Improving Rural Livelihoods:

CIAT's Medium-Term Plan 2002-2004

Submitted to the Board of Trustees
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CIAT
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International Center for Tropical Agriculture

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CIAT's Medium-Term Plan 2002-2004

Draft for BOT

May 2002

This revised draft proposal for the CIAT Medium-Term Plan (MTP) 2002-2004 is submitted for the consideration of the CIAT Board of Trustees. It aims to provide the operational basis for implementing CIAT's new Strategic Plan 2001-2010, "Sustaining Rural Livelihoods." It thus fully replaces earlier drafts of the MTP, which were submitted to TAC in March and again in August 2001. The previous drafts did not yet reflect the implications of the new Strategic Plan and other important developments, in particular the strategic alliance with the Tropical Soil Biology Fertility Program (TSBF). Among other innovations, this draft proposes a revised research agenda for CIAT, a re-organized management structure, and the formal incorporation of the TSBF Institute into the CGIAR through CIAT.

This document will briefly review the main highlights of the Strategic Plan which shape the development of this operational MTP. It will then review some of the salient characteristics of the current environment which will influence the plan 2002-2004. Next, the revised research portfolio will be presented. Organizational changes will be discussed, and the financial underpinning of the plan will be laid out. Appendices include descriptions of CIAT research projects in the standard CGIAR format and financial tables, similarly in the standard CGIAR format.

Strategic Framework 2001-2010

Ultimate purpose: Improving rural livelihoods

CIAT's strategy focuses on the 1.2 billion people who are "absolutely poor," subsisting on less than one US dollar a day. Although economic and technological progress has reduced the proportion of the world's people who are poor, one-fifth of the world's population remains excluded from the benefits of this progress. For two-thirds of these disadvantaged people, mostly women and children, poverty means hunger, malnutrition and poor health.

Most of the tropical world's poor people live in rural areas where livelihoods currently depend on productive farming and wise stewardship of the land. Their plight is further threatened by environmental degradation, including soil degradation, global warming and loss of agro-biodiversity. Efficient, sustainable production of crops and animals in the countryside also keeps food prices low, thereby benefiting poor urban consumers, who typically spend a large part of their income on food. Overcoming poverty and environmental abuse is not only a moral imperative but also the key to a peaceful harmonious future for humanity.

Consequently, ***improving rural livelihoods*** is the central focus of the new CIAT strategic plan. In the face of persisting poverty, the opportunities and challenges of globalization, and deteriorating ecological health, CIAT aims to be ***a socially and environmentally progressive force for change.*** CIAT will conduct research relevant to the current and emerging problems of some of the world's most disadvantaged people: the poor in low-income countries. Our focus is on people, not crops or resources but people and their livelihoods.

CIAT's strategy for 2001-2010 reaffirms a basic commitment to alleviating hunger and poverty while improving natural resource management. Improving the livelihoods of the rural poor through ***high quality science*** is an effective and direct way to address their needs while ensuring a supply of cheap food for the urban poor. The sustainable livelihoods pursued by disadvantaged rural people leads to the outcomes they desire by enabling them to continuously and systematically build their physical, economic, and social assets, thereby giving them more control over their lives.

We recognize that science-driven agriculture is just one of the ingredients needed to achieve sustainable rural livelihoods just as research is but one necessary ingredient to improve agriculture. Moreover, improved agriculture, be it through higher crop yields, reduced soil erosion, or new pest control technologies, by itself does not guarantee sustainable rural livelihoods. Nor can CIAT achieve these goals alone. We must work in partnership with others with common goals and complementary strategies.

Overarching goals

As a research center specializing in people-centered solutions for tropical agriculture, CIAT uses science to help the rural poor get to three interdependent "critical conditions" along their path to sustainable rural livelihoods.

- Competitive agriculture
- Agroecosystem health
- Rural innovation

Most of the tropical world's poor live in rural areas where agriculture is the single most important source of income and employment. Without a ***competitive agriculture***, many of the rural poor will not have the employment to earn their food; farmers will not have the cash they need for essentials like medicine and education; and the urban poor risk facing hunger due to higher food prices. Intensification, diversification, and higher value added are mutually reinforcing tactics to make small farmers more competitive.

Declining ***agroecosystem health*** is the enemy of many of the rural poor. Soil erosion, nutrient decline, reduced biodiversity, depleted water resources, global warming and new pests and diseases are just some of these threats to agro-ecosystems health and the livelihoods of the poor. Fragile environments, upon which many poor farmers depend, require special attention. If properly managed, natural resources in vulnerable settings, such as hillsides, can be quite productive and may be systematically improved

Protection of soil, water, and forests, as well as pest control, often requires collectively designed solutions applied beyond the scale of the single field or farm. ***Rural innovation*** to adopt new technologies, enter new markets, better manage resources and information, can often best be done at the community rather than the individual farm level. Enhanced social capital through participatory research, information systems, and collective action are key community assets that must be fostered.

Core scientific competencies

CIAT's core assets are its scientific competencies. These are multidisciplinary teams of scientists experienced in systems approaches to issues affecting agriculture and natural resource management. Supporting them are the world's largest germplasm collections of beans, cassava and tropical forages, and an up-to-date infrastructure of laboratories and other facilities. Equally important, we have long and rich experience working collaboratively with farmers and other agricultural specialists in a variety of local, national, regional, and

international organizations. To promote sustainable rural livelihoods, CIAT will cultivate five core scientific competencies:

Agrobiodiversity and genetics. Access to high-quality germplasm—for staple crops like cassava, beans, and rice, as well as for forages and alternative high-income crops—remains a high priority for small farmers. Genetic research, applied to conserved and characterized agrobiodiversity, leads to higher crop productivity, improved plant and soil health, and better human nutrition. Advances in molecular biology and genetic transformation have markedly improved our understanding of agrobiodiversity, thereby creating new opportunities for unlocking the potential of the vast genetic diversity found in the wild ancestors and close relatives of cultivated crops.

Ecology and management of pests and diseases. Crop damage by bacteria, fungi, viruses, insects, and other pests is a perennial risk in farming and can deal a knockout blow to rural livelihoods. In response, farmers all too frequently apply pesticides excessively, both damaging the environment and the health of farm families and consumers, while often failing to effectively control pests. Safer, more effective alternatives to pest management, based on better understanding of agro-ecologies, can combine crop varieties with genetic resistance to pests and pathogens; biological control to fight pests with their natural enemies; and better farm management practices, including judicious use of agro-chemicals.

Soil ecology and improvement. Healthy, fertile soil is vital to overall agroecosystem health and agricultural competitiveness. Soil quality needs to be enhanced, especially where degradation is already a problem. The soil is also a public "ecological service": a regulator of water quality and supply, a way to break down contaminants, and even a carbon sink to slow greenhouse warming. Thus, how tropical farmers manage soil is relevant not only to *their* livelihoods but also to the survival of *all* terrestrial life. We view soil holistically, as a complex living system. Emphasis is put on managing fertility based on better understanding of factors such as nutrient flows through plants and soil organisms.

Spatial analysis. Spatial information can help produce more food with fewer environmental risks. Land use decision makers, whether local farm communities or national government agencies, need appropriate tools to analyze trade-offs. Advances in geographic information systems (GIS) and modeling, combined with participatory data collection, offer major opportunities for better land management. However, more user-friendly interfaces need to be designed. Decision-support tools can analyze farming systems and scale up farm behavior to the watershed level to better understand the effects of farmer decisions on resource degradation or improvement.

Socioeconomic analysis and participatory research. Understanding farmer and community decision making is crucial to the success of new technologies for improving rural livelihoods. Socio-economic analysis generates insights and empirically validated principles for designing people-centered solutions, relying heavily but not exclusively on participatory methods. Other important tools and outputs are models, databases, and policy recommendations. Finally, a key contribution of socioeconomic analysis will be to monitor and evaluate CIAT research outputs and assess their impact, focusing more on issues of sustainability and poverty reduction rather than just productivity.

This combination of five competencies has distinct strengths. Each area of competence brings together related disciplines that have significant scope to contribute to and benefit from scientific advancement. And each can help CIAT and its partners to achieve a direct, positive, and lasting impact on rural livelihoods in the tropics. Furthermore, these core competencies are highly complementary, allowing for integrated approaches to problem solving. Together, they will form an enduring and stable institutional framework, while at the same time giving CIAT the flexibility to respond to an evolving research agenda. As science

advances and new research problems arise, adjustments will be needed. A major preoccupation of CIAT leadership will be to ensure that the human skills, technology, and equipment pertinent to these scientific areas are up to date.

Operational Context 2002-2004

World food situation. Sub-Saharan Africa and South Asia are seen by the CGIAR as the central foci of food insecurity and malnutrition over the period of this MTP. Poverty and associated food insecurity, much of it still rural, remains a significant problem, especially in Central America and Andean countries even though some Latin American countries will have strong per capita food production. Increasing international trade, financial flows, technology diffusion, rapid urbanization and ever-easier information flows will be characteristics of the period. Violent conflicts will be a major source of food insecurity and will divert attention from agricultural development in many situations, including countries in which CIAT works. There are a number of emerging health crises including the HIV/AIDS pandemic, the re-emergence of malaria, and micronutrient deficiencies which will affect agricultural productivity as well as human health.

Environmental challenges. As the reality of climate change is ever more evident, there is a growing concern about how agriculture and food production can adapt, especially in low income tropical countries. Extreme climate events appear to be growing in frequency, and will have an effect on soil and water resources that are already subject to substantial pressures towards degradation. The rural poor are especially vulnerable to these processes, and water will be a limiting factor in many regions. Ongoing trends of loss of agrobiodiversity will not be self-correcting.

Science and technology. Rapid advances in molecular biology will continue as will advances in computer and information sciences that expand the potential for modeling complex processes, both ecological and for human decision making. Associated with progress in biotechnology are new institutional frameworks, most importantly related to intellectual property rights, ownership of germplasm, and increased environmental and health regulation of novel agricultural technologies. CIAT needs to be active in harvesting useful new techniques at the frontiers of science and to keep abreast of changes in the policy realm that affect the development and deployment of agricultural innovations.

Agricultural research systems. Resources will remain highly constrained in most public sector systems in the tropics. Except for a handful of the larger countries, national research capacity will not be sufficient to meet challenges to increase productivity while respecting the environment. Regional research networks operated by national programs will be increasingly emphasized, but are likely to remain dependent on non-sustainable external funding. The private sector will have a growing role in a few field crops in a growing range of countries, but will not provide significant technologies for a wide array of tropical crops. Substantial private investment in major crops in the temperate countries risks leading to a widening technical gap in many tropical crops. Innovative approaches to harnessing the private sector could make a major contribution in the tropics.

CGIAR. There will be continued efforts at institutional reform based on strengthening the CG Secretariat and the Executive Council. Challenge programs are expected to emerge as a major element in the CG. While these programs will provide opportunities for increased collaboration among centers and between centers and advanced research institutes and NARS, at the same time they are likely to sharpen competition for resources. It is expected that the challenge programs will attract new resources, but there is no prospect for increased unrestricted resources for CIAT and the ongoing process of decline in unrestricted resources since 1989 can be expected to continue through the MTP period.

Innovations to CIAT's Research Agenda

Revitalizing CIAT's research agenda is the centerpiece of the MTP 2002-2004. The renewal of the research agenda is guided by four principles. First, the new research agenda must embody the spirit of the Strategic Plan 2001-2010. Second, the new research agenda must respond to emerging challenges and opportunities. Third, the new research agenda should promote integration and simplify the research portfolio. Fourth, the new research agenda should be based on existing healthy partnerships and current scientific strengths.

Four new elements are recommended for inclusion in the MTP research agenda:

- Tropical Soil Biology Fertility Institute
- Tropical fruits
- Climate change
- Information for rural development

Tropical Soil Biology Fertility Institute. Understanding and managing the soil as a living biological resource is a crucial strategy for improving soils. Enhanced biological activity including nutrient cycling and biological nitrogen fixation opens the possibility for improved and more sustainable agricultural productivity, especially for resource poor farmers in Africa for whom inorganic chemical fertilizers are not a realistic option. These approaches have been a common theme both of CIAT soils research and also that of the Tropical Soil Biology Fertility Program (TSBF) based in Kenya. CIAT and TSBF have worked closely together in the past, with elements of a common research agenda through the systemwide Soil Water Nutrient Management Program of the CGIAR, SWNMP. CIAT and TSBF have conducted joint field research, shared a scientific position, and developed proposals and raised funds together. Based on common objectives and a positive experience of collaboration, CIAT and TSBF have negotiated an agreement through which TSBF would become an institute within CIAT. To this alliance TSBF brings its cutting edge research experience on tropical soils in Africa as well as a strong network of national soil science researchers in Africa, while CIAT brings a similar body of research experience, based more in Latin America, as well as strong competencies in biotechnology, soil pests and diseases, participatory research, and spatial analysis. This alliance, supported by ICRAF which will host TSBF, creates a powerful interdisciplinary team to tackle the urgent challenges of soil fertility, especially in Africa. A close relationship between TSBF and the CIAT soil project should evolve towards a fusion of their research agendas with a continuing commitment to the SWNMP.

Tropical fruits. High value crops that generate employment and can tap growing markets can significantly contribute to agricultural competitivity and sustainable livelihoods for the rural poor. Generally the poor have scarce land resources which place severe limits on the incomes that they can generate from staple field crops. While staple field crops can be an important part of a food security strategy, they alone can not generate on small landholdings the incomes needed to lift the poor out of poverty. Consumption of tropical fruits is rising not only in tropical countries themselves, but also the demand for exports to high-income countries is also strong. These trends are likely to continue to create buoyant markets with high demand elasticity, favorable for farmer income generation. Policy makers in many tropical countries are keen to exploit these opportunities, but there is little coherent research on tropical fruits. See the project description in Appendix I for more detail on CIAT's intended strategy in tropical fruits.

Climate change. Growing evidence confirms that temperatures are rising, which may lead to future reductions in crop yields in most tropical and subtropical regions. Currently climate change is expected to slow growth in world food production, thereby leading to

higher food prices which the poor will find especially difficult to afford. In particular, food security is expected to deteriorate in Africa. The ability of countries, communities and families to adapt to and cope with climate change depends on such factors as wealth, technology, education and infrastructure. Low-income countries generally have less capacity to adapt and are thus most vulnerable to climate change. The poorest of the poor may often have the most to lose from climate change.

CIAT has been working on climate change issues for some years now and proposes to integrate this work into a focussed project, described in Appendix I. This work will build on GIS modeling research that has been attempting to better understand the impact of climate change on agriculture, especially on the poor. CIAT has also been conducting research on adapting agriculture to warmer and often drier climates where insect and disease pressures may also vary. Finally, CIAT has been conducting research on how agriculture may either exacerbate or mitigate climate change, for example, through improved digestibility of forages, land use change, and carbon sequestration. This project will articulate with the anticipated CG challenge program on climate change, to which CIAT is currently contributing the lead scientist.

Information for rural development. The information revolution has reached highly capitalized farmers and fully penetrated agricultural research systems in high-income countries. Information is rapidly and electronically available and is being used in increasingly sophisticated agricultural systems, for example, in precision farming. In comparison, poor farmers in the tropics lack information on markets, resource management options, and technology. Access to such information is increasingly feasible at the community level in many poor countries. A research strategy to better understand how to harness the information revolution for poor rural communities is described in Appendix I.

Integrating CIAT's Research Agenda

Enhancing research integration while simplifying the project portfolio is another objective of the revitalization of the research agenda in the MTP 2002-2004. This has led to the pulling together of research activities that were heretofore less tightly linked. **Genetic resources conservation** will continue, with all current resources, but rather than operating as a fully independent project, it will be folded into the Biotechnology project, thus emphasizing the close links between genetic conservation and utilization.

Similarly, the separate beans and **beans in Africa** projects will be merged into a single project, thereby restoring the complete integration that prevailed 1983-1995. In addition, a significant part of the research carried on in the beans in Africa project has not really be restricted to or focussed exclusively on beans. Elements of this more general systems research will be integrated into the IPM project, the soil project in collaboration with TSBF, impact assessment and participatory research. Work with the Africa Highlands Initiative will be linked to CIAT's hillsides project.

The **hillsides** project will be recast as a global effort, integrating research in Central America and the Andes with work in the uplands of Asia and the mid-altitude zones of Eastern and Southern Africa. While recognizing the unique characteristics of each of these regions, nonetheless there are a number of commonalities which it would be advantageous to exploit. All are regions characterized by small farmers managing a similar resource base in terms of soils and topography. Likewise many of their socio-economic characteristics are similar, for example, relatively poor integration in markets and the presence of common property of forests and water. Finally, many of the crops are the same, with forages, beans, cassava and tropical fruits widely but not universally cultivated. Parts of this work will be

carried out through the Ecoregional Program for Latin America, and others linked to the African Highlands Initiative.

Rather than continuing as a separate **small farm systems** project, systems research will be integrated into other projects as an approach. Some elements of the current systems research project will be integrated into the hillside project, while others, depending on their nature, may be integrated, for example, into soils or forage research. The objective of this change is to make the farm systems approach and integral part of a wide range of research at CIAT rather than treat it as a stand-alone activity.

Land management research, based largely on the capabilities for spatial analysis discussed above, is also seen as an approach or set of methods that is most effective when working through other thrusts of CIAT's research agenda. Instead of having a separate land management agenda, the intent is to more fully integrate land management approaches into research for the hillsides, South American savannas, and the Amazon basin. Moreover, these approaches can be integrated with soil, IPM, impact, and genetic improvement research. Because of the complexity of the current research activities of the existing land management project, it is best to use the first year of the MTP to promote an evolution of an integration of land management research as an approach to other objectives in the CIAT research agenda, rather than as an objective on its own.

CIAT's Continuing Research Agenda

Many of the current research areas of CIAT are expected to continue to contribute directly and substantially to the ultimate goal of sustainable rural livelihoods. These include some globally important public goods. Descriptions of all the projects noted in this section can be found in Appendix I. These project descriptions do not yet reflect the merging of activities from other projects as discussed in the preceding section. Planning to integrate these activities will initiate at the annual staff meeting in November, and will be complete before the meeting of the BOT Executive and Finance Committee in early 2002.

Cassava research will focus on making it a competitive alternative for resource poor farmers. Priority will be placed on reducing production costs and increasing product quality, for example, through improving starch quality or vitamin A content. Major partners will include IITA in Africa, EMBRAPA in Brazil, the CLAYUCA consortium with the private sector in Latin America, and the Cassava Biotechnology Network.

Tropical forages will be deployed more globally to take advantage of their multi-purpose uses as animal feed, for recuperation of degraded lands, and as a soil cover crop or erosion barrier. This global approach will be closely integrated with ILRI and the CGIAR Systemwide Livestock Program. Greater attention is being given to Southeast Asia and sub-Saharan Africa while the savannas and hillsides of the Americas also remain major targets.

Bean research will be closely linked to research networks in Africa and Latin America, if the latter are sustainable. Expected results include climbing beans better adapted to warm environments for small farmers, improved germplasm adapted to water deficits, and higher iron content for improved nutrition. Mexico and Brazil will be strong partners.

Rice research will be a very high priority for the Latin American and Caribbean region. Priority is given to strategic research to enhance the competitiveness of rice. Linked to IRRI's global rice research, CIAT will emphasize its partnerships with growers and the private sector through FLAR (the Latin America Fund for Irrigated Rice) and CIRAD of France.

Genetic Improvement Using is a key tool underpinning the genetic improvement work of all CIAT crops. The research of biotechnology is fully integrated with the objectives of the genetic improvement projects and does not pursue a separate set of objectives. The biotech lab emphasizes studies of genetic diversity and the development of markers to assist conventional breeding and some work on genetic transformation is also done.

Research on **participatory methods** develops techniques that empower local communities with the capacity to make better use of the formal agricultural research system. Flexible methods will be developed to allow for adaptation to local conditions. Strategic research on methods and their impact will be conducted with the Systemwide Farmer Participatory and Gender Research Program, and the methods will be disseminated globally through the Future Harvest Centers and other partners.

Research on methods to establish small **rural agroenterprises** to link market opportunities, processing technologies and environmentally sound production will yield principles that can be applied globally. Primary users will be technical personnel in rural development. Priority will be placed on testing principles in Africa and Southeast Asia, as well as to linking with tropical fruit research in Latin America.

Integrated pest management research will feature the global effort to overcome whiteflies, part of the Systemwide IPM program. Greater attention to soil borne pests and pathogens is expected, and this work will be closely linked with that of TSBF.

Impact assessment will continue to examine key issues related to the expected potential impact of CIAT research as well as to appraising the impact of past research outputs. Increased effort will be placed on looking at the impact of non-traditional research outputs and on the policy environment as it effects the impact of biotechnology.

Explorations for CIAT's Future Research Agenda

The research areas discussed above represent the major elements of the MTP research agenda that are organized as research projects presented in Appendix I. However, research challenges and opportunities are ever changing, and CIAT is alert to the potential to include additional areas into its research program in the future.

Savanna research has long been a priority at CIAT; was for some time a separate project; and currently is the core of an important partnership with the Ministry of Agriculture of Colombia. Savannas research draws heavily on inputs from biotechnology, rice, forages, cassava, soils, land management and impact assessment.

Likewise, research on the **Amazon** basin has long been a concern of CIAT and at one time a forest margins project was explicitly oriented to deal with Amazon issues. Recently, CIAT has been in close consultation with EMBRAPA of Brazil and other centers (CIFOR, ICRAF, IPGRI) to pull together common objectives with a view to working together for the Amazon in a new multi-institutional initiative.

Water is widely being seen as an ever more critical resource both for agriculture and other uses. An important initiative is being led by IWMI with a view to forming an inter-institutional effort on water resources. CIAT would participate with its expertise in the management of hillside watersheds.

The importance of the linkages between **agriculture and health** are becoming a higher priority. CIAT has taken the lead in moving forward a consortium of institutions working on increasing the micronutrient content of important foods. This is an especially effective way of

improving the nutritional status of the poor. Other work related to human health includes IPM research to reduce pesticide use. It has not yet been decided to pull together these different activities in a unified agriculture and health research agenda, but the work on micronutrients is expected to go forward strongly.

There is an emerging set of **biopolicy** issues centered on the use of genetic resources and transformation technology. To be effective in its own research, CIAT must be alert to these issues and there is a need for a more proactive effort along these lines in the CGIAR. The issues include ownership of genetic resources, intellectual property rights, environmental and health regulation of genetically modified crops, and the impacts of biotechnology research. Some research along these lines is conducted in genetic resources, biotechnology and impact assessment.

