POSITIONING THE CENTER TO DEAL WITH A CHANGING ENVIRONMENT (1994-1998)

CIAT's ACTION PLAN

Supplement B: **CIAT Areas of Compentence**

Scientific Reource Groups
Institutional Affairs

An Internal Document Prepared
by CIAT Management

April, 1994

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SUPPLEMENT B

CIAT's AREAS OF COMPETENCE

Scientific Resource Groups

To deliver research outputs effectively through its current program/project structure, CIAT requires a critical mass of scientific, sociological, and technical talent. These disciplinary-based talents are also essential to the future development of the Center's research on commodities and agroecologies.

Because of continuing budget constraints, now and in the future, it will not be possible for each project area to have an adequate internal critical mass. In addition, CIAT must have the capacity to develop strategic research capacity, which not only cuts across the Center's programs and projects but also strengthens and distinguishes our ability to contribute to joint intiatives with our national partners and other CG centers.

The scientific resource groups (SRGs) have been established to encourage innovation within the various disciplines that contribute to CIAT's mission. Each SRG will also be anchored to a particular research unit. The five groups, their overall objectives, and the associated research units are:

1. ***Genetic Diversity***

   Collect, conserve, analyze, evaluate, and distribute genetic diversity within and among selected species to support germplasm development and help other institutions in Latin America characterize, conserve, and monitor a wide range of plant genetic diversity.

   Associated unit: Genetic Resources Unit

2. ***Germplasm Development***

   Identify sources of useful genetic variability, assemble and recombine this variability into pools and complexes for variety development (using both conventional and biotechnology approaches), devise efficient selection techniques for rapid enrichment with desirable genes, and promote networks for disseminating improved germplasm.

   Associated unit: Biotechnology Research Unit

3. ***Disease and Pest Management***

   Provide tools for detecting and monitoring pests and pathogens, gene complexes that can provide durable resistance, biological control agents, and new knowledge about resistance mechanisms and the dynamic relationships between pests, diseases, natural enemies, and their plant hosts.

   Associated unit: Virology Research Unit

4. ***Production Systems and Soil Management***

   Develop sustainable systems that combine plant species in such a way as to increase productivity, maintain adequate soil cover, cycle nutrients efficiently, and increase soil organic matter.

   Associated unit: Soils Research Unit

5. ***Land Management***

   Analyze current patterns of land use and develop tools for designing sustainable land management strategies, with a strong emphasis on community action and government policy.

   Associated unit: Geographic Information Systems

Because they are new, the SRGs will need to evolve in response to needs and challenges. It is also possible that new SRGs may be developed as a result of increased disciplinary demands (e.g., in economics and sociology).

Each of our principal and senior staff will be a member of a specific SRG. A few staff may belong to more than one SRG. Staff assignments are currently being made in consultation with SRG and program leaders.

Institutional Affairs

To deploy its research capacity effectively, CIAT performs a range of essential support functions referred to as institutional affairs. These are divided into four groups:

1. ***Research and development linkages***: Strengthens our ties with others through global information systems, library and documentation services, and collaboration with national systems and international centers in training and technical advice.

2. ***Institutional sustainability***: Mobilizes additional financial resources, diversifying the funding base, through targeted communication and public awareness.

3. ***Operations management***: Administers financial, physical, and human resources and manages legal matters and government relations.

4. ***Center management***: Includes functions and resources provided by the offices of the director general and deputy and associate directors.

Genetic Diversity

In genetic resources research we have considerable capacity for analysis of intraspecific genetic variability and of diversity between species and for *ex situ* conservation of selected species.

