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

ROCAP

PROJECT PAPER

REGIONAL AGRICULTURE TECHNOLOGY NETWORKS

AID/LAC/P-409

Project Number: 596-0127

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

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

2. COUNTRY/ENTITY: ROCAP - CENTRAL AMERICAN REGIONAL

3. PROJECT NUMBER: 596-0127

4. BUREAU/OFFICE: LATIN AMERICA AND THE CARIBBEAN — 05

5. PROJECT TITLE (maximum 40 characters): Regional Agriculture Technology Networks

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 12 DD 31 YY 90

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 87 B. Quarter 4 C. Final FY 89

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

A. FUNDING SOURCE	FIRST FY 88 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	332	649.4	981.4	867.5	1,632.5	2,500
(Grant)	(332)	(649.4)	(981.4)	(867.5)	(1,632.5)	(2,500)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country	180	435	615	540	925	1,465
Other Donor(s)						
TOTALS	512	1,084.4	1,596.4	1,047.5	2,157.5	3,965

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	121	079				2,500		2,500	
(2)									
(3)									
(4)									
TOTALS						2,500		2,500	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 080 | 010 | 012

11. SECONDARY PURPOSE CODE:

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

A. Code	R/AG						
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

To improve the quality of and access to agricultural research results in the Central America and Panama region through the establishment of a regional technology development and transfer network in cacao.

14. SCHEDULED EVALUATIONS
Interim MM YY MM YY
Final MM 01 YY 90

15. SOURCE/ORIGIN OF GOODS AND SERVICES
☐ 000 ☒ 941 ☐ [illegible] ☐ Other (Specify) ____

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

I have reviewed the methods of implementation and financing of this project and certify that they are in agreement with Payment Verification Policy Implementation Guidance provided in AA/M R.S. Rollis memorandum of December 30, 1983.

J.O. Hill, Jr. Date 9/25/87

17. APPROVED BY
Signature: Nadine Hogan 9/25/87
Title: Nadine Hogan, Regional Director, ROCAP
Date Signed: MM 09 DD 25 YY 87

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
MM 12 DD 16 YY 87

AID 1330-4 (8-79)

PROJECT AUTHORIZATION

Name of Entity:	Inter-American Institute for Cooperation in Agriculture
Name of Project:	Regional Agriculture Technology Networks
Number of Project:	596-0127
Number of Grant:	596-0127-G-IC-7585-00

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Regional Agriculture Technology Networks project for the Inter-American Institute for Cooperation in Agriculture ("IICA"), involving planned obligations of not to exceed Two Million Five Hundred Thousand United States Dollars ($2,500,000) in grant funds ("Grant") over a three year period from date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange and local currency costs for the project. The planned life of the project is three (3) years.

2. The project ("Project") consists of the establishment of a regional technology development and transfer network (in the commodity of cacao) to improve the quality of and access to agricultural research results in the Central America and Panama region.

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 AID under the Grant shall have their source and origin in the United States, Guatemala, El Salvador, Honduras, Costa Rica or Belize, except as AID may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have as their place of nationality, except as AID may otherwise agree in writing, in the United States, Guatemala, El Salvador, Honduras, Costa Rica or Belize. Ocean shipping financed by AID under the Grant shall be financed only on flag vessels of the United States, except as AID may otherwise agree in writing.

B. Waivers

A waiver in the amount of $500,000 is approved to permit the procurement of long- and short-term technical assistance from any free world Latin American/Caribbean country, as well as from those countries already included in the authorized procurement source for this project, based on the justification included in the action memo.

William P. Schoux
Acting Regional Director

Date: 9/25/87

LIST OF ACRONYMS

ACRI	American Cacao Research Institute
APROCACAHO	Honduran Cacao Producers Association
CAP	Central America and Panama
CATIE	Tropical Agricultural Research and Training Center
CIAT	International Center for Tropical Agriculture
CIMMYT	International Center for Maize and Wheat Improvement
CIP	International Potato Center
EEC	European Economic Community
FAO	Food and Agriculture Organization of the United Nations
FHIA	Honduran Agricultural Research Foundation
IARC	International Agricultural Research Center
ICRISAT	International Research Center for Semi-arid Tropics
ICTA	Agricultural Science and Technology Research Institute, Guatemala
IDIAP	Panamanian Institute for Agricultural
IICA	Interamerican Institute for Cooperation in Agriculture
INFOP	
INIBAP	International Network for Banana and Plantain Research
IPM	Integrated Pest Management
IRCC	French Coffee and Cacao Research Institute
IRRI	International Rice Research Institute
LAC	Latin America and Caribbean Bureau, AID
NAG	National Advisory Group
NARS	National Agricultural Research Service
PADF	Pan American Development Foundation
PCCMCA	Central American Cooperative Program for Improvement of Food Crops
PRECODEPA	Regional Cooperative Potato Program
PROCIANDINO	Cooperative Research Program for the Andean Countries, IICA/BID
PROCISUR	Cooperative Research Program for the Southern Cone Countries, IICA/BID
PROMECAFE	Cooperative Program for Protection and Modernization of Coffee in Mexico, Central America and Panama
PVO	Private Voluntary Organization
ROCAP	Regional Office for Central America and Panama, AID
VITA	Volunteeers in Service to America

REGIONAL AGRICULTURE TECHNOLOGY NETWORKS
(596-0127)
PROJECT PAPER

I. RECOMMENDATIONS AND SUMMARY

A. Recommendation

The ROCAP Agricultural and Rural Development Office recommends authorization of the Agricultural Technology Networks Project (596-0127) with life of project funding of $2.5 million in grant funds and a PACD of December 31, 1990. This authorization provides for a three-year pilot Project to establish a technology network in cacao to learn more about the mechanisms, requirements, and feasibility of collaborative commodity-based research and technology transfer networks in the Central America and Panama region.

B. Project Summary

1. Goal and Purpose

The Project goal is to increase the production of cacao and to increase small and medium farm income in the Central America and Panama region. The Project purpose is to improve the quality of and access to agricultural research results in the Central America and Panama region through the establishment of a regional technology development and transfer network in cacao. The Project sub-purpose is to to learn more about the mechanisms, requirements, and feasibility of collaborative commodity-based research and technology transfer networks in the Central America and Panama region which may be used by AID or others in the future for developing subsequent networks. By the end of the Project, it is expected that national and regional capabilities in research and extension will be improved; that national programs in cacao will be effectively using improved production technology and extension methodologies developed through the network; that research in cacao in each country will be complementary to that in other countries rather than being duplicative; and that integrated research and extension systems for cacao are being used in participating countries.

2. Project Activities

The cacao network components include: network management, research, and training/technology transfer. The network management component consists of coordination of research and extension training activities among participating countries, meetings and conferences, and information exchange.

The research component consists of supplementing on-going research activities in CATIE and FHIA in three general areas: disease control, germplasm improvement and cultural practices. The activities will include regional research and validation trials conducted in participating countries with technical and financial assistance from the lead technical institutions.

The training/technology transfer component consists of development of technology transfer methodologies and training of national level research and extension personnel in cacao production, and cacao research and extension.

3. Summary Financial Plan (US$ 1,000)

Component	ROCAP	IICA(a)	CATIE(b)	FHIA(c)	Total
Network Management	685.5	75.0	150.0	150.0	1060.5
Research	1016.0		400.0	300.0	1716.0
Germplasm	325.5				
Disease Control	193.5				
Cultural Practices	497.0				
Training/Technology Transfer	480.5		240.0	150.0	870.5
Training	261.0				
Tech. Transfer	219.5				
Contingency	117.2				117.2
Overhead	200.8				200.8
Project Total	2,500.0	75.0	790.0	600.0	3647.0

(a) Includes only key administrative personnel. Not included are use of facilities and support from technical programs.

(b) Includes key technical personnel, construction to be financed from local currency trust fund, and operational support. Not included are use of facilities (ie. offices, laboratories, research farms) and support from other technical programs.

(c) Includes key technical personnel, and operational support. Not included are use of facilities (ie. offices, laboratories, research farms) and support from other technical programs to which Project contributes partial funding (eg. $35,000/year).

4. Summary Feasibility Findings

The Project analyses concluded that the Project is feasible on economic, financial, institutional, social, technical, and environmental grounds. The lead institutions are all capable and experienced institutions with full technical capability. The Project beneficiaries will be primarily small- and medium-sized farmers in the CAP region.

C. Project Development Committee

Project Development Committee
John McMahon, A/RADO (chairman)
Michael Lofstrom, A/PDO
Alejandro Pontaza, CONT

Consultants
Donald Feister, agricultural research expert
John Gillies, project design and economic analysis
Dr. Howard Ray, technology transfer
Dr. Jorge Soria, cacao production and research
Dr. Eduardo Lindarte, social scientist, IICA

Other Contributors
Harlan Davis, Deputy Director, IICA
Gustavo Enriquez, Director Cacao Program, CATIE
Jose Galindo-Lugo, CATIE Cacao Program
Mario Contreras, Research Director, FHIA
Jairo Cano, Communications Director, FHIA
Jesus Alfonso Sanchez, Cacao Program Director, FHIA
Leopoldo Alvarado, Director Agricultural Research, MNR, Honduras
Bertha Amaya de Belloso, Director General CENTA, El Salvador
Conrado Burgos, Chief National Livestock Research, MNR, Honduras
Jim Corven, PADF Cacao Development Project, Belize
Roberto Flores, IICA
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Francisco Olivares Palacios, Director General, Livestock Development Center, El Salvador
Rafael Perez Duverge, Director, Agriculture and Livestock Dept., Dominican Republic
Daniel Vartanian, IICA
Alexis Vasquez Morera, Director General of Agricultural Research and Extension, MAG, Costa Rica

ROCAP Review
Nadine Hogan, DIR
William Schoux, DDIR
Gordon Straub, RADO
Elena Brineman, GDO
Joe Hill, CONT
Gustavo Ruiz, PDO
Marc Scott, GDO
Robert Van Horn, RCMO

II. PROJECT BACKGROUND

A. Background and Problem

Agriculture is an important economic activity throughout the Central America and Panama region, contributing 20-25% of the GNP for all of the Central American countries except Panama. Substantial portions of the national populations are employed in the agricultural sector, ranging from 25% in Belize to 63% in Honduras. All of the countries in the region are heavily dependent on agricultural exports, which constitute at least 66% of the total export earnings in every country except for Panama (29%) and Guatemala (45%). These agricultural exports not only earn needed foreign exchange, but also contribute to the national revenues through export taxes.

Despite the unquestioned importance of agriculture in the region, national investment in agricultural research and development is relatively low. Although the World Bank recommends expenditures of 1% of the gross agricultural product (GAP) for research, only Panama meets this target with 1.17% of GAP invested in agricultural research. The research budgets of Central American countries range between 0.15% in Honduras and 0.26% in Costa Rica, which is low even in comparison to other developing countries (Peru 0.54%, Ecuador 0.66%, Kenya 0.92%, Bangladesh 0.41%, Cameroon 0.64%). In addition to support to national research programs, limited funding is also provided by CA/P countries to regional research institutions (ie. CATIE). The result of inadequate investment in research and extension is that average yields in other countries with similar ecological conditions exceed those achieved in the CA/P region by 100-200% for some crops.

The dynamics of development in the agricultural sector must be understood to appreciate the importance of national investment in research and extension. In general terms, there are four major factors which constrain agricultural development by inhibiting the adoption of improved technologies by farmers:

1) The lack of available, appropriate technologies;

2) Inadequate information diffusion and feedback about feasible technologies;

3) Inadequate agricultural infrastructure to allow utilization of the technology or to market the produce; and

4) Prices and policies which diminish the profitability and attractiveness of the technology.

Of these major areas of constraint, the first two constitute the technology generation and transfer process--the engine of agricultural development. The importance of this process cannot be overemphasized; agricultural development is dependent upon a continuous flow of new technology to the producers.

Continuity in the process is critical because neither world markets nor nature are static. Agricultural producers must be dynamic just to maintain market share, profitability, and comparative advantage. Technological improvements not only enable a country to keep up with production advances in other countries, but also to protect the existing industry from threats caused by constantly changing disease and pest infestations. If left unchecked, such threats as coffee rust, black sigatoka or swine fever can destroy the economic and agricultural base of a country.

Yet these crucial components of a dynamic and growing agricultural sector--research and extension--are consistently underfunded and poorly supported in Central America. A common problem in Central American agricultural institutions is that 80% or more of the budget is spent on salaries, leaving inadequate financing for operations, training, and transportation. Thus, even when institutions exist, they seldom have an adequate operating budget to function effectively.

It is important to recognize that the problems of technology generation and transfer in the region are rooted in limitations imposed by geography and economics as well as factors inherent in the nature of agricultural research and extension. Put simply, the countries are too small to take advantage of economies of scale and too poor to provide adequate resources for research and extension in all of the important agricultural commodities. The key factors are 1) the required critical mass of effort in research, validation, and extension; 2) human resource constraints, 3) country size and economies of scale in research; and 4) national budget constraints.

Technology generation and diffusion requires a minimum level of effort to be effective. Below that level, the investment is either too diffused to make a substantial impact or the process is not completed and transferable results are not obtained. This critical mass of effort must include adequate levels of effort in three areas: basic and adaptive research; validation of results; and dissemination. Limitations in the

scope of any of these activities reduce the effectiveness of the entire process.

Research requires the testing and evaluation of thousands of potential combinations of genetic varieties and cultural practices (e.g. spacing, planting times and practices, rates and types of applications of fertilizers, herbicides, pesticides, pruning, and land preparation), and improvements in plant properties through genetic improvement. The potential for discovering productive new technologies increases in direct proportion with the number of ongoing experiments and the capability of the personnel.

Moreover, promising varieties, practices, and input combinations must be tested outside of controlled experimental conditions to assure the validity of the technology under farm conditions in different areas. Geographic regions differ in terms of ecology (e.g. soil types, climate, altitude, slope, diseases, and pests) and economic conditions (e.g. availability and price of inputs, markets, labor availability, price stability, and infrastructure). Farmers have many constraints not encountered on experiment stations, including management capability, access to inputs and labor, and quality of inputs. Therefore, each technology package must be tested in and adapted to local conditions.

Finally, the objective of agricultural research is not simply to generate knowledge, but rather to have farmers productively use technology. Research must meet the needs of the farmers who will be using the technology, recognizing their social, economic, and physical constraints. Extension services must understand the technologies and have adequate resources and methodologies to communicate them effectively. This requires that research and extension function as a continuum from technology generation through testing, adaptation, diffusion, adoption and feedback. Each of these elements is crucial and requires effective technical and operational linkages between research and extension. One of the greatest weaknesses of technology development programs in developing countries is a failure to recognize this continuum and its implications for organizational structures, budgeting, establishment of research priorities, and extension methodologies.

The required critical mass of effort makes agricultural technology development and transfer unlike many other areas of public investment, with very different implications for budget decisions. For example, limited funding for housing results in fewer houses being built but does not reduce the utility of the homes already constructed. In

agricultural research, however, funding limitations resulting in the elimination of adaptive field trials or validation trials substantially reduce the value of the original research and limit the transferability of the res lts to the farmer. Inadequate funding for extension services limit technology adoption, rendering the new technology moot. For these reasons, funding limitations or reductions have a greater impact on agricultural research and extension programs than on many other types of programs.

Effective investment in technology development relies not only on the level of effort but also on the quality of the work. The breadth and depth of available human resources is a major problem in the Central American countries. The cost of developing and maintaining adequate technical expertise in a range of scientific fields for each important commodity is beyond the means of the individual countries. In the case of highly specialized crops s ch as cacao, the total number of well-qualified scientists available in the world is quite small. Similar constraints of insufficient numbers of adequately trained personnel affect the ability of the extension services to transfer new technologies to farmers.

The burden of providing adequate resources for research and extension is particularly acute for the small countries of Central America which are unable to take advantage of economies of scale. The minimum costs of conducting agricultural research in a commodity are approximately the same whether the results of the research are applied over one million hectares or over ten hectares. National borders limit the resource base over which to spread research costs, but do not correspondingly reduce the amount of research needed to achieve results. In addition, the total number of commodities grown in small countries which would benefit from research efforts is not substantially less than the number of commodities found in larger countries. Therefore, the cost of generating new technologies, in relation to budget resources and economic impact, is proportionately much greater in small countries than in large countries. To establish adequate research programs in every important commodity is clearly beyond the capability of small developing nations.

In the small developing nations of Central America, economic crises and a range of competing demands on small national budgets inevitably result in inadequate investment in research. Developing countries do not have an excess of investment capital, so political, social, and economic constraints limit investment in any one field. The long-term nature of investment in research makes such investment

particularly difficult in countries with critical short-term economic and political problems.

The combination of these factors--critical mass of effort, human resource constraints, economies of scale, and budget constraints--make the establishment of adequate research capabilities in every important crop virtually impossible for the small Central American countries. For this reason, a regional approach to technology generation is a particularly appropriate means of addressing the agricultural technology needs of the region.

B. Relationship to AID policies

1. A.I.D., LAC, and ROCAP Strategies

The Project approach of supporting a collaborative research and extension network to address production constraints is consistent with and supportive of A.I.D., LAC Bureau, and ROCAP policies and strategies. Agency agricultural development policy emphasizes development of human and institutional capability and intercountry collaboration. One of four major elements emphasized in the AID Policy Paper on Food and Agricultural Development is to develop "human resources and institutional capabilities, especially to generate, adapt and apply improved science and technology for food and agricultural development, and conduct research on developing country food and agriculture problems". The AID Sector Strategy on Agriculture encourages missions to pursue development activities "addressed to intercountry problems that can best be resolved by collaboration among countries where the problems exist".

The LAC Bureau's "Guidelines for Supporting Agricultural Research Institution-Building in Latin America and the Caribbean (December 1986)" stresses that "AID should develop and strengthen linkages between external research groups and national researchers" by supporting research networks and encouraging greater use of regional and international research organizations. At the November 1984 meeting, LAC Agriculture and Rural Development Officers emphasized that expanded research is fundamental to rapid growth of agricultural production, diversification and rural employment, noting that "the excellence of the International Centers contrasts sharply with the weakness of national research programs".

The ROCAP Agricultural Strategy prepared by Coopers & Lybrand recommends supporting research and technology transfer efforts to stress "transforming research results into

information materials which are readily usable by public and private sector technology transfer intermediaries, including extension agents, input supply houses, processors, and the media". The 1988-89 ROCAP Action Plan states that "institution strengthening and technology transfer at both the national and regional levels is a key focus of the ROCAP program in support of increased agricultural production and natural resource preservation and management". The role of ROCAP in undertaking projects with regional institutions to address development constraints which lend themselves to a regional and/or combined regional/bilateral approach was unanimously confirmed in the April 1987 deputy directors meeting.

2. Relationship to On-going ROCAP Projects

The Regional Agricultural Technology Network Project is complementary to and will benefit from several ongoing ROCAP-funded projects. These include:

The Regional Agricultural Higher Education Project (CATIE component, 596-0129A) which is strengthening CATIE's overall educational and research programs (eg. contracting of faculty, procurement of laboratory, computer and research farm equipment, construction of facilities). It also includes funds for institutional networking (eg. CATIE is expanding its collaborative programs with national, regional and international higher education and research institutions. In addition, CATIE serves as coordinator of a Central America, Panama and the Dominican Republic network of agricultural educational and research institutions established in 1986). This project also supports a fund-raising program for CATIE to enhance both core budget and project resources for priority programs.

The cacao network will establish linkages with educational institutions in the region. This will be facilitated by the existence of the educational network. The project will also benefit from the overall institutional strengthening of CATIE, including use of the modern well-equipped laboratories and computer center, and support from staff funded by the Higher Education project.

The Regional Tropical Watershed Management Project (596-0106) and Tree Crop Production Project (596-0117) which include development of regional data bases on forestry and natural resources, the establishment of a geographic information system computer capability for land use planning and watershed management areas, research on multi-use tree species, training of national personnel in forestry and watershed management, and

the production of technical and extension materials including regional newsletters for forestry and watershed management.

The data bases and the geographic information system planning capability created under these projects will directly benefit the cacao network in the development of climatological and soil analogs for the region. The Tree Crop project will also assist, as needed, in identifying appropriate forestry species adapted to particular ecological conditions for growing with cacao.

The Regional Integrated Pest Management Project (596-0110) which has established a regional plant pest diagnostic center, regional IPM research trials, conducted crop pest diagnostic studies, produced technical publications including an IPM newsletter, and trained national researchers in IPM and related technical areas.

The cacao network will benefit from the regional plant pest diagnostic center's analytical capability and its collection of crop pests. The IPM project coordinator is a cacao entomologist who collaborates closely with CATIE's cacao program. Other IPM specialists may also provide periodic assistance in identifying practices to control pest damage to cacao. In addition, national researchers trained in IPM principles may in some cases participate in cacao research activities in their countries.

The Non-traditional Agricultural Export Support Project (596-0108) which strengthens private sector capabilities through the provision of hands-on training and technical assistance concerning production, handling, transport and marketing technologies and market information for non-traditional agricultural exports. Coordination with this project will be particularly useful in facilitating the marketing and processing of cacao in the region.

The Coffee Pest Control Project (596-0090), using an integrated agricultural technology generation and transfer approach, is addressing disease and pest problems faced by small coffee producers. The experience of this project in establishing a successful regional collaborative research effort will be drawn upon in the network project, as will some of the technical expertise developed. In addition, the project will benefit from the farming systems methologies and trained personnel from the Small Farm Production Systems Project (596-0089) which ended in December 1986.

3. Relationship to Bilateral USAID Projects.

Cacao was selected for th pilot network because of the interest and support of the bilateral USAID missions, the lead institutions, and the agricultural research institutions in the region. Because the national-level support for research and extension activities will be crucial to successful participation in the Project and eventual transfer of new technologies to farmers, the complementarity to current and future USAID and other donor projects is particularly important. Four of the USAIDs in the region have on-going projects which will benefit from the Project and from which national level support for research and/or extension efforts can be provided. One mission is considering a future project and another mission can provide support if cacao is determined to be a viable crop for that country.

Belize. The Accelerated Cacao Development Project, an OPG with the Pan American Development Foundation, promotes cacao on a pilot basis for Belizians employed by the Hummingbird Hershey LTD, training extension workers and farmers, and developing extension materials. The experience of Belize in this program which will end in 1987 will be useful for other national efforts. The new Toledo Agricultural Marketing Project (505-0016) will support cacao production as part of an overall crop diversification program in southern Belize.

Costa Rica. The USAID Northern Infrastructure Zone Project (515-T041) includes funding for establishment of a cacao nursery. The Nontraditional Agricultural Exports Technical Support Project (515-0237) includes technical assistance to organize diverse cacao activities in the private sector. In addition, the mission is considering local currency funding in FY 88 to complement its support for the cacao industry.

El Salvador. USAID/El Salvador indicated that it did not consider cacao as a priority crop. However, it identified possible support for cacao producers and agribusiness related to cacao under two projects, Agribusiness Development (519-0327) and Water Management (519-0303 which emphasizes high value export crops) if cacao is determined to be a viable crop for that country.

Guatemala. USAID/Guatemala indicated a strong interest in cacao. It is considering a new project for a possible FY 88 start to support both research and extension in traditional export crops including cacao, coffee, rubber and cardamon.

Honduras. USAID/Honduras noted the proposed ROCAP project strongly complemented its ongoing program. The Agricultural Research Foundation Project (522-0249) which provides substantial support to FHIA would benefit as cacao is one of the program priorities of FHIA. In addition, through its Export Development and Services Project (522-0207) the mission provides support to FEPROEXAH to promote non-traditional exports (cacao is considered a non-traditional crop in Honduras). This project provides assistance to APROCACAO, the Cacao Producers' Association, since cacao is one of the priority crops which was identified for support. The Pan American Development Foundation and VITA are involved in this effort.

Panama. USAID/Panama has identified possible linkages with two on-going projects and a proposed FY88 project. These include the Agricultural Technology Development Project (525-0180) which provides institutional development support to IDIAP and the Agricultural Technology Transfer Project (525-0227) which provides institutional development support to MIDA. The latter has access to the services of a cacao expert who is a member of the Chemonics technical assistance team for the project. In addition, the mission plans on providing support to CONDEPRO, an organization designed to support private sector development efforts, with an emphasis on agricultural exports.

4. Relationship to AID/W Science and Technology and Central Projects

Various AID/W projects may eventually be linked with the Project for technical backstopping and related support. The cacao network will establish close linkages with the S&T Communications for Technology Transfer in Agriculture Project which is currently providing significant support to FHIA, one of the lead implementing institutions for this project. In addition, projects such as Pest and Pesticide Management, IBSNAT, Nittal, and Agroforestry Research and Training, Forestry/Fuelwood Research and Development, and Farming Systems Support may be called upon for selective support to the cacao network.

C. Other Donor Activity

1. Networks

The networking approach to collaborative research is being supported by several of the major donors. The international research centers, particularly CIAT, CIP, and CIMMYT, have encouraged networking of information and sharing in

their respective commodity programs in this region. All three of these IARCs have, in varying degrees, actively involved NARS in collaborative research or in conducting regional variety trials. The major problem for these programs is the shortage of operating funds on the national level and adequate support for regional travel. The most substantial activity of the IARCs is the CIP collaboration with the Regional Cooperative Potato Program (PRECODEPA), which has been functioning for ten years.

The FAO is supporting creation of over thirty technical cooperation networks in Latin America and the Caribbean, covering a variety of agricultural, scientific, and economic activities. Few of these networks are concerned with production level agricultural research, focusing instead on marketing, energy conservation, nutrition, or management. While such networks may be useful, they are not intended to develop collaborative or cooperative research activities but rather will facilitate exchange of information at annual conferences, support limited training, and finance studies. Funding for the networks is limited.

The International Network for the Improvement of Banana and Plantain (INIBAP) was established in 1986 in France to establish regional networks for banana and plantain research. The establishment of the Latin America network is still in its initial phases.

The Central American Cooperative Program for the Improvement of Crops and Animals (PCCMCA) is the oldest scientific and technical cooperation network in the region, having been established in 1954 by IICA. Supported by IICA and the Rockefeller Foundation, PCCMCA is a relatively informal structure consisting of annual meetings to share research results.

There are indications that the EEC is planning support of a regional network in food crops which will be based in CABEI. However, this planning is still in the initial stages and no firm decisions have been made.

IICA, the coordinating institution for the Project, has developed and supported multi-country, agricultural technology networks for various crops in the Southern Cone countries (PROCISUR) and the Andean countries (PROCIANDINO) of South America. The experience gained in these BID-financed efforts will be useful in the Technology Network Project. A regional network in animal production for Latin America (RISPAL) is also coordinated by IICA.

2. Cacao Programs

Donor support for cacao programs in the region varies considerably by country. Three countries have current programs providing technical assistance or credit to cacao farmers.

Belize has no major activities supported by other donors at this time. The World Bank, however, plans a loan program beginning in 1988 for agricultural production including cacao. The Hummingbird Hersheys Ltd. program includes support for cacao producers.

Costa Rica has a number of ongoing programs which either promote cacao production or which could provide some supporting services or credit for cacao producers. BID, EEC, and IBRD are supporting projects which may result in an additional 6,000 ha. of cacao being planted as part of larger rural development programs. The Chamber of Cacao Producers supports cooperative creation and promotes cacao production.

El Salvador has no current cacao program funded by either donors or the government.

Guatemala has no current donor-supported projects which support cacao. However, national credit and training programs include support for cacao production.

Honduran programs include BID loans to cacao producers and a planned project by the CABEI to establish 800 manzanas of cacao for agrarian reform groups.

Panama's Agricultural Development Bank channels technical assistance and credit from a World Bank loan to small cacao producers.

III. PROJECT DESCRIPTION

A. Project Strategy

Given the present economic and political conditions in the region, substantially increased national budget support for technology development and transfer is unlikely. However, the current economic difficulties of the countries do not diminish the importance of developing and disseminating improved technologies. Therefore, efficient use of existing technology and research/extension resources is imperative to achieve a critical mass of activity. A regional technology generation and transfer network is a particularly effective and appropriate means of achieving these goals.

The project strategy is to establish a regional research and technology transfer network in cacao as a pilot effort to achieve greater efficiency and impact of agricultural research and extension programs for that crop, and to learn more about the mechanisms, requirements, and feasibility of collaborative commodity-based research and technology transfer networks in the Central America and Panama region. The cacao network will create regional economies of scale through collaborative research programs, development of extension materials and methodologies, sharing of existing technologies and plant varieties, policy-level conferences, and training.

The Project is designed to build on the successful experience of the ROCAP-supported PROMECAFE project, which was recently extended for three years after an evaluation identified the key elements which enabled PROMECAFE to produce significant technology advances, increase the profitability of coffee in the region, and reduce vulnerability to coffee rust. The most important factors were the focus on a crop with common production problems in several countries which can be successfully addressed by research, specialization of research efforts by several capable lead institutions, and maximum collaboration to share information and materials. The PROMECAFE project has significantly strengthened research institutions and successfully addressed serious production problems which could not have been done on a national basis. Successful research network efforts in other regions include many of the above characteristics. The project will draw on these experiences in establishing the cacao network.

Lead research institutions will specialize in developing solutions to common production problems. National

institutions will undertake a region-wide testing and validation program to achieve maximum applicability of the research. Project assistance in on-farm testing and technology transfer methodologies will complete an integrated research/extension system for cacao to improve technology adoption rates by farmers. The collaborative network will strengthen regional capabilities in research and extension, reduce costly duplicative efforts, and produce the critical mass of effort needed to achieve results.

The collaborative program will involve extension personnel, producers, PVO's, and marketing and processing firms as well as research scientists to assure that the research is relevant and can be effectively disseminated. Production areas in the region will be classified by agro-ecological characteristics to make validation testing of regional research more efficient. Through the use of these ecological analogues, NARS will be able to adapt research to specific local climatic, economic, or natural conditions with the minimum amount of duplication of effort and the highest possible confidence in the transferability of the technology package.

Research conducted and coordinated through the network will be directed toward improving the profitability of cacao for small- and medium-sized farmers rather than on production or productivity improvements per se. By developing technology packages which will increase profitability, the program will increase the probability of eventual adoption by farmers. Just as important, the commercial focus will encourage a multidisciplinary approach, requiring the use of extension personnel, economists, sociologists, and other scientists in problem identification and technology evaluation.

It is recognized that the production problems of the participating countries cannot be solved solely by regional technology networks. Of the four constraints to adoption of improved technologies discussed above, three of them (dissemination, infrastructure, economic conditions) are addressed primarily on a national level. Appropriate regional support in these areas consists of training, provision of extension materials and strategies, and policy conferences to promote better understanding of and support for collaborative approaches and commodity programs. Moreover, the Project will provide technical and financial assistance to national advisory groups to assist them in effectively assessing their national needs and identifying constraints, coordinating donor activities in the commodity, soliciting government and donor support, and promoting appropriate policies and programs on a national level. National-level support for extension and research

activities and production support (credit, policies, input availability, etc.) will come from on-going and planned agricultural programs funded by AID and other donors. Countries without on-going programs will be assisted in promoting and coordinating donor support.

The Project includes the full range of activities and level of effort necessary to test the feasibility of a collaborative commodity-based research and technology transfer network. The cacao network components include: network management, research, and training/technology transfer.

The network management component consists of coordination of research and extension training activities among participating countries, meetings and conferences, and information exchange.

The research component consists of supplementing on-going research activities in CATIE and FHIA in three general areas: disease control, germplasm improvement and cultural practices. The activities will include regional research and validation trials conducted in participating countries with technical and financial assistance from the lead technical institutions.

The training/technology transfer component consists of development of technology transfer methodologies and training of national level research and extension personnel in cacao production, and cacao research and extension.

The Project authorization will be for $2.5 million and a life of project of three years.

The purpose of the pilot effort is to test the assumptions of a regional collaborative research/technology transfer network rather than to achieve significant research results. It is fully recognized that research on a tree crop like cacao requires ten to fifteen years to evaluate adequately the production and cost advantages of new technologies. Nonetheless, it is important that an adequate level of effort be maintained during the pilot period to put expanded research and extension efforts in place in the participating countries as well as the lead institutions. In addition, testing of the collaborative decision-making structure requires an adequate level of resources to coordinate. Therefore, the Project will finance supplemental research at lead institutions and operating/material expenses for regional trials in addition to training and information exchange. Financing for supplemental research will provide incentives for lead and national research

institutions to direct their current programs to meet regional as well as national objectives and will allow adequate testing of the concepts and mechanisms for collaborative technology networks. The supplemental research will not create new programs, hire key senior researchers, nor promote programs which cannot be sustained at an adequate, if reduced, level after the pilot project ends.

Commodity Selection

Pilot Network

Cacao was selected jointly by the Project design team and the directors of agricultural research from the participating countries for the pilot network to test the assumptions of a regional collaborative approach to research and technology transfer. The selection criteria were: 1) an effective network of this nature must not already exist for the commodity; 2) the commodity must be appropriate for small- and medium-sized producers; 3) the commodity must be of current economic importance to the participating countries or it must be a potentially important crop for the future; 4) at least three countries in the region must have active programs in research and extension in the commodity; 5) the potential for generating and disseminating improved technology in the commodity must exist; 6) an institution must exist with superior technical capability and germplasm collections to provide leadership on the regional level; and 7) at least two national programs must be able to support the lead institution with regional trials.

Based upon these criteria, and the interest expressed by both research directors and USAIDs, cacao was selected for the pilot collaborative research and technology transfer network. Cacao is grown in every country in the region and has considerable potential for increased production. Existing technologies could double or triple current yields. Further research could provide technologies to enable attaining up to eight times the current average yield in the Americas (eg. yields in the best farms in Malaysia are now producing at these levels). Considerable potential exists for expanding cacao production in areas where other crops are currently cultivated. There are significant production and disease problems in the crop which can be effectively addressed through research, and two institutions with superior technical capability exist in the region. Furthermore, cacao is an excellent crop for small- and medium-sized farmers with a ready international market.

