

**1996 REGIONAL TECHNOLOGY PROGRAM:
AGRICULTURE AND NATURAL RESOURCE MANAGEMENT**

(TC-96-01-38-8-RG, TC-96-02-01-3-RG, TC-96-01-50-2-RG, TC-96-01-49-5-RG,
TC-96-01-48-7-RG, TC-96-01-47-9-RG, TC-96-01-46-1-RG, TC-96-01-45-3-RG,
TC-96-01-44-5-RG, TC-96-02-02-1-RG)

EXECUTIVE SUMMARY

EXECUTING AGENCY: CIAT. Information and technology for natural resource management and poverty alleviation. Execution period: 24 months. Budget: US\$1.3 million in Brazilian reais.

CIMMYT. Improvement in the yield stability and productivity of rainfed wheat germ plasm. Execution period: 24 months. Budget: US\$1.2 million in Mexican pesos.

CIP. Regional cooperation for research on potatoes and other root and tuber crops and for natural resource management in the Andes. Execution period: 24 months. Budget: US\$1.2 million in Peruvian soles.

ICRAF. Sustainable agroforestry systems for the humid tropics. Execution period: 18 months. Budget: US\$600,000 in Peruvian soles.

ISNAR. Response to new technological demands and strengthening of research in agroindustry and natural resource management. Execution period: 24 months. Budget: US\$500,000 in Brazilian reais.

CIFOR. Management of secondary forests in the tropical regions of the Americas. Execution period: 24 months. Budget: US\$250,000 in Brazilian reais.

CARDI. Subregional cooperative program for agricultural research - PROCICARIBE. Execution period: 24 months. Budget: US\$250,000 in foreign exchange.

PROCISUR. Direct seeding for soil conservation in the southern cone. Execution period: 36 months. Budget: US\$250,000 in Argentine pesos.

PROCIANDINO. Sustainability indicators in Andean ecosystems. Execution period: 24 months. Budget: US\$150,000 in Venezuelan bolívares.

REGIONAL FUND. Support for the Secretariat of the Regional Agricultural Technology Fund. Execution period: 12 months. Budget: US\$300,000 in foreign exchange.

BENEFICIARIES: The Bank's borrowing member countries.

FINANCING: IDB: US\$6,000,000 (FSO)

Disbursements of up to US\$5,450,000 equivalent will be made in local currencies from the net income of the Fund for Special Operations; and, in the case of CARDI's PROCICARIBE project (US\$250,000) and the project to support consolidation of the Regional Agricultural Technology Fund (US\$300,000), disbursements will be made in foreign exchange.

TERMS: Request for final disbursement: three months after the end of the execution period.
Final disbursement: six months after the end of the execution period.

ENVIRONMENTAL CLASSIFICATION: The Environment Committee, at its meeting of February 20, 1996, classified this as a Category II operation.

OBJECTIVES: To contribute to the agricultural development, sustainable natural resource management and economic growth of the region through research, technological development, training in and dissemination of agricultural technology and natural resource management programs carried out by international and regional research and training centers and by means of subregional cooperative programs for the development of agricultural technology.

DESCRIPTION: The program consists of research projects, technology transfer and training in Latin America and the Caribbean in the following areas: development of information systems for the management of natural resources and the alleviation of poverty; genetic improvement of wheat; regional cooperation in research on potatoes and other Andean crops; development of agroforestry systems for the humid tropics; strengthening of agroindustry and natural resource management research systems; management of secondary tropical woodlands; development of indicators on the sustainability of Andean ecosystems; soil conservation through direct seeding; subregional (Caribbean) coordination activities in research and technology transfer; and support for technical and administrative activities to consolidate the Regional Fund.

BENEFITS: Based on the benefits produced by the Bank's investment in the research performed by international and regional research and training centers and subregional cooperative technology development programs in recent years, in addition to the investments described herein, highly significant results are anticipated in the region's economies, in terms of natural resource management and poverty alleviation.

RISKS: No risks are anticipated during execution of the operation, thanks to the experience acquired by the Bank in financing projects of this type over the past 20 years. There are risks inherent to the research process, which are considered low given the strategic and applied nature of the research to be conducted.

RESPONSIBILITY: Basic: INT/RTC; and Technical: SDS/ENV. Responsibility for on-site administrative tasks will be assigned as follows:

CIAT:	COF/CCO	CIFOR:	COF/CCR
CIMMYT:	COF/CME	CARDI:	COF/CTT
CIP:	COF/CPE	PROCISUR:	COF/CUR
ICRAF:	COF/CPE	PROCIANDINO:	COF/CEC
ISNAR:	COF/GBR	RATF:	SDS/ENV & INT/RTC

**EXCEPTIONS
TO THE BANK'S
POLICIES:**

To streamline the administration of the operation - which calls for a large number of individual consultants - and based on the experience of the executing agencies and on the contracting modality, an exception to the usual procedures for the selection and contracting of individual experts would be granted. In addition, a first disbursement of up to 50% of the total budget for each project, retroactive to January 1, 1996, would be made.