This means that we collect, conserve in safe storage facilities, characterize and evaluate (using both conventional approaches and DNA-based marker analysis), and distribute genetic resources freely. To meet phytosanitary standards for the international movement of germplasm under our trusteeship, we ensure the health of seed and other planting material. In performing these activities, CIAT concentrates on the following:

- Food crops and their relatives—*Manihot and Phaseolus*
- Forage legumes—*Arachis, Calopogonium, Centrosema, Chamaecrista, Desmodium, Pueria, and Stylosanthes*
- Grasses—*Andropogon, Brachiaria, Panicum, Paspalum, and Urochloa.*
- Soil biota—Rhizobium and mycorrhizae.

In the past we employed our capacity in this area primarily to support germplasm development. In view of widespread concern about diminishing species diversity, we have begun to broaden our horizon at all levels of biodiversity for those species under CIAT's responsibility. This includes the analysis of genetic diversity within species, diversity among related species, and biodiversity in relation to edaphic and ecological variation.

For example, the Center can support *in situ* conservation by employing molecular techniques in the study of the population dynamics of relevant species and genera in their natural settings within their center of origin. Similarly, we are applying molecular genetics to help develop strategies to establish core collections.

The methods and knowledge we will develop and apply for CIAT crops will be broadly applicable. We plan to provide training opportunities and research facilities for other institutions in Latin America and elswhere to characterize, conserve, and monitor a much wider range of plant biodiversity in keeping with the Biodiversity Convention, which emerged from the Earth Summit.

Expertise Needed

Core competence	Complementary competence	Project area
Genetics		Genetic resource management
Genetics		Diversity - Phaseolus
Genetics		Diversity - Manihot
Genetics		Diversity - tropical forages
Biotechnology		Diversity conservation
	Biotechnology	Cassava biotech network
	Molecular biology	Diversity - cassava
Molecular genetics		Diversity - beans/rice
	Molecular biology	Diversity - beans
Agronomy		Diversity - use of trop. forages

Competence Descriptors

***Genetics*:**

- Acquisition, collection, and exchange of plant genetic resources of mandated crop species and their wild relatives.
- Genetic systems of sexually and asexually reproducing species.
- Description of diversity at the morphological and genetic levels.
- Conservation strategies to maximize genetic diversity in core collections.

***Biotechnology*:**

- In vitro methods of genetic conservation.
- Wide hybridization for alien gene transfer.
- Transformation techniques to introduce foreign genes.
- Diagnostics and protocols to ensure dissemination of clean planting material.

***Molecular biology*:**

- DNA isolation, characterization, and sequence analysis.
- Recombinant DNA technology.
- Molecular probes and markers to analyze DNA sequence variation and develop molecular maps.

***Agronomy*:**

- Procedures for the evaluation of diversity in tropical legumes and grasses for use in agro/silvo/pastoral systems.

Training

- Training and workshops on conservation, description, handling, and dissemination of genetic resources.
- Molecular technologies to analyze species diversity for designing conservation strategies.

Germplasm Development

CIAT applies its strong capacity for genetic improvement of plants strictly to its mandate commodities. In this research we have traditionally concentrated on improving the adaptation of higher yielding germplasm to a broad range of environments, particularly in Latin America, Africa, and Asia. This is a four-stage process.

First, we identify sources of genetic variability to overcome constraints on production imposed by plant pests and diseases and by abiotic stresses, to enhance yield, to improve nutritional or processing quality, and to sustain crop productivity.

Then we assemble and recombine useful genetic variability into gene pools and complexes for variety development. This includes conventional crossing and recombination, novel wide hybridization for interspecific and intergeneric gene transfer, and molecular technology for introduction of defined alien genes and associated regulatory sequences.

The third major component is development of efficient selection strategies for rapid accumulation of desirable genes and gene complexes into adapted genotypes and populations. Conventional selection techniques are now being complemented by biochemical and molecular marker-based selection technologies to speed up the process of selection.

Finally, we foster and promote appropriate networks for effective dissemination of improved germplasm to national plant breeding and variety development programs.

