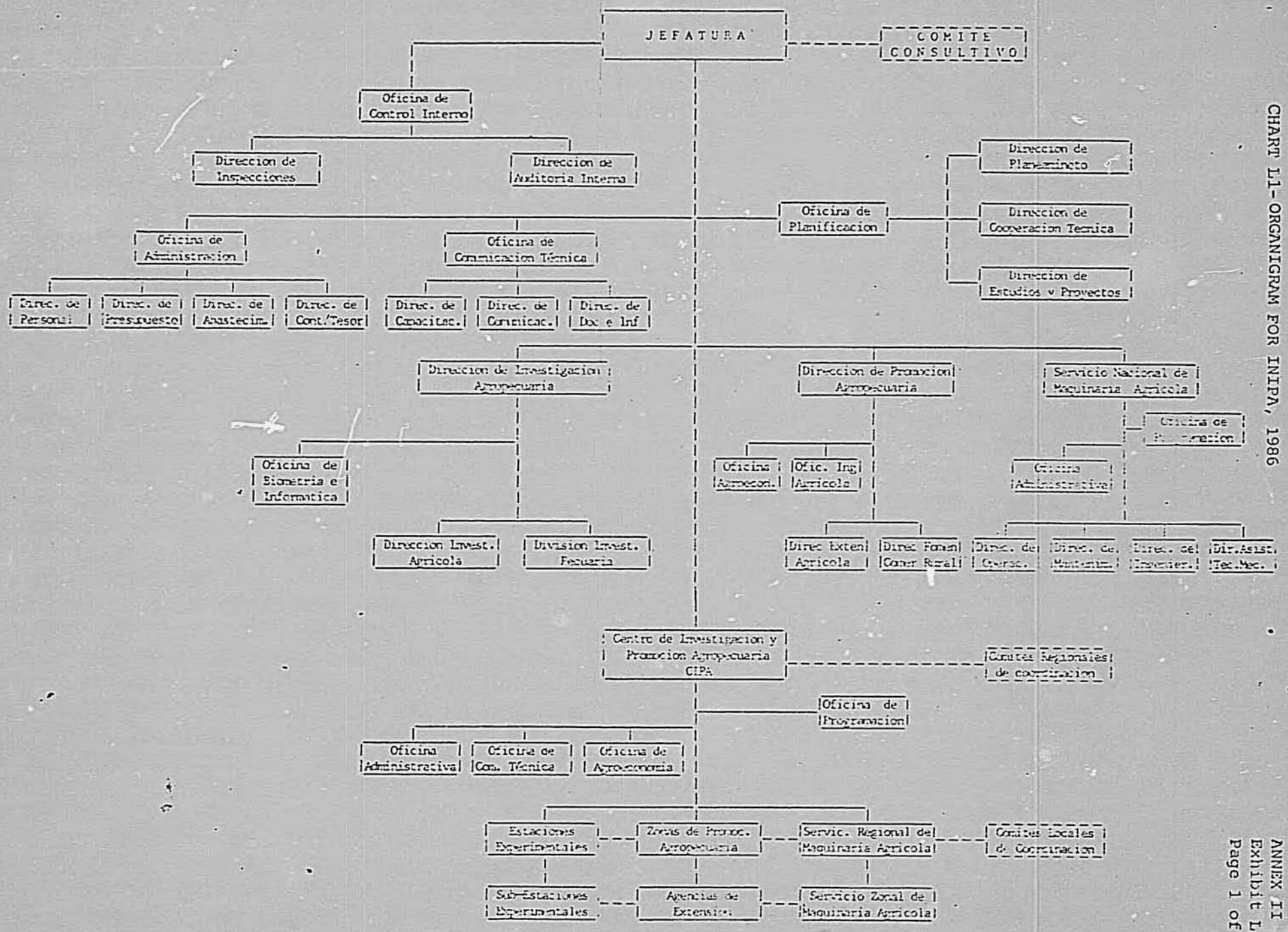


CHART L2- PLANNED ORGANIGRAM FOR INIAA HEADQUARTERS, 1987

