SUMMARY ANNUAL REPORT

2005

PROJECT IP - 1

Bean Improvement for the Tropics

CIAT
Centro Internacional de Agricultura Tropical
International Center for Tropical Agriculture

Table of Contents **Page No.**

1. PROJECT IP-1: BEAN IMPROVEMENT FOR THE TROPICS

PROJECT DESCRIPTION

Objective: To increase bean productivity through enhanced access and utilization of 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 as pesticides, fertilizers, and water.
2. Integration of traditional and advanced (e.g., marker-assisted selection) crop-improvement techniques and farmer participatory research approaches to facilitate rapid adoption of improved bean cultivars.
3. Institutional and organizational capacities of NARS, regional, and community organizations strengthened.
4. Increased access and adoption rates of bean based technologies through NARS, networks and farmers.

Gains: Improved varieties occupy 40% of bean area in Latin America and 15% in African network countries by 2005. Productivity and food security stabilized for poor rural and urban consumers in restricted areas. Pesticide use cut 20% in selected areas, reducing hazards to environment and health. Farmers growing new cultivars increase income from marketing beans by 10%-50%. Public and private researchers have access to beans with multiple-stress resistance and greater nutritional value. Research capacity strengthened through regional networks.

Milestones:

2005 Lines resistant to BCMV, BCMNV, stem maggot , root rots, CBB, anthracnose and angular leaf spot available to partners in Africa. Drought tolerant lines validated with partners. Lines tolerant to low nitrogen and low pH developed. *Pythium* root rot pathogen in Eastern Africa characterized and distribution established. ALS and *Pythium* resistance genes characterized. Progeny from marker-assisted selection for P-efficiency made available to partners.

2006 Nutritional quality traits incorporated into high-yielding, stress-tolerant cultivars. Heat tolerance incorporated into climbing beans. Lines tolerant to low nitrogen, phosphorus and acid soil complex available to partners in Africa. Method to quantify *Pythium* and *Fusarium* root rot pathogens in soil validated. Improved varieties to reach about 3 million people in Africa.

2007 An IPM system for whiteflies on snap beans has been adopted in major bean producing areas of the Andean zone. Gene combinations to manage major bean diseases and insect pests determined and deployed in improved varieties. Climbing beans adopted in at least 10 countries in Africa. Farmers growing new bean varieties realize a 10% increase in income from marketing beans.

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*: ASARECA, SACCAR, AfNet, ECABREN and SABRN (Africa); SIGTTA (Central America). *NARS:* CORPOICA (Colombia), EMBRAPA (Brazil), and more than 30 other NARs in Latin America and Africa. *Germplasm improvement:* NARS and farmers by FPR and PPB. *IPDM:* ICRAF, CIMMYT, IITA, CIP, TSBFI, partners in the systemwide IPM program and African Highland Initiative (AHI). *Training in breeding and IPM:* Bean/Cowpea CRSP and ICIPE. *Diffusing technology:* NGOs, churches, relief and governmental agencies, and entrepreneurs. *International institutions:* CATIE and EAP-Zamorano (Central America), universities and other institutions in Australia, Belgium, Canada, France, Netherlands, Spain, Switzerland, UK, and USA. *Gene tagging*: CRSP and USDA.

CGIAR system linkages: Enhancement & Breeding (75%); Crop Production Systems (10%); Protecting the Environment (5%); Networks (5%); Training (4%); Information (1%).

CIAT project linkages: Germplasm (SB-1 / SB-2); IPM (PE-1), nutrient & water-use efficiency (PE-2), climate change (PE-6), communities & watersheds (PE-3), participatory research (SN-3), impact (BP-1).

CIAT: IP-1 PROJECT LOG FRAME (2005-2007)

PROJECT: **BEAN IMPROVEMENT FOR THE TROPICS**
Project Manager: **STEPHEN BEEBE**

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, and 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 enhanced access and utilization of improved cultivars and management practices in partnership with NARS, regional networks, and farmers.	Improved cultivars and/or ICM used by NARS, and farmers in 40% of Latin America and 15% of African network countries by year 2005. Adopting farmers increase bean income by 10%. Regional networks devolved to local management, with CIAT as a research partner.	Reports of NARS and regional networks. Adoption survey reports. Publications. CIAT reports. End-of-project and evaluation reports.	Core researchers and budgets maintained. Continued donor support to regional networks. Resources in challenge programs accessed. 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 stresses with greater nutritional and market value.	2005 At least 40 breeding lines with BGMV, BCMV and anthracnose resistance plus drought tolerance available. 2005 Twenty lines resistant to stem maggot , or *with* two or more resistances to BCMV, BCNMV, root rots, CBB, anthracnose and/or angular leaf spot available to NARS, farmers and other partners (NGOs and community based organizations) in five countries in Africa (Uganda, Tanzania, Rwanda, DR Congo, and Kenya). 2005 Drought tolerant lines validated with partners in Nicaragua and available to four NARS in Africa (Kenya., Ethiopia, Tanzania, and Rwanda). 2005 Fifteen backcross progeny for enhanced nitrogen fixation delivered to Mexico. 2005 Ten lines tolerant to low nitrogen and low pH developed and made available to NARS in five countries in Africa (Malawi, DR Congo, Rwanda, Tanzania, and Kenya). 2006 High iron and zinc traits incorporated into at least 30 stress-tolerant breeding lines. 2006 Ten lines tolerant to low nitrogen and phosphorus and acid soil complex available to NARS, farmers and other partners in Africa (DRC, Kenya, Tanzania, Rwanda, Madagascar, Malawi, and Sudan). *2007 Approximately* 30 F3-derived F5 families developed with tropical and temperate adaptation, 80% more minerals, abiotic tolerance and 2 resistances	Reports from NARS and regional networks. Annual reports. Publications.	Continued donor support to the African networks, LAC and CIAT. Continued input of (CIAT) breeders, molecular geneticist, and plant nutritionist.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 2 Improved, large-seeded, bean germplasm resistant to major biotic and abiotic stresses with greater nutritional and market value.	2005 Lines resistant to BCMV, BCMNV, stem maggot , root rots, CBB, anthracnose and/or angular leaf spot available to partners in Africa 2005 Fifteen lines resistant to BCMV and CBB available to NARS in Uganda, Tanzania, Rwanda, Sudan, and Kenya. 2005 Five lines resistant to root rots, anthracnose and angular leaf spot available to four NARS in Africa (Kenya, DRC, Uganda and Rwanda) 2005: 15 bush bean lines resistant to BCMV and / or anthracnose and angular leaf spot available to NARS in Bolivia, Colombia, Ecuador and Peru 2006: 15 climbing bean lines with heat tolerance distributed to NARS and network partners in Andean region, East Africa and Southern Africa 2006: low phosphorus tolerance screened for in Andean beans. 2007: High iron and zinc traits incorporated into 15 new large-seeded lines mainly in the red mottled and red seed classes (everyone - please add to this one as you see fit). 2007: 5 popping bean lines with BCMV resistance available to NARS in Bolivia and Peru (this one is optional and is not funded but was in our original milestones)	Reports from NARS and regional networks. Annual reports. Publications.	Continued donor support to African networks, LAC and CIAT. Input of breeder and molecular geneticist.
Output 3 Strategies developed for managing diseases and pests in bean-based cropping systems.	2005 *Pythium* root rot pathogen in Eastern Africa (Kenya, Uganda and Rwanda) characterized and species distribution established. 2005 ALS and *Pythium* resistance genes characterized in 8 sources of ALS resistance and 4 sources of Pythium resistance. 2006 Method to quantify *Pythium* and *Fusarium* root rot pathogens in soil validated. 2007 An IPM system for whiteflies on snap beans has been adopted in major bean producing areas of the Andean zone. 2007 Gene combinations to manage ALS, BCMV and BGYMV determined for varietal improvement.	Reports from NARS and regional networks. Annual reports. Publications.	Continued input of pathologist, entomologist, and virologist. Continued donor support to whitefly IPM project.