Increasingly, we are taking into account the effects of our mandated crops and their management on the resource base. In so doing our aim is to improve, or at least maintain, production within the context of sustainable agricultural development. This objective will be supported by research aimed at identifying gene complexes associated with efficient use of soil nutrients, water, solar radiation, and which improve soil quality and are compatible with integrated cropping systems in keeping with our agroecological approach to resource management and sustainability.

In addition, we will employ our capacity in plant genetics and improvement to modify the quality traits of the mandated commodities to improve nutritional value and to enable others in developing countries to readily add value through postharvest processing and product development.

Across this whole range of activities, we will extend our pioneering efforts to employ molecular biology to make conventional germplasm development more efficient and diverse.

Expertise Needed

Core competence	Complementary competence	Project area
Genetics/Breeding		Beans - Andean
Genetics/Breeding		Beans - Mesoamerica
Breeding		Beans - East SSA
	Breeding/Agronomy	Beans - South SSA
	Breeding/Agronomy	Beans - Central SSA
Breeding		Cassava
Breeding		Cassava - Asia
Breeding/Agronomy		Cassava - SSA
Breeding		Tropical forages
Breeding	Rice - Upland	
Breeding	Rice - Lowland	
	Breeding	Rice - Upland/lowland
	Biochemistry	Various crops
	Biotechnology	Cassava
	Biotechnology	Rice
	Biotechnology	Beans
Agronomy (GxE)		Tropical forages
Agronomy (GxE)		Beans - LA
	Agronomy	Beans - LA
	Agronomy	Tropical forages - Asia
Physiology (plant)		Cassava - LA
Physiology (crop)		Rice
	Physiology (roots)	Rice
Physiology		Beans
Product processing		Cassava
	Product processing	Cassava
	Product processing	Cassava
	Product processing	Cassava
Economics		Cassava
Biometry		Various crops

Competence Descriptors

Genetics:

- Inheritance of agronomically useful traits at the monogenic and polygenic levels.
- Protocols to maximize phenoypic expression of useful genetic variability.
- Mating systems, reproductive biology, and polyploidy.
- Application of biochemical and molecular technologies to identify and isolate useful genetic variability.

Breeding:

- Identification and assembly of genes and gene complexes carrying useful genetic variability.
- Novel hybridization and recombination protocols.
- Selection design, protocols, and their implementation.
- Statistically robust evaluation of breeding material at differing stages of development.

Biochemistry/physiology

- Physiological basis of stress response.
- Biochemical basis of gene action for defined useful traits.
- Development of biochemical selection protocols.

Biotechnology:

- DNA markers and molecular maps for gene identification.
- DNA-based protocols for rapid and efficient selection and to pyramid gene complexes.
- Tissue culture and micropropagation.
- Embryo culture to rescue interspecific hybrids.
- Development of genetic transformation protocols.

Agronomy:

- Field evaluation and validation trials with NARS of gene pools and advanced breeding material.
- Genotype x environment interaction in major target areas.
- Adaptation of forages to various farming systems.
- Determination of factors influencing relations among plants and changes associated with soil and crop/pasture management.

Product processing:

- Postharvest intermediate stage processing of crops.
- Prototype development of low-cost conventional and novel products.
- Identification of genetically controlled postharvest quality traits.

Economics:

- Economic assessment and impact of changes in varieties, production, and postharvest processing.

Networks:

- Foster and promote germplasm exchange, research coordination, training and information transfer in Latin America, Africa, and Asia for mandated crops.
- Assist national programs in matching gene pools with farming systems to increase sustainable productivity.
- Integrate with resource management research to achieve sustainable productivity in agroecologies where CIAT works.

Disease and Pest Management

This area of competence in CIAT has expanded beyond its original role of supporting plant improvement. The key features of this area are to generate:

- Simple and inexpensive high-tech diagnostic tools that research institutions in developing countries can employ to detect and monitor the presence of causal agents of major biotic stress.
- Gene complexes which provide durable resistance, pyramided by molecular biology techniques.
- Biological control agents, which can serve as alternatives to the use of hazardous chemicals.
- New knowledge about the evolutionary dynamics of relations between pests, diseases, their natural enemies, and their plant hosts.
- New knowledge about mechanisms that govern the reaction of host plants to pests and pathogens.