Organizing for the MTP

Multi-disciplinary teams will be mobilized to plan and implement research **projects**, and are thus the key operational unit at CIAT. Project teams will foster a culture of cross-boundary teamwork and a results oriented approach. Projects need to integrate research, relationships with partners, and resource mobilization. The set of projects will evolve over time, and will be reviewed regularly through the annual preparation of Medium term Plans as required by the CGIAR.

Regional coordinators will harmonize research agendas, promote strategic alliances, and mobilize resources with partners in the regions. Research in the regions will be implemented through the CIAT projects but coordinated in the region by the regional coordinators.

Scientific competencies will play a major role in knowledge management to help ensure scientific quality and that CIAT uses the most effective and up to date methods to reach its research objectives. They will advise in the recruitment of scientists and will manage key capital resources.

Working groups will be constituted as needed to pool together expertise across project boundaries to respond to emerging challenges or opportunities.

The **Director General**, supported by the **Management Team**, will provide overall leadership and direction. Resource mobilization is an important function. The size and structure of the Management Team will evolve overtime, with a move towards a smaller team.

For CIAT, science is a means to promote development through sustainable rural livelihoods. Thus, **linking research with development** is an important concern. The transformation of scientific findings into outcomes for development needs to be actively pursued through a better understanding of the research process and the dissemination of research outputs.

Public-private partnerships will be of growing importance as new opportunities arise to engage the private sector in activities consistent with CIAT's objective of sustainable rural livelihoods. They can also provide mechanisms whereby the commercial sector shares the benefits it obtains from public sector research. CIAT's facilities will continue to be managed as a science park, encouraging like-minded institutions to share facilities and costs.

The **Board of Trustees** ensures that policies appropriately align objectives, programs and resources with CIAT's mission and charter. It monitors and approves the implementation of plans, budgets and policies.

Financing the MTP

The financial plan for the MTP 2002-2004 is based on a stable funding base of $32.5 million over the period of the plan. This is quite similar to the actual funding and expenditure levels in the recent past. Obtaining the resources to convert this plan into a reality can not occur without effort.

CIAT has had a series **of successes in recent years in obtaining a variety of new research grants**. Recently CIAT has obtained an important grant from USAID for the micronutrient initiative. Important new contracts have been signed with the Ministry of Agriculture and Development of Colombia. CIAT has entered a partnership to implement research related aspects of a USAID project in Haiti. The Kellogg Foundation has confirmed new support for farmer participatory research. Additional grants have been obtained for 2002 from Belgium, Canada, Germany and France, among others. Moreover, CIAT has significant new projects with good prospects in the pipeline.

CIAT has, therefore, reason to be confident about its funding prospects. Nevertheless, there are some significant risks that must be noted. Unrestricted resources have declined without exception every year since 1989, and 2002 is to be no exception with announced cuts from such key and important donors as Japan, Switzerland, and the World Bank. Moreover, the CG appears to have signaled its intention to reassign from some of the resources currently going to unrestricted support of centers to the new challenge programs. CIAT is, of course, actively seeking to participate in the new challenge programs in order to replace some of the at risk core resources. Overall, though, investment in overseas development assistance, the mainstay of CIAT financing, has been decreasing.

Consequently, it is realistic to assume that **unrestricted resources will continue to decline** over the period of the MTP. Financial stability can only be achieved by increasing income from other sources. Investment in science and technology has not suffered like overseas development assistance, so science and technology programs could be a source of some additional income. ACIAT has made a special effort to tap resources from philanthropic sources, and there is some scope for optimism.

With the decline of unrestricted funds and the growth in importance of research contracts, **internal adjustments are required**. For many years, unrestricted resources have funded the core research program while "special projects" were used to fund additional activities. Henceforth targeted funds can not be used to simply undertake additional new activities; they will have to become part of the core research program that can not otherwise be financed. Management believes that vigorous implementation of this policy can enable CIAT to escape the very significant downsizing that several centers are undergoing in 2002 due to the above mentioned donor cuts. Additionally cost saving measures are being sought in areas such as travel and purchasing.

In the last couple of years CIAT **has benefited from a decreasing cost of operations in Colombia** because the devaluation of the peso to the dollar was significantly higher than the rate of inflation. This is unlikely to go on indefinitely and it appears that the reverse may occur in 2001. If the cost of operations in Colombia increases, as it did during the early and mid-1990s, this could have a disrupting impact on CIAT's finances.

Implementing the MTP

This MTP lays out the planned research program, organization, and budget for 2002-2004. Nevertheless, much work is required to actually implement the plan. The specific operational mechanisms of the alliance with TSBF have to be worked out in practice. Similarly, with the

revitalization of the research portfolio, there will be changes in project structure. New projects will be initiated, some projects will be merged, and some activities and responsibilities will be shifted from one project to another. Developing the **new project workplans** will be an important task for scientists and managers over the next few months. This will begin in earnest with the planning week in November, and will culminate in detailed plans that will **be ready for the review of the Executive and Finance Committee meeting in early 2002**.

Likewise, considerable further detailed work will need to be done to relate the budgets of individual cost centers to the new project portfolio. While this is not expected to significantly alter the general resource assignments as reported in this document, nonetheless **updated budgets will be presented to the Executive and Finance Committee**. The overall resource distribution of the new project portfolio is contrasted in Table 1 with the previously planned levels in earlier drafts of the MTP.

In the CGIAR three-year medium term plans are prepared annually on a rolling basis. Many elements underpinning this MTP document are expected to be enduring through the plan period and beyond. Nevertheless, it is to be anticipated that there will be ongoing adjustments in the research agenda and resource assignments. These will be incorporated, as they occur, in the framework of annual three-year plans.

A major challenge will be to re-enforce strengths of CIAT's work culture, in particular integration. Internal integration promotes flexible cross boundary and inter-disciplinary research. External integration promotes good partnerships. CIAT's future success will be largely dependent on its ability to do research together, internally in teams, and externally with partners.

Table 1. MTP draft indicative budget: Comparison of current and previous versions ($US million). 2002-2004.

	Current proposal	**Submitted to TAC September 2001**	
Tropical Fruits	0.4	n.a.	0.0
Climate Change	0.9	n.a.	0.0
Information for Rural Development	1.6	n.a.	0.0
n.a.	0.0	Genetic Resources	1.0
Agrobiodiversity	3.5	Agrobiodiversity	3.5
Beans	4.4	Beans	1.7
n.a.	0.0	Beans in Africa	2.8
Cassava	2.1	Cassava	1.8
Rice	2.3	Rice	2.4
Forages	3.2	Forages	2.3
IPM	1.8	IPM	1.2
Soils/TSBF Institute	4.2	Soils	1.7
Hillsides	2.0	Hillsides	1.4
Land Management	1.4	Land Use	1.9
n.a.	0.0	Systems	2.7
Agroenterprises	0.8	Agroenterprises	1.1
n.a.	0.0	NARS Linkages	1.5
Participatory Research	1.2	Participatory Research	0.9
Impact Assessment	0.5	Impact Assessment	0.6
Ecoregional	0.2	Ecoregional	0.2
Systemwide Soils	0.5	Systemwide Soils	0.8
Systemwide Participatory Research	1.4	Systemwide Participatory	1.7
Total	**32.4**	**Total**	**31.2**

Appendix I

Project Descriptions and Logical Frameworks 2002-2004

Project BP-1: Impact Assessment

Project Description

Objective: To generate and disseminate information and tools to improve the capacity of CIAT and partner organizations to allocate research resources efficiently.

Outputs:
1. Expected impact of future research estimated.
2. Impact of selected past CIAT research monitored.
3. Tools developed to assess the impact of research, ex ante and ex post.
4. Institutional capacity for estimating, monitoring, and evaluating research impacts improved.

Gains: Improved allocation of resources can increase the rate of return on investment in agricultural research. Project target is 2%.

Milestones:

2002 Regulatory framework for GMO crops analyzed. Consumer attitudes to GMO Food risks in one low income country assessed. Role of improved follows in Amazon farming systems appraised. Riverine farming systems in Amazonia characterized. Methods for studying collective action evaluated. Distribution of benefits from bean genetic resources modeled. Impacts of research in Colombia plains reviewed.

2003 Impact monitoring systems in place in Asia agroecological sites. Surveys of bean adoption in two African countries initiated. Life histories of innovations in Central America conducted. One new study of impact of biotechnology completed.

2004 Two studies on technology adoption completed, and two new studies initiated. Impact of investments in social capital on NRM estimated.

2005 Impact of CIAT research on poverty reduction estimated. Impact monitoring system operational in all agroecological sites. Expected benefits of four potential research outputs appraised.

Users: Research planners in NARS and the CGIAR who make decisions on resource allocation. Stakeholders who need to measure expected returns to investment in agricultural and resource management research.

Collaborators: *Future impact of research:* Ministry of Agriculture (Colombia); University of Hohenheim; California State Polytechnic University, San Luis Obispo; Center for Development Research, Denmark; University of Valle, Colombia; CIAT projects Genetic resources, biotechnology on forages, rice, cassava, beans, Hillsides and CLAYUCA. *Impact of past research monitored*: CIMMYT; IFPRI; Systemwide Participatory Research and Gender Analysis Program; CIAT projects on cassava, rice, forages, IPM, Hillsides, Land Use, and Agroenterprises; all CIAT projects.

CGIAR system linkages: Improving Policies (100%).

CIAT project linkages: All CIAT projects.

CIAT BP-1 Project LogFrame (2002-2004)

Project: **Impact Assessment**
Project Manager: **Douglas Pachico**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To obtain knowledge and expertise for enhancing performance of decision making in the agricultural and development sectors are made available to appropriate users.	Performance of investment in tropical agricultural research improved.	Research project portfolios in tropical agricultural research.	
Purpose To generate and disseminate information and tools to improve the capacity of CIAT and partner organizations to allocate research resources efficiently, and document the impact of research investments.	• Research resources allocated more efficiently (expected rate of return to CIAT research portfolios increased). • Results of impact analysis used in decision making and priority setting. • Economic and environmental impact of selected past research identified and quantified.	Scientific publications from BP-1 and other projects. Published planning documents of CIAT and partner organizations. Published minutes of planning meetings in CIAT (BoT, MT, Project Managers) and partner organizations. External reviews of CIAT. Data on use of CIAT-developed tools.	Adequate funding to agricultural research and extension. Decision makers willing to use economic analysis in research priority setting.
Output 1 Expected impact of future research estimated.	• Expected rate of return for potential research projects estimated. • Expected economic, distributional, and environmental impact identified and quantified.	CIAT technical publications. CIAT published planning documents.	Willingness of decision makers to use the information. No external shocks that invalidate the results.
Output 2 Impact of selected past CIAT research documented.	• Economic, social, and environmental impact of CIAT research outputs identified and quantified.	CIAT technical publications.	
Output 3 Tools developed to assess the impact of research, *ex ante* and *ex post*.	• Methodologies generated. • Databases compiled and maintained. • Causal paths of impact mapped. • Indicators identified.	Databases available on BP-1 sites on Internet, on CIAT's internal network, and in BP-1's data library. Site flow data from web sites. Data on registered users of BP-1 software. Citations of project publications and tools in technical publications.	Analysts willing to use the tools in their impact analyses. Data available for using the tools.
Output 4 Institutional capacity for estimating, monitoring, and evaluating research impacts improved.	• Appropriate and well-designed impact assessment components included in the work plans and budgets of CIAT projects and projects of partner organizations.	CIAT project log frames and budgets. Work plans of CIAT researchers. Research proposals submitted by projects. Similar documentation from partner organizations.	Institutional and financial support for impact assessment.

Project GC-1: Confronting Global Climate Change for the Benefit of Tropical Agriculture

Project Description

Objective: To overcome expected reductions in productivity of some major food crops and forages as a consequence of climate change (CC), while reducing the environmental impact from agriculture, in ecoregions within the scope of CIAT's mandate.

Outputs:

1. Vulnerability and opportunity assessment developed of the response of critical ecoregions, populations, crops and crop wild relatives to changing climates.
2. Germplasm, and management systems adapted to changing climatic conditions and exacerbated incidence of pests and diseases.
3. Crop,forage, water and soil management strategies developed to minimize sources and/or increase sinks of Greenhouse gases (GHG).
4. Impact of implemented strategies for adaptation to and mitigation of CC assessed, and institutional capacity enhanced .

Gains:

* *Plant breeders* and *agronomists* will have access to realistic and detailed definitions of the climates that will be encountered in response to CC.
* *Farmers* and *consumers* of CGIAR-mandated and other food crops will have varieties adapted to marked changes in temperature and drought conditions.
* *Farmers* benefit from informed decision capacity and sustainable systems that minimize GHG emissions (CO_2, CH_4, and N_2O) and maximize carbon sequestration for international carbon trading.
**Policy makers* will have information of the extent of CC on the performance of CGIAR-mandated and other food crops and possible changes required to confront it and avoid wide-spread land degradation.
* *National governments* will have more accurate information on emissions of GHG's by sources and removal by sinks for incorporation in their annual inventories under the Article 7 of the Kyoto protocol.

Milestones:

2002 Maps of expected changes in maize yields in response to climate change for LatinAmerica and Africa. Alliances developed with CORPOICA, CONDESAN, MIS, FAO Lempira Sur, CATIE, JIRCAS, Ministry of the Environment, Colombia and Honduras. Two workshops held on CC issues in Central America (CA) and Colombia. Definition of CIAT activities within the Challenge program on CC .

2003 Advanced versions of FloraMap and MarkSim. Preliminary assessment of bean and cassava yields for CA and Africa.. Definition of areas in urgent need to preserve wild relatives of beans. Advanced lines of drought tolerant beans available to NARS for CA. Rank of tropical grasses by their nitrification inhibition potential (greenhouse studies) Global Warming Potential (GWP) estimated for the Llanos. Preliminary estimate of GWP for the Quesungual reference site, Honduras.

2004 Current and expected distribution of Macrophomina in LatinAmerica. Definition of areas to prioritize for conservation of wild relatives of cassava, release of Briachiaria hybrids tolerant to drought. Assessment of net reductions in N_2O emissions due to B. humidicola: Case studies in CentralAmerica and Colombian Llanos. Implemented pilot project to trade C from agroforestry systems (AFS) in Colombia.

Users: The immediate beneficiaries are farmers that grow CGIAR-mandated crops and the people that consume them, especially poor farmers in developing regions. Policy makers will use the information on predicted changes in climate to plan land use and to include environmental services as part of the development agenda for selected regions.

CGIAR system linkages: Protecting the Environment (50%); Improving Productivity (20%); Training (10%); Information (10%); Networks (10%). Participation in the Inter-Center Working Group on Climate Change.

Collaborators: NARS and National Research Centers: Brazil (EMBRAPA, INPE, INPA); Colombia (CORPOICA, Instituto Von Humboldt, Universidad Nacional, Ministerio del Ambiente, IDEAM), Central America (Universidad de Honduras, Ministerio del Ambiente); CGIAR Centers: ILRI; CIMMYT, ICRAF. Advanced Research institutions: (Cornell University, Univeristy of Florida, USA; University of Zurich, Switzerland, Bayreuth University, Germany,); Climate change modelers (e.g., Hadley Climate Center, UK; NCAR, US); international and local NGOs; farmers' and community organizations.

CIAT project linkages: IP1,IP3, PE1, PE2, PE5, SN2, SN3.

CIAT GC-1 Project LogFrame (2002-2004)

Project: **Confronting Global Climate Change for the Benefit of Tropical Agriculture.**
Project Manager: **Marco Rondón**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To contribute to long-term increases in agricultural productivity, poverty reduction, and to the conservation of the global environment.	• Agricultural production increased. • Farmers' income increased. • Agriculture-related emissions of greenhouse gases (GHG) reduced • Water production levels maintained or increased.	• National statistics of agricultural production • National statistics on rural income • National and international inventories of GHG. • National and regional inventories of water resources.	
Purpose To overcome expected reductions in productivity of some major food crops and forages as a consequence of global climate change, while reducing the environmental impact from agriculture in ecoregions within the scope of CIAT's mandate.	• Net increase in agricultural productivity resulting from adoption of climate change (CC)-adapted crops. • Net reduction in the Global Warming Potential (GWP) of key ecoregions: Tropical Lowlands, Hillsides, and Andes.	• National and regional statistics of food and forage production. • Regional and National inventories of GHG compared over time.	• NARS partners show interest in collaborative research • Adequate funds from global challenge programs (climate change, water) allocated. • Favorable policies for the release and adoption of new crop and forage varieties. • Policy and trading incentives timely implemented to favor adoption of environmentally safe management practices.
Outputs 1. Vulnerability and opportunity assessment developed about the response of critical ecoregions, populations, crops and crop wild relatives to changing climates. 2. Germplasm and management systems adapted to changing climatic conditions and exacerbated incidence of pests and diseases. 3. Crop, forage, water and soil management strategies developed to minimize sources and/or increase sinks of GHG. 4. Impact of implemented strategies for adaptation to and mitigation of GCC assessed, and institutional capacity enhanced.	• Maps of risk of yield decline (maize, beans, cassava) for Africa and Latin America. • Maps of risks of loss of habitat for crop wild relatives. • Adoption of drought adapted crop and forage varieties as key components of production systems that minimize crop failures • Pilot testing of developed methodologies in at least 3 benchmark ecoregions: Tropical Lowlands, Hillsides, and Andes. • Implementation of a pilot project for trading C sequestered in soils and/or biomass. • Studies conducted on the assessment of economic benefits of adoption of drought-tolerant beans and pastures in Latin America. • Study prepared on scenarios for potential C trading in improved pastures and no-tillage cropping systems. • One B.Sc. and two M.Sc. theses submitted.	• Maps available • Information transferred to policy makers • Field verification • Project reports • National average of yields in dry seasons • National GHG inventories • Pilot contract for C trading. • Studies transferred to policy makers.	• Active participation of germplasm development projects. • Access to benchmark sites continued • Continued commitment of local partners to project activities. • Successful involvement NARS partners for release of new varieties. • Access to benchmark sites continued • Successful involvement of suitable partners, experienced in C trading.

IP-1 Project: Bean Improvement for the Tropics

Project Description

Objective: To increase bean productivity through improved cultivars and management practices in partnership with NARS, regional networks and farmers.

Outputs:
1. Higher and stable bean production with less dependency on inputs such us pesticides, fertilizers, and water.
2. Integration of traditional and advanced (e.g. marker-assisted selection) crop improvement techniques and farmer participatory research activities to facilitate the rapid adoption of improved bean cultivars.
3. Strengthening of NARS, regional networks and farmers in basic food production and technology adoption.
4. Higher rates of bean technology adoption achieved through NARS, regional networks and farmers.

Gains: Improved varieties grown in 40% of Latin America and 10% of Africa (in network countries) by year 2005. Bean productivity stabilized, and bean availability secured for poor rural and urban consumers in restricted areas. Pesticide use cut by 20% in selected areas, thus reducing hazards to environment and health. Farmers growing the new cultivars will see a 10-50% increase in their income from marketing beans. Public and private researchers have access to beans with multiple stress resistance and greater nutritional value. Research capacity strengthened through regional networks.

Milestones:

2003 Marker-assisted selection developed for various biotic constraints. Lines with resistance to angular leaf spot, drought, bean common mosaic virus, and bean golden mosaic virus developed. Specialty types developed in Andean beans.

2004 Lines resistant to bean common mosaic virus, black root, beanfly, root rots and angular leaf spot made available to partners in Africa. Advanced lines with improved drought tolerance validated with partners. Progeny from marker-assisted selection for P-efficiency made available to partners.

2005 Nutritional quality traits incorporated into high-yielding and stress-tolerant cultivars.

Users: Small farmers in tropical America and Africa (mainly women) will obtain higher and more stable yields. Poor consumers, especially women and children, will benefit from low-cost protein and micronutrients. The environment and community at large will benefit from reduced pesticide and fertilizer use. Food legume researchers will access an enhanced knowledge base and germplasm.

Collaborators: *Regional networks and institutions*: PABRA, ASARECA, ECABREN, and SABRN (Africa); PROFRIJOL and PROFRIZA (Central and Andean America). *Developing improved germplasm:* NARS and farmers for FPR. *Improving soil, pest, and disease management:* ICRAF, CIMMYT, IITA, CIP, TSBFI, and national partners in the Systemwide IPM program and African Highland Initiative (AHI). *Training in breeding and IPM:* Bean/Cowpea CRSP and ICIPE. *Diffusing new technology:* NGOs, churches, relief and governmental agencies, and entrepreneurs. *International institutions* like CATIE and EAP-Zamorano (Central America). Universities and other institutions in: Australia, Belgium, Canada, France, Netherlands, Spain, Switzerland, UK, and USA. *Resistance breeding and gene tagging*: Bean/Cowpea CRSP.

CGIAR system linkages: Enhancement & Breeding (70%); Crop Production Systems (10%); Protecting the Environment (10%); Networks (5%); Training (5%).

CIAT project linkages: Germplasm conservation and characterization (SB-1 and SB-2).
IP-1 and IP-2 contributes to IPM (PE-1), nutrient and water use efficiency (PE-2), climate change (PE-?), sustainable hillside systems (PE-3), and participatory research (SN-3). Its impact is assessed in BP-1.

CIAT IP-1 Project LogFrame (2003-2004)

Project: **Beans Improvement for the Tropics**
Project Manager: **César Cardona**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To obtain a lasting increase in food availability and income for the poor through improved bean productivity.	Increased bean production, better income distribution and nutrition with improved cultivars and management practices.	National production statistics.	Adoption continues at rates at least comparable with those in the past.
Purpose To increase bean productivity through improved cultivars and management practices in partnership with NARS, regional networks and farmers.	Improved cultivars and/or management practices are used by NARS, regional networks and farmers in 40% of Latin America and 10% of Africa (in network countries) by year 2005. Farmers growing new varieties see a 10% increase in income from marketing of beans. Regional networks fully devolved to local management, with CIAT participating as a research partner.	Reports of NARS and regional networks. Adoption survey reports. Publications. CIAT reports. End-of-project and evaluation reports.	Core of bean researchers and operation budgets are maintained. Continued donor support to regional networks. Access to resources from challenge programs. Regional bodies and national governments continue to give priority to bean production.
Output 1 Improved, small-seeded, bean germplasm resistant to major biotic and abiotic stress factors and combined with greater nutritional and market value.	Improved parents, populations, and/or lines available to NARS, regional networks and farmers.	Reports from NARS and regional networks. Annual reports. Publications.	Continued donor support to PROFRIJOL, the African networks and CIAT. Continued input of breeders, molecular geneticist and plant nutritionist.
Output 2 Improved, large-seeded, bean germplasm resistant to major biotic and abiotic stress factors and combined with greater nutritional and market value.	Improved parents, populations, and/or lines available to NARS, regional networks and farmers.	Reports from NARS and regional networks. Annual reports. Publications.	Continued donor support to PROFRIZA, PROFRIJOL, the African networks and CIAT. Continued input of breeder and molecular geneticist.
Output 3 Strategies developed for managing diseases and pests in bean-based croping systems.	IPM strategies developed. Gene combinations to control insects and pathogens determined.	Reports from NARS and regional networks. Annual reports. Publications.	Continued input of Pathologist, Entomologist, and Virologist. Continued donor support to whitefly IPM project.
Output 4 Improved cultivars and management practices developed and tested in partnership with NARS, regional networks, NGOs and farmers.	Bean productivity increased. Farmers' dependence on inputs reduced. Nutritional value of beans increased. Production costs reduced. Climbing bean widely adopted in Kenya and at least one other country in Africa. Improved crop management practices adopted by 10% of farmers by 2005.	Trials on experiment stations and on farms. National statistics. Publications.	Continued donor support. Active collaboration with all partners involved, including farmers.