I. BACKGROUND

A. The regional technology development system

- 1.1 The regional system for the generation and transfer of technology is composed of national, regional and international organizations. The national systems consist of Institutos Nacionales de Investigación Agropecuaria [National Agricultural Research Institutes] (INIAs), agricultural universities, foundations and other non-governmental organizations, producers' associations and private sector enterprises. The components of the national systems complement each other by conducting (or financing) different types of research and producing different types of technology. Private enterprises in general invest in applied and adaptive research to generate technologies that can be sold (chemical, mechanical), while the INIAs generate technologies that are public goods.
- 1.2 To meet the technology needs common to the various subregional agroecological conditions, the INIAs have set up cooperative research programs (PROCIs). The Centros Internacionales de Investigación Agrícola [International Centers for Agricultural Research] (CIIAs) complement the activities of the INIAs and PROCIs in the region by carrying out strategic medium- and long-term research in the region's priority areas.
- 1.3 The objective of the CIIAs that belong to the Consultative Group on International Agricultural Research (CGIAR) is to contribute to the sustained increase of food production in developing countries through agricultural research, the transfer of technology and training in order to improve nutritional levels and the general economic welfare of the low-income population. In addition to the traditional activities for genetic improvement of strategic food crops, the research agenda calls for studies on the conservation and management of natural and genetic resources; the development and management of production systems; institutional strengthening; and studies on socioeconomic factors, food policies and the management of research.
- 1.4 The importance of the CIIAs' work for the region is based on:
(i) the development of "generic" technologies with public property characteristics and of use in different agroecological zones;
(ii) the utilization of economies of scale in agricultural research of a strategic nature, in the sharing of information and in the ability to assemble a critical mass of researchers; and (iii) the development and maintenance of germ plasm banks. The generation and dissemination of know-how produced by the CIIAs in conjunction with the INIAs in the region have boosted food production, tightened genetic security, increased the preservation and management of natural resources and created a mechanism of effective cooperation for developing the agricultural sectors and economies of the region.

B. The Bank's contribution to regional technological innovation

- 1.5 The IDB's investment in the strengthening of national research systems (through loans) and in the regional and international research institutions (by means of nonreimbursable technical-cooperation operations) has been generally very effective, complementing the Bank's efforts to promote other areas of agricultural, economic and social development and serving to ensure successful development of the sector and the economies in the region. 1/
- 1.6 The impact of the Bank's investment in the CIIAs was achieved by means of increased production and productivity in commodities of the utmost importance to Latin America and the Caribbean (corn, wheat, potatoes, cassava, rice and grassland); better management of natural resources; and the implementation of new agricultural policies plus the generation of income and jobs stemming from those activities. The widespread multiplier effect of these pursuits, financed on a nonreimbursable basis, has further increased the returns on national technology innovation projects financed by the Bank through its loans. 2/
- 1.7 The Bank has supported the CIIAs' activities in the region since 1974, mainly through annual contributions to the basic budgets of the centers located in the various countries. It also supported the creation of the PROCIs by financing cooperative projects of subregional interest. Due to the shortage of concessional resources, since the start of the 1990s the Bank has decreased its financing to CIIAs and PROCIs by about US\$1 million per year (see Annex XI), while promoting alternative ways of continuing to finance regional agricultural research.
- 1.8 In this regard, with support from the Bank, a group of countries in the region has drawn up a proposal for financing based on the establishment of a Regional Agricultural Technology Fund (RATF)

1/ The background of the Bank's contribution to regional agricultural research has been examined on various occasions - for example, "The role played by the IDB in strengthening agricultural research in Latin America and the Caribbean," which was prepared in 1993, summarizes the main findings of two years of work, including an international workshop organized by the Bank. The proposal for establishing the Regional Technology Fund (1995) also examines the Bank's contribution to the regional research system.

2/ An annual economic benefit of more than US\$1 billion is estimated to have accrued from the work of the CIIAs and INIAs in the region in recent years, with rates of return in excess of 40%, taking into account only the benefits of the genetic improvement of beans, corn, rice and wheat (see "The role played by CIAT, CIMMYT and the CIP in agricultural research in Latin America and the Caribbean." Cali, Colombia, October 1992).

amounting to roughly US\$200 million over a period of three years. The income produced by the RATF would ensure the availability of a minimum level of resources to support regional agricultural technology development activities, thus providing continuity and stability for the financing of priority endeavors of common interest to the Latin American and Caribbean countries. At the same time, it would strengthen the countries' role in defining the regional research agenda. Most of the resources for the RATF would be contributed by the countries of the region, whose commitments for that purpose were confirmed at a special session of the recent annual meeting of the Bank's Board of Governors. The IDB contribution to the regional technology program will decline as the RATF is increasingly able to generate its own resources.

II. OBJECTIVES

- 2.1 The program's objective is to contribute to agricultural development, sustainable management of natural resources and economic growth in the countries of the region through programs of research, technological development, training and dissemination of agricultural technologies that would be carried out by the CIIAs, PROCIs and the regional and national research institutions.
- 2.2 Given the type of research (strategic and applied at the regional level) and technology to be developed (biological and operational) and the proposed transfer and training activities, the program complements the research programs executed at the national level by the public and private sectors.