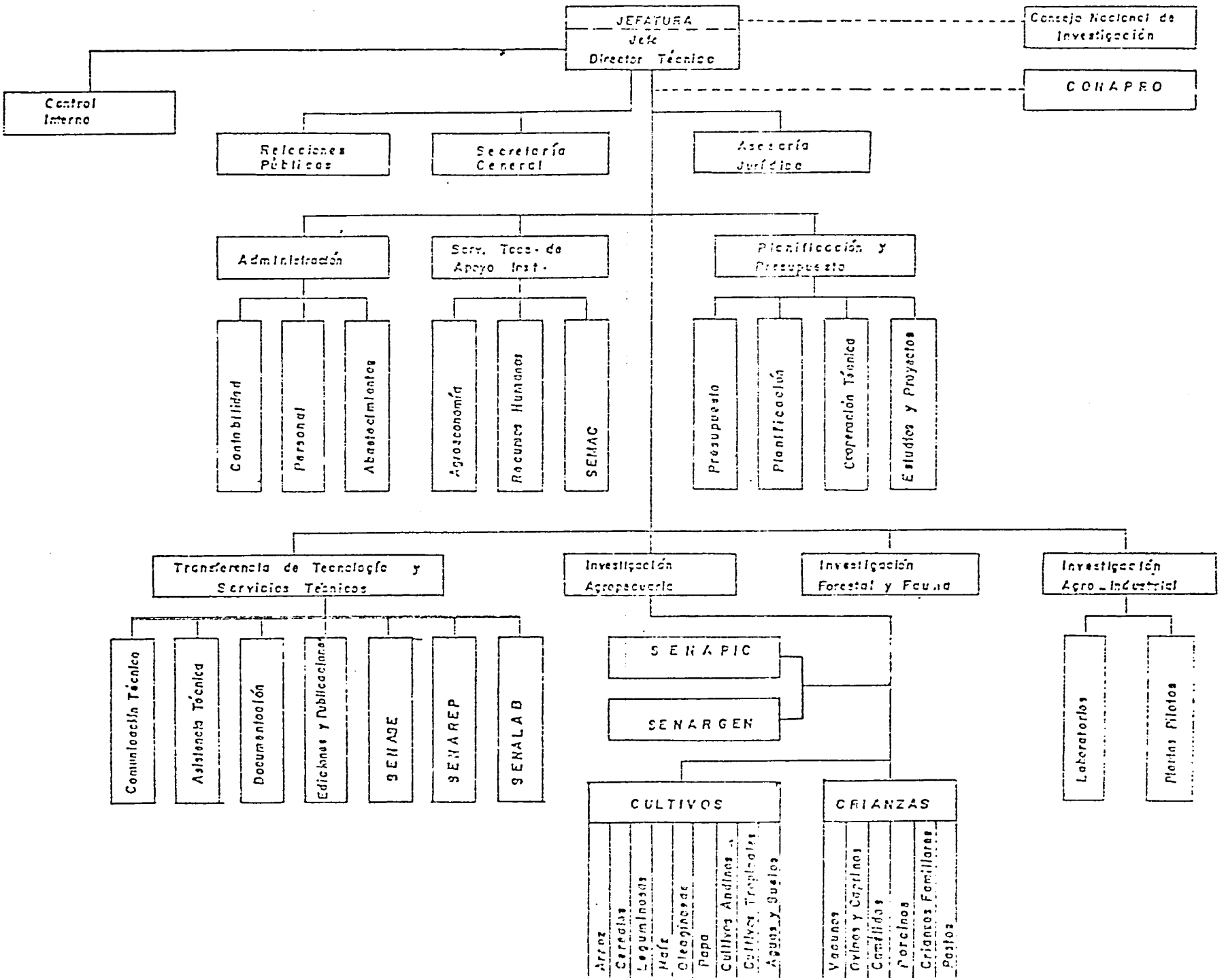


CHART L3- PLANNED ORGANIZATION CHART FOR INIAA
(Headquarters and Field Organization), 1987

