



Arresting Resource Degradation



A Proposal For:

Inter-American Development Bank
Special Project Funding

Applicant:

CIAT

Centro Internacional de Agricultura Tropical

Collaborating Partners:

International Food Policy Research Institute

Programa Cooperativo de Generación y Transferencia de
Tecnología para los Trópicos Suramericanos (PROCITROPICOS)

World Resources Institute

July 1992

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Arresting Resource Degradation in the Forest Margins of Amazonia

ECONOMIC AND POLICY ANALYSIS OF AGRICULTURAL LAND USE

A Proposal for: Inter-American Development Bank (IDB)
Special Project Funding

Applicant: International Center for Tropical Agriculture (CIAT)
Cali, Colombia

Collaborating Partners: International Food Policy Research Institute (IFPRI) -
Washington, U.S.A.

Programa Cooperativo de Generación y Transferencia
de Tecnología para los Trópicos Suramericanos
(PROCITROPICOS), Brasilia, Brazil

World Resources Institute (WRI), Washington, U.S.A.



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Table of Contents

	<u>Page</u>
ACRONYMS	v
1.0 Summary	vi
2.0 Background	1
2.1 Importance of Investments in Agricultural Research	1
2.2 Background to the Project	2
2.3 Background of the Executing Agency and Collaborating Partners	4
2.3.1 Centro Internacional de Agricultura Tropical - CIAT	4
2.3.2 International Food Policy Research Institute (IFPRI)	5
2.3.3 World Resources Institute (WRI)	6
2.3.4 PROCITROPICOS	7
2.4 Relationship of Proposal to IDB Development Priorities	7
3.0 Objectives	11
3.1 Purpose	11
3.2 Immediate Project Objectives	11
3.3 Final Objective	12
4.0 Project Description	13
4.1 Outputs	13
4.2 Activities	14

Table of Contents con'td

	<u>Page</u>
4.3 Organization of the Execution of the Project	14
4.4 Supervision of Project Execution	21
4.5 Period for the Execution of the Project	21
4.6 Chronogram of Activities	21
4.7 Gender Issues	22
5.0 Consolidated Budget	24
6.0 Rationale/Justification	25
7.0 Reports	28
7.1 Detailed Work Plan	28
7.2 Progress Reports	28
7.3 Annual Financial Statements and Final Audited Statement..	28
7.4 Final Report of the Executing Agency	29
8.0 Evaluation	30
8.1 Periodic Reviews of the Project	30
8.2 Final Evaluation	30
8.3 Methodology for Evaluation	30
9.0 Bibliography	31

List of Figures

	<u>Page</u>	
Figure 1	Work Breakdown Structure of Project Activities	15-16
Figure 2	Project Organization Chart	17
Figure 3	Multi-disciplinary Project Team	18
Figure 4	Annual Project Budget for IDB Request	36
Figure 5	Total Project Budget by Major Categories of Expenditures	36

List of Tables

	<u>Page</u>	
Table 1	Consolidated IDB Project Budget Request	24

List of Appendices

	<u>Page</u>	
Appendix 1	Importance of Agricultural Research to Development	32
Appendix 2	Detailed Budget	33
Appendix 3	Description of Project Activities	42
Appendix 4	Chronogram of Project Activities	48
Appendix 5	Previous CIAT/IDB Special Project Experience	55
Appendix 6	Background on CIAT	57

Acronyms

CIAT	Centro Internacional de Agricultura Tropical
CGIAR	The Consultative Group On International Agricultural Research
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuaria
ICA	Instituto Colombiano Agropecuario
IDB	Inter-American Development Bank
IFPRI	International Food Policy Research Institute
ISPN	Instituto Sociedade População é Natureza
PROCITROPICOS	Programa Cooperativo de Generación y Transferencia de Tecnología para los Trópicos Suramericanos
WRI	World Resources Institute

1.0 Summary of Request for Special Project Funding

Title: Arresting Resource Degradation in the Forest Margins of Amazonia:
Economic and Policy Analysis of Agricultural Land Use

1.1 Principal Facts

1.1.1 Total for the Operation

Total cost: \$6.480 million

IDB contribution: \$5.260 million

1.1.2 Overall Objective

The overall project purpose is to provide an objective, quantified, field-derived analysis of alternative land use strategies, policies and technologies that could lead to reducing deforestation and soil degradation while increasing agricultural production.

1.1.3 Participants in the Project

Applicant: Centro Internacional de Agricultura Tropical (CIAT). Cali, Colombia

Collaborating Partners:

International Food Policy Research Institute (IFPRI). Washington, USA

Programa Cooperativo de Generación y Transferencia de Tecnología para los Trópicos Suramericanos (PROCITROPICOS). Brasilia, Brazil

World Resources Institute (WRI). Washington, USA

1.1.4 Implementation Period

January 1993 to December 1996

1.2 Background

1.2.1 Background of Request and its Priority

This proposal is in response to the IDB policy to provide some of its support for international agricultural research centers through Special Projects. Research on the costs of resource degradation and its policy implications is a priority for the new CIAT division on Resource Management Research. It also addresses a problem that is faced by most of the Bank's member countries.

1.2.2 Background of Beneficiary and Executing Agency

Beneficiaries:

The immediate beneficiaries are the policy formulators and technology generators in ministries of agriculture, the environment and national planning in Latin America who will have access to the research findings. The long term beneficiaries are future generations in Latin America who will benefit from current initiatives to promote sustainable agricultural development.

Executing Agency

CIAT specializes in germplasm research and resource management research. The IDB has provided CIAT with core funding in past years as well as Special Project funding for both an agropastoral project and a training of trainers project.

1.3 Project Description

1.3.1 Specific Objectives to Accomplish

The specific project objectives are to:

- characterize trends and patterns in land use
- show how the productivity of converted forest land changes with the length of time it is farmed and how farmers and rural communities adapt to change in land productivity
- appraise the costs of resource degradation under different land use systems
- show how macro and sectoral policies and available technologies affect the extent of land conversion from forests to agriculture and the incidence of new migration into forest areas

- assess the likelihood of agricultural technologies increasing the flow of migrants to environmentally fragile areas
- test technologies and farming practices, through on-farm trials in selected sites, that could improve on the sustainable productivity of existing methods used on converted farm land
- assess the potential for the adoption of alternative crops and production methods demonstrated to be environmentally less degrading
- analyze the factors that determine which farmers adopt superior farming practices already available and how such adoption affects household decisions about land use and the incidence of relocation to the forest frontier
- promote informational exchange with national and regional decision makers in both natural resource policy and agricultural technology development on issues of land use trends, patterns, strategies, costs and benefits.

1.3.2 Activities

The major project activities include:

- characterizing land use patterns and trends
- understanding farmers' land use decisions
- analyzing relationships among policy measures, technology choices and farmer decision making on land use and migration
- estimating costs of resource degradation
- training of national scientists in land use analysis
- promoting policy dialogue among researchers, policy formulators and decision makers
- project management

1.4 Budget

1.4.1 Bank Contribution: \$5.260 million

1.5 Rationale

1.5.1 Rationale of Project

Agricultural sustainability must ensure that agricultural production is achieved in harmony with considerations of economic growth, equity and resource conservation. It is a multi-dimensional problem that requires a systems approach based on knowledge provided by researchers coming from a variety of disciplines. CIAT/IFPRI/WRI/PROCITROPICOS provide the IDB with a means of conducting this research using expertise from several institutions.

1.5.2 Rationale of Activities and Proposed Organization

Activities

The major activities have been designed so that CIAT takes prime responsibility for the characterization of land use patterns and trends; evaluating the impact of agricultural technology on resource use; as well as the assessment of the costs of resource degradation. IFPRI takes responsibility for the understanding of farmers' land use strategies at the field level and the policy analyses at the macro level. The World Resources Institute will assist CIAT in the estimation of the costs of resource degradation whereas PROCITROPICOS will assist CIAT and IFPRI in the field-based research on the impact of technologies on resource degradation.

Organization

This project is being implemented collaboratively by both international and regional organizations. In order to ensure clear accountability with the donor, there is one member (CIAT) which is designated as the lead partner responsible for all contracting and reporting requirements with the IDB and which has overall responsibility for execution of the project. CIAT will, in turn, sub-contract the other collaborating partners.

2.0 BACKGROUND

CIAT and IFPRI are international centers whose research leads to increased agricultural productivity

Donor support of international agricultural research centers helps strengthen national capacities and helps formulate improved policies

2.1 Importance of Investments In Agricultural Research

The CGIAR system, of which CIAT and IFPRI are members, was established over 20 years ago to develop agricultural technologies that lead to increased agricultural productivity. These international centers, supported by the CGIAR, are part of a global agricultural research system that ensures that international scientific capacity is brought to bear on the problems of the world's disadvantaged peoples.

Donor investments in supporting the international agricultural research activities of centers such as CIAT and IFPRI provide the following economic and institutional benefits:

- Increasing productivity on farmer fields through creating or adopting new technologies
- Protecting and preserving the productivity of natural resources on which agriculture depends
- Improving the policy environment by assisting developing countries to formulate and carry out effective agriculture and research policy
- Strengthening national agricultural research systems in developing countries
- Conserving germplasm and making it available to all regions and countries
- Creating and strengthening linkages between developing country institutions and other components of the global agricultural system.

Through the efforts of institutes such as CIAT and IFPRI and their national partners in developing countries, there has not only been an increase in food productivity, but also increased farmer income, reduced pricing of food, better nutrition, more rational policies

Links between productivity research and natural resource management research are being strengthened by CIAT and IFPRI

The IDB can play a major role in facilitating this important linkage

There are many negative effects from converting forests to agricultural land as a result of farmer migration

and stronger institutions. (Additional background on the contribution of the international agricultural centers is found in Appendix 1).

The CGIAR system is moving to strengthen the connections between productivity research and natural resource management research. CIAT and IFPRI are at the leading edge of this new initiative.

Studies in both productivity research and natural resource management research require collaboration at many levels. The CGIAR centers focus on international strategic research whereas regional and national partners focus on the applied research which is area-based and provides the inputs into the strategic research.

There is an opportunity for a donor such as the IDB in playing a major role in facilitating the linkage of productivity and natural resource management research in Latin America. This can best be done by supporting collaborative research proposals that bring together the expertise of international, regional and national organizations that share a common research agenda.

2.2 Background to the Project

There exists considerable concern that rapid settlement of the Amazon region is leading to the destruction of the tropical forest and the degradation of land resources.

The conversion of primary tropical forest to agriculture can have important externality costs in the form of reduced biodiversity and changes in regional and global climate. Additionally, since converted land is easily degraded once subjected to available farming practices, it is often lost as a productive economic resource after only a few years of use. This loss not only undermines the sustainability of incomes of existing settlers, encouraging them to periodically relocate to the forest frontier, but it also deprives future generations of potentially valuable resources.

Government policies strongly influence inter-regional migration

Agricultural settlement in primary tropical forests often results from inter-regional migration by poor people who have limited economic opportunities elsewhere. However, past studies have shown that the rate and spatial distribution of new settlement is strongly influenced by government policies (macro and trade policies, and forest and agriculture sector policies with respect to pricing, taxation, subsidies, concessions, etc.), investments in infrastructure (roads, power lines, mines, dams, etc.), and by government settlement schemes and land ownership policies.

Inappropriate farming practices lead to land degradation and further intra-regional migration and deforestation

The extent of deforestation in settled areas, and the need for agriculturalists to periodically relocate to the frontier, also depends on their ability to sustain land productivity. Where land is quickly degraded through the use of inappropriate farming practices, the extent of deforestation and intra-regional migration to the frontier can be expected to be greater and food security and human welfare objectives more difficult to achieve.

There is a need to study land use patterns in the Amazon

Land use in the Amazon is extremely dynamic. Its patterns are continually altered by frontier settlement, disturbance of natural environments, introduction of new crops and technologies, massive population movements, and rapid economic change. These patterns have not been systematically characterized, and neither are the reasons for rates and directions of change well understood.