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Output 4 Improved cultivars and management practices developed, evaluated and widely disseminated in partnership with NARS, regional networks, NGOs, and farmers.	2005 Improved ISFM practices adopted in 5 countries by 7 % of farmers: composting, integration of inorganic and organic amendments, use of different types of green manures, crop residue management, integration of varieties tolerant to low soil fertility conditions in Kenya, DRC, Uganda, Rwanda and Tanzania. 2006 Improved IPDM practices adopted in 5 countries (Kenya, Malawi, Uganda, Sudan and Tanzania) by 7 % of farmers 2006: Nationally-facilitated strategic alliances established with NGOs interested in sustainable seed production approaches and with seed companies (where these exist) in about 14 countries in Eastern and southern Africa. 2006 Improved varieties or crop management technologies to reach about 3 million people in Africa. 2007 Farmers growing new bean varieties realize a 10% increase in income from marketing beans. – (Uganda, Ethiopia, Rwanda, DRC, Malawi) 2007 *Climbing* beans adopted in at least 10 countries in Africa (Rwanda, Uganda, Tanzania, Kenya, Malawi, Sudan, DRC, Zambia, Burundi, Madagascar, Ethiopia) and in Latin America (Bolivia, Colombia, Ecuador, Peru)	Trials on experiment stations and on farms. National statistics. Publications.	Continued donor support. Active collaboration with all partners involved, including farmers. Adequate support for socio-economic studies
Output 5 Strengthened institutional, organizational and collaborative capacity of NARS and sub-regional networks in Africa and Latin America	2005: National bean seed consultations and partnerships established in Uganda, Rwanda, Malawi, Ethiopia, DRC, Kenya, Tanzania, Mozambique and Zambia to facilitate seed diffusion. 2005: Impact assessment of improved bean varieties backstopped by regional resource persons (from Uganda and Kenya) is completed in Rwanda, Tanzania, Ethiopia and Malawi. 2005: Guidelines and manuals for enhancing capacity and skills of NARS partners in participatory plant breeding, marker assisted selection and participatory monitoring and evaluation developed. 2005 Latin American networks with Central America, Mexico and Brazil revived around theme of biofortification 2006: Participatory monitoring and evaluation of regional bean research program within NARS established in at least 12 PABRA countries. 2006: Participatory plant breeding routinely applied in at least 12 PABRA countries (Kenya, Uganda, Ethiopia, Rwanda, Tanzania, Malawi, Uganda, Mozambique, DRC, Sudan and Zambia)	Reports from NARS, regional networks and PABRA. Annual Reports. PABRA reports,	Continued donor support. NARES scientists remain stable in their position. Partners commit resources to and incorporate innovative approaches

2. CGIAR Output Template

Project: __IP-1_____

Completed by: __Steve Beebe and Bean Team_____ Ext. __3447_____

Based on the project's 2005-2007 MTP, list ALL output targets anticipated to be delivered in 2005.

Output	Output Target 2005[1]	Category	Achieved (yes or no)[2]
Improved, small-seeded, bean germplasm resistant to major biotic and abiotic stresses with greater nutritional and market value.	At least 40 breeding lines with BGMV, BCMV and anthracnose resistance plus drought tolerance available.	Materials	Yes
	Twenty lines resistant to stem maggot , or with two or more resistances to BCMV, BCNMV, root rots, CBB, anthracnose and/or angular leaf spot available to NARS, farmers and other partners (NGOs and community based organizations) in five countries in Africa (Uganda, Tanzania, Rwanda, DR Congo, and Kenya).	Materials	Yes
	Drought tolerant lines validated with partners in Nicaragua and available to four NARS in Africa (Kenya., Ethiopia, Tanzania, and Rwanda).	Materials	Yes
	Fifteen backcross progeny for enhanced nitrogen fixation delivered to Mexico.	Materials	Yes
	Ten lines tolerant to low nitrogen and low pH developed and made available to NARS in five countries in Africa (Malawi, DR Congo, Rwanda, Tanzania, and Kenya).	Materials	Yes
Improved, large-seeded, bean germplasm resistant to major biotic and abiotic stresses with greater nutritional and market value	Lines resistant to BCMV, BCMNV, stem maggot , root rots, CBB, anthracnose and/or angular leaf spot available to partners in Africa.	Materials	Yes
	Fifteen lines resistant to BCMV and CBB available to NARS in Uganda, Tanzania, Rwanda, Sudan, and Kenya	Materials	Yes
	Five lines resistant to root rots, anthracnose and angular leaf spot available to four NARS in Africa (Kenya, DRC, Uganda and Rwanda)	Materials	Yes
	15 bush bean lines resistant to BCMV and / or anthracnose and angular leaf spot available to NARS in Bolivia, Colombia, Ecuador and Peru	Materials	Yes

[1] See page 3 of 2005 instructions for definition of output target.
[2] Provide a brief explanation of any output targets not achieved.

CGIAR Output Template cont'd...