In this area of competence, we are able to supply basic information in support of biopesticide development. However, other organizations will have to generate marketable products, possibly as a result of research collaboration with CIAT.

Overall, this expertise provides a strong foundation for collaboration with other institutions to find more effective methods to manage and control the impact of pests, diseases, and weeds, particularly IPM. IPM contributes to increased production, maintenance of biodiversity, and conservation of the natural resource base, while minimizing human health risks associated with chemical pest control.

Expertise Needed

Core competence	-Complementary competence	Project area
Pathology		Rice
Pathology		Cassava
Pathology		Beans
	Pathology	Beans - SSA
Pathology/Molecular biology		Forages
Entomology		Beans/Rice
Entomology		Beans - SSA
Entomology		Cassava
	Entomology/IPM	Cassava - Brazil
Entomology		Rice/forages
Virology		Beans/forages
Virology/Molecular biology		Cassava/rice
Weed science		Various crops

Competence Descriptors

Pathology:

- Identification and assessment of genes for durable disease resistance.
- Epidemiology of pathogen diversity and prediction of virulence change.
- Development of screening protocols for pathogen resistance.
- Development of diagnostics for monitoring disease incidence thresholds.

Virology:

- Virus identification and epidemiology of viral diseases, mode of transmission, and prediction of virulence change.
- Development of screening procedures for host plant resistence and monitoring disease incidence.

- Development and implementation of virus detection methods, including serology and DNA-based techniques.
- Application of molecular biology to develop transgenic virus resistant plants.
- Viral screening methods to produce clean planting material.

Entomology:

- Identification and assessment of host plant resistance.
- Assessment of biotype diversity in insect pests.
- Identification, collection, rearing, and dissemination of natural enemies of pests, diseases, and weeds of mandated crops.

IPM:

- Integrated participatory assessment for problem diagnosis and development of control strategies.
- Integration of adapted varieties resistant to pests and diseases as key components to IPM.
- Development and pilot scale implementation of biocontrol methods and strategies.
- Development of prototype integrated pest control systems, including agronomic practices.
- Development of action thresholds to minimize pesticide use, reduce contamination, and human health problems and encourage natural biological control.
- Monitoring protocols to sustain use and modification of IPM strategies.
- Collaboration and training involving national programs to assemble components and implement strategies for integrated control.

Production Systems and Soil Management

By combining complementary plant species according to sound ecological principles production systems must increase productivity, maintain a soil cover, cycle nutrients efficiently, and increase soil organic matter.

To identify promising technological alternatives, we must have the capacity to evaluate prototype systems in terms of their productivity and effects on the resource base. We also need to understand why some options fulfill the requirements of sound resource management and others do not (and under what conditions). This in turn requires that we have sufficient competence in soil science to examine the processes that contribute to soil degradation (such as erosion and nutrient depletion) and those that improve the soil (such as crop rotation and proper residue management). Mathematical models are powerful tools for elucidating soil-plant dynamics and predicting the effects of alternative systems and production-conservation tradeoffs.

CIAT is committed to working with a wide range of cooperating institutions to gather the necessary data and analyze underlying relationships for:

- Assessing the economic and ecological sustainability of existing production systems.
- Generating alternative prototype systems.
- Anticipating the tradeoffs between crop productivity and soil and water quality under alternative production systems.
- Relating indicators of soil degradation to changes in crop productivity and in the agricultural environment.
- Understanding dynamic soil processes and their effects on soil and water quality.

This competence area should also include the capacity to develop methodologies for participatory design and evaluation of alternative production systems.