Increasing urbanization, continued immigration of new settlers, land development, increased timber extraction, continued slash-and-burn practices by indigenous groups, and expansion of ranching are among the perceived problems that result in continued deforestation and affect land use patterns.

At the same time, new technologies are being made available by local, national and international institutes as well as by the private sector. These technologies are either not adopted or partially adopted, but more often than not are unsustainable and/or represent further incentives for deforestation.

The ecological impact of new agricultural technologies is seldom studied

Field-derived research will help provide alternative land use strategies that are sustainable

This project will contribute to the formulation of more appropriate development strategies for the Brazilian Amazon

New crops, plant varieties, management practices, and spatial and temporal arrangements of production systems greatly influence land use and resource degradation. Agricultural production techniques have been changing rapidly in the Amazon region, with minimal attention to their impact on the resource base. Thus, ongoing research to increase agricultural productivity should take into account the ecological impact of new technology.

The central purpose of this project is to provide an objective, quantified, field-derived basis for the analysis of alternative land use strategies, policies and technologies that could lead to reducing deforestation and soil degradation while increasing agricultural production.

The combination of land use strategies, policies and technologies should aim at relieving market and social pressures in the most fragile land/forests in the Amazon region.

While conversion of some primary tropical forests may prove essential in some countries for economic growth and poverty alleviation, more appropriate development strategies in terms of government policies, infrastructure investments, agricultural research and forest management, might enable these goals to be achieved with much lower rates of deforestation and land degradation. This research project will attempt to delineate such strategies for selected study sites in the Brazilian Amazon.

2.3 Background of the Executing Agency and Collaborating Partners

2.3.1 Centro Internacional de Agricultura Tropical (CIAT)

The mission of CIAT is to "contribute to the alleviation of hunger and poverty in tropical developing countries by applying science to the generation of technology that will lead to lasting increases in agricultural output while preserving the natural resource base".

CIAT has initiated a Resource Management Research Division with a Land Use and three Agroecosystems programs including Forest Margins

CIAT has a comparative advantage in technology generation and GIS for land use analyses

CIAT, which was established in 1967, has traditionally done and continues to give a high priority to strategic research on germplasm development for commodity improvement with respect to cassava, beans, rice and tropical forages.

The Inter-American Development Bank has made core contributions to CIAT and has also supported Special Projects, such as the "Training of Trainers" and the "Agropastoral Project" (see Appendix 5). The latter recently had a mid-project evaluation and the results were very favorable.

CIAT has now initiated a resource management research division to complement the germplasm research. The new division has a **land use** program that investigates the relationships between policies and land use strategies, and the impact of both on production, the resource base and the environment. The division also has three agroecosystem programs which focus on the disturbed **forest margins** in the humid tropics, the mid-altitude tropical **hillsides** and lowland acid-soil **savannas**.

This new initiative in resource management research has the institutional commitment of CIAT's Board of Directors and is considered a priority, as noted in both CIAT's *Strategic Plan* and its *Operational Plan* for 1993 to 1998.

CIAT offers an international focal point where inter-institutional efforts in resource management research can coalesce. CIAT brings to this project a comparative advantage in the area of technology generation for sustainable agriculture and the geographic information systems for land use analyses. (More details on CIAT are provided in Appendix 6).

2.3.2 International Food Policy Research Institute (IFPRI)

IFPRI was established in 1975 to identify and analyze national and international strategies and policies for meeting food needs in the world with particular emphasis on low-income countries and on the poorer groups in those countries.

The Environment and Production Technology Division is a new division within IFPRI, created in 1991, to examine policies to accelerate sustainable agricultural production in developing countries through the application of appropriate agricultural technology while minimizing potential adverse environmental impacts. In other words, the principal concern of this division is how acceleration of Third World food production through the spread of new agricultural methods can be accomplished in the manner that best sustains the natural resource base. IFPRI also has a Trade and Macroeconomics Division which will participate in this project.

IFPRI has a comparative advantage in macro and micro policy analyses

IFPRI brings to this project a comparative advantage in the macro and micro policy analyses of variables affecting farmers' land use decisions.

2.3.3 World Resources Institute (WRI)

The World Resources Institute is a policy research center created in late 1982 to help governments, international organizations and private businesses address the fundamental question as to how societies can meet basic human needs and nurture economic growth without undermining the natural resources and environmental integrity in which life, economic vitality and international security depend.

The World Resources Institute has a comparative advantage in research expertise on the costs of resource degradation

The Institute's current areas of policy research include tropical forests, biological diversity, sustainable agriculture, energy, climatic change, atmospheric pollution, economic incentives for sustainable development, and resource and environmental information.

WRI brings to this project a comparative advantage in economic models and methodologies for estimating the costs of resource degradation.

2.3.4 PROCITROPICOS

The objective of PROCITROPICOS is to promote and contribute to the sustainable agricultural development of the subregions of the South American humid tropics, the foothills, plains and savannas through the efficient use of renewable natural resources and by offering a true alternative for economic reactivation and increased biological and physical productivity in the future.

PROCITROPICOS is a facilitator for ensuring the appropriate field research expertise is brought to the project

The member countries of PROCITROPICOS are Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela. The coordination in each country is the responsibility of the national agricultural research institution. For Brazil, this is the Brazilian Agricultural Research Enterprise (EMBRAPA) whereas for Colombia it is the Colombian Agriculture and Livestock Institute (ICA).

PROCITROPICOS brings to this project the field research expertise for the data collection at the site level in Brazil.

2.4 Relationship of Proposal to IDB Developmental Priorities

Agriculture and the environment are important sectors for the IDB's lending program

Agriculture and environmental activities are important sectors for the IDB's lending program accounting for almost 30% of the Bank's lending during the 1961-91 period. Member countries are increasing their requests for loans and technical cooperation from the IDB to solve problems related to the loss of natural forests, the degradation of watersheds, soil degradation and the use of agricultural chemicals.

The proposed research is consistent with the IDB's concern for sustainable development

The project proposed by CIAT and its collaborating partners is directly related to the IDB's concern for development that is sustainable.

In 1989, the IDB's Environmental Committee in its *Conceptual Framework for Environmental Protection* indicated that the principal environmental problems of Latin America included, among others:

Sustainable development is multi-dimensional and includes ecological sustainability

An independent commission has recommended the establishment of environmental information systems for land use planning

- deforestation
- deterioration of watersheds caused by improper land use and indiscriminate use of agro-chemicals
- destruction of biological diversity
- surface and underground water pollution
- environmental pollution due to improper use of agro-chemicals

At an IDB sponsored seminar in 1989 on sustainable development and the environment, Sachs notes that the concept of sustainable development is multi-dimensional (social, economic, ecological, geographical and cultural). Ecological sustainability refers to intensifying the uses of the resource potential of the diverse ecosystems with minimum damage. This involves the search for resource efficient technologies and regenerative agriculture and agroforestry.

In 1989, the IDB and others donors convened an independent commission for Latin America and the Caribbean to develop a regional outlook on the issue of the environment. In *Our Own Agenda*, the Latin American and Caribbean Commission On Development and Environment recommended the development of inventories of the region's natural resources that consider the dynamics of ecosystems. With respect to technical cooperation, the Commission recommended:

- the establishment of environmental information systems for land use planning purposes and the possibility of interconnecting such systems to set up a regional network
- the use of new technologies to conduct studies to determine the potential of specific ecosystems and techniques for prudent management.

Key IDB policy documents have recommended land use planning for Amazonia that is based on ecological and economic criteria

The proposed research is consistent with strategies recommended by the IDB's Environmental Committee

When the IDB, in 1991, published its *Guidelines for the Application of Environmental Procedures in the Agricultural Sector* it emphasized that the concern for the sustainability of agricultural production is inseparable from the concern for the negative environmental impacts of production technologies and poor resource management. The Committee stated that "inappropriate land clearing and tilling methods...represent production methods whose negative impacts undermine agricultural sustainability". Both basic and applied research are needed to help improve resource management.

The IDB has been a strong supporter of the Commission on Development and Environment for Amazonia. The Commission has presented its report *Amazonia Without Myths* in 1992. In making its recommendations for strategies for sustainable development, the Commission emphasized the importance of conducting land use planning "based on ecological and economic criteria which take into account the realities of nature, especially the ecosystems and soils existing in the region, plus the present use of the land and the specific interests of the inhabitants."

The IDB (1992), in *Investing In a Common Future*, has stated that unsustainable land use policies and the lack of economic opportunity are directly responsible for deforestation as poor farmers push agricultural frontiers into increasingly fragile ecological areas. The Bank also noted that questions such as "land tenure; soil conservation; local community participation; restoration and protection of ecosystems; research and extension are now routinely a part of initial project stages."

Also in 1992, the IDB's Environmental Committee highlighted its environmental policies and strategies. As noted in the *1991 Annual Report on the Environment and Natural Resources*, those strategies include:

- increasing ecosystem productivity by means of reducing soil losses and improving water use through the introduction of agricultural practices, soil conservation and watershed management

The Amazon basin is a priority region for the IDB environmental strategies

- ensuring priority attention is given to the poorest people, women, local communities and indigenous people
- assigning priority to the Amazon basin and other tropical rainforests and to the tropical and subtropical Andes
- emphasizing institutional development and encouraging horizontal cooperation.

The proposal that follows is consistent with these strategies.

3.0 OBJECTIVES

The project has a clearly defined purpose, immediate and final objectives

3.1 Purpose

The purpose for which the contribution from the IDB is being requested is to cooperate in the financing of resource management studies to be carried out by CIAT and IFPRI, with the assistance of the World Resources Institute and PROCIPTROPICOS for the improvement of land use strategies, policies and technologies that can lead to reducing deforestation and contributing to sustainable land use systems in Amazonia.

3.2 Immediate Project Objectives

The immediate project objectives are to:

- Characterize trends and patterns in land use
- Show how the productivity of converted forest land changes with the length of time it is farmed and how farmers and rural communities adapt to changes in land productivity
- Appraise the costs of resource degradation under different land use systems
- Show how macro and sectoral policies and available technologies affect the extent of land conversion from forests to agriculture and the incidence of new migration into forest areas
- Assess the likelihood of agricultural technologies increasing the flow of migrants to environmentally fragile areas
- Test technologies and farming practices, through on-farm trials in selected sites, that could improve on the sustainable productivity of existing methods used on converted farm land
- Assess the potential for the adoption of alternative crops and production methods demonstrated to be environmentally less degrading

- Analyze the factors that determine which farmers adopt superior farming practices already available and how such adoption affects household decisions about land use and the incidence of relocation to the forest frontier
- Promote information exchange with national and regional decision makers in both natural resource policy and agriculture technology development on issues of land use trends, patterns, strategies, costs and benefits.

3.3 Final Objective

The final objective refers to the benefit that would accrue to society as the result of the implementation of conclusions, recommendations or experiences resulting from the technical cooperation project.

The final objective of this project is to contribute to the sustainable development of agriculture in the forest margins of the Amazon by promoting policies and technologies that stimulate higher productivity in degraded lands while discouraging market/social pressures on fragile environments.

4.0 PROJECT DESCRIPTION

4.1 Outputs

The principal project outputs are:

- Geographic information systems and data bases characterizing land use patterns at the regional level in the Amazon forest margins
- An understanding of farmers' land use decisions/ strategies
- An understanding of inter and intra-regional migration and its relationship to policy and technology
- Micro-level data on land use
- Estimates on the costs of resource degradation by land use group; and improved methodologies for assessing the costs of resource degradation
- Guidelines for policies and instruments that promote the adoption of economically viable and ecologically sound agricultural practices
- Frameworks for the design of technologies that increase productivity, enhance the resource base and are culturally acceptable to farmers
- Papers on policy and technology issues that will provide an objective basis for dialogue among researchers, policy formulators and decision makers
- Publishing of a book for international circulation on the objectives, methods and results of the project
- National scientists trained in land use analysis

Outputs include policy guidelines, published documents, data bases and trained scientists

4.2 Activities

The principal activities in the project are shown in Figure 1 which contains the Work Breakdown Structure. The activities are directly related to the outputs produced by the project and are described in Appendix 3.