Subsequent Networks

As part of network management activities, the Project will conduct an intensive review of alternatives for future commodity networks, assess the feasibility of each, and develop a prioritized list in cooperation with USAIDs, national research and extension services, regional and international research centers, and government policymakers. During the third year of the Project, a comprehensive evaluation will be completed to assess the achievements of the cacao network and the feasibility of maintaining it and expanding to additional networks. Should the evaluation indicate that the approach has merit, intensive review and project design activities will be initiated to determine the level and additional support needed for the cacao network to become fully institutionalized and to design additional commodity networks. The decision on subsequent networks will be taken after full consideration of the alternatives, including assessment of potential impact of networks for various commodities, national level interest, capability, and commitment to the commodity, USAID interest and support, and the relative costs for different networks.

B. Goal and Purpose

The Project goal is to increase production of cacao and to increase small- and medium-farm income in the Central America and Panama region.

The project purpose is to improve the quality and access to agricultural research results in the Central America and Panama region through the establishment of a regional technology development and transfer network in cacao. The Project sub-purpose is to to learn more about the mechanisms, requirements, and feasibility of collaborative commodity-based research and technology transfer networks in the Central America and Panama region which may be used by AID or others in the future for supporting the establishment of other networks. By the end of the Project, it is expected that national and regional capabilities in research and extension will be improved; that national programs in cacao will be effectively using improved production technology and extension methodologies developed through the network; that research in cacao in each country will be complementary to that in other countries rather than being duplicative; and that integrated research and extension systems for cacao are being used in participating countries. In addition, it is expected that the collaborative mechanisms will be strengthening national level programs, on-farm trials will be in place, and adequate resources will be being provided at the national level to support both research and extension activities.

C. Cacao Network

1. Background

Cacao is produced throughout the region and is a traditional export crop in Guatemala, Costa Rica and Panama. There are almost 25,000 hectares under production in the Central American countries with a present total production of almost 10,000 MT. Productivity in the region is very low, around 250 to 300 Kg/ha/year, compared to potential yields of 800-1200 Kg./Ha. using existing technology. Improved varieties and cultural practices could increase yields in new plantations to 2,000 - 2,500 Kg./Ha. The highly technified plantations of Malaysia are producing yields of 3,000 to 3,500 Kg./Ha.

TABLE 1
CACAO PRODUCTION IN CENTRAL AMERICA (1)

Country	Area Cultivated (Ha.)	Production (MT)	Yield Kg./Ha.	Potential Area (Ha.)
Belize	N/A	N/A	N/A	20,000
Costa Rica (2)	10,405	4,836	464	269,000
El Salvador	115	36	313	60,000
Guatemala	4,680	2,400	512	36,000
Honduras	3,850	1,545	401	30,000
Panama	5,651	1,143	202	15,000
TOTAL (3)	24,701	9,960	403	410,000

1. Area, production, and yield figures are not particularly reliable for secondary crops like cacao. These estimates are based on information collected from national figures and data used in the PADF Inter-American Cacao Conference held in San Jose, Costa Rica in January 1987, with some adjustments to maintain consistency.

2. Costa Rican totals do not include new plantings which are not yet in production totaling 4,507 Ha. or the planned expansion of an additional 6,175 Ha. in on-going projects over the next three years.

3. The inclusion of the additional Costa Rica cultivation, current and planned, would increase the total area in production in Costa Rica to 21,087 Ha. and increase the total regional area by 43% to 35,386 ha. The total also does not include the Dominican Republic, with 135,000 cultivated hectares and production of 40,000 MT, which is eligible for limited support as a non-ROCAP AID country.

A particularly advantageous crop for small- and medium- sized farms in the low-wet and wet-dry tropics, cacao does not require costly pest control, irrigation facilities or processing technologies. The crop does not contribute to erosion, has high labor requirements, provides a relatively good income to producers, and has a good export market.

The potential for the Central American cacao industry lies in the substantial possibilities for increased production through improved yields and expanded areas of cultivation. Moreover, Central American cacao fits a special niche in the world markets which is not controlled by international cacao quota agreements and for which there is very limited competition from the major producers. Much of this cacao comes from criollo and trinitario types which have high flavor and aroma characteristics not found in the bulk-type cacao grown in the major producer countries like Ivory Coast, Brazil, and Malaysia. The production of high flavor cacao is not regulated by the international cacao quota agreement. The largest producers of the flavored cacao, which is only 6.6% of total cacao production, are Ecuador, Venezuela, and several Caribbean countries. However, to take full advantage of this commercial and competitive advantage and receive a (small) price differential, the cacao must be properly processed at the farm level. Current fermentation and drying methods being used in the region are not adequate to provide the needed quality, even though adequate processing technology is readily available.

The primary disease problem affecting cacao production in the region are moniliaphora, Phytophthora pod rot, and Ceratocystis. The cacao industry in Central America has been severely affected over the past two decades by these diseases, in some cases causing production losses exceeding 50% of yield. In the future, Witches Broom disease, currently found only south of the Panama Canal, may be a serious threat to the industry throughout the region. In addition to disease problems, cacao farms suffer from limitations imposed by aging plantations with unselected varieties, poor cultural practices, and low levels of technology usage. Problems in production systems and cultural practices include overshading, poor weed control, poor pruning, and limited use of fertilizers. Traditional pruning methods result in plant architecture which makes disease control and harvest expensive and difficult.

Although some improved technologies have existed for many years, most cacao farmers do not use them. Transfer of improved technologies is inhibited by inadequate extension methodology, resource limitations, and limited knowledge of cacao technology. There are few full-time cacao extension or research workers in the region and knowledge of cacao production and processing technologies is very limited.

2. Cacao Network Strategy and Description

To address these problems, the project will include elements for research, training and technology transfer, and network management. Rather than simply facilitating information exchange, it is important that the network produce usable results, incorporating national institutions in the testing and extension of new technologies.

The project components are integrated and mutually reinforcing in order to maximize their impact on national research and extension programs. Central to the integration is communication and training--the catalytic forces that guide the technology development and transfer process. Research activities in the lead institutions and national programs are interdependent, each institution drawing upon the others for specialized expertise, materials, or regional test and validation results. Training or extension and research are linked to facilitate national-level coordination of efforts, to assure that each understands the functions of the other, and to facilitate feedback of extension and producer concerns into the research process. Frequent interaction on national and regional levels is maintained on all relevant levels--policy, project coordination, and technical exchange--to facilitate scientific collaboration and national program support to fully utilize project outputs in each country.

The network management component provides a mechanism for communication and effective regional collaboration through joint programming of research and training activities, meetings and conferences, exchange of information, and interinstitutional coordination. This function will institutionalize the regional, collaborative approach to research and extension systems.

The research component will concentrate on three general areas of research: disease control, variety development, and cultural practices. The research will be conducted at lead technical institutions in collaboration with variety and cultural practice experiments and validation trials carried out by national institutions.

The training and technology transfer component will assist in the design and use of more effective technology transfer methodologies and improve the capacity of national research and extension personnel in participating countries.

The implementation of the regional research and technology network in cacao requires the coordinated efforts of three lead institutions (IICA, Inter-american Institute for Cooperation in Agriculture; CATIE, Tropical Agriculture Research and Training Center; and FHIA, Honduran Foundation for Agriculture Research). IICA will be the overall administrative and coordinating institution for the cacao network, with CATIE and FHIA assuming technical leadership in both research and training conducted in support of the regional program.

3. Components

a. Network Management

The key to networking lies in the process of managing collaborative research rather than in specific areas of scientific inquiry. The objective of this component is to assure that programming of cacao research and extension support activities in the region is accomplished on a collaborative and cooperative basis rather than simply providing a mechanism for information interchange among separate programs. The specific activities undertaken in this component will bring people together from throughout the region for the purpose of coordinating programs, exchanging information, and solving problems.

Management of the network consists of:

* joint decision-making on research, extension, and training priorities and allocation of Project and counterpart resources through annual meetings of the Executive Committee;

* coordination of research programs in participating institutions through quarterly meetings of lead institution scientists;

* interchange of research findings and concerns at technical, policy, and administrative levels among participating institutions in semiannual technical meetings, publications, and newsletters;

* promotion of linked research and extension programs on a national level through technical assistance and training;

* expanded national government and donor support through policy conferences;

* development of operational linkages with producer organizations, marketing and processing firms, private voluntary organizations, and oth r interested parties;

* development of national advisory committees to assess constraints and needs, coordinate donor and national efforts in the commodity, and promote adequate support for the commodity program.

The Executive Committee, composed of the Project Coordinator and representatives of th l ad institutions, ROCAP, and national research and extension institutions, will establish priorities for research, extension, and training activities; select key personnel; coordinate and approve programs, workplans and budgets for Project activities of participating institutions; and resolve institutional disagreements. It will consult periodically with an Advisory Committee composed of representatives of the private sector marketing and processing firms, producer organizations, PVO's, policy makers, and other organizations involved in the cacao industry. It is expected that representatives of ACRI, Hersheys and other processing companies, and PADF will be on the advisory committee. These meetings will facilitate private sector input into the project and help to assure that the Executive Committee is aware of the concerns of the target groups.

The Project will be administered by a Project Coordinator, located at IICA's headquarters in Costa Rica, with overall responsibility for project implementation, assuring that project activities are in accordance with the grant agreement and the annual workplans and budgets. The Coordinator will also be responsible for the overall guidance and coordination of research and extension activities, maintaining a series of publications and newsletters to keep all participating institutions informed, and preparing annual reports of Project activities. This individual will have at least an MS degree in agriculture with substantial experience in agricultural research and extension programs in developing countries, including administration. A knowledge of cacao production is highly desirable.

Communication is the essential element in an effective collaborative research network. Lead institutions will meet quarterly to coordinate programs and exchange information and technical personnel will meet every six months. Research and extension workers in participating countries will be provided with up-to-date information on cacao production and processing

technologies and on research and technology transfer methods through a series of fact sheets organized into loose- leaf handbook form, research summaries, and quarterly newsletters. Research reports, bulletins, pamphlets, and other forms of publications will be published and disseminated by each participating institution.

In order to keep research and extension personnel fully aware of regional and international experience in cacao research and dissemination, selected national and lead institution personnel will visit cacao and extension programs in other participating countries and in countries outside of the region. Regional visiting can improve program coordination and allow scientists to work on problems of particular interest in lead or national research institutions. International travel might include visiting cacao programs in Colombia, Brazil, Mexico, the Dominican Republic or Malaysia and well-integrated research/extension programs for other crops in Latin America.

Researchers and extensionists also need access to national, regional and world literature on cacao and technology transfer. This will be achieved through upgrading the cacao bibliography of the CATIE computerized documentation center and making it available to all participating countries on diskettes. Participating countries will also be expected to contribute entries to that bibliography.

Bi-annual regional conferences will be held to brief policymakers and donor organizations on network results, the cacao industry in the region, benefits of collaborative technology networks, and the implications for national research and technology transfer programs and budgets.

The effectiveness and impact of the regional program will depend on the ability of national programs to coordinate national activities, to support Project research and extension activities, and to resolve production constraints. Since this level of activity is outside the province of a regional project, it will be the responsibility of the national representatives to establish a national advisory group to identify support for Project activities, review operations, and resolve implementation problems. This group will be the primary mechanism for channeling national concerns from extension and research personnel, private sector firms, producers, processors, and policy-makers into the Executive Committee agenda. It will also be the primary mechanism to assess needs on a national level, coordinate donor and national efforts in the commodity, and to leverage additional resources to support Project research and extension and overcome infrastructure, credit, or policy constraints to cacao production.

An Institutional Development Expert, preferably having knowledge of the cacao industry, and development institutions and donor programs in Central America will be contracted with Project funds to assist the national advisory groups to organize, analyze problems, generate support, and leverage resources from all potential sources. This individual will be based at IICA's headquarters. Project financial support of $2,000 per group per year will be provided to offset some of the organization expenses.

Project funding will be provided for salary, travel and perdiem costs for the Project Coordinator and Institutional Development Expert, communications and operating expenses, and office supplies and equipment. Financing will also be provided for all supplies, travel and perdiem expenses for committee meetings, conferences, workshops and evaluations and for technical assistance and studies to develop the second network. IICA will provide office space and furniture, utilities, the services of an administrative assistant and secretary, transportation in Costa Rica for its staff, and accounting support.

b. Research

1. Disease Control

There are three major cacao disease problems now found in the region which seriously depress yield and farm profit: Monilia Pod Rot, (presently found only in Panama, Costa Rica and Nicaragua); Blackpod; and Mal de Machete. Disease control research will concentrate on (1) understanding the epidemiology of these diseases and (2) determining chemical and plantation sanitation practices to control them.

In different ecological conditions, it is essential to understand the time-phased infection dynamics, including the mode of propagation, spread, infection seasonality, preferred microecological environment and damage level. Once the diseases are understood, studies will be conducted on a range of fungicides and complementary plantation sanitation measures to determine their efficacy in controlling each disease. New fungicides will be screened in the laboratory and the best materials compared with existing control recommendations in the field. Samples of cacao from fields treated with promising fungicides will be tested organoleptically and chemically to determine pesticide residues and effect on cacao taste. AID/W environmental officer approval will be required prior to the inclusion of pesticide use recommendations in extension training or materials. Lead institutions will take all prudent precautions in the use of pesticides in research and trials.

Field trials will analyze the most efficient mode and timing of application, the economic threshold, minimum effective concentrations, and use of alternate sanitation systems. By the end of the Pilot Project, at least three plantation sanitation trials will have been carried out at the experimental farm and at least two demonstration trials will have been installed on farmers fields. In addition, screening tests on at least, twenty commercial and experimental fungicides will be completed and regional field experiments will be initiated in each country to evaluate the best three fungicides identified.

CATIE will be the lead technical institution for this activity, providing the services of its pathologists, use of laboratories and greenhouses, access to the library, use of the field research station at La Lola and experimental sites in Turrialba, and field labor for the experiments. CATIE's present staff of two PhD level pathologists (one CATIE-funded and the second from IRCC of France) will be responsible for carrying out this research. An office/laboratory building will be constructed at the La Lola site using local currency from CATIE's trust fund.

Project funding will be used to hire two technical field assistants and to purchase specialized research equipment, a vehicle, laboratory chemicals and supplies, and spray equipment for field work. Additional equipment will be purchased by the Project to facilitate microclimatic characterization of field research sites and spore traps needed to determine disease transmission potentials under a range of ecological and agronomic conditions. Project funding will also be provided for operational costs of regional trials and travel for CATIE's research staff to supervise the field research.

The national programs will provide research and extension personnel working in cacao areas to establish field trials and/or demonstration plots, local logistical support and field sites, and training facilities when necessary.

2. Production and Testing of High Yielding, Disease Tolerant Germplasm

Chemical control and sanitation research is important for managing disease problems in existing cacao plantations. For future plantings, however, the use of high yielding resistant hybrids or clones will be necessary to reduce the costs of production and make small producers more competitive.

CATIE, with the largest cacao collection in this hemisphere (over 400 lines/clones), has 20-40 resistant

clones for each of the three major diseases and produces hybrid seed commercially. Field test results of the better hybrids show that overall yields in well managed plantings are high (800-1200 Kg./Ha.) compared to yields of 200-350 Kg./Ha. in genetically unimproved plantings. The best individual high yielding clones produce at over 2500 Kg./Ha. under experimental conditions. Selection and dissemination of these currently available high-yielding plants in disease tolerant segregating lines could make possible substantial increases in cacao yields.

Unfortunately, most of these varieties are self- incompatible (i.e. cannot pollinate within the variety), thus making their use in plantations much more complex than desirable. Furthermore, the diseases apparently continue to mutate, making some tolerant plant lines susceptible over time and necessitating the use of resistant lines/clones in mixtures. Even more important, the selection and use of superior hybrid lines is made considerably more difficult by substantial lack of uniformity in the offspring when propagated by sexual means. Hybrid seedlings continue to segregate genetically for yield and phenotypically for plant characteristics, which means that plant offspring have a range of characteristics from the parents but are not uniform. Thus offspring will range from individual plants which are both resistant and high yielding to those which are neither.

This component is directed toward improving the disease tolerance, yield and plant qualities of cacao germplasm, improving self-compatibility, and making the best existing varieties available to producers in the region.

Even with the problems of compatibility and segregation, the existing disease tolerant germplasm at CATIE is of much better quality than most being used by producers in the region. In order to make this material available as quickly as possible to cacao producers, CATIE will provide the best existing germplasm to participating countries for national production of hybrid seed. Clonal gardens will be established during the Pilot Project in each country (approximately two hectares/country) and national technicians trained in making the appropriate crosses and in the preparation of seeds for sale to farmers.

Research to be initiated during the Project on developing improved varieties will include laboratory studies, field tests, and regional trials to select the best lines for each ecological zone in the region. Laboratory studies will include development of appropriate screening methods for major diseases, screening existing and new recombinant germplasm for resistance, and monitoring potential disease mutations. Field research

studies will include crossing some 50-80 lines of cacao, seed production, field disease and yield testing in formal experiments. Data will be collected on climatic factors and plantation microclimatic situations, plant growth, disease and insect damage, pod production, bean yield, bean size, dry weight of beans, bean/pod ratio, taste testing (flavor and aroma) and manufacturability (by cooperative arrangement between CATIE's Cacao program and Hershey, Mars and M&M) on a per cultivar basis.

The national cacao plant improvement studies (regional trials) will collect data on environmental conditions, plant growth, disease index (incidence), yield, bean/pod ratio, shade incidence and outturn of cacao. Data will be collected on an individual plant basis and the first selection of outstanding plants in each country will be made after three years of yield data is evaluated. The selected lines will be tested for quality. The data will be analyzed annually and a national annual progress report prepared. The national data will also be analyzed by CATIE for regional analysis and preparation of annual reports.

By the end of the Project, replicated experiments for all of the major diseases will be planted in each country and data collection and analyses begun. Technicians in each participating country will be trained in the testing and use of improved germplasm. At least 30 crosses with potential resistance to at least two major diseases will be produced and planted in field experiments, analysis of clones for plant, flavor, aroma and manufacturing characteristics will be ongoing, and the cacao data bank will be receiving and analyzing research results from all participating institutions for region-wide dissemination. The national clonal gardens will be producing 200,000 hybrid seeds annually per country for sale to farmers.

CATIE's senior cacao plant breeder will direct this component, design regional experiments, train national counterparts, and provide technical assistance and germplasm to collaborating institutions. A senior data management specialist, provided by IICA for the coffee pest control project, will work closely with CATIE on statistical data systems software development, data summarization and analysis. This technician also will assist FHIA in the development of climatological and soil analogs for the region (Component 2c).

Project funds will be provided for short-term technical assistance, support personnel (including a data operator to maintain the database), a vehicle, computers and field equipment, and travel, supplies and operating expenses to supervise and establish ten to twenty regional trials. A small sample processing facility for quality studies of resistant

lines/clones will be funded by CATIE from its local currency trust fund.

3. Improvement of Cultural Practices

Historically, cacao research has concentrated on increasing yields through closer planting distances, using improved hybrid cultivars, and reducing losses from diseases and insects rather than on developing economically efficient and profitable production systems. As a result, the profitability of cacao production is far below it's potential. In this sense, cacao lags far behind other tropical crops such as coffee, sugar and bananas. Among areas with research potential is plant architecture; many cacao experts believe that the present architecture is inefficient for disease control and harvesting. The existing traditional plantings today are too tall, spreading the fruiting area far beyond the pickers reach. Research is needed to determine the best planting configuration, plant growth form, pruning system, plant height and other factors that affect per area yield, production efficiency and labor convenience.

This component will build on the ongoing cacao cultural practices research program at FHIA. The program includes studies on production and processing costs, farm management, planting density, use of non-traditional and traditional economic plant species as shade, evaluation of manual and chemical weed control methods, impact of ecological conditions on plant growth, irrigation and drainage requirements, and plant response to fertilizer applications. The technical staff of three cacao specialists is supported by a well qualified group of subject matter specialists in agricultural economics, agronomy, plant nutrition, agricultural engineering, and other disciplines. Its new 50 Ha. cacao research center is in a major production area of Honduras which has a range of ecological conditions similar to those found in most of the production zones of the region.

The existing program will be complemented by Project-funded research to expand current experiments, initiate new studies, and include regional trials. Potential areas for new research include: (a) new planting configurations to increase labor and input efficiency; (b) shade and plant nutrition relationships vs. yield; (c) planting configuration vs. pruning systems; (d) studies on ecological effects (elevation, rainfall, etc.) on yields of cacao hybrids and new disease resistant clones; (e) plantation rehabilitation by grafting; (f) system of replanting plantations; and (g) interplanting cacao with other economic tree crops for shade.

For each of the selected research areas, one or more experiments will be planted in FHIA's experiment station and on private cacao farms in participating countries. FHIA will also improve and test a rapid method for characterizing potential commercial areas for cacao production applicable regionwide. The research will assess alternate methods of collecting and utilizing environmental, socio-economic and technical data and information to identify and characterize potential new cacao areas in the region where disease incidence is less severe. Research results will be published in annual reports and technical publications for use in training courses and national extension programs.

Project funding will be provided for technical and support personnel, laborers, administrative support, travel, supplies, equipment, and vehicles.

c. Technology Transfer and Training

1. Technology Transfer

The transfer of improved production and processing technologies to cacao producers is inhibited by shortage of trained personnel and inadequate extension methodologies which rely heavily on one-on-one interpersonal contact and do not make adequate use of group mechanisms or media channels. In addition, little is known about the characteristics and socio-economic conditions of cacao farmers. Another major factor limiting technology transfer is the lack of viable research-extension linkages; typically, research and extension are administered separately and function independently. As a result, only a small percentage of cacao producers use improved production and processing practices, leaving product quality and productivity at inadequate levels.

Unlike technology research and development, technology transfer does not lend itself to regional collaboration. Extension activities must be done on a national basis. Nonetheless, the importance of extension cannot be overemphasized--unless the technology is used by farmers, it is worthless. Therefore, the Project will support those aspects of technology dissemination which are appropriate to a regional project and for which economies of scale can be realized--training and developing strategies and extension materials.

In order to improve technology transfer to cacao farmers, a prototypical technology transfer strategy and communication material package will be developed using Honduras as a pilot country. The first step in this process will to be identify available agricultural technologies which are ready for

diffusion and assess them from farmers' perspectives--perceived dependability; economic benefit; risk; similarity to present practices; practicality, considering farmers' resource constraints; and possible negative consequences of adopting or not adopting. A study will be conducted to determine farmer and rural family characteristics--cultural and social; vocabulary; receptivity to change; ways of receiving and using new information; present practice and adoption levels; hidden constraints (and incentives) that may be encountered in trying an innovation; and variability among the farmers.

Once the above information is available, a strategy for developing and disseminating information to cacao farmers will be developed. Message content will be determined and sequenced; desired behavioral changes will be defined; the cacao producers will be segmented into groups with similar characteristics and potentials; and mutually reinforcing channels for delivering information will be selected. The proposed strategies, messages and media materials will be pretested in the field to ascertain their effectiveness in transferring information to farmers. The production of media materials and dissemination of information will be synchronized with the cacao production and processing cycle.

Recognizing the resource and personnel constraints faced by national extension services, the extension strategy will emphasize group work (e.g. PROMECAFE project approach with Grupos de Amistad y Trabajo) rather than one on-one contact with farmers and appropriate use of mass media to complement and reinforce group and individual contacts. Two special studies will be conducted with contracted technical assistance to assess alternative means of using farmer groups and to assess the impact of multi-channel dissemination.

Feedback from farmers will be collected systematically and disseminated for use by both research and extension workers. Periodic checks or studies, herein termed operational evaluation, will be conducted to determine if the messages disseminated to the cacao producers have been timely, well-received, understood, and considered to be practical, and whether the various program elements are functioning as planned.

FHIA will be the primary lead institution in this component because of its greater technical and equipment capability for producing audio-visual materials, and its linkage to the AID/W Communication for Technology Transfer in Agriculture (CTTA) Project. FHIA will work in close collaboration with both CATIE and IICA. A Training and Technology Transfer Coordinator (TTTC) will be contracted by IICA, based at its headquarters in

Costa Rica, to organize and coordinate the technology transfer methodology, studies, and communication strategies, disseminate the results through training and publications, and coordinate the overall training program for researchers and extensionists. This individual will have an MS degree in agriculture with experience in communications, or an MS degree in communications with experience in agriculture. A knowledge of cacao production and development programs in Central America is desirable.

Project financing will be provided for technical assistance, salary and travel for the Training and Transfer Coordinator, materials and supplies, and publication costs.

2. Training

Few researchers are presently engaged full-time in cacao research in the region, other than at CATIE and FHIA, and most are not adequately trained in either cacao production and processing technologies or cacao research methods. Due to the scarcity of trained researchers, small national research budgets and the nature of the commodity, national programs will depend upon the CATIE and FHIA research programs for plant improvement and development of improved production and processing technologies. Nonetheless, national programs have a crucial role in validating and adapting technologies, conducting regional trials, providing feedback to CATIE and FHIA concerning trial results and identification of new problems. Upgrading the competence of national researchers to fulfill their role in developing an effective regional network is essential for Project success.

The national extension services are in a similar situation. There are fewer than ten full-time cacao extension workers in the region, although every country except for El Salvador has a few part-time cacao extension workers, and the level of knowledge of cacao production and processing is very low. The effectiveness of the extension efforts is also limited by inadequate understanding of the target farmers and poor technology communication methodologies.

The training program will concentrate on upgrading the technical competence of research and extension workers in research and extension methodologies, improving their knowledge of cacao production and processing, and strengthening research-extension linkages. The basis for improved research-extension linkages will be established through joint participation of researchers and extensionists in training programs and establishment of jointly conducted on-farm trials in each country.

Training will be designed to develop working relationships and improve multidisciplinary understanding between research and extension personnel. Training for research workers will focus on technologies and research methods but will include a technology transfer element related to the content. Training for extension workers will concentrate on communication and technology transfer methodologies but will include substantive training in cacao production, processing, and research.

The task-oriented courses will be structured to include a combination of classroom lectures and discussion and field/laboratory work. Field and laboratory situations will be observed and analyzed, and each trainee will be required to perform techniques/methods relevant to the course content. Communication skills to improve the ability of extensionists and researchers to communicate effectively with cacao producers will be emphasized.

Training will be cyclical in that research and extension workers will participate in a series of training events, sequenced in a manner to reinforce knowledge and skills gained in previous courses and to increase their breadth and depth of understanding of subjects relevant to their needs. It is anticipated that some repeat training will be required due to staff turnover.

CATIE and FHIA will carry out most of the training activities. Both institutions have conducted short-term training courses, workshops and field days on cacao production and other subject areas. Training has been provided to researchers, extensionists, progressive farmers, university staff and students and others. The Training/Transfer Coordinator, in close collaboration with CATIE and FHIA, will identify and contact institutions which could collaborate in regional or national training, such as Hummingbird-Hershey Ltd. in Belize (which has just completed construction of a small training center), INFOP, CURLA, and APROCACAHO in Honduras, the University of Costa Rica, cacao professionals in the Dominican Republic, the American Cacao Research Institute (ACRI), and the Pan American Development Foundation (PADF) which works in cacao development in Belize, Honduras and several Caribbean countries.

The training program will include:

1) Initial one to two-week general course on cacao production, processing and technology transfer. Research and extension workers will participate together in the course to initiate the process of developing research/extension linkages and joint effort.

2) Special one-week courses conducted by the lead research institutions on research and extension metholodogies to prepare national cooperating personnel for their role in regional trials.

3) One-week national courses, with regionally trained extension and research staff, and locally available experts, as principal instructors; reinforced by Project training/transfer coordinator and/or one representative from CATIE, FHIA or IICA.

4) Three-day regional courses on specific topics--research and extension workers to attend separate courses, with a few exceptions depending upon course content.

5) Three-day national courses for extensionists, with regionally trained extension and research staff, and locally available experts, as principal instructors; reinforced by Project training/transfer coordinator and/or one representative from CATIE, FHIA or IICA.

6) Refresher courses for previously trained personnel plus new personnel assigned to national programs.

7) Individual training in video/television use will be given at the Radio Netherlands Training Center for one staff member of CATIE and one from FHIA.

Regional training for extensionists will be designed to train and equip national extension staff to organize and conduct training and transfer programs in their own countries. The Training/Transfer Coordinator and an appropriate staffer from CATIE, FHIA or IICA will participate in initial national training programs to provide reinforcement and to evaluate the effectiveness of the national training programs. One or more representatives of FHIA will participate in all courses held at CATIE and vice versa to facilitate coordination between the two institutions. An IICA representative will participate in extension-oriented courses as appropriate.

Training aids and materials developed for training courses will be designed to serve both as teaching aids during the training program and as organized references for later use. Three levels of training materials will be required: 1) for researchers; 2) for extensionists; and 3) for cacao producers. Although the Project will not enter into national technology transfer programs directly, the producer-level training materials will be required for use in extensionist training.

Training packages will include the following types of materials:

* loose-leaf cacao production, processing and technology transfer handbook in which a detailed cacao production calendar will be included;

* videotapes with accompanying training guides and prototypical printed materials--particularly related to research methods and technology transfer-oriented training (the latter at two levels--extension training and farmer);

* working materials--exercises, plant materials, etc.

* other audiovisual and demonstration materials as appropriate.

Each training participant will receive an updated handbook and set of working materials. The Project will provide each country with a set video/print packages and other audiovisual and demonstration materials and publications.

The training plan will be developed by the Training/Transfer Coordinator in collaboration with the Project Coordinator, CATIE, FHIA and IICA at the first semi-annual coordination workshop. Prior to the workshop, the Training/Transfer Coordinator will survey the participating countries to determine the number of research and extension workers to be trained, their present levels of training and experience in cacao, and their present research and/or extension responsibilities. The training plans will be reviewed by the Executive Committee as part of the overall work plan.

The Project will finance all staff and trainee travel and perdiem costs, audiovisual and other training equipment, materials and publications, and short-term technical assistance. The sponsoring institutions will pay for trainees' salaries and benefits. For planning purposes, it is assumed that six countries will participate in the Project and that the total number of cacao researchers in the region will not exceed 20 (excluding CATIE and FHIA). CATIE and FHIA will make their existing facilities available for training. CATIE will also construct a dormitory/classroom facility at La Lola using local currency from its trust fund.

IV. FINANCIAL PLAN

A. Budget

Project funding is $2,500,000 in AID grant funds. Although identification of specific counterpart is not required for regional projects (eg. Handbook 3, Appendix 2GA), counterpart contributions which are critical to the success of the project must be clearly identified. The identified counterpart contributions of the three lead institutions (IICA, CATIE, FHIA) and national institutions reflect a continuing program and level of effort required for successful implementation of the Project.

The Project components are Network Management, Research, and Training and Technology Transfer. Project resources will be used to directly assist the six countries of Central America (including Belize) and Panama to participate in and contribute to the technology generation and transfer network. Project funding in support of regional activities will be provided for technical assistance, support personnel, equipment and supplies, operating expenses, pubications, training, travel and perdiem, and conferences.

Project financing on the national level will be limited to operating expenses for regional trials, extension materials development and training costs (including the purchase of some audio-visual equipment). National institutions will provide researchers to collaborate in regional trials along with adequate logistical support (ie. vehicle, equipment, administrative support). Limited and indirect support will be provided to the Dominican Republic, which is a participating member of both IICA and CATIE, an AID recipient, and has a strong national program in cacao. Support for the Dominican Republic will be limited to allowing participation in training programs, provision of extension, research and genetic plant materials, and information. The Dominican Republic will provide travel and transportation for trainees, and all operating costs for regional trials conducted in the country.

IICA will provide the following minimum counterpart: a full-time administrative assistant and secretary for the LOP, office space, furnishings and office equipment, transportation in Costa Rica for its staff, and utilities.

In addition, the Radio Netherland's program in mass-media communication at IICA will provide technical

backstopping to the project as will the senior data base specialist assigned to the PROMECAFE project. Project resources will finance three international specialists, the purchase of a vehicle, microcomputer and audio-visual equipment, and operational costs (ie. supplies, travel/per diem, communications etc.).

CATIE will provide the following minimum counterpart: three senior-level (PhD) researchers, two agriculture technicians, the equivalent of $190,000 in local currency (from the Agricultural Higher Education Project trust fund or other sources) for the renovation and construction of research/training facilities (eg. greenhouse, seed processing facilities, field office/laboratory, dormitory/classroom) and the provision of furniture and appliances as appropriate, and approximately current levels of funding to support research/training activities of its ongoing cacao program.

In addition, CATIE will provide in-kind contributions of its research/training facilities, technical support from other areas (eg. computer center, library, data base, soils and plant analysis laboratories, etc.). The Project will finance additional national technical and support personnel, consultants, equipment for laboratories and research stations, audio-visual equipment, microcomputers, vehicles, and operational costs for both research and training.

FHIA will provide the following minimum counterpart: one MS-level researcher and two agricultural research technicians, use of its research and training facilities, and approximately current levels of funding to support its ongoing cacao program.

The Project will finance national technical and support personnel, consultants, equipment for laboratories and research stations, audio-visual equipment, microcomputer, vehicles, and operational costs for both research and training. In return for Project financing of $35,000 annually, FHIA will make available adequate technical support from its communication division, discipline departments (eg. economics, soils, agronomy etc.), and analytical units (eg. soil and plant analysis, computer center).