III. PROGRAM DESCRIPTION

- 3.1 The 1996 program reflects the diverse and complex nature of the demands for research on a regional agenda seeking topical as well as geographical balance. The proposed program continues the Bank's investment in the regional technology development system, which has already posted impressive socioeconomic returns through the generation of income and employment, natural resource conservation and poverty alleviation.
- 3.2 The proposed activities will be carried out in conjunction with national research organizations and cofinanced by the international centers themselves, by regional and national organizations and, in some cases, by bilateral agencies. The identification, selection and priority ranking of the program's projects were based on the technical analysis performed by RE1/EN1, RE2/EN2, RE3/EN3, SDS/ENV and INT/RTC from September through December 1995.

A. Activities

- 3.3 The program would finance the following research and technology transfer activities: the development of information systems for natural resource management and poverty alleviation; genetic improvement of wheat; regional cooperation for research on potatoes and other Andean crops; the development of agroforestry systems for the humid tropics; the strengthening of research systems in agroindustry and natural resource management; secondary forest management; the development of sustainability indicators for Andean ecosystems; and soil conservation by means of direct seeding. The following paragraphs present a summary of the projects in the 1996 program (see Annexes I through X, available in the technical files of SDS/ENV, for complete project proposals).
- 3.4 International Center for Tropical Agriculture (CIAT). Information and technology for natural resource management and poverty alleviation (TC-96-01-38-8-RG). Duration: two years. Budget: US\$1.3 million. At present, Latin America's natural resources are subject to a high rate of degradation due to faulty land management. Agriculture is without question the principal purpose for which land is used, and it represents one of the most important sectors of the region's economy. In particular, rapid and intense degradation of resources is frequently - although not always - related to poverty in rural areas. For those for whom agriculture is synonymous with day-to-day survival, the need to maintain food security as minimum income supersedes any consideration of longer-term factors such as the protection of natural resources.
- 3.5 The project seeks to help break the vicious circle of poverty and degradation of resources from two complementary angles. It will develop methodologies and databases that relate participatory approaches based on the community to georeferenced data. This will enable: (i) communities to gain better access to comparable experiences from adaptive participatory research in other communities; (ii) researchers to perform a better extrapolation of findings in specific locales; (iii) policy-makers to identify more accurately the interrelationships between poverty, the degradation of natural resources and key conditions, both in agriculture and in the environment, to leverage the effect of allocating the meager resources available in the countries for rural development; and (iv) the impact of this research on Latin America to be evaluated. The project includes the improvement of techniques to achieve better management of the infertile acid soils which predominate in tropical Latin America.
- 3.6 International Maize and Wheat Improvement Center (CIMMYT). Improvement in the yield stability and productivity of rainfed wheat germ plasm (TC-96-02-01-3-RG). Duration: two years. Budget: US\$1.2 million. Wheat is the second most important basic crop in Latin America, occupying close to 8 million hectares on

which more than 18 million tons are produced. The average yield in Latin America is 2.3 tons per hectare, and 86% of the area devoted to this cereal in the region is located in the southern cone; 10% in Mexico; and 4% in the Andean region. Rainfed wheat accounts for 92% of the wheat grown in Latin America, with Mexico and Chile the only significant exceptions. In Argentina, 25% is grown under conditions of high precipitation; the remaining 75% suffers from drought almost every year during the early stages of its crop growth. In Brazil, about 40% of the wheat is grown under heavy rainfall, on acid and eroded soils that are aluminum toxic. The remaining 60% is subject to drought in some years. Thanks to more than 30 years of CIMMYT collaboration with the INIAs of the region, varieties of wheat derived from CIMMYT are grown on 84% of the entire area devoted to this crop in Latin America. That area includes 90% of the wheat fields in Argentina, 64% of those in Brazil and 95% of those in Mexico.

- 3.7 The project's aim is to generate high-yield varieties of wheat with good yield stability, strong resistance to disease, and improved industrial quality for rainfed wheat areas in Latin America, with a view to achieving sustainable production of this crop in the region. The activities to be carried out under the project will result in the generation of stable and high-yield flour wheat for those areas. The long-term objectives include the incorporation of resistance to numerous diseases in high-yield germ plasm, while at the same time improving its industrial quality and heightening its tolerance to germination on the stalk. The germ plasm to be used in acid soils must also tolerate toxicity from aluminum. Improved genetic materials will be distributed to the national programs, which will reselect and evaluate them before adopting them as varieties. An exchange of information will be promoted and a unified database on wheat varieties will be established.
- 3.8 **International Potato Center (CIP). Regional cooperation for research on potatoes and other root and tubers crops, and the management of natural resources in the Andes (TC-96-01-50-2-RG).** Duration: two years. Budget: US\$1.2 million. The CIP's regional research program is designed to strengthen the capability of national institutions to identify limiting factors; to perform research and apply the results to the solution of problems with the production and use made of the nation's crops and natural resources. The CIP has contributed to agricultural research in the region through horizontal cooperation mechanisms and research contracts with national institutions. The cutback in CIIA budgets has impaired the ability to maintain the system for cooperation with the INIAs. At the same time, the shrinkage of national research budgets has affected basic food crop research. This situation implies a loss of installed capacity, both in human resources and in underutilization of physical resources being built up by means of own funds or with the help of international cooperation.