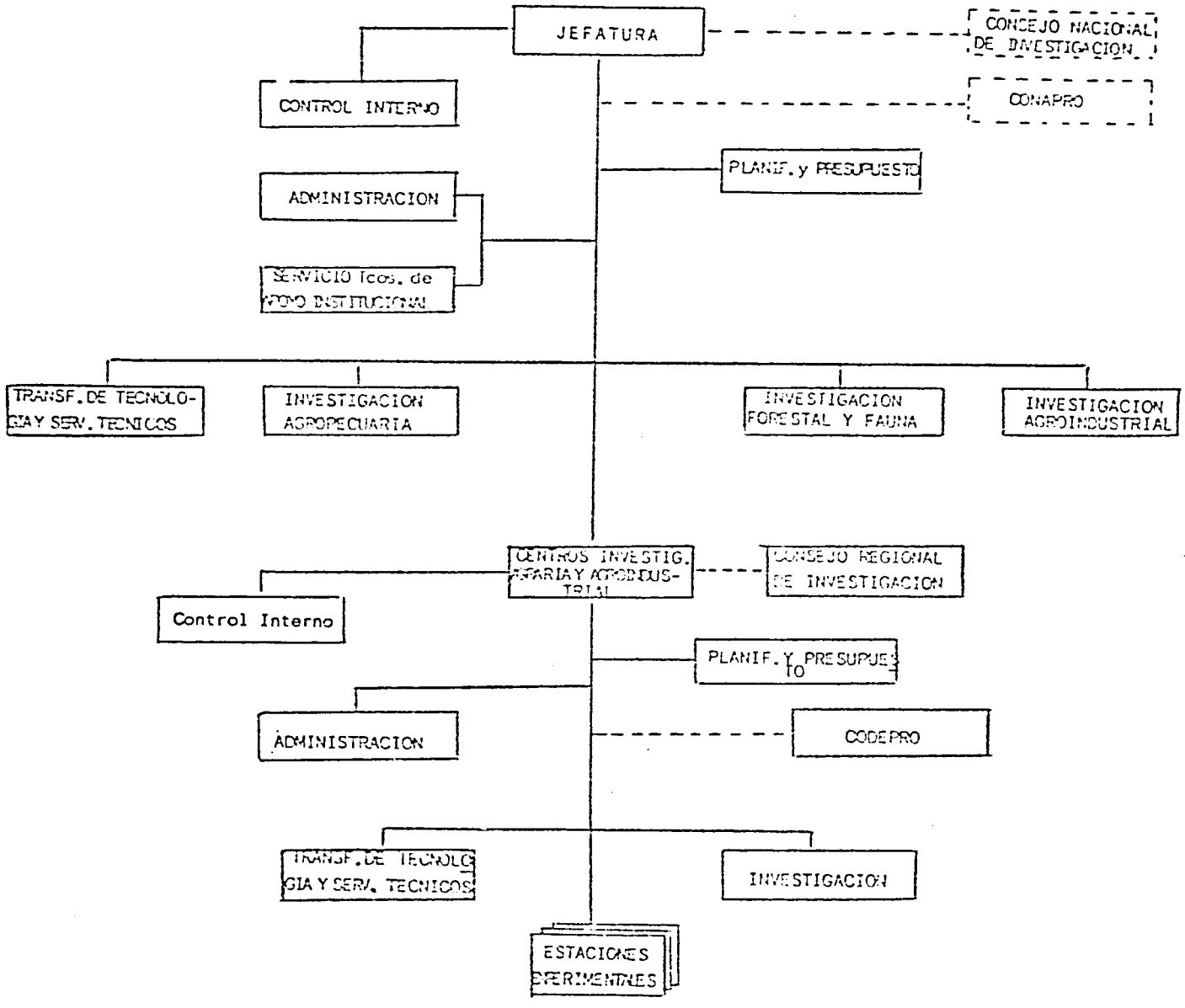