Expertise Needed

Core competence	Complementary competence	Project area
***Soil nutrient management*:**		
Soil chemistry		P cycling
Soil chemistry		Analytical lab
Soil physics*		Erosion/compaction
	Soil physics	Erosion
Soil microbiology		N cycling
	Soil biochemistry	Organic matter
	Agronomy	Soil management
	Agronomy	Soil/crop-Cassava Asia
Plant nutrition		Lowland crops
Soil biology*		Soil biota/crop
***Production systems*:**		
Soils/agronomy		Segmental cropping
Soils/agronomy		Fallow systems - HS
Soil/agronomy		Agropastoral - Sav
Agronomy		Crop systems - HSCA
	Agronomy	Native pastures
Physiology (weeds)		Lowland crops
Agronomy		Farm systems-SSA/beans
Agronomy		Farm systems-SSA/beans
Production systems		Crop/livestock
Animal nutrition		Pasture management
Agricultural economics		Farm economics
	Agricultural economics	Farm economics - HSCA
Sociology		Participatory research

* Suggested new positions under review.

Competence Descriptors

***Soil chemistry*:**

- Application of chemical methods for acid soil analysis.
- Analysis of nutrient (P) cycling and use efficiency in prototype crop and pasture systems in acid soils.
- Development of crop and cropping systems models that represent crop growth, phenology, and nutrient cycling.
- Modelling crop and pasture growth and production in agropastoral systems.

***Soil physics*:**

- Analysis of land use systems and soil physical conditions to control erosion and compaction of acid soils.
- Conceptual and mathematical models that simulate soil physical trends under contrasting land uses.

***Soil microbiology*:**

- N cycling in tropical low-fertility soils, where fertilizer inputs are restricted;
- Determination of the efficiency of N fixation, use, and transfer in alternative cropping systems.
- Development of models of N and organic matter cycling.

***Soil biology*:**

- Identification and quantification of soil biota under relevant vegetation covers.
- Study of the dynamics of soil biota under prevailing production systems, estimating their effect on soil quality.

***Soils/agronomy*:**

- Development and evaluation of alternative cropping/pasture systems for the corresponding ecosystems.
- Understanding compatibility in multispecies systems to develop a mechanistic model of soil and plant processes.

Agronomy:

- Analysis of the contribution of selected crops and pastures to performance of alternative prototype farming systems.
- Validation of alternative cropping/production systems compatible with natural resource protection.
- Quantification of soil processes in agropastoral systems.

Animal nutrition:

- Analysis and quantification of forage/animal interactions.
- Identification of nutritional and antinutritional factors in plants grown on acid soils of low fertility.
- Grazing patterns in agropastoral systems.

Physiology/weed ecology:

- Physiological traits to increase yield.
- Physiological approaches to overcome abiotic constraints, particularly in low-fertility, acid soils.
- Development of efficient screening/selection protocols for higher yield and adaptation to environmental stress.
- Effect of weed competition on land degradation in lowland agroecosystems.

Plant nutrition:

- Identification of soil fertility constraints on crop yield.
- Novel selection protocols for efficient nutrient uptake.
- Improved symbiosis with soil microorganisms.
- Nutrient accumulation and nutritional value of crops for human consumption.
- Assessment of gene-controlled quality traits in postharvest processing.

***Agricultural economics*:**

- Assessment of the economic benefits and impact of alternative agricultural technologies at the farm level.
- Evaluation of the impact of external factors, such as prices and other policies, on on-farm land use strategies.

***Sociology*:**

- Development of participatory research methods to evaluate alternative technologies at farm and community levels.
- Analysis of farming systems in the decision making process at the farm and rural community levels.
- Analysis of on-farm testing of alternative production systems.