- 3.9 The project is designed: (i) to strengthen the CIP's regional research in Latin America and the Caribbean through direct and collaborative execution or execution by contract of those research activities that can be performed with comparative advantages by institutions in Latin American and Caribbean countries; (ii) to support the operation of collaborative research networks in the Andean countries (PRACIPA), the southern cone (PROCIPA), Central America and the Caribbean (PRECODEPA) and the Consortium for Sustainable Development of the Andean Ecoregion (CONDESAN); and (iii) to assist in the development of human resources to strengthen the INIAs. The principal results of the project will be: the generation and adaptation of technology that is appropriate for the ecological conditions prevailing in the region to overcome the main limiting factors affecting potatoes and other root and tuber crops in the Andes; a better knowledge of the structure, functions and changes in land use systems in the Andes; the provision of training and information for the subregional potato research networks; information about and description of the dynamics of soil and water management in the Andean production systems, with emphasis on those devoted to potato production.
- 3.10 International Center for Research in Agroforestry (ICRAF). Sustainable agroforestry systems for the humid tropics (TC-96-01-49-5-RG). Duration: 18 months. Budget: US\$600,000. The work performed by ICRAF relative to the humid tropics in the region includes research and training in agroforestry systems that reduce deforestation, soil degradation and rural poverty. To that end, new agroforestry technologies with a multidisciplinary and systematic approach have been developed, including farmer participation and attention to the situation of women and indigenous peoples. Financed by the IDB, ICRAF has been engaged in a research and training project in the Peruvian Amazon since 1994 and, despite the short time involved, concrete results have already been obtained. The proposed project is aimed at expanding such activities in the region in close collaboration with CIAT, IFPRI and national agencies as part of the global initiative on alternatives to slash and burn methods.
- 3.11 The project's objectives are to: (i) examine the political, social and biophysical determinants of deforestation and agricultural production in the humid tropics of Latin America and to establish a regional research agenda; (ii) develop strategies for prudent management and use of the genetic resources of multiple-use priority tree species for the improvement of agroforestry systems based on indigenous lore, among other sources; (iii) understand the processes in the principal land use systems that affect soil recovery, degradation and sustainability in the humid tropics in Latin America; (iv) identify and develop economically viable, socially acceptable and ecologically rational agroforestry systems in collaboration with national, regional, international institutions, plus NGOs and farmers; and (v) through training and

dissemination, strengthen the capability of national institutions in the development of multidisciplinary agroforestry research for the improvement of land use systems in the western Amazon basin and the Yucatán Peninsula.

- 3.12 In collaboration with national research programs in Peru and Mexico, the project will develop a research base for the development of sustainable agroforestry systems in the western Amazon basin and the Yucatán Peninsula. Application of the research findings will allow ecologically sustainable agroforestry technologies to be developed for low-income farmers. It should also help to: increase the welfare of the population living in and around the forests; diversify production; increase biodiversity in land use systems; and reduce environmental degradation triggered by slash and burn farming.
- 3.13 International Service for National Agricultural Research (ISNAR). Responses to new technological demands, research on agroindustry and on the management of natural resources (TC-96-01-48-7-RG). Duration: two years. Budget: US\$500,000. At a time when many of the INIAs in the region are coping with cutbacks in their budgets, they are faced with new demands for agricultural technology. First of all, the agroindustrial sector is daily becoming more important as an engine of development. Secondly, the management of natural resources – not only in agricultural activities but in others as well (the generation of energy, tourism, extraction of water, etc.) – requires ever greater amounts of research. The INIAs in the region must meet these demands. But the consequences of an approach focussed on agroindustry or on natural resources are not very clear; the strategies are not well defined; and the relations between the two approaches have not been examined in depth.
- 3.14 The project will examine the factors that define responses to the technological demands of agroindustry and the environmental sector. The specific objectives are to: (i) evaluate the impact of the new technological demands on research policies and the design of the INIAs; (ii) evaluate and propose analytical and planning methods to focus research on the new demands; (iii) study the legal factors and institutions that affect the generation and transfer of technological solutions (intellectual property rights, cadastral laws); (iv) evaluate the points of agreement and friction between the two types of demand and seek ways to reconcile them; and (v) disseminate methodologies and results and help the countries to formulate responses.
- 3.15 Researchers from the region, assisted by ISNAR staff members, will produce six specific studies: three publications on the implications of agroindustrial demands and another three on those associated with environmental demands. As a result of these studies, a summary document will be prepared to evaluate the feasibility of the responses to agroindustrial and environmental

demands. Additional results of the project will be two manuals for the "participatory planning of activities" in research policy in response to the new demands, plus at least five national proposals featuring specific activities in response to agroindustrial and environmental demands. The project will also enhance regional capability for the analysis and design of research policies. The proposal was drawn up in conjunction with five INIAs in the region (Argentina, Brazil, Chile, Colombia and Mexico), and they will take part in project execution and financing. The project complements the activities for strengthening the planning, monitoring and evaluation of research in the region, carried out by ISNAR with financing from the IDB.