4.3 Organization of the Execution of the Project

The organizational structure in CIAT for managing this project is illustrated in Figure 2. The composition and reporting structure for the multi-disciplinary, inter-institutional research team is shown in Figure 3.

The project will be organized and managed to reflect the following principles:

Clearly Designated Project Coordinator

This project is being implemented by the staff of several research institutes. The collaborating institutions, however, have designated a single institute (CIAT) as the legally contracted executing agency and have designated a single individual as Research Coordinator who is responsible for the coordination of all research activities and for ensuring appropriate progress reporting to the IDB.

It should be emphasized that, while CIAT is responsible for the financial and reporting activities to the donors, each participating partner institution maintains responsibility for its own scientific and technical contributions to the project.

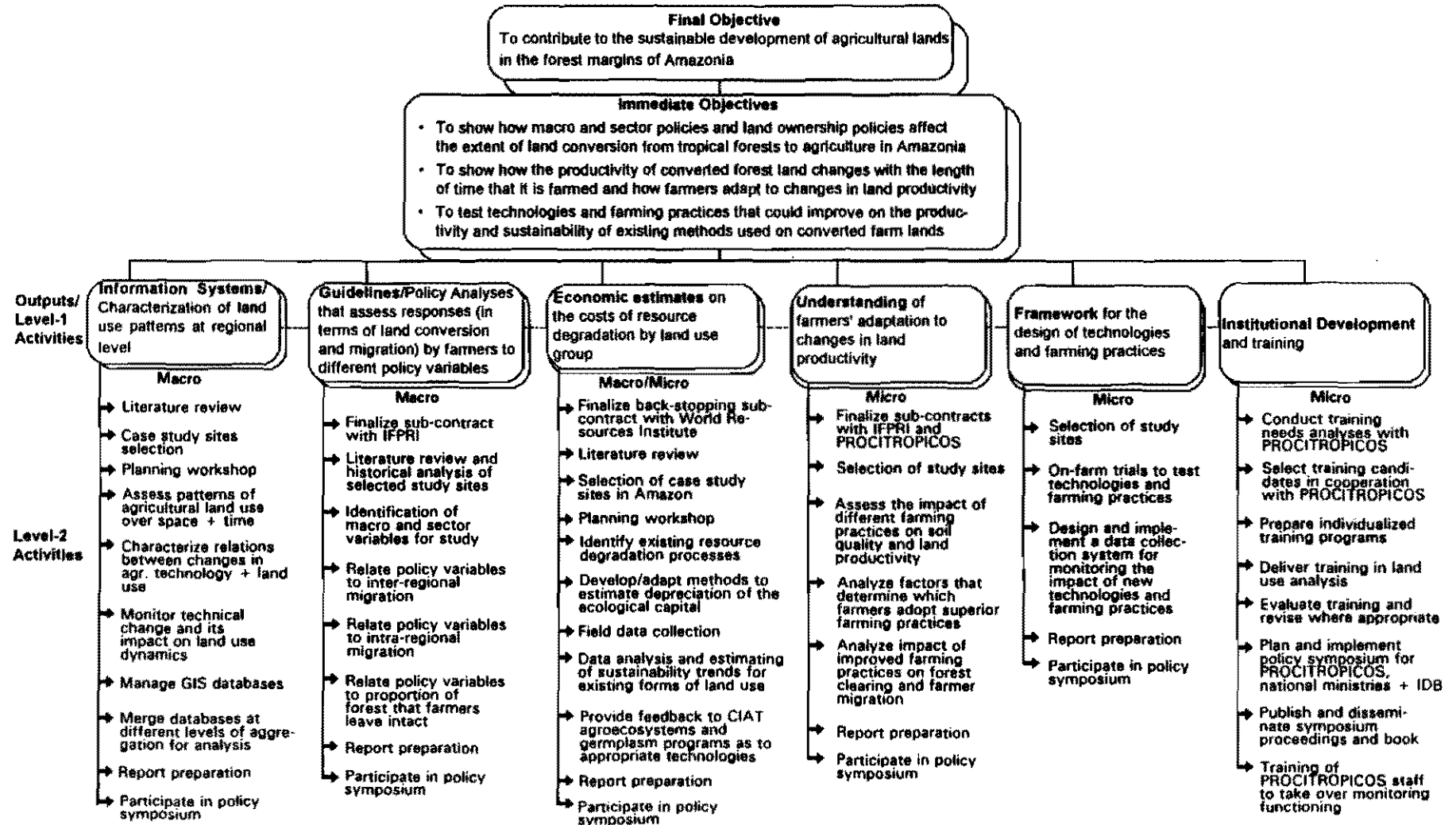
IFPRI is designated as a collaborating partner in the project and is being sub-contracted by CIAT to provide research services in the area of macro and micro policy analysis of agricultural land use.

The World Resources Institute is being sub-contracted by CIAT to assist in the project component dealing with the estimates of the costs of resource degradation.

The project has one overall project coordinator

There is one executing agency, CIAT, which in turn sub-contracts the other institutional partners for the provision of their services

Figure 1 Work Breakdown Structure of Project



--- Note: The macro and micro components are integrally linked (see Appendix 3, sub-section 3.4)

Figure 1. Con'td
Work Breakdown Structure for Project Management

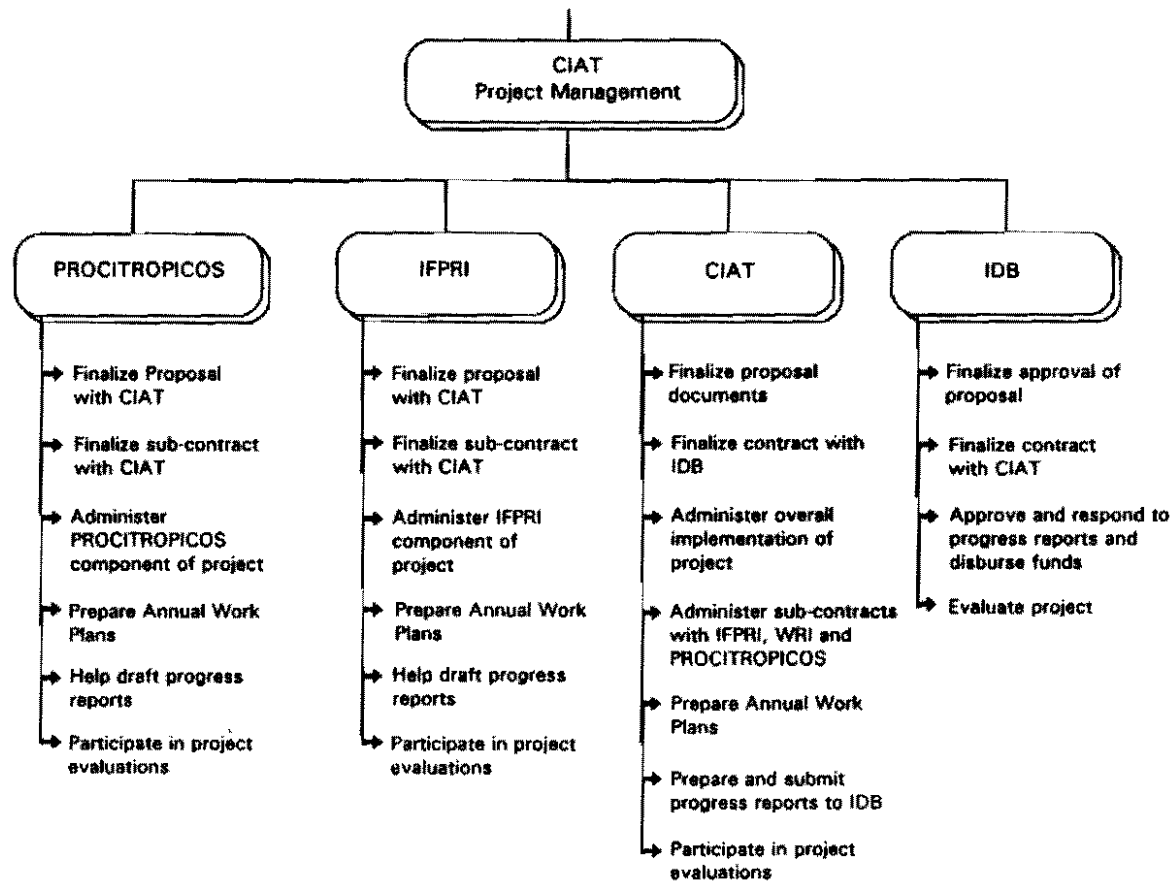
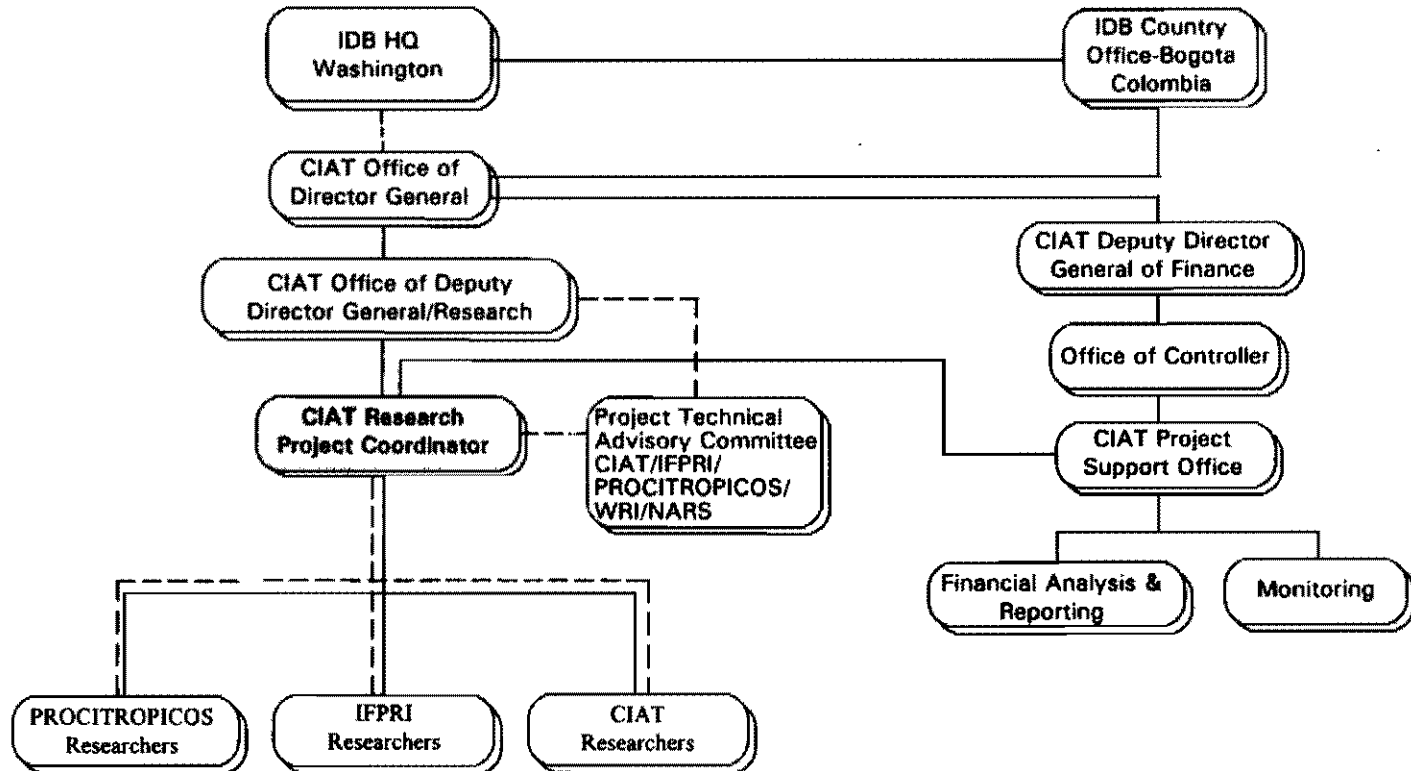