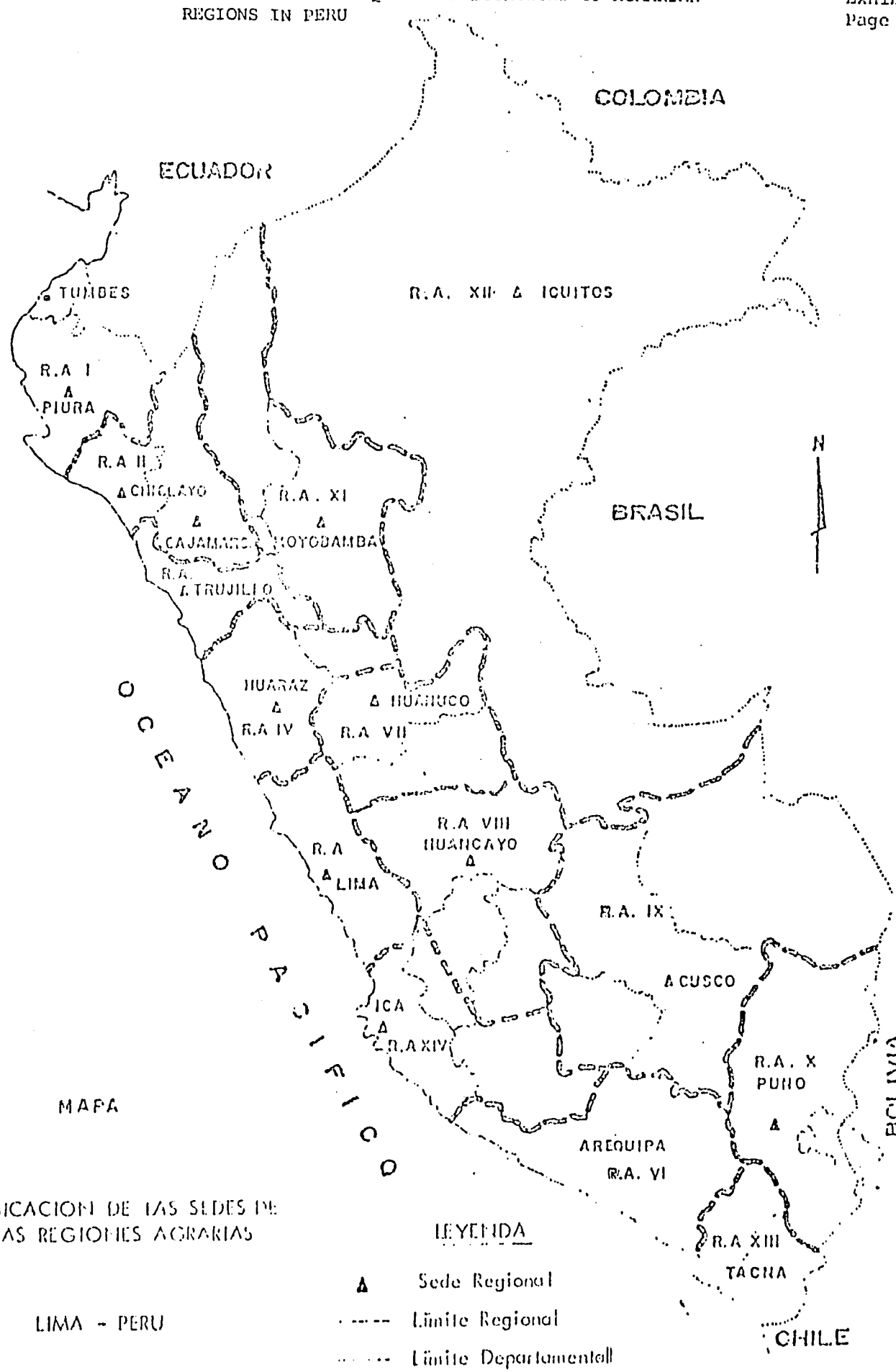