AGRICULTURE TECHNOLOGY NETWORKS PROJECT
BUDGET SUMMARY ($000)

COMPONENT	Year 1	Year 2	Year 3	TOTAL
Management	251.8	219.3	207.1	678.2
Research				
Germplasm	156.5	83.5	81.5	321.5
Disease	83.5	50.5	59.5	193.5
Cultural	199.0	149.0	149.0	497.0
Subtotal	441.0	283.0	290.0	1014.0
Training/Transfer				
Transfer	74.5	77.0	68.0	219.5
Training	87.0	94.0	86.0	267.0
Subtotal	161.5	171.0	154.0	486.5
PROJECT SUBTOTAL	854.3	673.3	651.1	2178.7
Contingency	45.1	36.8	34.6	116.4
Overhead	60.0	61.8	59.8	180.9
PROJECT TOTAL	981.4	771.9	746.6	2500.0

AGRICULTURE TECHNOLOGY NETWORKS PROJECT
PROJECT TOTALS BY BUDGET CATEGORY

	Year 1	Year 2	Year 3	TOTAL
TA	155.0	200.0	160.0	515.0
Personnel	126.0	120.0	120.0	366.0
Travel/Per diem	74.0	76.0	67.0	219.0
Conferences	46.0	31.0	46.0	123.0
Publications/mat	25.0	32.0	20.0	77.0
Supply/ Op Exp	104.8	104.8	104.6	314.2
Equipment	121.5	2.5	0.5	124.5
Vehicles	60.0	0.0	0.0	60.0
Regional Trials	66.0	48.0	57.0	171.0
Training	43.0	57.0	58.0	158.0
SUBTOTAL	821.3	672.3	633.1	2127.7
Overhead	80.0	61.8	59.3	200.7
Contingency 5%	45.1	36.8	34.6	116.4
Studies, Eval.	35.0	0.0	20.0	55.0
GRAND TOTAL	981.4	771.9	746.6	2500.0

AGRICULTURE TECHNOLOGY NETWORKS PROJECT
PROJECT TOTALS BY INSTITUTION

	Year 1	Year 2	Year 3	TOTAL
IICA	308.9	347.2	314.8	970.9
CATIE	323.2	179.7	189.8	692.7
FHIA	269.2	208.2	187.5	665.0
AID	35.0	0.0	20.0	55.0
Contingency	45.1	36.8	34.6	116.4
PROJECT TOTAL	981.4	771.9	746.6	2500.0

AGRICULTURE TECHNOLOGY NETWORKS PROJECT
BUDGET BY INSTITUTION AND CATEGORY

BUDGET CATEGORY	Year 1	Year 2	Year 3	TOTAL
IICA				
TA	107.5	152.5	117.5	377.5
Personnel	0.0	0.0	0.0	0.0
Travel/Perdiem	50.0	57.0	46.0	153.0
Conferences	46.0	31.0	46.0	123.0
Publications/Mat	3.0	2.0	2.0	7.0
Supply/ Op Exp	22.0	22.0	22.0	66.0
Equipment	14.5	0.0	0.0	14.5
Vehicles	0.0	0.0	0.0	0.0
Regional Trials	0.0	0.0	0.0	0.0
Training	43.0	57.0	58.0	158.0
Subtotal IICA	286.0	321.5	291.5	899.0
Overhead 8%	22.9	25.7	23.3	71.9
TOTAL IICA	308.9	347.2	314.8	970.9
CATIE				
TA	22.5	22.5	22.5	67.5
Personnel	49.0	43.0	43.0	135.0
Travel/Perdiem	15.0	12.0	12.0	39.0
Conferences	0.0	0.0	0.0	0.0
Publications/Mat	2.0	10.0	10.0	22.0
Supply/ Op Exp	53.0	53.0	53.0	159.0
Equipment	78.5	0.5	0.5	79.5
Regional Trials	36.0	18.0	27.0	81.0
Vehicles	30.0	0.0	0.0	30.0
Training	0.0	0.0	0.0	0.0
Subtotal CATIE	286.0	159.0	168.0	613.0
Overhead 12%	37.2	23.7	21.8	79.7
TOTAL CATIE	323.2	179.7	189.8	692.7
FHIA				
TA	25.0	25.0	20.0	70.0
Personnel	77.0	77.0	77.0	231.0
Travel/Perdiem	9.0	9.0	9.0	27.0
Conferences				0.0
Publications/Mat	20.0	20.0	3.0	43.0
Supply/ Op Exp	29.8	29.8	29.8	89.2
Equipment	28.5	2.0	0.0	32.5
Vehicles	30.0	0.0	0.0	30.0
Regional Trials	30.0	30.0	30.0	90.0
Training				0.0
Subtotal FHIA	249.3	192.8	173.8	615.7
Overhead 8%	19.9	15.4	13.9	49.3
TOTAL FHIA	269.2	208.2	187.5	665.0

B. Overhead

Overhead will be paid to IICA, CATIE and FHIA based on the annual Project budget for each institution. Overhead rates are considered provisional and will be adjusted as required based on the results of annual audits of each institution. The provisional overhead rates are 8 per cent for IICA, 13 per cent for CATIE and 8 per cent for FHIA. A brief discussion of how overhead rates were derived follows with more detail provided in the institutional annnex.

IICA's overhead fee supports common services. In October 1985, IICA's Board of Directors approved a resolution establishing an overhead charge for any project. The minimum charge was fixed at 8 per cent based on the total funds provided by the grantor. IICA recently conducted an internal analysis which indicates overhead ranges from 6 to 19% based on the complexity of the project and degree of administrative support required. Given the separate contracting and procurement authority being proposed for each lead institution, the project will not require significant administrative support from IICA in addition to that already contemplated under project funding (ie. three international specialists). Thus, a provisional overhead of 8%.

CATIE does not have a overhead policy or standard methodology for determining an overhead rate. Among projects that it currently manages, some do not pay overhead and others range from 13 to 25% of the projects total cost. CATIE is initiating an analysis which will enable it to establish a standard overhead policy. A provisional rate of 13% is being proposed which is equal to that of the most recently negotiated donor-funded project with CATIE.

FHIA is a relatively new institution and, like CATIE, has no established overhead policy or standard methodology for determining an overhead rate for externally funded projects. As it broadens its funding base, it is essential that it develop an appropriate policy on overhead. ROCAP will work closely with USAID/Honduras in assisting FHIA in this area based on the results of audited financial statements. An analysis carried out by ROCAP showed that to cover the entire administrative costs of FHIA (ie. direction, finance, library) attributed to its cacao program, based on 1987 budget levels, an overhead rate of 18% would be required. Given that FHIA is a national foundation with a program emphasis directed to Honduras, it was assumed that only 45% of the administrative costs of the cacao program should be covered by the new regional project. A provisional overhead rate of 8% was thus established for this project.

C. Methods of Implementation and Financing

Advances and direct reimbursement financing method will be used for all project expenditures. This method has been employed in previous ROCAP-funded projects with IICA and is judged to provide good internal control with low vulnerability. Given the regional nature of the project and that IICA, CATIE and FHIA will operate in many countries in the region, reimbursement will be made in U.S. dollars. Each institution will maintain a separate bank account for project funds. IICA will maintain an account in the United States, to which project advances and reimbursement of expenditures will be made in dollars. IICA in turn will reimburse CATIE and FHIA for their expenditures and replenish advances to separate bank accounts in dollars.

As a non-profit institution with a limited internal cash flow available to apply to project activities, advances are required to assure adequate implementation of project activities. The amount of each advance is based upon Treasury and AID guidelines and is only for immediate disbursing needs. This procedure is currently used under other ROCAP-financed projects with IICA, and experience has shown that is is effective and can be carefully controlled.

Based upon periodic assessments of the accounting and internal control system of IICA, by both independent auditors and ROCAP financial analysts, a Certified Summary Disbursing Report, accompanied by a SF-1034 to process reimbursements to the institution, is accepted by ROCAP's Controller's Office to document project expenditures. Post payment reviews are performed by ROCAP's Financial Analysts based on randomly selected samples of vouchers which are large enough to provide reasonable assurance that the voucher approval is correct and will be supported by appropriate documentation.

D. Audit Coverage

IICA, CATIE and FHIA's internal control policies require an independent annual audit to document their financial status. Peat, Marwick, Mitchell & Co. has performed these audits for IICA and CATIE in the past and the institutions subsequently provide these to ROCAP once they are certified. FHIA is audited by Arthur Young International, with certified copies submitted to USAID/Honduras. Annual external audits are scheduled during the life of the Project for each lead institution. These audits will be closely coordinated with other external audits being conducted for AID-funded projects with each institution so as to avoid duplication and minimize

cost. An independent Costa Rican accounting firm will carry out the audits for IICA and CATIE (the same firm auditing other ROCAP-funded projects with these institutions), and in the case of FHIA an independent Honduran accounting firm will carry out the audit (the same firm auditing the USAID/Honduras project supporting FHIA). The yearly audit will include an analysis of the adequacy of the provisional overhead rate being paid each institution, with rates adjusted as necessary.

As part of their duties, ROCAP's Financial Analysts will periodically visit IICA, CATIE and FHIA to review aspects related to the implementation of the Project, as well as address other financial matters which may arise. In the case of FHIA, the financial review will be coordinated closely with USAID/Honduras, given the substantial funding it is providing to FHIA.

V. PROJECT ANALYSES

A. Economic Analysis

The Project economic issues are concerned with the economics of networking as well as the economic feasibility of cacao as the primary focus of the research network. On the network level, the issues are (1) what is the justification for investing in a regional research and training activity for a relatively minor crop, and (2) is a regional network a cost-effective means of conducting research? On the commodity level, the primary questions are (1) is the market for cacao adequate to encourage expanded production, (2) is cacao a profitable crop under the projected world price levels.

Network

The Project proposes to invest $2.5 million in a regional network which will increase yields and improve profitability of cacao production through research and extension activities. The current cacao industry in the participating countries of Central America and Panama is relatively small--the total value of production is approximately $18,426,000, with regional production of 9,960 MT and a current world price of around $1,850/MT. The potential for cacao production in the region is much greater than current production, with potential yield increases exceeding 200% and a potential area expansion of much more than tenfold. For illustration purposes, if one assumes that area cultivated in cacao slightly more than doubled (to 80,000 Ha.) and average yields increased to 900 Kg./Ha. (which is still well below potential using existing technology), the value of the resulting 72,000MT would be $133,200,000. The potential for cacao production clearly exists in the region, but the potential can not be realized without substantial effort in both research and extension.

A standard cost-benefit analysis is of little value in a project such as this. The direct impact of the project will be on generation of new production technology, and training of researchers and extension with little or no direct impact on producers. Therefore, constructing elaborate quantitative cost-benefit analyses which rest on massive, and wholly unsupportable assumptions about research results, national budgets, yield increases, new plantings, and attempting to identify the contribution of new research and training would simply be an exercise in economic game-playing.

A more useful, and enlightening, approach is to attempt to put the Project costs into the perspective of a regional investment. Rather than reducing hypothetical numbers to one dubious ratio, the approach of this analysis will be to indicate the order of magnitude of growth in the cacao industry which would be required to justify the Project and to assess whether it is reasonable to expect this level of change from the Project.

The current area in production is 24,701 hectares with an additional 4,507 hectares already planted in Costa Rica which further 6,175 hectares will be planted in Costa Rica as part of on-going projects and several thousand hectares will be planted in Belize as part of the cacao project. Future cacao promotion activities are planned in Guatemala and Honduras. The most conservative working assumption is that no additional land will be planted in cacao over the next twenty years beyond the 35,586 hectares already planned (excluding Belize). The additional assumption can be made that cacao yields will increase by 1% per year without the Project. This is a generous assumption, as cacao yields have not changed substantially in this region for decades. A twenty-year planning period is also conservative-- cacao begins producing in year three, hits maximum production around year 8, and continues producing at high levels for more than thirty years.

Using these extremely conservative assumptions, what level of impact would be required to justify the expenditure of $2.5 million on a research and training network? Assuming a discount rate of 10%, network maintenance costs of $100,000/year, and an average price over twenty years of $1,850/MT, the average yield for the region would have to increase by less than 1% annually (eg. .92%) over twenty years to justify the Project (Scenario 1). With this rate of increase, the average yield for the region would <u>still be only 583 Kg./Ha. after twenty years</u>--less than half of the current potential using existing technology. For illustration purposes, if the new plantings in Costa Rica (10,682 hectares by 1990) use hybrid seeds and semi-technified practices to achieve average yields of 1,200 Kg./Ha., and other existing plantations have no yield increases whatsoever, the average regional yield would increase to 641 Kg./Ha.

With this perspective, it is obvious that only a very modest and achievable impact attributed to Project activities is required to justify the Project. A more realistic assessment of yield increases and modest expansion of cultivated area would yield net benefits, in present value terms, of tens of millions of dollars. A four percent annual increase in yield and the

ESTIMATED BENEFITS FROM COCOA PRODUCTION
SCENARIO I

Assumptions:

Area cultivated	35386
Current average yield (kg/ha)	400
Average annual increase	0.0192
Average price	1850
Discount Rate	0.1

	With Project					Without Project	
Year	Area (ha)	Yield (kg/ha)	Production (mt)	Value of Production	Project Costs	Production (mt)	Value of Production
1	24,701	400	9,880	$18,278,740	$981,400	14,154	$26,185,640
2	29,000	408	11,823	$21,872,032	$771,900	14,296	$26,447,496
3	34,000	416	14,127	$26,135,419	$746,800	14,439	$26,711,971
4	34,000	423	14,398	$26,637,219	$100,000	14,583	$26,979,091
5	35,386	432	15,273	$28,255,361	$100,000	14,729	$27,248,882
6	35,386	440	15,566	$28,797,863	$100,000	14,876	$27,521,371
7	35,386	448	15,865	$29,350,782	$100,000	15,025	$27,796,585
8	35,386	457	16,170	$29,914,317	$100,000	15,175	$28,074,550
9	35,386	466	16,480	$30,488,672	$100,000	15,327	$28,355,296
10	35,386	475	16,797	$31,074,055	$100,000	15,480	$28,638,849
11	35,386	484	17,119	$31,670,677	$100,000	15,635	$28,925,237
12	35,386	493	17,448	$32,278,754	$100,000	15,792	$29,214,490
13	35,386	503	17,783	$32,898,506	$100,000	15,950	$29,506,635
14	35,386	512	18,124	$33,530,157	$100,000	16,109	$29,801,701
15	35,386	522	18,472	$34,173,936	$100,000	16,270	$30,099,718
16	35,386	532	18,827	$34,830,076	$100,000	16,433	$30,400,715
17	35,386	542	19,189	$35,498,813	$100,000	16,597	$30,704,722
18	35,386	553	19,557	$36,180,390	$100,000	16,763	$31,011,769
19	35,386	563	19,932	$36,875,054	$100,000	16,931	$31,321,887
20	35,386	574	20,315	$37,583,055	$100,000	17,100	$31,635,106
net present value				$240,901,926	$2,693,869		$238,180,661

Net Present Value of Project Benefits $27,396

ESTIMATED BENEFITS FROM COCOA PRODUCTION
SCENARIO II

Assumptions:

Area cultivated	35386
Current average yield (kg/ha)	400
Average annual increase	0.04
Average price	1850
Discount Rate	0.1

			With Project			Without Project	
Year	Area (ha)	Yield (kg/ha)	Production (mt)	Value of Production	Project Costs	Production (mt)	Value of Production
1	24,781	400	9,880	$18,278,742	$981,400	14,154	$26,185,649
2	29,000	416	12,064	$22,318,400	$771,920	14,296	$26,447,496
3	34,000	433	14,710	$27,213,056	$749,800	14,439	$26,711,971
4	34,000	450	15,298	$28,301,578	$130,000	14,583	$26,979,091
5	35,386	468	16,559	$30,633,495	$130,000	14,729	$27,248,882
6	35,686	487	17,367	$32,128,932	$130,000	14,876	$27,521,371
7	35,996	506	18,214	$33,694,979	$130,000	15,025	$27,796,585
8	36,286	526	19,100	$35,334,928	$100,000	15,175	$28,074,550
9	36,586	547	20,028	$37,052,145	$100,000	15,327	$28,355,296
10	36,886	569	21,000	$38,850,207	$100,000	15,480	$28,638,849
11	37,186	592	22,018	$40,732,829	$100,000	15,635	$28,925,237
12	37,486	616	23,083	$42,703,901	$100,000	15,792	$29,214,490
13	37,786	640	24,199	$44,767,487	$100,000	15,950	$29,506,635
14	38,086	666	25,366	$46,927,932	$100,000	16,109	$29,801,701
15	38,386	693	26,589	$49,189,378	$100,000	16,270	$30,099,718
16	38,686	720	27,869	$51,556,762	$100,000	16,433	$30,400,715
17	38,986	749	29,208	$54,034,875	$100,000	16,597	$30,704,722
18	39,286	779	30,610	$56,628,662	$100,000	16,763	$31,011,769
19	39,586	810	32,073	$59,343,540	$100,000	16,931	$31,321,887
20	39,886	843	33,614	$62,185,002	$100,000	17,100	$31,635,106
net present value				$292,488,397	$2,673,869		$238,180,661

Net Present Value of Project Benefits $51,617,867

addition of 300 Ha. cultivated annually after year five would produce net benefits of over $51 million (Scenario II). Beyond the direct benefits of increased production, the cacao industry will contribute foreign exchange, create employment, and potentially substitute for cacao imports in the region.

Cost effectiveness of network approach

The basic premise of the project is that the small CA/P countries cannot afford to establish and maintain adequate research activities in every crop on a national level. Assuming that adequate scientific capability in each commodity exists and that some level of networking would inevitably occur from research by regional institutions like CATIE, what would separate country programs cost?

The Project research support costs averaging $422,000 per year are only part of the total cacao research efforts supported by CATIE and FHIA. Excluding capital costs, CATIE's program budget is $514,000 per year and FHIA's budget is $204,000 per year. The critical mass of effort includes work on tissue culture, germplasm development, disease control and cultural practices. Assuming that the absolute minimum level of effort needed to achieve critical mass would be 75% of the combined capability of CATIE and FHIA, each national program would have to maintain a $855,000 per year program. For the entire region, the cacao research costs would exceed $5,130,000 per year if each country supported independent programs. By working on a network basis, the average cost per country and lead institution is only $142,500 and the actual costs of national participation in the network, given that CATIE and FHIA have ongoing programs, is limited to personnel and operating expenses to conduct regional research and validation trials.

There is no question but that the network approach is clearly the most cost-effective approach to research in commodities of interest to all of the countries in the region and moreover is the only feasible means of developing and maintaining the critical mass of effort.

Economics of Cacao Investments:

Market. Does the world market for cacao production in the next fifteen years offer adequate demand to justify increasing production in this region, given the level of expansion and market position in other countries? This is a crucial question for the cacao industry in the region. There is no clear or straightforward answer, although a number of positive indications exist.

First of all, one has to recognize that cacao is a very long-term crop. The plants begin producing in the third or fourth year, reach full production by year eight, and continue producing at a high level for 30 years. Estimates about world economic conditions, prices, supply, and demand over such long periods cannot be made with any degree of confidence.

Current supply and demand statistics indicate that world demand is being met. Production has exceeded bean grindings for the past three years, stocks are growing, and the price of bulk cacao has fallen from a high of $1.06 per pound in 1983 to a forecast price of $.87 for the 1986/1987 year. Overall demand for cacao is estimated to grow at 1.6% under current projections. The supply of cacao over the next 10-15 years will depend on production and expansion decisions made in the major producer countries of Brazil, Ivory Coast, Ghana, and Malaysia over the next several years. The entire issue of supply and demand is further complicated by the international cacao agreements, which impose quotas on production and establish price floors, but which currently are under negotiation and have no enforcement powers.

World Bank cacao price projections indicate that prices will continue to be low for the next several years, will begin to recover around the turn of the decade to about $1.07/lb, and will be up to $1.51/lb by 1995. However, these projections can be affected by production decisions made in the next few years by only one or two of the big producers. The Ivory Coast, with 40% of the world market, may reduce expansion in the coming years of relatively low prices, as might Brazil. Should this happen, prices will recover faster than projected. On the other hand, continued expansion of production could keep prices weak for many years. The small countries of the CA/P region produce less than 10,000 MT of the total world production of almost 2,000,000 MT. Therefore, production increases in this region will have little if any impact on world markets.

Three important points must be made about the impact of low prices and the position of the CA/P region in the world markets. First, even at the current low prices, cacao remains a profitable crop and will continue to be profitable at even lower prices. Obviously, improved production systems and plant materials which lower the cost of production will lower the breakeven point for cacao producers even further. The cacao markets, like other markets, will belong not to the biggest but to the most efficient.

Second, the economics of any agricultural commodity, particularly long-term crops, lie in the average returns over

many years--the years of high prices offsetting the years of oversupply. While the price fluctuations in cacao are significant, the low prices are still not a threat to efficient producers even if considered on a year-by-year basis rather than five year averages.

The third aspect which is particularly relevant to market forecasts is that the cacao which is in oversupply, grown by the major producers of Africa, Asia, and Brazil, is of the bulk cacao variety which is used primarily for cacao butter production. The varieties grown in this region, however, meet a particular niche in the cacao markets for unique flavor and aroma characteristics needed in confection manufacture. The flavored cacao, about 6% of the total world cacao production, is not subject to production quotas and is not grown by any of the major producers. The major producers of this type of cacao are Ecuador and Venezuela.

Therefore, the prospects for expanded cacao production in the CA/P region are reasonably good. The flavored cacao market will be the fastest growing segment of the cacao market and the region can participate in that growth. An indication of the potential for cacao production in the region is that Hershey's has made a substantial commitment to its Hummingbird plantation in Belize and has commited to buying all of the cacao that is produced.

Microeconomic Issues:

The key question on the microeconomic level is whether cacao is a profitable crop under existing and potential technologies. In reviewing this issue, it must be emphasized that the level of confidence possible in agricultural statistics available for secondary crops is very low. Acreage, production, and yield statistics for the CAP countries in cacao are unreliable and cost of production studies are highly suspect. Price levels and export levels can be estimated with somewhat more confidence because of export records. Given the problems of data integrity, this question can only be answered in approximate terms.

To a large extent, the microeconomics of cacao production depends on the level of technology which is available to and used by the farmers. The key to successful farming in a long- term crop is to lower cost of production to the point that the enterprise can be sustained during periods of low prices. While the current costs of production for older plantations are relatively high, use of improved varieties and moderate use of inputs can substantially reduce cost of production. The costs

of production for the best managed farms in intensively managed farms of Malaysia, with yields of over 3000 kg per hectare, is less than 40 cents per pound. Estimated costs in current plantations in Central America under relatively low technology situations are around 65 cents per pound.

An analysis of cacao production economics in Belize was done for the Toledo Agricultural Marketing Project. The analysis showed that a low input production system would return $527/acre in peak production and a high input system would return$739/acre in the peak production years at $.70/lb market price.

A more limited study of the economics of applying disease control technologies on existing plantations was done by Jose Galindo, the cacao expert at CATIE. Evaluating the impact and cost of using fungicides and sanitary techniques to combat two common diseases, the costs of the technologies were computed in yield figures and compared with the yield gains attributed to their usage. As illustrated in Table 3, the yield increases resulting from usage of these techniques and inputs more than compensated for the costs.

While it is not now possible to reach firm conclusions about the cost of production and relative breakeven point for different production systems in the region, it is safe to say that improved technology can substantially reduce the production costs, increase yields, and increase profitability. Studies in other areas have shown that production costs can be reduced to below $.40 per pound, at which level even the current low prices would provide substantial profits. In the studies to be conducted at FHIA during the project, the economics of cacao production in the region will be studied much more closely.

TABLE 3
INCIDENCE AND DISEASE CONTROL COSTS FOR ALTERNATIVE TECHNOLOGIES TO CONTROL MONILIA AND BLACK MAZORCA IN 18 YEAR OLD CACAO PLANTS

Practice	Natural Polination Incidence		Yield
	Monilia (%)	Mazorca (%)	Kg./Ha.
Sanitary Pruning & Fungicide	19.6	5.6	1,108
Sanitary Pruning	34.1	6.1	1,048
Control Plot	66.5	15.4	208

Practice	Manual Polination Incidence		Yield
	Monilia (%)	Mazorca (%)	Kg./Ha.
Sanitary Pruning & Fungicide	32.2	10.2	2,121
Sanitary Pruning	34.8	12.1	1,496
Control Plot	68.3	17.4	249

Costs of Disease Control in Yields

Sanitary Pruning	50-60 Kg. of dry cacao
Fungicide	60-7- Kg. of dry cacao
Manual Polination	250 Kg. of dry cacao

Source: Jose Galindo, La Lola CATIE, 1980

B. Institutional Analysis

The implementation of the regional agricultural research and technology network in cacao requires the coordinated efforts of three lead institutions (IICA, Inter-american Institute for Cooperation in Agriculture; CATIE, Tropical Agriculture Research and Training Center; and FHIA, Honduran Foundation for Agriculture Research). IICA is the overall administrative and coordinating institution for the regional cacao network, with CATIE and FHIA assuming technical leadership in both agricultural research and training conducted in support of the regional program.

1. IICA

IICA has considerable experience in the administration and implementation of complex multi-institutional regional agricultural research, training and technology transfer programs. Under its technology generation and transfer program (program II) IICA currently is managing two major regional research networks programs co-funded by BID; PROCISUR which involves Argentina, Bolivia, Brazil, Chile, Paraguay, and Uruguay; and PROCIANDINO which involves Bolivia, Colombia, Ecuador, Peru and Venezuela. PROCISUR initiated activities in 1984 building on an IICA/Southern Cone/BID program begun in 1980, and PROCIANDINO began activities in 1986. In response to a mandate from its executive board of directors, IICA, in close collaboration with national research institutions, is currently developing a proposal similar to the IICA/BID research networks in South America for the Central American region (PROCICENTRAL) to promote overall research coordination among national, regional, and international institutions. The cacao network supported under this ROCAP project will eventually develop linkages to the broader research network being established by IICA. A regional network in animal production for Latin America (RISPAL) is also coordinated by IICA.

In addition, IICA has administered through its Central America office a five-year regional research effort in coffee pest control financed by USAID/ROCAP and participating countries. A recent project evaluation of this program noted the significant results obtained to-date and the effectiveness of IICA's technical leadership and administration. Based on evaluation recommendations, ROCAP would authorize a three-year extension of this project to consolidate research findings and emphasize technology transfer. IICA has considerable experience administering and implementing AID-funded projects, both at the national and regional levels. In addition to the coffee pest control project mentioned above, IICA implemented the ROCAP-funded Agricultural Secretariat Project (on agricultural policy issues) which ended in December 1985.

Nature and Purposes of IICA

IICA is the specialized agency for agriculture of the inter-american system. With its present structure, it is the institutional continuation of the Inter-American Institute for Agricultural Sciences, which was created by the Council of Directors of the Pan American Union in October of 1942.

The Convention governing the Institute States that IICA's purpose is to "encourage, promote and support the

efforts of the Member States to achieve their agricultural development and rural well-being." IICA's functions as established by the new Convention are to:

a. Promote the strengthening of national education, research, and rural development institutions, in order to give impetus to the advancement and the dissemination of science and technology applied to rural progress.

b. Formulate and execute plans, programs, projects and activities, in accordance with the needs of the governments of the Member States, that will help them meet their objectives for agricultural development and rural welfare policies and programs.

c. Establish and maintain relations of cooperation and coordination with the Organization of American States and with other agencies or programs, and with governmental and nongovernmental entities that pursue similar objectives.

d. Act as an organ for consultation, technical execution and administration of programs and projects in the agricultural sector, through agreements with the Organization of American States, or with national, inter-American or international agencies and entities.

IICA programs for the 1987-1991 period

The concentration of efforts will take shape through the organization of five programs which include:
Program I. Agricultural Policy Analysis and Planning;
Program II. Technology Generation and Transfer;
Program III. Organization and Management for Rural Development;
Program IV. Marketing and Agroindustry; and
Program V. Animal Health and Plant Protection.

The technologies network project will be located under Program II. This program promotes and supports actions by the member countries to improve the design of their technological policies, strengthen the organization and management of their technology generation and transfer systems and facilitate international technology transfer, so as to make better use of available resources and a better and more effective contribution to solving the technological problems of agricultural production.

2. CATIE

CATIE has been identified as one of two lead technical institutions for the Regional Agricultural Technologies Networks project (initial cacao network) because of its technical expertise in cacao, experience in implementation of complex multi-country projects funded by ROCAP and other donors, availability of excellent research and training facilities and support services, and its regional mandate which includes conducting research and educational programs through effective establishment of institutional networking arrangements with national, regional and international institutions in Central America, Panama and the Dominican Republic.

CATIE has a long history of implementing ROCAP- and USAID- funded projects. Currently CATIE is executing four ROCAP projects. These include the Regional Agricultural Higher Education (596-0129A) a joint ROCAP/USAID-Costa Rica-funded project), the Regional Tropical Watershed Management (596-0106), the Integrated Pest Management (596-0110) , and the Tree Crop Production (596-0117) for $9 million. In addition, recently completed ROCAP projects with CATIE (December 1985 and December 1986, respectively) include Fuelwood and Alternative Energy Resources (596-0089), and Small Farm Production Systems (596-0083).

Organization

Summary History. The Valley of Turrialba was selected in 1942 as the site for th headquarters of the Inter-American Institute of Agricultural Sciences (IICA) of the O.A.S. When the General Directorate of IICA was transferred to San José in 1960, it maintained at Turrialba the training and research in agriculture, animal husbandry and forestry, begun in 1942.

To carry them out, IICA created the Centro de Enseñanza e Investigación (CEI) at Turrialba. From 1960 to 1969 the growth of IICA's graduate program strengthened the training of Latin Americans in Turrialba. In 1970, CEI became the Centro Tropical de Enseñanza e Investigación (CTEI), and continued its graduate training programs.

Creation of CATIE

On January 12, 1973, IICA and the Government of Costa Rica created the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE). Costa Rica's Legislative Assembly approved this agreement in June 1973, and designated the CATIE's headquarters to be at Turrialba.

This non-profit autonomus organization, scientific and educational in nature, was created to promote and carry out research and training at different levels in the area of agriculture, forestry and animal husbandry, with the purpose of responding to the needs of the American tropics, particularly the countries of Central America, Panama and the Caribbean. At present the member countries are Guatemala, Honduras, Nicaragua, Costa Rica, Panama and the Dominican Republic.

Objectives of CATIE

The policy of CATIE is based on research and training in the development of the agricultural and renewable natural resources of the region. CATIE's actions are intended to benefit mainly small- and medium-size farmers who are a large part of the rural population. The main objectives are to:

a. Develop research methods and technologies for the diverse socio-economic and ecological conditions of the Central American tropics, in accordance with the needs and priorities of crops, livestock and renewable natural resources.

b. Strengthen national research institutions and higher level training in crops, livestock and renewable natural resources.

c. Conserve, produce, distribute and evaluate the genetic materials of scientific value adapted to the ecological conditions of the Central American tropics and resistent to pests and diseases; contribute to increasing the efficiency of agriculture livestock and renewable natural resources; and improve the quality and quantity of food.

d. Improve the research and training activities, so that the scientific, technical and educational results are of some practical utility for the member countries. The dissemination of the research results is done to increase productivity and improve the quality of crops, livestock and renewable natural resources.

e. Plan and carry out graduate programs and training in agriculture, livestock, and renewable natural resources in accordance with scientific, technological and educational progress.

Programs

1. Training

CATIE offers a two-year master's degree program, in agreement with the University of Costa Rica and other universities. The Center admits an average of 45 new students each year. CATIE offers short courses, conferences and in-service training in special fields.

2. Research

CATIE conducts research on annual and perennial crops, animal husbandry and renewable natural resources. Among the support resources are the computer center, the tissue culture laboratory, the plant genetics unit, the seed bank, and the computer center, the tissue culture laboratory, the plant genetics units, the seed bank, the small farms program, and the widely dispersed tree species trials.

3. Library and Information Systems

The Orton Memorial Library of the Inter-American Center for Agricultural Documentation and Information (CIDIA) is one of the most complete in Latin America in the field of tropical agriculture. It provides ample support to the Center's diverse research and training program. Each of CATIE's departments has an information distribution center.

Institutional Development Plan

CATIE presented to its Board of Directors in June 1987 a proposed ten-year institutional development strategy, the cumulation of over two years of interaction with its member countries and in-depth analysis, which identifies program priorities, resource requirements and organizational modifications. The major elements of CATIE's development plan, endorsed by its Board of Directors at the June 1987 meeting, are discussed below.

CATIE has identified seven priority program areas in its long-range plan. These include: a) perennial crops, b) annual food crops, c) promising tropical crops, d) tropical livestock, e) forestry and agroforestry, f) integrated development of production systems, and g) integrated management of watersheds and regional natural resources.

CATIE currently has five departments: a) Crop Production, b) Animal Production, c) Renewable Natural Resources, d) Graduate Studies and Training, and e) Administration and Finance, and is administered by a Director and Deputy Director, as shown in the organization structure presented in Annex B Exhibit D. The approved new organizational structure, shown in Annex B Exhibit E, refocuses research and training in three principal areas, 1) Perrennial Crops Improvement (including coffee, cacao and plantain), 2) Sustainable Agricultural Production and Development (including work on annual food crops, livestock, promising tropical crops and agroforestry), and 3) Integrated Natural Resources Management (with emphasis on watershed and fragile land management). In addition, an associate director for research and one for education are proposed.

Cacao Program

CATIE's support to the proposed regional cacao technology network will be administered under its perennial crops program. This program (with emphasis on cacao, coffee and plantain) will conduct research on a) biology and genetics, with the purpose of developing improved germplasm resistant to the major crop diseases, b) plant protection, emphasizing biological control methods, c) tropical soils and climate, and d) socio-economics. CATIE has a strong cacao program at present and is recognized in the region for its expertise. The cacao program includes the La Lola cacao research station (96 ha), 15 ha. of cacao for experiments and seed production and a 3.5 ha. cacao germ plasm collection at its Turrialba research center, three PhD and one MS researcher, several technicians, administrative support and field laborers. Over the past eight years, CATIE has provided short-term training to approximately 300 agricultural technicians from CA/P countries and the Dominican Republic. In addition to its ongoing research program, it has produced substantial amounts of certified seed for distribution to various countries.