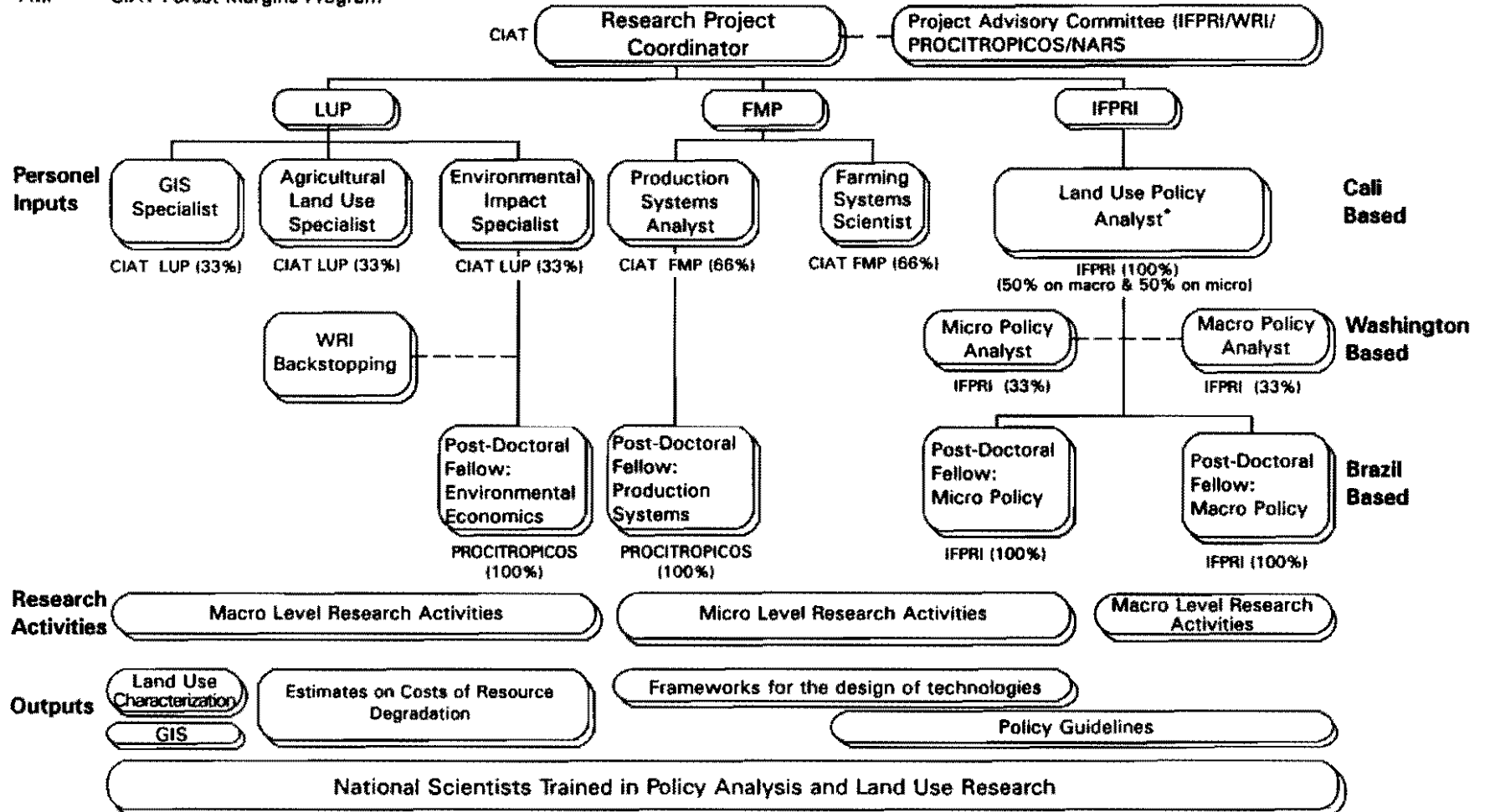
Figure 2. CIAT Project Organization Chart



Communication lines for
liaison or scientific contributions -----
Mgt and/or financial reporting lines _____

% = Time on Project
 LUP = CIAT Land Use Program
 FMP = CIAT Forest Margins Program

**Figure 3: Multi-Disciplinary Project Team
 (Organization Chart in Relation to Project Activities and Outputs)**



*Note: The IFPRI Land Use Policy Analyst is based in Cali with large portions of time in Brazil and Washington

PROCITROPICOS is being sub-contracted by CIAT to assist in the site research in Brazil and funds will be requested from another donor for this component of the project.

Multi-disciplinary Teams

A multi-disciplinary team using an integrative research strategy is required for addressing problems of increasing agricultural production in harmony with considerations of economic growth, equity and resource conservation.

The CIAT/IFPRI collaboration has organized the following multi-disciplinary research team:

- Research Project Coordinator -CIAT (Leader within the Resource Management Division)
- Production Systems (Technology) Analyst * (CIAT)
- Senior Policy Analyst, Land Use (IFPRI)
- Environmental Impact Specialist (CIAT)
- Agricultural Land Use Specialist (CIAT)
- Geographic Information Systems/Information Management Analyst (CIAT)
- Farming Systems Scientist (CIAT)
- Post-doctoral Fellow, Macro Policy Analysis (IFPRI)
- Post-doctoral Fellow, Micro Policy Analysis (IFPRI)
- Post-doctoral Fellow, Environmental Impact Economics (PROCITROPICOS)
- Post-doctoral Fellow, Production Systems Analysis (PROCITROPICOS)

The research is conducted through inter-institutional collaboration that relies on a multi-disciplinary team

International, regional and national institutions are working collaboratively on a shared research agenda in this project

Dissemination of the research findings will be facilitated through each partner's institutional networks

Inter-Institutional Collaboration

No one institution has a monopoly on the research expertise necessary to address issues of sustainable agricultural development. Sustainable agriculture emphasizes inter-dependencies and that requires broad-based collaboration. Different institutions must focus on research agendas that foster complementarity.

This project offers a mechanism for fostering inter-institutional research collaboration with CIAT as a facilitator and international focal point. The project provides for research collaboration involving the following types of organizations:

- International Agricultural Research Centers (e.g., CIAT, IFPRI)
- International Policy Research Centers (e.g., WRI)
- Regional Research Centers (e.g., PROCITROPICOS)
- National Agricultural Research Centers (e.g., EMBRAPA, ICA)
- Non-Governmental and Farmers' Organizations.

In addition, there will be dissemination of the research findings to the policy sections of relevant national ministries in the region responsible for national planning, agriculture and the environment.

Vertical and Horizontal Linkages of Cooperation

The project follows a systems approach to integrate research and development efforts at different levels of aggregation from plot to region, through two-way partnerships in a particular site:

Institutional partnerships in the project are based on comparative advantages in research expertise

- issue partnerships with IFPRI on macro and micro policies (CIAT brings the technology generation expertise and shares in the micro policy. IFPRI brings the macro policy expertise and shares in the micro policy)
- issue partnerships with WRI on resource economics and environmental impact
- issue partnerships with PROCITROPICOS and EMPRAPA on technology and resource degradation.

Cross-sectional and longitudinal studies across the ecosystem provide the agroecological and socio-economic variability vis-a-vis the development of improved land use alternatives.

4.4 Supervision of Project Execution

The project is being managed by a designated CIAT Research Coordinator responsible for the overall execution of the project.

CIAT's Project Support Office coordinates the submission of progress reports to the IDB

The project is monitored by CIAT's Project Support Office which is responsible for providing the IDB with technical and financial progress reports throughout the implementation of the project.

4.5 Period for the Execution of the Project

The project duration is four years with a commencement date of 1993, immediately following IDB approval of the proposal.

4.6 Chronogram of Activities

The detailed chronogram of activities is shown in Appendix 4.

4.7 Gender Issues

CIAT has a Gender Advisory Committee and has been active in promoting gender analysis in agricultural research. It recently has published the proceedings of workshops dealing with this important issue (CIAT, 1992).

Women work extensively in small-scale farming where home consumption is still important. Small farm activities in which women participate frequently include planting, fertilizing, weeding and harvesting crops. Women have limited access to land and therefore have almost no access to credit, technical assistance, training, cooperative organizations and agrarian reform. This lack of knowledge and capital causes women to work land less efficiently than men. As men seek income outside of the family farm, women are left in charge of agricultural production.

In deciding whether or not to adopt a new agricultural technology, women will consider the impact it would have on the time for her domestic duties and for taking care of her children; the possibility of reducing her children's participation in agricultural activities to increase their schooling; and the impact it would have on production for home consumption.

Gender issues are part of the process of economic development and because of this they will become a part of the frame of reference within which all CIAT activities are conducted.

This means that gender analysis will be highlighted in diagnostic research; in adoption, impact and evaluation studies; and in methodology development and training, especially that related to on-farm testing and participatory research.

The research partners recognize that technologies that involve innovations in farmer management and modify labor input or demand (e.g., changes in cultural practices, integrated pest management, soil conservation and new

The project will address gender issues in technology adoption

production systems) may require gender analysis during the technology generation process. It is important to take into account the different roles of men and women in Latin American agriculture in the development of technology. If the criteria of both men and women are used as reference points for the development of agricultural technology, then the likelihood of a new technology being adopted is increased.

This project will integrate gender issues in the following ways:

Gender analysis will be incorporated in the research design, implementation and evaluation

- Implementing participatory research to integrate women in the design, implementation and evaluation of the project
- Disaggregating the primary and secondary data (e.g., on farm level studies) collected, by gender, wherever possible
- Addressing the different roles of men and women in the policy analyses and guidelines
- Addressing the impact on women of new agricultural technology generation
- Ensuring that gender is a selection criteria for the identification of training candidates
- Specifying gender analysis in any terms of reference prepared for evaluations of this project.

5.0 CONSOLIDATED BUDGET

The consolidated budget (in thousands of current US \$, which has an assumed 5% inflation allowance included) is shown in Table 1. The detailed budget as well as the breakdown of the travel component for the entire project and the explanatory notes are shown in Appendix 2.

Table 1

**Consolidated IDB Project Budget Request (in thousands of US \$)
(CIAT + IFPRI)**

CIAT + IFPRI	Year 1	Year 2	Year 3	Year 4	IDB Total
Project Staff	472	499	523	550	2,044
Emoluments	47	73	50	86	256
Travel	142	149	158	165	614
Trainees & Participants	32	41	43	82	198
General Support	531	549	557	511	2,148
Total	1,224	1,311	1,331	1,394	5,260

6.0 RATIONALE/JUSTIFICATION

In the fragile resource environment of Amazonia, farmers face declining yields and levels of income (already low) due to a lack of appropriate agricultural technology, inadequate economic and social infrastructure, and inappropriate agricultural policies.

Pressure on lands bordering forest areas intensifies as farmers exhaust the fertility of their initial plots at the forest margin, and, in the absence of yield-improving technology, either deforest remaining privately-held stands or, if this option no longer exists, move on in search of unclaimed virgin forest.

Knowledge of the macro-micro linkages behind the rural poverty-environmental degradation spiral in tropical South America remains inadequate in spite of more than twenty years of concerted and varied government efforts to develop the region. Previous studies on land-use patterns at the regional level have relied almost exclusively on aggregate data, either secondary statistical data or remote sensing information.