Project IP-3: Improved Cassava for the Developing World

Project Description

Objective: To develop germplasm, methods and tools for increased productivity and value of the cassava crop that will result in increased income and development of rural communities involved in cassava growth and processing.

Outputs:

1. Genetic base of cassava and related Manihot species evaluated and available for cassava improvement
2. Genetic stocks improved gene pools developed and transferred to national programs.
3. Collaboration with other institutions..
4. Maintenance of germplasm bank in the field
5. Breeding for insect and other arthropods resistance and development of alternative methods for their control
6. Disease resistance in cassava.
7. Development and use of biotechnology tools for cassava improvement.
8. Knowledge of cassava genetics.

Gains: The rural populations in Africa, Asia and Latin America and the Caribbean benefit by increased productivity, enhanced value of the products produced, and flexibility by the availability of different processing alternatives for cassava.

Milestones:

2002 A set of three different diallels evaluated and analyzed to gain knowledge of the inheritance of traits of agronomic relevance. The shift of the breeding scheme from the production of hybrids to the design of parental lines initiated.

2003 The first set of S1 lines planted in the field. Better understanding of methods for the control of post-harvest physiological deterioration. Better understanding of germplasm and processing procedures for the production of fried cassava chips.

2004 The first "trapiche yuquero" begins full production of cassava flour. Other alternative uses in the process of scaling up.

2005 The first hybrids from parental lines with some degree of inbreeding produced. First results from the newly developed protocol for the production of doubled-haploids.

Users: Immediate beneficiaries are farmers growing cassava as a cash crop or for subsistence farming. Close beneficiaries are processing industries related to cassava (for animal feed, for processed food, for starch or derived products).

Collaborators: IITA and IFPRI (CG Centers), NARs in Asia (particularly in Thailand, Vietnam, China, India and Indonesia) and Latin America (particularly Brazil, Colombia, Cuba, Haiti and Venezuela), CLAYUCA, and private sector involved in cassava processing.

CGIAR system linkages: IITA cassava breeding (10%); Biofortification Initiative (10%); Training (20%); Information (20%); Networks (30%); Organization and Management (10%). Participates in the Global Cassava Strategy.

CIAT IP-3 Project LogFrame (2002-2005)

Project: **Improved Cassava For The Developing World**
Project Manager: **Hernán Ceballos**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To improve the livelihoods of rural populations in Latin America, Africa and Asia by increasing cassava productivity, while protecting the environment and enhancing the value of products derived from this crop.	Increased productivity of cassava clones. Widened uses for cassava. Increasing the area planted to the crop.	National statistics of different countries where projects have been implemented. Recognition of private sector (processing).	
Purpose To develop methods and tools that will make the genetic improvement of cassava more efficient and to identify valuable germplasm for the breeding project. Eventually a technology package involving germplasm, cultural practices and processing alternatives will be made available to rural communities.	By the end of year 2005, the project has consolidated the technology packages for alternative industrial uses of cassava as well as strengthened the reliability and sustainability of the crop as a source of food security for subsistence farming.	Reports and project documents of our partner institutions. Reports from the processing sector.	Political and institutional support for sustainable rural and agricultural development at the reference sites and targeted countries is maintained. Natural disasters and civil strife do not impede progress toward contributing to the project's goal. Absence of drastic changes in the price of maize as a commodity that greatly affects cassava competitiveness.
Output 1 Genetic base of cassava and related Manihot species evaluated and available for cassava improvement.	• Evaluation of genetic diversity for carotene and key minerals content in roots and foliage. • Evaluation of genetic diversity for starch quality and properties in cassava roots.. • Evaluation of the effect of carotene content in reducing post-harvest physiological deterioration.	Articles published. Annual reports and project proposals. Clones developed to take advantage of findings from this output.	Natural disasters or civil strife do not impede progress toward achieving the project's goal. Cassava germplasm bank is maintained in the field.
Output 2 Genetic stocks of improved gene pools developed and transferred to national programs.	• Changes in the breeding scheme implemented and their consequences measured. • Development of a new product in cassava: lines with varying degree of inbreeding. • Resources found for the development of a protocol for the production of doubled-haploids in cassava.. • Number of clones for each agro-ecological region with outstanding performance.	Project home page. Annual reports and working documents. Scientific publications. Shipment of germplasm to collaborators in different countries.	Natural disasters or civil strife do not impede progress toward achieving the project's goal. Adequate funding for research activities.
Output 3 Collaboration with other institutions in place.	• Continue the consolidation of CLAYUCA. • Continue with joint research and collaboration with IITA • Continue the support of cassava breeding projects in Asia • Training of visiting scientists. • Close interaction with private sector involved in cassava processing.	Case studies published. Annual reports and working documents. Submission of joint research proposals. Support from private sector	Natural disasters or civil strife do not impede progress toward achieving the project's goal.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 4 Germplasm bank in the field maintained.	• Continue the collection of data for a complete data set from the germplasm bank. • *Introduction of new germplasm.*from different countries in the world.	Project proposals and reports. Accessions planted and maintained in the field. Introduction of new accessions	Natural disasters or civil strife do not impede progress toward achieving the project's goal.
Output 5 Breeding for insect and other arthropods resistance and alternative methods for their control developed.	• Search for molecular marker(s) associated with resistance to white flies. • Introgression of .resistance to white flies into breeding stocks. • Evaluation of reaction to insects and arthropods in breeding stocks. • Development of methods for the biological control of soil insects.	Annual reports and working documents.. Scientific publications. Development of commercial products for biological control of pests in cassava.	Natural disasters or civil strife do not impede progress toward achieving the project's goal. Adequate funding for research activities.
Output 6 Disease resistance in cassava identified	• Identification of the causal agent of the frog skin disease and modes of transmission. • Implementation of the molecular marker associated with resistance to ACMV • Identification of germplasm and cultural practices to control root rot in cassava. • Identification of parental material resistant to bacterial blight and super-elongation disease.	Annual reports and working documents.. Scientific publications. Training manuals Development of a diagnostic kit for frog skin disease	Natural disasters or civil strife do not impede progress toward achieving the project's goal. Adequate funding for research activities.
Output 7 Biotechnology tools for cassava improvement developed and used .	• Development of a protocol for the production of doubled-haploids in cassava. • Identification of genes of commercial, environmental or consumer preference value for genetic transformation. • Identification of traits of agronomic relevance to be associated with molecular markers for MAS. • Collaboration for the development of QTLs of agronomic relevance.	Annual reports and working documents.. Scientific publications. Molecular markers identified.	Natural disasters or civil strife do not impede progress toward achieving the project's goal. Adequate funding for research activities.
Output 8 Cassava genetics known.	• Evaluation of diallel sets for coastal, acid soil savannas and mid-altitude valleys to analyze the inheritance of important traits. Identification of populations showing interesting segregations for further analysis using molecular markers. • Testing of the hypothesis that hybrids from inbred lines are better performing than those produced from non-inbred parents.	Annual reports and working documents.. Scientific publications. Training manuals	Natural disasters or civil strife do not impede progress toward achieving the project's goal. Adequate funding for research activities.

Project IP-4: Improved Rice for Latin America and the Caribbean

Project Description

Objectives: To add to the well being of the rice sector with emphasis on the resource poor rice farmers by increasing genetic diversity and the stability of high yielding varieties. These will require lower inputs, allowing lower production costs, help protect the environment, and make rice locally available at a reasonable price.

Outputs:

1. Enhancing Gene Pools
2. Integrated Pest and Disease Management
3. Education and Rice Cultivation as a Vehicle to Alleviate Poverty

Gains: Robust high yielding rice varieties requiring lower inputs will be developed. We will provide well-characterized progenitors and advanced materials with an ample genetic base as well as training to our partners. The focus will be on developing the capability to increase the number of desirable traits in varieties. This will lower unit costs giving farmers higher profits as well as maintain rice as an affordable food for the consumers.

Milestones:

2003 Improved rice populations with high yields and high quality grain will be made available for their evaluation by national organizations. These populations will include advance materials from the interspecific breeding activities that are designed to broaden the genetic base of rice. Molecular markers for blast resistance genes, sheath blight, crinkling disease, RHBV, and *T. orizicolus* will be developed. Developing marker assisted selection (MAS) for traits not previous included in our improve efforts such as resistance to bacterial blight and nematodes. Sources of improved progenitors with combinations of blast resistance genes will be distributed to national programs. Improved rice populations with broader genetic base enhanced by recurrent selection will be distributed to national programs. Gene flow, IPR, safety and efficacy studies for transgenic rice will be made for hoja blanca and sheath blight. Participatory breeding will be used to reach the resource poor rice farmers. Bioreactors will be adapted to increase mass production of double haploids.

2004 Genetic progress for populations enhanced by recurrent selection for different traits will be assessed in several countries. Studies of the genetics of complex traits including yield that used interspecific crosses and molecular markers will be completed. MAS will be used to combine resistant genes to produce rice that has durable blast resistance. Molecular and virulence characterization of rice pathogens including brown spot and sheath rot. Advanced populations using wild rice genes and recurrent selection will continue to be developed. These populations will include additional traits such as resistant to crinkling disease. The use of MAS as a breeding tool will be implemented for at least five characteristics. Transgenic rice resistant to RHBV will be tested regionally. Distribution maps of wild species and characterization of red rice will be available.

2005 MAS for multiple traits will become a routine activity. Participatory selection and breeding will be releasing new rice varieties for resource poor farmers. Advanced lines with multiple traits from wild species of rice will be tested for national programs for their release as varieties. An interactive training for rice researchers through the Internet or available as CD-ROMs will be available for both farmers and scientists. The developing systematic selection methods for complex traits will increasingly become the focus of the genetic studies. Near isogenic lines for blast resistant genes will be used in regional studies to understand the dynamics of the pathogen and develop locally resistant varieties. Using transgenic technologies will be scaled up for use in breeding programs and transgenic hoja blanca rice will be available to national programs.

Users: Rice researchers especially in Latin America. Ultimate beneficiaries are the LA rice farmers most of whom are small farmers, and the resource poor consumer who are eating rice because it is available and affordable.

Principal Collaborators: France CIRAD & IRD, FLAR, Japan JIRCAS, Korea RDA, Colombia FEDEARROZ & CORPOICA, Brazil EMBRAPA, Peru INIA, Venezuela INIA & DANAC, Nicaragua, BoliviaCIAT, CubaIIA, Costa Rica, China, ChileINIA, UruguayINIA, Argentina UCor, LaPlata, USA KSU, Cornell, LSU, TexasAM, Rutgers.

CGIAR system linkages: Enhancement and Breeding (50%); Protecting the Environment (20%); Saving Biodiversity (15%); Transfer of Technologies (10%); Crop Systems (5%). Linked to IRRI and WARDA.

CIAT project linkages: Germplasm conservation SB-1, genomics SB-2, participatory research SW-3 for upland in hillsides PE-3 and cropping systems SW-2 for the savannahs. Provide improved germplasm to PE-1 and PE-2.

CIAT IP-4 Project LogFrame (2002-2004)

Project: **Improved Rice Germplasm for the Latin America and the Caribbean**
Project Manager: **Lee Calvert**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal Germplasm of beans, cassava, tropical forages, rice and their wild relatives collected, conserved and enhanced and made accessible to NARS and other partners.	• A sufficient number of accessions (of beans, cassava and tropical forages) representing genetic diversity are conserved and managed ex-situ. • Strategies and guidelines for in-situ management of biodiversity of beans, cassava and tropical forages have been developed and tested with users. • Accessible germplasm of rice meet NARS standards in terms of productivity, stability, agronomic traits and user needs. • Techniques and relevant information for more efficient and reliable germplasm improvement are accessible to users.	• CIAT's germplasm bank inventories. • Partners technical reports. Annual reports.	
Purpose To increase rice genetic diversity and enhance gene pools for higher, more stable yields with lower unit production costs that propiciate lower prices to consumers and reduce environmental hazards.	• Evaluations of yield potential (interspecific, wide, elite crosses and recurrent selection). • Continued use of improved germplasm by NARS. • Monitoring rice production practices and markets. • IPM practices in place for stable production and cleaner environment. • Rice lines selected with desired gene traits. • Potential sources for high levels of biotic and abiotic stress resistance.	• Databases. • Project, CIAT and NARS annual reports. • Publications. • Promotional Activities (conferences, training, workshops, field days)	• Stability (internal and external) • National policies favor adoption of new technology.
Outputs 1. Rice gene pools enhanced. 2. Rice pests and the Genetics of resistance characterized. 3. Education and rice cultivation used as a vehicle to alleviate poverty	• Pathogen/pest variation and source of resistance identified. • IPM strategies. • Workshops. • Training courses. • Farmers' surveys.	• Project progress report for 2002. • Publications. • Project progress and workshop reports	• Continued support from CIAT/CIRAD/FLAR. • Continued adequate funding. • Recommendations adopted by NARS and implemented by farmers.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 1. Enhancing Gene Pools. Activities A. Rice improvement using conventional breeding and gene pools/populations with recesive male-sterile genes. - Evaluation of savannas upland rice lines in Latin American countries. B. Developing upland rice for small landholders C. Advance and evaluation of inter-specific gene pools. D. Introgression of new plant type genes into LAC's gene pools. E. The use of anther culture and in vitro culture for enhancement of gene pools.	• Rice populations developed and improved (tolerance soil acidity; resistance to blast, RHBV, *T. orizicolus* (13); good grain quality; early maturity. • Number of field trials planted and lines selected. • Populations distributed to NARS for line development. • Populations developed (14); populations in process (12); populations yield tested/molecular characterized (4). Partners (WARDA, CIRAD, EMBRAPA, CORNELL). • Number of crosses made (433); tropical irrigated (226), temperate (155), upland (52). Number of selected lines. • Double haploids: interspecific crosses (386), acceleration breeding populations (815), somaclones (3758-Venezuela; 4440-Colombia)	• Project progress report for 2001. • Field visits and evaluations in testing sites. • Breeding populations distributed to LAC. • Breeding populations in storage and field. • Best lines and QTL'S identified. • Breeding populations in storage and field. • . • Double haploids in storage • Publications.	• Continued support from CIAT/CIRAD/FLAR. • Adequate funding and timely release of budget. • Favorable climate. • Continued financial support for anther culture lab. • Crosses, field support and operational costs provided by FLAR.
Output 2. Integrated Pest and Disease Management Activities A. Characterizing the interactions of host plant resistance to rice blast, sheath blight and grain discoloration B. Characterizing and using partial and complete resistance for the control of rice blast. C. Characterizing the interactions of host plant rice hoja blanca virus and *T. orizicolus* complex D. Foreign genes as novel sources of resistance to rice hoja blanca virus and *Rhizoctonia solani*. E. Characterizing the interactions of host plant, *Polymyxa graminis* and rice stripe necrotic virus that causes entorchamiento.	• Virulence spectrum and genetic structure of rice pathogens. • Molecular markers associated and number of resistance genes. • Sources of complete, complementary and partial resistance. • Rice lines with diversified resistance to RHBV and *T. orizicolus*. • Understanding components of resistance to the RHBV complex. • Crop management components developed. • Transgenic lines with RHBV-viral genes with reduced symptoms produced and evaluated. • Transgenes introgressed into commercial cultivars. • Using novel genes for multicomponent resistance to rice pathogens. • Characterization of the RSNV and vector complex. • Development of germplasm evaluation methods.	• Pest and disease resistant varieties released by partners. • Collection of rice pathogens. • Database of resistance sources • Crosses made among resistance sources. • F7 lines with stable blast resistance combining genes Pi-1 and Pi-2. • Rice genome map with blast resistance genes mapped. • Rice progress report for 2001 • Publications • Resistant germplasm selected under artificial conditions.	• Rice crosses and populations developed by breeders. • Biotech. Unit identify molecular markers associated with resistance. • Continue collaboration with FLAR. • Continue adequate funding from Colombia and Rockefeller. • Continue support and adequate funding from CIAT, CIRAD, and FLAR. • Continued funding from Colombia, Rockefeller, Colciencias. • Permission for field testing of transgenic plants is granted. • Continued support and adequate funding.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 3. Education and Rice Cultivation as a Vehicle to Alleviate Poverty Activities A. Participatory development of rice for poor communities in marginal areas. B. FLAR – CIAT collaboration. C. Collaborators training and information.	• Community based projects • New varieties of small equipment for rice systems • Number of scientists trained. • Workshops • Published reports of courses. • FLAR annual report • Publications • Web pages	• Increased production in marginal areas. • No. of communities participating • Rice progress report for 2001 • CIAT's Web page	• Special funds continue. • Recommendations adopted by farmers.

Project IP5: Tropical Grasses and Legumes: Optimizing Genetic Diversity for Multipurpose use

Project Description

Objective: To develop and utilize superior gene pools of grasses and legumes for sustainable agricultural systems in subhumid and humid tropics.

Outputs:

1. Optimized genetic diversity for quality attributes, for host-parasite-symbiont interactions, and for adaptation to edaphic and climatic constraints, for legumes and selected grasses.
2. Selected grasses and a range of herbaceous and shrubby legumes evaluated with partners, and made available to farmers for livestock production and for soil conservation and improvement.

Gains: Defined genetic diversity in selected grass and legume species for key quality attributes, disease and pest resistance, and environmental adaptation. Known utility in production systems of elite grass and legume germplasm. New grasses and legumes will contribute to increased milk supplies to children, cash flow for small dairy farmers, while conserving and enhancing the natural resource base.

Milestones:

2002 Defined patterns of variation in spittlebug bioecology in contrasting ecosystems. Known animal production potential of *Brachiaria* hybrids with resistance to spittlebug. Forage availability and livestock productivity increased in selected provinces of 6 countries in S.E. Asia.

2003 Methods and tools available to enhance targeting and adoption of multipurpose forage germplasm in smallholder production systems in the hillsides of Central America. *Brachiaria* hybrids with resistance to spittlebug are made available to farmers. Role of Endophytes in Rhizoctonia resistance in *Brachiaria brizantha* defined.

2004 Multipurpose legumes validated for use in priority crop livestock systems. Prototype field management systems designed for enhancing endophytes' role in drought tolerance of *Brachiaria* species.

Users: Governmental, nongovernmental, and farmer organizations throughout the subhumid and humid tropics who need additional grass and legume genetic resources with enhanced potential to intensify and sustain productivity of agricultural and livestock systems.

Collaborators: National, governmental, and nongovernmental agricultural research and/or development organizations; SROs (Univ. of Hohenheim, Cornell Univ., IGER, OFI, CSIRO, JIRCAS, ETHZ, Univ. of Gottingen).

CGIAR system linkages: Enhancement & Breeding (20%); Livestock Production Systems (15%); Protecting the Environment (15%); Saving Biodiversity (40%); Strengthening NARS (10%). Participates in the Systemwide Livestock Program (ILRI) through the Tropileche Consortium.

CIAT project linkages: Genetic resources conserved in the Genetic Resources Unit will be used to develop superior gene pools, using where necessary molecular techniques (SB-2). Selected grasses and legumes will be evaluated in different production systems of LAC, Asia and Africa using participatory methods (SN-3) to assess their impact in rural livelihoods and in natural resources conservation (PE-2, PE-3).

CIAT IP-5 Project LogFrame (2002-2004)

Project: **Tropical Grasses and Legumes: Optimizing Genetic Diversity for Multipurpose Use**
Project Manager: **Carlos E. Lascano**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To contribute to the improved welfare of small farmers and urban poor by increasing milk and beef production while conserving and enhancing the natural resource base	• New cultivars of grasses and legumes used by farmers. • Raised productivity of livestock and crops while protecting biodiversity and land in savannas, forest margins and hillsides	Statistics and case studies on socio-economic benefits and natural resource conservation in smallholder livestock farms in LAC and Southeast Asia	Policies are put in place by governments to favor sustainable livestock and forage development in marginal areas occupied by small farmers
Purpose To deliver to farmers superior gene pools of grasses and legumes for sustainable agriculture systems in subhumid and humid tropics.	• Demonstrated economical and ecological benefits of multipurpose grasses and legumes to livestock and crop farmers in savannas, forest margins, and hillsides	• Range of variation in desirable traits • Performance of forage components in systems	• Support from traditional and nontraditional donors • Effective collaboration: • CIAT's Projects • AROs, partners and farmers, NGOs
Outputs 1. Grass and legume genotypes with high quality attributes are developed.	• Utility of different accessions of *Cratylia* under direct grazing by milking cows known by 2002. • New *Brachiaria* genotypes with superior forage quality are made available to partners and farmers for improved animal performance by 2003.	• On-farm demonstrations • Scientific publications • Annual Reports • Theses	• Effective collaboration with: • CIAT Projects (PE2) • AROs, partners and farmers, and farmer groups
2. Grass and legume genotypes with known reaction to pests and diseases and interaction with symbiont organisms are developed.	• QTL's for resistance to spittlebug (and high aluminum in the soil) in *Brachiaria* are available for marker-assisted selection by 2003. • Benefits of endophytes (biotic and abiotic constraints) demonstrated under field conditions by 2003. • Role of endophytes in Rhizoctonia resistance in *Brachiaria* clarified by 2003. • *Brachiaria* genetic recombinants with combined resistance to different species of spittlebug are available to NARS by 2003	• On-farm demonstrations • Scientific publications • Annual Reports • Theses	• Effective collaboration with: • CIAT Projects (SB1, SB2) • AROs, partners and farmers and farmer groups
3. Grass and legume genotypes with superior adaptation to edaphic and climatic constraints are developed.	• New *Brachiaria, Paspalum, Leucaena, Calliandra, Desmodium,* and *Arachis* accessions with adaptation to major abiotic constraints (low fertility soils, drought, poor drainage, and cool temperatures) are available to partners and farmers by 2003. • Improved accessions of *Vigna* and *Lablab* with adaptation and known value to farmers in hillsides of Central America are available to partners and farmers by 2003. • *Brachiaria* genetic recombinants with resistance to high aluminum in the soil and with drought tolerance are available to partners and farmers by 2004. • QTL's for Al tolerance in *Brachiaria* identified by 2003.	• On-farm demonstrations • Scientific publications • Annual Reports • Theses	• Effective collaboration with: • CIAT Projects (SB1, PE2, PE4) • AROs, partners and farmers, NGOs, farmer groups
4. In partnership with NARS, superior and diverse grasses and legumes are evaluated and disseminated through participatory research.	• New grass and legume cultivars released by partners and farmers are available to farmers by 2002. • Improved multipurpose grasses and legumes result in increased on-farm milk, meat, and crop production in benchmark sites (hillsides and forest margins), and reduced labour requirements in benchmark sites in SE Asia by 2003. • Scaling up process of *Cratylia argentea* in Central America in place by 2002. • New market opportunities for protein leaf meal assessed by 2003. • Widespread adoption of forage technologies in SE Asia. • Effective forage multiplication systems are established in benchmark sites in SE Asia. • Researchers and develoment workers of NARS are trained in forage agronomy and participatory methods. • An information network on forage research and development is established in SE Asia.	Surveys on adoption impact of new grasses and legumes: • Seed sold • Area planted • Production parameters • Environmental/socioeconomic indicators	Effective collaboration with: • CIAT Projects (PE2, SN1, SN2, SN3, BP1 and Ecoregional Program) • Partners and farmers, NGOs and farmer groups

Project PE-1: Integrated Pest and Disease Management

Project Description

Objective: To develop and transfer knowledge systems and pest and disease management components for sustainable productivity and healthier environments.