Output	Output Target 2005[1]	Category	Achieved (yes or no)[2]
Strategies developed for managing diseases and pests in bean-based cropping systems	*Pythium* root rot pathogen in Eastern Africa (Kenya, Uganda and Rwanda) characterized and species distribution established.	Other kinds of knowledge	Yes
	ALS and *Pythium* resistance genes characterized in 8 sources of ALS resistance and 4 sources of Pythium resistance.	Other kinds of knowledge	Yes
Improved cultivars and management practices developed, evaluated and widely disseminated in partnership with NARS, regional networks, NGOs, and farmers.	Improved ISFM practices adopted in 5 countries by 7 % of farmers: composting, integration of inorganic and organic amendments, use of different types of green manures, crop residue management, integration of varieties tolerant to low soil fertility conditions in Kenya, DRC, Uganda, Rwanda and Tanzania.	Practices	Yes
Strengthened institutional, organizational and collaborative capacity of NARS and sub-regional networks in Africa and Latin America	National bean seed consultations and partnerships established in Uganda, Rwanda, Malawi, Ethiopia, DRC, Kenya, Tanzania, Mozambique and Zambia to facilitate seed diffusion.	Capacity	Yes
	Impact assessment of improved bean varieties backstopped by regional resource persons (from Uganda and Kenya) is completed in Rwanda, Tanzania, Ethiopia and Malawi.	Other kinds of knowledge	Yes
	Guidelines and manuals for enhancing capacity and skills of NARS partners in participatory plant breeding, marker assisted selection and participatory monitoring and evaluation developed.	Capacity	Yes
	Latin American networks with Central America, Mexico and Brazil revived around theme of biofortification	Capacity	Yes

Categories of output targets to be used are: *Materials*, Policy strategies, Practices, Capacity, and Other kinds of knowledge.

[1] See page 3 of 2005 instructions for definition of output target.
[2] Provide a brief explanation of any output targets not achieved.

3. Research Highlights in 2005

We will highlight four areas of our current research portfolio:

3.1 Breeding for higher mineral content in combination with agronomic traits

Improvement of nutritional quality must go hand in hand with improvement of agronomic characters. Data from 2005 in Mesoamerican bush beans demonstrate an ample advantage over checks in drought tolerance (200% or more yield under very difficult conditions!) while increasing iron concentration by about 20% in several lines. Black beans with higher minerals and drought tolerance were also resistant to angular leaf spot and BGYMV. While increases attained in minerals were real, this was still a relatively modest gain. Thus, in the next cycle of crosses, more care was taken to obtain mineral data on $F_{1:3}$ families across sites before making individual plant selections. Compared to the first cycle selections, this group expressed much better gain in iron and zinc (as much as 50 and 30% respectively), suggesting that the modifications in the selection procedure were effective for recovery of higher minerals. In small seeded heat tolerant climbers, derived from popular African cultivars G2333 and G685 and tested across sites, the range in seed iron content was from 36 ppm to 104 ppm for iron content with averages of 62.6 ppm for Palmira and 55.90 for Darien. These materials will undoubtedly be very popular in mid-to-low altitude production areas in Africa.

3.2 Development of molecular markers for resistance to *Apion godmani*

The bean pod weevil (*Apion godmani*) is a serious pest of bean in Mexico and Central America. Resistance exists in Mexican landraces selected in past years. However, attack will vary from year to year, making breeding for resistance unpredictable. Efforts to identify molecular markers for resistance were initiated as long as ten years ago, but were hindered by small population size, erratic phenotypic data and lack of adequate markers. Continuing efforts to overcome these limitations, in collaboration with the Mexican national program, have resulted in the first reliable markers. A total of nine RAPD bands were significantly associated with resistance were selected for cloning. Fifteen primer sets were designed for the nine RAPD bands and were tested on the population parents and on the bulks. Most of the PCR products were monomorphic as SCARs but a single SCAR (W6800R) showed a polymorphic fragment with clear positive and negative signals in PCR amplification. All monomorphic SCARs were tested with frequently-cutting (4 bp recognition sites) restriction enzymes, revealing CAPs polymorphisms for four of the PCR fragments. The molecular markers were mapped to loci on chromosomes 2, 3, 4 and 6 (linkage groups b01, b08, b07and b11, respectively). In single point regression analysis, individual markers explained from 3.5 to 22.5% of the variance for the resistance trait with the most significant markers mapping to chromosome 2 (b01). Two additional significant markers were mapped to chromosome 6 (b11) and explained from 4.3 to 10.2% of variance depending on the season. There may be additional resistance genes on chromosome 4 (b07) and chromosome 3 (b08). These are among the first specific markers developed for tagging insect resistance in common bean and are expected to facilitate breeding for resistance to *A. godmani*.

3.3 An integrated approach to control of *Pythium* root rot

A participatory rural appraisal was carried out in two major bean producing areas in Uganda. Diseases emerged as the most important constraint to production, with root rots clearly being the most important disease. *Pythium* is the major root rot pathogen but can occur in combination with *Fusarium spp.* or *Rhizoctonia solani.* Bean is grown in an intensive agricultural system together with sorghum, maize, sweet potatoes, Irish potatoes, bananas and peas. A study was carried out to determine the role of other crops in the disease problem. Pythium isolates significantly affected the level of disease on CAL 96, sorghum and peas, suggesting that these two latter crops could play a role in root rot. Therefore in

developing management strategies for root rots, it would be advantageous to consider a systems' approach rather than a commodity approach. The effects of four root rot management options i.e. farmyard manure, green manure (*Crotalaria)*, NPK fertilizer and a fungicide (Ridomil) previously known to have useful effects against bean root rots were evaluated on sorghum, maize, peas and beans. The amendments improved early season crop tolerance, crop survival, root rot severity and dry matter relative to the control. Ridomil apparently gave protection against *Pythium* species. Plant recovery was evident in plots amended with GM, FYM and NPK. The potential of biocontrol was explored. Isolates of *P. ultimum* and of *Mortierella* were screened against each other for their potential use as biocontrol agents. *Mortierella* markedly reduced disease severity when added as antagonist to the pathogenic *Pythium*.

Finally, a backcrossing program to transfer resistance into popular market class types (backgrounds) was initiated in 2004. Twenty backcross populations were generated. Currently $BC_{s5}F_3$GLP2 x RWR 719 with 111 progenies have been given to partners in Kakamega (Kenya) and were also planted in Kawanda for seed multiplication. A molecular marker for a resistance gene was identified at CIAT headquarters.