CHART L4- BAUNDARIES AND HEADQUARTERS LOCATIONS OF AGRARIAN REGIONS IN PERU



MAPA

UBICACION DE LAS SEDES DE LAS REGIONES AGRARIAS

LEYENDA

▲ Sede Regional

---- Límite Regional

---- Límite Departamental

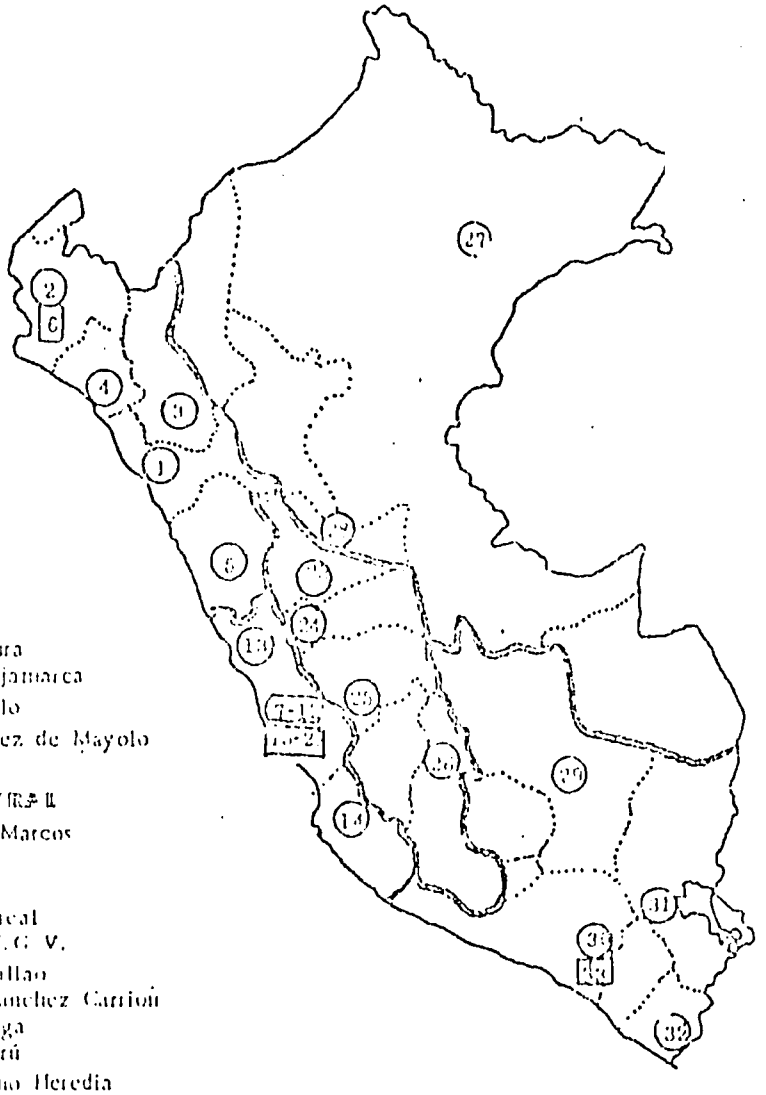
LIMA - PERU

CHART L5 - LOCATION OF PUBLIC AND PRIVATE SECTOR UNIVERSITIES BY REGION

UBICACION DE LAS UNIVERSIDADES ESTATALES Y PARTICULARES POR REGIONES

Año 1978

MAPA



REGION NORTE

1. U. N. de Trujillo
2. U. N. Técnica de Piura
3. U. N. Técnica de Cajamarca
4. U. N. Pedro Ruiz Gallo
5. U. N. Santiago Antúnez de Mayolo
6. U. P. de Piura

REGION COSTA CENTRAL

7. U. N. Mayor de San Marcos
8. U. N. de Ingeniería
9. U. N. Agraria
10. U. N. Federico Villarreal
11. U. N. de Educación E. G. V.
12. U. N. Técnica del Callao
13. U. N. José Faustino Sanchez Carrión
14. U. N. San Luis Gonzaga
15. P. U. Católica del Perú
16. U. P. Peruana Cayetano Heredia
17. U. P. del Pacífico
18. U. P. de Lima
19. U. P. San Martín de Porres
20. U. P. Femenina del Sagrado Corazón
21. U. P. Inca Garcilaso de la Vega
22. U. P. Ricardo Palma

REGION SIERRA CENTRAL

23. U. N. Hermilio Valdizán
24. U. N. Daniel Alcides Carrión
25. U. N. del Centro del Perú
26. U. N. San Cristóbal de Huamanga

REGION ORIENTE

27. U. N. de la Amazonía Peruana
28. U. N. Agraria de la Selva

REGION SUR

29. U. N. de San Antonio Abad
30. U. N. de San Agustín
31. U. N. Técnica del Altiplano
32. U. N. de Tacna
33. U. P. Católica Santa María