Outputs:
1. Pest and disease complexes described and analyzed.
2. Pest and disease management components and IPM strategies and tactics developed.
3. NARS' capacity to design and execute IPM research and implementation strengthened.
4. Global IPM networks and knowledge systems developed.

Gains: Increased crop yields and reduced environmental damage. Natural enemies of major pests and diseases evaluated. IPM developed, and tested and verified on farms. Increased knowledge of the biology and ecology of pests and diseases and of the damage they cause. Molecular characterization of major pathogens and diagnostic kits made available. Whitefly biodiversity characterized. FPR methods for IPM developed and implemented. Biological control agents established in new regions. Pests and diseases on additional food and fruit crops evaluated or characterized.

Milestones:

2002 A global network and website for information on tropical AES developed. Participatory diagnosis of soil pest problems and local agricultural practices realized. Evaluation and/or dissemination of biological control agents of major pests of specific crops. IPM projects developed for AES. Components of the IPM package for global whitefly project ready for diffusion. Fruit crop viruses identified and diagnostic tools developed. Whitefly resistance mechanisms in cassava identified.

2003 IPM for cassava viruses and root-rot diseases implemented. Rapid diagnostic technique for new reovirus of cassava available and association studies fro reovirus and CFSD will be completed. Cassava germplasm with resistance to CBB identified by use of molecular markers. Research on soil-borne arthropods and pathogens advanced and coordinated with system-wide programs. Use of cassava varieties tolerant of frogskin disease in breeding and IPM programs. Biological control of soil borne arthropods advanced. Cassava hornworm baculovirus available to farmers.

2004 Biological control through entomopathogens developed for soil-borne pests. Natural enemies of whitefly available for IPM programs. Information and technologies for implementing phytosanitary certification programs for cassava and other crops. Molecular markers tagging resistance to CBB available. Germplasm screened for resistance to *Phytophthora* root rot, using marker-assisted selection. Epidemiological validation of specified whitefly-transmitted geminiviruses. Characterization of cassava reovirus completed.

2005 Integrated components for IPM of soil-borne pests available for the implementation of FPR methods. CFSD tolerant varieties released. IPM for cassava Bacterial Blight Disease Implemented. Identification of candidate genes CBB and *Phytophthora* root rot resistance from cassava. Whitefly resistant cassava varieties available to farmers. Biological pesticide identified for whitefly control.

Users: Biodiversity of AES determined and made available to researchers. NARS scientists, extension workers, and farmers trained in IPM methodologies. Crop yields for small farmers increased and stable production systems identified.

Collaborators: IARCs (IITA, ICIPE, CIP, ICARDA, AVRDC); AROs (e.g., CATIE, NRI, Crop and Food Institute, NZ, Universities of Florida, Wisconsin, Cornell, São Paulo, Caldas, Palmira, Valle, DBT, ETH, IPP, CIRAD, IRD, John Innes Center, CRCTPP). NARS (e.g., EMBRAPA, CORPOICA, ICA, INIAP, INIVIT, MADR, NARO, IDIAP); NGOs; and private industries ASOCOLFLORES, Palmas de Casanare, Palmar de Oriente, Cía Agrícola de Espárragos), PRONATA, COLCIENCIAS, SENA.

CGIAR system linkages: Increasing Productivity (30%); Saving Biodiversity (20%); Protecting the Environment (40%); Strengthening NARS (10%). Whitefly and Participatory Methods Projects and Soil Biota, Fertility and Plan Health in the System-wide Program on IPM.

CIAT PE-1 Project LogFrame (2002-2004)

Project: **Integrated Pest and Disease Management**
Project Manager: **Anthony Bellotti**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To increase crop yields and reduce environmental contamination through the effective management of major pests and diseases.	• Increased cassava yields. • Reductions in environmental degradation through adoption of improved technology. • Reduction of losses to several major diseases.	Production statistics. Adoption and impact studies. Project reports.	
Purpose To develop and transfer knowledge systems and pest and disease management components for sustainable productivity and healthier environments.	• Adoption of germplasm with resistance to biological constraints. • Establishment of released natural enemies. • Use of environmentally friendly control strategies. • Improved understanding of major biotic constraints.	End-of-project reports. Refereed publications, book chapters. Adoption and impact studies.	National policies favorable to adoption of IPM strategies (i.e., increased support to extension, reduction of subsidies to pesticides). National programs are active and strong in key countries Active collaboration from other IARCs and DC research organizations. Active collaboration from AROs.
Output 1 Pest and disease complexes described and analyzed.	• Pests, diseases, natural enemies, and vectors characterized. • Host/pest/natural enemy/vector interactions analyzed. • Better diagnostic tools available. • Biological control agents established. • Better understanding of the influence of drought in host- pest interactions. • Identification of cassava with tolerance of diseases. • Pest and disease distribution (maps) determined.	All areas: Project reports, refereed publications, book chapters. Reports with maps, economic damage, biological information. Analysis of experiments. Transfer of tools to seed health facilities.	NARS have the needed resources. Adequate interaction with other disciplinary scientists. Successful experiments. Continued development of new varieties that are commercially acceptable. Farmers have adequate access to extension agents, credit lines, and other factors that influence adoption. Collaboration with NARS possible. Evaluation, screening, and exploration sites accessible.
Output 2 Pest and disease management components and IPM strategies and tactics developed.	• Testing of components for effectiveness. • Control strategy recommendations clearly identified and crop management practices determined. • Farmer testing components. • Guides on IPM strategies published. • Disease detection methods available. • Web site published.	Analysis of experiments. Guidelines for IPM. Reports on field effectiveness and probability of adoption of components. Field-oriented brochures.	

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 3 NARS' capacity to design and execute IPM research and implementation strengthened.	• Training, especially in FPR. • Development of projects with NARS. • Training materials developed.	Reports on training courses. Concept notes and projects prepared with partners.	
Output 4 Global IPM networks and knowledge systems developed.	• Network of researchers established. • Preparation of web pages and databases with relevant IPM information.	Electronically published web pages and databases.	

PE-2. Overcoming Soil Degradation-TSBF Institute

Project Description

Objective: To develop and disseminate to clients strategic principles, concepts, methods and management options for protecting and improving the health and fertility of soils through manipulation of biological processes and the efficient use of soil, water and nutrient resources in tropical agroecosystems.

Outputs:
1. Biophysical and socioeconomic constraints to integrated soil fertility management (ISFM) identified and knowledge on soil processes improved.
2. Improved soil management practices developed and disseminated.
3. Ecosystem services enhanced through ISFM.
4. Research and training capacity of stakeholders enhanced.

Gains: Guidelines for selecting productive and resource-use-efficient crop and forage components. Guidelines for identifying profitable options to manage organic and mineral inputs, crop residues, and green manure, and for controlling erosion and improving soil structure. Site-specific guidelines for optimum management of combined use of inorganic and organic resources. Soil-quality indicators to assist farmers and extension workers in assessing soil health. Decision-support systems for resource conservation and productivity enhancement. Strengthened capacity of NARS by use of decision guides for integrated soil fertility management.

Milestones:
2003 Decision-making tools available for managing soil erosion, nutrient cycling and maintenance of an arable layer. Correlations established between local soil quality indicators and scientific measurements.
2004 Innovations for establishing an arable layer available. Soil management strategies to improve soil structure available for hillsides. Indicators of soil fertility, biological health, and physical quality used for decision making in hillsides and savanna agroecosystems.
2005 A soil quality monitoring system developed and tested by partners. Decision making tool available for combined management of organic and inorganic resources. List of soil quality indicators available to NARS to monitor land degradation. Farmers adopting improved system components, including crops and soil management technologies.

Users: Principally small-scale crop-livestock farmers and extension workers in tropical agroecosystems of sub-Saharan Africa, Latin America and south-east Asia

Collaborators: NARS: CORPOICA (Colombia), DICTA (Honduras), EMBRAPA (Brazil), IAR (Nigeria), IER (Mali), INERA (Burkina Faso), INRAB (Benin), INRAN (Niger), INTA (Nicaragua), ITRA (Togo), KARI (Kenya), NARO (Uganda), SRI (Ghana); AROs: CIP, IFDC, ICRAF, IITA, ICRISAT, IRD (France), ETH (Switzerland), JIRCAS (Japan); Universities: Kenyatta (Kenya), Makerere (Uganda), Nacional (Colombia), Nairobi (Kenya), Sokoine (Tanzania), UNA (Nicaragua), UNA and Zamorano (Honduras), Uberlandia (Brasil), Imbabwe (Zimbabwe), Leuven (Belgium), Paris (France), Bayreuth and Hohenheim (Germany), SLU (Sweden), NAU (Norway), Cornell (USA), Ohio State (USA).

CGIAR system linkages: Enhancement & Breeding (10%); Crop Production Systems (20%); Protecting the Environment (40%); Saving Biodiversity (10%); Strengthening NARS (20%).
Convener of Systemwide Program on Soil, Water & Nutrient Management (SWNM), and contributes to the Ecoregional Program for Tropical Latin America, the African Highlands Initiative and the Alternatives to Slash and Burn Programme.

CIAT project linkages: Integrated soil fertility and soil pest&disease management (IP-1, PE-1), acid-soil adapted components received and adaptive attributes identified for compatibility in systems (IP-1 to IP-5), strategies to mitigate soil degradation (PE-3, PE-4, Climate Change), agroenterprise alternatives to improve profitability of soil management options (SN-1), and strengthening NARS via participation (SN-3).

CIAT PE-2 Project LogFrame (2002-2004)

Project: **TSBF Institute**
Project Manager: **Michael J. Swift**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To empower farmers to conduct sustainable agroecosystem management by increasing capacity for integrated soil fertility management through the generation and sharing of knowledge and tools across multiple scales.	• Yields in farmers fields increased. • Land degradation halted/reduced. • Yields per unit area and input increased. • Land use changed	• Farmers surveys. • Regional/national production statistics. • Land use surveys (satellite imagery, rapid rural appraisal) .	
Purpose To develop and disseminate to clients strategic principles, concepts, methods and management options for protecting and improving the health and fertility of soils through manipulation of biological processes and the efficient use of soil, water and nutrient resources in tropical agroecosystems.	• Technologies for soil improvement/ management developed. • Limiting soil-plant-water processes identified. • Compatible plant components identified for low fertility soils in crop-livestock systems. • Guidelines, manuals and training materials for integrated soil fertility management produced.	• Scientific publications • Soil and crop management guidelines published • Decision support systems developed • Annual reports	• National policies favorable to adoption of IPM strategies (i.e., increased support to extension, reduction of subsidies to pesticides). • National programs are active and strong in key countries • Farmers adopt new technologies
Output 1. Biophysical and socioeconomic constraints to integrated soil fertility management (ISFM) identified and knowledge on soil processes improved.	• Soil, water, nutrient and knowledge constraints to sustainable production defined, and the understanding of the role of soil biota, multipurpose germplasm, and organic and inorganic resources for sustainable management of land resources improved.	• Annual Report/ publications • Reviews published • Documents of synthesized results • Detailed tables published in Annual Report. • Decision guides for ISFM developed.	• Sufficient operational funds for soil and plant analyses. • Literature on constraints available • Farmers continue to participate. • Projects SN-2, PE-3 and PE-4 actively participate. • Collaboration of participatory research project (SN-3), RII and NARS.
Output 3. Ecosystem services enhanced through ISFM:	• The soil's capacity to provide ecosystem services (global warming potential, water quality and supply, erosion control, nutrient cycling) and maintain soil biodiversity in the face of global change in land use and climate enhanced.	• Annual reports/ publications. • Internationally accepted standard methods for characterization and evaluation of below-ground biodiversity (BGBD), including set of indicators for BGBD loss agreed (GEF funded special Project). • Methods for assessing impacts of land management on soil microbial and faunal diversity tested • Workplan developed to evaluate interactions between soil management practices and soil-borne pests and beneficial organisms.	• Collaboration from partners. • Information from questionnaires synthesized comparisons made with available PE-3 results. • Collaboration with PE-3 on soil erosion in CA. • Collaboration with SN-2, PE-4, PE-3 and SWNM Program. • Collaboration with PE-4 on land quality indicators at reference sites.
Output 4. Research and training capacity of stakeholders enhanced:	• Research and training capacity of stakeholders in the tropics in the fields of soil biology, fertility and tropical agroecosystem management enhanced through the dissemination of principles, concepts, methods and tools.	• Scientific information (theses, publications, workshop reports, project documents) disseminated to network members and all stakeholders • Network trials planned and implemented with partners • Degree-oriented and on-the-job personnel trained (Farmer, NARS, NGO's)	• Continued interest/participation of NARS and ARO partners, and national and international universities. • Continued support for collaborative activities e.g. systemwide SWNM program.

PE-4 Land Use in Latin America

Project Description

Objective: To enable decision-makers, ranging from farmers to World Bank investors, reduce the uncertainties of development by providing relevant information about land use change.

Outputs:
1. Baseline and time series and time-series data for subsequent analysis performed.
2. Information and insight of biological limitations and drivers of land use change developed.
3. Analysis and prediction of socio-economic factors influencing land use development performed.
4. Analysis and prediction of vulnerability of land use systems to significant external events performed.
5. Methods of capturing farmer's knowledge in land use division support developed.

Gains: Detailed georeferenced databases on land use, ecological, and socioeconomic factors. Environmental and sustainability indicators of land use, networking on the environment, land use, sustainable agriculture, and indicators. A blend of theoretical, methodological, and field-based inquiry for decisions on sustainable agriculture. Upscaling and extrapolation tools available for a variety of uses.

Milestones:

2002 Germplasm targeting tool completed (Beta version). World climate surfaces upgraded to 1-km grid. Flora Map 2.0 released. Dynamic Land Use Model (Beta version) released. Indicators for sustainability at the municipality level published for Andean countries.

2003 Strategic databases on agricultural, environmental, social, and economic issues maintained and updated. Environmental and sustainability indicators routinely distributed to decision makers in the region at different levels. Remote sensing information on land use changes in tropical America routinely collected and available for different purposes. Integrated GIS and mathematical models to support land management decisions by national organizations. National and local institutions from tropical America strengthened to use information, analysis, and tools.

2004 Data, analyses, and tools for natural resources management disseminated throughout tropical America and other tropical areas of the world.

Collaborators: ICRAF, CIP, ILRI, ECLAC, University of Guelph (Canada), IICA (Costa Rica), IILA (Italy), IIASA (Austria), WRI (USA), RIVM (the Netherlands), TCA (Amazonian Cooperation Treaty), the Earth Council (Costa Rica), the World Bank. NARSs, GOs, and NGOs in Latin America = DNP, IGAC, MinAmbiente, IDEAM, CARDER (Colombia); Ministry of the Environment, EMBRAPA (Brazil); IVITA, INIA (Peru); INIAP (Ecuador).

CGIAR system linkages: Protecting the Environment (60%); Improving Policies (20%); Enhancement & Breeding (10%); Saving Biodiversity (10%). Contributes to the Ecoregional Program for Tropical Latin America.

CIAT project linkages: GIS studies assist SB-1, SB-2, IP-1, and PE-2; model development with PE-3, PE-5, and BP-1.

CIAT PE-4 Project LogFrame (2002-2004)

Project: **Land Use in Latin America**
Project Manager: **Simon Cook**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To reduce the risk of agricultural development in the tropics by providing spatial information about significant opportunities and threats of natural resource management.	• Risk recognised as a reducible factor . • Information adopted by decision makers. • CIAT, CG or other collaborating research institute activities enhanced by the ability to target activities	Policy, projects or funding strategies modified identifiably to include spatial information Research portfolios modified identifiably by targeting or pre-selection Risk management strategies, based on spatial information, included in development projects	
Purpose To enable decision-makers, ranging from farmers to World Bank investors to reduce the uncertainties of development by providing relevant information about land use change.	Decision-makers use spatial information to reduce risk	Documented case studies at farm scale, national scale and regional scale Published methods of generalising improved decision making using spatial information of land use	That uncertainty significantly obstructs land use decisions at a range of scales That spatial variation introduces significant uncertainty to these problems That relevant spatial information can be generated in a cost-effective manner
Output 1 Baseline and time-series data for subsequent analysis performed.	Population, crop and selected databases generated Detailed climate data-sets developed for modellers. Detailed future climatic data-sets used for prediction of climate change effects.	Information available at CIAT. Selected information downloadable at CIAT website	Information can be delivered to analysts and decision-makers
Output 2 Information and insight of biological limitations and drivers of land use change developed.	Threats of global climate change (GCC) to regional crop production defined for entire regions. Threats of climate change to plant genetic resources defined. Models developed for defining the impact of GCC on the potential productivity of a range of crops developed.	Maps and data-bases completed. Models developed, calibrated, verified and published. Projects developed to apply models.	Sufficient data is available to generate insight.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 3 Analysis and prediction of socio-economic factors influencing land use development performed.	Spatial processes driving land use change identified Distribution of poverty and its causes identified more accurately using spatial information.	Published explanations of the improved accuracy of explaining land use change. Spatial drivers of poverty explained in published case studies by June 2004. Information used to direct poverty-alleviation policy.	Sufficient data are available to generate insight. Links exist with Government and NGO partners to enable implementation of poverty alleviation policies.
Output 4 Analysis and prediction of vulnerability of land use systems to significant external events performed.	Indicators of vulnerability adopted by policy agencies. Spatial information on vulnerability used to reduce investment risks in at least one country case study.	Methods of vulnerability assessment published with case study at national or regional scale by June 2004. Ex -ante analysis of the benefits of risk reduction published.	Sufficient data is available to generate insight.
Output 5 Methods of capturing farmer's knowledge in land use decision support developed.	Strengths and weaknesses, overlaps and gaps identified between farmers and scientist knowledge with respect to locally (e.g. declining soil fertility) and globally (e.g. climate change) rooted resource base management problems. Respective roles of farmers and scientists identified in the local decision-problem about locally and globally rooted resource base problems. Farmer-farmer decision-support network established that tackle selected locally and globally rooted resource base problems.	Case study documented of farmers generating information and merging with 'hard' data of natural land resources. Network of farmer support initiated. Minimum 200 users at second order organizations. Generated methods and tools documented and disseminated.	Sufficient data is available to generate insight. Local structures enable network establishment.

Project SB-2: Conservation and Use of Tropical Genetic Resources

Project Description

Objective: Preserve the Designated Collection and employ modern biotechnology to identify and use genetic diversity for broadening the genetic base and increasing the productivity of mandated and selected nonmandated crops.

Outputs:

1. Improved characterization of the genetic diversity of wild and cultivated species and associated organisms.
2. Genes and gene combinations used to broaden the genetic base.
3. Mandate corps conserved and multiplied as per international standards.
4. Germplasm available, restored and safely duplicated.
5. Designate Collections made socially relevant.
6. Strengthen NARS for conservation and utilization of Neotropical plant genetic resources.
7. Conservation of Designate Collections linked with on-farm conservation efforts and protected areas.

Milestones:

2002 Cassava cryopreservation implemented
Gene transfer used to broaden the genetic base and enhance germplasm of rice, cassava, and the forage grass *Brachiaria*.
Screening with microarray technology initiated.
Marker-assisted selection implemented for rice, beans and *Brachiaria*.
ESTs generated for cassava starch and CBB.
Development of a LIMS
Procedures developed for conservation of wild species and landraces, based on studies of seed biology and physiology.
Safe-duplication and restoration continued.

2003 Efficient transformation system devolved for beans.
Transgenic cassava tested for resistance to stemborer.
Bioreactor technology implemented for cassava and rice.
Markers developed for iron and Zinc in beans
Collaboration with public and private partners strengthened.
Rice Advanced backcross populations characterized.
Protocols for cryoconservation of seeds and tissue germplasm established.
Germplasm collections regenerated.
Safe-duplication and restoration continued.

2004 High throughput screening of germplasm bank and breeding materials implemented, using microarray technology.
Chracterization of Al tolerance in Brachiaria
Marker-assisted selection for ACMV and whitefly resistance initiated.
Transgenic rice resistant to a spectrum of fungal diseases.
Development of insertion mutatgensis population in rice using Ac/DS
Gene flow studies for bean and rice completed
Links with conservation efforts in protected areas and on farm established.
Germplasm collections regenerated.
Initiation of DNA banks for core collections
Safe-duplication and restoration continued

Users: CIAT and NARS partners (public and private) involved in germplasm conservation and crop genetic improvement and agrobiodiversity conservation; AROs from DCs and LDCs, using CIAT technologies.

Collaborators: IARCs (IPGRI through the Systemwide Genetic Resources Program, CIP, and IITA through root and tuber crop research, IFPRI through biofortification proposal and CATIE); NARS (CORPOICA, ICA, EMBRAPA, IDEA, INIAA, INIFAP, UCR, INIAs); AROs (Cornell U, Yale U, IRD, CIRAD, U. Clemson, Kansas State University, U. Bath, U. Hannover , Rutgers U. Danforth Center, Ghent U, Gembloux U, Cambia, NCGR); biodiversity institutions (A. von Humboldt, INBIO, SINCHI, Smithsonian); and corporations and private organizations.