3.4 Expanding the use and impact of Participatory Plant Breeding

A Participatory Plant Breeding (PPB) Monitoring tour involving 14 NARs scientists from eight countries was conducted in May 2005, and highlighted salient trends and accomplishments of the bean networks in the field of PPB. Over 50% of the plant breeders in the ECABREN and SABRN networks are employing participatory approaches in variety selection and breeding (27 scientists out of a total of 53). In the last three years, the bean networks have made important gains in learning how to get PPB-selected varieties released through the formal system. Releases include: in Ethiopia, two by the Ethiopian Agricultural Research Organization (EARO) in 2003 with 3 in the pipeline; and two in work led by the Southern Agricultural Research Institute (SARI) in 2002 and 2 others recommended for region-specific use. In northern Tanzania, the Selian Agricultural Research Institute (SARI) anticipates multi-release of nine materials in 2006. In Southern Uganda two varieties were identified by the community of Bukoba, working with the National Agricultural Research Organization (NARO). Variety criteria of different users groups (women/men, more market-oriented/home consumption) are well understood across a range of agro-ecological zones and such preference information is feeding back to fine-tune formal breeding programs. While yield and disease resistance remain among the key decision-making criteria, three others stand out across sites: *Early maturity* (linked to both drought escape and to 'filling the hunger gap") is perhaps first priority (above absolute yield) in moisture-stressed regions; *marketability* (for both domestic and export concerns) increasingly proves key, even for the poorest; and *cooking time* (as well as *taste*) have risen in importance as rural farmers move to supply town/urban markets, and as fuelwood becomes harder to access. In summary, the bean networks and ECABREN, in particular, are developing capacity to get farmer evaluations taken seriously as an input and even a determining factor in official release; and to move PPB varieties through formal systems.

4. Problems encountered and their solution

In 2004 we noted that management of CIAT projects is an ever-increasing challenge as core donors, special project donors, the World Bank, Challenge Programs and now the Science Council all seek to implement programs of supervision or control with varying criteria and indicators. A common denominator that many require is partnership that brings transaction costs. The Challenge Programs, while promoting some very positive elements of interaction among centers, and a more active role of national program partners, also demand significant effort in coordination that frankly is not being met. This situation continues as a systemic problem of CIAT (and the CGIAR) and is even exacerbated, as more time must be dedicated to project development.

Previously, internet connectivity was a problem for staff in Africa. This denied out-posted staff access to library or journals and also access to budget information / balances. Lat year Carlos Meneses gave support in improving the connection for Kawanda Station, Uganda, resulting in improved connectivity at and links through a Vsat system for Kawanda based staff. But since this was a shared system, the Kawanda office is in transition to a new server, and is still experiencing problems.

The African team still does not enjoy systematic 2-way communication with other CIAT projects at HQ.

Drought in East and southern Africa has created problems of power cuts. Generator bills to maintain electricity in offices and biotechnology labs are high, and in Arusha, Tanzania power cuts are affecting internet access.

The practice of Full Cost Recovery is now recognized as an inadequate mechanism to cover the deficit which for the last several years has been consciously budgeted into the CIAT core funding. This has created disorder and has made planning ever more difficult. It is hoped that a relatively permanent solution is found to bring stability to CIAT's finances, since the present level of core funding that is foreseen for 2006 is not sustainable with the number of commitments that we have acquired in our efforts to bring special project funding to CIAT. Projects that were developed one or more years ago and that foresaw the hiring of staff, must now dedicate the funds that were budgeted for staffing to FCR. The application of FCR to unplanned expenditures for the purpose of balancing budgets raises serious questions of accountability in case of audit. A stable and common policy on budgeting is essential for year-to-year planning.

Field equipment of Station Operations is sorely overdue for replacement. Fieldwork is frequently delayed by breakdowns of tractors or planters. The decay in the state of our equipment reflects an excess demand for capital funds as CIAT has expanded its research agenda, and more projects seek to establish and maintain an infrastructure that is necessary to carry out research and attract funds. No solution is in sight at this time.

5. Publications List (*includes accepted, in press & submitted*) - see complete list in Annual Report

5.1 Refereed and non-refereed journal articles

- Papers published in English: 15
- Papers accepted in English: 3
- Papers submitted in English: 4
- Papers in press in English: 7
- Papers published in Spanish: 5
- Papers in press in Spanish: 4

5.2 Book chapters and books (all in English)

- Book chapters published: 6
- Book chapters in review 1
- Book chapters in press: 2

5.3 Workshop and conference papers

- Papers in English: 59
- Papers in Spanish: 9
- Papers in French: 1

5.4 Proceedings, posters, abstracts, others

- Proceedings: in English 3
  in French 1
  in Portuguese 1
  in Spanish 1
- Posters: in English 11
  in Spanish 6
- Abstracts: in English 8
- Others: in English 7
  in others 3 (African languages)

5.5 Editorial Contributions

- Reviewed papers for:
  Agronomy Journal
  European Journal of Plant Pathology
  Field Crops Research
  Journal of Phytopathology
  Phytopathology, American Society of Horticultural Science (ASHS)
- Co-Edition of the book 'Whitefly and Whitefly-borne Viruses in the Tropics: Building a Knowledge Base for Global Action. CIAT Publication No. 341, 351 p.

6. List of special projects

6.1 At Headquarters

6.1.1 New proposals approved in 2005

Title	Donor	Funding period	Total value	Amount to Partners (US $)	Available to CIAT (US $)
Improved beans for Africa and Latin America	DFID, UK	2005	US 265,143	-	265,143
Development of Reference Molecular Marker Kits to Analyze Diversity of Germplasm for the Year 1 GCP Crops	CIMMYT-GCP 50% beans 50% cassava	2005	US 12,600	-	12,600
2005 Commissioned Research-GCP Consortium Members - TILLING mutagenesis and drought gene analysis	Generation Challenge Program	2005	US 139,500	-	139,500
Desarrollo de mapas genéticos para el mejoramiento del contenido de micronutrients Fe y Zn en frijoles andinos como alternativa para reducir las deficiencias nutricionales de la población colombiana	FIDAR	2005-2006	US 24,000	-	24,000
Integrated management of whiteflies in the tropics	DFID	2005-2008	US 242,768	92,240	150,528
Reducing pesticide use and pesticide resistance in rice and beans in the Andean zone	FONTAGRO	2006-2009	US 125,000		

6.1.2 List of ongoing special projects in 2005

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available in 2005 (US $)
Integration of bio-fertilization in bean cultivation by optimizing the use of the Rhizobium-bean symbiosis	K.U. Leuven, Belgium	2001-2005	4,002.000 B. francs	28,100	29,295
Andean climbing bean improvement for the Andean Zone	IICA/BID/ FONTAGRO	2002-2005	US 125,000	38,500	-
Bean genomics for improved drought tolerance in Latin America	BMZ, Germany	2003-2006	740,000 Euros	81,120	108,160

Ongoing special projects cont'd ...