(23) Universidades Estatales

[10] Universidades Particulares

CHART L6 - ORGANIGRAM FOR NATIONAL AGRARIAN UNIVERSITY AT LA MOLINA

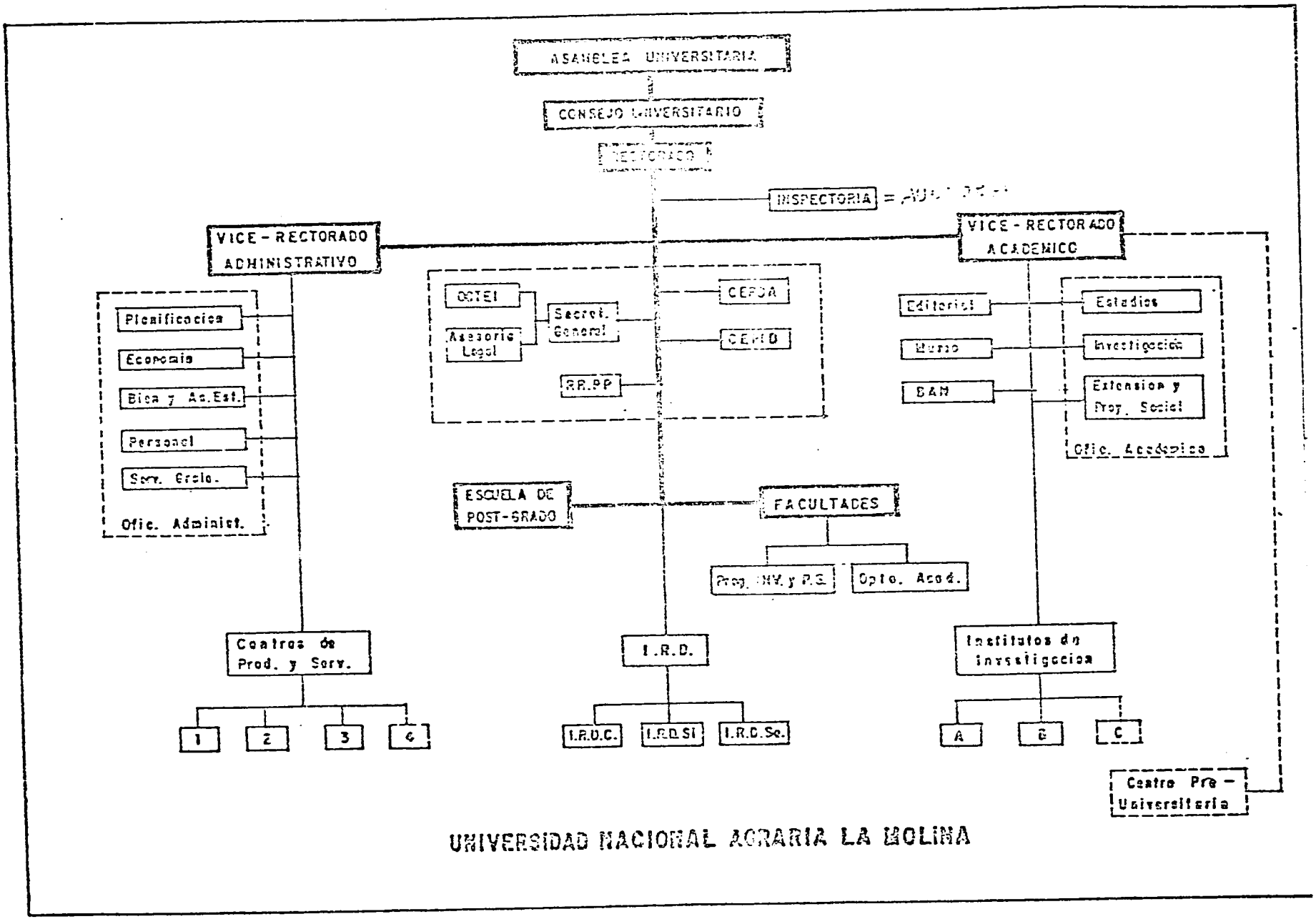


CHART L7 -AGRICULTURAL DEVELOPMENT FOUNDATION OF THE NATIONAL AGRARIAN UNIVERSITY (FDA/UNA)

ORGANIGRAMA DE PUESTOS

(Anexo Nº 2)