3. FHIA

FHIA has been identified as one of the lead technical institutions under the project. This is based on the strength of its cacao program and technology transfer activities, its excellent research and training facilities, and the relative stability of its funding. USAID/Honduras is supporting FHIA with a ten-year, 20 million dollar institutional development grant.

Background and Functions

Creation of FHIA. On May 15, 1984 FHIA was constituted as a private, civil, non-political, non-profit organization dedicated to agricultural research, especially traditional and non-traditional export crops for diversification.

Objectives of FHIA

FHIA's main purpose is the improvement of the production levels of the Honduran farmers and generating sources of employment. The objectives are:

a) To develop an agricultural technology which can support and promote the productivity of traditional and non-traditional export crops of the country.

b) To provide specialized agricultural services to the Honduran producers and to public and private institutions of the sector.

c) To support governmental and private programs that improve the production of basic food crops.

d) To provide technical information which can contribute to the planning and development of the Honduran agriculture sector.

Programs

FHIA has six major technical programs. These include national programs in citrus, cacao, plantain, vegetables, diversification, and an international banana/plantain breeding program. FHIA's support to the regional cacao technology network will be administered by its cacao program.

Cacao Program

FHIA's program in cacao includes a 50 Ha. research station, one MS-level researcher, two technicians, and support from the various technical departments (approximately 20% of their time is devoted to the program). Although only recently established, the program has already identified major production constraints, conducted a survey of cacao producers in Honduras, initiated field research trials, established a technical advisory committee consisting of various national institutions involved in cacao production, and carried out a number of training courses for producers and extensionists.

Library and Communications

FHIA is developing the Division of Communication which will permit, in mass form, the training of extensionists and leader producers as a communication mechanism with users. FHIA's is acquiring communication equipment, graphic arts, photography, video, sound and transport and renovating a building for audiovisual production training. The AID/W CTTA project is providing technical assistance to FHIA in the agricultural communications area.

FHIA's library began its services in 1953 and has bibliographic material on banana, abaca, african palm and diversification crops.

C. Financial Analysis

The financial issues for this Project concern the financial strength of the implementing institutions and the question of recurrent costs of maintaining network activities at the end of the Project.

1. Recurrent Costs

The intent of the Project is to test the collaborative research approach on a regional basis and to determine whether or not it is feasible. The intent is not to create an institution which must be maintained in order to justify the Project. Therefore, the recurrent cost issue is less a question of assuring that mechanisms are in place to finance and maintain the network than it is to determine whether the network costs are sustainable by the participating countries should they decide to continue. The usefulness and feasibility of the concept are irrelevant if the costs of the network are clearly too great for the region to sustain without continuing donor assistance.

The major part of the total Pilot Project funding of $2.5 million is for training, development of technology transfer strategies, and research. The research component, which makes up over half of the Project expenditures, will strengthen existing capability in the lead institutions and expand the level of research without creating new institutions, personnel positions, or other major recurrent costs. The supplementary research undertaken with Project funds will increase the potential for achieving tangible results by the end of the Project, provide incentives for participating institutions to direct their own resources to the collaborative program, and cover operating expenses to establish trials in

each cooperating country. It will also fund expenses for lead institution scientists to work closely with national level counterparts and provide technical assistance in establishing and maintaining research plots and validation trials.

The minimum level of effort to maintain the network at a reduced, but adequate level of activity would include the following activities: (1) annual meetings of the coordinating committee; (2) at least semiannual meetings of the lead institutions and key scientists from participating countries; (3) travel and perdiem for lead institution scientists to participating countries; and (4) publication and reproduction expenses. Elements which would be highly desirable, but probably not absolutely necessary, would include a project coordinator, policy conferences, and some level of continuing training of national personnel. On the national level, participating countries would have to provide all operating and personnel costs for maintaining the trials (the costs of establishing them having been absorbed by the Project).

The total costs of the essential elements for the regional activities would be approximately $50,000 per year. The total cost, including all of the desirable elements, would be approximately $150,000 per year. (It should be understood that this level of funding would not cover the basic costs of CATIE and FHIA research programs, which are considered to be their normal program components.) This relatively low level of cost of maintenance is possible because most of the major costs of establishing the network and research activities have been borne by the Project. Thus, the annual cost per country, excluding the national level cost of directing their research and extension resources toward supporting the program, would range from $8,333 to $25,000 per year.

This annual cost would not prove to be an excessive burden to any of the participating countries. If the collaborative program is effective in developing and disseminating useful technologies, strengthening the national committees, and communicating the value of the program in policy conferences, there should be no problem in covering the recurrent costs of the network.

D. Technical Analysis Summary

The key technical issues are whether the network is structured so as to be feasible, whether the total research capability and level of effort envisioned under the project is adequate to produce results, and whether the technical issues affecting the crop are well understood by the implementing institutions and scientists.

The difficulty of establishing workable regional collaborative programs which require the coordination of national institutions and to some degree the channeling of scarce national research and extension resources to support regional programs should not be underestimated. It is implicitly recognized in the Project design that active participation and collaboration from both national and regional level institutions is essential to the success of the network. The strong role of the Executive Committee is intended to solidify the directors' commitment to the collaborative program and provide the incentive to direct national level resources to the regional effort. The negative side of the strong Executive Committee role will be an decrease in efficiency, some delays in implementation, and the occasional protracted negotiation inherent in committee workings. Nonetheless, the cost in efficiency is a small price to pay to secure a commitment to the program; a commitment which can only be developed by participation and the confidence that the network is responsive to their needs.

The level of research and training effort to be supported under this Pilot Project is based on the technical analysis of research needs and current capability in cacao research and extension. It is recognized that longer-term efforts are required in both research (including development of tissue culture methodology) and technology transfer areas to meet the development needs of cacao. The supplementary research activities will enable the lead institutions to establish experiments in the most critical areas at a level of effort which will produce usable results. Moreover, the three areas of primary focus are all interrelated and mutually supporting, so that advances in any of the areas will provide useful feedback and information to the other fields of study.

The technical focus of the research and extension efforts was established by one of the leading cacao scientists of the hemisphere. The production problems of this complex crop, described briefly in the Project Description, are addressed in detail in the Technical Analysis Annex. The project activities are directed at the most important production constraints in cacao and will use the current state of the art materials and technologies to pursue the research. The intervisiting program will allow the scientists to visit the best cacao research and production facilities in the world to assure that their knowledge is up-to-date.

E. Social Soundness Analysis

The primary beneficiaries of this Project will be small- and medium sized cacao producers in the CA/P region. The vast majority of cacao producers in the region are small farmers--over 90% of the producers in Honduras and Costa Rica farm less than seven hectares. Women will benefit through increased opportunities in household processing and marketing, activities in which women traditionally have an important role.

The adoption of new technologies is dependent upon the technology addressing socioeconomic constraints and being consistent with cultural patterns. Analysis of cultural and socioeconomic constraints indicate that no significant barriers to adoption exist (Social Soundness Analysis Annex). The Project design is structured to maximize the awareness of producers constraints and perceptions on the part of both researchers and extension to assure that their needs are being met.

F. Environmental Analysis

The project will have a net positive impact on the environment, therefore, a negative determination was approved for the project as a whole. A diferred threshold decision is approved for activities involving extension of technology packages to farmers.

The activities to establish and promote a network quality for the categorical exclusion based on AID environmental procedures Section 216.2 (c)(i) and (iii). Activities involving cacao research under controlled and carefully monitored conditions qualify for the categorical exclusion per Section 216.2 (c)(i)(iii). Pesticide procurement and use by specialized project personnel in IICA, CATIE, AND FHIA qualifies for exemption to pesticide procurement per Section 216.3 (b)(2)(iii). Project staff will restrict experimentation to non-US/EPA restricted products and to applications and uses previously established and approved.

A deferred threshold decision is approved for activities in the technology transfer imponent for extension of technology packages to farmers. These technological packages will be reviewed and approved on a case-by-case basis by AID/W LAC/CEO. A Condition cendet to Disbursement to this effect has been included. A copy of the Environmental Threshold Decision is attached as Project Exhibit F.

VI. MONITORING AND IMPLEMENTATION PLAN

A. Administrative Arrangements

1. Project Administration

IICA (the Grantee) will be responsible for the overall administration of the Project and for providing facilities and support to the Project Coordinator, training/technology transfer coordinator, and institutional development specialist.

Project implementation responsibilities will be assigned to a Project Coordinator located in the Technology Development and Transfer Division of IICA (Program II). The Coordinator, who will be contracted specifically for this project, will be an agricultural specialist with experience in agricultural research and extension programs in developing countries, and preferably knowledge of cacao and the CA/P region. The Coordinator will be responsible for technical coordination and direction of cacao research and extension efforts; coordinating and facilitating network activities; acting as liaison to the A.I.D. project manager, serving as principal contact among the participating institutions and between these institutions and technical resources outside of the region; and coordinating overall administration of the Project, including development of annual workplans and budgets. IICA will provide a full-time administrative assistant to work on logistical planning, accounting, and general office support, along with a full-time secretary.

Overall policy and operational direction of the Project will be vested in an Executive Committee, comprising the senior representatives of the lead institutions (IICA, CATIE, FHIA), representatives of national research and extension programs, a representative of USAID/ROCAP and the Project Coordinator. The Executive Committee will meet at least once a year to coordinate annual workplans and budgets, set research and training priorities, approve subcontracts and Memoranda of Understanding concerning the Project between IICA, the lead institutions (CATIE, FHIA), and the national institutions and resolve any serious operational problems.

Executive Committee officers and the Project Coordinator will also meet at least once a year with an Advisory Committee comprised of scientists, representatives of the private sector marketing and processing firms, producer

associations, private voluntary organizations, and other interested parties. The purpose of these meetings is to keep all interested parties briefed and to assure that the concerns and opinions of all interested parties can be directed to the decision making level of the Project.

A national advisory group will be formed in each participating country to support the project activities in that country, review operations, resolve any project related implementation problems, and to keep national directors and its cacao program representatives informed of the issues to be resolved in the Executive Committee sessions. The makeup of these groups will be established according to the needs of each country, but should include both research and extension personnel as well as representatives of the private sector and producers.

Preparation of Workplans and Budgets

Each implementing institution will prepare annual workplans and budgets by October 31st of each year, in close collaboration with national institutions. The project coordinator will integrate these proposed workplans into an overall annual workplan and budget for review and approval by the the Executive Committee at its annual meeting in November. Once endorsed by the Executive Committee, the workplan and budget will be submitted to AID for review and approval.

Submission of Project Reports and Project Monitoring

CATIE and FHIA will prepare quarterly progress reports as well as annual reports on their project components. IICA, as overall coordinator, will consolidate these into one report which includes the components it directly manages. These will be submitted by IICA to AID for review and required actions. Quarterly reports will both identify current project status as well as actions planned for the upcoming quarter. Lead institution personnel (IICA, CATIE, FHIA) will meet quarterly with the AID project manager and other AID officials as required to review project status and address implementation concerns.

2. Institutional Responsibilities

IICA

As the Grantee, IICA will have the primary responsibility for assuring that the Project is conducted to

meet the objectives and within the guidelines established by the Project Agreement. IICA will sign Memorandum of Understanding with all participating institutions and sub-agreements with the lead research institutions to clarify each institution's role and responsibilities under the Project.

CATIE

The Cacao program in CATIE will be the lead institution for variety testing, germplasm dissemination, tissue culture methodology, disease control, epidemiology of diseases, and product quality research. In addition, CATIE will share responsibilities with IICA and FHIA in networking and training/technology transfer components of the Project. The Director of the Cacao Program will be responsible for all Project-funded activities managed by CATIE and will prepare all reports, workplans, and budgets for CATIE research and training activities.

CATIE will be responsible for all Project related contracting and procurement for those activities conducted by CATIE. The specific contracting and procurement requirements are included in Exhibit C. CATIE will provide usage of all facilities and germplasm at the La Lola cacao facility and at Turrialba, trial plots for research, classrooms, library, offices, greenhouses, laboratory equipment, computer center and the time of senior cacao scientists to direct the research. With funds from the Agricultural Higher Education Project (USAID/Costa Rica trust fund) or other sources CATIE will repair and/or construct greenhouses and other facilities (ie. expansion of tissue culture laboratory) at its main research center in Turrialba, as well as field laboratories/offices, classrooms, dormitories, a seed processing facility, and other basic infrastructure at the La Lola experiment station as required for the program.

FHIA

FHIA will be the lead institution for all Project activities in cultural practice research, technology transfer, and development of technical recommendation packages. In addition, it will share responsibilities for training and networking components with CATIE and IICA. The director of the cacao program will be responsible for administration and planning of all Project activities, preparation of annual reports, workplans, and budgets, and liaison with other institutions.

FHIA will be responsible for all procurement and contracting necessary for its own activities. These are presented in Exhibit E. It will make available to the Project land and labor for research, office space, laboratories, time of technical personnel, and the services of support scientists from the discipline departments.

AID

The AID project manager in the ROCAP agricultural office will be responsible for supervision of the Project, working closely with the Project Coordinator located in IICA. Both individuals will communicate regularly with each of the bilateral AID mission representatives to inform them of project status. AID will have prior approval authority for all sub-contracts, sub-agreements, memorandum of understanding, workplans and budgets for the implementing institutions, and the selection of key project personnel. A ROCAP project implementation committee, composed of representatives from the Agricultural, Project Development, Controller and Program Offices, will be established to meet as required to resolve implementation difficulties which may arise.

B. Procurement Plan

IICA, CATIE and FHIA will each serve as its own procurement and contracting agent for all commodities, personnel, training and technical assistance to be procured under the Project. The following is a plan for procurement activities to be carried out under the Project, with assistance and guidance from ROCAP as needed. A more detailed plan, including institutional capability, waiver requirements etc., is given in Exhibit E.

Acct. No.	Services Required	Duration	Start Date	Cost ($000)	Procurement Mode
	IICA				
100	Internat'l Personnel				
	Proj. Coord.	2.5 yrs	June 88	135.0	HC/PSC
	T/T Coord.	2.5 yrs	June 88	135.0	HC/PSC
	Inst. Spec.	2.0 yrs	June 88	100.0	HC/PSC
	Audits			7.5	HC/Inst.
400	Equipment		Oct. 87	14.5	HC/P.O.
	CATIE				
100	Internat'l Personnel	various	various	67.5	HC/PSC
100	National Personnel & Adm. Support	various	various	135.0	HC/PSC
400	Equipment, vehicle		Feb. 88	109.5	HC/P.O.
	FHIA				
100	Internat'l Personnel	various	various	70.0	HC/PSC
100	National Personnel & Adm. Support	various	various	231.0	HC/PSC
400	Equipment, vehicle		Feb. 88	60.5	HC/P.O.

C. Evaluation Plan

Over the life of the Project one evaluation will be scheduled. It will occur during the third year of project implementation and will be conducted by independent contractors. The evaluation will be supplemented by periodic joint review meetings (at least annually) between senior level lead institution personnel and ROCAP officials. The objective of the evaluation is to assess the achievements of the cacao network and determine the feasibility of continuing support to this network and expanding to additional networks.

The evaluation will focus on the extent to which institutions have established effective networking relationships for planning and carrying out research and technology transfer/training activities. It will evaluate the adequacy of operational mechanisms which are in place for decision making and project implementation (eg. executive committee, regional advisory committee, national advisory group, relationships among lead institutions and between them and national institutions). In addition it will review the nature and suitability of research, training and other activities conducted under the Project. Given the time required to obtain significant results in research on a crop such as cacao, the evaluation will focus instead on whether lead institutions are effectively involving national programs in research activities, as well as review the level of commitment by the countries for the program. Specific lessons learned regarding this model of research/technology transfer networking will be pointed out for consideration in future networks.

D. Implementation Plan

Year 1

ACTIVITY	MONTH
Project Authorization	September 10, 1987
Project Agreement Signed	September 25, 1987
Establish Project Management office at IICA	October 1987
Initiate international search for project coordinator, training/technology transfer coordinator	November 1987
Initiate equipment purchase for IICA	October 1987
Preparation of 1988 work plan and budget	October, Nov. 1987
CATIE conducts design work for construction at La Lola, and identifies specific equipment needs for these facilities	October, November 1987

ACTIVITY	MONTH
First meeting of Executive Committee	December 1987
All Conditions Precedent to Initial Disbursement fulfilled	December 1987
ROCAP approval of 1988 work plan and budget	January 1988
Initial coordination meeting of lead institution personnel including technical personnel	January 1988
Initiate international search for institutional development specialist	January 1988
CATIE carrys out greenhouse renovation	January 1988
Equipment for IICA arrives	January 1988
CATIE and FHIA design new research experiments and prepare plant material	February-June 1988
CATIE and FHIA initiate contracting of personnel	February 1988
CATIE and FHIA initiate commodity procurement	February 1988
Training programs are initiated	February 1988
Design work completed for construction at La Lola	February 1988
Construction of facilities initiated at La Lola	March 1988
CATIE and FHIA secretarial, data base and other support personnel contracted	March 1988
Quarterly coordination meeting of lead institution personnel	April 1988
Quarterly report submitted to ROCAP	April 1988

ACTIVITY	MONTH
CATIE and FHIA MS research and technical staff assume positions	May 1988
CATIE and FHIA initiate new research trials	June-July 1988
Project coordinator, training/technology transfer coordinator, and institutional specialist assume positions	July/August 1988
Quarterly coordination meeting of lead institution personnel	July 1988
Quarterly report submitted to ROCAP	July 1988
Laboratory, audio-visual, field research equipment and vehicles for FHIA and CATIE arrive	August 1988
Joint review ROCAP/lead institutions	October 1988
Quarterly report submitted to ROCAP	October 1988
Preparation of 1989 work plan and budget	September/October 1988
Construction of facilities at La Lola is completed	November 1988
Second meeting of Executive Committee	November 1988
ROCAP approval of 1989 work plan and budget	December 1988
Year 2	
Coordination meeting of lead institution and technical research personnel	January 1989
Annual report submitted to ROCAP	January 1989
Quarterly meeting of lead institutions	April 1989
Quarterly report submitted to ROCAP	April 1989
Coordination meeting of research scientists	June 1989

ACTIVITY	MONTH
Quarterly meeting of lead institutions	July 1989
Quarterly report submitted to ROCAP	July 1989
Joint review meeting ROCAP/lead institutions	October 1989
Quarterly report submitted to ROCAP	October 1989
Annual work plan and budget prepared	September/ October 1989
Policy conference scheduled in conjunction with Executive Committee meeting	November 1989
Annual work plan approved by ROCAP	December 1989

The third year's implementation plan will include the above major events, as well as identifying detailed activities for research, training/technology transfer and network coordination components. Financial audits will be performed annually. The project evaluation will be scheduled for approximately March 1990.

The institutional Development Specialist completes assignment in July 1990 and submits final report of progress on the establishment and strengthening of National Advisory Groups.

VII. NEGOTIATING STATUS. COVENANTS, AND CONDITIONS

A. Negotiating Status

The design of the Project has been developed in collaboration with three lead institutions (IICA, CATIE, FHIA) and national research institutions of the participating countries. All have endorsed the structure and nature of the project (including project administration, decision-making responsibilities, project components, and respective institutional roles). The primary issues remaining to be negotiated are the overhead rates and lead institution counterpart contributions. It is therefore expected that negotiation of the Project Agreement will be accomplished in a relatively short period of time (approximately three weeks) after authorization of the project.

B. Conditions and Covenants

1. Conditions Precedent to Disbursement

In addition to the standard conditions to initial disbursement, including the designation of official IICA representatives and their authorized signatures, and the establishment of separate bank accounts by each institution, the following conditions and covenants will be included in the Project agreement:

a. First Disbursement

Except as AID may otherwise agree to in writing, the following are conditions precedent to the initial disbursement of AID funds:

(i) Prior to the disbursement, or to the issuance of any commitment documents under the Project Agreement with IICA for anything other than expenditures incurred by IICA for hiring international staff, the establishment of the Project's administration office, travel and per diem costs incurred in Cooperating Countries by IICA, CATIE and FHIA related to the preparation of a time-phased implementation plan and budget, the establishment of an Executive Committee, and the review of the first year's implementation plan/budget by the Executive Committee, IICA will furnish, in form and substance satisfactory to AID.

(a) a signed memorandum of understanding between IICA and the participating countries indicating their interest in and commitment to the Project, and the identification of a representative from national research and extension institutions to serve on the Project's Executive Committee;

(b) signed sub-agreements between IICA and CATIE, and IICA and FHIA identifying respective institutional roles and responsibilities under the project, operational mechanisms, counterpart commitments, and the designation of a representative to serve on the Project's Executive Committee. The sub-agreements shall include procurement and contracting rules, calendar of responsibilities, levels of obligations requiring approval by IICA and AID, and detailed description of the minimum level of program activities which must be maintained during the Project. In the case of CATIE, the minimum program and contribution will include the use of its research and training facilities at Turrialba and at the La Lola cacao research station for the Project, minimum staffing of three senior level researchers, various technical and support personnel, operational funds of approximately current levels to support its ongoing cacao program, and funding of the equivalent of $190,000 in local currency for the construction or renovation of greenhouses at Turrialba, and field office/laboratory, dormitory/classroom, seed processing facility and related infrastructure inprovements at its La Lola research station.

In the case of FHIA, the minimum contribution and program shall include the use of its research and training facilities at its La Lima station and La Masica cacao research station for the Project, minimum staffing of one senior level researcher, various technical and support personnel, and operational funds of approximately current levels to support its ongoing cacao program.

(c) a time-phased implementation plan, approved by the Executive Committee, including a budget, for activities to be carried out at IICA, lead institutions (CATIE and FHIA) and in each country, detailing actions to be taken and procurement arrangements to be made during the first year of the Project including the planned use of pesticides for research purposes.

b. Disbursement of Funds For Select Technology Transfer Activities

Except as AID may otherwise agree to in writing, the following is a condition precedent to the disbursement of

AID funds for technology transfer activities which involve the direct use of pesticides or include information on the use of pesticides:

(i) Prior to the disbursement of funds for technology transfer activities which involve the direct use of pesticides or include information on the use of pesticides IICA will submit any proposed technological packages involving pesticide use to ROCAP, and will obtain the approval of the AID/W LAC/CEO prior to their dissemination under the Project.

2. Covenants:

a) IICA, CATIE and FHIA shall covenant to use their best efforts to ensure continued collaboration on selected project activities and provide the necessary financial resources to sustain project results beyond the life of the Project. This will be reflected in IICA's Sub-Agreements with both CATIE and FHIA.

b) IICA will covenant to ensure that the Project does everything within its power and scope to prevent the conversion of tropical forests to establish cacao plantations. This will be reflected in IICA's Sub-Agreements with both CATIE and FHIA.

c) IICA will covenant to ensure that the manufacturers of the pesticides to be used in the Project 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. This will be reflected in IICA's Sub-Agreements with both CATIE and FHIA.

d) The Parties agree to establish an on-going evaluation program as part of the Project consisting of a tracking and monitoring system of research and technology transfer results of the Project, and an end of project final impact evaluation. Except as the Parties otherwise agree in writing the final evaluation will take place in January 1990. The evaluation program will include:

(1) evaluation of the progress towards attainment of the objectives of the Project;

(2) identification and evaluation of problem areas or constraints which may inhibit such attainment;

(3) assessment of how such information may be used to help overcome such problems; and

(4) evaluation to the degree feasible of the overall development impact of the Project.

e) IICA covenants to provide to A.I.D. each year, in form and substance satisfactory to A.I.D., an implementation plan and budget, approved by the Executive Committee, for that year's activities.

f) IICA covenants to provide to A.I.D. quarterly and annual progress reports that show the consolidated activities of IICA, CATIE, AND FHIA for that quarter as well as actions planned by these institutions for the upcoming quarter.

UNCLASSIFIED STATE 147612/01

EXHIBIT A

ACTION ROCP INFO AMB DCM AID ECON CHRON/5

VZCZCSTO912 (29-MAY-86 TOR: 20:21
CO RUEHGT CN: 23331
DE RUEHC #7612/01 1292017 CHRG: ROCP
ZNR UUUUU ZZH DIST: ROCP
O 2920152 MAY 86
FM SECSTATE WASHDC
TO RUEHGT/AMEMBASSY GUATEMALA IMMEDIATE 9271
INFO RUEHZP/AMEMBASSY PANAMA IMMEDIATE 2329
RUEHGT/AMEMBASSY GUATEMALA IMMEDIATE 9272
RUFETG/AMEMBASSY TEGUCIGALPA IMMEDIATE 3856
RUEHSN/AMEMBASSY SAN SALVADOR IMMEDIATE 2142
RUEHSJ/AMEMBASSY SAN JOSE IMMEDIATE 0476
ET
UNCLAS STATE 147612

AIDAC GUATEMALA FOR ROCAP

E.O. 12356: N/A
TAGS:
SUBJECT: ROCAP REGIONAL AGRICULTURE TECHNOLOGY NETWORKS PROJECT 96-0127)

1. THE BUREAU REVIEWED AND APPROVED THE PID FOR THE SUBJECT PROJECT ON APRIL 7, 1986, PROVISIONAL UPON THE RECEIPT OF CABLES FROM THE BILATERAL MISSIONS. ALL CABLES HAVE BEEN RECEIVED. THE FOLLOWING GUIDANCE IS PROVIDED FOR USE IN PREPARING THE PROJECT PAPER, WHICH THE MISSION IS AUTHORIZED TO APPROVE IN THE FIELD AFTER OBTAINING CONCURRENCE OF THE BILATERAL MISSIONS IN THE REGION.

2. COUNTRY PARTICIPATION. THE PROJECT PAPER SHOULD CLARIFY NON-ROCAP COUNTRY PARTICIPATION EXPECTED IN THE PROJECT. USE OF PROJECT FUNDS FOR NON-ROCAP COUNTRY PARTICIPATION SHOULD BE LIMITED TO NO MORE THAN FIVE PERCENT OF BUDGETED FUNDS AND ONLY WHEN PARTICIPATION IS JUSTIFIED AS NECESSARY TO STRENGTHEN THE RESEARCH PROGRAM AND ENSURE MAXIMUM POTENTIAL BENEFITS TO PARTICIPATING ROCAP COUNTRIES.

3. COUNTRY COMMITMENT. IN RECOGNITION OF THE OPERATING BUDGET CONSTRAINTS FACING NATIONAL AND REGIONAL RESEARCH INTITIES, ROCAP SHOULD ENCOURAGE BILATERAL MISSIONS TO EXPLORE WITH PARTICIPATING COUNTRY GOVERNMENTS THE POSSIBLE PROGRAMMING OF LOCAL CURRENCY GENERATIONS FROM ESF OR PL-480 ASSISTANCE TO SUPPORT ACTIVITIES COMPLEMENTARY TO PROJECT-FUNDED ACTIVITIES.

ROCAP REPRESENTATIVES AGREED TO INCLUDE IN THE PROJECT PAPER A DISCUSSION OF ALL FINANCIAL REQUIREMENTS, AT BOTH THE NATIONAL AND THE REGIONAL LEVELS, FOR A RESEARCH NETWORK TO OPERATE SUCCESSFULLY. THE PROJECT PAPER SHOULD ALSO INCLUDE MEASURES TAKEN OR EXPECTED TO BE TAKEN TO DEMONSTRATE COUNTRY COMMITMENT AND TO ENSURE PROPOSED PROJECT ACTIVITES ARE NOT CONSTRAINED BY LACK OF

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SECONDARY SUPPORT.

4. PROJECT MANAGEMENT. MISSION REPRESENTATIVES DESCRIBED ALTERNATIVE CONTRACTING ARRANGEMENTS FOR PROJECT MANAGEMENT. IT WAS AGREED THAT THE NUMBER OF PROJECT COMPONENTS (RESEARCH NETWORKS) SHOULD NOT EXCEED FOUR. WE FURTHER UNDERSTAND THAT THE PROJECT IS TIME-LIMITED; AID ASSISTANCE WILL NOT BE EXPECTED TO CONTINUE AFTER THE EIGHT-YEAR LIFE OF THE PROJECT.

5. AID SUPPORT. IT WAS UNDERSTOOD THAT THIS PROJECT WOULD BE DISCRETE AND FINITE. IN NO CASE WAS THIS PROJECT TO BE SEEN AS THE FIRST STEP TO A CONTINUOUS AID INVOLVEMENT IN AND SUPPORT FOR THESE NETWORKS. RATHER, AID SUPPORT WOULD CEASE AT PROJECT END, AND THEREAFTER THE NATURE OF THE NETWORKS WOULD DEPEND UPON WHAT THE PARTICIPATING COUNTRIES WERE WILLING TO SUPPORT.

6. RESEARCH PRIORITIES. MISSION REPRESENTATIVES AGREED TO CONSIDER VEGETABLES (FOR EXPORT AS WELL AS FOR LOCAL CONSUMPTION) IN SELECTION OF THE RESEARCH NETWORKS TO BE SUPPORTED UNDER THE PROJECT. THE PROJECT WILL FUND RESEARCH IN MARKETING IN THE LIMITED SENSE OF POST-HARVEST HANDLING AND LOSSES WHERE THIS CONSTRAINT HAS BEEN IDENTIFIED AS A PRIMARY OBSTACLE TO INCREASED PRODUCTION OF A SELECTED RESEARCH COMMODITY.

7. TECHNOLOGY DIFFUSION. SEVERAL MISSIONS HAVE EXPRESSED CONCERN ABOUT HOW THE PROJECT WILL ENSURE THAT RESEARCH RESULTS ARE DISSEMINATED TO FARMERS GIVEN THE WEAKNESSES AND CONSTRAINTS IN THE EXISTING EXTENSION INFRASTRUCTURE. DURING INTENSIVE REVIEW, THE MISSION IS REQUESTED TO SPECIFICALLY ADDRESS THIS ISSUE.

8. PRIVATE SECTOR INVOLVEMENT. ROCAP REPRESENTA -VES CLARIFIED THE MISSION'S INTENTION TO INCLUDE PRIVATE SECTOR ENTITIES AS PARTICIPANTS IN THE RESEARCH NETWORKS. ALSO, TO ENCOURAGE PROJECT SUSTAINABILITY, IT WAS AGREED THAT THE PROJECT DEVELOPMENT TEAM WOULD EXAMINE THE FEASIBILITY OF CHARGING USER FEES IN APPROPRIATE INSTANCES (PARTICULARLY IN THE CASE OF PRIVATE SECTOR, FOR-PROFIT ENTITIES, SUCH AS AGRICU TURE INPUT DISTRIBUTORS).

9. ENVIRONMENTAL IMPACT. THE CATEGORICAL EXCLUSION FOR RESEARCH ACTIVITIES INCLUDED IN SECTION 216.2(C)III OF AID ENVIRONMENTAL PROCEDURES DOES NOT NECESSARILY APPLY WHEN PESTICIDES ARE PROCURED OR USED. SINCE SOME PROJECT FUNDS ARE EXPECTED TO BE USED FOR PESTICIDES IN QUO E ON-FARM UNQUOTE TRIALS, MISSION REPRESENTATIVES AGREE TO INCLUDE APPROPRIATE LANGUAGE IN THE PROJECT AGREEMENT(S SETTING FORTH THE MISSION AND THE GRANTEE'S UNDERSTAND NG

THAT PROJECT FUNDS WOULD NOT BE USED FOR PROCUREMENT OR USE OF PESTICIDES WITHOUT FIRST CARRYING OUT AN ENVIRONMENTAL ASSESSMENT TO BE REVIEWED AND APPROVED IN AID/W.

10. BILATERAL MISSION SUPPORT. PID APPROVAL WAS PROVISIONAL UPON RECEIPT OF SUPPORTING CABLES FROM THE BILATERAL MISSIONS. SINCE SOME MISSIONS HAVE EXPRESSED RESERVATIONS, OR CONCURRENCE WITH THE PID PROVISIO.A UPON THE SELECTION OF RESEARCH COMMODITIES, ROCAP IS REQUESTED TO OBTAIN CONCURRENCE OF ALL MISSIONS BEFORE AUTHORIZING THE PROJECT PAPER. SHOULD ANY BILATERAL MISSION IN THE REGION NOT CONCUR WITH THE PROJECT, PLEASE ADVISE AID/W BFORE AUTHORIZING.

11. PAYMENT VERIFICATION. THE MISSION IS REMINDED THAT ALL PROJECT PAPERS MUST FOLLOW THE GUIDANCE PROVIDED ON PAYMENT VERIFICATION POLICY PROVIDED BY AA/M TO MISSION DIRECTORS ON DECEMBER 30, 1983, PARTICULARLY PP. 6-8, WHICH DEAL SPECIFICALLY WITH PROJECT PAPERS.

12. GRAY AMENDMENT. GRAY AMENDMENT POLICIES SHOULD BE CAREFULLY CONSIDERED DURING PP PREPARATION. A P-A. FOR THE UTILIZATION OF MINORITY-AND WOMEN-OWNED BUSNESS S SHOULD BE PRESENTED IN THE PP.