Research on land-use trends must consider socio-economic and agroecological forces

While these techniques can map trends in land-use patterns and natural resource depletion, they leave completely unaddressed the socio-economic and agroecological forces that largely determine the farm-level decisions behind these trends. Land-use studies undertaken at the farm level rarely attempt to understand the process of farmer decision-making; those that do, fail to link on-farm decision-making with the wider socio-economic environment and regional processes of ecological change.

Most countries in the region will have to intensify their agriculture. This intensification is necessary not only to meet future demands, but to avoid further encroachment on areas that should be protected. No matter which intensification strategies are pursued, they usually involve alterations of the resource base, leading to trade-offs between economic growth and environmental costs.

There is a need to develop production technologies that increase productivity and economic benefits enough to offset conservation costs. Yet, in addition to the intra

New agricultural production technologies must contribute to sustainable development

Quantitative estimates on the costs of resource degradation and an understanding of the macro and micro forces propelling farm level decisions will help in the design of appropriate technologies and policies

and inter-generational costs of degradation of natural resources, there are other social costs involved in production-conservation trade-offs. They include the costs of assessing and monitoring the state of natural resources, the costs of developing new technologies and corresponding support systems, and the costs of educating people on the need for sustainable development. However, the most important of them all for developing countries is probably the potential delay in "exploiting" natural resources for the short-term benefit of society, and the corresponding political costs of not doing so.

There is a need, therefore, to quantify the economic impact of degradation processes such as deforestation, erosion and pollution in terms of loss of productive potential and/or additional costs of controlling the damage. Such quantitative estimates are certainly necessary to assess the potential benefit of technologies claimed to be more sustainable.

Above all, the estimates are necessary to demonstrate that negative relationships between economic growth and resource degradation impair development. Relationships could then be used to guide researchers in the design of appropriate technologies to minimize trade-offs, and advise policy makers/implementers on the application of incentives/disincentives for their adoption.

Formulating such policies, however, requires an understanding of the way they influence the technological choices of agricultural land users, a key element in production-conservation links.

Any policy or technology-based effort on the part of governments or researchers to alter land-use patterns must be based on solid information regarding the macro and micro forces that propel farm-level decisions, and the links between farmer welfare and natural resource use.

This multi-partner collaboration sets out to fill this information gap for a variety of social, economic and policy circumstances in one agroecological zone --- the

The project will also result in important methodological contributions for research on sustainable agricultural development

forest margins of Amazonia. The research will take into account resource base diversity within this zone and will generate and apply policy recommendations and new technologies designed to enhance agricultural productivity that can be sustained.

In doing so, the research partners will also make important methodological contributions to research on sustainable agriculture. Such policies would encourage farmers to make better use of already deforested lands at their disposal, thereby reducing the incentive to deforest private plots further and thus preventing additional exhaustion of virgin forests.

7.0 REPORTS

Annual work plans which are activity-based will be supplied to the IDB

7.1 Detailed Work Plan

CIAT will provide the IDB with an Annual Work Plan which updates the implementation schedule for the coming 12 month period for each of the activities identified in the Work Breakdown Structure. The Annual Work Plan will also update the prorated budget figures for the coming 12 month period.

The Annual Work Plan submitted by CIAT for the IDB component of the project will cover the activities and budget for the international partners of this joint collaboration (i.e., CIAT, IFPRI, WRI).

7.2 Progress Reports

Progress reports will cover the activities of all the collaborating partners

CIAT will provide the IDB with regular technical and financial progress reports for the IDB component of the project (e.g., for quarterly periods) in a format approved by the IDB.

The progress reports submitted by CIAT will cover the activities of CIAT and the other collaborating partners (i.e., IFPRI, WRI) in the IDB component of the project.

7.3 Annual Financial Statements and Final Audited Statement

CIAT will provide the IDB with annual financial statements for the IDB component of the project in a format approved by the IDB.

A final audited statement for the IDB component of the project covering the entire implementation period can be supplied to the IDB, if required.

The financial statements submitted by CIAT will cover the expenditures on project activities for the international institutes implementing the project (i.e., CIAT, IFPRI and WRI). For this project, IFPRI and WRI will operate with sub-contracts from CIAT and will report to CIAT in a manner consistent with the IDB format and requirements.

7.4 Final Report of the Executing Agency

CIAT will provide the IDB with a final report for the project in a format approved by the IDB. The final report will include a brief synthesis of the direct results for the project.

The final report submitted by CIAT for the IDB component of the project will cover the activities for CIAT as well as for the collaborating partners (i.e., IFPRI and WRI).

8.0 EVALUATION

8.1 Periodic Reviews of the Project

The research project partners and the IDB will have an opportunity to monitor the implementation of the project through the quarterly technical and financial progress reports.

A mid-project evaluation has been budgeted for the end of the second year of the project. This evaluation will look at both efficiency and effectiveness issues and identify any areas for corrective action to be taken during the final two years of the project.

8.2 Final Evaluation

A final evaluation has been budgeted at the end of Year 4 of the project. The evaluation team will consist of relevant specialists from the region and will address issues related to project rationale; management of the project including lines of responsibility, communications, reporting systems and financial controls; and effectiveness in achieving projected project outputs and objectives.

8.3 Methodology for Evaluation

CIAT will assist the IDB in preparing terms of reference for the evaluation studies and specifying the issues to be addressed and the methodology to be used.

Mid-project and end-of-project evaluations are provided for in the budget

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APPENDICES

APPENDIX 1

Importance of Agricultural Research to Development

During the past two decades, CIAT's research efforts have concentrated on the agricultural systems that produce beans, cassava, rice and beef/milk. Production of these commodities in Latin America has increased sufficiently, so that food production growth has kept ahead of population growth. These production increases have come mainly from higher food production per unit of land achieved through an investment in agricultural research.

CIAT's commodities are important in terms of Latin American food consumption patterns (contributing directly to the calories and proteins available for human consumption). The CIAT commodities play a basic role in the diets of the poor in Latin America.

Agricultural research centers such as CIAT have had a direct impact on improved germplasm. Plant varieties with better yield potential, pest resistance or soil adaptation remain a principal way to increase agricultural productivity. Plant varieties are often scale-neutral and allow small farmers to reap benefits similar to those for large farmers. Moreover, farmers who adopt productivity-increasing technologies are not pressed to move staple food production to marginal lands nor to practice shifting cultivation that affects the forests.

In a recent study by the three international agricultural research centers in Latin America (CIAT, CIMMYT, CIP), Janssen et al (1992), found that rates of return on the Centers' research investment in the improvement of the most important crops in Latin America (maize, rice and wheat) ranged from 50% to 70%.

Additionally, in a study supported by the IDB, Meissner (1991), concludes that "gains stemming from the research system have made foodstuffs more abundant and profitable throughout Latin America and the developing world --- the biggest impact the Bank has received for its development dollars, bar none."

CIAT has also been very active in establishing agricultural research networks. Such networks allow for the division of labor and sharing of knowledge and research results thus reducing the cost of research, accelerating progress and thereby contributing to higher returns on research investment.

As the agricultural sector is modernized due to changes in agricultural production technology, there are important environmental issues to be considered in order for agricultural development to be sustainable. Just as CIAT has played a major role in improving germplasm through strategic research, it is now establishing a Resource Management Research Division that, in the long run, will contribute to the goals of economic growth, equity, sustainability and institutional strengthening.

International centers such as CIAT have brought considerable economies of scale to the genetic improvement efforts of national programs and to the training of their personnel. These economies of scale will also occur for CIAT's resource management research to the benefit of sustainable agricultural production in Latin America.

APPENDIX 2

ANNUAL REQUIREMENTS FOR CIAT/IFPRI/WRI PROJECT BUDGET (IN THOUSANDS OF CURRENT \$US)

ITEM	Year 1					Year 2					Year 3					Year 4					Total Project Costs						
	CIAT	IFPRI	IDB	Other	TOTAL	CIAT	IFPRI	IDB	Other	TOTAL	CIAT	IFPRI	IDB	Other	TOTAL	CIAT	IFPRI	IDB	Other	TOTAL	CIAT	IFPRI	IDB	Other	TOTAL		
2.0 INDIVIDUAL CONSULTANTS PROJECT STAFF																											
2.1 Salaries + Allowances of Senior Project Staff																											
Macro Level: Cell Based																											
- Agricultural Land Use Specialist (33%)	30		30		30	32		32		32	33		33		33	35		35		35	130		130		130		
- Geographic Information Systems Specialist (33%)	30		30		30	32		32		32	33		33		33	35		35		35	130		130		130		
- Environmental Impact (Resource) Economist (33%)	30		30		30	32		32		32	33		33		33	35		35		35	130		130		130		
- Production Systems Analyst (66%)	61		61		61	64		64		64	66		66		66	71		71		71	264		264		264		
- Land Use Policy Analyst (100%) Field Site in Brazil: Policy		82	82		82		97	97		97		102	102		102		107	107		107		398	398		398		
- Post-doctoral Fellow in Policy Analysis: Macro (100%)		50	50		50		53	53		53		55	55		55		58	58		58		218	218		218		
- Post-doctoral Fellow in Policy Analysis: micro (100%)		50	50		50		53	53		53		55	55		55		58	58		58		218	218		218		
Micro Level: Cell Based																											
- Social Scientist (66%) Washington	61		61		61	64		64		64	66		66		66	71		71		71	264		264		264		
- Policy Analyst: Micro (33%)		34	34		34		36	36		36		38	38		38		40	40		40		148	148		148		
- Policy Analyst: Macro (33%)		34	34		34		36	36		36		38	38		38		40	40		40		148	148		148		
Sub-total	212	260	472	0	472	224	275	499	0	499	235	288	523	0	523	247	303	550	0	550	918	1128	2044	0	2044		
2.2 Emoluments for professional services																											
- evaluators contracts			0		0	25		25		25			0		0	35		35		35	60		60		60		
- editing, translating & interpreting services	15	7	22		22	18	7	23		23	17	8	25		25	18	8	26		26	66	30	96		96		
- Sub-contract with WRI for resource economics component	25		25		25	25		25		25	25		25		25	25		25		25	100		100		100		
- Brazil field research: Econ. of Res. Degradation (PROCITROPICOS)			0	275	275		0	300		300		0	315		315		0	330		330		0	1220		1220		
Sub-total	40	7	47	275	322	68	7	73	300	373	42	8	50	315	365	78	8	86	330	416	226	30	256	1220	1476		
2.5 Mission travel of Senior Research staff (tickets + Per diem)	80	62	142		142	84	85	149		149	89	69	158		158	93	72	165		165	346	268	614		614		
Sub-total	80	62	142	0	142	84	85	149	0	149	89	69	158	0	158	93	72	165	0	165	346	268	614	0	614		

IDB = Total CIAT + IFPRI contribution required from IDB
 Other = Other donor required for Brazil field research costs with PROCITROPICOS
 Total = Total project costs for all donors

Signature


 Office of Controller

APPENDIX 2

ANNUAL REQUIREMENTS FOR CIAT/FPFRI/RI PROJECT BUDGET (IN THOUSANDS OF CURRENT DOLLARS)