CGIAR system linkages: Saving Biodiversity (40%); Enhancement & Breeding (50%); Training (10%).

CIAT project linkages: *Inputs to SB-2:* Germplasm accessions from the gene bank project. Segregating populations from crop productivity projects. Characterized insect and pathogen strains and populations from crop protection projects. GIS services from the Land Use project. *Outputs from SB-2:* Management of designated collection (genebank), genetic and molecular techniques for the gene bank, crop productivity, and Soils (microbial) projects. Identified genes and gene combinations for crop productivity and protection projects. Methods and techniques for propagation and conservation for gene bank and productivity projects. Interspecific hybrids and transgenic stocks for crop productivity and IPM projects.

CIAT SB-2 Project LogFrame (2002-2004)

Project: **Conservation ansd Use of Tropical Genetic Resources**
Project Manager: **Joe Tohme**

Narrative Summary	Measurable Indicators	Means of Verification	Assumptions
Goal To contribute to the sustainable increase of productivity and quality of mandated and other priority crops, and the conservation of agrobiodiversity in tropical countries.	• CIAT scientists and partners using biotechnology information and tools in crop research. • Genetic stocks available to key CIAT partners.	CIAT and NARS publications. Statistics on agriculture and biodiversity.	
Purpose To converse the genetic diversity and ensure that characterized agrobiodiversity, improved crop genetic stocks, and modern molecular and cellular methods and tools are used by CIAT and NARS scientists for improving, using, and conserving crop genetic resources.	• Information on diversity of wild and cultivated species. • Mapped economic genes and gene complexes. • Improved genetic stocks, lines, populations.	Publications, reports, project proposals.	Pro-active participation of CIAT and NARS agricultural scientists and biologists.
Output 1 Genomes characterized: Characterization of genomes of wild and cultivated species of mandated and nonmandated crops and of associated organisms.	• Molecular information on diversity of mandated and nonmandated crops species, and related organisms. • Bioinformatic techniques implemented. • QTLs for yield component in rice, for nutrition traits in bean and cassava for Al tolerance in Brachiaria	Publications, reports, project proposals. Germplasm. Availability of a Lab Information Management System (LIMS)	Availability of up-to-date genomics equipment and operational funding.
Output 2 Genomes modified: genes and gene combinations used to broaden the genetic base of mandated and nonmandated crops.	• Transgenic lines of rice and advances in cassava, beans, *Brachiaria,* and other crops. • Cloned genes and preparation of gene constructs. • Information on new transformation and tissue culture techniques.	Publications, reports, project proposals. Germplasm.	IPR management to access genes and gene promoters. Biosafety regulations in place.
Output 3 Collaboration with public- and private-sector partners enhanced.	• CIAT partners in LDCs using information and genetic stocks. • New partnerships with private sector.	Publications. Training courses and workshops. Project proposals.	Government and industry support national biotech initiatives.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 4 Mandate corps conserved and multiplied as per international standards.	Germination Rates for long stored materials Cost per accession/ year as compared to other genebanks.	Visits to GRU substations and conservation facilities.	Absence of uncontrolled diseases Quarantine glass-house space available in different altitudes.
Output 5 Germplasm available, restored and safely duplicated.	# of germplam requests received and satisfied annually. Users received germplasm and data. Users asked for novel germplasm and data.	Visits to multiplication plots. Reports on requests and delivery. # of core collections multiplied and shipped.	Agreement with CIAT remains.
Output 6 Designate Collections made socially relevant.	Landrace diversity restored back to farmers Farmers use new varities. Breeders use novel genes	Germplasm catalogs Plant variety registration logs. National catalogs	International collecting possible. Quarantine matters cleared
Output 7 Strengthen NARS for conservation and utilization of Neotropical plant genetic resources.	NARS germplasm collections conserved # trainees trained at CIAT. # universities and NARS using training materials	Country questionnaires Courses registries. Distribution/sales of training materials	NARS and networks willing to cooperate.
Output 8 Conservation of Designate Collections linked with on-farm conservation efforts and protected areas.	# case studies and pilot *in-situ* conservation projects.	Projects documentation	Interest of NARS in conservation efforts. Interest of farmers in conservation efforts.

Project SB-3: Tropical Fruits, a Delicious Way to Improve well-being

Project Description

Objective: to provide information and support to partners in the public and private sector for the promotion of production, processing and marketing of tropical fruits by rural communities which leads to increased wealth and improved welfare for present and future generations in the countryside.

Outputs:
The first phase of the project will be to obtain a stable funding base for the initiative. Once this base is established the following outputs will be forthcoming:

1. Interactive web based information system in place for farmers groups, development agencies and entrepreneurs to determine what tropical fruits could be grown successfully in a given locale.
2. Tropical fruit based business opportunities identified for target populations and/ or areas and development of these opportunities.
3. Two projects established in areas in which CIAT has special expertise, to satisfy specific needs of local organisations and add value to CIAT's Tropical Fruit project.
4. Periodic Market intelligence reports developed.

Gains: Farmers, farmers groups, entrepreneurs and development agencies will obtain information on what fruit crops can be grown successfully where based on agro ecological similarities. The rural population will be able to identify new business opportunities by matching crops that can be grown in their area and demand for classes of product. Development agencies will be able to identify income-generating opportunities for particular target populations or regions.

Milestones:

2002 Project preparation and data collection: Two external funding proposals prepared and presented.
2003 Preliminary versions of software to interpret relationships fruit/ climate/soil databases. Pilot testing of climate homologues for identification of promising species linked to a specific target population identified jointly with Agroenterprises, Hillsides or other CIAT projects. First expert workshop on class of product demand.
2004 One hundred fruit crops in database. Database queries used by external organisations to identify business opportunities. Two fruit based agroenterprise projects initiated (jointly with project SN-1)
2005 Three hundred fruit crops in database. Germplasm exchange of ten species facilitated by the project.

Users: Farmers groups, farmers, entrepreneurs, and any development agencies interested in increasing rural incomes in areas where tropical fruits may have a role to play; local research and development organisations; importers/exporters of tropical fruits.

Collaborators: Fruit gatherers and producers, national and international research and development agencies, developed and developing country universities, IPGRI, ICRAF.

CIAT project linkages: This project depends on collaboration with Land Use PE-4 for software development, access to databases and management and pilot testing of the fruit/soil climate queries. All work in the area of identifying business opportunities will be in conjunction with Agroenterprises SN-1. Participatory Research SN-3 will collaborate with studies on particular fruits and test of selected fruits. Hillsides PE-3 will identify sustainable business opportunities and will implement fruit projects.

CIAT SB-3 Project LogFrame (2002-2005)

Project: **Tropical Fruits, a Delicious Way to Improve Well-being**
Project Manager: James H. Cock

Narrative Summary	Measurable Indicators	Means of Verification	*Important Assumptions*
Goal • To promote production, processing and marketing of tropical fruits, in an environmentally sound manner, by rural communities which brings wealth and improved welfare to present and future generations in the countryside	• Increased sales of tropical fruits by rural communities. • Environmental certificates such as ISO[1] 14000 obtained by fruit production chains	• Case studies, agri-business reports and personal testimonies on socio- economic benefits perceived by rural communities. Case studies of production, processing and marketing systems. • Internationally accepted certificates of environmentally sound practices.	
Purpose • To provide information and support to partners in the public and private sector that promote production, processing and marketing of tropical fruits	• "What to grow where" databases and software used by farmers groups, entrepreneurs, and development agencies. • Agri-business opportunities based on matching market demand with potentially growable crops identified for specific target populations (regions). • Exotic fruit species (crops) introductions based on "What to grow where" into commercial production schemes • Specific new technologies commercially used.	• Number of hits on web site • Documentation of satisfied requests for support in developing fruit based agri-business • Documented cases of introduction of exotics • Documented use of new technologies and beneficial effects	• A market for new products • Germplasm available • Active and effective collaboration between local, national and international institutions. • Logistical and administrative support with CIAT.
Outputs 1. Interactive web-based information system in place for farmer groups, development agencies and entrepreneurs to determine what tropical fruits can be grown successfully in a given place. "What to Grow Where"	• Funded projects on "What to Grow Where" • Various climatic homologues identified (2003) • Pan tropical climate databases established (2003) • Database with 300 tropical fruits (2005) • Web based access to databases (2007) • Database with 2000 tropical fruits (2008)	• Documents and deposits in the bank • Demonstrations • Reports • Scientific publications • Hits on Website and follow up surveys	• Donor(s) interest in long term projects with indirect impact • Available resources and effective collaboration with IPGRI and local organisations • Normal germplasm exchange
2. Fruit-based business opportunities identified for target populations and/or areas and development of these opportunities. Rural Agro *enterprises*	• Funded projects on rural business enterprises (2004). • Agreements with partners within and outside CIAT (2004) • Successful • Adaptation and adoption of technology from one region (continent) in another. • Successful new agro- *businesses* established using transferred technology (2005)	• Documents and deposits in the bank. • Visits to agri-businesses, business reports • Case studies • Reports.	• Resources allocated to and collaboration with CIAT project PE-4. • Free exchange of information and technology.
3. Two projects established in areas which CIAT has expertise. Specific fruit crop technologies.	• New technology developed by CIAT under contract to other agencies effectively used by the fruit business.	• Baseline studies and surveys • Reports of local agencies	• Willingness of farmers to introduce new fruits.
4. Periodic market intelligence reports developed	• Expert meetings • Positive feedback on use of information.	• Reports of expert meetings and consultants • Feedback and testimony from users	• Cooperation from other IARCs

[1] The International Organisation for Standardisation issues the ISO 14000 certification to environmentally sound enterprises.

Project SN-1: Rural Agroenterprises Development

Project Description

Objective: To develop methods and tools for use by local practitioners in the participatory design and execution of decentralized rural agro-enterprise development schemes aimed at diversifying and adding value to the production of smallholder farmers.

Outputs:

1. Methods for identifying viable market opportunities that incorporate small-scale farmer selection criteria.
2. Decision-making tools and institutional models for strengthening rural agro-enterprises and complementary support services.
3. Methods and tools for the development of local capacity for selecting and developing postharvest processing and handling technologies.
4. Options for integrating collective action with business organization for establishing sustainable enterprises
5. National personnel trained in the design and execution of agro-enterprise development projects.

Gains: The rural populations in Central America, the Andean Region, E and S Africa and SE Asia gain enhanced capacity to establish small-scale agroprocessing enterprises. Linkages improved between conservation, production, added-value processing, markets, and consumers. Sustainable production practices catalyzed and adopted more widely.

Milestones:

2002 Alliances and projects established in E and S Africa for the validation and adaptation of the methods and tools developed by the project in Latin America.
Field guides and associated training materials for the design of Integrated Agroenterprise Development Projects available
Financial profitability model developed for evaluating production and processing enterprises

2003 Alliances and projects established in Asia for validation and adaptation of the methods and tools developed by the project in Latin America.

2004 Guidelines available for designing institutional support systems for rural agro-industry.

Users: Immediate beneficiaries are the technical personnel of government and non-government organizations in rural development and rural policy makers. Ultimate beneficiaries are the inhabitants of rural areas, including female small farmers, and entrepreneurs, who benefit from training and information on market opportunities, post harvest technologies, enterprise skills and access to better support services.

Collaborators: *Development of methods and technology components:* CIRAD, NRI, PRODAR (Lima), IDRC, CIP, IITA, SEARCA, UPWARD, CARE, CRS. *Execution of pilot projects:* CIPASLA (Colombia), CLODEST (Honduras), and CODESU (Peru), Africare, TIP, Concern Universal. *Training and networking:* PRODAR-IICA (Peru), members of P*h*Action consortium (GTZ, NRI, JIRCAS, ACIAR, CIRAD, FAO, IITA, CIP, IFPRI, IRRI,

CGIAR system linkages: Protecting the Environment (10%); Crop Production Systems (10%); Training (20%); Information (20%); Networks (10%); Organization and Management (30%). Participates in the Global Forum for Postharvest Research (P*h*Action).

CIAT SN-1 Project LogFrame (2002-2004)

Project: **Rural Agroenterprises Development**
Project Manager: **Rupert Best**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To improve the livelihoods of rural populations in Latin America, Africa and Asia by enhancing the capacity of support institutions to promote competitive and environmentally responsible agroenterprises that equitably link small holder farmers to growth markets	% decrease of rural poverty index in selected areas of Africa, Asia, and Latin America.	National statistics of different countries where projects have been implemented.	
Purpose To develop methods and tools for use by local practitioners in the participatory design and execution of decentralized rural agro-enterprise development schemes aimed at diversifying and adding value to the production of smallholder farmers.	By the end of year 2006, the project has complemented its activities in the reference sites by establishing alliances with important partner institutions in Latin America who are widely using the methods, tools, and institutional models developed by the project. These products have been adapted by partners in Asia and Africa are being applied in a selected number of sites on both continents	Reports and project documents of our partner institutions.	Political and institutional support for sustainable rural and agricultural development at the reference sites and targeted countries is maintained. Natural disasters and civil strife do not impede progress toward contributing to the project's goal.
Output 1 Tools, methods, and information for identifying and developing market opportunities, developed as an input for the design of economically viable and sustainable rural agro-enterprises.	• Training materials for market opportunity identification available and being used by partners in LA, Asia and Africa. • A series of market opportunities identification methods and tools are available for use in different situations identified and in the process of being developed in the reference sites and elsewhere through alliances. • Information system on alternative trade available. • Training materials for the design of market plans and strategies for small agro-enterprises available.	Manual published. Annual reports and project proposals. Project home page. Training materials	Collaborating institutions have adequate resources to use the materials and tools developed. Natural disasters or civil strife do not impede progress toward achieving the project's goal.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 2 Tools, methods, and information systems that can be used in the selection and local development and adaptation of appropriate postharvest technologies for small-scale rural agro-enterprises.	• Methods and tools developed for establishing local information systems in support of agroenterprise development. • Series of manuals on methods and techniques for the participatory development of postharvest technology for improving the efficiency of rural agro-industry. • Manuals in preparation on techniques for the participatory development of new rural agro-industrial products and processes.	Project home page. Manuals published. Annual reports and working documents.	
Output 3 Information, options, and recommendations for the design of efficient and effective organizational and business schemes for small-scale rural agro-enterprise and their support services.	• Case studies of small rural agro-enterprises, documenting best practices, key success factors, and lessons learned, completed for Latin America and Asia. • Options for the organization of enterprises, their links in the agrifood chain, and the organization of support services are being tested in the reference sites and with other partner institutions.	Case studies published. Project proposals and annual reports. PhD thesis on agroenterprise clusters (local food systems).	
Output 4 Institutional models and policy options for establishing and strengthening rural agro-enterprises and their support systems within a territorial context.	• 10 or more agro-enterprise projects being executed in the reference sites in Latin America, Asia and Africa. • Manual on the identification and development of integrated R&D rural agro-enterprise projects completed. • Guidelines for the design of local support systems for promoting agro-enterprises at the microregional level.	Project proposals and reports. Published field guides and associated training materials. Guide published.	
Output 5 Alliances consolidated with a range of strategic stakeholders, with whom the project carries out research and training to enhanced the capacity to design and develop successful agro-enterprise projects.	• 200 trained personnel in aspects related to agro-enterprise development in Latin America, Africa and Asia. • Case studies on the adoption and impact of agro-enterprise R&D completed. • Project WWW home page expanded and updated periodically with project outputs. • Strategic alliances with research and development partners for both research and capacity building	Training documents, course evaluations, and annual reports. PhD thesis completed on rural innovation and impact of the project's work in the LA reference sites. Project home page. Letters of Understanding, project contracts, and inter-institutional agreements.	

Project SN-3: Participatory Research

Project Description

Objective: To develop and disseminate participatory research (PR) principles, approaches, analytical tools, indigenous knowledge, and organizational principles that strengthen the capacity of R&D institutions to respond to the demands of stakeholder groups for improved levels of human well-being and agroecosystem health.

Outputs:

1. PR approaches, analytical tools, and indigenous knowledge that lead to the incorporation of farmers and other users' priorities in R&D agendas developed for interested institutions.
2. Organizational strategies and procedures for PR.
3. Professionals and others trained as facilitators of PR.
4. Material and information on PR approaches, analytical tools, indigenous knowledge, and organizational principles developed.
5. Impact of SN-3 activities documented.
6. CIAT projects and other institutions supported and strengthened in conducting PR.
7. Capacity of the SN-3 team strengthened.

Gains:

Users involved at early stages in decisions about innovation development. Methods available for incorporating user preferences. Participatory methods applied on a routine basis in CIAT research. At least three LA universities with the capacity to teach PR methods. At least 1000 trainees and 40 trainers able to apply these methods in the region. Contribution of PR to technology adoption rates measured in restricted areas. Lessons learned, and methodologies and materials disseminated globally, jointly with the Systemwide Programme on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation (SP-PRGA), convened by CIAT, and with the Farmer Participatory Research for the IPM project of the Systemwide Program on Integrated Pest Management (SP-IPM).

Milestones:

2002 Watershed organizational models replicated in at least two countries beyond the three pilot sites. PPB approaches institutionalized in at least three NARS (one in each of Africa, Asia, and LAC) on a national scale. At least 15 CGIAR and NARS IPM project leaders trained in participatory approaches. Pilot organizational model for rural telecenters established at one site. Methods for PR on NRM at the landscape scale applied in at least one site.

2003 Associations of community-based farmer research services formed in at least four countries. Participatory projects for integrated management of AES health established in at least five CGIAR and NARS centers.

2004 CIAL approach validated in Africa. Methods for participatory agroenterprise development systematized and available for users. Seed enterprises established at village level in two African countries.

Users:

This work will benefit poor farmers, processors, traders, and consumers in rural areas, especially in fragile environments. Farmer-researchers will have improved capacity for innovation. *Researchers* will receive more accurate and timely feedback from users about acceptability of production technologies and conservation practices. Researchers and planners *will profit* from methods for conducting adaptive research and implementing policies on natural resource conservation at the micro level.

Collaborators:

NARS, NGOs, universities, SP-PRGA, SP-IPM.

CGIAR system linkages:

Organization and Management (70%); Training (30%); Convenor of SP-PRGA; Coordinator of the FPR-IPM project of SP-IPM.

CIAT project linkages:

Inputs to PE-1, PE-3, PE-4, PE-5, IP-1, IP-2, IP-3, IP-5, SN-1, and BP-1; outputs from PE-3, PE-4, IP-3, BP-1, and SN-1

CIAT SN-3 Participatory Research Project LogFrame (2002-2004)

Project: **Participatory Research**
Project manager: **Carlos A. Quirós (acting)**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To develop and apply knowledge, tools, technologies, skills, and organizational principles that contribute to improving human well-being and AES health.	• Application of participatory methods, analytical tools, and organizational principles by R&D organizations that result in incorporating farmers and other end-users' needs in Integrated agroecosystem management and conservation (IAEM). • Use of project products at additional reference sites in two AES (hillsides and forest margins) of CIAT's mandate in 5 years. • Use of project products by a minimum of three institutions outside LAC at end of year 5. • Improvement in end-users' well-being at the respective reference sites.	Projects, plans, and reports of national public-sector entities, donors, NGOs, and community-based organizations in the three reference sites and mandated AES of CIAT's mandate, which refer to their use of project products.	
Purpose To develop and disseminate PR principles, approaches, analytical tools, indigenous knowledge, and organizational principles that strengthen the capacity of R&D institutions to respond to the demands of stakeholder groups for improved human well-being and AES health.	• Number of R&D organizations applying participatory methods, analytical tools, and organizational principles. • Number of entities in LAC teaching participatory methods. • Number of meetings among stakeholder groups. • Number of participatory projects implemented by R&D institutions.	Impact study. Institutional reports. Publications. Proceedings.	Institutional economic stability. Financing for training activities and publication and dissemination of materials. Institutions willing to prepare and support facilitators and to share information. End-users—above all, farmers willing to participate.
Output 1 PR approaches, analytical tools, and indigenous knowledge that lead to the incorporation of farmers and other users' priorities in R&D agendas developed for interested institutions.	Number of methodological approaches developed or adapted and analytical tools developed for IAEM	Project reports. Publications.	Good coordination and integration among collaborators. Minimal conflicts for meeting demands. Full participation of stakeholder groups. Field staff fulfilling true facilitator roles. Data available from reference sites. Internet system functioning well.
Output 2 Organizational strategies and procedures for PR.	Number of strategies and organizational procedures for PR adopted and adapted.	Project reports. Publications.	

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 3 Professionals and others trained as facilitators of PR.	Number of professionals, technicians, and farmer-researchers trained in PR methodology.	Project reports.	Institutions willing to prepare and support facilitators. Funding available.
Output 4 Material and information on PR approaches, analytical tools, indigenous knowledge, and organizational principles developed.	• Number of visits to Web sites. • Number of requests for materials and information. • Number of materials published.	*Project reports.* Publications.	
Output 5 Impact of SN-3 project activities documented.	Dependent on nature of study, e.g., for CIALs: number of host countries; total no. of initiated, inactive, and mature CIALs; research and self-management capacity; no. and diversity of institutions facilitating CIALs; gender composition; diversity of research themes; no. of beneficiaries, microenterprises formed, community services performed, facilitators and trainers trained, second-order organizations formed, and requests for publications and training materials.	Case studies, M&E reports and databases, impact studies.	Staff have time, suitable methodologies, and funds available.
Output 6 CIAT projects and other institutions supported and strengthened in conducting PR.	• Number of internal projects supported. • Number of external entities strengthened. • Number of participatory projects carried out by internal projects and other institutions.	Project reports. Publications of internal projects and of other institutions.	
Output 7 Capacity of SN-3 team strengthened.	• Number of team meetings. • Number of team-organized seminars and workshops.	Project reports.	

SN-4 Information and Communications in Rural Communities

A CIAT project that links research with development and cyberspace with the town square

Project Description

Objective: To strengthen the decision making capacity of rural communities and R&D organizations by better enabling them to obtain, generate, and share information and knowledge, with the aid of modern information and communications technologies (ICTs).

Outputs:

1. Appropriate models for integrating ICTs into rural community development
2. Local information systems for rural agroenterprise development
3. Local information systems to support agriculture and natural resource management (NRM)
4. Tools for local assessment of risks and opportunities in crop production and NRM
5. A virtual network of community-based groups employing participatory R&D methods, linked with formal R&D organizations
6. Impact assessment and continuous learning

Milestones:

2003 Training tool on community telecenter development, initial version of a local information system for rural agroenterprise development, and preliminary study of telecenter impacts completed in Colombia.