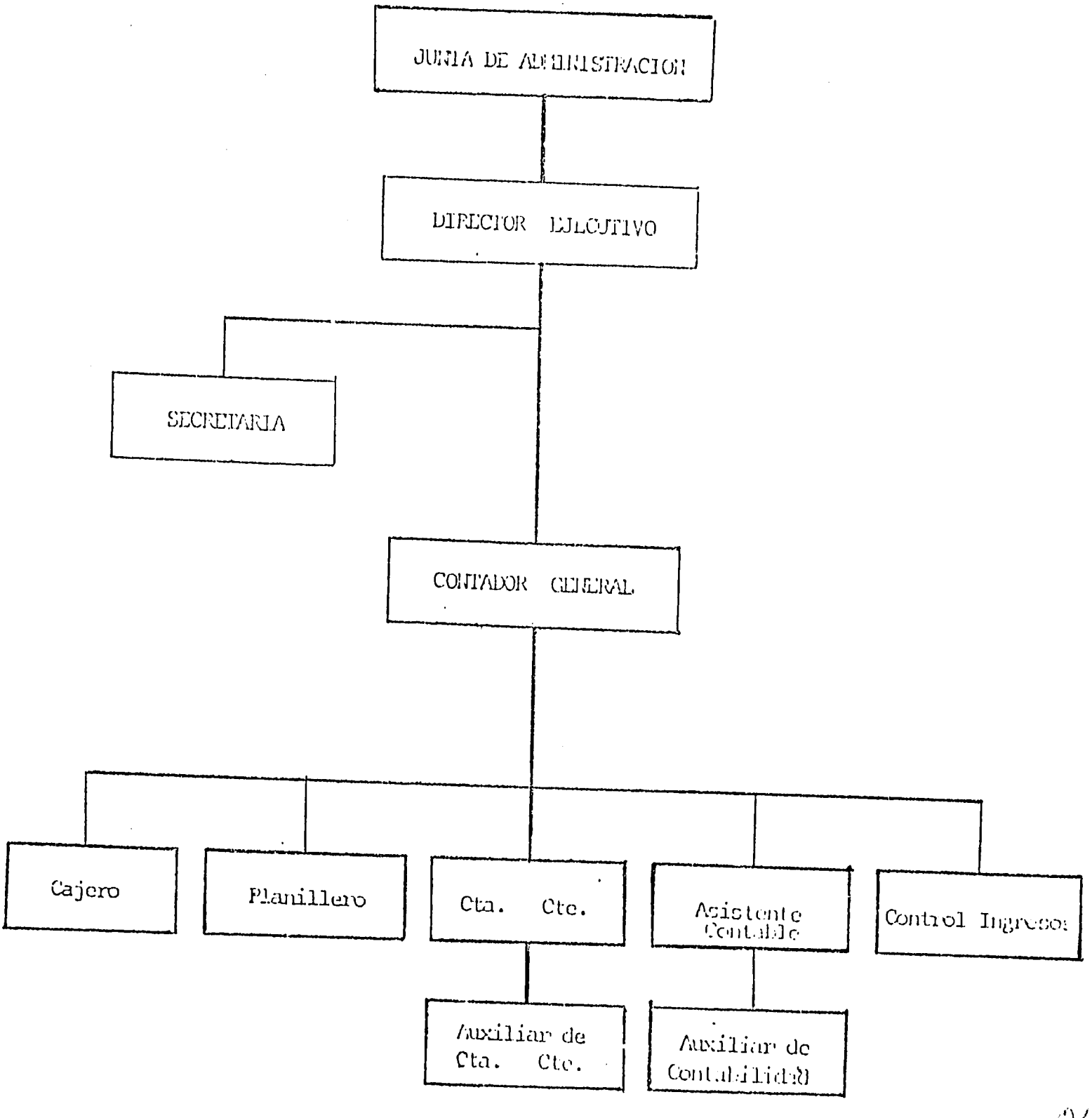
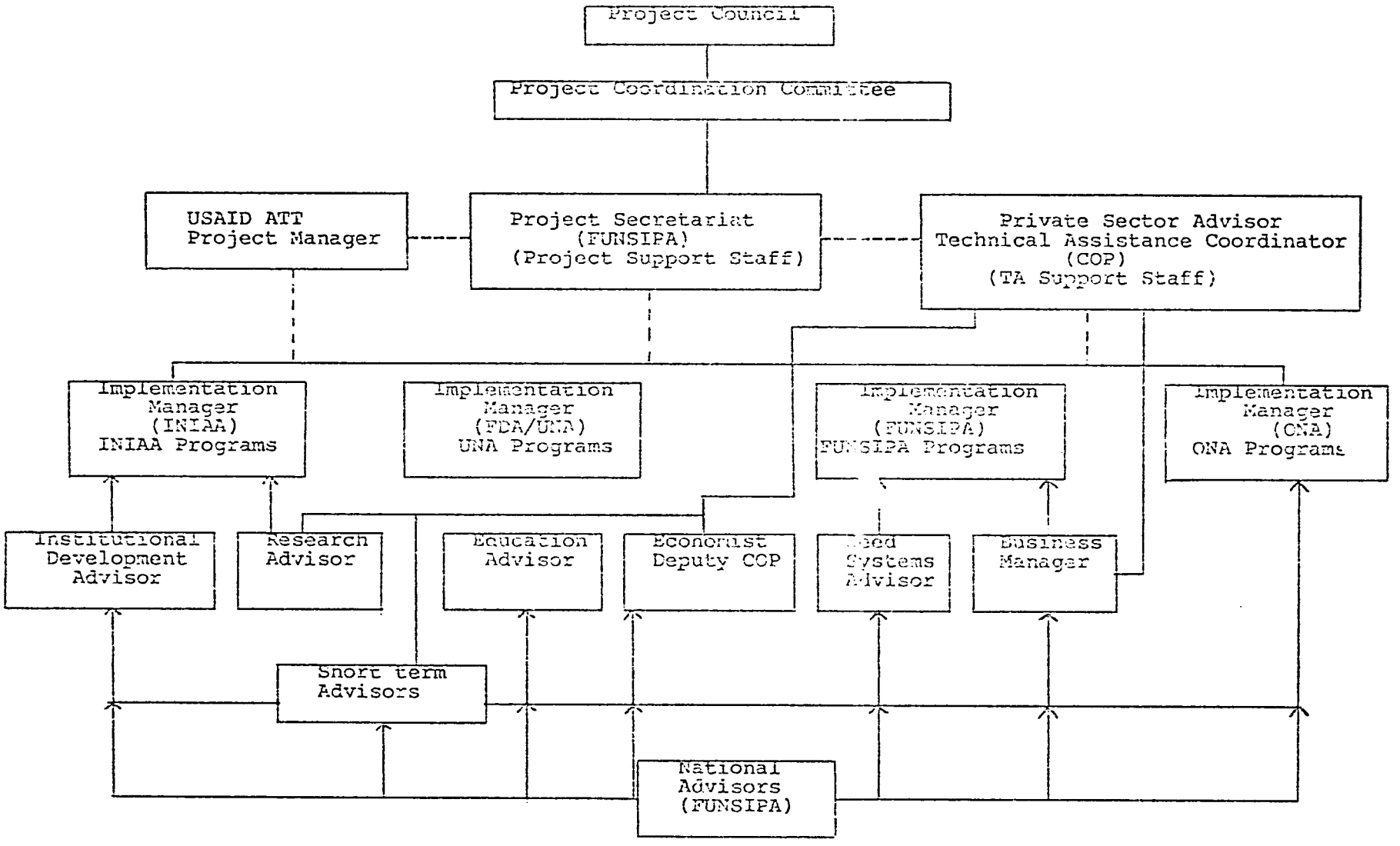