13. STATUTORY CHECKLISTS. THE PROJECT PAPER SHOULD INCLUDE THE APPROPRIATE STATUTORY CHECKLISTS IN ACCORDANCE WITH GUIDANCE PROVIDED TO THE MISSIONS IN A MEMORANDUM FROM GC/LAC DATED JANUARY 30, 1986. ARMACOST

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REGIONAL AGRICULTURE TECHNOLOGY NETWORKS
(596-0127)

LOGICAL FRAMEWORK

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
GOAL:			
To increase production of cacao and to increase small and medium farm income	1. New plantings of cacao use improved plant material & production technologies 2. Cost of production is reduced 3. Yield of cacao/ha is increased	National Records MAG Records	1. National policies and socio-economic structures do not inhibit adoption of technologies 2. World prices remain at adequate levels to justify technology adoption. 3. National infrastructure and support services adequate to meet input and marketing needs
PURPOSE:			
To improve the quality of and access to agricultural research in the CA/P region through the establishment of regional technology development and transfer networks in cacao	1. Network research results are integrated into national research and extension programs 2. Research being conducted in member countries is complementary and not duplicative 3. On-farm validation trials effectively involves extension and research personnel in member countries 4. Regional and national research and extension institutions are more capable of designing and implementing programs 5. Countries policies for cacao production reflect concerns of national and regional advisory groups	Evaluation Evaluation Evaluation Evaluation Evaluation	1. National institutions are able to accomodate extension/research linkages 2. National programs maintain adequate levels of resources in research and extension programs 3. National institutions perceive benefits from regional collaborative approach.
SUBPURPOSE:			
To learn more about the mechanisms, requirements, and feasibility of collaborative commodity-based research and technology transfer networks in CA/P region			

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
OUTPUTS:			
Cocoa Network			
1. Network of research, extension and support institutions established and operational	1a. Research and training priorities established and reviewed annually. b. Annual workplans and budgets prepared and approved. c. Coordination meetings of lead institutions held quarterly d. Technical conferences of cacao professionals from all member institutions held semiannually e. Technical interchange facilitated through intervisiting, informal communications, personal contacts f. Publications, newsletters, etc disseminated g. Policy and donor conferences held biannually h. National and regional advisory groups are operational	1a. Project reports b. Project workplans c. Minutes, AID attendance d. Reports e. Reports f. Publication g. AID attendance	1a, b, c, d, e, f. National and lead technical institutions from regional collaborative approach. 1d, c. National institutions identify personnel to participate in technical interchange and conferences. 1g. Government policy makers and donors demonstrate an interest in cacao program.
2. Research			
a. Disease resistant, high yield varieties tested and germplasm produced and distributed	a1. Clonal gardens in each country established (approx. 2HA/country)with best clones and producing at least 200,000 seeds/yr/country. a2. At least 2 replicated experiments in different ecological conditions in each country for major diseases a3. At least one replicated regional experiment for witches broom in each cooperating country	a1. Project report, eval., field visits a2. Project report, eval., field visits a3. Project report, eval., field visits	2a1, a2, a3, a4. National institutions are willing to collaborate in establishing trials and clonal gardens. 2a6. IICA, CATIE and FHIA collaborate in developing data bank.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
	a4. At least 30 crosses with resistance to two major diseases produced and testing initiated in regional experiments	a4. Project report, eval., field visits	
	a5. Sample processing facility built and used to evaluate germplasm quality	a5. Project report, eval., field visits	
	a6. Data bank maintained	a6. Project report, eval.	
b. Disease control research conducted	b1. At least 20 fungicides screened	b1. Project report, eval., field visits	2b. National institutions are willing to collaborate in establishing trials.
	b2. At least 5 fungicides being tested in regional trials	b2. Project report, eval., field visits	
	b3. At least 3 regional trials of sanitation practices	b3. Project report, eval., field visits	
	b4. Epidemiological studies completed	b4. Project report, eval.	
c. Economic and agronomic evaluation of cultural practices conducted	c1. At least 5 experimental trials completed at FHIA	c1. Project report, eval., field visits	2c1, c2, c3. National institutions are willing to collaborate in establishing trials.
	c2. At least 10 regional trials and validation tests conducted	c2. Project report, eval., field visits	
	c3. Research results included in publications and training	c3. Project report, eval.	2c4. IICA, CATIE and FHIA collaborate in developing ecological analogues.
	c4. Ecological analogues developed	c4. Project report, eval.	
3. Training and Technology Transfer			
a. Training materials and publications produced and distributed	3a1. Materials available in each participating country	3a1. Project report, eval.	3a, b. National institutions are willing to collaborate in extension materials development.
b. Technology transfer campaigns designed	3b1. 3 studies completed	3b1. Project report, eval.	
	3b2. Prototype extension campaign designed and tested	3b2. Project report, eval.	
	3b3. Extension materials developed and incorporated into training	3b3. Project report, eval.	

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
c. Training conducted	3c1. One week initial courses held for extensionists and researchers in cacao production	3c1. Project report, eval.	3c. National institutions identify individuals for training
	3c2. One week specialized courses held for extensionists and researchers	3c2. Project report, eval.	
	3c3. Approximately 20 researchers & 25 extensionists trained	3c3. Project report, eval.	
	3c4. National courses in extension held each year assisted by Project	3c4. Project report, eval.	
	3c5. At least 5 people do in-service training with lead institutions	3c5. Project report, eval.	
	3c6. At least 2 lead institution staff trained at Radio Netherlands in broadcast media usage	3c6. Project report, eval.	

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
INPUTS: ($000)			
1. AID		1. ROCAP Accounting Records	1. Inputs will be provided on schedule.
Technical assistance	515.0		
Personnel	366.0		
Travel Per diem	219.0		
Conferences	123.0		
Publications	77.0		
Supplies, Operating Expenses	314.2		
Equipment	124.5		
Vehicles	60.0		
Regional Trials	171.0		
Training	158.0		
Overhead	200.9		
Contingency	116.4		
Studies, Evaluation	55.0		
TOTAL	2,500.0		
2. IICA (a)		2. IICA Accounting Records	2. Inputs will be provided on schedule.
Administrative Personnel	75.0		
3. CATIE (b)		3. CATIE Accounting Records	3. Inputs will be provided on schedule.
Senior Technical Personnel	360.0		
Construction	190.0		
Operational Support	240.0		
Sub-total CATIE	790.0		
4. FHIA (b) on		4. FHIA Accounting Records	4. Inputs will be provided schedule.
Technical Personnel	240.0		
Operational Support	360.0		
Sub-total FHIA	600.0		
PROJECT TOTAL	3,647.0		

(a) IICA will also contribute various support facilities and infrastructure that are not quantified here: offices, equipment, utilities, transportation in Costa Rica.

(b) CATIE and FHIA will also contribute various support facilities and infrastructure that are not quantified here: offices, laboratories, research farms, equipment, computing services, documentation and publication services.

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EXHIBIT C

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Pirie M. Gall, PPD

DATE: 10/28/87

FROM : Gordon Straub, RADO

SUBJECT: Request for Assistance for Regional Agricultural Technology Networks Project (595-0127)

IICA has been actively promoting technology generation and transfer networks in the CAP region for over 40 years. The IICA Division of Technology Generation and Transfer has worked closely with ROCAP since early 1987 in analyzing potential areas for network development, assessing alternative means for structuring such a network, soliciting financial and organizational support, and developing proposals.

In recognition of IICA's interest in this area, ROCAP signed a Limited Scope Grant Agreement with IICA on September 26, 1986 to conduct a major feasibility study for a commodity based network, which included an analysis and prioritization of crops and a proposal for an organizational structure. As part of this LSGA, IICA also sponsored two meetings with directors of agricultural research from all of the countries in the region to review the study findings and assist ROCAP in project design. The first of these meetings was held on June 1 and 2, 1987 and the second was on August 1, 1987. As a direct result of IICA's work and active promotion of the idea, the project was subsequently designed and signed.

We consider that IICA's work and enthusiastic promotion of this project over the past year constitute a request for project assistance which is adequate to meet AID requirements for the PP, and that this summary of events should be inserted in the PP in lieu of a letter requesting assistance.

DETAILED BUDGET TABLES

AGRICULTURE TECHNOLOGY NETWORKS PROJECT

Component	Year 1	Year 2	Year 3	TOTAL
NETWORK MANAGEMENT				
IICA				
LT TA, Proj Coordinator	35.0	50.0	50.0	135.0
LT TA, Institutional Expert	35.0	50.0	15.0	100.0
Admin Support Personnel (asst, sec) (1)	0.0	0.0	0.0	0.0
Coordinator travel/perdiem (2)	13.0	13.0	13.0	39.0
Institutional Expert Travel/perdiem	12.0	18.0	6.0	36.0
Coordination Meetings (3)	31.0	31.0	31.0	93.0
Intervisiting Reg + Int (4)	18.0	18.0	18.0	54.0
Publications and Reports	2.0	2.0	2.0	6.0
Supplies, operating expenses, tele, stamps	10.0	10.0	10.0	30.0
Equipment (computer)	4.0	0.0	0.0	4.0
Vehicles	0.0	0.0	0.0	0.0
Policy Conferences (5)	15.0	0.0	15.0	30.0
Audits (6)	2.5	2.5	2.5	7.5
Studies/Operating Support for NAG(7)	12.0	12.0	12.0	36.0
CATIE - photocopies, infor exchange				
Bibliography (8)	11.0	0.5	0.5	12.0
Purchase publications, photocopies	5.0	5.0	5.0	15.0
Data Entry clerk	6.0	0.0	0.0	6.0
Audit (6)	2.5	2.5	2.5	7.5
FHIA - publications, copies	2.3	2.3	2.1	6.7
Audit (6)	2.5	2.5	2.5	7.5
AID-Studies, evaluation (9)	35.0	0.0	20.0	55.0
SUBTOTAL NETWORK MANAGEMENT	253.8	219.3	207.1	680.2

(1) IICA will provide office furniture, Admin Asst, Sec
(2) 6 trips @ $600, 100 days @ $60/
(3) Exec Comm Annual 18 people @$300/trip, 3 days @ $80 x 18 =9,720
Technical Meetings 2/year, 8 trips @ $300, 3 days @80 each = 9640
Lead Inst Coordination 4X, 6 trips @ $300, 3 days @ $80 =12,900
(4) 3 people/year, intl trips @ $2,000 each, 14 days @ $100 = 10200
Regional visiting 8 people, $300/trip, 8 days @$80 = 7520
(5) 25 people, $200/trip, 3days @ $60/day, = 14500
(6) Audits $2,500/yr/institution
(7) Studies $2,000/country/yr for support to national advisory groups
(8) Yr 1 includes computer, supplies
(9) Study for subsequent networks yr 1 and eval. yr 3

RESEARCH GERMPLASM IMPROVEMENT RESEARCH	Year 1	Year 2	Year 3	TOTAL
ST Technical Assistance (1)	7.5	7.5	7.5	22.5
Technical and support personnel (2)	30.0	30.0	30.0	90.0
Laborers (3)	1.0	1.0	1.0	3.0
Administrative Supplies/maint (4)	5.0	5.0	5.0	15.0
Staff Travel/perdiem (5)	8.0	5.0	5.0	18.0
Supplies (lab/greenhouse)	5.0	6.0	6.0	18.0
Equipment (6)	77.0	0.0	0.0	77.0
Vehicles (2 4wd pickup)	30.0	0.0	0.0	30.0
Operating Expenses (7)	20.0	20.0	20.0	60.0
Regional Trials (8)	15.0	9.0	9.0	33.0
SUBTOTAL GERMPLASM	158.5	83.5	83.5	325.5

(1) short term specialists, 1pa @ $7,500 per
(2) MS Assist plant breeder, 18,000, Field assist. @ 10,000/yr.
data clerk @ $6,000/yr.
(3) Field labor support

(4) Vehicle fuel/maint @4,000, off supplies, 2000, facil main 3000
(5) To set up regional trials, year 1, 5 visits/trial,
2 trials/country. Year 2-4, 2 visits/trial, Year 4+, 3 visits/trial
Yr 1, 5 trips @ $800, 50 days @ $80 = 800
Yr 2, 2 trips @ $820, 24 days @ $80 = 3520, Yr 3 4300
in country trave. with lodging @ 10 days @ $40
(6) Computer, lab & field research equipment, tractor
(7) Vehicle fuel/maint @4000, greenhse and field supplies, tractor costs
(8) 1 research trial/country, 6 countries, $2300 Yr 1, $1500 Yr 2+

DISEASE CONTROL RESEARCH	Year 1	Year 2	Year 3	TOTAL
ST Technical Assistance (1)	7.5	7.5	7.5	22.5
Technical & Support Personnel (2)	12.0	12.0	12.0	36.0
Administrative/operating expenses	13.0	13.0	13.0	39.0
Staff Travel/perdiem	5.0	5.0	5.0	15.0
Supplies	4.0	4.0	4.0	12.0
Equipment (3)	24.0	0.0	0.0	24.0
Regional Trials (4)	18.0	9.0	18.0	45.0
SUBTOTAL DISEASE CONTROL	83.5	50.5	59.5	193.5

(1) 1 pm advisory pathologist
(2) 2 field assistants @ 6000 ea
(3) Field research equip.
(4) 1 research trial/country (6) @ 3000 yr 1 and 1,500 yr 2+
1 validation trial/country @ 1500 Yr1, 10000 yr 2+, start yr 3

CULTURAL PRACTICES RESEARCH	Year 1	Year 2	Year 3	TOTAL
ST Technical Assistance (1)	7.5	7.5	7.5	22.5
Technical and Support Personnel (2)	42.0	42.0	42.0	126.0
Tech Dept Support (3)	35.0	35.0	35.0	105.0
Operating/admin expenses (4)	19.0	19.0	19.0	57.0
Staff Travel/perdiem (5)	7.0	7.0	7.0	21.0
Supplies	8.5	8.5	8.5	25.5
Equipment (6)	20.0	0.0	0.0	20.0
Vehicles (7)	30.0	0.0	0.0	30.0
Regional Trials (8)	30.0	30.0	30.0	90.0
SUBTOTAL CULTURAL PRACTICES	199.0	149.0	149.0	497.0
SUBTOTAL RESEARCH COMPONENT	441.0	283.0	292.0	1016.0

(1) 1pm/year 7,500
(2) 2 MS Agr @ 18,000ea, 1 Field assist @ 6000ea
(3) Includes commun, disciplines, lab support
(4) vehicle opera, insur,supple, maint
(5) 3RT @ 800, 50 days @ 80, 10 days @ 40 (Hond)
(6) soil class, computer, tractor,
(7) 2 4WD pickup
(8) 2 valid trials/country (6) yr1 1,500, yr2+ 1000
1 research trial/country, yr 1 3000, yr 2+ 1500

TRAINING AND TECHNOLOGY TRANSFER	Year 1	Year 2	Year 3	TOTAL
IICA				
LT TA, Training/Transfer Coordinator	35.0	50.0	50.0	135.0
Trainer travel/per diem	6.0	7.0	8.0	21.0
Equipment	10.5	0.0	0.0	10.5
SUBTOTAL IICA TECH. TRANSFER	51.5	57.0	58.0	166.5
CATIE				
Equipment	1.5	0.0	0.0	1.5
SUBTOTAL CATIE TECH. TRANSFER	1.5	0.0	0.0	1.5
FHIA				
ST Technical Assistance	10.0	10.0	5.0	25.0
Material Production	10.0	10.0	5.0	25.0
Equipment	1.5	0.0	0.0	1.5
SUBTOTAL FHIA TECH. TRANSFER	21.5	20.0	10.0	51.5
SUBTOTAL TECH. TRANSFER COMPONENT	74.5	77.0	68.0	219.5
TRAINING				
IICA				
ST Technical Assistance	0.0	0.0	0.0	0.0
Equipment	0.0	0.0	0.0	0.0
Trainee Travel/perdiem	28.0	42.0	48.0	118.0
Staff Travel/perdiem	1.0	1.0	1.0	3.0
Materials and Publications	1.0	0.0	0.0	1.0
InService Training at Lead Inst.	10.0	10.0	10.0	30.0
Radio Math training	5.0	5.0	0.0	10.0
SUBTOTAL IICA TRAINING	45.0	58.0	59.0	162.0
CATIE				
ST Technical Assistance	5.0	5.0	5.0	15.0
Staff Travel/perdiem	2.0	2.0	2.0	6.0
Materials and Publications	2.0	10.0	10.0	22.0
Equipment	9.0	0.0	0.0	9.0
SUBTOTAL CATIE TRAINING	18.0	17.0	17.0	52.0
FHIA				
ST Technical Assistance	5.0	5.0	5.0	15.0
Staff Travel/perdiem	2.0	2.0	2.0	6.0
Materials and Publications	10.0	10.0	3.0	23.0
Equipment	7.0	2.0	0.0	9.0
SUBTOTAL FHIA TRAINING	24.0	19.0	10.0	53.0
SUBTOTAL TRAINING COMPONENT	87.0	94.0	86.0	267.0
Subtotal Training/Tech. Transfer	161.5	171.0	154.0	486.5
PROJECT SUBTOTAL	856.3	673.3	653.1	2182.7

EXHIBIT E

PROCUREMENT PLAN

A) Procurement & Contracting Capability of IICA, CATIE and FHIA

IICA, CATIE and FHIA will each serve as its own procurement and contracting agent for all commodities, personnel, training and technical assistance to be procured under the project following procedures outlined in Handbook 11 for Host Country procurement. Assistance and guidance will be provided by ROCAP as needed.

IICA has considerable experience in the implementation of AID funded projects including those funded by ROCAP (eg. the ongoing Coffee Pest Control Project and the Agricultural Secretariat Project which ended in 1985). IICA has satisfactorily handled both international and local procurement of goods and services under these projects, and has a good understanding of AID regulations for Host Country procurement.

CATIE is currently implementing four large ROCAP funded projects (Tropical Watershed Management, Integrated Pest Management, Agricultural Higher Education and Tree Crop Production), and has a long history of carrying out AID projects (eg. previous ROCAP projects included Small Farm Production Systems, and Fuelwood and Renewable Energy) which include substantial levels of international and local procurement of goods and services. Several CATIE personnel have received training from the ROCAP procurement specialist regarding AID regulations for procurement of goods and services. In addition, ROCAP has assisted CATIE in preparing more complex procurement documents and advertizing procurement requirements in the AID Bulletin and Commerce Buisness Daily. Recent projects have also used the services of Procurement Services Agents for complex procurements. ROCAP considers CATIE, working in close coordination with ROCAP, to have enough understanding of AID regulations to handle both international and local procurement under host country contracting.

FHIA receives substantial support from USAID/Honduras under the Honduran Research Foundation project (eg. $20 million, ten year project for institutional support which began in 1985). That project includes significant amounts of international and

local procurement of goods and services. The agricultural technologies networks project is the first ROCAP project to include FHIA as an implementing institution. ROCAP will therefore work closely with FHIA personnel in developing more complex procurement documents and advertizing procurement requirements in the U.S. This assistance by ROCAP, along with FHIA's experience with AID regulations for Host Country procurement under the USAID/Honduras supported project will enable FHIA to satisfactorily carry out procurement actions under the cacao network.

B) Procurement Requirements

A listing of the major procurement of goods and services to be done under the Agricultural Technologies Networks Project (cacao network) including estimated initiation date, procurement mode and cost is presented below. A narrative description, detailed list of equipment, and indication of whether dollar or local currency funding is also given. A more detailed procurement plan will be prepared by the three institutions in conjunction with the submission of the first annual work plan and budget.

Acct. No.	Services Required	Duration	Start Date	Cost ($000)	Procurement Mode
	IICA				
100	Internat'l Personnel				
	Proj. Coord.	2.5 yrs	June 88	135.0	HC/PSC
	T/T Coord.	2.5 yrs	June 88	135.0	HC/PSC
	Inst. Spec.	2.0 yrs	June 88	100.0	HC/PSC
	Audits			7.5	HC/Inst.
400	Equipment		Oct. 87	29.5	HC/P.O.
	CATIE				
100	Internat'l Personnel	various	various	67.5	HC/PSC
100	National Personnel & Adm. Support	various	various	135.0	HC/PSC
400	Equipment, vehicle		Feb. 88	109.5	HC/P.O.
	FHIA				
100	Internat'l Personnel	various	various	70.0	HC/PSC
100	National Personnel & Adm. Support	various	various	231.0	HC/PSC
400	Equipment, vehicle		Feb. 88	60.5	HC/P.O.

I) Technical Assistance

A) IICA

The project will finance three long-term specialists: a project coordinator and a training/technology transfer coordinator for approximately 32 months each, and an institutional development specialist for 24 months. Estimated annual budget for each position is $50,000 including salary,

benefits, cost of recruitment and repatriation. These positions will be dollar funded.

B) CATIE and FHIA

Various consultants will be contracted to assist CATIE and FHIA on research and training/technology transfer components. Estimated monthly cost of each consultancy including travel, per diem, honorarium and miscellaneous costs is $7,500. These positions will be dollar funded.

C) IICA, CATIE and FHIA

An annual audit of each institution will be done by a local auditing firm. The estimated cost is $2,500/year for each institution, funded in local currency.

II) National Personnel & Administrative Support

A) IICA

IICA will provide a full-time administrative assistant and secretary to work on the project. No project funds are budgeted for support personnel.

B) CATIE

The project will finance the following positions for three years: an MS level assistant plant breeder ($18,000/yr), field assistant ($6,000/yr) and data entry clerk ($6,000/yr) under the germplasm research component; and two field assistants ($6,000/yr each) under the disease control research component. In addition, a data entry clerk will be funded for one year ($6,000) to set up CATIE's bibliographic data base for cacao. These positions will be funded in local currency.

C) FHIA

The project will finance two MS agronomists ($18,000/yr each) and one field assistant ($6,000/yr) for three years under the cultural practices research component. In addition, the project will provide $35,000/yr for three years to FHIA for support services provided by its technical departments, communication division, and analytical units (ie. soil and plant analysis, computer center) to the project. These positions will be funded in local currency.

III) Equipment

A) IICA

1) One microcomputer and printer	4,000
2) Seven VCR/monitors at $1,500 (one for IICA and one for each country)	10,500
IICA TOTAL	14,500

The equipment for IICA, if available locally as shelf item procurement, will be funded in local currency. Items unavailable as shelf items will be dollar funded.

B) CATIE

1) Two four-wheel drive pickup trucks	$ 30,000
2) One microcomputer and printer (library)	4,000
3) Research Equipment (germplasm improvement)	
a) Two microcomputers and printers	8,000
b) One 35 HP tractor & accesories	6,000
c) Laboratory equipment for La Lola research station (to be defined at later date)	7,500
d) Seed processing equipment	5,000
e) Moisture tester	1,000
f) Soil shreader	2,500
g) Seed sample dryer	3,000
4) Research equipment (disease control)	
a) Hygrothermographs (4) at $600	2,400
b) Spore traps (2) at $2,250	4,500
c) Sprayers (5) knapsack at $150	750
d) Sprayers (3) motorized backpack at $700	2,100
e) Clechophoresis & attachments	4,250
f) Pathology lab. equipment La Lola (to be detined at a later date)	10,000
5) One VCR/monitor	1,500
6) Audio visual training equipment	9,000
CATIE TOTAL	$101,500

Vehicles and equipment, if available for shelf item procurement, will be funded in local currency. Items unavailable as shelf items will be dollar funded.

C) FHIA

1) Two four-wheel drive pickup trucks	$ 30,000
2) Research equipment (cultural practices)	
a) One microcomputer and printer	4,000
b) One 12-15 HP tractor & accessories	11,500
c) Soil classification equipment	2,000
d) Soil shreader	2,500
3) One VCR/monitor	1,500
4) Audio visual training equipment	9,000
FHIA TOTAL	60,500

Vehicles and equipment, if available for shelf item procurement, will be funded in local currency. Items unavailable as shelf items will be dollar funded.

C. Gray Amendment Opportunities

The principal Gray Amendment opportunities under the project will be for minority and small business consulting firms to participate as sub-contractors of IICA, CATIE or FHIA, as short-term consulting assignments as specified in the Procurement Plan. These contracts will include a variety of assignments related to cacao production and general agricultural technology transfer, as well as socio-economic analysis.

D. Waivers

The Project will be grant funded from DA funds, therefore source/origin/nationality is restricted to Geographic Code 000 for foreign exchange costs and CACM countries for local currency costs. However, the contracting of the international personnel to provide long-term and short-term technical assistance requires the technical capabilities of Spanish speaking individuals with expertise in cacao who may not be available from the United States and CACM countries. Moreover, the scientific institutional networking nature of the project makes it extremely important that strong linkages be established by the Project with countries with cacao programs outside the Central America, Belize and Panama region. The CA/P region has limited expertize in cacao production and cacao research. In many CA/P countries cacao is considered a non-traditional crop, and as a result only limited funding has been provided to date in the region for cacao research, training and extension efforts. As the CA/P countries expand their efforts in cacao research, extension and marketing it is crucial that they have

access to and benefit from the experience of countries having more advanced cacao programs. The importance of developing such scientific linkages was clearly shown by a recent evaluation of the ongoing ROCAP-funded Coffee Pest Control Project, which showed that through the Project's collaboration with coffee research programs in various parts of the world, dramatic progress in developing disease resistant varieties was achieved which would not have been possible by working in isolation. Major cacao producers in the hemisphere including the Dominican Republic, Brazil, Ecuador, Colombia, Venezuela, Mexico and Caribbean countries should be linked to the project and can provide needed technical assistance. Linkages should also be established with major cacao producing countries outside the hemisphere (ie. Ivory Coast, Ghana, Malaysia) to obtain plant materials and improved production technologies.

Handbook I, Supplement B, Section 5B 10a (1) allows for the authorization of a waiver to authorize a different geographic code or include additional suppliers based on, among other criteria, "such other circumstances as are determined to be critical to the achievement of project objectives". This criteria is met here. The estimated cost of the international long and short-term technical assistance is $500,000. In accordance with Redelegation of Authority 754, the Mission Director has the authority to change the authorized Geographic Code for the nationality of suppliers of services for up to $5 million per transaction. Given the above, the Project Authorization will indicate that the authorized nationality for technical assistance will be Geographic Code 000, CACM and other free world Latin American/Caribbean countries.

It is anticipated that certain required specialized laboratory, field research and audio visual equipment may be unavailable from Geographic Code 000. However, it is not possible at this time to determine which specific items may require source/origin waivers. Therefore, source/origin waivers will be sought on a case by case basis for the procurement of materials and equipment as required.

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Exhibit F
Project No.596-0127
LAC/DR IEE No.87-36

INITIAL ENVIRONMENTAL EXAMINATION

Project Country	:	Central America and Panama Regional (CA/P)
Project Title and Number:		Regional Agricultural Technology Networks (596-0127)
Life of Project	:	3 years (FY'87-90)
Funding	:	$2.5 million (Grant)
IEE Prepared by	:	Frank Zadroga, REMS/ROCAP
Date	:	August 25, 1987
Recommended Threshold Decision	:	Negative determination based on the implementation of the mitigative measures established in this IEE; deferred determination for the specific technical packages that include the use of pesticides which will be analyzed for environmental impact after they are developed and before they are extended to producers for commercial application.
Concurrence	:	Nadine Hogan, Mission Director, ROCAP — Date 9/30/87

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

Exhibit F
LAC-IEE-87-36

ENVIRONMENTAL THRESHOLD DECISION

Project Location	:	ROCAP
Project Title	:	Regional Agriculture Technology Networks
Project Number	:	596-0127
Funding	:	$2,500,000
Life of Project	:	Three years
IEE Prepared by	:	Frank Zadroga ROCAP/San Jose
Recommended Threshold Decision	:	Negative Determination/Deferred Determination
Bureau Threshold Decision	:	Concur with Recommendation
Comments	:	None
Copy to	:	Nadine Hogan, Director ROCAP/Guatemala
Copy to	:	Frank Zadroga, RBMS ROCAP/San Jose
Copy to	:	Gordon Straub, RADO ROCAP/San Jose
Copy to	:	Donald Boyd, LAC/DR/CEN
Copy to	:	IEE File

James S. Hester Date SEP 25 1987

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

I. Project Description

The goal of the project is to increase the production of food and export crops and to increase small and medium farm incomes in CA/P.

The project purpose is to improve the quality of and access to agricultural research in CA/P through the establishment of regional collaborative technology development and transfer networks in several selected crops over the life of the project.

Project outputs are limited to a Phase I pilot effort which will establish a regional cacao network; other networks are expected to be designed and implemented during subsequent phases subject to funding availability and based on an evaluation of the cacao network after approximately two years of implementation. Activities of the cacao network are organized under three major components. 1) The pilot project will fund the establishment and operation of a network of research, extension and support institutions. The principal institutions involved are IICA, CATIE and FHIA. Specific strengthening activities will entail network administration and organization, meetings, technical conferences and information exchange. 2) Cacao research will be conducted on major problems related to cacao production, economics of production and post-harvest handling. Specific technologies to be developed are disease resistant high yield varieties (tested, produced and distributed), disease control, economic and agronomic evaluation of production practices, and data base development. 3) Finally, the project will carry out training, communication and technology transfer. The transfer activity will be aimed at the adoption of improved production technologies and the results of the project research component.

Project Area

The pilot project will be implemented by the regional agricultural institutions IICA and CATIE and FHIA (Honduran Agricultural Research Foundation). Research will be conducted under controlled conditions at the experiment stations of CATIE and FHIA. Field testing will be conducted in low altitude cacao producing regions of Central America, predominantly in the Atlantic Coastal plane, where there are an estimated 17,200 cacao producers and a total of approximately 43,500 hectares in cacao.

In Central America, cacao is produced in lowland regions with a relatively uniform annual rainfall distribution, normally between sea level and 800 meters in altitude. A few areas where cacao appears to be successful also occur in the Pacific lowlands, such as on the Osa Peninsula of southeast Costa Rica.

Topography is generally flat to rolling and cacao does best on deep, fertile well drained alluvial and/or volcanic soils along rivers and coastal areas. Irrigation is not needed since cacao requires high and relatively uniform rainfall somewhere between 40 and 200 inches per year, and fewer than three effective dry months. These environmental conditions generally translate into Tropical Moist to Wet Forest life Zones (according to the Holdridge ecological classification system). Cacao plantations are generally developed in forest lands, and constitute an understory under some other tree/shade species.

Environmental Consequences

Network Building

The network establishment/promotion component encompasses activities that do not have a significant effect on the natural or physical environment. This component qualifies for a categorical exclusion based on AID environmental procedures Section 216.2(c)(i) and (iii).

Cacao Research

The research component of the project will carry out investigation, field trials and field evaluations for small experimental areas and under carefully monitored conditions. Cacao research activities that directly or indirectly effect the environment will include: the development, testing, production, and distribution of new disease resistant and high yield varieties of cacao; and the development and testing of disease control technologies, including the use of chemical, biological and cultural practices. Pesticides would be procured and utilized on an experimental basis.

The research component would qualify for categorical exclusion per 216.2(c)(i)(iii). Both IICA and CATIE have developed research and monitoring capabilities under previous USAID/ROCAP projects, such as the Regional Coffee

Pest Control Project (596-0090), and it is reasonable to assume that the same level of professionalism will be developed for this project. FHIA has three years of experience with USAID/H funding under the Agricultural Research Foundation Project (No.522-0249), a 10 year, $20 million project. Likewise, it is reasonable to expect careful control and monitoring of research activities from FHIA. Pesticide procurement and use by the specialized project personnel of IICA, CATIE and FHIA qualifies for exemption to pesticide procurement per 216.3(b)(2)(iii).

Cacao Technology Transfer

Specific cacao pest control and production technologies will be transferred to the CA/P countries by project personnel via research and demonstration, as well as through training publications, extension materials and limited on-farm validation trials.

Since specific production and pest control technologies, including cultural practices, pesticides and improved plant materials, will be applied at a very limited scale (approximately 2 validation trials/country/year) by non-project personnel the potential exists for significant environmental and human health impacts, especially resulting from pesticide use. Pesticides could be transported through or stored in agroecosystems in various forms and ways, including in soils, in water (via runoff, streams or ground water) and in non-target organisms, (plants and animals), and could constitute downstream or foodchain risks. Residues of systemic pesticides could also occur in cacao beans and lead to export/marketing and quality control problems.

Regarding cultural practices and the promotion of cacao production, the potential exists for partial or total cutting of tropical forests for cacao plantation establishment. Cacao requires partial shade, and plantation establishment in natural forest would require cutting of understory vegetation and probably a thinning of overstory canopy vegetation. Alternatives to primary natural forest cutting exist since cacao can be established in secondary forests or as artificial plantations together with shade trees on cleared lands. Although with cacao plantations a protective tree/vegetative cover is retained, the loss of native plant and animal species and a consequent reduction in the biological diversity of the

site is inevitable when primary natural forest is affected. This impact is greatly reduced when cacao plantations are established in secondary forests or on cleared lands.

Although improper cultural practices could lead to soil erosion, especially from access roads and trails, the tree crop/agroforestry nature of cacao plantations, when properly managed, is protective against soil erosion.

Indirect Environmental Consequences

Since the project is designed to promote cacao planting by small and medium sized farmers as well as to control cacao diseases and make new technologies and improved plant varieties available to help with production and disease control, it is expected that the project will have a net positive environmental impact in the long run. Cacao is a tree crop and, if properly managed and located, is sustainable. As part of the project, existing chemical and cultural practices, such as plant density and the use of shade, will be adapted to fit the small farmer enterprise and are expected to help increase production and welfare. Also, a productive agroforestry system will be established - an agroecosystem that environmentally is much more desirable than many alternative tropical land used (i.e annual crops, grazing). The extent to which these technologies are accepted by small farmers will dictate the extent of the indirect positive environmental impact.

II. Conclusions and Recommendations

From the above discussion, it is determined that the project will have a net positive effect on the environment. The application of project results will help to control the spread of cacao pests, and provide the small farmer with the technologies which will permit an increase in production to be accomplished in an environmentally sound manner.

A. The project is designed to strengthen institutional research and to develop resistant varieties. The development of resistant varieties, in time, will have a significant impact in reducing dependence on pesticides for the control of monilia, pod rot, and other pests.

B. The control of cacao diseases and pests with pesticides will undoubtedly affect water quality since most of the cacao in the region is grown at low elevations and moist to wet bioclimatic conditions. Pesticides used under these conditions will find their way into rivers, streams and perhaps aquifers. They will contaminate surface and perhaps ground-waters. The use of copper fungicides in disease control will have a minor impact on water quality since copper fungicides are rapidly absorbed in the soil; however, use of other pesticides that leach readily may have a greater negative impact. Therefore, the project objective of improved chemical control will have a moderate long-term beneficial impact on water quality. Environmental impact analysis will allow the project to select technologies for transfer with minimum environmental risk, and to promote improved integrated pest management practices throughout the region.