2004 Projects under way in other Latin American countries to develop local information systems in support of agriculture and NRM as well as risk- and opportunity-assessment tools and to build a virtual network of community-based groups using participatory methods, linked with formal R&D organizations

Users: The immediate beneficiaries will be local organizations (particularly farmer groups, NGOs, and schools) that acquire new information management and communications skills. To the extent that new ICTs are linked with conventional media (such as community radio) and informal communications networks, a much broader segment of the rural population--including groups, such as women, who often get less than their share of development benefits--will gain more equitable access to relevant information and knowledge.

Collaborators: The project will seek alliances with other international centers in target subregions--e.g. CONDESAN/CIP in the Andean zone, CATIE in Central America, and ICRAF in eastern Africa. It will also identify developing country universities, research institutes, government programs (such as Compartel in Colombia), and NGOs committed to improving the use of new ICTs in remote rural areas. At the grassroots level, the project will identify numerous local partners for developing project outputs. Finally, the project will build alliances with international organizations that have strong expertise in information and communications for development--e.g., Bellanet, the Association for Progressive Communications (APC), and the International Institute for Communications and Development (IICD).

CIAT project linkages: Provides all Center projects with a new option for increasing research impact and obtaining feedback on their products from rural people. While focusing initially on tropical America, the project will actively pursue opportunities to work in Africa and Asia.

CIAT SN-4 Project LogFrame (2002–2004)

Project: **Information and Communications for Rural Communities**
Project manager: **Nathan Russell**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To help the rural poor build sustainable livelihoods by improving the flow of genuinely relevant information among rural communities and research and development (R&D) organizations.	• Increased numbers of more efficient rural agroenterprises. • Increased numbers of local initiatives aimed at improving natural resource management. • Increased opportunities for off-farm activities that generate income and employment.	• Impact evaluation within a sustainable livelihoods framework, based on household surveys, interviews with key informants, and group techniques in target rural communities.	
Purpose To strengthen the decision making capacity of rural communities and R&D organizations by better enabling them to obtain, generate, and share information and knowledge, with the aid of modern information and communications technologies (ICTs).	• New options for enhancing livelihoods identified by individuals and organizations in rural communities through improved information access. • Stronger planning and problem-solving capacities in rural communities, based on improved electronic communications both among communities and with R&D organizations. • A greater capacity in local organizations to satisfy information demand in rural communities.	• Case studies on the use of information obtained with the aid of ICTs in target rural communities. • Impact evaluation of Web-based information applications developed by local organizations.	• Rural communities can obtain affordable, reliable access to the Internet. • National and local organizations commit themselves to providing rural communities with relevant information services. • Rural communities prove receptive to a new information culture based on the use of modern ICTs. • Systems for continuous monitoring and evaluation adopted by organizations hosting rural community telecenters.
Outputs 1. Appropriate models for integrating ICTs into rural community development 2. Local information systems for rural agroenterprise development 3. Local information systems to support agriculture and natural resource management (NRM) 4. Tools for local assessment of risks and opportunities in crop production and NRM 5. Virtual networks of community-based groups employing participatory R&D methods, linked with formal R&D organizations 6. Impact assessment and continuous learning	• Feasibility studies on achieving connectivity in target rural communities. • Financially and socially sustainable telecenters established by local organizations with the aid of training tools developed by CIAT. • Dynamic, Web-based information systems developed by local organizations receiving training and other support from the Center. • Locally developed Web-based information systems successfully integrated with conventional communications media in rural communities. • Relevant information services developed for farmers that use participatory R&D methods, thus providing a basis for virtual networks of farmer groups.	• Training tools available in print form and on CD-ROM. • Locally developed information systems available on the World Wide Web. • Consultancy reports and project information on the Web and in print form. • Conference papers, journal articles, and technical reports on the performance and impact of community telecenters.	• Public and private telecommunications agencies support initiatives to create affordable, reliable Internet access in remote rural areas. • National and local organizations can generate resources through information services that enable them to sustain these services. • National and local organizations gain credibility in rural communities as reliable providers of useful Web-based information services.

Project SW-1: Ecoregional Program for Tropical Latin America

Project Description

Objective: To enhance the effectiveness of research in tropical America by (1) improving the capacity to define and understand productivity and natural resource problems in agriculture and their relationships with rural poverty; (2) developing, adapting, and implementing suitable solutions to these problems through joint work with different partners at different levels; and (3) extrapolating results within and among AES.

Outputs:

1. Enhanced ability to undertake cross-country and AES analysis and to extrapolate results from reference sites.
2. Methodology for prioritizing and undertaking resource management research at the local (i.e., watershed) level.
3. Local consortia using research results to effectively address development problems at the local level.
4. National and regional consortia exchanging information and extracting lessons from their experience.
5. Improved capacities to self-assess impact and performance.

Gains: Effective impact on rural development achieved by local consortia. Enhanced capacity of regional consortia (CONDESAN network for the high Andes, Alternatives to Slash-and-Burn Agriculture Program in the forest margins, Central American Hillsides and the Savannas Consortium) to address AES problems. Strategic alliances among advanced, international, and national organizations (governmental, NGOs, grassroot) to solve specific problems will make more efficient use of complementary capacities and abilities. New models for partnerships will ensure that priority problems are addressed and experience is systematized and exchanged.

Milestones:

2002 Ecoregional consortia at all levels (local, national, regional) working actively. Extrapolation of activities validated at the ecoregional reference sites in progress.

2003 Decision tools developed for analyzing impacts of technology and policy across different scales. National capacity for AES research and action increased and active in the field in several regions.

2004 Joint ecoregional research and action mainstreamed. Impact assessment refined and mainstreamed.

Users: Researchers in the four consortia will have more complete information in AES research. Policy makers will have more useful tools for prioritizing research. National programs will have new models of partnership between stakeholders. Conservation and development organizations and projects will have access to experiences, lessons, tools, and methods resulting from research.

Collaborators: National organizations from tropical Latin America; international organizations (CATIE, CIAT, CIFOR, CIMMYT, CIP, CIRAD, ICRAF, ICRISAT, IFDC, IFPRI, ILRI, ORSTOM); PROCITROPICOS; and SROs from Germany, the Netherlands, and USA.

CGIAR system linkages: Protecting the Environment (40%), Saving Biodiversity (10%), Crop and Livestock Production Systems (25%), Training (5%), Organization and Management (10%), Improving Policies (10%). Linkages with systemwide programs: Alternatives to Slash-and-Burn Agriculture Program; Soils, Water & Nutrient Management; Livestock Programme; and SP-PRGA.

CIAT project linkages: Will receive input from all CIAT projects at the benchmark sites: forest margins (Pucallpa in Peru), hillsides (Honduras, Nicaragua, Colombia), and savannas (Puerto López in Colombia).

CIAT SW-1 Project LogFrame (2002-2004)

Project: Ecoregional Program for Tropical Latin America
Project Manager: Simon Cook

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Purpose To help CGIAR centers participate actively in rural development processes in different ecoregions of tropical Latin America (TLA).	• CGIAR centers involved actively in at least six local rural sustainable development initiatives (LoRSDI), other than the reference sites. • At least 10 specific CGIAR research outputs being used to solve specific problems of LoRSDIs.	Reports from the organizations active in LoRSDIs. Field verification. CGIAR project research reports.	Availability of funds. Acceptance of the ecoregional approach by CGIAR centers.
Output 1 Partnerships. Local and national organizations operating in rural areas of different ecoregions are supported by CGIAR centers in implementing R&D with an ecoregional approach.	• Local and national individual or consortium partnerships including at least 25 organizations supporting LoRSDIs established in at least six places in TLA. • At least 15 partner organizations supported in planning, assessment, and fund searching in the reference sites. • Ecoregional Network operational and active. • Collaboration with at least three ecoregional consortia. • Partnerships developed for at least three strategic ecoregional issues[a].	Reports from partner organizations. Field verification.	Availability of funds. AES consortia (CONDESAN, Hillsides, PROCI programs) perform the stakeholder consultation function effectively.
Output 2 Exchange. CGIAR centers, rural development organizations, and national and regional networks actively exchange methods, products, and experiences.	• Training materials on ecoregional issues[a] developed, tested, and made • available for use. • At least 50 members of partner organizations trained on ecoregional issues[a]. • Regional experiences on at least four ecoregional issues[a] systematized through practitioner workshops, and emerging lessons available through the Ecoregional Network and publications.	Reports from partner organizations. Training materials. Workshop proceedings. Publications. Ecoregional Network Web site contents.	
Output 3 Research. CGIAR centers, international, national, and local organizations implement joint research activities on ecoregional issues[a].	Joint research on at least five ecoregional issues[a].	Research reports. Papers. Presentations in meetings.	Funding available.
Output 4 International projection. Rural development organizations working in regions other than TLA benefit from the experiences and expertise developed in TLA.	• At least one meeting and three exchanges with non-TLA ecoregional programs. • Participation in at least two non-TLA initiatives on ecoregional issues[a].	Meeting proceedings. Non-TLA partners' reports. Trip reports. Publications.	
Output 5 CIAT activities. CIAT management requirements are fulfilled by the Ecoregional Program.	• Preparation of annual report. • Preparation of annual work plan. • Fulfillment of staff performance evaluation. • Program management. • Participation in other planning, review, and evaluation activities.	Annual report. Annual work plan. Performance evaluation forms. Other documents.	

a. Ecoregional issues = relevant issues for every ecoregion. These issues are identified annually by the Ecoregional Program and added to this list. To prevent dispersion, the number of ecoregional issues will not exceed five. For 1999, the ecoregional issues were:
- Analysis and synthesis of landscape and ecoregional units.
- Project and impact assessment.
- Sustainable use of biological diversity.
- Stakeholder-based approaches to resource management at the watershed (local) scale.
- Upscaling processes.

Project SW-2: Soil, Water & Nutrient Management

Project Description

Objective: To contribute to long-term increases in agricultural productivity, poverty reduction, and to the conservation and enhancement of land and water resources.

Outputs:
1. Economically viable SWNM technologies that are socially acceptable and ecologically sound.
2. Improved methods and diagnostic tools for PR.
3. Indicators to monitor the environmental and economic impact of land use systems.
4. Decision support systems, such as models and GIS, for generating and extrapolating options.
5. Stronger institutional capacity to implement SWNM programs and policies.
6. A framework for partnerships between stakeholder groups.
7. Information on appropriate policies to promote sustainable practices.

Gains: Linkages of research on SWNM at key sites within the CGIAR ecoregional programs. Improved research efficiency through collaboration among NARS, IARCs, and SROs through capacity building. Avoidance of duplication of efforts in SWNM and increased rate of technology development. A core group of resource management scientists. Accelerated scientific progress through sharing of experience, common methods, databases, and models across regions. Strengthened research projects already in place through an integrated approach. Complementation of ongoing research where knowledge gaps exist and provision of new knowledge is required to improve NRM worldwide.

Milestones:
2002 Guidelines available for optimizing soil water use. Water and nutrient fluxes determined in watersheds under different land use management practices. Recommendations available for NRM in areas of high risk of land degradation.
2003 Validation of soil quality indicators. Cadre of local scientists, farmer groups, and extension workers trained to develop local solutions to SWNM constraints in the four consortia.
2004 Independent community-based investigations established by four consortia in benchmark areas. Technologies for soil improvement established in two sites.

Users: Farmers and other land users, NARS, extension workers, NGOs, and community-based groups.

Collaborators: IARCs (TSBF, IBSRAM, IFDC, ICRISAT, ICARDA, IITA, ICRAF, ORSTOM); NARS, universities, and AROs of the four SWNM consortia.

CGIAR system linkages: Saving Biodiversity (5%), Increasing Productivity (35%), Protecting the Environment (35%), Strengthening NARS (15%), Improving Policies (10%).

CIAT project linkages: Confronting soil degradation (PE-2); watershed resource management (PE-3); land use studies (PE-4); smallholder systems (PE-5); and participatory methods (SN-3).

CIAT SW-2 Project LogFrame (2002-2004)

Project: **Systemwide Programs**
Project Manager: **Vacant**

The SWNM program's log frame, presented below, is still being developed, pending contributions from the four research consortia.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To contribute to long-term increases in agricultural productivity, poverty reduction, and to the conservation and enhancement of land and water resources.	• Agricultural production increased in benchmark sites. • Farmers' income increased. • Land degradation halted or decreased.	Agricultural census data. Human welfare statistics.	
Purpose To develop, disseminate, and promote implementation by land users of effective, ecologically sound technologies and systems for sustainable land management and conservation.	• 20% of farmers in restricted areas adopt at least one new SWNM technology per consortium through individual and community-based actions. • Information on SWNM technologies published.	Surveys of land use practices. Lists of publications, web pages. Bulletins and brochures.	Policy environment is favorable for the adoption of improved SWNM technologies. Farmers are reached through NARES and IARCs. NARES have the means to disseminate technologies and information.
Output 1 Technologies and tools for improved soil, water, and nutrient management developed.	At least two new or improved SWNM technologies developed by each of the four research consortia.	Publications in international journals. Manuals and decision support tools. Annual reports.	External funding levels are maintained. Benchmark sites established and maintained with partners.
Output 2 Community-based institutional mechanisms that encourage use of sustainable land management practices developed, tested, and promoted.	Each consortium has established at least one community-based organization in each restricted area or study site.	Annual reports, newsletters, and bulletins.	Community-based groups continue with their own resources. Institutions within each consortium maintain their matching support for the SWNM program.
Output 3 Capacity of stakeholders to plan and implement research programs on sustainable land management enhanced.	• Farmers, NARES personnel, and policy makers trained. • At least four training manuals and guidelines for SWNM produced.	Numbers of training courses, field visits held. Number of personnel trained. Institutional reports.	NARES have means to execute programs.
Output 4 Policies that address equity issues, access to resources, and land tenure developed.	Guidelines and decision support systems developed.	Policy guideline documents. Publications in international journals.	Policy makers are open to dialogue with SWNM program.

Project SW-3: Participatory Research and Gender Analysis

Project Description

Objective: To assess and develop methodologies and organizational innovations for gender-sensitive participatory research (PR), and operationalize their use in plant breeding (PB), and crop management and NRM.

Outputs:
1. Methods for PPB developed.
2. Methods for PR on NRM developed.
3. Gender-sensitive methodologies suitable for pre-adaptive PR developed.
4. Evaluation and functioning of innovations for institutionalizing participatory approaches.
5. Innovative approaches to capacity building functioning.
6. New partnerships among the IARCs, NARS, NGOs, and farmer groups developed.

Gains: Accelerated learning from existing experience and generation of new, widely applicable, methodologies for pre-adaptive PR and GA. The CGIAR and NARS will access a worldwide exchange of expertise on PR and GA among a wide range of institutions. Considerable savings and increased impact from NARS generated by better designed technologies. Indigenous systems of crop development and NRM will be strengthened and integrated in a mutually reinforcing way with formal research. Poor rural women will be important participants in and beneficiaries of research. The development and adoption of diverse germplasm will be greatly accelerated in major food crops.

Duration: Five years.

Milestones:
2002 Guidelines prepared on methods for scaling up NRM options and participatory NRM methods. Ten experiments conducted and evaluated on how resource user and research experimentation fit together. A comparison of costs and benefits in participatory NRM compiled and published as a working paper. Synthesis and case studies on the effectiveness of GA and methods for including different users across technology development in PB and NRM published.

2003 Published guidelines on the costs and benefits of different approaches to involving and targeting differentiated users. Guidelines for PR and GA methods and strategies in NRM published. Three case studies of organizational change for improving the effective participation of different stakeholders completed and synthesized. The costs and benefits of including PB and NRM in GA assessed.

2004 At least three CGIAR centers with partners incorporate PPB into core (mainstream) PB programs. At least two CGIAR centers incorporate participatory methodologies resulting from the program's work into their NRM research.

Users: Poor rural women farmers, poor farmers in general, CGIAR centers, NARIs, NGOs, and rural grassroot organizations.

Collaborators: IARCs, NARS, NGOs, grassroot organizations, universities.

CGIAR system linkages: Enhancement & Breeding (25%); Crop and Livestock Production Systems (25%); Protecting the Environment (30%); Strengthening NARS (100%), that is, Training (40%), Organization and Management (20%).

CIAT project linkages: SB-1, IP-2, IP-3, PE-2, SN-3, and BP-1.

CIAT SW-3 Project LogFrame (2002-2004)

Project: **Participatory Research and Gender Analysis**
Project Manager: **Jacqueline Ashby**

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal To improve the ability of the CGIAR system and collaborating institutions to develop technology that alleviates poverty, improves food security, and protects the environment with equity.	At least 50% of the CGIAR centers have increased their apacity to use PR and GA at the end of 5 years. Impact of PR and GA on technology development processes and research organization has been documented in at least 10 case studies that show appropriate use of PR and GA in that improved benefits for rural poor and women can be projected.	Published results of the SP-PRGA impact studies. Program monitoring and assessment of capacity building in the centers. External review reports.	CGIAR centers and partner institutions are willing to commit staff and budget to PR and GA, to contribute to capacity building, and to collaborate in impact assessment.
Purpose To assess and develop methodologies and organizational innovations for gender-sensitive PR and operationalize their use in PB, crop management, and NRM.	Using PR and GA is integrated into the CGIAR system and partner institutions' core research. Effective methods for PR and GA in technology development and institutional innovation are developed and disseminated; the methods are recognized and understood by relevant senior management and staff; and the methods are being applied appropriately by at least 50% of CGIAR centers supported by Program research and capacity building by the end of 5 years. Center projects collaborating with the Program have gender-sensitive stakeholder/farmer participation in the organization and management of the research process. The Program's planning and evaluation organs are stakeholder-based and include active farmer representation.	Program publications. Center annual reviews, reports, and publications. Program monitoring and assessment of the use of these approaches in the centers and their partners and the results of the small grant programs. External review reports.	Donor commitment to the Program remains steady over the 5 years. Center staff collaborating with the Program can include results in their center's reports and annual reviews. Stakeholders are willing to contribute actively to planning and evaluation of the Program.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Overall Output 1 Methods and organization for PPB developed.			
Specific output 1 Effective participatory methods in PB assessed and developed, with focus on breeding by farmers; plant selection (segregating lines); variety selection (fixed lines).	Methodology guidelines published for all three approaches. Methods in use in at least four cases involving national programs and NGOs (at least one case) for each type of breeding. Publications disseminated on the results of the methods. Workshops held to exchange results.	Program publications, journal and book publications. Program home page. Impact assessment studies. Annual reports and workshop proceedings.	Method development and assessment can be advanced quickly in some "model" crops. Analysis of effectiveness in farmer breeding, plant selection, and variety selection.
Specific output 2 Improved targeting of beneficiary groups to involve in participatory breeding through developing methods for involving direct and indirect stakeholders.	Published guidelines on cost-benefits of different approaches to involving and targeting differentiated users. Synthesized findings on how to involve hidden and indirect stakeholders and how to resolve conflicts among diverse groups. Evidence available that PB products are more user-differentiated. Evidence available that indirect stakeholders, such as extension workers have been involved.	Program publications. PhD dissertations. Impact assessment studies.	CGIAR, NARS, and farmer- researchers are willing to collaborate in studies, using stakeholder/beneficiary differentiation.
Specific output 3 Effective organizational forms for operationalizing participatory breeding identified and developed in the research process.	Ways in which existing breeding programs organize and fund links with farmers reviewed and documented. Reports available on organizational options for participatory breeding along with cost-benefit analyses. Guidelines for decision makers on promising forms of organization. Capacity building through training and consultancies provided.	Program publications. Annual reports and reports on training courses and workshops. Consultancy reports. Interviews with farmers, researchers, and research managers participating in Program workshops, training, and collaborative research projects. Annual reports.	CGIAR, NARS (including NGOs), and farmer-researchers are willing to collaborate in studies of organization.
Specific output 4 User access to products of participatory breeding ensured through identification of effective organizational forms and links to supporting seed services.	Synthesis of case studies on how to strengthen local seed production systems. Published analyses on the role of the formal seed system in PB approaches. At least two channels identified that move PB products rapidly to different users.	Program publications, journal articles, and books. Interviews with farmers participating in Program-sponsored research on PPB.	PPB experience is sufficiently advanced in the 5-year planning period for seed multiplication and distribution issues to be studied.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Overall Output II Methods and organization for participatory NRM research developed.			
Specific output 2 Development and dissemination of improved crop and NRM strategies, incorporating better use of existing and new PR and GA methods.	Workshops conducted with at least six collaborative research projects to incorporate GA and gender-sensitive participatory methods into ongoing activities. Materials accessible on approaches for upscaling participatory NRM in 2000. Up to 10 experiments conducted and evaluated on how farmer and researcher experimentation fit together. Up to three community-based and three researcher-based resource monitoring tools tested and compared, and results ready for dissemination in 2000. Up to four regional trained groups in PR and GA actively supply training in 1999.	Program annual reports, workshop reports. Published guidelines for PR and GA methods and organizational strategies. Working paper on web site. Results disseminated via NRM working group and network. Proceedings and reports are available on Web site.	At least six projects, with 5-6 years experience, exist that are willing to conduct action research. Projects are conducting studies of impact or are willing to do so. Projects are selected that have accomplished some measurable impact.
Specific output 3 Organizational capacity to use PR and GA methods in NRM research improved with a focus on farmers, local institutions, scientists, extension workers, and research and extension institutions.	New options for organizational innovation for participatory approaches to NRM research identified from at least three case studies at different management scales. Up to three case studies of collective resource monitoring. Farmer representation in NRM research decision making increased. Training of trainers and research partners in GA or user analysis conducted for existing and new NRM research partnerships.	Comparative analysis and case studies of organizational options published on the SP-PRGA home page. NRM small grant annual reports. PhD dissertations. Farmer representatives on collaborating projects' stakeholder committees and on the SP-PRGA planning committee. Directory of trainers for training in GA or user and impact analysis in NRM on the SP-PRGA home page.	Cooperating projects are willing to test a range of methods and indicators. Cooperating projects comply with small grant conditions to set up stakeholder committees. Training in PR and GA and impact analysis is of interest to cooperating institutions.
Specific output 4 Development of effective methods for involving gender-differentiated and other direct and indirect stakeholders in NRM.	Working paper is compiled and published on comparison of costs and benefits to technology design, adoption of different levels of participation, inclusion of different types of users across types of NRM, and scales of management. Guides for involving different stakeholder groups in participatory NRM are accessible.	Working paper and PhD dissertations on costs and benefits on the SP-PRGA home page. Published resources on methods for stakeholder participation on the SP-PRGA home page.	Reliable data can be obtained at a meaningful scale for estimating costs and projecting benefits. This compilation of resource materials is seen as necessary by PR and GA networks.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Overall Output III Use of GA is "mainstreamed".			
Specific output 1 Effective methods and capacity for using gender/stakeholder analyses developed.	Guidelines are available from the GWG on special methods for effective stakeholder and/or user participation in PB and NRM technology development oriented at including the illiterate, poor, women, and other disadvantaged people. Approaches to using gender and stakeholder analyses and information on their likely outcomes and costs are integrated into published PBG and NRMG PR guidelines. Program workshops and training support integrate gender and stakeholder analyses. Gender and stakeholder analyses are being applied appropriately to target technology designed for specific kinds of users, particularly, poor rural women, by at least 50% of the centers and/or their partners collaborating in the SP-PRGA small grant programs. Program organization uses appropriate procedures for ensuring representation of gender-differentiated stakeholders at project steering committee and Program Planning Group levels.	GWG guidelines. SP-PRGA home page. PBG and NRMG annual reports and publised guidelines. Annual reports on training events. Small grant annual reports; site visits to collaborating centers; interviews with small grant recipients. Reports of small grant steering committee and Program Planning Group participation.	Projects are interested in implementing innovations as regards gender and/or user analysis and involvement in research steering committees. Projects are willing to monitor costs and share historical data on costs.
Specific output 2 Effects of using gender and/or stakeholder analyses in technology development assessed.	Results of research on effects of differentiating users by gender and other characteristics on adoption of PPB and NRM technologies by different groups are disseminated and being used by centers and/or partners. Results of research on effects of differentiating users by gender and other characteristics on the design of PB or NRM technologies are disseminated and being used by centers and/or partners.	Working papers. PhD dissertations. SP-PRGA home page. Small grant annual reports; site visits.	PB and NRM guidelines are published.