CHART L8. ATT PROJECT
ADMINISTRATIVE AND TECHNICAL ASSISTANCE ARRANGEMENTS



UNIVERSIDAD NACIONAL AGRARIA

TELEFONO 35-2035 - APDO. 456 - LA MOLINA LIMA PERU

MA
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RECEIVED

La Molina, 24 de Julio de 1987.
N° 27309/87-SG-UNA.

Señor Dr.
Donor Lien
Director de A.I.D.
PRESENTE

Me es grato solicitar a la Agencia Interamericana para el Desarrollo, que para el nuevo proyecto ATT se considere la posibilidad de contar con MIAC en lo que respecta al asesoramiento externo. El presente pedido se realiza en vista de las relaciones ya establecidas con esta institución, dentro del Proyecto PADI y que salvo algunos ajustes que hacer, mi Despacho considera satisfactorio.

Atentamente,

Ing. Alberto Fujimori F.
RECTOR

"Año del Bicentenario del Nacimiento de don Faustino Sánchez Carrión".

REPUBLICA PERUANA

SECTOR AGRARIO

Instituto Nacional de Investigación y Promoción Agropecuaria

INIPA

18 FEB 1988
RECEIVED

Lima,

Ans dt 2/26

ACTION COPY
Cable
Telex No. 673
DATE: 6/12/88
INITIALS: TH

OFICIO Nº 199 -87-INIPA-J-IEE/C.

Señor Doctor
DONOR M. LION
Director de la Agencia para
el Desarrollo Internacional
Ciudad.-

ACTION: AGR
INFO: DAR
DP
PROG
O
DO

Estimado Dr. Lion:

Tengo el agrado de dirigirme a usted para expresarle nuestra satisfacción con la asistencia técnica que la Universidad Estatal de Carolina del Norte (NCSU) está brindando a INIPA bajo el Proyecto de Investigación, Extensión y Educación Agrícola, (IEE) y para solicitarle que esta asistencia continúe bajo el nuevo proyecto que estamos desarrollando conjuntamente.

NCSU ha proporcionado asistencia técnica al Perú desde hace 30 años. Durante este tiempo, la NCSU como institución y sus miembros, han desarrollado un profundo entendimiento e interés en las características y problemas de la agricultura peruana. Durante los últimos cinco años, NCSU ha colaborado con el desarrollo de INIPA y ha contribuido en forma muy importante en la constitución de los Programas Nacionales por productos, en el desarrollo de nuestros recursos humanos y en la relación que tenemos con los Centros Internacionales de Investigación Agrícola. Además, ha sido un instrumento muy valioso en la integración de varios recursos de donación en el sistema IEE, según se hace notar en un estudio de 1985 sobre dicho sistema en el Perú, el cual fue patrocinado por AID.

Aún cuando estos logros son valiosos, se requiere continuar esfuerzos dirigidos a la consolidación de los Programas Nacionales y para el continuo desarrollo de otros programas y servicios de apoyo, como Economía Agrícola, Control Integrado de Plagas, Recursos Genéticos, Servicio Nacional de Semilla y Comunicación Técnica y el desarrollo de un fuerte equipo especializado en la extensión agropecuaria.

Teniendo en cuenta la próxima terminación del proyecto IEE y por consiguiente, del contrato con la NCSU, me preocupa que pudiera interrumpirse este apoyo al INIPA por un determinado tiempo y que en la eventualidad que ella sea reemplazada por otra institución, esta requiriera

SECTOR AGRARIO

Instituto Nacional de Investigación y Promoción Agropecuaria

/..

de un tiempo considerable para aprender sobre la realidad y requerimientos del INIPA y nuestra agricultura.

Con base a estos antecedentes le solicito que la AID tome las medidas necesarias para que la asistencia técnica de NCSU continúe bajo el nuevo proyecto y que NCSU sea notificada de esta decisión lo más pronto posible a fin de asegurar la permanencia de sus principales integrantes en los cargos técnicos en que colabora.

Sin otro particular quedo de usted.

Atentamente,