ITEM	Year 1				Year 2				Year 3				Year 4				Total Project Costs								
	CIAT	IFPRI	IDB	Other	TOTAL	CIAT	IFPRI	IDB	Other	TOTAL	CIAT	IFPRI	IDB	Other	TOTAL	CIAT	IFPRI	IDB	Other	TOTAL					
3.0 TRAINEES AND PARTICIPANTS																									
6.1 Office rental	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
6.2 Subsidence Allowance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
6.3 Travel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
6.3.1 International	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
6.3.1.1 Tickets (airfare)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
6.3.1.1.1 Tickets (airfare)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Participants (25) in Planning and Policy Workshops (25)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3.3 Travel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3.3.1 International	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3.3.1.1 Tickets (airfare)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3.3.1.1.1 Tickets (airfare)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
3.3.1.1.2 Per Diem (meals & hotel)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Sub-total	22	10	32	0	32	27	14	43	0	43	29	14	43	0	43	66	28	82	0	82	134	64	106	0	198
6.0 GENERAL SUPPORT																									
6.1 Office rental	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.2 Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.3 Research staff work vehicle	11	11	22	0	22	12	12	24	0	24	12	12	24	0	24	13	13	26	0	26	48	48	96	96	96
6.3.1 Fax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.3.1.1 Photocopier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4 Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1 Vehicle gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1.1 Vehicle gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1.1.1 Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1.1.2 Research Supplies/Office supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1.1.3 Computer services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1.1.4 Geographic Information Systems hardware and software	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1.1.5 Laptop computers, printers and software for project staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.4.1.1.6 Geographic data acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5 Support Staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5.1 Secretaries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5.1.1 Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5.1.2 Support Staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5.1.2.1 Research Support Staff: Call	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5.1.2.2 Printing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5.1.2.3 Distribution	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5.1.2.4 Communications (telephone, telex, fax, mail)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total	395	136	531	0	531	418	133	549	0	549	417	140	557	0	557	563	148	511	0	511	1,581	557	2,148	0	2,148
TOTAL	749	475	1,224	275	1,499	817	494	1,311	300	1,611	812	518	1,331	315	1,646	637	557	1,394	330	1,724	3,215	2,045	5,260	1,230	6,490

APPENDIX 2

**TRAVEL BUDGET IN US \$
(International and National)**

Project Position	% of time Dedicated to project	International Travel			Local (within country) travel			Total Project (int.+local) tickets + PD
		Tickets	Per Diems	Total	Tickets	Per Diems	Total	
CIAT								
Environmental Impact/Resource Economist and res. support staff	33	3x1000= \$3,000	42x150= \$6,300	\$9,300	2x250= \$500	10x150= \$1,500	\$2,000	\$11,300
Agricultural Land Use Specialist and research support staff	33	3x1000= \$3,000	42x150= \$6,300	\$9,300	2x250= \$500	10x150= \$1,500	\$2,000	\$11,300
Geographic Information Systems Analyst and research support staff	33	3x1000= \$3,000	42x150= \$6,300	\$9,300	2x250= \$500	10x150= \$1,500	\$2,000	\$11,300
Production Systems Analyst and research support staff	66	6x1000= \$6,000	84x150= \$12,600	\$18,600	4x250= \$1,000	20x150= \$3,000	\$4,000	\$22,600
Social Scientist and research support staff	66	6x1000= \$6,000	84x150= \$12,600	\$18,600	4x250= \$1,000	20x150= \$3,000	\$4,000	\$22,600
Sub-total		\$21,000	\$44,100	\$65,100	\$3,500	\$10,500	\$14,000	\$79,100
IFPRI								
Senior Policy Analyst (Cali-based)	100	4x1000= \$4,000	56x150= \$8,400	\$12,400	2x250= \$500	10x150= \$1,500	\$2,000	\$14,400
Macro Policy Analyst (Washington)	33	2x3000= \$6,000	30x150= \$4,500	\$10,500				\$10,500
Micro Policy Analysts (Washington) (2 analysts at 50% of their time each)	100	4x3000= \$12,000	60x150= \$9,000	\$21,000				\$21,000
Post-doctoral Fellow: Policy analysis (macro) field research	100	2x1000= \$2,000	28x150= \$4,200	\$6,200	2x250= \$500	10x150= \$1,500	\$2,000	\$8,200
Post-doctoral Fellow: Policy analysis (micro)	100	2x1000= \$2,000	28x150= \$4,200	\$6,200	2x250= \$500	10x150= \$1,500	\$2,000	\$8,200
Sub-total		\$26,000	\$30,300	\$56,300	\$1,500	\$4,500	\$6,000	\$62,300
Total CIAT + IFPRI		\$47,000	\$74,400	\$121,400	\$5,000	\$15,000	\$20,000	\$141,400

Figure 4. Annual project budget for IDB request by institutional share

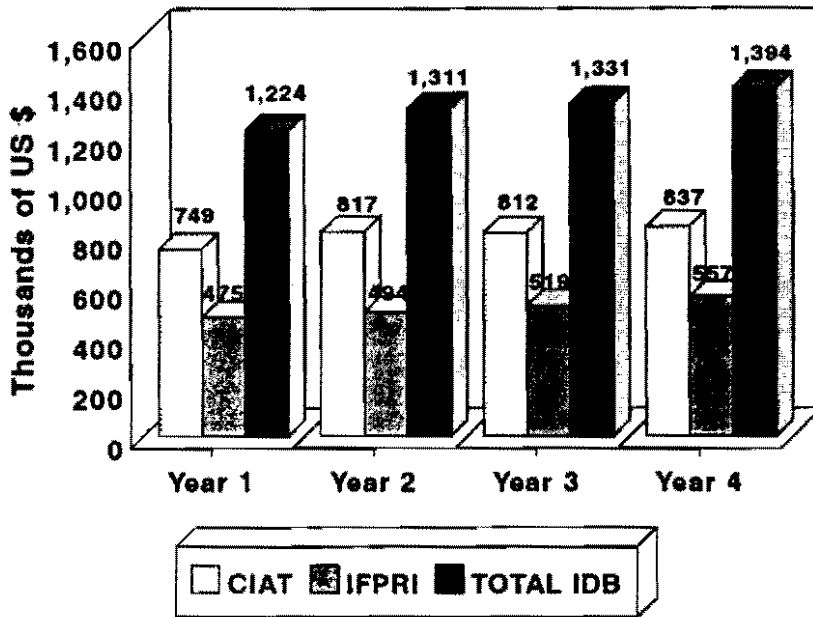
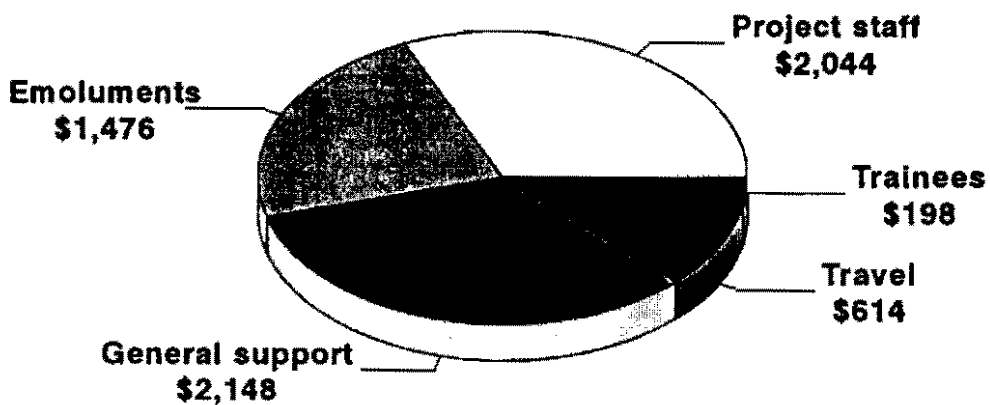


Figure 5. Total project budget (in thousands of US \$) by major categories of expenditures (all donors)



APPENDIX 2

Explanatory Notes of Detailed Budget

The budget breakdown by component represents CIAT's best estimate at the time of project design. There will be an annual workplan and budget prepared each year and it is assumed there will be budget flexibility with the IDB to re-allocate between components, if required, providing the total approved project budget is not exceeded.

IDB Budget 2.0

Senior Personnel Costs (Salaries and Benefits)

Full-time Senior research staff salaries and benefits are budgeted at an average of \$92,000 each for the base year (1992) and part-time project staff salaries are prorated accordingly.

The IFPRI senior policy analyst and post-doctoral research fellows will have work periods based in Brazil, Cali and Washington. The allocation of time across the Centers will depend on the need for collaboration at particular phases of the research project.

IDB Budget 2.2

Emoluments for Professional Services

Outside consultants will be contracted to provide the following services:

Mid-Project and End-of-Project Evaluations

At the end of Year 2, a mid-project evaluation is planned to address issues of efficiency (how the project was managed) and effectiveness (progress toward attaining project objectives and outputs). This mid-project evaluation is estimated at US \$ 25,000.

At the termination of the project, there is an end-of-project evaluation planned which will address issues of efficiency, effectiveness and project impact. The budget for the end-of-project evaluation is estimated at US \$ 35,000 .

Editing, Translating and Interpreter Professional Services

Both external and internal contracted professional services for the project are required in the area of editing of project publications (\$10,000 annually in \$ 1992), graphics arts and photographic services (\$10,000 annually in \$ 1992), and translation services (\$2,000 annually in \$ 1992).

Estimating Costs of Resource Degradation

A sub-contract with the World Resources Institute for a total of \$100,000 (\$25,000 annually) will be entered to provide backstopping services on the component dealing with the estimates on the costs of resource degradation.

Brazil Field Research Costs (PROCITROPICOS)

A total of \$1.220 million is required for field research in Brazil (\$275,000 in Year 1, \$300,000 in Year 2, \$315,000 in Year 3 and \$330,000 in Year 4). The field research costs will be requested from another donor.

PROCITROPICOS will serve as a facilitating mechanism that will assist CIAT and IFPRI in identifying the specific research team for the field component. The specific roles and responsibilities and budget by activity for the field research component will be specified by CIAT and IFPRI at the time of the sub-contracting.

IDB Budget Code 2.5

Mission Travel of Senior Research Staff

The detailed breakdown of the estimated budget requirements for travel are shown in Appendix 2-B.

Per diems for hotel accommodation, meals and incidents are based on the rate of \$150 per day.

The budget for the Cali-based senior staff provides for travel costs of both the senior scientist and the research support staff (i.e., research associates).

The IFPRI senior policy analyst is expected to alternate work periods between Cali, Brazil and Washington. Flexibility for re-allocations within the travel budget is required for this, as well as for the IFPRI post-doctoral research fellows based in Brazil, who will also have work periods in Washington and Cali.

IDB Budget Code 3.0

Trainees and Participants

Trainees

The project has budgeted for the following training component:

- On-the-job training and thesis supervision of 3 masters students a year from National Agricultural Research Systems (resource economics, policy analysis) in the second, third and fourth year of the project. CIAT will supervise 2 trainees annually and IFPRI will supervise one annually.

A subsistence allowance of US \$ 1,000 per month (1992 \$) per trainee for 12 months is required resulting in budgeted amounts for this item of \$24,000 for CIAT and \$12,000 for IFPRI. When adjusted for 5 % annual inflation, the budgeted subsistence allowance for the 2 CIAT masters students becomes \$25,000 in Year 2 of the project, \$27,000 in Year 3 and \$28,000 in Year 4. The budgeted subsistence allowances for the IFPRI trainees in Years 2, 3 and 4 of the project are: \$13,000 in Year 2, \$13,000 in Year 3 and \$14,000 in Year 4.

Return airfare for each trainee in the region is estimated at \$900 (1992 \$) or a total for the 2 CIAT trainees annually of \$1,800 (1992 \$) which, when adjusted for 5% annual inflation, becomes \$1,900 in Year 2 of the project, \$2,000 in Year 3 and \$2,100 in Year 4. The IFPRI trainee airfare is budgeted at \$1,000 in the second, third and fourth year of project.

- Participants in Planning and Policy Dialogue Workshops

There will be one planning workshop held in Year 1 of the project with 25 regional participants from ministries of agriculture, environment, and from national planning. The workshop will last for three days and have a total budgeted cost in Year 1 of \$22,500 for plane fares (\$900 per participant) and \$9,375 for subsistence allowance (\$45 per night in residence per participant for 5 nights allowing for variations in arrival and departure schedules and \$30 per day for 5 days for meals per participant).

In the final year of the project, there will be a major symposium for policy formulators and decision makers from relevant national ministries and the IDB to address the implications for policy of the research findings. The budget for 25 participants to attend the policy dialogue workshop in Year 4 is \$26,300 for plane fares and \$11,000 for hotel and meals (costs have allowed for 5% inflation from the 1992 base year).