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available in 2005 (US $)
Increasing bean and maize agrobiodiversity as an approach for improving production systems, food security and nutrition in Nariño, Colombia	ECOFONDO/ FIDAR, Colombia	2003-2006	US 8,823	-	2,941
Biofortified Crops for Improved Human Nutrition – Harvest Plus Challenge Program	World Bank DANIDA, Denmark Gates Foundation	2003-2008	US 300,000	58,400	267,100
Obtención de nuevas variedades de frijol común con atributos de rendimiento y potencial para nuevos mercados, utilizando selección convencional y asistida por marcadores moleculares	COLCIENCIAS/ *Universidad* Nacional de Colombia	2004-2007	US 8,235	-	3,294
Mejoramiento de la nutrición humana en comunidades pobres de América Latina utilizando maiz (QPM) y frijol común biofortificados con micronutrients	IICA/BID/ FONTAGRO	2004-2007	US 350,000	224,800	45,743

6.2 In Africa

6.2.1 New proposals approved in 2005

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available to CIAT (US $)
Enhanced utilization of nutrient rich beans for nutrition and income	ASARECA/ USAID	2005-2006	US 280,000	280,000	-
Bean root rot disease management in Uganda	DFID-CPP	2005-2006	UK £ 76,927	UK £ 47,600	UK £ 29,327
Promotion of Integrated Pest Management (IPM) Strategies of Major Insect Pests and Diseases of Phaseolus Beans in Hillsides Systems in Eastern, Central and Southern Africa	DFID-CP Natural Resources International Ltd. (NRI)	2005-2006	UK £ 62,100	UK £ 27,870	UK £ 34,230
Evaluation of biorationals for bean bruchid pest management by smallholder farmers in Lake *Victoria* Basin	SAREC-SIDA, Sweden	2005-2007	US $ 30,000	10,000	20,000
Assessing The Effect of Long-Term Seed Aid in Ethiopia	IDRC	2005-2007	US 232,705	133,865	98,840

Proposals approved cont'd ....

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available to CIAT (US $)
Enhancing competitiveness of snap bean for domestic and export markets	ASARECA/EU	2005-2008	US 430,000	430,000	-
Increasing Food Security and Rural Incomes in Eastern, Central and Southern Africa through Genetic Improvement of Bush and Climbing Beans	RF	2005-2008	US 287,500	34,000	253,500

6.2.2 List of ongoing special projects in 2005

Title	Donor	Funding period	Total amount	Amount to partners (US $)	Available in 2005 (US $)
Assisting disaster-affected and chronically-stressed communities in East and Central Africa: Focus on small farmer seed systems	USAID/OFDA	2002-2005	US 245,650	167,600	78,050
Getting High-Yielding and Adapted Bean Varieties into the Hand and Fields of Seed-Stressed Farmers	USAID	2003-2005	US 188,000	120,000	68,000
Seed aid and germplasm restoration in disaster situations: Synthesis of lessons learned and promotion of more effective practices	IDRC	2003-2005	198,000 CAD US 126,000	112,000	14,000
East and Central Africa Bean Research Network	ASARECA/ USAID	2003-2006	US 219,000	60,000	159,000
Supporting improved nutrition, food security and community empowerment for poverty alleviation	CIDA	2003-2008	US 4,458.513	2,688.010	1,770.503
Promotion of Integrated Pest Management (IPM) Strategies of Major Insect Pests and Diseases of *Phaseolus* Beans in Hillsides Systems in Eastern, Central and Southern Africa	DFID	2004-2005	UK £ 81,750 US 125,625	-	31,407
East and Central Africa Bean Research Network	USAID/ REDSO	2004-2006	US 490,000	157,000	333,000
Climbing bean & agroforestry interventions	FARM-AFRICA MATF	2004-2006	UK £59,997	UK £59,997	-

Ongoing special projects cont'd....

Title	Donor	Funding period	Total amount	Amount to partners (US $)	Available in 2005 (US $)
Supporting improved nutrition, food security and community empowerment for poverty alleviation	SDC	2004-2007	US 2,000.000	1,294.731	705,269
Application of marker assisted selection (MAS) for the improvement of bean common mosaic necrotic virus resistance in common bean (*Phaseolus vulgaris*	USAID/ through ASARECA Competitive Grant System	2004-2007	US 150,000	147,818	2,182

6.2.3 Regional research subprojects under SABRN funded by PABRA

Activity Set	Activity	Value $	Country
1.2: Exploit genetic diversity of bean to address marginal environments	1.2.1: Continue to characterize; generate segregating populations for resistance to major diseases and tolerance to pests, low soil fertility and moisture stresses; test and demonstrate varieties for resistance to above stresses [including disease & pest (BSM) nurseries]	2000	Malawi
		1000	Mozambique
		4000	South Africa
		2000	S/ H Tanzania
		1700	Zambia
		1700	Zimbabwe
	1.2.6: Bean materials for low soil fertility and moisture stress in BILFA and BIWADA (including white pea bean) fast tracked into farmer managed acceptability trials. BIWADA in 6 SABRN countries	1800	D R Congo
		1000	Lesotho
		500	Malawi
		500	Mozambique
		500	South Africa
		800	Swaziland
		800	Tanzania
		800	Zambia
		800	Zimbabwe
1.3. Improve understanding of opportunities in local, regional and international bean markets [studies on 4 regional markets; new bean types and products; and seed demand in two countries per network]	1.3.1 Complete and disseminate results to seed sector from studies on bean seed demand in the region	2700	D.R Congo
		1500	Lesotho
		1000	Malawi
		1000	Mozambique
		1000	South Africa
		1000	Swaziland
		1000	Tanzania
		1000	Zambia
		1000	Zimbabwe
1.4. Develop new bean varieties that address food security and market demands [including establishment of participatory plant breeding and other novel methods]	1.4.1. Continue to generate and evaluate segregating populations and advanced bush and climbing bean lines for priority trait combinations in food, canning and export beans	2000	D.R Congo
		2000	Malawi
		2000	Mozambique
		2000	Swaziland
		2000	Tanzania
		2000	Zambia
		2000	Zimbabwe

Regional research subprojects under SABRN cont'd ...