- 3.16 **International Center for Forestry Research (CIFOR). Management of secondary forests in the tropical regions of the Americas (TC 96 01-47-9-RG).** Duration: two years. Budget: US\$250,000. The project will be executed in coordination with the Tropical Agricultural Research and Training Center (CATIE), which is headquartered in Costa Rica. CIFOR holds a worldwide forestry research mandate, with emphasis on conservation, rehabilitation, and sustainable use of tropical forests. CATIE promotes comprehensive and multidisciplinary research in the tropical areas of the Americas, and it is also one of the leading regional organizations in forestry training and research, both in natural timberlands and in forest plantations. The secondary forests consist of woody vegetation that grows on land that has been abandoned after its original vegetation has been destroyed by human activities. Owing to increasing deforestation for the development of farmland and animal husbandry in the humid tropics and subsequent abandonment of such land, the total area of secondary forests has grown significantly.
- 3.17 The project's objective is to improve productive management of neotropical secondary forests and their contribution to the local economies in the context of agriculture/forest frontiers (or on the perimeter of the forests) in the tropical areas of the Americas. The main purpose is to boost the commercial productivity of the secondary forests and develop local capacity to perform applied research on sustainable management of these forests. The project's goal is to improve resource management options, incorporating production based on secondary forests in the context of land use for the low-income population living at the edge of the forests in rural areas. An important strategic factor is the development and validation of management guidelines that can be applied to the secondary forests, not only for the production of lumber and products other than wood but also for the conservation of biodiversity.
- 3.18 The project will be executed mainly in three areas of reference located in the wet lowlands of the Amazon and Central America (tentatively, Altamira in Pará, Brazil; Pucallpa in Peru; and Río

San Juan in Nicaragua). The goals include: an analysis of biological, ecological, socioeconomic and policy-related factors, based on the work performed at the sites selected plus workshops and other meetings with researchers and users targeted by the project; provision of on-the-job training for the researchers and technical staff of the collaborating institutions; and monitoring of the three research sites by means of permanent plots of land that will be used for the tests developed by the project. Long-term studies of growth and yield will be conducted at those sites to provide a basis for comparing the effects of the management techniques.

- 3.19 **Caribbean Agricultural Research and Development Institute (CARDI).** Subregional coordination of agricultural research - PROCICARIBE (TC-96-01-46-1-RG). Duration: two years. Budget: US\$250,000. CARDI, formed by 12 member countries of the region, was established in 1975 to meet the demands expressed by CARICOM member countries. From its headquarters in Trinidad, it carries out various programs aimed at the generation and transfer of technology in all of the member states.
- 3.20 The project calls for the coordination of technological innovation efforts in three areas: policies and planning of regional research activities; the programming of research resources; and regional coordination by item and specific function. One of the project goals is to set up a cooperative program for the ongoing generation and transfer of technology in the region (adapted from the model for similar programs in South America). Known as PROCICARIBE, it will coordinate the activities sponsored by CARDI with the other research networks in the region, as well as with universities and other regional and international research centers.
- 3.21 **PROCISUR (Cooperative Southern Cone Program for Agricultural Technology Development).** Direct seeding and soil conservation in the southern cone (TC-96-01-45-3-RG). Duration: three years. Budget: US\$250,000. There is ample evidence to show that the loss of soils has severely eroded agricultural productivity in the southern cone, coinciding with accelerated expansion of the agricultural frontier in places where soils are marginal, with adverse effects on the environment. Direct seeding is a way to plant crops that can be used instead of mechanized farming. The plant cover is thus not disturbed, so losses from erosion and the consequent environmental pollution are greatly reduced. The southern cone displays a marked lag in the use of farming practices that encourage productive soil conservation. The research and technology dissemination efforts deployed are not consonant with the enormous size of the agricultural basin, and the productive viability of the sector - in particular that of smaller farmers - is compromised. The traditional technological proposals based on diversified production and the systematization of farming practices have met with very little success.

- 3.22 Direct seeding offers a valuable opportunity to assist very small-scale farmers, since the technology employed requires less capital; smaller-scale farm equipment is needed; and there are more opportunities for shared use by a number of farmers than in the case of conventional agriculture. To that end, groups of producers in the region have adopted the direct seeding method. The professionals who advise those groups are hampered by some technical constraints, inasmuch as this new technology has not yet been covered in regular university courses due to the shortage of instructors qualified to teach it.
- 3.23 The purpose of the project is to facilitate adoption of direct seeding techniques in the broad agricultural regions of the southern cone, thereby improving conservationist use of the soil and boosting the productive sustainability of the crops. The project will train some 500 technicians who will advise groups of producers. It will also coordinate and provide methodological strengthening for about 20 applied research projects to be executed in the region. The project agenda calls for five regional technical meetings of specialists; nine regional courses for the technicians who advise producers; 20 research projects the results of which will bring simultaneous benefits to various countries; and the promotion of agreements with the public and private sectors concerning research and dissemination. PROCISUR is an institutionalized regional mechanism to facilitate cooperation between IICA and the various INIAs located in Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay. The participation of the region's universities and private enterprise in the project will be coordinated through PROCISUR and the INIAs. Cofinancing for the project will be supplied by the participating INIAs.
- 3.24 PROCIANDINO (Cooperative Andean Subregion Program for Agricultural Technology Research and Transfer). Indicators of sustainability in Andean ecosystems (TC-95-05-13-4-RG). Duration: two years. Budget: US\$150,000. The project will develop methodologies to determine sustainability indicators in specific ecosystems and will be executed within the framework of the Andean Network for Research and Transfer of Soil Management and Conservation Technology (REDAMACS), which operates in PROCIANDINO. Its three stages will be carried out over a period of two years: (i) diagnosis of the ecosystems' sustainability, based on an evaluation of present and potential use of the areas under study; (ii) identification of sustainability indicators and prioritization of areas and systems of production, under which proposals will be drawn up for suggested use, alternative management and recommendations; and (iii) the development of methodologies to monitor and validate the indicators in question.
- 3.25 The indicators include biophysical, socioeconomic and cultural aspects of sustainability in the areas under study. They will be selected on the basis of simple criteria that are easy to handle,