Land Management

A central feature of CIAT's strategic plan is that it broadens the scope of our research to encompass the management of agricultural land. To gain a sufficient grasp of this complex issue requires analysis of potential impact of existing land use patterns on the environment, identifying main determinants, and suggesting alternatives to foster or change prevailing trends. Alternatives can then be designed by operating simultaneously at the micro level of community action and at the macro level of policy-making, combining the "bottom up" with the "top down" approaches to sustainable agricultural development. Research on these issues requires that we have the capacity to:

- Analyze current trends in economic production and environmental degradation under the prevailing land use patterns.
- Assess the effects on these patterns of existing policies and institutional structures.
- Design alternative patterns and evaluate their potential impact on the private and social benefits/costs.

In addition, we must have the expertise needed to develop the following tools for sustainable land use:

- Institutional mechanisms for community assessment of changes in production systems and in other aspects of the rural landscape.
- Decision-support systems that help rural communities examine alternative production systems.
- Models that rural communities and government policy makers can employ for participatory land-use planning.
- Information systems that help farmers and policy makers design land management strategies that are economically viable, environmentally sound, and socially acceptable.

Expertise Needed

Core competence	Complementary competence	Project area
Agronomy		Land use patterns
Geography		GIS
Systems analysis		Cross-scale linkage
Tropical ecology		Landscape impact
Resource economics		Land use economics
	Anthropology	Farm decision support
	Sociology	Farm socioeconomics
SSA		beans
Ag economics*		Policy/decision making

* Suggested new positions under review.

Competence Descriptors

***Agronomy*:**

- Patterns of land use and their relation to agricultural technology and socioeconomic trends.
- Development of regional and country databases and models, including biophysical and socioeconomic variables.

***Geography*:**

- Development of GIS databases integrating biophysical, economic, and social variables.
- Integration of land use analysis from the watershed to the continental scale.
- Development of effective computer networking.

***Systems analysis*:**

- Modelling and mathematical simulation of agroecological systems at contrasting levels of aggregation.
- Development of watershed, regional, and continental models of land use.

***Tropical ecology*:**

- Assessing the ecological impact of agriculture, other technologies, and policy on land use pattern at the regional and ecosystem levels in the tropics.
- Identification of limitations and opportunities in developing ecologically sound agriculture in the tropics.

***Resource economics*:**

- Economic analysis of land use patterns at the watershed, community, and regional levels.
- Assessment of social costs of resource degradation and social benefits of resource preservation and enhancement.
- Evaluation of the impact of regional, national, and international policies on land use trends and patterns.

- Modelling the impact of contrasting policy and technological scenarios in differing national and international market situations.

Agricultural economics:

- Study the effects of policy instruments on land use patterns and agricultural technologies.
- Appraise the effect of alternative policy scenarios on alnd use patterns.
- Understand the policy making and implementation processes.

Institutional Affairs

To deploy its research capacity effectively, CIAT must perform a series of support functions, which we refer to as institutional affairs. These are divided into four groups: (1) research and development linkages, (2) institutional sustainability, (3) operations management, and (4) Center management.

Research and Development Linkages

Our research activities are linked with the global information system in science and technology through direct access to the world's important data networks. In addition to direct access to the system by the scientists, the link with international information systems is mediated and facilitated through CIAT's library and documentation services. Beyond electronic access to the world's information systems, CIAT also contributes to the body of scientific and technical knowledge through diverse media ranging from print to video.

CIAT's works in a complementary fashion with national, regional, and international institutions, both in the public and private sectors and in the developing and developed worlds. Such collaboration is supported in numerous ways, including the convening of the groups concerned; joint, participatory planning, execution, and evaluation of projects; provision of training and technical advice; and conflict resolution.

CIAT participates in institution building through projects aimed at developing specific capacities and through linking isolated efforts into inter-institutional efforts.

In addition to strengthening and expanding its current institutional linkages, CIAT must set up new ones, particularly with policy makers. This is essential for helping create a policy environment that is conducive to sustainable development. We can contribute to that end by: (a) using research sites as showcases for bringing key issues to the attention of decision makers;

(b) establishing direct contacts between these people and Center staff;

(c) organizing conferences; and (d) informing decision makers through print and audiovisual media.