Activity Set	Activity	Value $	Country
	1.4.3 Conduct more rapid eco-regional evaluations of best advanced lines and nurseries (9 countries in SABRN)	1500	D.R Congo
		1500	Lesotho
		1500	Malawi
		1500	Mozambique
		1500	South Africa
		1500	Swaziland
		1500	Tanzania
		1500	Zambia
		1500	Zimbabwe
	1.4.4 Apply participatory variety evaluation (PVS) of promising materials with end-users especially women, traders, processors and exporters and thereby identify new varieties for formal national releases	1500	Malawi
		1500	Mozambique
		1500	South Africa
		1500	Swaziland
		1500	Tanzania
		1500	Zambia
		1500	Zimbabwe
	1.4.5 Production of breeders and foundation seed to feed adequate amounts into seed supply chains, with provision of variety descriptors (8 countries in SABRN)	2000	D.R Congo
		1000	Lesotho
		1000	Malawi
		6000	Mozambique
		1000	Swaziland
		1000	Tanzania
		1000	Zambia
		6000	Zimbabwe
6.1. Train regional and national scientists in new methods, approaches and techniques such as marker-assisted selection, selection for micro-nutrients, and participatory breeding etc.	6.1.1 Support partners to carry out participatory variety selection in 4 pilot countries within SABRN	5000	Malawi
		5000	Mozambique
		5000	South Africa
		5000	Zimbabwe
	6.1.2 Support for NARI scientists at Bunda College of Agriculture (Malawi) doing MSc studies and University of Free State, (S/Africa)	10000	Malawi
		5000	South Africa
	8.1.1 Complementary studies to the impact assessment in Malawi	10000	Malawi

6.2.4 Regional research projects in ECABREN

The launch in July 2004 by ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa) of Competitive Grant System (CGS) paralyzed the execution of priority research projects identified by the stakeholders.

- Two concept notes on snap bean and navy/canning bean submitted to CGS Funding Stream A (destined for NARS) were among three top ranked in each call group among about 70 concept notes pre-screened. But, only snap bean project ranked first in its group went through the process of full proposal development, and competed against another project in the group for finally selection funding. The snap project though approved could not start as financial and administrative issues were to be settled first; only breeding activities continued being supported through PABRA. This project should finally start being implemented in four countries including Uganda, Kenya, Rwanda and Tanzania by different institutions. This project was funded for an amount of Euros 420,000 originating from European Union for three-year period starting January 2006 after 17 months of first call.

- Moreover, through CGS Funding Stream B (NPPs) only one consolidated project on nutrient rich beans with four major outputs was submitted and approved in March 2005; but the implantation of the project was planned to start in April 2005 though administrative procedures delayed the disbursement of funds to implementing institutions in DR Congo, Kenya, Tanzania and Uganda. The project is funded for an amount of US$ 240,000 by USAID through ASARECA for a period of the two years (October 2004 -September 2006).

- A third project: 'Study on Export marketing of beans (or value of export beans): The case of Ethiopia, Kenya, Uganda and Madagascar' was analyzed and approved to support regional team leader and national resource persons for about US$40-45,000 maximum. Supposed to start in the third quarter of the 2005, the project should now start in January 2006 with funding from USAID through ASARECA/ECAPAPA.

6.3 List of proposals and concept notes submitted

6.3.1 At Headquarters

Title	Donor	Comments	Funding period	Total amount
Fighting drought and aluminum toxicity: Integrating functional genomics, phenotypic screening and participatory evaluation with farmers to develop stress resistant common bean and *Brachiaria* for the tropics.	BMZ	Proposal approved	3 years	Euros 1.1 million
Building a genetic platform for the model grain legume *Phaseolus vulgaris* L. (common beans) to reduce aluminum toxicity and enhance nodulation.	ZIL, Switzerland	Proposal submitted		199,652 Swiss francs
Variedades de frijol tolerantes a la sequía para la sostenibilidad productiva y alimentaria de los sectores rurales de centro américa.	SICTA	Proposal submitted		US$78,200
Improvement of Chitti bean in Iran	SPII, Karaj, Iran	Proposal submitted	4 years	US240,000
Gene targets for increasing abiotic stress tolerance in *Phaseolus vulgaris* (common bean)	Europe: Univ. of Hannover and Sheffield S. America: Univ. of Chile	Proposal submitted	For over 4 years	Euros 1.9 million
Enhancing Crop Productivity: Exploiting the molecular basis of host-pathogen interaction to develop durable disease resistance in African crops, using Angular Leaf Spot disease of bean as a model	Rockefeller Foundation	Concept note	3 years (2006–2008)	US322,230

Proposals and concept notes submitted cont'd....

Title	Donor	Comments	Funding period	Total amount
Alternativas verdes para el control de enfermedades y plagas en productos de alto valor: Extractos de fique (*Furcraea cabuya*) y swinglia (*Swinglia glutinosa*) como fuentes de sustancias bioplaguicidas natural	MADR	Concept note	18 months	Col$180,000,000
Alternativas verdes para el manejo sostenible de plagas y enfermedades en cultivos hortícolas de alto valor en Colombia.	MADR	Rejected	3 years	Col$700,000,000
Improving fruit and vegetable product quality from smallholder systems: Optimizing soil-crop-pest management for economically viable, socially acceptable and ecologically sustainable production	Federal Ministry of Finance (BMF), Austria	Concept note	3 years	500,000 Euros
Innovación para el mejoramiento de la simbiosis fijadora de nitrógeno en leguminosas de grano	FONTAGRO		3 years	US360,250
Improving rural livelihoods in Rwanda: Promoting integrated crop, disease, and pest management (ICDPM) strategies for intensification and diversification of agricultural systems	Bilateral project for Belgium	Concept note	3 years (2005-2007)	3 million Euros
Improving livelihoods of smallholder farmers in the Great Lakes Region: Overcoming major production constraints in bean based cropping systems to assure food security and to enhance income generation	DGDC, Belgium	Concept note submitted	5 years (2005-2009)	1,355 million Euros
Improving Livelihoods at Risk: Technologies and policies for restoring degraded agricultural land in Central America	CIDA	A joint concept note submitted (IP-5, PE-2, PE-1, PE-3).		Can $ 10 million
Action research for improving food security and rural livelihoods: Enhancing the resilience and profitability of agriculture in drought-prone hillside areas of Central America	IFAD	Concept note submitted with PE-2 team	Over 5 years	US$2,079,400
Doubly green beans: Sustainable income generation for smallholder Colombian and Ecuadorian snap bean farmers with an environmentally clean product for local markets	CFC	Idea submitted	4 years	2 million Euros

6.3.2 In Africa

Title	Donor	Comments	Funding period	Total amount
Promotion of integrated pest and soil management strategies for *Phaseolus* beans in smallholder farming systems in Malawi, Mozambique and Tanzania	McKnight Foundation	Submitted	for 3 years	US$ 300,000
Scaling-out integrated soil and pest management bean based technologies with farmers	EU-ASARECA	Submitted	for 3 years	EUROS 419,500