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- 3.24 PROCIANDINO (Cooperative Andean Subregion Program for Agricultural Technology Research and Transfer). Indicators of sustainability in Andean ecosystems (TC-95-05-13-4-RG). Duration: two years. Budget: US\$150,000. The project will develop methodologies to determine sustainability indicators in specific ecosystems and will be executed within the framework of the Andean Network for Research and Transfer of Soil Management and Conservation Technology (REDAMACS), which operates in PROCIANDINO. Its three stages will be carried out over a period of two years: (i) diagnosis of the ecosystems' sustainability, based on an evaluation of present and potential use of the areas under study; (ii) identification of sustainability indicators and prioritization of areas and systems of production, under which proposals will be drawn up for suggested use, alternative management and recommendations; and (iii) the development of methodologies to monitor and validate the indicators in question.
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applicable to different scales, relevant to agroecological and socioeconomic conditions in the area, and focused on the most significant degradation processes in those areas. The program will be carried out in two microbasins, one in the subbasin of the Pereño River in the state of Táchira and the other in the eastern part of the state of Sucre. In both areas, national organizations such as FONAIAP will work up natural resource plans that incorporate the socioeconomic component. For its part, CIAT will support the project with its scientific capability and its training and research infrastructure.

3.26 **Regional Fund. Support for the activities of the Technical-Administrative Secretariat of the Regional Agricultural Technology Fund (RATF) (TC-96-02-02-1-RG). Duration: one year. Budget: US\$300,000.** Pursuant to the proposal creating the RATF, the countries and institutions that are members thereof will make capital contributions to it, while the Bank will support the technical and administrative activities of its Executive Council and Secretariat during the consolidation stage of the RATF. The main activities slated for 1996 include: drafting the Operations Manual; finalizing the technical proposal to identify the region's priority research areas; preparing the first draft of the medium-term plan; preparing the first operating plan for the financing; and setting up and implementing the project's databases.

3.27 The budget will be used to engage short-term international consultants for the Secretariat (senior secretary, a junior assistant and a senior assistant) plus an administrative assistant; to hold two meetings of the RATF's Executive Council (one in the region and the other in Washington, D.C.); to hold two regional technical meetings; to defray the expenses entailed by the operation of the Secretariat and the Council (office space, communications, translations, publications); and for preparation of the documents cited in the preceding paragraph. Responsibility for execution will be assigned to SDS/ENV.

B. Organization and execution

3.28 Each of the executing agencies will be responsible to the IDB for carrying out the activities financed by the Bank. Basic responsibility for the program will be assigned to the Regional Technical Cooperation Division of the Integration and Regional Programs Department (INT/RTC). Technical responsibility will be borne by the Environment Division of the Social Programs and Sustainable Development Department (SDS/ENV).

Table 1. 1996 REGIONAL TECHNOLOGY PROGRAM: AGRICULTURE AND NATURAL RESOURCE MANAGEMENT		
EXECUTING AGENCY	PROJECT	US\$000 (currency/COF)
CIAT	International Center for Tropical Agriculture	
	Information and technology for natural resource management and poverty alleviation	\$1,300 (\$BR/CCO)
CIMMYT	International Maize and Wheat Improvement Center	
	Improvement in yield stability and in the productivity of rainfed wheat germ plasm	\$1,200 (\$ME/CME)
CIP	International Potato Center	
	Regional cooperation for research on potatoes and other root and tuber crops; and for the management of natural resources in the Andes	\$1,200 (\$PE/CPE)
ICRAF	International Center for Research in Agroforestry	
	Sustainable agroforestry systems for the humid tropics	\$600 (\$PE/CPE)
ISNAR	International Service for National Agricultural Research	
	Response to new technological demands, strengthening of research on agroindustry and natural resource management	\$500 (\$BR/CBR)
CIFOR	International Center for Forestry Research	
	Management of secondary forests in the tropical regions of the Americas	\$250 (\$BR/CCR)
CARDI	Caribbean Agricultural Research and Development Institute	
	Subregional cooperative program on agricultural Research - PROCICARIBE	\$250 (\$VE/CTT)
PROCISUR	IICA-PROCISUR	
	Direct seeding and soil conservation in the southern cone	\$250 (\$AR/CUR)
PROCIANDINO	IICA-PROCIANDINO	
	Sustainability in Andean ecosystems	\$150 (\$VE/CEC)
REGIONAL	Support for the Secretariat of the Regional Agricultural Technology Fund	\$300 (\$US/INT)
	TOTAL for 1996	\$6,000

E. Disbursements and special conditions precedent

3.32 The funds for each of the projects will be disbursed in three stages:

- first disbursement (50%) upon signature of the agreement;
- second disbursement (40%) upon approval of the midterm technical report (paragraph 3.30);
- third disbursement (10%) upon approval of the final technical report (paragraph 3.30).