Institutional Sustainability

CIAT's ability to weather the storm of the 1990s will depend heavily on our success in mobilizing financial resources and in securing the patronage of decision makers and other influential people in the countries we serve. We must have their support to work effectively with national institutions and to maintain our good standing with the international donor community.

CIAT must diversify its financial base by attracting additional funds from the environmental "windows" of traditional donors and by identifying other donors. Since it will take at least a year or two to establish these new relationships, we must act now and allocate sufficient staff time and money if we hope to stabilize the financial base by 1995. Our principal means of accomplishing these ends will be to match projects with donors. In most cases we will seek funds from different donors for different projects or project components. While drawing mainly on CIAT's own expertise for resource mobilization, we must also be prepared to supplement it by hiring consultants.

CIAT's funding strategy must be supported by strong efforts to create a favorable image of the Center in the eyes of donors, their constituencies, other influential people, and the general public. To achieve this effect, CIAT is taking a two-pronged approach, consisting of targetted communication with key individuals and more general dissemination of information through print and electronic media.

Operations Management

In addition to overall administration of physical, financial, and human resources, operations management includes all of the centralized function through which the Center maintains its physical infrastructure and provides support service.

Specifically, operations management refers to (a) financial administration (accounting, treasury, budgeting, and control of fixed assets); (b) administration of human resources (international and national staff, including temporary staff and consultants); (c) development and upkeep of the physical infrastructure (buildings, machinery, and equipment); and (d) central services (e.g., the provision of services required in legal matters, in maintaining the Center's relations with the local and national governments, purchasing and warehousing operations, field operations, motor pool, transportation, and administrative systems development).

Center Management

Center management includes functions and resources used in support of the overall administration of the Center. Included are the Office of the Director General, the Research Directors, Impact Assessment, and Internal Audit.

Expertise Needed

Core competence	Complementary competence	Function
***Research and development linkages*:**		
R&D Linkages (SS)		Coordination of linkages
Library and documentation (SS)		Mediate the linkage between CIAT and global information systems
Training Administration (GAS)		Admissions office & logistics support
	Training	Development of training materials and methods
Technical Publishing (SS)		Development of printed technical publications:
***Institutional sustainability*:**		
Project Design and Funding (SS)*		Maintenance of donor information; project design; and matching of projects with funding sources.
Public Awareness (SS)		Production and dissemination of public information materials in support of funding strategy
***Operations management*:**		
Coordination (SS)		Overall coordination of financial, administrative and CIAT-wide services
Financial Administration (SS)		Administration of accounting, budgeting, and treasury services
Budgeting (GAS)		Development and administration of budgets
Business Administration (SS)		Coordination of central and CIAT-wide services
Project Administration (GAS)*		Coordination of administrative aspects and reporting requirements of special projects

Experimental Field Operations (SS)	Coordination of field operation services
Human Resources Administration (GAS)	Administration and development of support staff
Electronic Information Management (GAS)	Coordination of hardware, software, and netware; and coordination of data base development
Laboratory Analysis (GAS)	Coordination of laboratory and other specialized research services
Biometrics (Assoc. Scientist)	Coordination of biometrics services
Maintenance of Physical	Coordination of preventive Infrastructure (GAS) and corrective maintenance of physical infrastructure of the Center
Materials Acquisition (GAS)	Coordination and supervision of purchasing, warehousing and importation services
Graphic Arts Production (GAS)	Supervision of production of graphic arts and printing services
***Center management*:**	
Director General (SS)	Chief Executive Officer of the Center
Research Direction (2 SS)	Coordination of the implementation of the Center's research strategies; and fund raising
Impact Assessment (SS)	Coordination of ex-ante and ex post impact assessment for priority setting and accountability.
Internal Audit (GAS)	Review and audit of financial processes

* Paid from overhead charges on special projects.