Appendix II

Financial Tables
2002-2004

Table 1. CIAT - Cost Allocation : Financial Requirements by CGIAR Outputs, 2002

(expenditure in $ million)

Center Projects	Germplasm Improvement	Germplasm Collection	Sustainable Production	Policy	Enhancing NARS	PROJECT TOTALS
SB3 Tropical Fruits, a Delicious Way to Improve Well-Being	0.112	0.000	0.223	0.000	0.112	**0.447**
SB2 Conservation and Use of Tropical Genetic Resources	1.923	1.399	0.000	0.000	0.175	**3.497**
IP1 Beans Improvement for the Tropics	3.323	0.000	0.665	0.000	0.443	**4.431**
IP3 Improve Cassava for the Developing World	1.060	0.530	0.318	0.000	0.212	**2.120**
IP4 Improved Rice for Latin America and the Caribbean	1.380	0.460	0.230	0.115	0.115	**2.299**
IP5 Tropical Grasses and Legumes	0.947	1.262	0.631	0.000	0.316	**3.156**
PE1 Integrated Pest and Disease Management	0.000	0.351	1.228	0.000	0.175	**1.754**
PE2 Overcoming Soil Degradation / TSBF Institute	0.625	0.208	2.502	0.000	0.834	**4.169**
PE3 Hillsides Watersheds	0.000	0.101	1.315	0.405	0.202	**2.023**
PE4 Land Use in Latin America	0.142	0.142	0.852	0.284	0.000	**1.421**
GC1 Confronting Global Climate Change	0.000	0.000	0.781	0.000	0.138	**0.919**
SN1 Rural Agroenterprises Development	0.000	0.000	0.303	0.000	0.455	**0.758**
SN4 Information and Communication in Rural Communities	0.000	0.000	0.000	0.000	1.639	**1.639**
SN3 Participatory Research	0.304	0.000	0.608	0.000	0.304	**1.217**
BP1 Impact Assessment	0.000	0.000	0.000	0.514	0.000	**0.514**
SW1 Ecoregional Program for Tropical Latin America	0.000	0.020	0.140	0.020	0.020	**0.200**
SW2 Soil Water & Nutrient Management	0.000	0.000	0.405	0.051	0.051	**0.506**
SW3 Participatory Research and Gender Analysis	0.348	0.000	0.765	0.000	0.278	**1.390**
UNDERTAKING TOTALS	**10.163**	**4.473**	**10.966**	**1.389**	**5.469**	**32.460**

Table 2. CIAT - Cost Allocation: Allocation of resources by CGIAR Outputs and CGIAR Activities, 2002-2004

(expenditure in $ million)

Outputs:	2002 (proposal)	2003 (plan)	2004 (plan)
Germplasm Improvement *(Activity: Germplasm Enhancement & Breeding, plus Networks, as appropriate)*	10.163	10.163	10.163
Germplasm Collection *(Activity: Saving Biodiversity, plus networks, as appropriate)*	4.473	4.473	4.473
Sustainable Production *(Activity: Production Systems Dev & Mgmt, Protecting the Environment and Networks, as appropriate)*	10.966	10.966	10.966
Policy *(Activity: Improving Policies, plus Networks, as appropriate)*	1.389	1.389	1.389
Enhancing NARS *(Activity: Strengthening NARS - the three sub-activities, plus Networks, as appropriate)*	5.469	5.469	5.469
TOTAL	32.460	32.460	32.460

Activities:	2002 (proposal)	2003 (plan)	2004 (plan)
Increasing Productivity	14.464	14.464	14.464
of which:			
Germplasm Enhancement & Breeding	10.163	10.163	10.163
Production Systems Development & Management	4.301	4.301	4.301
Protecting the Environment	6.665	6.665	6.665
Saving Biodiversity	4.473	4.473	4.473
Improving Policies	1.389	1.389	1.389
Strengthening NARS	5.469	5.469	5.469
of which:			
Training and Professional Development	1.433	1.433	1.433
Documentation, Publications, Info. Dissemination	1.434	1.434	1.434
Organization & Management Counselling	0.552	0.552	0.552
Networks	2.050	2.050	2.050
TOTAL	32.460	32.460	32.460

Table 3. CIAT- Cost Allocation: Project & Output Cost Summary, 2002-2004

(in $ million)

	2002 (proposal)	2003 (plan)	2004 (plan)
SB3 Tropical Fruits, a Delicious Way to Improve Well-Being	0.447	0.447	0.447
SB2 Conservation and Use of Tropical Genetic Resources	3.497	3.497	3.497
IP1 Bean Improvement for the Tropics	4.431	4.431	4.431
IP3 Improve Cassava for the Developing World	2.120	2.120	2.120
IP4 Improved Rice for Latin America and the Caribbean	2.299	2.299	2.299
IP5 Tropical Grasses and Legumes	3.156	3.156	3.156
PE1 Integrated Pest and Disease Management	1.754	1.754	1.754
PE2 Overcoming Soil Degradation / TSB Institute	4.169	4.169	4.169
PE3 Hillsides Watersheds	2.023	2.023	2.023
PE4 Land Use in Latin America	1.421	1.421	1.421
GC1 Confronting Global Climate Change	0.919	0.919	0.919
SN1 Rural Agroenterprises Development	0.758	0.758	0.758
SN4 Information and Communication in Rural Communities	1.639	1.639	1.639
SN3 Participatory Research	1.217	1.217	1.217
BP1 Impact Assessment	0.514	0.514	0.514
SW1 Ecoregional Program for Tropical Latin America	0.200	0.200	0.200
SW2 Soil Water and Nutrient Management	0.506	0.506	0.506
SW3 Participatory Research and Gender Analysis	1.390	1.390	1.390
Total	**32.460**	**32.460**	**32.460**

Summary by Undertaking:

	2002 (proposal)	2003 (plan)	2004 (plan)
Increasing Productivity	**14.464**	**14.464**	**14.464**
Protecting the Environment	**6.665**	**6.665**	**6.665**
Saving Biodiversity	**4.473**	**4.473**	**4.473**
Improving Policies	**1.389**	**1.389**	**1.389**
Strengthening NARS	**5.469**	**5.469**	**5.469**
Total:	**32.460**	**32.460**	**32.460**

Summary by Output:

	2002 (proposal)	2003 (plan)	2004 (plan)
Germplasm Improvement	**10.163**	**10.163**	**10.163**
Germplasm Collection	**4.473**	**4.473**	**4.473**
Sustainable Production	**10.966**	**10.966**	**10.966**
Policy	**1.389**	**1.389**	**1.389**
Enhancing NARS	**5.469**	**5.469**	**5.469**
Total:	**32.460**	**32.460**	**32.460**

Table 4. CIAT- Cost Allocation: Allocation of Project Cost to CGIAR Activities, 2002-2004

(in $ million)

Project	Activity	2002 (proposal)	2003 (plan)	2004 (plan)
01. Tropical Fruits, a Delicious Way to Improve Well-Being	Enhancement and Breeding (Fruits)	0.112	0.112	0.112
	Production Systems (Fruits)	0.112	0.112	0.112
	Protecting the Environment	0.112	0.112	0.112
	Strengthening NARS--Training	0.045	0.045	0.045
	Strengthening NARS--Information	0.022	0.022	0.022
	Strengthening NARS--Org & Mgt	0.022	0.022	0.022
	Strengthening NARS--Networks	0.022	0.022	0.022
		0.447	**0.447**	**0.447**
02. Conservation and Use of Tropical Genetic Resources	Enhancement and Breeding (Bean)	0.577	0.577	0.577
	Enhancement and Breeding (Cassava)	0.577	0.577	0.577
	Enhancement and Breeding (Rice)	0.577	0.577	0.577
	Enhancement and Breeding (Livestock)	0.192	0.192	0.192
	Saving Biodiversity	1.399	1.399	1.399
	Strengthening NARS--Training	0.140	0.140	0.140
	Strengthening NARS--Information	0.035	0.035	0.035
		3.497	**3.497**	**3.497**
03. Bean Improvement for the Tropics	Enhancement and Breeding (Bean)	3.323	3.323	3.323
	Production Systems (Bean)	0.443	0.443	0.443
	Protecting the Environment	0.222	0.222	0.222
	Strengthening NARS--Training	0.177	0.177	0.177
	Strengthening NARS--Information	0.044	0.044	0.044
	Strengthening NARS--Networks	0.222	0.222	0.222
		4.431	**4.431**	**4.431**
04. Improve Cassava for the Developing World	Enhancement and Breeding (Cassava)	1.060	1.060	1.060
	Production Systems (Cassava)	0.212	0.212	0.212
	Protecting the Environment	0.106	0.106	0.106
	Saving Biodiversity	0.530	0.530	0.530
	Strengthening NARS--Training	0.072	0.072	0.072
	Strengthening NARS--Networks	0.140	0.140	0.140
		2.120	**2.120**	**2.120**
05. Improved Rice for Latin America and the Caribbean	Enhancement and Breeding (Rice)	1.380	1.380	1.380
	Production Systems (Rice)	0.115	0.115	0.115
	Protecting the Environment	0.115	0.115	0.115
	Saving Biodiversity	0.460	0.460	0.460
	Improving Policies	0.115	0.115	0.115
	Strengthening NARS--Training	0.046	0.046	0.046
	Strengthening NARS--Information	0.023	0.023	0.023
	Strengthening NARS--Networks	0.046	0.046	0.046
		2.299	**2.299**	**2.299**
06. Tropical Forages and Legumes	Enhancement and Breeding (Livestock)	0.947	0.947	0.947
	Production Systems (Livestock)	0.473	0.473	0.473
	Protecting the Environment	0.158	0.158	0.158
	Saving Biodiversity	1.262	1.262	1.262
	Strengthening NARS--Training	0.158	0.158	0.158
	Strengthening NARS--Information	0.032	0.032	0.032
	Strengthening NARS--Networks	0.126	0.126	0.126
		3.156	**3.156**	**3.156**
07. Integrated Pest and Disease Management	Production Systems (Cassava)	0.526	0.526	0.526
	Protecting the Environment	0.702	0.702	0.702
	Saving Biodiversity	0.351	0.351	0.351
	Strengthening NARS--Networks	0.175	0.175	0.175
		1.754	**1.754**	**1.754**
08. Overcoming Soil Degradation / TSBF Institute	Enhancement and Breeding (Beans)	0.125	0.125	0.125
	Enhancement and Breeding (Cassava)	0.156	0.156	0.156
	Enhancement and Breeding (Rices)	0.125	0.125	0.125
	Enhancement and Breeding (Livestock)	0.219	0.219	0.219
	Production Systems (Rice)	0.250	0.250	0.250
	Production Systems (Livestock)	0.584	0.584	0.584
	Protecting the Environment	1.668	1.668	1.668
	Saving Biodiversity	0.208	0.208	0.208
	Strengthening NARS--Networks	0.834	0.834	0.834
		4.169	**4.169**	**4.169**
9. Hillsides Watersheds	Production Systems (Bean)	0.025	0.025	0.025
	Production Systems (Cassava)	0.025	0.025	0.025
	Production Systems (Livestock)	0.051	0.051	0.051
	Protecting the Environment	1.214	1.214	1.214
	Saving Biodiversity	0.101	0.101	0.101
	Improving Policies	0.405	0.405	0.405
	Strengthening NARS--Networks	0.202	0.202	0.202
		2.023	**2.023**	**2.023**
10. Land Use in Latin America	Enhancement and Breeding (Beans)	0.043	0.043	0.043
	Enhancement and Breeding (Cassava)	0.043	0.043	0.043
	Enhancement and Breeding (Rice)	0.028	0.028	0.028
	Enhancement and Breeding (Livestock)	0.028	0.028	0.028
	Protecting the Environment	0.852	0.852	0.852
	Saving Biodiversity	0.142	0.142	0.142
	Improving Policies	0.284	0.284	0.284
		1.421	**1.421**	**1.421**
11. Confronting Global Climate Change	Production Systems (Bean)	0.115	0.115	0.115
	Production Systems (Cassava)	0.115	0.115	0.115
	Production Systems (Livestock)	0.230	0.230	0.230
	Protecting the Environment	0.322	0.322	0.322
	Strengthening NARS--Training	0.046	0.046	0.046
	Strengthening NARS--Information	0.046	0.046	0.046
	Strengthening NARS--Networks	0.046	0.046	0.046
		0.919	**0.919**	**0.919**

12. Rural Agroenterprises Development	Production Systems (Cassava)	0.152	0.152	0.152
	Protecting the Environment	0.152	0.152	0.152
	Strengthening NARS--Training	0.076	0.076	0.076
	Strengthening NARS--Information	0.076	0.076	0.076
	Strengthening NARS--Org & Mgt	0.227	0.227	0.227
	Strengthening NARS--Networks	0.076	0.076	0.076
		0.758	0.758	0.758
13. Information and Communication in Rural Communities	Strengthening NARS--Training	0.492	0.492	0.492
	Strengthening NARS--Information	0.984	0.984	0.984
	Strengthening NARS--Org & Mgt	0.082	0.082	0.082
	Strengthening NARS--Networks	0.082	0.082	0.082
		1.639	1.639	1.639
14. Participatory Research	Enhancement and Breeding (Beans)	0.101	0.101	0.101
	Enhancement and Breeding (Cassava)	0.101	0.101	0.101
	Enhancement and Breeding (Livestock)	0.102	0.102	0.102
	Production Systems (Bean)	0.101	0.101	0.101
	Production Systems (Cassava)	0.101	0.101	0.101
	Production Systems (Livestock)	0.101	0.101	0.101
	Protecting the Environment	0.304	0.304	0.304
	Strengthening NARS--Training	0.061	0.061	0.061
	Strengthening NARS--Information	0.061	0.061	0.061
	Strengthening NARS--Org & Mgt	0.183	0.183	0.183
		1.217	1.217	1.217
15. Impact Assessment	Improving Policies	0.514	0.514	0.514
		0.514	0.514	0.514
16. Ecoregional Program for Tropical Latin America	Production Systems (Bean)	0.017	0.017	0.017
	Production Systems (Cassava)	0.017	0.017	0.017
	Production Systems (Rice)	0.017	0.017	0.017
	Production Systems (Livestock)	0.020	0.020	0.020
	Protecting the Environment	0.070	0.070	0.070
	Saving Biodiversity	0.020	0.020	0.020
	Improving Policies	0.020	0.020	0.020
	Strengthening NARS--Training	0.010	0.010	0.010
	Strengthening NARS--Networks	0.010	0.010	0.010
		0.200	0.200	0.200
17. Soil, Water, and Nutrient Management (SWNM)	Production Systems (Bean)	0.015	0.015	0.015
	Production Systems (Cassava)	0.015	0.015	0.015
	Production Systems (Rice)	0.015	0.015	0.015
	Production Systems (Livestock)	0.106	0.106	0.106
	Protecting the Environment	0.253	0.253	0.253
	Improving Policies	0.051	0.051	0.051
	Strengthening NARS--Networks	0.051	0.051	0.051
		0.506	0.506	0.506
18. Participatory Research and Gender Analysis (PRGA)	Enhancement and Breeding (Beans)	0.087	0.087	0.087
	Enhancement and Breeding (Cassava)	0.087	0.087	0.087
	Enhancement and Breeding (Rice)	0.087	0.087	0.087
	Enhancement and Breeding (Livestock)	0.087	0.087	0.087
	Production Systems (Bean)	0.086	0.086	0.086
	Production Systems (Cassava)	0.086	0.086	0.086
	Production Systems (Rice)	0.089	0.089	0.089
	Production Systems (Livestock)	0.087	0.087	0.087
	Protecting the Environment	0.417	0.417	0.417
	Strengthening NARS--Training	0.111	0.111	0.111
	Strengthening NARS--Information	0.111	0.111	0.111
	Strengthening NARS--Org & Mgt	0.028	0.028	0.028
	Strengthening NARS--Networks	0.028	0.028	0.028
		1.390	1.390	1.390

Summary by Undertaking:

	2002 (proposal)	2003 (plan)	2004 (plan)
Increasing Productivity	14.464	14.464	14.464
Protecting the Environment	6.665	6.665	6.665
Saving Biodiversity	4.473	4.473	4.473
Improving Policies	1.389	1.389	1.389
Strengthening NARS	5.469	5.469	5.469
Total:	32.460	32.460	32.460

Summary by Output:

	2002 (proposal)	2003 (plan)	2004 (plan)
Germplasm Improvement	10.163	10.163	10.163
Germplasm Collection	4.473	4.473	4.473
Sustainable Production	10.966	10.966	10.966
Policy	1.389	1.389	1.389
Enhancing NARS	5.469	5.469	5.469
Total:	32.460	32.460	32.460

Table 5. CIAT-Investment, 2002-2004

Investments by Production Sector, Commodity and Region (in $ million)

PRODUCTION SECTORS & COMMODITIES	2002 (proposal)	2003 (plan)	2004 (plan)
1/ ***Germplasm Enhancement & Breeding***			
Crops	**8.477**	**8.477**	**8.477**
Beans	4.256	4.256	4.256
Cassava	2.024	2.024	2.024
Rice	2.197	2.197	2.197
Fruits	0.112	0.112	0.112
Livestock	1.575	1.575	1.575
Trees			
Fish			
TOTAL	**10.164**	**10.164**	**10.164**
1/ ***Production Systems Dev. & Management***			
Crops	**2.959**	**2.959**	**2.959**
Beans	0.991	0.991	0.991
Cassava	1.469	1.469	1.469
Rice	0.499	0.499	0.499
Fruits	0.112	0.112	0.112
Livestock	1.228	1.228	1.228
Trees			
Fish			
TOTAL	**4.299**	**4.299**	**4.299**
2/ ***Total Research Agenda***			
Crops	**25.666**	**25.666**	**25.666**
Beans	11.776	11.776	11.776
Cassava	7.840	7.840	7.840
Rice	6.051	6.051	6.051
Fruits	0.503	0.503	0.503
Livestock	6.291	6.291	6.291
Trees			
Fish			
TOTAL	**32.460**	**32.460**	**32.460**

REGION	2002 (proposal)	2003 (plan)	2004 (plan)
Sub-Saharan Africa (SSA)	8.437	8.437	8.437
Asia	4.864	4.864	4.864
Latin American and the Caribbean (LAC)	18.734	18.734	18.734
West Asia and North Africa (WANA)	0.425	0.425	0.425
TOTAL	**32.460**	**32.460**	**32.460**

1/ Includes overheads, and must add up to the sum of the individual sectors/commodities from the project portfolio.

2/ Equals the sum of sectors/commmodities in Increasing Productivity, scaled up to total investments for the Research Agenda.