7. Capacity building 2005

Number of person days of training for partners: 4102

7.1 Courses and workshops at Headquarters

Date	Title	Duration (days)	Total No. participants	No. Women participants	No. of *CIAT/Network* instructors	No. of NARS instructors
Nov. 8/04	Sampling insects, biology of whiteflies	1	27	?	2	
Nov. 17/04	Sampling insects, biology of whiteflies	1	?	?	2	
Febr-March	How to measure parasitism in whiteflies	120	1	1	3	
Feb. 23	Biology and ecology of whiteflies	1	30	5	1	
April 22	Training in sampling methods	1	8	3	2	
May 4	Biology and ecology of whiteflies	1	-	-	1	
May 19	Biology and ecology of whiteflies	1	35	10	1	
June	Sampling insects, biology of whiteflies	1	65	20	1	
15-19 August	Workshop on "Breeding common bean for nutritional value and drought tolerance" at CIAT	5	35	7	10	12
September	Biology and ecology of whiteflies	1	2	2	2	
October 12	Management of whiteflies	1	19	5	1	
Oct. 10-22	Management of whiteflies	14	1	0	4	
Nov. 17-19	Workshop on agronomic and integrated disease management of snap and dry beans in Bogotá, Colombia	2	65		1	
23-25 Nov.	One training course offered at CIAT on Viral Diseases of High value Crops	3	20	1	5	12

7.2 Courses and workshops in Africa

Date	Title	Duration (days)	Total No. participants	No. Women participants	No. of CIAT instructors	No. of NARS instructors
7-12 Jan.	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: Zambia –ZARI (Lusaka)	2	25	2	2	12
16-19 Jan.	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: Northern Zone of Tanzania (SARI)	3	35	7	2	15
8-10 Febr.	Innovation Histories of the Adoption of Bean Varieties, Kampala, Uganda	2	16	8	3	
15-17 Febr.	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: Southern Highlands of Tanzania –Uyole	3	15	5	2	10
21-24 Feb.	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: DRC-Katanga –Lubumbashi	4	30	7	2	
14-18 March	Strengthening Capacity for Participatory Monitoring and Evaluation for the National Bean Programmes in ECABREN Partner Countries, Nairobi, Kenya	5	35		4	
19 March	Biofortification Project Planning meeting, Nairobi, Kenya	1	13	3		
30-31 March	Planning of bean research in Cameroon	2	15	2	2	1
1 April/May	Participatory Plant Breeding Monitoring Tour in Ethiopia	12	12	3	3	
20-21 April	Ethiopia Bean Seed Impacts Partner Meeting	3				
21-22 April	Feed Back on the Seed Distribution - Monitoring Survey from of the USAID supported Seed Distribution Project, The meeting organized by EARO and its partners. Melkassa/Ethiopia	2	41	3	2	25
25-27 April	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: Lesotho of Department of Research –SADC-Seed Security Network (SSSN)/CGIAR Centers-Lesotho/Maseru.	3	42	13	2	25
24 Apr-7 May	Participatory Plant Breeding Monitoring Tour	20	14	2	3	4

Courses and workshops cont'd...

Date	Title	Duration (days)	Total No. participants	No. Women participants	No. of CIAT instructors	No. of NARS instructors
16-18 May	Ninth Annual Meeting of the PABRA Steering Committee, Arusha, Tanzania	3	17	4		
18 May	Ouru Masawa farmer field day, Kenya	1	107	54	53	
23-25 May	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: Swaziland Department of Research – SSSN/CGIAR Centers –Swaziland-Melkens/Mbabane.	3	33	6	2	17
30 May	Workshop on Strengthening Common Bean Seed System in Eastern Ethiopia	1	15			
8-11 June	Breeder's Course on making crosses, Uganda /	4	20	3	5	0
7-18 June	Breeder's Course and Field Visits (Uganda/Rwanda/ Kenya)	10	17			
13-18 June	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: Ethiopia- ILRI/IPMS- Addis Ababa	5	57	3	2	25
17 June	Sanya Juu farmer field day, northern Tanzania	1	174	92	82	
19-22 June	PM & E workshop	3	16	3	2	0
9-16 July	PM & E workshop, Antananarivo, Madagascar	5	33	13	2	0
19-20 July	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa: Rwanda –ISAR/RSSP-Kigali/Rwanda	2	44	5	4	4
27-28 July	Principles and Application of Decentralized Seed Systems: Experiences of CIAT-PABRA in disseminating improved bean varieties in Africa Malawi –DARS-NGOs consortium. Lilongwe/Malawi	2	33	10	1	5
12-20 Aug.	PM & E workshop	5	36	6	1	1
25–26 Aug.	Training of enumerators at Oyugis for IPDM uptake surveys in Kisii site, Kenya	2	16	10	6	
21-30 Aug.	PM & E workshop	5	31	10	1	1
1-8 Oct.	PM & E workshop, Melkassa, Ethiopia	5	34	3	2	0
3-7 Oct.	Marker Assisted Selection in Plant Breeding: Principles and practices, Kawanda, Uganda	5	13	6		
17-22 Oct.	PM & E workshop, Luzaka, Zambia	5	10	2	2	0

Courses and workshops cont'd ...

Date	Title	Duration (days)	Total No. participants	No. Women participants	No. of CIAT instructors	No. of NARS instructors
Oct 31-Nov 3	Reviewing PABRA Regional Strategy for IPDM & INM in Beans, Kampala, Uganda	4	33	10		
23 Nov.	Tarime farmers' IPM learning visit to Bototo in Kisii	1	25	9	16	
24 Nov.	Tarime farmers' learning visit to Ouru Masawa	1	26	11	15	
25 Nov.	Training of Tarime farmers on bean IPDM and participatory group research approach	1	27	22	5	

7.3 List of NARS visiting scientists: 9 from Latin America, two from Africa, one from Asia

Name	Institution	Country	Dates of stay	Subject
Teresa Avila	Centro Fitogenético Pairumani/Univ. San Simón, Cochabamba	Bolivia	19 Oct. – 19 Nov.	Evaluation of genetic diversity in Bolivian accessions of common bean
Orlando Chaveco	Estación Territorial de Investig. Agropec. La División, Velasco	Cuba	20-28 August	Planning for Ph.D. thesis research
Karen Cichy	PhD program, Dept of Agronomy, Michigan State University	USA	15 Oct – 31 July	Visiting student (Fullbright Fellowship) - studied low P adaptation in Andean beans
Ramiro de la Cruz	INIA – Lara	Venezuela	15-25 Nov.	Training in nutrition breeding and biofortification program
Mauricio Guzmán	INTA	Nicaragua	25 July – 19 Aug.	Training in management of drought nurseries at CIAT
Merion Margaret Liebenberg	ARC Grain Crops Institute	South Africa	10-16 November	Conducting research work in the area of scientifical exchange in Breeding, Biotechnology, Pathology and Germplasm Collection in field and laboratory activities
Sandra Miranda	Instituto Nacional de Ciencias Agrícolas (INCA	Cuba	2 March – 31 May	Training in bean genetic diversity
			25 July – 15 Dec.	To carry out the assembly of a reference molecular marker kit for Bean at CIAT as part of the Generation Challenge Program Project
Miguel Perez	INIA – Maracay	Venezuela	1-30 November	Training in marker assisted selection
Ximena Reyes	Centro Fitogenético Pairumani/Univ. San Simón, Cochabamba	Bolivia	31 May-20 Dec.	Evaluation of genetic diversity in Bolivian accessions of common bean

NARS visiting scientists cont'd ....