C. Achievement of project objectives will have a moderate impact on health. Specifically, it will contribute to a reduction in pesticide contamination in the cacao bean as well as in other foodstuffs and ecosystem components in areas where cacao is grown. At present, a large number of the food products consumed in the region (i.e. beef, seafood and fish, vegetables, etc.) are contaminated with pesticides because of indiscriminate sales and use. Such contamination in many instances exceeds accepted tolerances as established by the USEPA and FAO/WHO. Helping the small farmer cope with cacao pests and developing technological packages to help him modernize his farming operations, will increase his standard of living by providing resources for a more balanced diet.

D. To cope with cacao pests and increase production, as an immediate effort, agricultural pesticides must be introduced in areas where their use was not required in the past. Agricultural chemicals improperly used will have an adverse effect on production and in time will be detrimental to man and the environment. However, the effect of cacao pests left unchecked will be devastating on the economy and the livelihood of the small cacao producer. Ideally, resistant varieties provide the best means to cope with the problem; unfortunately there are no proven commercial

varieties that can be used on a commercial scale. The safeguards that will be incorporated in the technological packages for small producers, dealing with safe use of pesticides, will help minimize such problems. The program of experimental field testing will be under the guidance and supervision of competent scientists and will not require further environmental examination.

1. Research Activities

The research applications and limited field testing to be carried out under the project qualify for a categorical exclusion per sections 216.2(c)(1)(iii) and 216.2(c)(2)(ii). Likewise, the procurement and use of pesticides for research or limited field evaluation/trials by or under the supervision of the specialized project personnel of IICA, CATIE and FHIA qualify as an exception to the pesticide procedures per section 216.3(b)(2)(iii).

Given the modest funding level and limited duration of this pilot effort, IICA/CATIE/FHIA will have limited opportunity to test and verify chemical pest control practices. For this reason and in order to minimize human health and environmental risks associated with the use of pesticides, project staff should restrict experimentation to non US/NEPA restricted products and to applications and uses previously established and approved. In the case of non registered pesticides, WHO/FAO health tolerances and guidelines should be followed. These precautions will not only increase the efficiency of research efforts relating to chemical control, but will also help to assure that pesticide use be sound from both the environmental and human health points of view. Thus, wherever possible products that have the least environmental and human health such as rapid degradation rates; low toxicity to fish, wildlife, beneficial insects and other non target organisms should be preferred.

III. Specific Mitigative Measures

The Regional Agricultural Technology Networks project contemplates the design and implementation of several additional networks in subsequent phases of the project. The inclusion of additional network(s) will require an

amendment of this IEE which must be reviewed and approved by the LAC Bureau Chief Environmental Office, prior to the commitment of additional funds.

Cultural practices

The Regional Agricultural Technology Network Project via its Cacao Network will increase the production of cacao in the CA/P region. Although it is not the intent of the network to promote the establishment of new cacao plantations at the expense of natural tropical forests, through project technology transfer actions in participating countries this possibility exists. In accordance with FAA Section 118 legislation on the conservation of tropical forests (as revised on October 3, 1986), AID is required to deny assistance to activities that would unnecessarily result in the conversion of tropical forest lands. Accordingly, the Regional Agricultural Networks/CACAO project should covenant to do everything within the power and scope of the project to prevent the conversion of tropical forests to establish cacao plantations. Furthermore, the project should actively promote the intensification and application of improved technologies on existing plantations.

Research Activities Relating to Pesticide Use-A Covenant

Regarding pesticide procurement and use for research applications, section 216.3(b)(L2)(iii) applies. Consequently, IICA covenants to ensure that the manufacturers of the pesticides to be used 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 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.

Environmental Analysis for Technology Transfer-A Condition Precedent

Because of the potential that exists for significant environmental impact resulting from the technology transfer

component, the project agrees to carry out the appropriate environmental analysis, according to AID environmental procedures 22 CFR Part 216 and its section 216.3(b) that specifically refers to pesticide procedures, and FAA Section 118 regarding the protection of tropical forests and biological diversity, for all technological packages for cacao production and pest control. Regarding pesticide use/procurement, project staff, with the assistance of CATIE's Integrated Pest Management Project staff, and ROCAP environmental and pest management specialists, will carry out these environmental evaluations, and mitigative measures determined to be necessary will be incorporated into the technology packages before their transfer to the CA/P region. This procedure is requested based on 216.3(a)(7).

Determent of environmental evaluation for the specific technology packages to be promoted under the project is requested based upon the environmental procedures 216.3 section (a)(i). This procedure is applicable for the following reasons:

1. This IEE can not analyze the specific technologies that will be transferred/extended to the countries at this time since the research upon which these technologies are based is not yet concluded, and the specific technological package is not yet determined.

2. An environmental analysis will be performed for each technological package before it is extended to cacao producers for broad commercial application. Given the regional nature of this project, this procedure will yield much greater efficiency since a threshold decision will allow the transfer of cacao pest control and production technology to all other CA/P countries without further major environmental evaluation.

3. In addition, the Regional Agricultural Technology Network Project, through its cacao network staff, will be the most suitable and best prepared organization to carry out the environmental analysis because of the extensive research and field trails that they would have carried out.

In summary, ROCAP requests a negative determination for the overall project including its research and network establishment/promotion activities. Furthermore, a

deferred threshold decision is requested for the technology transfer component, specifically for all the technology packages proposed to be extended for cacao production and pest control by the project. These technological packages will be analyzed and approved on a case by case basis or on a collective basis. Approval from the LAC/CEO will be required for the expenditure of funds for transfer promotion of specific production and pest control packages.

ANNEX A

TECHNICAL ANALYSIS

1- Assessment of present situation and potential areas for cacao production in C.A.

Cacao is native to tropical America and was domesticated somewhere in the present Central America-Mexico tropical region. During the early spanish colonial period the main source of cacao to export to Europe was from Mexico, Guatemala, and Nicaragua. Since the eighteenth century Ecuador, Colombia, Venezuela and Trinidad Tobago were the largest producers of the world until the early 19 th. hundreds, when West Africa and Brazil took the lead to the present.

The Central American countries, particularly Guatemala, Nicaragua, Costa Rica and Panama kept cacao up to the present as one of the traditional and important export crops, although they never became large producers. At the present there are around 25.000 hectares under production in the five Central American countries, excluding El Salvador. The area production was near 9.000 MT., with a productivity from 250 to 300 Kg./ha./year, which is very low, if compared with other tropical American countries as Brazil (700 Kg./ha./year) and Colombia (411 Kg./ha./year).

Estimates by Ministeries of Agriculture show additional potential areas of 15.000 ha. in Panama, 269.000 ha. in Costa Rica, 349.000 in Nicaragua, 25.000 in Honduras and 36.000 ha. in Guatemala. A more critical evaluation, particularly based on appropriate soil and drainage conditions will reduce or increase the areas in some countries, but it can be safely stated that there are ample suitable lands for cacao in the tropics of C.A. Cacao is perhaps among the best ecologically suited crops for a proper use of the wet tropics.

2- Problems limiting production.

The low productivity in the region is due to several problems, being the more important ones:

a) Old age of plantings of unselected seeds. The present traditional areas were planted around 1915-20, replacing the banana producing areas devastated by the Panama disease and were initially made by the large

international fruit companies. Later these plantings passed to small & medium size farmers. Ages of these plantings range around 50-60 years, while the productive life is estimated up to 40 years. This indicates that renewal of these old plantings with improved cultivars and good technical management could almost triple the present production. More increments will be possible using new potential areas.

b) High incidence of diseases.

Perhaps the most limiting factors in old and new plantings are the damages caused by three fungal diseases: Moniliophthora, Phytophthora and Ceratocystis. The first two ones attack the pods and, if not controlled, could cause losses of up to 50% of the fruits. Ceratocystis kills all the susceptible trees. Phytophthora and Ceratocystis are present in all C.A. countries. Monilia is in Panama, Costa Rica and South of Nicaragua. Crinipellis is in the east of Panama but care should be taken to its spread to the other C.A. countries. This disease is equally or more destructive than Monilia and unfortunately there is not yet chemical control and no cultivars with high levels of resistances.

c) Poor management of the plantations.

The traditional cacao cultivation system is an extracting activity with little or no imputs. Its survival is due to the low productivity and the recycling of nutrients, coming from the decomposition and mineralization of the litter formed by the dry leaves and branches of cacao and shade trees. Because of the lack of formation and proper maintenance pruning, the trees grow too tall, making very difficult disease and pest control; and sanitation measures and even harvesting.

d) Lack of government policies for transference of technology and credit.

CATIE in the region and cacao research stations in other countries in South America have produced technologies that have shown its goodness. However, due to lack of cacao extension services in the majority of the C.A. countries, most of the plantations, with exception of a limited number of new

areas, the use of existing technologies is neglected. There are technologies available with new high yielding and disease tolerant cultivars, disease and insect control and sanitation measures, prunning methods, fertilizers use and seed fermenting and drying. With proper transfer and adoption of these available technologies, easily these countries could double their present production. The adoption of these technologies has been limited greatly due to lack of adequate credit mechanisms

3- State of the art in research and technology transfer and needs of more research.

a) Breeding for high yield, disease resistances and quality.

Breeding in cacao has been done under two methodologies:

I- Clones by individual tree selection and evaluation for desirable characteristics and its asexual (clonal) reproduction. A large number of clones has been produced in different cacao experiment stations in tropical america. Among the more important ones are: the ICS, SCA, IMC, P, Na, Pa clones in Trinidad; the EET clones in Ecuador; SC clones in Colombia; SIC, SIAL and CEPEC clones in Brazil; Cho, Chu, Oc in Venezuela; R and P clones in Mexico; SGU in Guatemala; UF and CC clones in Costa Rica.

Plantings with clones were made in the early 50's in the origin countries, but were not widely accepted because of susceptibilities to one or various diseases and the more specialized management needed in the plantings. However, in some countries like, Ecuador, Trinidad, Mexico and Guatemala progressive farmers are using clones with excelent results. CATIE has in its clonal collection a list of high yielding clones (up to 2.500 Kg./ha.) with resistances to one or more diseases and of good quality. These clones, propagated asexually by cuttings, buddings or tissue culture techniques could be used by well trained and progressive farmers.

Additional individual tree selection and evaluation should be done as part of this project in the F1 hybrid experimental plots conducted by CATIE or in

13'

other hybrid farmers fields. Selections should aim at high yields, good quality beans and the inclusion of resistances or tolerances to one, two or more diseases. With fast asexual propagation methods (tissue culture) ideal new plantings could be made with uniform trees, having high yields, resistance to the main diseases and of high and uniform seed quality.

II- Hybrid seed progenies.

In view of the low adoption, specially by small and medium size farmers, of the improved clones in spite of its high yielding and disease resistance attributes, cacao breeders started in the 1950's producing and testing hybrid progenies of crosses between clones selected by the characteristics desirable to be combined in the F1 progeny. Trinidad, Ecuador and Costa Rica (CATIE) begun in the early sixties selecting and producing hybrid seed progenies for distribution to farmers with high acceptance. Brazil and Colombia joined in the late sixties to the effort and at the present, most of the new plantings in the tropical america countries are made with selected hybrids. At the present every cacao experiment station, breeding by hybrids, has a list of recommended crosses.

A well managed hybrid planting can produce yields between 1.200 to 2.500 Kg./ha.

However, hybrids have some of the following inconveniences:

1- Coming from heterozygous parental clones, the F1 progenies segregate for most of the characters, including yield, disease reaction and seed quality. Depending on the crosses a variable proportion of plants area outstandingly high yielders that could be tested as potentially new clones after evaluation of their attributes. Also one can find a proportion of low yielding and poor quality plants that should be eliminated at the early stages of growth.

2- Most of the parent clones of hybrids are selfincompatible, making the F1 progeny also highly selfincompatible. To avoid low productivity due to selfincompatibilities, a hybrid planting should be made always with a mixture of crosses of parents having different alleles that are cross compatible.

Cacao has both, compatible and incompatible plants in selfings and/or crossings. Incompatibilities impede that pollen of the same genotype fertilizes ovules (same or other plants) with similar genotype. Incompatibilities are controlled by a series of 5 different alleles and one recessive to them for selfcompatibility. Most of the upper Amazon clones used for hybrids are selfincompatible with different genotypes. F1 of crosses between selfincompatible x selfcompatible and selfincompatible x selfincompatible originate selfincompatible progenies. Depending on the alleles present in each parent, different selfcompatible F1 progenies are crosscompatible with other selfincompatible F1s.

Also, more attention should be paid to the selection and testing of fully selfcompatible F1 crosses, by using only selfcompatible parents. To achieve this and being selfcompatibility controlled by the recessive allele , backcrossing heterozygous clones to selfcompatible ones should be the fastest approach.

In the hybrid breeding system by hybrids, more research is needed on the production of more uniform F1 progenies. This could be achieved using more homozygous parents This type of clones could be obtained by inbreeding, which is a long term process, or by hyploid induction and immediate duplication of chromosomes. This last technique could be developed by tissue culture.

Further advances on yield, based on general and/or specific combining abilities could be obtained by three or four way crosses. Research should continue to determine the combining abilities of the desirable clones for the breeding schemes.

CATIE has developed basic genetic information on the inheritance of the more important genetic traits related to the components of yield and resistance to some diseases, particularly Phytophthora, Ceratocystis and Monilia. CATIE has in its germplasm collection clones and genetic stocks with the needed attributes for breeding.

Breeding for flavour and aroma is another important avenue of research as the consumer countries are becoming more quality minded. Countries producing flavour cacao are not subject to quota systems in the international agreements. Tropical America should take to its advantage of having readily available clones of criollo and Arriba flavour, which have the best demand in the world flavour market. This germplasm is not yet present in the largest producing countries outside this continent.

b) Disease epidemiology, sanitation and chemical control.

Diseases are the major limiting factor to production in tropical america, as opposed to insect pests in Africa, where also Phytophthora is important . Research on epidemiology of Phytophthora has been done in Ghana, Nigeria and Brazil. Chemical control recommendations, including fungicides, doses, and frequencies had been produced. At the present a research network to study the epidemiology of Moniliophthora and Crinipellis is operating with components in CATIE for Monilia, INIAP - Ecuador, and CEPEC-Belem-Brazil for Crinipellis, ICA - Colombia and FONAIAP Venezuela for Monilia, and CEPEC-Bahia-Brazil for Phytophthora. However more research is still needed to make available the basic information in epidemiology to guide the best use of chemical and sanitation control methods.

So far, some fungicides have shown their efficiency to control Monilia in lab and field conditions, but its use by farmers is still very expensive because of the costs of the fungicides and the high frequency of application. With a better knowledge of the epidemiology these costs could be reduced. The situation with Crinipellis is far more delayed as the disease attacks fruits and the vegetative parts of the plant.

The use of systemic fungicides is being tested in the south america cacao research centers. Early in the 1950s, two clones (SCA 6 and SCA 12) were found resistant to Crinipellis in Trinidad, but few years later the fungus mutated and the clones lost resistance. The best solution for control of all these diseases will come with an integrated approach of pathologists and breeders breeding highly resistant cultivars, combined with good chemical control and sanitation measures. Pathologists have developed methods to screen for resistances to Phytophthora, Monilia, Ceratocystis and Crinipellis, but these methods need to be improved as they are not yet fully reliable.

CEPEC-Bahia, Brazil has several clones with different levels of resistance to Phytophthora and CEPEC-Belem, has a large collection of germplasm to study resistance to Witches Broom. This germplasm is being evaluated. NIAP-Pichilingue, Ecuador has several clones with different levels of resistance to Monilia, others to Witches Broom and other to Ceratocystis. FONAIAP-Caucagua, Venezuela and

the University of West Indies-Trinidad have also clones with resistances to Witches Broom and to Ceratocystis.

Resistances to all diseases have been reported as controlled by multiple genes (horizontal resistance), breeding for disease resistances should be made by crossing clones or individuals of different genetic origin, having resistances and other desirable traits. This will hopefully help to summ up genes for resistance in F1 plants. These plants should be tested for disease resistances yield and quality .

c) Improvement of Cultural Practices.

The cacao plant has branches with two habits of growth: (i) orthotropic branches are originated of any bud coming below the horquet of seed origin plants. New orthotropic branches produce a new horquet always and this originates that plantings, where no prunning of orthotropic suckers has been done, give origin to very tall, ultistored canopies which are difficult to manage disease and pest control and sanitation. This is the case for the common plantings in Tropical America, that have trees with up to 10-15 mts. high. (ii) Plagiotropic branches come from norquet branches. When vegetatively propagated (clones) they produce trees that keep a lateral growth habit. Most of the present clonal plantings are made of this type of branches. This kind of plantings need a good management of prunning to provide the proper and balanced shape to the trees in order to avoid toppling when loaded of fruits, as their root system is superficial with no tap roots. Plagiotropic branches for clonal plantings are more commonly used because they are more abundant than orthotropic ones.

Although there are general recommendations for prunning of seedling and clonal plantings, there is still a lot to be investigated on the best architecture of the plant and the ideal shape of a cacao plantation for a more efficient management of the production and disease control.

Experiments should be made to determine in seedling populations (with basal orthotropic breds) to determine the advantages of limiting the growth of one or two horquet levels, combined with distances and arrangement of the branches in the horquet and of pickets in the field. Care should be taken also to the possibilities of future use of mechanization for agronomic practices. The University of

West Indies-St. Augustine, Trinidad, has initiated a cacao mechanization project.

A better control of the hight of the trees is obtained with plants originated from plagiotropic (lateral branches) material. Research with this plant material should be directed to the number of branches per tree, their orientation in the tree and in the arrangement of the trees in the planting scheme. Single, paired rows at different distances, hedge rows with fan shapes should be tested as part of many other alternatives.

For the research on the architecture of the plants it should be kept in mind that there is an urgent need to keep trees low in altitude.

The hight of the tree to some extent is related also with density of plantings. Close distances promote upward elongation of the stems because of competition for light. The same effect is produced by excess of overhead shade.

Cacao is grown generally associated with overhead shade trees of various species. Very little is known about the advantages or disadvantages of the different species. The most common species belong to the Leguminosae family, but some other economic species as laurel (cordia sp.), pejibaye (Bachtris), mangos, citrus and avocados are also used.

CATIE has preliminary results of the effects on the soil fertility and physical aspects of different shade tree species associated with cacao.

More studies are needed of the biological and economic interelationships between different tree species, combined with distances to obtain the maximum yields of cacao and the shade species.

Also the fields of plant fertility (use of fertilizers),weed control and post harvest handling of the plantations need to be adjusted for the different soil types and ecological conditions where cacao will be grown in the region. The analog concept should be used for regional research experiments involving soils and climatological effects.

d) Tissue Culture

Among the main limitations for a rapid expansion of new cacao plantings with improved plant material is the lack of infraestructure to produce enough hybrid seeds or clonal plants.

A solution to this problem could be obtained by developing the proper techniques for tissue culture of cacao. Cacao research in Ghana, Cammeroun and IRAT-Montpellier (France) has reported some progress, but has not yet developed the final techniques. Also the proper methodologies to screen for resistances to main diseases in plantlets from tissue culture has to be developed.

Once developed the technique it is foreseable that most of the new plantings will be of clonal origin. This will facilitate the use of the best available clones and the selection and testing of new promising better plants. Future plantings could be made with orthotropic or plagiotropic growth habits, depending on the origin of the tissue.

Tissue culture methods will permit early evaluations for resistances or tolerances to the main diseases and insect pests.

Hybrid seed breeding might become mainly a source to produce desirable genetic recombinations for selection of individual trees with the most desirable characteristics to be propagated by tissue culture.

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INSTITUTIONAL ANALYSIS

The implementation of the regional agricultural technologies network in cacao requires the coordinated efforts of three lead institutions (IICA, Interamerican Institute for Cooperation in Agriculture; CATIE, Tropical Agriculture Research and Training Center; and FHIA, Honduran Agriculture Research Foundation). IICA is the overall administrative and coordinating institution for the regional cacao network, with CATIE and FHIA assuming technical leadership in both agricultural research and training conducted in support of the regional program. Since all three institutions will be actively involved in the project including handling their own contracting and commodity procurement, a detailed institutional analysis is provided for each.

IICA

Administrative Capability

IICA has considerable experience in the administration and implementation of complex multi-institutional regional agricultural research, training and technology transfer programs. Under its technology generation and transfer program (program II) IICA currently is managing two major regional research networks programs co-funded by BID; PROCISUR which involves Argentina, Bolivia, Brazil, Chile, Paraguay, and Uraquay; and PROCIANDINO which involves Bolivia, Colombia, Ecuador, Peru and Venezuela. PROCISUR initiated activities in 1984 building on an IICA/Southern Cone/BID program begun in 1980, and PROCIANDINO began activities in 1986. In response to a mandate from its executive board of directors, IICA, in close collaboration with national research institutions, is currently developing a proposal similar to the IICA/BID research networks in South America for the Central American region (PROCICENTRAL) to promote overall research coordination among national, regional, and international institutions. The cacao network supported under this ROCAP project will eventually develop linkages to the broader research network being established by IICA. A regional network in animal production for Latin America (RISPAL) is also coordinated by IICA.

In addition, IICA has administered through its Central America office a five-year regional research effort in coffee pest control financed by USAID/ROCAP and participating countries. A recent project evaluation of this program noted the significant

results obtained to date and the effectiveness of IICA's technical leadership and administration. Based on evaluation recommendations, ROCAP is authorizing a three-year extension of this project to consolidate research findings and emphasize technology transfer. IICA has considerable experience administering and implementing AID funded projects, both at the national and regional levels. In addition to the coffee pest control project mentioned above, IICA implemented a ROCAP funded agricultural policy project which ended in December 1985.

A. Nature and Purposes of IICA

IICA is the specialized agency for agriculture of the inter- american system. With its present structure, it is the institutional continuation of the Inter-American Institute for Agricultural Sciences, which was created by the Council of Directors of the Pan American Union in October of 1942.

The Convention governing the Institute States that IICA's purpose is to "encourage, promote and support the efforts of the Member States to achieve their agricultural development and rural well-being." IICA is an international organization, with full legal capacity. It is governed by its Member States, which are responsible for providing guidance, following up on activities and evaluating the Institute's actions. The Inter-American Board of Agriculture (IABA) is the Institute's highest governing body, and the General Directorate, its executive body.

The Inter-American Board of Agriculture (IABA) is composed of representatives of all the Member States. It meets every two years, and its responsibilities include approving policy guidelines and the two year program budget. In order to perform these duties, the Board has the Executive Committee as an executive body, acting on its behalf. The Executive Committee is composed of representatives of twelve Member States, elected on the principle of rotation and geographic distribution. Its functions include examining proposals for the biennial program budget, submitted to the Board by the Director General, and making preliminary comments and recommendations to the Board in its role as a preparatory body.

The General Directorate is comprised of technical and administrative units responsible for coordinating and implementing of the Institute's actions, in accordance with policies established by the Board.

IICA's functions as established by the new Convention are to:

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a. Promote the strengthening of national education, research, and rural development institutions, in order to give impetus to the advancement and the dissemination of science and technology applied to rural progress.

b. Formulate and execute plans, programs, projects and activities, in accordance with the needs of the governments of the Member States, that will help them meet their objectives for agricultural development and rural welfare policies and programs.

c. Establish and maintain relations of cooperation and coordination with the Organization of American States and with other agencies or programs, and with governmental and nongovernmental entities that pursue similar objectives.

d. Act as an organ for consultation, technical execution and administration of programs and projects in the agricultural sector, through agreements with the Organization of American States, or with national, inter-American or international agencies and entities.

B. IICA programs for the 1987-1991 period

The concentration of efforts will take shape through the organization of five programs which include: Program I. Agricultural Policy Analysis and Planning; Program II. Technology Generation and Transfer; Program III. Organization and Management for Rural Development; Program IV. Marketing and Agroindustry; and Program V. Animal Health and Plant Protection.

The technologies network project will be located under Program II. This program promotes and supports actions by the member countries to improve the design of their technological policies, strengthen the organization and management of their technology generation and transfer systems and facilitate international technology transfer, so as to make better use of available resources and a better and more effective contribution to solving the technological problems of agricultural production.

C. Management Structure

IICA's organizational structure is shown in Table Exhibit A.

site is inevitable when primary natural forest is affected. This impact is greatly reduced when cacao plantations are established in secondary forests or on cleared lands.

Although improper cultural practices could lead to soil erosion, especially from access roads and trails, the tree crop/agroforestry nature of cacao plantations, when properly managed, is protective against soil erosion.

Indirect Environmental Consequences

Since the project is designed to promote cacao planting by small and medium sized farmers as well as to control cacao diseases and make new technologies and improved plant varieties available to help with production and disease control, it is expected that the project will have a net positive environmental impact in the long run. Cacao is a tree crop and, if properly managed and located, is sustainable. As part of the project, existing chemical and cultural practices, such as plant density and the use of shade, will be adapted to fit the small farmer enterprise and are expected to help increase production and welfare. Also, a productive agroforestry system will be established - an agroecosystem that environmentally is much more desirable than many alternative tropical land used (i.e annual crops, grazing). The extent to which these technologies are accepted by small farmers will dictate the extent of the indirect positive environmental impact.

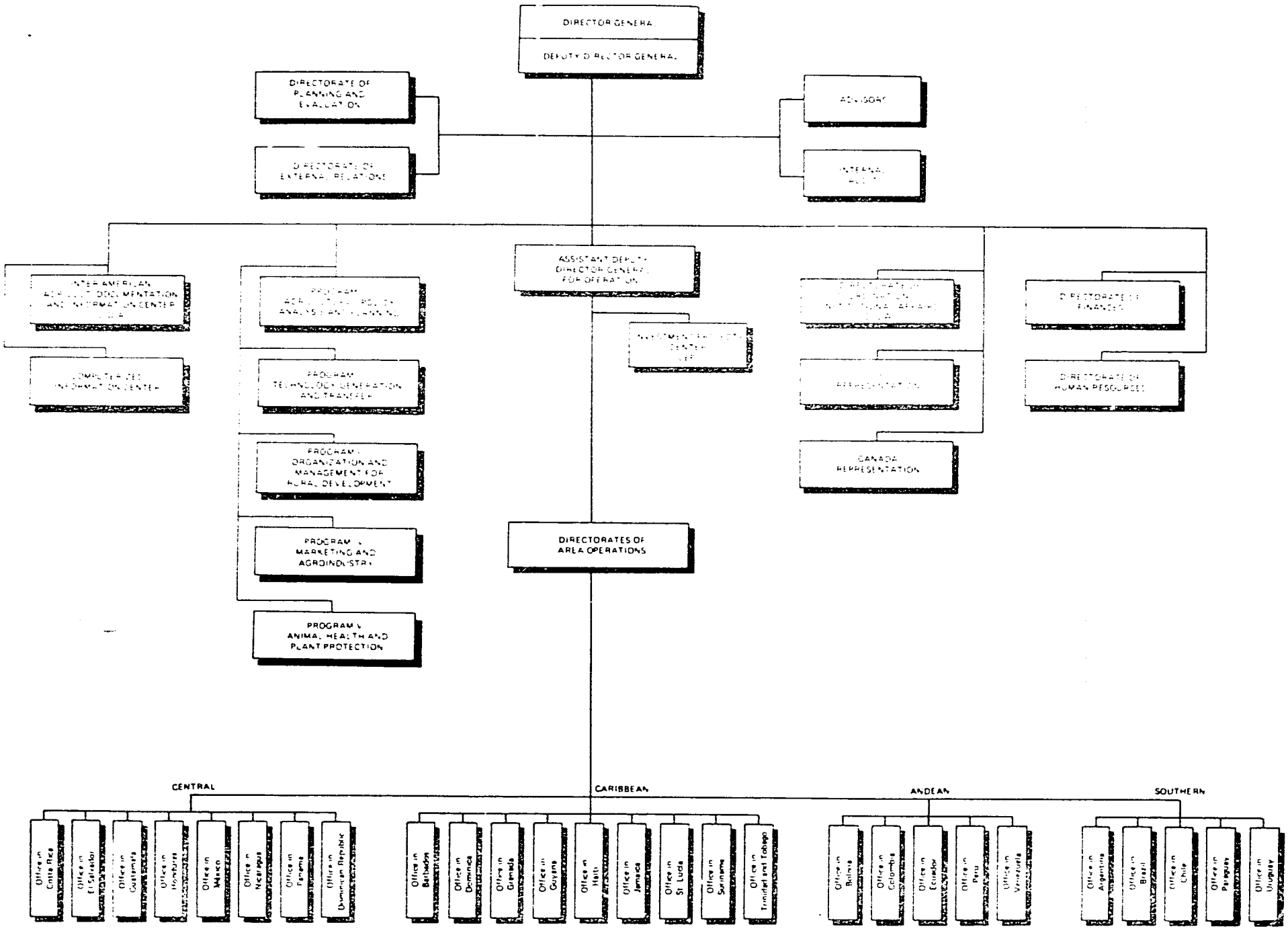
II. Conclusions and Recommendations

From the above discussion, it is determined that the project will have a net positive effect on the environment. The application of project results will help to control the spread of cacao pests, and provide the small farmer with the technologies which will permit an increase in production to be accomplished in an environmentally sound manner.

A. The project is designed to strengthen institutional research and to develop resistant varieties. The development of resistant varieties, in time, will have a significant impact in reducing dependence on pesticides for the control of monilia, pod rot, and other pests.

IICA ORGANIZATIONAL CHART

Exhibit A



Units for supervision of operations

Directorates for area operations (central, Caribbean, Andean and southern) are the principal means for supervising operations. Their task is to coordinate actions taking place in their assigned regions, supervise national offices, and serve as a liaison between national offices and the central office of the General Directorate.

Technical cooperation units

IICA renders its technical cooperation services to the member countries through the program directorates, national offices and technical support units.

Program directorates

Program directorates are the principal technical units of the Institute. They are responsible for developing concepts and work methodologies in the area of program concentration. They seek and obtain external resources to support specific projects. They establish mechanisms for capitalizing on experiences with the implementation of actions taking place in the program framework. Finally, they are responsible for the training of technical specialists assigned to each program.

National offices

National offices are the units through which the Institute maintains permanent relations with government authorities; they provide the institutional and administrative foundation for implementating IICA's work in the countries.

Technical support units

The functions of technical support units include developing special capacities and providing specific services that will reinforce and supplement the work of program and area directorates and the national offices to which they are assigned. The technical support units are: the Investment Projects Center (CEPI), the Inter-American Agricultural Documentation and Information Center (CIDIA), the Editorial Service and the Computerized Information Center.

Tropical Agriculture Research and Training Center (CATIE)

CATIE is a research and training center of the Inter-American system, associated with IICA. It has special

organizational characteristics that guarantee it the operating independence required in its mandate. CATIE and IICA maintain institutional and technical relations to facilitate mutual cooperation and support, so that they in turn provide the Member States with better service, each within its own area of responsibility.

D. FINANCE

IICA's resources are derived from three sources: quotas, indirect administrative and technical costs, and external resources.

The financial statements of IICA are annually audit by the local representative of the external auditors Peat, Marwick, Mitchell & Co. The results are shown only for the year ending December 1986 because during that year IICA adapted its financial reports presentations to meet generally accepted accounting principles; therefore, comparing 1986 with 1985 could lead to erroneous conclusions. Yet some modifications can be shown, for example, the reporting of actual income for the quotas of the Member countries, instead of the budget quotas.

The balance sheet indicates a position without liquidity problems and now recognizes the value of its capital assets incorporating them as an increase to the general fund. The impact of the recognition of the estimate for quotas of doubtful receivable and fund liabilities to severance pay payment as contingencies impact was a reduction of the general working fund from $10.5 a $3.8 million dollars.

The income quotas from budget, $20,065,000, was similar to the one really received by this concept, $20,785,079. For the first time in this year the income from overhead is presented separately and simultaneously is used for the supplied services to the projects.

CATIE

Administrative Capability

CATIE has been identified as one of two lead technical institutions for the Regional Agricultural Technologies Networks project (cacao network) because of its technical expertise in cacao, experience in implementation of complex multi-country projects funded by ROCAP and other donors, availability of excellent research and training facilities and

support services, and its regional mandate which includes conducting research and educational programs through effective establishment of institutional networking arrangements with national and regional institutions in Central America, Panama and the Dominican Republic, and with international organizations.

Exhibit B.

IICA Financial Situation to December 31, 1986

(US Dollars)

	1986	%
Assets		
Cash	$1398342	4
Marketable securities	5040272	16
Uncollected quotas	9612431	30
Inventories	182783	1
Prepaid expenses and other assets	557404	2
TOTAL CURRENT ASSETS	16791232	53
Land, furniture and equipment	14821563	47
TOTAL	$31612795	100%
Liabilities and Regular Fund		
Accounts payable	$ 1760411	6
Due to Trust and agreements	3932920	12
Various accruals	323959	1
TOTAL CURRENT LIABILITIES	6017290	19
Reserves for severance indemnities	6940789	22
TOTAL LIABILITIES	12958079	41
Regular fund balance		
Working subfund	3833153	12
Land, furniture and equipment	14821563	47
TOTAL	$31612795	100%

Exhibit C.

IICA Statement of Revenues and Expenses

year ended December 31, 1986

(US Dollars)

		%
Revenues		
Member's quotas	$ 20065500	96
Recovery of indirect administrative costs (Overhead)	942930	4
TOTAL REVENUES	21008430	100%
Expenses		
Salaries	12441947	59
Scholarships	185641	1
Travel and per diem	1838510	10
Documents and materials	798400	3
Rental of Plant and equipment	419453	2
Maintenance, communication and other services	950358	5
Contracts, tasks y allowances	2577633	12
Miscellaneous	705467	3
Administrative Costs (Overhead)	942930	4
TOTAL EXPENSES	20860339	99
Increase in working subfund	148091	1

CATIE has a long history of implementing ROCAP and USAID funded projects. Currently CATIE is executing four ROCAP projects. These include the Regional Agricultural Higher Education (596-0129A) a joint ROCAP/USAID-Costa Rica funded project $13.05 million) to reinforce CATIE's programs in training and research, the Regional Tropical Watershed Management (596-0106) for $6 million, the Integrated Pest Management (596-0110) for $6.75 million, and the Tree Crop Production (596-0117) for $9 million. In addition, recently completed ROCAP projects with CATIE (December 1985 and December 1986 respectively) include Fuelwood and Alternative Energy Resources (596-0089), and Small Farm Production Systems (596-0083). CATIE has considerably improved its overall planning and project management capability over the past years (projects now utilize computer tracking of project activities, and improved financial reporting and personnel management systems are being installed). CATIE personnel, in general, have a good understanding of USAID procedures and regulations, and work closely with ROCAP financial and procurement officials as required to address specific problem areas. Complex commodity procurement is handled through the use of Procurement Services Agents. CATIE has been granted contracting authority ($25,000 per transaction) for procurement of goods and services without specific prior ROCAP approval based on annual authorization of detailed project work plans and commitment of funds at that time by ROCAP.