The costs of the planning and policy dialogue workshops are shared between CIAT and IFPRI on a 70/30 basis.

IDB Budget 2.2

General Support

6.3 Equipment

Vehicles

The annual budget for leasing six research vehicles (3 for CIAT staff, 3 for IFPRI staff) required during project implementation is \$22,000 (\$3,600 per year for each vehicle in 1992 \$).

6.4 Supplies

Gasoline is budgeted at \$1,000 per year per project research vehicle.

Research and office supplies are budgeted at \$25,000 annually in the first year and increased by 5% a year for inflation in subsequent years of the project.

6.5 Computer Services

The hardware and software associated with the Geographic Information Systems have a total budget of \$225,000 (\$60,000 in Year 1, \$90,000 in Year 2 and \$75,000 in the first part of Year 3 of the project).

The laptop computers, printers and software required for the project research staff are budgeted at \$5,000 per staff member for a total of \$35,000 in Year 1.

Purchase of geographic data acquisition (e.g., the geographic images of the various field sites taken by satellite) have an annual budget of \$20,000 (1992 \$).

6.6 Support Staff

The project team is supported by a group of Research Associates (average annual salary of \$27,000 per associate), Research Assistants (average annual salary of \$14,000) bilingual secretaries (average annual salary of \$10,000 per secretary) and technicians (average annual salaries of \$8,000) dedicated to the project. Total secretarial support staff costs dedicated to the project are estimated at \$30,000 in 1992 which is increased in subsequent years by a 5% inflation factor. Total research support staff costs dedicated to the project are estimated at \$318,000 in 1992 which is increased in subsequent years by a 5% inflation factor. The project support team has the following anticipated composition:

Secretarial Project Support Staff			
<i>Local secretaries:</i>	CIAT	2 x 10,000	= \$20,000
	IFPRI	1 x 10,000	= \$10,000
Sub-Total of local secretaries			\$30,000
Research Project Support Staff			
<i>Local Research Associates</i>	CIAT	6 x 27,000	= \$162,000
	IFPRI	2 x 27,000	= \$54,000
<i>Local Research Assistants</i>	CIAT	3 x 14,000	= \$42,000
	IFPRI	2 x 14,000	= \$28,000
<i>Local Technicians</i>	CIAT	3 x 8,000	= \$24,000
	IFPRI	1 x 8,000	= \$8,000
Sub-Total of Research	CIAT		= \$228,000
Project Support Staff	IFPRI		= \$90,000
			\$318,000

Flexibility in the IFPRI local research support staff is required to respond to annual work plan requirements that may vary depending on whether the senior policy analyst is based for that period in Cali, Brazil or Washington.

6.7 Publications

The printing budget assumes the following:

- Planning documents/Monographs/Workshop/Symposium Proceedings

Six documents produced a year (40 pages per document and having camera ready preparation costs of \$12 per page) resulting in a total printing cost for the 6 documents of approximately \$3,000 per year.

- The distribution costs assume a distribution of 500 with one dollar per unit distribution costs resulting in annual distribution costs of \$3,000 for the six documents.

6.8 Communications

The annual communications budget (telephone, telex, fax, mail) assumes \$1,500 for the work of each of the senior project research staff resulting in annual requirements for the total research team of \$9,000 (1992 \$).

APPENDIX 3

Description of Project Activities

3.1 Information Systems and Characterization of Land Use Patterns at Regional Level (Output)

- Literature review
- Case study sites selection

Researchers will select one area-based site for in-depth study of the forest margins in Brazil.

- Planning Workshop

A planning workshop in the first year of the project will have participation from collaborating research institutions in the region and from policy departments of national ministries for agriculture, environment and national planning in the member countries of PROCITROPICOS (Brazil, Colombia, Peru, Bolivia, Ecuador and Venezuela).

- Assess Patterns of Agricultural Land Use Over Space and Time

Land use patterns at the regional level for forest margin zones in Brazil, Peru, Bolivia, Ecuador and Venezuela will be analyzed.

- Characterize Relations Between Changes in Agricultural Technology and Land Use
- Monitor Technical Change and Its Impact on Land Use Dynamics
- Manage Geographic Information Systems (GIS) Databases
- Merge databases at Different Levels of Aggregation for Analysis
- Report Preparation

In the final year, CIAT will sponsor a symposium to provide a mechanism in which researchers, policy formulators and decision makers from relevant national ministries can address the policy implications of the research findings.

- Participate in Policy Symposium

CIAT will publish the symposium proceedings and ensure its dissemination to its network with an interest in resource management research. This network will include national agricultural research systems; NGOs and farmer organizations; universities; and national ministries of agriculture, environment and national planning.

3.2 Guidelines and Policy Analyses that Assess Responses (in terms of land conversion and migration) by Farmers to Different Policy Variables (Output)

- Finalize sub-contract with IFPRI
- Literature review
- A literature review will be conducted on the macro forces that have promoted migration into the fragile forest margins of the Amazon region.
- Study Site Selection

The same case study sites in the forest margins of Brazil that were selected for the assessment of resource degradation will be used for the analyses of policy relationships.

- Planning Workshop

A planning workshop on the policy analysis component of the project will be held in the first year at the same time as the planning workshop for the project component that assesses the economic impact of resource degradation.

Participants will come from collaborating national agricultural research systems and from the policy departments of ministries of agriculture, environment and national planning of the countries in the region.

- Development of Standard Methodologies

A standard methodology for gathering and analyzing data on land use patterns and elements of the social and natural environment that shape land-use decisions will be developed for application across the diverse case study sites. This component looks at how the productivity of converted forest land changes with the length of time that it is farmed and how farmers and rural communities adapt to changes in land productivity.

Adaptive mechanisms that will be studied include land use practices, choice of technology, diversification into non-farm activities, employment and migration. The methodology will include:

- Assessing the impact of different farming practices on soil quality and land productivity, and their sustainability over time.
- Analyzing the factors that determine which farmers adopt superior farming practices that are already available in their communities. Determining factors that will be analyzed include household characteristics (demographic, education, wealth, etc.), farm characteristics (size, land quality, years farmed, etc.), locational characteristics (access to roads, markets, credit, etc.), and land ownership rights.
- Analyzing the impact of improved farming practices on household incomes and welfare, on household decisions to clear or retain remaining forest on their farms, on the incidence of relocation to the forest frontier, and on the incidence of new migration into the region.

Since it will be impossible to collect adequate longitudinal data on sampled households, the research design will also exploit the cross-sectional variation to be found by sampling households located at varying distances from the forest frontier. It is expected that distance will be highly correlated with the length of time that converted forest land has been farmed.

- **Data Analysis**

A concerted effort will be made (via sampling strategies) to get a clear picture of the variation present in land use/agricultural practices both within and across study sites. This will strengthen the research team's ability to extrapolate from the results of these studies, compare across sites, and document successful modes of agricultural adaption in the study area.

- **Analysis of Policy Options**
- **Report Preparation**

3.3 Economic Estimates on the Costs of Degradation (Output)

- **Finalize sub-contract with World Resources Institute**
- **Literature review**
- **Selection of case study sites in Amazonia**

- Planning workshops
- Identify existing resource degradation processes
- Develop methods to estimate depreciation of the ecological capital
- Field data collection
- Data analysis and estimating of sustainability trends for existing forms of land use
- Provide feedback to CIAT's agroecosystems

Feedback on the costs of resource degradation will be provided to CIAT's agroecosystem programs for the forest margins and the savannas and to CIAT's germplasm programs for beans, rice, cassava and tropical forages.

- Report Preparation
- Participate in policy symposium

3.4 Understanding of Farmers' Adaptation to Changes in Land Productivity (Output)

- Finalize sub-contracts with IFPRI and PROCITROPICOS
- Literature Review
- Selection of case study sites
- Assess the impact of different farming practices on soil quality and land productivity
- Analyze factors that determine which farmers adopt superior farming practices
- Analyze impact of improved farming on forest clearing and farmer migration
- Report Preparation
- Participate in Policy Symposium

Interrelationships Between Micro and Macro Components

It is quite clear that the micro and macro components of the research project are integrally linked. Understanding farmers' responses (from resource allocation decisions to migration decisions) to policy signals and farmers' adaption to land degradation are two pieces of the same puzzle. Both policy changes and soil quality changes affect expected output and profit, and will influence resource allocation accordingly. Therefore, using a common micro-level data base collected in close collaboration with a Brazilian field team, both of the IFPRI components will attempt to improve our understanding of the policies and other factors affecting resource allocation and technology adoption.

3.5 Framework for the Design of Technologies and Farming Practices. (Output)

- Selection of study sites
- On-farm trials to test technologies and farming practices
- Design and implement a data collection system for monitoring the impact of new technologies and farming practices
- Report preparation
- Participate in policy symposium

3.6 Institutional Strengthening and Trained National Scientists (Output)

- Conduct training needs analyses with PROCITROPICOS

A training needs analysis will be conducted with the national agricultural research systems participating in the study. This needs assessment will identify requirements for on-the-job training in land use analysis for masters' level students at the thesis level.

- Select Training Candidates

PROCITROPICOS and the national agricultural research systems will be responsible for identifying which staff members within their organization can profit most from the CIAT/IFPRI on-the-job training and thesis supervision and who ideally will be in a position to transfer this knowledge to their colleagues in the same institution.

- **Prepare Individualized Training Programs**

The training will be on-the-job internships that provide opportunities for practical attachments in specialized research areas related to resource economics and policy analysis of land use.

- **Deliver Training**

The on-the-job training will be provided both in the field (Brazil) and at CIAT's headquarters in Cali, Colombia.

- **Evaluate Training and Revise Where Appropriate**

A questionnaire will be completed by the trainees, following their on-the-job training to identify which areas of the supervised attachments require revision. This will improve the effectiveness of the training offered in subsequent years.

- **Plan and Deliver Policy Symposium**

In the final year, CIAT will sponsor a symposium to provide a mechanism in which researchers, policy formulators and decision makers from relevant national ministries can address the policy implications of the research findings.

- **Publication and Dissemination of Symposium Proceedings**

CIAT will publish the symposium proceedings and ensure its dissemination to its network with an interest in resource management research. This network will include national agricultural research systems; NGOs and farmer organizations; universities; and national ministries of agriculture, environment and national planning.