Loading Calculation

Total Research Agenda	2002	2003	2004
Beans	11.776	11.776	11.776
Cassava	7.840	7.840	7.840
Rice	6.051	6.051	6.051
Fruits	0.503	0.503	0.503
Livestock	6.291	6.291	6.291
	32.460	**32.460**	**32.460**

Table 6. CIAT- Expenditures, 2001 - 2004

Object of Expenditure, Capital Investment and Capital Fund Cash Reconciliation (in $ million)

OBJECT OF EXPENDITURE	2001 (actual)	2002 (proposal)	2003 (plan)	2004 (plan)
Personnel	16.095	16.400	16.500	16.600
Supplies and Services	10.725	12.510	12.410	12.310
Operational Travel	2.317	2.400	2.400	2.400
Depreciation	1.228	1.150	1.150	1.150
TOTAL	**30.365**	**32.460**	**32.460**	**32.460**
CAPITAL INVESTMENTS	**2001 (actual)**	**2002 (proposal)**	**2003 (plan)**	**2004 (plan)**
Physical Facilities				
Research	0.00			
sub-total	**0.002**	**0.000**	**0.000**	**0.000**
Infrastructure & Leasehold	**0.000**	**0.100**	**0.100**	**0.100**
Furnishing & Equipment				
Farming	0.045	0.260	0.200	0.150
Laboratory & Scientific	0.081	0.470	0.350	0.300
Office	0.015	0.020	0.020	0.020
Housing	0.000	0.000	0.000	0.000
Auxiliary Units	0.029	0.050	0.050	0.050
Computers	0.371	0.700	0.350	0.300
Vehicles	0.365	0.500	0.500	0.500
Aircraft				
sub-total	**0.906**	**2.000**	**1.470**	**1.320**
TOTAL	**0.908**	**2.100**	**1.570**	**1.420**
CAPITAL FUND CASH RECONCILIATION	**2001 (actual)**	**2002 (proposal)**	**2003 (plan)**	**2004 (plan)**
Balance, January 1	0.787	1.025	0.325	0.155
plus: annual depreciation charge	1.228	1.150	1.150	1.150
plus / minus: disposal gains/(losses)	0.166	0.150	0.150	0.150
plus / minus: other	-0.248	0.100	0.100	0.100
minus: asset acquisition costs	-0.908	-2.100	-1.570	-1.420
equals: Balance, December 31	**1.025**	**0.325**	**0.155**	**0.135**

Table 7. CIAT - Financing: Unrestricted and Restricted Grants and Center Income, 2001-2002

(in $ million)

Member	2001 ($ actual)	2001 (nat. currency)	2002 ($ proposal)	2002 (nat. currency)
Unrestricted Contributions				
AUSTRALIA	0.099	0.200	0.106	0.200
BELGIUM	0.076	0.087	0.079	0.087
CANADA	0.728	1.125	0.710	1.125
DENMARK	0.231	2.000	0.235	2.000
GERMANY	0.140	0.153	0.134	0.153
JAPAN	1.089	142.136	0.799	105.040
MEXICO	0.010	0.010	0.010	0.010
NETHERLANDS	0.080	0.091	0.079	0.091
NORWAY	0.609	5.550	0.631	5.550
SOUTH AFRICA	0.025	0.025	0.025	0.025
SPAIN	0.100	0.100	0.000	0.000
SWEDEN	0.339	3.700	0.352	3.700
SWITZERLAND	0.825	1.350	0.762	1.300
THAILAND	0.014	0.014	0.014	0.014
USA	2.200	2.200	2.200	2.200
WORLD BANK	3.420	3.420	3.174	3.174
subtotal	9.985		9.309	

	2001 ($ actual)		2002 ($ estimated)	
Restricted Contributions				
ADB	0.327		0.554	
AGROPOLIS	0.000		0.047	
ASOCOLFLORES	0.033		0.022	
AUSTRALIA	0.436		0.499	
BELGIUM	0.485		0.314	
BRAZIL	0.130		0.130	
CAF	0.000		0.172	
COLCIENCIAS	0.023		0.028	
CANADA	0.542		0.607	
CEGA	0.078		0.090	
CENIACUA	0.000		0.015	
CENIPALMA	0.011		0.000	
CGIAR	0.050		0.043	
CLAYUCA	0.031		0.050	
COLOMBIA	2.253		2.153	
DAI - DEVELOPMENT ALTERNATIVES INC.	0.000		0.825	
DENMARK	0.137		0.095	
EU	1.656		1.776	
FAO	0.019		0.165	
FIDAR	0.015		0.007	
FLAR	0.540		0.431	
FENAVI	0.036		0.000	
FORD FDN	0.375		0.400	
FRANCE	0.795		0.833	
GERMANY	1.282		1.796	
HUMBOLT INSTITUTE	0.004		0.023	
ICRAF	0.101		0.015	
IDB	0.066		0.000	
IDRC	0.511		0.487	
IFAD	0.014		0.215	
IFPRI	0.179		0.071	
IICA	0.006		0.044	
IITA	0.000		0.062	
ILRI	0.263		0.033	
INFORCAUCA	0.000		0.043	
IPGRI	0.001		0.002	
ITALY	0.173		0.116	
JAPAN	2.060	268.864	2.050	269.575
KELLOGG FDN	0.160		0.405	
K. U. LEUVEN	0.006		0.014	
MOVIMONDO	0.006		0.027	
NETHERLANDS	0.324		0.554	
NEW ZEALAND	0.310		0.200	
NIPPON FDN	0.341		0.397	
NRI	0.013		0.000	
NSCC	0.036		0.083	
OTHERS	0.169		0.100	
POLAR FDN	0.018		0.000	
PAPALOTLA	0.123		0.213	
PERU	0.000		0.065	
PRONATTA	0.098		0.109	
ROCKEFELLER FDN	0.426		1.045	
SPAIN	0.000		0.050	
SWEEDEN	0.000		0.039	
SWITZERLAND	1.551		1.240	
UNEP	0.000		0.542	
UNIVERSISTY OF HOHENHEIM	0.000		0.007	
UNIVERSITY OF CHILE	0.000		0.014	
UNIVERSITY OF UPPSALA	0.022		0.009	
UNITED KINGDOM	1.061		1.228	
USA	0.764		1.408	
USDA	0.126		0.109	
WALLACE FDN	0.027		0.000	
WORLD BANK	0.091		0.000	
YALE UNIVERSITY	0.000		0.025	
subtotal	18.385		22.051	
TOTAL GRANTS	28.370		31.360	

Summary Statement of Activitiy	2001 ($ estimated)	2002 ($ proposal)
Member Grants	28.370	31.360
+ Center Income (other revenues)	2.103	1.100
= Total Revenues	30.473	32.460
Less:		
Total Expenses	30.365	32.460
Surplus (Deficit) of total revenues over total expenses	0.108	0.000

Table 9. CIAT- Staff Composition: Internationally and Nationally Recruited Staf

	2001 (actual)		2002 (proposal)		2003 (plan)		2004 (plan)	
	Hired by:		Hired by:		Hired by:		Hired by:	
	center	other	center	other	center	other	center	other
Internationally-Recruited Staff (IRS)								
Research and Research Support	80	6	86	6	86	6	86	6
of which:								
Post-doctoral Fellows	6		6		6		6	
Associate Professionals	26	6	26	6	26	6	26	6
Training / Communications	3		3		3		3	
of which:								
Post-doctoral Fellows								
Associate Professionals								
Research Management	7		7		7		7	
of which:								
Post-doctoral Fellows								
Associate Professionals	1		1		1		1	
Total IRS	**90**	**6**	**96**	**6**	**96**	**6**	**96**	**6**
Support Staff	**600**		**614**		**614**		**614**	
TOTAL STAFF	**690**	**6**	**710**	**6**	**710**	**6**	**710**	**6**

DEFINITIONS

Internationally-Recruited Staff (IRS)

This category includes staff who carry out highly technical/senior functions, as defined by the center, and they may include personnel hired in the local or regional labor market. Included in this group, but shown separately, are post-doctoral fellows and associate professionals (who may have other titles in different centers), and who often are staff provided by donors as part of a project or other institutional arrangement. Costs for consultants engaged for specific tasks are not personnel expenses and the individuals are not staff; their costs should be calculated in the "supplies and services" category.

Support Staff

This category includes the numerical majority, in many cases, of personnel at a center. These are usually, but not necessarily always, individuals hired in the local labor market. They carry out functions which require less demanding skills than for the IRS category. The support staff category does not include seasonal field labor or other individuals engaged on a purely contract basis, for example when a center contracts with an employment agency to provide security, janitorial, and other services. Such costs should be calculated in the "supplies and services" category.

Table 10a. CIAT-Financial Position: Cash Requirement and Revenue Flow, 2001-2002

(In $'000)

MONTHLY CASH USES AND SOURCES

2001 Note: 1/	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Opening Cash Balance	5.957	8.883	5.350	4.996	3.713	3.725	3.551	2.895	2.541	2.637	2.748	5.238
Receipts												
Grants												
Unrestricted	4.300	0.089	- 1.200	0.100	1.246	0.230	0.040	0.000	0.000	0.275	1.320	1.185
Restricted	2.950	0.559	0.810	0.881	1.230	1.850	1.058	1.800	1.900	1.900	2.900	4.200
Earned Income/Others	0.066	0.319	0.066	0.066	0.066	1.066	0.066	0.066	0.066	0.066	0.600	0.500
Subtotal	**7.316**	**0.967**	**2.076**	**1.047**	**2.542**	**3.146**	**1.164**	**1.866**	**1.966**	**2.241**	**4.820**	**5.885**
Disbursements												
Operations	4.360	2.480	2.400	2.300	2.500	3.200	1.700	2.100	1.750	1.800	2.000	2.500
Capital Acquisition	0.030	0.030	0.030	0.030	0.030	0.120	0.120	0.120	0.120	0.330	0.330	0.285
Others	0.000	1.990	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal	**4.390**	**4.500**	**2.430**	**2.330**	**2.530**	**3.320**	**1.820**	**2.220**	**1.870**	**2.130**	**2.330**	**2.785**
Net monthly movement	2.926	-3.533	-0.354	-1.283	0.012	-0.174	-0.656	-0.354	0.096	0.111	2.490	3.100
Ending Cash Balance	**8.883**	**5.350**	**4.996**	**3.713**	**3.725**	**3.551**	**2.895**	**2.541**	**2.637**	**2.748**	**5.238**	**8.338**

2002 Note: 2/	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Opening Cash Balance	8.338	9.738	7.938	8.138	7.338	7.138	5.788	5.038	4.588	4.338	4.248	6.000
Receipts												
Grants												
Unrestricted	2.700	0.100	1.200	0.100	1.000	0.200	0.000	0.000	0.000	0.260	1.800	2.000
Restricted	2.800	1.600	1.500	1.400	1.600	1.700	1.500	2.000	2.000	2.000	2.000	3.000
Earned Income/Others	0.000	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.602	0.100
Subtotal	**5.500**	**1.800**	**2.800**	**1.600**	**2.700**	**2.000**	**1.600**	**2.100**	**2.100**	**2.360**	**4.402**	**5.100**
Disbursements												
Operations	4.000	2.500	2.500	2.300	2.600	3.200	2.200	2.400	2.200	2.200	2.400	2.800
Capital Acquisition	0.100	0.100	0.100	0.100	0.300	0.150	0.150	0.150	0.150	0.250	0.250	0.300
Others	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal	**4.100**	**3.600**	**2.600**	**2.400**	**2.900**	**3.350**	**2.350**	**2.550**	**2.350**	**2.450**	**2.650**	**3.100**
Net monthly movement	1.400	-1.800	0.200	-0.800	-0.200	-1.350	-0.750	-0.450	-0.250	-0.090	1.752	2.000
Ending Cash Balance	**9.738**	**7.938**	**8.138**	**7.338**	**7.138**	**5.788**	**5.038**	**4.588**	**4.338**	**4.248**	**6.000**	**8.000**

2003 Note: 3/	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Opening Cash Balance	8.000	9.400	8.600	8.800	8.000	7.830	6.480	5.730	5.280	5.030	5.090	6.590
Receipts												
Grants												
Unrestricted	2.700	0.100	1.200	0.100	1.000	0.200	0.000	0.000	0.000	0.260	1.800	2.000
Restricted	2.800	1.600	1.500	1.400	1.600	1.700	1.500	2.000	2.000	2.000	2.000	2.110
Earned Income/Others	0.000	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.200	0.100
Subtotal	**5.500**	**1.800**	**2.800**	**1.600**	**2.700**	**2.000**	**1.600**	**2.100**	**2.100**	**2.360**	**4.000**	**4.210**
Disbursements												
Operations	4.000	2.500	2.500	2.300	2.600	3.200	2.200	2.400	2.200	2.200	2.400	2.800
Capital Acquisition	0.100	0.100	0.100	0.100	0.270	0.150	0.150	0.150	0.150	0.100	0.100	0.100
Others	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal	**4.100**	**2.600**	**2.600**	**2.400**	**2.870**	**3.350**	**2.350**	**2.550**	**2.350**	**2.300**	**2.500**	**2.900**
Net monthly movement	1.400	-0.800	0.200	-0.800	-0.170	-1.350	-0.750	-0.450	-0.250	0.060	1.500	1.310
Ending Cash Balance	**9.400**	**8.600**	**8.800**	**8.000**	**7.830**	**6.480**	**5.730**	**5.280**	**5.030**	**5.090**	**6.590**	**7.900**

Table 10b. CIAT- Financial Position: Currency Structure of Expenditures, 2001-2002

	2001 (actual) note 1/			2002 (estimated) note 2/			2003 (estimated) note 3/		
Currency	Amount	$ value	% share	Amount	$ value	% share	Amount	$ value	% share
US Dollar		15.183	50%		15.581	48%		15.581	48%
Colombian Peso	32,825	14.272	47%	36,615	15.256	47%	36,615	15.256	47%
Others note 4/		0.911	3%		1.623	5%		1.623	5%
TOTAL		30.365	100%		32.460	100%		32.460	100%

Notes:
1/ this part to be completed only in the Research Agenda submission (March).
2/ this part to be completed in both the Agenda & Financing Plan submissions.
3/ this part to be completed only in the Financing Plan submission (September).
4/ All other currencies the sum of which accounts for less than 5% of total expenditure.

Table 11. CIAT- Financial Position: Assets, Liabilities and Net Assets, 2001 - 2004

(in $'000)

Assets	2001 (actual)	2002 (proposal	2003 (plan)	2004 (plan)
Current Assets				
Cash & Cash Equivalents	8,338	7,800	7,900	8,000
Accounts Receivable				
Donors	3,883	3,800	3,600	3,400
Employees	145	130	130	130
Other	1,041	1,000	1,000	1,000
Inventories	263	250	250	250
Prepaid Expenses	170	150	150	150
Investments	1,070	1,150	1,250	1,350
Total Current Assets	**14,910**	**14,280**	**14,280**	**14,280**
Fixed Assets				
Property, Plant, & Equipment	23,180	24,680	25,680	26,680
Less: Accumulated Depreciation	-13,380	-14,180	-14,980	-15,780
Total Fixed Assets - Net	**9,800**	**10,500**	**10,700**	**10,900**
Other assets	**66**	**50**	**50**	**50**
Total Assets	**24,776**	**24,830**	**25,030**	**25,230**
Liabilities and Net Assets				
Current Liabilities				
Bank Indebtedness	0	100	100	100
Accounts Payable				
Donors	4,277	4,234	4,484	4,534
Employees	436	400	400	400
Others	2,111	2,000	1,800	1,800
In-Trust Accounts	1,056	1,000	1,000	1,000
Accruals and Provisions [1/]	494	644	744	844
Total Current Liabilities	**8,374**	**8,378**	**8,528**	**8,678**
Long-Term Liabilities	2,986	3,036	3,086	3,136
Total Liabilities	**11,360**	**11,414**	**11,614**	**11,814**
Net Assets				
Appropriated	251	200	150	100
Unappropriated	13,165	13,216	13,266	13,316
Total Net Assets	**13,416**	**13,416**	**13,416**	**13,416**
Total Liabilities & Net Assets	**24,776**	**24,830**	**25,030**	**25,230**

Appendix III

List of Acronyms and Abbreviations

Acronyms

ADB	Asian Development Bank
AHI	African Highland Initiative
Bean/Cowpea CRSP	Bean/Cowpea Collaborative Research Support Program (*of the* University of Georgia, USA)
BoT	Board of Trustees (*of* CIAT)
CA	Département des Cultures Annuelles (*of* CIRAD)
CARDER	Corporación Autónoma Regional de Risaralda, Colombia
CARE	Cooperative for American Relief Everywhere
CATIE	Centro Agrónomico Tropical de Investigación y Enseñanza, Costa Rica
CBN	Cassava Biotechnology Network
CENIPALMA	Centro de Investigación en Palma de Aceite, Colombia
CIALs	Comités de Investigación Agrícola Local, Colombia
CIFOR	Centre for International Forestry Research, Indonesia
CIMMYT	Centro Internacional para Mejoramiento de Maiz y Trigo, Mexico
CIP	Centro Internacional de la Papa, Peru
CIPASLA	Consorcio Interinstitucional para una Agricultura Sostenible en Laderas, Colombia
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement, France
CLODEST	Comité Local para el Desarrollo Sostenible de la Cuenca del Río Tascalapa, Honduras
CNPMF	Centro Nacional de Pesquisa de Mandioca e Fruticultura Tropical (*of* EMBRAPA)
CODESU	Corporación para el Desarrollo Sostenible de Ucayali, Peru
COLCIENCIAS	Instituto Colombiano para el Desarrollo de la Ciencia y la Tecnología "Francisco José de Caldas", Colombia
CONDESAN	Consorcio para el Desarrollo Sostenible de la Ecorregión Andina, Peru
CORPOICA	Corporación Colombiana de Investigación Agropecuaria
CSIRO	Commonwealth Scientific and Industrial Research Organisation, Australia
CURLA	Centro Universitario Regional del Litoral Atlántico, Honduras
DANIDA	Danish International Development Agency, Denmark
DFID	Department for International Development, UK
DGIS	Directorate-General for International Co-operation, the Netherlands
DICTA	Dirección de Ciencia y Tecnología Agropecuaria, Honduras
DNP	Departamento Nacional de Planeación, Colombia
EAP-Zamorano	Escuela Agrícola Panamericana *at* Zamorano, Honduras
EC	Economic Commission (*of the* European Union)
ECABREN	Eastern and Central Africa Bean Research Network
ECLAC	Economic Commission for Latin America and the Caribbean
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária, Brazil
EPMR	External Program and Management Review (*of* CIAT)
ETH	Eidgenössische Technische Hochschule, Switzerland
FAO	Food and Agriculture Organization of the United Nations
FCRI	Field Crop Research Institute, Thailand
FLAR	Fondo Latinoamericano y del Caribe para Arroz de Riego, *based at* CIAT
FONAIAP	Fondo Nacional de Investigaciones Agropecuarias, Venezuela
GRU	Genetic Resources Unit (*of* CIAT)
GWG	Gender Working Group (*of the* CGIAR Systemwide Programme on Participatory Research and Gender Analysis for...)
IBSRAM	International Board for Soil Research and Management, Thailand
ICA	Instituto Colombiano Agropecuario, Colombia
ICARDA	International Center for Agricultural Research in the Dry Areas, Syria
ICER	Internally Commissioned External Review (*of* CIAT)
ICIPE	International Centre of Insect Physiology and Ecology, Kenya
ICRAF	International Centre for Research in Agroforestry, Kenya
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics, India

IDEAM	Instituto de Hidrología, Meteorología y Estudios Ambientales, Colombia
IDIAP	Instituto de Investigación Agropecuaria de Panamá
IDRC	International Development Research Centre, Canada
IFDC	International Fertilizer Development Center, USA
IFPRI	International Food Policy Research Institute, USA
IGAC	Instituto Geográfico "Agustín Codazzi", Colombia
IGDN	Inter-American Geospatial Data Network
IGER	Institute of Grasslands Environment Research, UK
IIA	Instituto de Investigaciones Agropecuarias, Venezuela
IIASA	International Institute for Applied Systems Analysis, Austria
IICA	Instituto Interamericano de Cooperación para la Agricultura, Costa Rica
IILA	Instituto Italo-Latino Americano, Italy
IITA	International Institute of Tropical Agriculture, Nigeria
ILRI	International Livestock Research Institute, Kenya
INBIO	Instituto Nacional de Biodiversidad, Costa Rica
INIA	Instituto Nacional de Investigación Agraria, Peru (*now* INIAA)
INIAA	Instituto Nacional de Investigación Agraria y Agroindustrial, Peru (*formerly* INIA)
INIAP	Instituto Nacional Autónomo de Investigaciones Agropecuarias, Ecuador (*formerly* Instituto Nacional de Investigaciones Agropecuarias)
INIFAP	Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, Mexico
INIVIT	Instituto de Investigaciones de Viandas Tropicales, Cuba
INTA	Instituto Nacional de Tecnología Agropecuaria, Argentina
IPGRI	International Plant Genetic Resources Institute, Italy
IPRA	Investigación Participativa en Agricultura/*Participatory Research in Agriculture* (CIAT)
IRRI	International Rice Research Institute, the Philippines
IVITA	Instituto Veterinario de Investigaciones Tropicales y de Altura, Peru
IWMI	International Water Management Institute, Sri Lanka (*formerly* International Irrigation Management Institute)
JIRCAS	Japan International Research Center for Agricultural Sciences
LSU	Louisiana State University, USA
MT	Management Team (*of* CIAT)
NARO	National Agricultural Research Organization, Uganda
NRI	Natural Resources Institute, UK
NRMG	Natural Resource Management Group (*of the* CGIAR Systemwide Programme on Participatory Research and Gender Analysis for...)
OFI	Oxford Forestry Institute, UK
ORSTOM	L'Institut Français de Recherche Scientifique pour le Développement en Coopération, France (*now* L'Institut de Recherche pour le Développement)
PABRA	Pan-Africa Bean Research Alliance
PASOLAC	Programa de Agricultura Sostenible de Laderas en Centro América
PBG	Plant Breeding Group (*of the* CGIAR Systemwide Programme on Participatory Research and Gender Analysis for...)
PROCITROPICOS	Programa Cooperativo de Investigación y Transferencia de Tecnología para los Trópicos Suramericanos
PRODAR	Programa para el Desarrollo Agroindustrial Rural, Costa Rica
PROFRIJOL	Programa Cooperativo Regional de Frijol para Centro América, México y el Caribe
PROFRIZA	Proyecto Regional de Frijol para la Zona Andina
RIVM	Rijksinstitut voor Volksgezondheid en Milienhygiene (National Institute of Public Health and Environmental Protection), The Netherlands
SABRN	South Africa Bean Research Network
SDC	Swiss Agency for Development and Cooperation
SINCHI	Instituto Amazónico de Investigaciones Científicas, Colombia

SINGER	The CGIAR System-wide Information Network for Genetic Resources
SP-IPM	Systemwide Program on Integrated Pest Management (*of the* CGIAR)
SP-PRGA	The CGIAR Systemwide Programme on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation
SWNM	The CGIAR Systemwide Program on Soil, Water & Nutrient Management
TAC	Technical Advisory Committee (*of the* CGIAR)
TCA	Tratado de Cooperación Amazónica
TSBF	Tropical Soil Biology and Fertility Programme, Kenya
UNEP	United Nations Environment Programme
UNIVALLE	Universidad del Valle, Colombia
USDA	United States Department of Agriculture
WARDA	West Africa Rice Development Association, Cote d'Ivoire
WRI	World Resources Institute, USA
WWW	World Wide Web

Abbreviations

ACMV	African cassava mosaic virus
AES	Agroecosystem
Al	Aluminum
ARIs	Advanced research institutes
AROs	Advanced research organizations
C	Carbon
CBB	Common bacterial blight of bean; Cassava bacterial blight
CD-ROM	Compact disk—read-only memory
CLOs	Comités locales
DCs	Developed countries
DS	Decision support
ESTs	Expressed sequence tags (biotechnology)
FM	Forest margins
FPR	Farmer participatory research
FTE	Full-time equivalent
GA	Gender analysis
GIS	Geographic information systems
GOs	Governmental organizations
HS	Hillsides
IARCs	International agricultural research centers (the CGIAR system)
INIAs	Instituciones nacionales de investigación agropecuaria
IPM	Integrated pest management
IPR	Intellectual property rights
LA	Latin America (n)
LAC	Latin America and the Caribbean
LDCs	Less-developed countries
LoRSDIs	Local rural sustainable development initiatives
M&E	Monitoring and evaluation
MTA	Material transfer agreement (used in germplasm exchange)
MTP	Medium-Term Plan (CIAT)

N	Nitrogen
NARES	National agricultural research and extension systems
NARIs	National agricultural research institutes
NARS	National agricultural research systems
NGOs	Nongovernmental organizations
NRM	Natural resource management
P	Phosphorus
PB	Plant breeding
PPB	Participatory plant breeding
PR	Participatory research
R&D	Research and development
RHBV	Rice "hoja blanca" virus
SP	Systemwide program (*of the* CGIAR)
SROs	Specialized research organizations
SS	Senior staff (*of* CIAT)
TLA	Tropical Latin America