I. ORGANIZATION

A. Summary History

The Valley of Turrialba was selected in 1942 as the site for the headquarters of the Inter-American Institute of Agricultural Sciences (IICA) of the O.A.S. When the General Directorate of IICA was transferred to San José in 1960, it maintained at Turrialba the training and research in agriculture, animal husbandry and forestry, begun in 1942.

To carry them out, IICA created the Centro de Enseñanza e Investigación (CEI) at Turrialba. From 1960 to 1969 the growth of IICA's graduate program strengthened the training of Latin Americans in Turrialba. In 1970, CEI became the Centro Tropical de Enseñanza e Investigación (CTEI), and continued its graduate training programs.

B. Creation of CATIE

On January 12, 1973, IICA and the Government of Costa Rica created the Centro Agronómico Tropical de Investigación y

Enseñanza (CATIE). Costa Rica's Legislative Assembly approved this agreement in June 1973, and designated the CATIE's headquarters to be at Turrialba.

This non-profit autonomus organization, scientific and educational in nature, was created to promote and carry out research and training at different levels in the area of agriculture, forestry and animal husbandry, with the purpose of responding to the needs of the American tropics, particularly the countries of Central America, Panama and the Caribbean. At present the member countries are Guatemala, Honduras, Nicaragua, Costa Rica, Panama and the Dominican Republic.

Upon establishing CATIE, the founders gave it a mandate to shift from teaching to research in an effort to solve specific problems of the small farmers. Research was no longer limited to complementing the graduate study program but was to assume a more active role corresponding to the work carried out by national institutions in order to respond to needs as perceived by the member countries.

C. Evolution

From the mid 1970's CATIE' increased emphasis on research responded to the agricultural needs of Central American countries. Notable progress was made in the coffee rust, forestry, development of farming systems, animal and crop production systems, watershed management, tissue culture and cacao research.

D. Objectives of CATIE

The policy of CATIE is based on research and training in the development of the agricultural and renewable natural resources of the region. CATIE's actions are intended to benefit mainly small and medium size farmers who are a large part of the rural population. The main objectives are to:

- Develop research methods and technologies for the diverse socio-economic and ecological conditions of the Central American tropics, in accordance with the needs and priorities of crops, livestock and renewable natural resources.

- Strengthen national research institutions and higher level training in crops, livestock and renewable natural resources.

- Conserve, produce, distribute and evaluate the genetic materials of scientific value adapted to the ecological conditions of the Central American tropics and resistent to pests and diseases; contribute to increase the efficiency of agriculture livestock and renewable natural resources; and improve the quality and quantity of food.

- Improve the research and training activities, so that the scientific, technical and educational results are of some practical utility for the member countries. The dissemination of the research results is done to increase productivity and improve the quality of crops, livestock and renewable natural resources.

- Plan and carry out graduate programs and training in agriculture, livestock, and renewable natural resources in accordance with scientific, technological and educational progress.

E. Programs

1. Training

CATIE offers a two year master's degree program, in agreement with the University of Costa Rica and other universities. The Center admits an average of 45 new students each year. CATIE offers short courses, conferences and in-service training in special fields.

2. Research

CATIE conducts research on annual and perennial crops, animal husbandry and renewable natural resources. Among the support resources are the computer center, the tissue culture laboratory, the plant genetics units, the seed bank, the small farms program, and the widely dispersed tree species trials.

3. Library and Information Systems

The Orton Memorial Library of the Inter-American Center for Agricultural Documentation and Information (CIDIA) is one of the most complete in Latin America in the field of tropical agriculture. It provides ample support to the Center's diverse research and training program. Each of CATIE's departments has an information distribution center.

F. Current organizational structure

1. Central Administration

CATIE's highest governing body is the Inter-American Board of Agriculture. It is responsible for reviewing the biannual report on technical, financial and administrative matters submitted by CATIE's director. Regular members of CATIE can include the governments of the IICA member countries. Adherent members can include other government, international organizations and international institutions created for purposes similar to those of CATIE.

CATIE's Board of Directors has the permanent responsibility for the supervision and control of CATIE. It presently is made up of a representative from each of three of its current member countries (Costa Rica, Honduras, Guatemala, Panama, Nicaragua and the Dominican Republic), IICA, and the Inter-American Board of Agriculture. A contract amendment, tentatively scheduled to take effect in January 1988, will expand the number of Board members of CATIE to include a representative of each member country, two members from IICA, a representative of the Inter-American Board of Agriculture, and three international scientists. This is a significant development as it provides for more even country representation and greater involvement by international scientists in support of CATIE's overall programs.

The General Directorate is responsible for directing and administering CATIE within the guidelines and policies set by the Board of Directors and under the Boards supervision.

The Executive Committee is an advisory body to the Board of Directors. It carries out the functions assigned by the Board of Directors and does the preparatory work for the Board of Directors' meetings, and is composed of selected members of the Board of Directors.

A Technical Advisory Council advises the Board on policies and strategies in the field of research, training and technology transfer and an Academic Council advises on curriculum and relevant policies affecting the educational programs. The Director is responsible for the Center's operation, and is elected by the Board members for a four-year term renewable one.

Assisting the Director and Deputy Director in centralized operations are several units. The Office of Institutional Planning provides long-term planning in strengthening CATIE's responsiveness to member countries. This office, with the Technical-Administrative Council, coordinates inter-department programming.

The Office of Internal Audit supports management with auditing services and has linkage to the Accounting Unit. The Office of External Financial and Technical Cooperation is responsible for relations with donors and coordinates donor projects. The Office of Official Relations provides public relations services at CATIE and the Computer Center provides computer services.

2. Technical Programs

CATIE presented to its Board of Directors in June 1987 a proposed ten-year institutional strategy, the cumulation of over two years of interaction with its member countries and in-depth analysis, which identifies program priorities, resource requirements and organizational modifications. The major elements of CATIE's long-range plan.

CATIE currently has five departments: a) Crop Production, b) Animal Production, c) Renewable Natural Resources, d) Graduate Studies and Training, e) Administration and Finance, and is administered by a Director and Deputy Director. The current organization structure is presented in Exhibit D. The proposed new organizational structure, shown in Exhibit E., proposes a reorganization of research and training along three principal areas, 1) Perennial Crops Improvement (including coffee, cacao and plantain), 2) Sustainable Agricultural Production and Development (including work on annual food crops, livestock, promising tropical crops and agroforestry), and 3) Integrated Natural Resources Management (with emphasis on watershed and fragile land management). In addition, an associate director for research and one for education are proposed.

CATIE has identified seven priority program areas in its long-range plan. These include: a) perennial crops, b) annual food crops, c) promising tropical crops, d) tropical livestock, e) forestry and agroforestry, f) integrated development of production systems, and g) integrated management of watersheds and regional natural resources.

CACAO PROGRAM

CATIE's support to the regional cacao technology network will be administered under its perennial crops program. This program (with emphasis on cacao, coffee and plantain) will conduct research on a) biology and genetics, with the purpose of developing improved germplasm resistant to the major crop

diseases, b) plant protection, emphasizing biological control methods, c) tropical soils and climate, and d) socio-economics. CATIE has a strong cacao program at present and is recognized in the region for its expertise. The cacao program includes the La Lola cacao research station (96 Ha), 15 Ha. of cacao at its Turrialba research center, 3.5 Ha. of cacao germ plasm collection, three PhD and one MS researcher, several technicians, administrative support and field laborers.

II. INFRASTRUCTURE

A. Lands

CATIE's central facility covers 1,069 hectares of the Turrialba Valley, bordering the western side of the city of Turrialba. The soil lends itself to coffee, sugar cane, cacao, improved pasture, citrus and other fruit trees, vegetables, and forest trees. The climate is warm and humid with an annual rainfall of 2900 millimeters a year. Of the land area 266 hectares are dovoted to crop research, 287 to animal research and 100 to the natural renewable resources program. About 396 ha. are used for residential areas, buildings and landscaping. The remainder is in commercial production or reserve.

Exhibit D

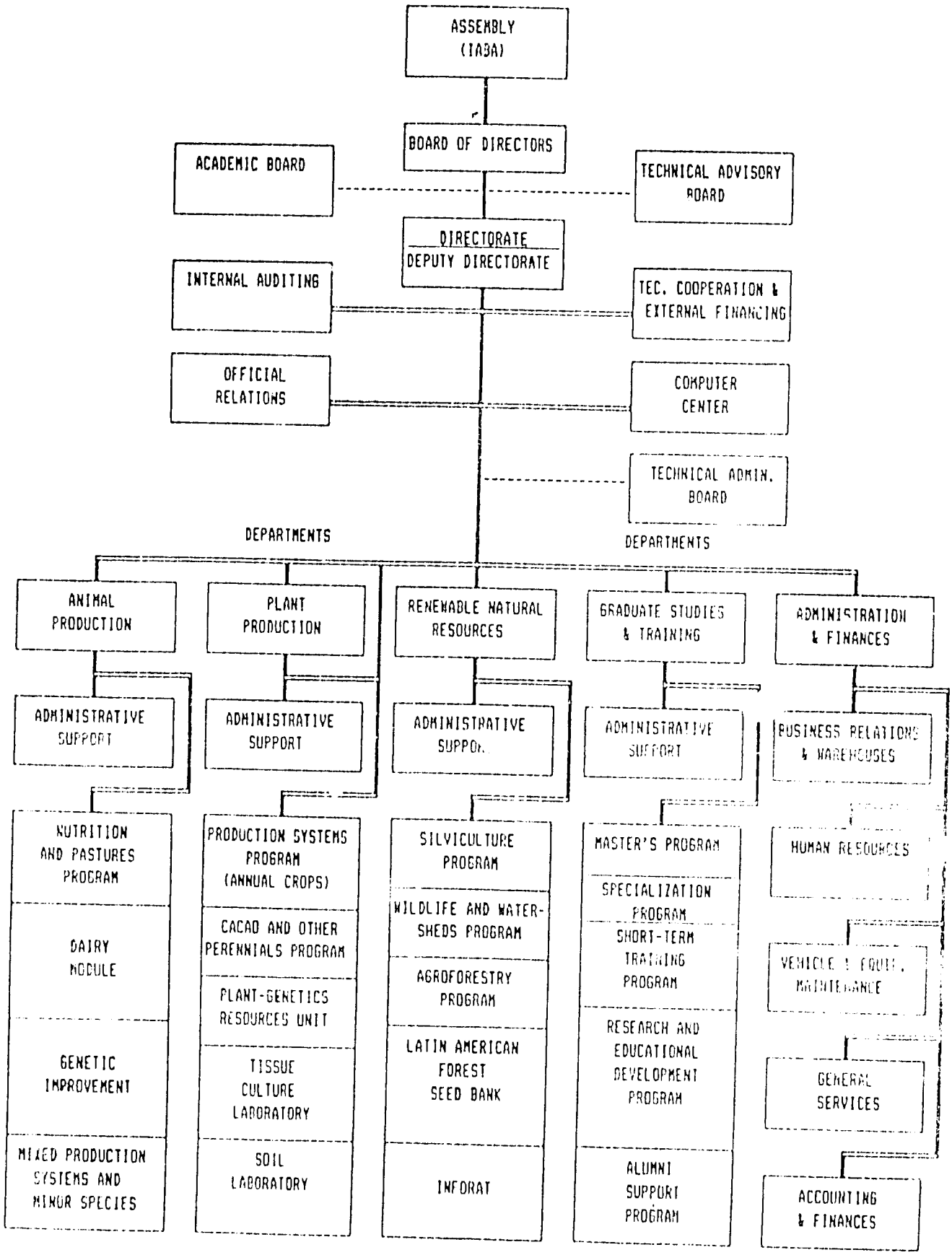


Fig. 2 CATIE's present organization

Exhibit E

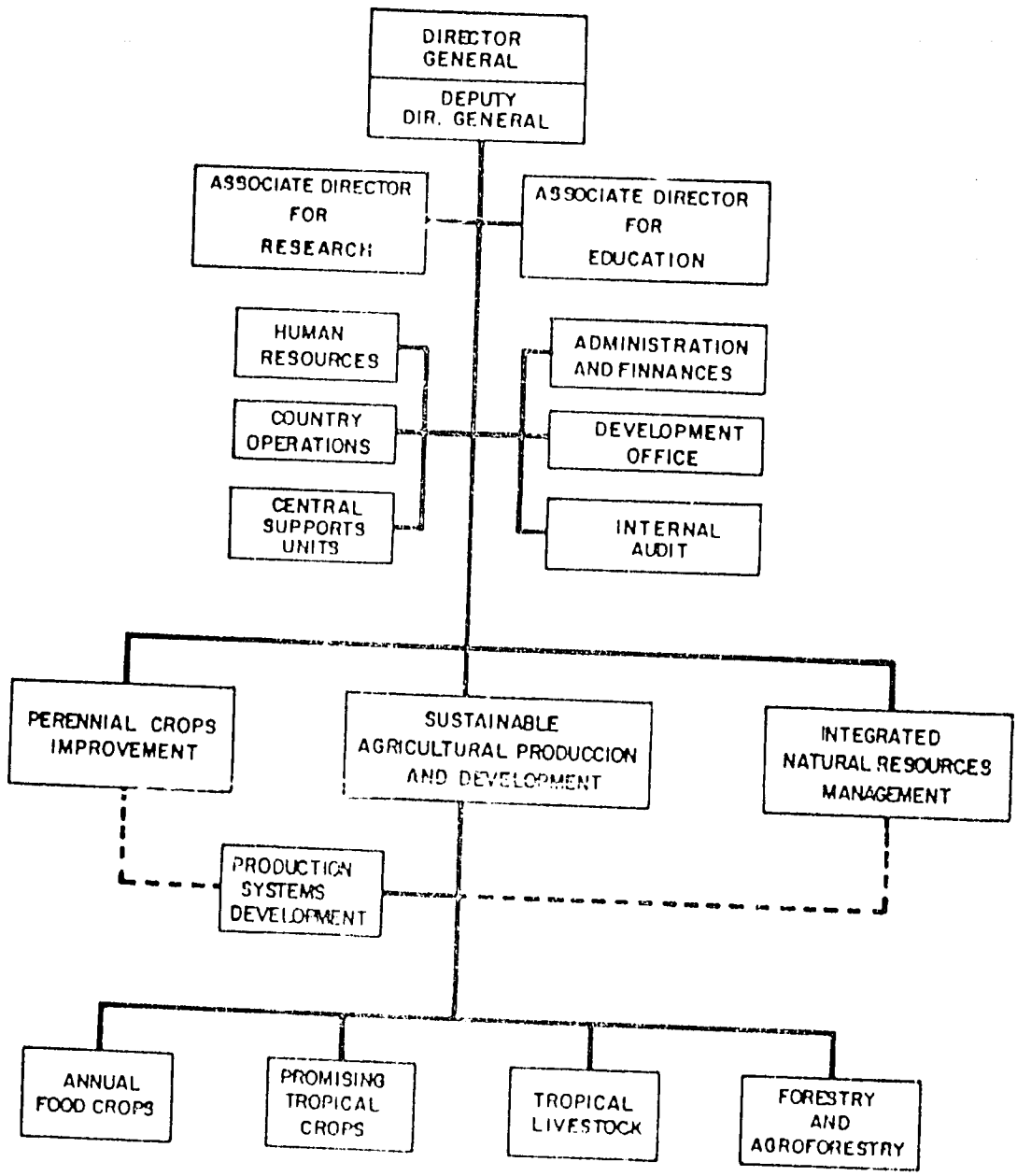


Fig.3 Proposed organizotion for CATIE

B. Buildings and Facilities

CATIE's main facilities include four office buildings, a conference hall with other meeting rooms, classrooms, and teaching laboratories. There are also laboratories and facilities for soils, plant pathology, entomology, plant physiology, animal nutrition and physiology and languages. The center has numerous greenhouses, a herbarium two cold chambers for genetic materials, an arboretum, nurseries, a meteorological station, and a building for the cattle and small animals program. In addition, there are a 24-room dormitory, an apartment building to house visitors, a warehouse and workshop and two tissue culture laboratories, a coffee processing plant and a computer center. Other CATIE facilities are three dormitories for single students, 11 apartments for married students, one guest house and 48 residences for staff.

Under the Regional Agricultural Higher Education Project (USAID/Costa Rica local currency trust fund) a major construction program is underway including staff and student housing, a classroom/office building, computer center, improvements in electrical and water systems, and renovation at both CATIE's main campus, and livestock and cacao research stations. In regard to the cacao network, CATIE has programmed funds from the local currency trust fund for construction at La Lola (tentatively including a field office/laboratory building, seed processing facility, dormitory/classroom/cafeteria building).

C. Equipment

All laboratories are equipped for requisite research and teaching. Under the Regional Agricultural Higher Education project, new equipment is currently being purchased for all laboratories as well as field research stations. CATIE maintains a motor pool of some 60 vehicles and a filling station. It is equipped with agricultural machinery including tractors, bulldozers, loader, and spray equipment for the commercial farm operation of coffee and sugar cane. The dairy farm has mechanical milkers and a creamery.

The Computer Center has Hewlett-Packard and IBM computers for processing and storing data. CATIE is currently upgrading its computer center from funding provided under the Higher Education project. In addition, it has recently acquired under the Regional Tropical Watershed Management Project sophisticated Data General mini computers and software as part of the development of geographic information system and

expanded data base capability. Technical departments and administration also have access to microcomputers in addition to computer center equipment.

The Conference room is equipped with slide film projectors and an opaque projector.

CATIE Portfolio of Projects

As of december 1986, CATIE was managing more than 48 projects, ranging from $22,000 to about $2,500,000 per project/year for a total annual cost of $11.5 million. Life of projects costs is more than $33.0 million. Principal donors include USAID, FIDA, CIID, GTZ, DDA, CEE, and the Kellogg Foundation. CATIE has initiated a major fund-raising drive to identify new sources of core budget and project funding. A fund-raising office is being established and a specialist in fund-raising recruited under the Agricultural Higher Education Project. In addition, at a recent meeting of the CGIAR donor group, a donor support group was organized for CATIE.

ADMINISTRATION/FINANCE

The Accounting, Finance and Administrative Department has a new structure separating finance into controller and treasurer functions as of July 1987 to improve overall management effectiveness and provide training for staff. For additional details see organizational chart in exhibit F.

Also, a study conducted by the local representative of Price Waterhouse is being carried out in order to re-design the accounting system. Pending the installation of the redesigned system, some minor changes have recently been implemented. These include computerization of cash transactions and bank account status, inventories, purchase orders and committments; improved tracking of project related travel, and document flow and filing. Lastly, effective July 1, 1987 a new personnel system developed with the assistance of NASPAA, is being implemented. CATIE has designated a human resources director to oversee its implemtation.

CATIE is annually audited by the local representative of Peat, Marwick, Mitchell & Co. As a non-for-profit organization, CATIE has adopted some procedures that differ from generally accepted accounting principles. Nevertheless, for the purposes of this project, those practices adopted by the Board of Directors do not affect the financial position of CATIE.

Exhibit 6 in CATIE's condensed Balance Sheet for the years ended december 31, 1985 and 1986. Cash on hand and in banks includes funds that are restricted and may only be used to cover expenditures related to contracts signed with CATIE. Because of the advance-reimbursement procedures with differente donors, CATIE has faced liquidity problems. Now, new procedures, the re-design of the accoun ing sustem as mentioned increase in collections, savings and a close budgetary control make medium to long term prospects look good.

Exhibit F

ORGANIGRAMA

DEPARTAMENTO DE ADMINISTRACION Y FINANZAS

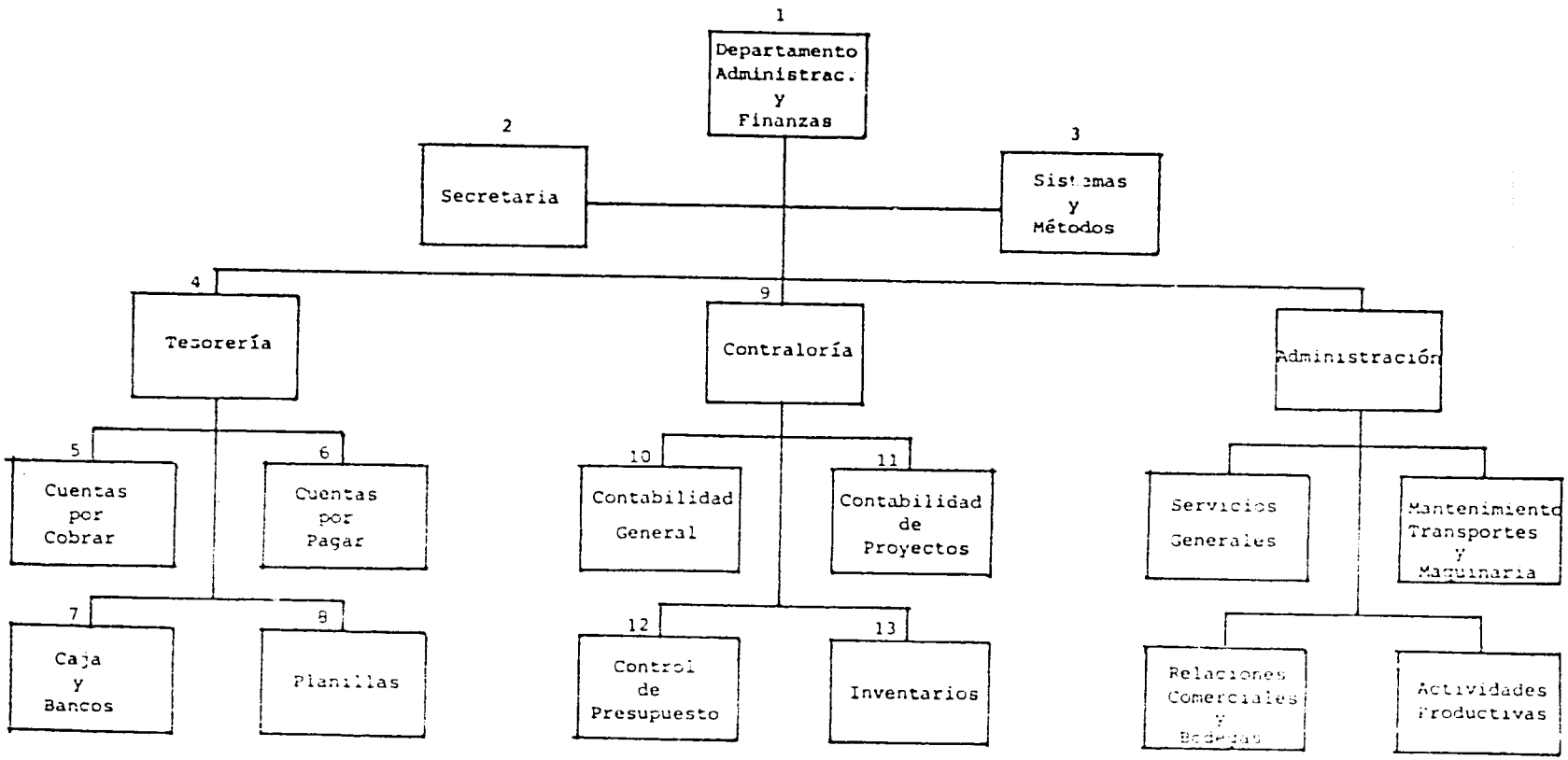


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Exhibit H compares statements of revenues and expenses for the years 1985 and 1986. Main sources of income are members' contributions, productive activities and Administrative and logistic support. Expenses were primarily for salaries, retirement of international professional personnel, severance indemnities and general administrative expenses.

If we add salaries paid under basic activities. Productive activities and trust funds, they represent 52% of total executed expenses in 1986. Of this total 9% were for administrative and services departments, which in a commendable percentage for a non-profit organization and reflects the measures adopted on reducing staff. 1987 revised projections look for a budget surplus of approximately $400 thousand.

The implementation of the redesigned accounting and financial system will enable CATIE to: a) provide accurate and timely information to administration and to department and project heads; b) establish a cost accounting system for the proper allocation of counterpart contribution; c) revise overhead rates in a timely manner; and d) compare projects progress against budgets.

OVERHEAD

Presently, CATIE does not have either a policy or a standard methodology which can be used as a basis in order to settle and/or negotiate an overhead rate. Among the projects that it now manages some do not pay overhead, others recognize an established amount of money and others express overhead as a percentage of specific line items, varying from 13% to 25% of the programs cost.

One of the objectives of overhead is to permit the implementing institution to recover costs and expenses which it will incur as a consequence in the increase of the level of activities corresponding to the new program that are added to the institution.

The last project that ROCAP financed with CATIE was signed in August 1985, and used for the financial analysis budget figures thru December 1983. The expenses structure showed by CATIE at that time was an element evaluated to recognize an overhead rate of approximately 25% of the total project expenses.

At this date, CATIE is implementing different administratives and financial measures in order to eliminate

the deficit position it encountered in 1985 and reduce debts which continued thru 1986. Among other things, CATIE has reduced its international personnel staff paid by core budget from 38 in 1986 to 25 in 1987. According to this type of

EXHIBIT G

TROPICAL AGRICULTURE RESEARCH AND TRAINING CENTER

BALANCE SHEETS

DECEMBER 31, 1986 AND 1985

US (000'S) DOLLARS

	1985	1986	1986 IN %
ASSETS			
Cash	507	617	14%
Account Receivables	877	918	21
Inventories			
Long Term Receivables from Members	140	230	5
Property, machinery and equipment	2064	2103	50
TOTAL ASSETS	$4172	4293	100%
LIABILITIES AND FUND BALANCE			
Notes Payable	-	93	2
Accounts Payable & Accrued Expenses	465	893	21
Due to IICA	-	118	3
Due to Trust Funds & Agreements	1095	531	12
Various Reserves	20	39	1
Sub-Total Current Liabilities	$1580	1674	39
Reserve for Retirement of Int.Personnel	919	817	19
Reserve for Severance Indemnities	324	318	7
TOTAL LIABILITIES	2823	2809	65
Fund Advance	1349	1484	35
	$4172	4293	100%

EXHIBIT H

TROPICAL AGRICULTURE RESEARCH AND TRAINING CENTER

STATEMENTS OF REVENUES AND EXPENSES

YEARS ENDED DECEMBER 31, 1986 AND 1985

U.S. (000's) DOLLARS

	1985	1986	1986 IN %
REVENUES			
Members' Quotas	$1304	1304	32%
Administration of Goods and services	501	559	14
Technical Support Services	211	153	4
Teaching Activities	177	116	3
Productive Activities	778	883	22
Administrative and Logistic Support	637	815	20
Other Income	51	245	5
TOTAL REVENUE	$3659	4075	100%
EXPENSES			
General Directorate	765	904	22%
Planning	23	-	
Technical Programs	1724	1467	36
Administration and services	1371	1047	26
Productive Activities	424	585	14
Other Expenses & Loss on Inventory Valuat.	117	53	1
TOTAL EXPENSES	$4424	4056	99.5
Excess (loss) of revenge over expenses	(765)	19	0.5
Donated Fixed Assets Adjusted	797	116	3
Excess of Revenues over Expenses	$ 32	135	3%

measures, the expenses for core budget are considerably reduced, causing variation in the relation of the indirect expenses to direct expenses, or other relations which are used to calculate the overhead rate. On the other hand, the most recent project which CATIE accepted has an overhead rate of 13% of the total expenses less the equipment cost to be purchased. Deduction of the equipment cost in order to calculate the overhead rate responds to the transfer of equipment to the implementing institution when the project finishes.

Since CATIE has no specific overhead calculation methods, the proposed project has budgeted a provisional rate of 13% on the total cost of CATIE's component. When the overhead study currently being carried out develops satisfactory metnodology for determining overhead, audited annual figures will be used as a bases for reviewing its dependability. The final overhead rate will be the one which absorbs a reasonable share of CATIE's operation costs related to implementing the project so as not to prejudice the institution. If the audited rate is more than the one budget, the funds will be taken from the Contingencies line item in order to meet the additional expense.

Honduran Agricultural Research Foundation - FHIA

FHIA has been identified as one of the lead technical institutions under the project. This is based on the strength of its cacao program and technology transfer activities, its excellent research and training facilities, and the stability of its funding.

I. BACKGROUND AND FUNCTIONS

A. Creation of FHIA

On May 15, 1984 FHIA was constituted as a private, civil, non-political, non-profit organization dedicated to agricultural research, especially traditional and non-traditional export crops for diversification.

FHIA's resources are derived from two main sources: USAID/H approved a donation of U.S.$20 million dollars (Agricultural Research Foundation Project) which will support FHIA in its initial 10 years of operations, and United Brands Company donated the land, buildings and installations that now are property of FHIA.

B. Objectives of FHIA

FHIA's main purpose is the improvement of the production levels of the Honduran farmers and generating sources of employment. The objectives are:

a) To develop an agricultural technology which can support and promote the productivity of traditional and non-traditional export crops of the country.

b) To provide specialized agricultural services to the Honduran producers and to public and private institutions of the sector.

c) To support governmental and private programs that improve the production of basic food crops.

d) To provide technical information which can contribute to the planning and development of the Honduran agriculture sector.

C) Programs

FHIA has six major programs. These include national programs in citrus, cacao, plantain, vegetables, and diversification for new exportable species or substitutes in traditional imports, and an international program in banana/plantain breeding. FHIA's support to the regional cacao technology network will be administered by its cacao program.

Cacao Program

FHIA's program in cacao includes a 50 Ha research station, one MS level researcher, two technicians, and support from the various technical departments (approximately 20 % of their time is devoted to the program).

FHIA's cacao program has identified the following problems which need consideration: a) Limited technical control by farmers in the minimum handling practices; b) high incidence of "Black Spot of the Mazorca"; c) use of unselected material; d) low density of sowing; e) inadequate shading; f) drainage problems; g) absence of fertilization practices; and h) disregard and/or negligence to an adequate processing of the seed.

This program plans to conduct research on variety improvement, crop phenology, plant protection, post harvest

handling, management crop economic evaluation. Also, the program contemplates the production of hybrid seed, the establishment of demostration plots and the training of technicians and lead farmers.

FHIA has established the Technical Advisory Committee of the Program with the co-partnership of the Cacao Producers Association - APROCAHO-, FEPROEXAAH, Natural Resources Ministry and the Hondurean Agrarian National Institute -INA, the Professional Training Institute -INFOP, CDI/PTR and IHCAFE.

Other Services

FHIA gives a very important contribution to the agricultural sector by specialized services in soil and plant analysis, pest and disease diagnosis, fungicide, trials, analysis of fungicide residues.

Library and Communications

FHIA is developing the Division of Communication which will permit, in mass form, to train extensionists and leader producers as a communication mechanism with users. FHIA is acquiring communication equipment, graphic arts, photography, video, sound and transport and renovating a building for audiovisual production training.

FHIA's library began its services in 1953 and has bibliographic material on banana, abaca, african palm, diversification products, etc.

D) Current Organizational Structure

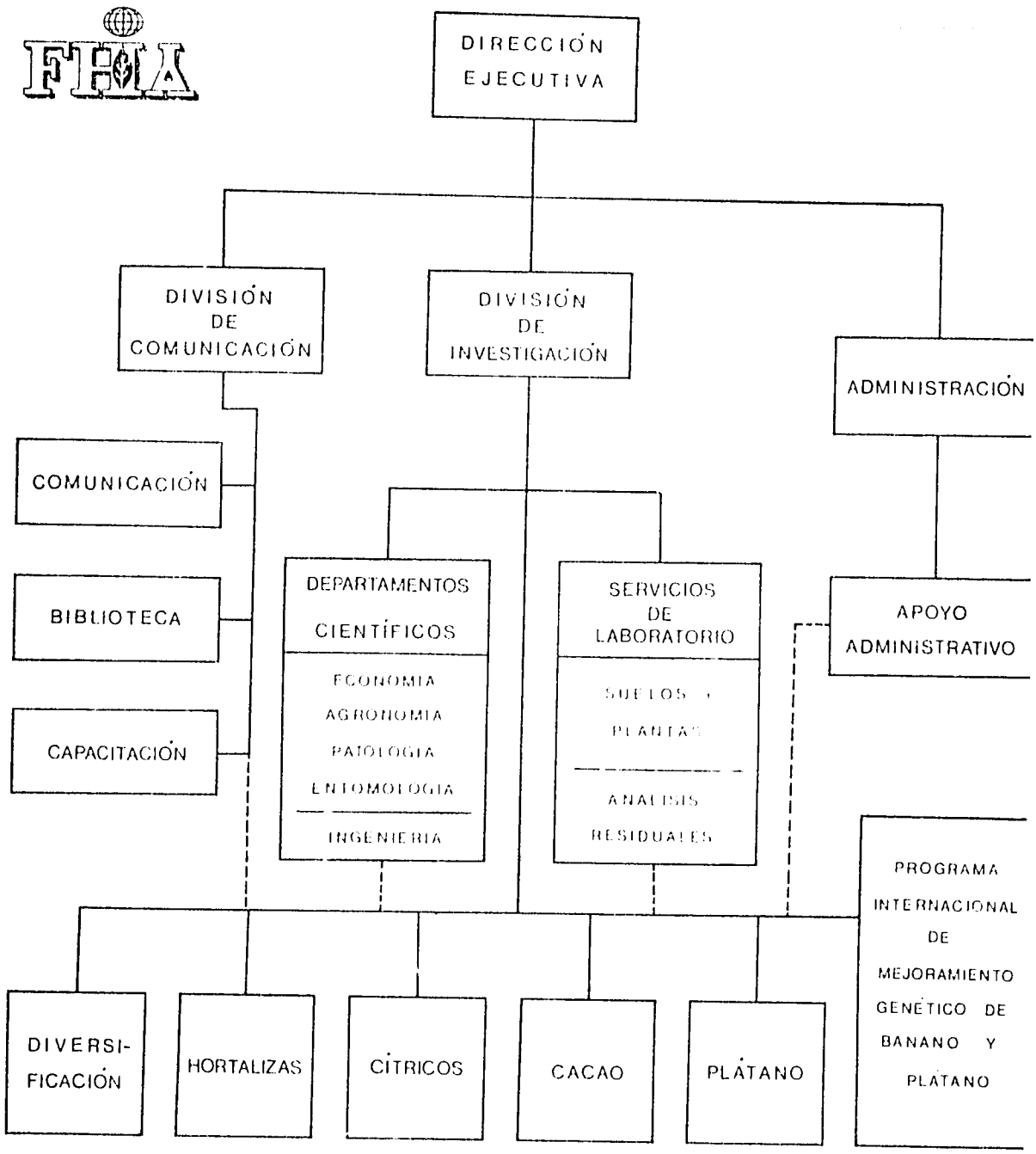
FHIA's executive structure is presented in Exhibit I. The principal executive institution of the Foundation is constituted by an Assembly of 30 members which includes private and government sector representatives. The Assembly also counts with the participation of national scientists. After the Assembly of the Foundation there is the Management Council, integrated by seven members and afterwards the Executive Directorate.