CHRONOGRAM OF PROJECT ACTIVITIES

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Information Systems and Characterization of Land Use patterns at Regional Level																
- Literature review	█	█														
- Case study site selection		█														
- Planning workshop			█													
- Assess patterns of agricultural land use over space + time				█	█	█	█	█	█	█	█	█	█	█	█	█
- Characterize relations between changes in agricultural technology + land use				█	█	█	█	█	█	█	█	█	█	█	█	█
- Analyze technical change and its impact on land use dynamics									█	█	█	█	█	█	█	█
- Manage GIS databases					█	█	█	█	█	█	█	█	█	█	█	█
- Merge databases at different levels of aggregation for analysis					█	█	█	█	█	█	█	█	█	█	█	█
- Report preparation														█	█	█
- Participate in policy symposium																█
Guidelines and policy analyses that assess responses (in terms of land conversion and migration) by farmers to different policy variables																
- Finalize sub-contract with IFPRI	█															
- Literature review	█	█														

CHRONOGRAM OF PROJECT ACTIVITIES

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
- Planning workshops			■													
- Identification of macro and sector variables for study			■													
- Development of base questionnaires				■	■											
- Relate policy variables to inter-regional migration				■	■	■	■	■								
- Relate policy variables to intra-regional migration					■	■	■	■	■	■	■	■				
- Relate policy variables to proportion of forest that farmers leave intact								■	■	■	■	■	■			
- Report preparation														■	■	■
- Participate in policy symposium																■
Economic estimates on the costs of resource degradation by land use group																
- Finalize sub-contract with World Resources Institute	■															
- Literature review	■	■														
- Case study site selection		■														
- Planning workshop			■													
- Identify existing resource degradation processes				■	■											

CHRONOGRAM OF PROJECT ACTIVITIES

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
- Develop methods to estimate depreciation of the ecological capital				█	█											
- Field data collection					█	█	█	█	█	█	█	█				
- Data analysis									█	█	█	█				
- Provide feedback to CIAT agroecosystems and germplasm programs													█	█		
- Report preparation														█	█	█
- Participate in policy symposium																█
Understanding of farmers' adaptation to changes in land productivity																
- Finalize sub-contracts with IFPRI and PROCITROPICOS	█															
- Literature review	█	█														
- Case study site selection		█	█													
- Planning workshop			█	█												
- Development of standard methodology		█	█	█												
- Development of base questionnaires		█	█	█												
- Assess the impact of different farming practices on soil quality and land productivity				█	█	█	█	█	█	█	█	█	█	█	█	█
- Analyze factors that determine which farmers adopt superior farming practices									█	█	█	█	█	█	█	█

CHRONOGRAM OF PROJECT ACTIVITIES

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
- Report preparation																
- Participate in policy symposium																
Framework for the design of technologies and farming practices																
- Selection of study sites	■															
- On farm trials to test technologies and farming practices		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
- Design and implementation of data collection systems for monitoring the impact of new technologies and farming practices		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
- Report preparation																
- Participate in policy symposium																
Institutional strengthening and training																
- Conduct training needs analysis with PROCITROPICOS			■	■												
- Select training candidates in cooperation with PROCITROPICOS				■				■				■				
- Prepare individualized training programs				■				■				■				
- Deliver training in land use analysis					■	■	■	■	■	■	■	■	■	■	■	■
- Evaluate training and revise where appropriate					■	■	■	■	■	■	■	■				

CHRONOGRAM OF PROJECT ACTIVITIES

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
- Plan and implement policy symposium for PROCITROPICOS, national ministries + IDB																
- Publish and disseminate symposium proceedings																
- Training of PROCITROPICOS staff to take over monitoring function																
PROJECT MANAGEMENT																
IFPRI																
- Finalize proposal with CIAT																
- Finalize sub-contract with CIAT																
- Administer IFPRI component of project																
- Prepare Annual Work Plans																
- Help draft progress reports																
- Participate in project evaluations																
CIAT																
- Finalize proposal documents																
- Finalize contract with IDB																
- Administer overall implementation of project																

CHRONOGRAM OF PROJECT ACTIVITIES

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
- Administer sub-contracts with IFPRI, WRI and PROCITROPICOS	[Shaded bar]															
- Prepare Annual Work Plans	[Shaded bar]				[Shaded bar]				[Shaded bar]				[Shaded bar]			
- Prepare and submit progress reports to IDB	[Shaded bar]															
- Participate in project evaluations																
PROCITROPICOS																
- Finalize proposal with CIAT	[Shaded bar]															
- Finalize sub-contract with CIAT	[Shaded bar]															
- Administer PROCITROPICOS component of project	[Shaded bar]															
- Prepare annual work plans	[Shaded bar]				[Shaded bar]				[Shaded bar]				[Shaded bar]			
- Help draft progress reports	[Shaded bar]															
- Participate in project evaluation																
WORLD RESOURCES INSTITUTE																
- Finalize proposal with CIAT	[Shaded bar]															
- Finalize sub-contract with CIAT	[Shaded bar]															
- Administer WRI component of project	[Shaded bar]															
- Prepare annual work plans	[Shaded bar]				[Shaded bar]				[Shaded bar]				[Shaded bar]			

CHRONOGRAM OF PROJECT ACTIVITIES

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
- Help draft progress reports																
- Participate in project evaluation																
IDB																
- Finalize approval of proposal																
- Finalize contract with CIAT																
- Approve and respond to progress reports and disburse funds																
- Evaluate project																

APPENDIX 5-1

TRAINING OF TRAINERS IN BEANS, CASSAVA AND RICE PRODUCTION	
Donor: Inter-American Development Bank (IDB)	
Location: CIAT Headquarters and Latin America	Duration: 18 months (1991-1992)
Status: Ongoing	Total value: US \$ 1,130,000
<p>Goal: To strengthen national institutions' capacity to operate sub-regional training systems on adaptive research and technology transfer for the production of beans, cassava and rice.</p> <p>Objectives:</p> <ul style="list-style-type: none"> • to foster the development of inter-institutional mechanisms for the establishment of sub-regional training systems. • to instruct trainers on the new training systems. • to develop training materials in cooperation with the trainees. <p>Output:</p> <ul style="list-style-type: none"> • three operational sub-regional training systems in: <ol style="list-style-type: none"> (1) bean production for Central America, Mexico and the Dominican Republic; (2) cassava production for Brazil, Paraguay and Argentina; and (3) rice production for Venezuela, Colombia and Ecuador. • trained staff of 25-50 trainers for each sub-regional training system. • Curriculum materials consisting of 7-10 training units for each sub-regional training system. • 5-7 courses given by each team during or after their training (20 participants by course). <p>Description of principal activities:</p> <ul style="list-style-type: none"> • institutionalizing the sub-regional training systems. • selecting trainees. • coordinating activities of sub-regional systems and steering committees. • training of trainers. • producing training units/curriculum materials in modular format. <p>CIAT's role: CIAT is executing the project and reporting to donor.</p> <p>Evaluation: at the end of the project by a team of two external experts and a CIAT representative.</p>	
<p>CIAT personnel involved: Dr. Vicente Zapata, Project Coordinator</p>	<p>Partners: National Agricultural Research Systems (NARS) from countries of the sub-regional training systems</p>

APPENDIX 5-2

DEVELOPMENT OF AGROPASTORAL SYSTEMS FOR THE ACID SOILS SAVANNAS OF THE HUMID TROPICS	
Donor: Inter-American Development Bank (IDB)	
Location: CIAT Headquarters and countries of the Amazon region	Duration: 4 years (1992-1995)
Status: Ongoing	Total value: US \$ 3,760,000
<p>Objective: To contribute to the design of agropastoral systems based on the combined use of crops and pastures that will increase productivity, improve input use efficiency, recycle soil nutrients efficiently and maintain or improve the natural resource base.</p> <p>Outputs:</p> <ul style="list-style-type: none"> • improved crops and pastures appropriate for integrated production systems • better understanding of the interaction between the components of the system • increased productivity of agropastoral systems • preserved natural resources <p>Description of principal activities:</p> <ul style="list-style-type: none"> • studying restrictions and potential of agropastoral systems • developing germplasm adapted to savanna conditions • integrating system's components • analyzing crop competition, inputs efficiency and biotic factors • evaluating socioeconomic aspects of the systems • preparing an agropastoral networking system • training of National Agricultural Research Systems (NARS) researchers from participating countries <p>CIAT's role: CIAT is the chief executing agency and is jointly implementing the project with the NARS of the Amazon region. CIAT administers the project's funds and is responsible for progress reporting to the donor.</p> <p>Evaluation: This project will be evaluated at the end of the second and fourth year of activities.</p>	
CIAT personnel involved: Dr. Raul Vera, Project Coordinator Dr. Luis Sanint, Rice Economist	Partners: NARS of the Amazon region

APPENDIX 6

The International Center for Tropical Agriculture (Centro Internacional de Agricultural Tropical - CIAT)

CIAT's MISSION

CIAT was established in 1967. Its mission is to contribute to the alleviation of hunger and poverty in tropical developing countries by applying science to the generation of technology that will lead to lasting improvements in agricultural output while preserving the natural resource base. CIAT pursues this mission through two interrelated approaches: research on germplasm development and research on resource management.

CIAT is increasingly emphasizing strategic research that covers a wide agroecological zone while assisting national and regional research partners to assume major responsibilities for applied and adaptive research that are more location specific.

GERMPLASM DEVELOPMENT DIVISION

CIAT's germplasm development programs (beans, cassava, rice, tropical forages) focus on the development of germplasm-based technology that efficiently uses inputs and is adapted to environmental constraints in tropical and sub-tropical developing countries. Research support is provided for the four commodity programs by the Germplasm Resources Unit, the Virology Research Unit and the Biotechnology Research Unit.

CIAT has a global responsibility for research on cassava, field beans and tropical forage species in acid soils. It has a regional responsibility for research on rice in Latin America and the Caribbean.

RESOURCE MANAGEMENT RESEARCH DIVISION

This new division focuses on research that will improve the management of resources available for agriculture in tropical America such that gains in food outputs and other commodities are compatible with the long-term preservation and enhancement of the resource base.

There are three agroecological and one land use research programs which integrate the work of the division. The agroecosystem programs focus on disturbed **forest margins** in the humid tropics, mid-altitude tropical **hillsides** and lowland acid-soil **savannas**.

CIAT works collaboratively with other institutions in providing an interdisciplinary approach to the multi-dimensional problem of agricultural sustainability.

STAFF AND FACILITIES

CIAT has a staff of approximately 100 international scientists who work closely with their counterparts in national agricultural research systems.

CIAT's main research facilities are located outside of Palmira close to Cali's airport. CIAT also has research stations in various parts of Colombia including Carimagua, Villavicencio, Popayán and Pivijay. CIAT conducts area-based research in other countries of Latin America, the Caribbean, Africa and Asia in partnership with national and regional institutions.

INSTITUTIONAL RELATIONS

Training

Training at CIAT supports the institutional development objectives of strengthening both national research capacity and the national links between research and development and of supporting the development of sub-regional training systems. In 1991, approximately 150 research scientists from national agricultural research systems in developing countries received specialized training in individualized programs at CIAT.

CIAT has developed a training of trainers program for rice, beans and cassava scientists and extensionists. This is provided at a sub-regional basis in Latin America.

CIAT also provides post-graduate training opportunities to young researchers from developed countries to become acquainted with international tropical agricultural research. In 1991, CIAT supervised both practicums and doctoral research projects for 16 students from universities in North America and Europe.

Undergraduate students from Colombia are also given the opportunity to carry out research projects under the guidance of CIAT scientists, in fulfillment of a partial requisite to obtain their first degree. In 1991, 46 Colombian students completed their theses at CIAT, 52% of these being women.

CIAT has modern desktop publishing and printing facilities for producing highly effective print-based learning materials. In addition, it now has a small television studio for in-house production of audio visual training materials for use with national scientists.

Information Services

CIAT's library collection contains over 40,000 volumes with an emphasis on tropical agriculture; 37,000 specialized documents on common beans, cassava, rice and tropical pastures; 2,500 journals; and 400 technical bulletins; as well as maps, microfilms and audiotutorials. CIAT also has a computerized inventory of over 11,000 slides.

This is an extremely valuable resource for researchers at CIAT and at national research programs.

CIAT relies on the latest information and communications technologies, including electronic mail, compact disc (CD-ROM) and online databases to ensure rapid exchange of current research information with national agricultural research programs in Latin America.

Publications

CIAT publishes technical monographs, journals, working documents, manuals, training materials and research program newsletters. This is an important activity for ensuring widespread dissemination of research findings. CIAT has a worldwide distribution of over 1,600 subscribers for its quarterly abstracts on beans, cassava and tropical pastures research findings.

Conferences and Official Visits

CIAT organizes conferences both at headquarters and in-country. The objectives are to provide for information exchange, technical reviews, institutional strengthening through training, evaluation and inter-institutional planning on collaborative research agendas, thereby reducing duplication of efforts by building on the comparative advantages of individual institutes. In 1991, CIAT held 17 such conferences.

In addition, there are over 3,000 national and international visits to CIAT annually. These visits are encouraged as part of CIAT's public education program to help inform the educational and scientific community, the general public and the donors as to the advances that have been achieved through investments in agricultural research that contribute to sustainable development.

DONOR SUPPORT

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- Public corporations such as the International Development Research Center.

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