- 3.33 Given the nature of the research projects to be executed, the first disbursement will include up to 50% of the total project budget. In addition, to expedite execution of the program, the first disbursement will be made retroactive to January 1, 1996, and outlays incurred for the projects in the program since that date will be recognized.
- 3.34 The executing agencies must retain in their possession all documents which substantiate the expenditures made with resources of the contribution. That documentation will be available at the project headquarters and must be kept for a period of no less than two years from the date of the final disbursement of the Bank's contribution.

F. Selection and contracting of consultants and procurement of goods and services

- 3.35 An exception to the procedures for the selection and contracting of individual experts is requested. It is based on the need to streamline the administrative procedures; on the successful experience of more than 20 years acquired by the Bank and by the executing agencies in this type of activity; and on the contracting modality, which would allow the CIIAs and PROCIs to be hired as specialized firms. The procurement of goods and services must be conducted in accordance with the Bank's procedures and pursuant to the aforementioned exception. Only actual and direct expenditures for execution of the project will be eligible; indirect outlays or general operating services not included in the detailed budgets for the proposals (see Annexes I through X) cannot be charged to the resources of the financing.

IV. BENEFITS AND RISKS

- 4.1 Results that are highly significant for the region are anticipated as a result of the activities included in the program. Specifically, substantial benefits are expected to stem from: the new information systems for the management of natural resources; new varieties of rainfed wheat; increases in the production of Andean crops; the management of agroforestry systems and secondary forests; and soil conservation, thanks to direct seeding.
- 4.2 No risks are anticipated in the execution of this operation, inasmuch as the executing agencies have shown that they are capable of meeting the commitments they have assumed at the technical and administrative levels. The activities scheduled for the 1995 program are being conducted satisfactorily. There are risks inherent to the research process, which are considered low given that the research to be conducted is essentially applied and strategic in nature.

V. MONITORING AND EVALUATION

- 5.1 Technical monitoring of program execution will be performed by means of evaluations of progress made in the projects, based on the approved proposal, the midterm technical report and the final technical report. This task will be carried out by the Country Offices involved in the program and by SDS/ENV.
- 5.2 In addition to the final technical report, an **evaluation report** will be compiled for each of the projects (with the exception of the Regional Fund) to cover the six-month period following the end of the execution period. The report will be written up by consultants engaged by the executing agencies. The purpose of the report is to carry out an independent technical evaluation of the project's achievements with a view to possible future projects that might be financed on similar topics, or carried out by the same executing agency. The cost of the evaluations will be included in the budget of each project. The executing agency will provide the Bank with a copy of the pertinent documentation as soon as the evaluation is completed.
- 5.3 The evaluation report will include the following topics: attainment of the objectives; the degree of execution of the activities scheduled, including strengthening of the national research institutes involved in the project; new knowledge and technologies generated by the project and the impact thereof; limiting factors affecting the project, and suggestions and recommendations for overcoming them; and the degree of continuity anticipated in the research activities carried out during the project execution period.

**THE BANK'S REGIONAL TECHNICAL-COOPERATION FUNDING
FOR THE AGRICULTURAL TECHNOLOGY PROGRAM, 1990-1996**
(in thousands of U.S. dollars)

INTERNATIONAL CENTERS (CIAT, CIMMYT, CIP)	1990	1991	1992	1993	1994	1995
International Center for Tropical Agriculture	5,170	3,800	3,108	2,350	2,350	1,800
Core budget	4,230	2,058	1,500	1,350	1,750	
Agropastoral systems savannahs acid soils	940	960	1,260	600	***	1,200
Trainer training		782	348	***		
Diagnostic evaluation of agricultural use of Amazon land				400	***	
Postgraduate training R&D sustainable tropical agriculture					600	
Ecoregional research activities						600
Information and technology for natural resource management						
International Maize and Wheat Improvement Center	4,880	3,340	2,466	1,900	2,250	1,500
Core budget	4,370	2,315	1,500	1,350	1,750	
Improvement germ plasm maize acid soils	510	538	585	550	***	
Training wheat — INTA		487	381	***		
Improvement resistance maize stunting					500	
Maize and wheat research and technology transfer						1,500
Improvement in yield stability and productivity of wheat						
International Potato Center	1,750	1,411	1,185	1,000	1,650	1,500
Core budget	1,230	497	500	500	1,050	1,500
Improvement of potato resistance to late blight	520	523	476			
Training potato production Southern Cone PROCIPA		391	209			
Human resources development Andean crops				500	***	
Integrated potato pest management Andean zone					600	***
Regional cooperation for research on potato and other tubers						
SUBTOTAL CIAT, CIMMYT, CIP	11,800	8,551	6,759	5,250	6,250	4,800