The management structure is constituted by a General Manager responsible for the Personnel Office, Finance and Services.

In 1985, FHIA's personnel expanded from 82 employees to 156; 155 of them work by the research area and 41 in administration.

In the Finance Office an accounting and budget control system was established, with the assistance of the Financial Analysis Department of USAID/Honduras. FHIA has established systems for the control and evaluation of inventories; budget execution; policies and procedures regarding travel expenses, cash disbursement, advance payments, petty cash, billing and payrolls.

Exhibit I



ESTRUCTURA ORGÁNICA EJECUTIVA

E. Finance

FHIA is audited annually by the local representative of Arthur Young International Firm. Its 1985 report shows that the financial report "present reasonably the financial situation of FHIA"; thus, a favorable opinion.

Exhibits J. and K. summarizes the financial reports to December 31, 1985. Thirty one percent of its budget was used on administrative expenses and sixty nine percent on research expenses. The balance sheet indicates a favorable financial situation, without the problems of liquidity or contracting of debts. The results of the report indicate that FHIA depends on the funding of international donors in order to meet its operational expenses. As a non-profitable institution, its principal line item is in Personal Services.

The resources that FHIA handled come from two main sources: USAID/Honduras in the financial resources and United Brands on capital assets. Eighty six percent of the gross income came from USAID/Honduras. In the future, FHIA should diversify and increase its sources of funds until it becomes self-sufficient.

OVERHEAD

FHIA is an institution which does not receive fixed quotas from its members. This implies that the resources must come from the sale of its services and/or donations.

At this moment, FHIA does not have a methodology to calculate the overhead to charge to the projects. Because of this, the following exercise proposes to establish a provisional overhead rate. It was determined as follows:

a) The 1987 budget expressed in Lempiras was used.

b) The budget is divided in operational expenses and capital expenses (investment). Only the figures of operational expenses were used.

c) The budget line items are the following: Research Division, Programs, Departments, Analytical Services, Communication Division, Development and Management.

d) It was assumed that Administration and Library give service to all the other activities; for that reason Administration and Library are indirect expenses (not

identified with a particular activity) and the other activities, line items or divisions are identifiable direct expenses.

Exhibit J.

FHIA BALANCE SHEET

AS OF DECEMBER 31, 1985

(FIGURE IN US$)

		%
ASSETS		
Cash & Banks	$ 740942	27
Short-Term deposits	125000	5
Accounts Receivable	43878	2
Pre-Paid Expenses	5584	-
Sub-Total	915404	34
Prop., Facs., & Equipment	1793840	66
TOTAL	2709244	100%
Liabilities & Fund Account		
Accounts Payable	49360	2
Accrued Liabilities	40734	2
Accrued Expenses	24940	1
TOTAL LIABILITIES	115034	5
Fund Accounts		
Donations	1802108	66
General working fund	79210	29
TOTAL	$2709244	100%

x-rate: £2.00 = US$1.00

Exhibit K.

FHIA STATEMENT OF REVENUES AND EXPENSES

YEAR ENDED DECEMBER 31, 1985

(US DOLLARS)

		%
Revenues		
Donations from Intenat'l Inst.	$1999152	90
Lab. and Tech. Services	148468	7
Interests	13388	1
Other Donations	52614	2
Other Income	1287	-
TOTAL	2214859	100%
Expenses		
Salaries and Benefits	1082801	49
Maintenance	37938	2
Chemicals for Lab.	13444	1
Misc. Services	29122	1
Travel and Per diem	63096	3
Professional fees	21422	1
Electricity	58315	3
Telephone and Telex	24699	1
Gasoline and oils	25083	1
Depreciation	41059	2
Other Expenses	168523	7
TOTAL	1565502	71
Increase in general working fund	649357	29

x-rate = L2.00 = $1.00

e) The relation between Indirect Expenses to Direct Expenses is 34.9% calculated as follows:

(rounded figures expressed in Lempiras)

Indirect Expenses

Administration	L 1,821,000
Library	162,000
	1,983,000

Direct Expenses

Research Division	L 262,000
Programs	1,678,000
Departament	2,081,000
Analytical Services	440,000
Communications Division	1,081,000
Development	146,000
TOTAL	L 5,688,000

$$\frac{\text{Indirect Expenses}}{\text{Direct Expenses}} = \frac{1,983,000}{5,688,000} = 34.9\%$$

f) The Indirect Expenses were distributed among Direct Expenses to set an expenses amount in which each Division or Activities should absorb as follows:

		FACTOR	
Research Division	L 262,000	0.349	L 91,000
Programs	1,678,000	"	585,000
Departaments	2,081,000	"	726,000
Analytical Services	440,000	"	154,000
Communications Division	1,081,000	"	376,000
Development	146,000	"	51,000
	L5,688,000		1,983,000

g) By using the same factor of 34.9% each of the different Programs must be responsible for some overhead amount based in the quantity of resources it manages.

PROGRAMS	OPERATIONAL EXPENSES	FACTOR	OVERHEAD TO ABSORB
Citrus	L 212,000	0.349	L 74,000
Cacao	204,000	"	71,000
Plantain	259,000	"	90,000
Vegetables	143,000	"	50,000
Diversification	280,000	"	98,000
Genetic banana/plantain	580,000	"	202,000
	L1,678,000		L585,000

n) If the present cacao project provided $1,200,000 (L2,400,000) to FHIA during 6 years and absorbs 100% of overhead (L71,000/yr.) attributable to the cacao program, then:

$$\frac{L\ 71{,}000 \times 6}{L\ 2{,}400{,}000} = 18\%$$

The provisional overhead rate has been budgeted at 8% of the total costs of the project managed by FHIA given that the new project would not be expected to cover the entire overhead attributed to the cacao program. This represents 45 % of the overhead attributed to the cacao program. Funds are budgeted separately for the support to be provided the cacao project from FHIA's technical and communication departments.

The statement of incomes is representative of a services institution which has few well established sources of support, and because of this, it has to be managed with a balanced budget.

CATIE and FHIA Linkages to National Institutions Under the Cacao Network

The proposed technologies networks project for cacao will require the active participation of both national research and extension institutions of the countries involved. Representatives from each will be members of the executive committee to direct the overall program. In addition, national research and extension institutions will be integrally involved in research and farm-level validation trials of new technologies, beneficiaries of training and information materials, and key to the successful establishment of national advisory groups to provide feedback to the project. Research institutions will include: Ministry of Agriculture (Belize), Ministry of Agriculture (Costa Rica), CENTA (El Salvador), ICTA (Guatemala), PNIA (Honduras) and IDIAP (Panama).

CATIE currently has working agreements with most research institutions in the Central America and Panama region, as well as in the Dominican Republic. Thus far, it has established no formal relationships with Belize. FHIA has working relationships with various institutions in Honduras. CATIE and FHIA will establish and/or reinforce linkages with research and extension institutions in participating countries.

SOCIAL SOUNDNESS ANALYSIS

The following is an overview of major social issues related to the establishment of a regional collaborative technology development and transfer network. Project objectives seek to build and transfer a solid base of knowledge, expertise and research capability that will increase small and medium sized farm use of technologies and through them expand cocoa output and reduce its costs of production.

The social soundness analysis first reviews target populations and the distribution of impacts. The issue here concerns whether target groups will be among the principal beneficiaries of project activities. Second, the analysis addresses the issue of how likely is the main target group of farmers to adopt the innovations introduced by the project. Major themes here involve the relation of the project to its socioeconomic and cultural environments, the likelihood that project results will be diffused, and the distribution of benefits from the project. Given the regional nature of the project analysis, the indicated themes will require discussion at two levels. Regional institutions, that is to say CATIE and FHIA, work directly with national institutions in each country. The latter in turn bear primary responsibility for direct linkage with the farmer. Diffusion of project results therefore must be viewed from a dual perspective of both linkages among regional institutions, and of intra-national linkage between national institutions and the farmer.

TARGET POPULATIONS AND THE DISTRIBUTION OF BENEFITS

The Range of Beneficiaries

The staff of professionals working on cocoa research at CATIE and FHIA and those working on cocoa research and extension in national public and private institutions in the CA&P region will be among the individuals first to be affected by the project. Others include government officials, community leaders, extension workers in general, small and medium sized farmers, cocoa producer associations, co-op members and individuals involved in rural enterprises who directly or indirectly participate in activities promoted by the project. Additional beneficiaries include rural laborers, urban poor, women, research organizations and the countries themselves in general.

A critical assumption is that strengthening cocoa research, training and information dissemination capabilities in the region can increase cocoa production and reduce its costs. Achieving these objectives will require focusing research more precisely on a regional basis while improving national capabilities for validating results and linkages for the transfer of these.

SPECIFIC BENEFICIARIES

Farmers and Rural Laborers

The key target group for the project includes small and medium sized cocoa growers as well as laborers on cocoa plantations. The accepted regional definition of "small farm" is one of size 30 hectares or smaller. According to CATIE, small farmers comprise about 64% of the farming population in the CA&P region, and produce about 75% of all food crops in the region (except rice, for which 27% of regional production is contributed by small farmers). A large share of these producers operate farms under 10 hectares.

Detailed information on extent of cocoa production by farm size is available only for some countries. Data for Panama show that over 63% of cocoa producers are located on farms under 10 hectares but holding less that 5% of the total surface of these farms. In Guatemala, 53% of cocoa producers are located on farms under 7 hectares which hold around 27% of the total area in cocoa and produce close to 36% of that crop. Information for other countries refers only to size of cocoa plots. In Costa Rica around 92% of cocoa plots are under 10 hectares accounting for almost half of both cocoa area and total production. In Honduras over 91% of the crop producers hold cocoa plots under 7 hectares. Finally, production in El Salvador takes place currently on a single large farm with 112 hectares in cocoa.

While the specific characteristics of small farmers vary among countries, production zones, and actual farm sizes, several general features typify the CA&P small farmer. Often they are provisional farmers, lacking a firm legal claim to their land. They have little land, little capital and low educational levels. Many farms are on relatively poor quality land. Operations tend to be highly labor intensive with over half of variable production costs deriving from cash or opportunity costs of labor.

Many small farmers need to produce food for their subsistence and that of their families. Also, they cannot

afford to wait several years for production to begin if it is their only cash source. Thus small CA&P farm operators are characterized by mixed farming of crops and animals, combinations of perennial and annual crops, intercropping and traditional methods designed to reduce risk. Within this context, cocoa growing provides deferred income thus representing a form of savings.

Cocoa yields in the region are low, between 400-700 lbs per hectare in most cases according to CATIE, and with few systematic differences due to farm size. Currently available technology offers the possibility of yields in the 2000-3000 lb range. Understanding the potential involved is essential and a brief discussion on the nature of innovations proposed follows.

Changes represented by currently available technology are essentially of two kinds. One consists of improved genetic materials (varieties) both for raising yields and for increasing resistance to pests and diseases. The other consists of modified cultural practices. Among the latter, and beside changes in labor intensity, some involve applications of industrial inputs such as fertilizers or pesticides. Others only involve the application of new knowledge such as changes in shade practices or in plant densities.

Depending on existing pests and diseases in each country--e.g. phytophora palmivora, monilia roreri, crinipellis perniciosa, or characteristics fimbriata--estimates of yield improvement on the basis of the latter type of cultural practices--mainly frequent removal of diseased pods--range from 20% to over 90%. That is, on the basis of additional labor and application of new knowledge, substantive improvements may be achieved. Further yield gains would of course require other improvements. Nevertheless, the point illustrates the potential of even simple technification on production yields.

Actual cocoa technology used in the region varies widely although, as noted earlier, it leans mostly toward the lower end. Yields as low as 200 lbs per hectare or even lower are associated with a strategy of harvesting and minor weed control only. At the other end, farm using available technology are obtaining yields in the 1500-2500 lab range.

Cocoa growing is an essentially labor intensive activity where little mechanization is applicable. The effect of further technical change diffused by the project will be in the direction of increasing labor requirements. Analysis of recommendations currently advocated by FHIA imply that each 2.3 hectares of cocoa, properly managed, would generate the

equivalent of one full time permanent job, directly in production. This would be an upper bound requirement and actual labor intensity in less technified operations is much lower.

Currently the region has around 36,000 hectares in cocoa on close to 12,000 farms. Estimates of total potentially suitable and mostly available land for the crop range between 400,000-600,000 hectares. Assuming only half of the labor requirement per hectare given by FHIA would imply around 87,000 permanent jobs. Applying the full requirement to 600,000 hectares would imply an upper limit of 260,000 jobs.

While developing cocoa production to its potential in the region would certainly raise the number of available and required jobs, bottlenecks due to labor shortages would still be unlikely for a number of reasons. First, a full expansion to the upper limit is probably unlikely because other crops currently occupy at least part of the land. Should it occur, however, some jobs used in these crops would be made available for cocoa. Second, the labor intensity of cocoa production would be desirable in the region where an economically active population in agriculture of over 3.1 million in 1985 (for Costa Rica, El Salvador, Guatemala, Honduras, and Panama--no data for Belize--according to the United Nations' Economic Commission for Latin America) continues to grow. Third, while smallholders face restrictions of land, capital and manpower, in relative terms, the first is generally more pressing than the third. Because of it they usually need to work off of their farms at least part of the year. For smallholders and their families, improved technology for cocoa growing will afford enhanced on farm occupational and income opportunities in a profitable activity. Expansion of areas currently under cultivation will have a similar effect. Analogous considerations apply to laborers on large farms where technical change and expanded cultivation will provide both a greater number of jobs and the cash income to afford better salaries.

The importance of cocoa as a cash crop should not be minimized in a region where half of the population remains in rural areas but is in the process of becoming increasingly integrated with the urban economy. The latter, taking place through markets and heightened interaction--deriving from improved transportation and communication facilities--is giving rise to expectations and demands for money incomes.

The Urban Poor

Additional jobs will derive from the transportation and marketing of the crop. Eventually, cocoa processing may play an

important role in this respect. At present, domestic markets for chocolate and other cocoa products are small in most countries except Costa Rica. Generally, most cocoa produced in the region is exported. The small internal supply has not generally offered incentives for establishing cocoa processing facilities. As the domestic supply of cocoa rises, however, from enhanced production deriving from technology made available by the project, changes of interest in processing and the domestic market are anticipated. In Honduras, for example, the Central American Bank will shortly be reviewing a proposal to fund the establishment of a cocoa processing plant to be owned by cooperatives of cocoa producers within the national agrarian reform program.

Women

The project will benefit women in several important ways deriving from growth in cocoa production. The increased labor requirements of technification and larger areas under cultivation will afford greater work opportunities for women both on and off family farms. Since cocoa is entirely a cash crop, a larger work role even on the farm is likely to be accompanied by a direct sharing in proceeds from sales. Other opportunities will derive from the marketing of the product.

Another important way women will benefit is through the development of household processing facilities. With the expected increase of production, domestic markets for cocoa derived products, currently restricted by inadequate supplies, will grow quickly. This will afford opportunities for household processing and the marketing of outputs, an area where women hold comparative advantages. For instance, dry cocoa may be shelled, toasted, ground and mixed with sugar and other ingredients for beverage purpose or to make chocolate candies. This represents an area of interest and opportunity for volunteer organizations. Some activities are already under way. In Honduras, for instance, APROCACAHO has been coordinating with PADF and the Peace Core for the purpose of developing a project for household processing.

Central American Countries

Central American countries presently face serious economic difficulties originating in the weaknesses, restrictions and uncertainties of many of their traditional international markets. Such is currently the case with sugar, coffee and bananas, among others. Increasing indebtedness and reliance on foreign donors as outcomes can ultimately only worsen problems. Within this context, the search for alternative and self sustaining economic bases becomes important. Here cocoa

production, an export crop, holds the potential for becoming an important source of foreign exchange for stimulating economic growth.

Adoption

Adoption of the new technology supply made available through the outcome of network activities will depend on compatibility of innovations with two broad sets of conditions. On the one hand, objective socioeconomic conditions must favor cocoa production and provide incentives for growing it. Suitable prices, marketing facilities and availability of inputs and credit, therefore, constitute necessary preconditions. On the other hand, innovations must fit in culturally with community understandings, beliefs, attitudes and values.

Socioeconomic Conditions

Neither technification nor production (excluding subsistence crops) constitute ends in themselves but rather means to income and other sources of welfare. Markets and buyers are thus essentially preconditions for production and technification. Marketing arrangements in the region are quite variable. In Panama, virtually all cocoa grown is sold and exported through the Cooperativa de Cacao Bocatoresa. Producers are paid current New York prices minus transportation and marketing costs. At the other end in the most widely prevailing arrangement in countries such as Honduras, Costa Rica and Guatemala, producers sell their crop to middlemen who in turn resell or export it. In Honduras, for example, the dominant pattern involves middlemen purchasing the crop locally, selling it to wholesalers that resell it in turn to large buyers in El Salvador, who then export it to the United States and other countries. In the process, the producer ends up receiving a variable but mostly low share of export prices. Small scale producers often experience income losses through ignorance of market conditions, long distances, and lack of transportation facilities. In some countries, as in Honduras, plans by producer associations such as APROCACAHO, are under way to improve the buying and marketing condition of their members through establishing crop reception centers. Self organization by producers appears to hold the greatest promise in dealing with this problem in the region.

Other essential preconditions concern access to inputs and to credit. Fertilizers and pesticides are usually available through private enterprise outlets and through agrarian banks although specific problems in given areas remain. In Honduras, APROCACAHO is developing plans to increase local supplies of such products in conjunction with BANESA. Access to improved

and tested genetic materials has constituted a major obstacle in the past. Importing them from CATIE in Costa Rica is usually necessary--a difficult and costly operation for smallholders. In addition, no firm guarantee of adaptation to local conditions may be expected. One important effect the proposed network will have is to increase locally available supplies of germplasm as well as broadening the testing of released varieties.

More often than not the major problem with inputs concerns not only their availability but access to credit in order to buy them. A review of existing evidence on credit suggests no shortage of potentially available funds. The World Bank, IDB and USAID, among other institutions, have provided funding for agricultural credit in a number of countries in the CASP region, for a variety of crops, cocoa among them. In addition to external donor and loan funds are those provided from national sources.

Funding availability, however, does not necessarily imply access by smallholders to credit. Smallholders experience serious difficulties in knowing about, qualifying for and obtaining credit. Many are not legal owners of the land they farm and cannot thus mortgage it. Frequently, they cannot handle the necessary paperwork or comply with other requirements for loans. Often also they may be unaware of credit opportunities.

Without credit, smallholders are unable to adopt innovations that involve using purchased inputs. They may still be able to adopt innovations centered on applying new knowledge only, such as modified agronomic practices. Technification, however, usually involves a package or system of specific changes in which piecemeal adoption fails to bring about desired results. For instance, high yielding varieties may show little effect in the absence of fertilizer use.

Although no systematic evidence on credit by farm size is available, the prevailing consensus in the region suggests that small cocoa growers do face serious problems of access to credit. Among solutions considered, those involving local disbursement and control of funds through community organization and grower associations appear to offer the greatest promise. Such approaches have been tried successfully in a number of countries and in relation to a variety of crops. They also offer ample opportunity for a useful supportive role by volunteer organizations and the Peace Corps in setting up the organizational machinery and making available, necessary administrative knowledge and experience for beginning and developing successful community efforts.

Sociocultural Considerations

In a comprehensive review of world literature on the diffusion of innovations, most of them of a technical nature in agriculture and health, Rogers[1/] identified a set of characteristics or attributes of innovations related to adoption. Likelihood of adoption was found to be positively associated to the relative advantage showed by an innovation--in which profitability becomes a major but not the only consideration; for instance, status also prove important--as well to its compatibility with existing beliefs, practices and needs. "Trialability"--whether an innovation admitted small scale or partial testing--and visibility of results also were found positively related to likelihood of innovation. A negative relation was found with the complexity--degree of difficulty to understand and use--of innovations.

Other literature and studies have identified risk aversiveness as a major characteristic of peasants and smallholders bearing on likelihood of adoption. Because the smallholder and his family live so close to subsistence, change involves a dangerous risk. On the other hand, when potential benefits are large and visible, rapid adoption becomes likely as was demonstrated in Asia during the Green Revolution when large numbers of smallholders adopted the new seeds and introduced irrigation.

In examining potential farmer receptiveness to innovations deriving from the project in CA&P several elements appear outstanding. One is the nature of cocoa as a cash crop. Farmer interest in cash crops throughout the region has been increasing on account of growing integration between the rural and urban economies, already noted above. Farmer attention to cocoa partakes of this interest. Consequently, attitudes toward cocoa growing tend to include a strong motivation based on expected profits as well as flexibility concerning the best means for achieving them. A positive condition in cocoa growing areas arises from the fact that in practical terms most small scale farmer are or will be newcomers to the crop. This avoids the long ingrained kind of structural inertia regarding changes in technical practices that are often associated with communities having a long, usually hereditary, experience with one particular farming system.

1/ Everett M. Rogers, Diffusion of Innovations, 3rd ed. (New York: Free Press, 1983).

A second consideration derives from the nature of the innovations already available as well as anticipated for the future. These, as noted earlier, involve mainly development and use of improved varieties as well as modified cultural practices. No radical departures from existing patterns of work and organization such as might be implied, for example, with heavy mechanization, are anticipated. The bulk of observable changes, aside from new varieties, will lie mainly in different agronomical practices, a higher intensity of labor, and the use of agrochemicals such as fertilizers and pesticides. Current evidence indicates that potential difficulties with adoption do not derive from cultural obstacles. It suggests that the main challenges lie with objective preconditions in terms of securing availability and access of smallholders to necessary inputs and infrastructure such as knowledge, varieties, chemicals, credit, buyers and marketing. Cocoa fermenting provides an instructive example. While Central American cocoa is classified as of potential high quality, much of actual production falls short of this level due to non fermentation after picking. Farmers have generally lacked the knowledge of how to ferment their product but also buyers have failed to establish a premium in favor of fermented cocoa. Recently, FHIA and APROCACAHO in Honduras have been diffusing knowledge of simple and easy fermentation techniques among growers. Also some buyers have established a premium on fermented cocoa. Officials from both FHIA and APROCACAHO report a rising number of growers are engaging in the fermentation of their product.

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ANNEX D

RESEARCH AND EXTENSION CAPABILITIES IN THE REGION

COUNTRY	RESEARCH			EXTENSION
	PERSONNEL	FACILITIES	PROJECT FOCUS	
Guatemala				
DIGESA				
Los Brillantes	1 Spec Agronomo 1 Agronomo 1 technician (60%)	5 Ha	Genetic Improvement Cultivation Practices	7 technicians (3 Ing Agron)
Navajoa	1 Ing Agronomo (60%)	2.5 Ha	Clone Evaluation Cultivation Practices	
Sachitepequez		70 Ha	Coffee Diversification with Anacafe	
La Libertad		140 Ha	Material evaluation	
Univ San Carlos	1 Ing Agron 10 technicians (5%)	Bulbuxya Exp Farm 10 Ha	Student research Farmer outreach demonstration plots Farmer training	5 - 7 students
ANACAFE	1 Researcher (10% time) 7 technicians	23 Ha 2 clone gardens	Production of vegetative material Hybrid seed production and evaluation Farmer training w/CATIE	unknown
CIRF (FAO)			Financial assistance for genetic material collection	
ICTA			Exp. Sta. and farm trials clone evaluation fertilizer rates shade management	

COUNTRY	RESEARCH PERSONNEL	FACILITIES	PROJECT FOCUS	EXTENSION
HONDURAS				
FHIA	1 MS (40%) 2 Ing Agron (90%) 16 researchers (20%)	50 Ha	physiology of cocoa plant ecological zone studies irrigation systems micro economic farm systems hybrid evaluations cultivation practices	
IHCAFE	2 Ing Agron		spacing trials hybrid trials chemical control of black mazorca clonal garden management	3 person years
INA	1 Ing Agron		clonal garden management	1 person year
Ebarht Foundation			financed studies on processing and cultivation	
CEPROD			conducted studied for Ebarht foundation and is proposing to Central American Bank the development of 860 ha cocoa farm in Guaymas	
COHDEFOR			wishes to promote cocoa in forests, is currently training technicians	
FEPROEXAAH			promotes production and export of many products, including cococa	
APROCACAHO			works with FHIA, VITA, PADF to transfer technology to farmers technical training for other institutions	9 person years
EL SALVADOR				
	none	none	no current research into cocoa ISIC has coffee diversification program which includes interest in cocoa	

COUNTRY	RESEARCH PERSONNEL	FACILITIES	PROJECT FOCUS	EXTENSION
Costa Rica				
MAG	1 MS coordinator Ing Agronomo (2) -entomology -phytopathology Agronomo (2)		PIPA seed production - will plant 7,000 ha ONS - seed improvement and production	MAG 25 (50%) IDA 2 ONS 2
University of Costa Rica	Ing. Agronomo (20%)	exp. farm	Student research	
Desarrollo Cacaotero		1.4 Ha	clonal garden, seed production	
Cacaotera Playa Blanca roduction		1.8 ha	clonal garden, seed	
Granjas Tropicales		1.5 Ha	seed production	
Kellogg Foundation			Training courses	
CATIE	1 PhD Admin 2 PhD fitopath 1 MS PIPA Ing Agron -hort. Ing Agron Farm Mgt 5 technicians 4 admin support 6 trainers 70 field labor	LaLola 96 ha Turrialba 15 ha 1.5 ha cocoa collec	Genetic Improvement Plantation Mgt Entomological res Product quality production systems post harvest mgt	
PANAMA				
MIDA	1 Ing Agron 1 MS	1.8 ha	hybrid evaluation clonal gardens production systems	MIDA 15 BDA 3

COUNTRY	RESEARCH PERSONNEL	FACILITIES	PROJECT FOCUS	EXTENSION
BELIZE				
Ministry of Agr.	None	None	No current research	6
Humingbird Hershey	5	1805 Ac farm including 700 AC cocoa	- variety trials - cultural practices - post harvest handling and processing	0
CARDI	None	None	No current research	0

ANNEX E

PARTICIPANTS AT RESEARCH DIRECTORS' MEETING HELD TO DISCUSS PROJECT DESIGN

Eduardo Lindarte, IICA

Jose Galindo-Lugo, CATIE Cacao Program

Leopoldo Alvarado, Director Agricultural Research, MNR, Honduras

Bertha Amaya de Belloso, Director General CENTA, El Salvador

Conrado Burgos, Chief National Livestock Research, MNR, Honduras

Jim Corven, PADF Cacao Development Project, Belize

Roberto Flores, IICA

Delia Gutierrez Rodriguez, SEPSA, Costa Rica

Horacio Juarez Arellano, IICA

Francisco Olivares Palacios, Director General, Livestock Development Center, El Salvador

Rafael Perez Duverge, Director, Agriculture and Livestock Dept., Dominican Republic

Daniel Vartanian, IICA

Alexis Vasquez Morera, Director General of Agricultural Research and Extension, MAG, Costa Rica

John McMahon, ROCAP Agricultural Office

Donald Feister, Project Design Team

John Gillies, Project Design Team

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JOB DESCRIPTIONS FOR LONG-TERM STAFF

I) Project Coordinator

The Project Coordinator will be needed for approximately three years beginning in early 1988. The individual will be based at IICA's headquarters in San Jose, Costa Rica with frequent travel throughout Central America, Belize and Panama. Occasional trips outside the region may also be required.

A) Qualifications

1) MS degree in an agricultural discipline.
2) Minimum of six years experience in agricultural research or extension programs in developing countries, preferably in Latin America with at least three years in an administrative capacity.
3) Knowledge of cacao production and cacao research/development highly desirable.
4) Knowledge of Central America and of national and regional research and development institutions highly desirable.
5) Knowledge of and experience with AID or other donor projects desirable.
6) Fluency in English and Spanish required.
7) Good communication and organizational skills essential, computer skills desirable.

B) Duties

1) Assumes overall responsibility for the management of the project's technical and financial operations.
2) Supervises the training/technology transfer coordinator and institutional specialist assigned to the project.
3) Prepares, in collaboration with CATIE, FHIA and national institutions annual work plans and budgets for review by the Executive Committee and approval by ROCAP.
4) Prepares, in collaboration with CATIE and FHIA quarterly and annual progress reports for submission to ROCAP.
5) Coordinates quarterly meetings with CATIE and FHIA, and annual meetings of the Executive Committee.
6) Maintains ROCAP officials, USAID missions in the CA/P region and IICA informed of project status.

II. Training and Technology Transfer Coordinator

The Training/Technology Transfer Coordinator will be hired for approximately three years beginning in early 1988. The individual will be based at IICA's headquarters in San Jose, Costa Rica with frequent travel throughout Central America, Belize and Panama. Occasional trips outside the region may also be required. He/she will report to the project coordinator.

A) Qualifications

1) MS degree in agriculture with experience in communications, or MS degree in communications with experience in agriculture (or equivalent experience of either above).
2) Minimum of five years experience in agricultural communications/technology transfer programs in developing countries, preferably in Latin America.
3) Proven ability as a trainer, and in project administration, management and coordination.
4) Experience in cacao production desirable.
5) Fluency in Spanish required, with fluency in English desirable.
6) Knowledge of Central American institutions and of research/extension programs desirable.
7) Knowledge of and experience with AID or other donor projects desirable.
8) Computer skills desirable.

B) Duties

1) Serves as liason with CATIE, FHIA, IICA and participating institutions on all matters related to training and technology transfer.
2) Coordinates the development of annual work plans and budgets related to training and technology transfer activities.
3) Schedules and organizes all regional training events, in collaboration with the host institution, including determination of course content and teaching methods, identification of instructors and trainees, logistic arrangements, and course evaluations.
4) Schedules and organizes semi-annual training/transfer coordination workshops with lead institutions.
5) Participates in national and regional training events as a resource person.
6) Coordinates the preparation, reproduction and distribution of training aids/materials and project publications.

7) Prepares, produces and distributes, in collaboration with CATIE and FHIA, a quarterly project newsletter.
8) Evaluates the effectiveness of regional training events as evidenced by trainee performance in subsequent training and technology transfer activities.
9) Collaborates with CATIE and FHIA in the preparation of quarterly and annual progress reports regarding training/transfer activities.

III. Institutional Development Specialist

The Institutional Development Specialist will be contracted for a period of two years beginning in early 1988. The individual will be based at IICA's headquarters in San Jose, Costa Rica with frequent travel throughout Central America, Belize and Panama. Occasional trips outside the region may also be required. He/she will report to the project coordinator.

A) Qualifications

1) MS degree or equivalent experience in business administration, management, or social sciences (ie. rural sociology, cultural anthropology).
2) A minimum of five years of experience in institutional or group organizational strengthening in developing countries, preferably Latin America.
3) Experience with agricultural commodity producer organizations/cooperatives and/or national commodity advisory groups highly desirable.
4) Experience in cacao production desirable.
5) Fluency in Spanish required, with fluency in English desirable.
6) Knowledge of Central American institutions and of research/extension programs desirable.
7) Knowledge of and experience with AID or other donor projects desirable.

B) Duties

1) Provides organizational leadership to the countries of Central America, Belize and Panama in the establishment of effective operational National Advisory Groups, NAGs, for cacao (eg. groups which may include public or private sector

research, extension, policy, input provision, marketing and processing and financial sector representatives).

2) Works with existing cacao programs, AID missions, and research and extension directors to identify potential members of NAGs.
3) Schedules initial organization meeting to discuss with potential members the nature and objectives of the regional cacao network project and the role/responsibility of NAGs.
4) Identifies, in collaboration with the NAG in each country, the ongoing programs, their nature and sources of funding which support cacao production, marketing or processing.
5) Identifies, with NAGs, training and research priorities which will be considered for support under the regional cacao network.
6) Facilitates the conduct of specialized studies, as needed and identified by NAGs, to identify key constraints to cacao production for discussion with policy makers, donors and others. Assists NAGs secure funding support (beyond level budgeted in Project of $2,000/year/country for NAGs) and identify qualified individuals to carry out studies.
7) Meets with AID missions and other donor representatives to inform them of the status of the regional cacao networks program.
8) Collaborates with NAGs and the Project Coordinator in identifying participants for the bi-annual policy/donor conferences hosted by IICA, and assists the Project Coordinator in their organization and implementation.