	INTERNATIONAL CENTERS (OTHER)	1990	1991	1992	1993	1994	1995
	International Service for National Agricultural Research	0	449	241	0	600	0
	Research methodology, follow-up and evaluation, INIAs Research planning, follow-up and evaluation, INIAs (Stage II) Response to new technological demands, research on agriculture and natural resources		449	241	***	*** 600	
	International Plant Genetic Resources Institute	0	0	0	500	0	500
	Native tropical fruit genetic resources project Research and technology transfer network in MUSA				500	***	500
	International Food Policy Research Institute	0	0	0	500	400	1,000
	Mountainside land use policies, Central America Policies for minimizing natural resource degradation, Amazon Food, agriculture and environmental policies				500	*** 400	1,000
	International Center for Research in Agroforestry	0	0	0	750	0	0
	Agroforestry alternatives to tropical deforestation Sustainable agroforestry systems for humid tropics				750	***	
	International Irrigation Management Institute	0	0	0	0	500	0
	Institutional strengthening of INIAs in water resource management					500	
	Center for Agriculture and Biosciences International	0	0	0	0	250	0
	Agriculture and environment information network project					250	
	IICA/Asian Vegetable Development and Research Center	0	0	0	0	0	450
	Training in vegetable production in Central America and Caribbean						450
	University of West Indies/International Center for Living Aquatic Resources Management	0	0	0	0	0	250
	Protected marine areas and fisheries management in coral reefs						250
	International Center for Forestry Research	0	0	0	0	0	0
	Secondary forest management in tropical Americas						
	SUBTOTAL OTHERS	0	449	241	1,750	1,750	2,200

	SUBREGIONAL COOPERATIVE PROGRAMS	1990	1991	1992	1993	1994	1995
OCIs	Regional	0	305	0	0	750	0
	Regional and subregional research priorities		305			750	***
RO- NO	PROCIANDINO (IBTA-BO, ICA-CO, INIAP-EC, INIA-PE, FONAIAP-VE)	0	0	0	225	250	0
	Consolidation Andean research and technology transfer network — export fruit and vegetable crops				225	***	
	Consolidation Andean research and technology transfer network — soil management and conservation					250	***
	Sustainability indicators in Andean ecosystems						
RO- ICOS	PROCITROPICOS (IBTA, EMBRAPA, ICA, INIAP, MAG-GUY, INIA, MAG-SUR, FONAIAP)	0	0	0	120	115	
	Study on regeneration and sustainable management of degraded soils, savannahs				120	***	
	Study for preservation of Amazon forest	0	0	0		115	***
UR	PROCISUR (INTA-AR, IBTA-BO, EMBRAPA-BR, INIA-CH, DIA-PR, INIA-UR)					250	0
	Biotechnology, production of plants with high genetic health capacity					250	***
	Direct planting, soil conservation, Southern Cone						
	Caribbean Agricultural Research and Development Institute	0	0	0	0	0	0
	Subregional coordination of agricultural research — PROCICARIBE						
	SUBTOTAL SUBREGIONAL COOPERATIVE PROGRAMS	0	305	0	345	1,365	0
AL	Regional Agricultural Technology Fund	0	0	0	0	100	0
	Support for Secretariat of Regional Agricultural Technology Fund					100	***
	GRAND TOTAL	11,800	9,305	7,000	7,345	9,465	7,000

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the International Center for Tropical Agriculture (CIAT), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.
2. That up to the equivalent of US\$1,300,000 in reais, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.
3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the International Maize and Wheat Improvement Center (CIMMYT), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$1,200,000 in pesos mexicanos, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the International Potato Center (CIP), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$1,200,000 in nuevos soles, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the International Centre for Research in Agroforestry, for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$600,000 in nuevos soles, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the International Service for National Agricultural Research (ISNAR), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$500,000 in reais, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the International Center for Forestry Research (CIFOR), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$250,000 in reais, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the Caribbean Agricultural Research and Development Institute (CARDI), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$250,000 in foreign exchange, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the Instituto Interamericano de Cooperación para la Agricultura - Programa Cooperativo de Investigación y Transferencia de Tecnología Agropecuaria para los Trópicos Suramericanos (IICA-PROCIANDINO), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$150,000 in bolívares venezolanos, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.
2. That up to the sum of US\$300,000 in foreign exchange, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.
3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR THE 1996
REGIONAL PROGRAM OF TECHNOLOGY: AGRICULTURE AND
NATURAL RESOURCE MANAGEMENT

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such agreements as may be necessary and to take such additional measures as may be pertinent for the execution of the plan of operations referred to in Document AT- with respect to a nonreimbursable technical cooperation with the Instituto Interamericano de Cooperación para la Agricultura - Programa Cooperativo para el Desarrollo Tecnológico Agropecuario del Cono Sur (IICA-PROCISUR), for the execution of the 1996 Regional Program of Technology: Agriculture and Natural Resource Management.

2. That up to the equivalent of US\$250,000 in pesos argentinos, is authorized for the purpose of this resolution, chargeable to the net income of the Fund for Special Operations.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.