Name	Institution	Country	Dates of stay	Subject
Nohra Rodriguez	MS program, Universidad Nacional	Colombia	10 Oct – 23 Dec.	Visiting student - marker assisted selection
Allen Ssekamatte,	Pathology assistant	Uganda	4-29 April	Training in marker assisted selection
Xiaoyan Zhang	PhD program, CAAS, Beijing	China	14 Jan – 31 July	Visiting student - evaluation of genetic diversity in Chinese accessions of common bean

7.4 List of higher degree students supervised

7.4.1 At Headquarters:

PhD Candidates

Name	Status	University	Research
Enrique Bravo	Continuing	Univ. del Valle	Molecular characterization of the NL4 strain of bean common mosaic virus
Ivan Ochoa	Continuing	Pennsylvania State University, USA	Genetic mapping of low phosphorous tolerance in common bean
Andres Felipe Rangel	Continuing	University of Hannover, Germany	Mechanisms of aluminum resistance in common bean
Helena Reichel	Continuing	University of Gembloux, Belgium	Candidate supervised by Virology Unit (
Gloria Santana	Continuing	Univ. Nacional	Studying resistance to bean common mosaic v
León Darío Vélez	Continuing	Univ. Nacional	Studying the inheritance of intercropping ability between common bean and maize
Oscar Vizgarra	Completed	From Argentina	Completed his thesis, involving a statistical analysis of multi-locational trials carried out over a 15 year period in the north-west of Argentina

MSc candidates

Name	Status	University	Research
Orlando Chaveco	Completed	From Cuba	Based on a physiological analysis of lines derived from the cross of DOR 364 x BAT 477, the latter of which has expressed resistance to multiple abiotic stresses.
Maritza Cuervo	Initiated	Universidad Nacional	Candidate supervised by the Virology Unit
Juan Manuel Diaz	Completed	Universidad Nacional	Evaluation of genetic diversity in Andean accessions of the common bean core collection using microsatellites
Lucy Díaz	Completed	Universidad Nacional	Evaluation of genetic diversity in Mesoamerican accessions of the common bean core collection using microsatellites
Luz Nayibe Garzón	Continuing	Universidad Nacional	Development of molecular markers for anthracnose resistance in common bean and their application
María Antonia Henríquez	Completed	Universidad Nacional	"Use of Expressed Sequence Tags (ESTs) to understand the interaction of bean genotypes and *Phaeoisariopsis griseola*"

MSc cont'd ...

Name	Status	University	Research
Ana Karina Martínez	Continuing	Universidad Nacional	Candidate supervised by the Virology Unit
Carmenza Montoya	Initiated	Universidad Nacional	"Evaluation of SCARs for resistance to mosaic virus in families of snap beans."
Wilfredo Pantoja	Continuing	Universidad Nacional	Evaluation of genetic diversity in Tepary bean accessions
Leopoldo Serrano	Continuing	Universidad de El Salvador	candidate supervised by the Virology Unit
Paola Sotelo	Continuing	Universidad Nacional	Inheritance of crumpled leaf virus in snap beans

Pregraduate students

Name	Status	University	Research
Carolina Chavarro	Continuing	Universidad Javeriana	Heat tolerance in Andean common beans
Lorena Cortés	Completed	Universidad del Valle	"Effect of different sources of green manure to manage root rot pathogens of common bean (*P. vulgaris*)"
Edward Guevara Jessica Acherman	Continuing		Studying climbing bean adaptation
Yenni Lorena López	Completed	Universidad Nacional	"Evaluation of common bean genotypes *Phaseolus vulgaris* L. for drought tolerance under greenhouse conditions"
Henry Lozano	Continuing	Universidad Nacional	Advanced backcross – studying micronutrient content in wild common bean crosses
Diana Ximena Marín Ana Lucía Henao	Continuing	Universidad Javeriana	Carrying out economic analysis of climbing beans in five department of Colombia together with the Impact Assessment Unit
Lina Maria Rodríguez	Completed	Universidad de los Andes	Studies on geminivirus resistance genes
Tito Sandoval	Continuing	Universidad del Valle	Studying phytate accumulation in common bean
Sandra Jimena Valencia	Completed	Universidad Nacional	"Sub-lethal effects of antibiosis on the demography of *Zabrotes subfasciatus* and *Acanthoscelides obtectus*, storage pests of beans"

7.4.2 In Africa:

PhD Candidates

Name	Status	University	Title
Geofrey Kananji	Continuing	University of Natal (South Africa)	Improvement of dry bean resistance to bruchid in Malawi
Otsyula Reuben	Continuing	Makerere	Study of inheritance and development of root rot (*Pythium*) resistant varieties using marker assisted selection in common beans
Virginia Gichuru	Continuing	Makerere	Characterization and pathogenicity of *Pythium* isolates on crops, which are intercrops of beans in South Western Uganda

PhD cont'd...

Name	Status	University	Title
Clare Mukankusi	Continuing	University of Kwa Zulu – Natal	Breeding beans (*Phaseolus vulgaris*) for resistance to *Fusa* root rot (*Fusarium solani* f. sp *phaseoli*) and large seed size Uganda
Edwin Nuitjen	Completed	Wageningen University	Farmer management of gene-flow: the impact of genetic diversity and crop improvement in The Gambia
Bayush Tsegaye	Continuing	Norway University of Life Sciences	Incentives for on-farm conservation in a centre of diversity: a case study of durum what (*Triticum turgidum* L.) landraces from East Shewa, central Ethiopia

MSc candidates

Name	Status	University	Title
Simon Bereng	Waiting to graduate	University of Free State (South Africa)	Screening bean germplasm for low P tolerance under acidic soils with and without lime application in Lesotho
Barthlomew Y. E. Chatayika	Finishing	Univ. of Malawi (Bunda College of Agriculture)	Mode of inheritance for angular leaf spot and common bacterial blight resistance in common bean
Kibyego, Michael	Completed	Moi University	MSc Agric. Marketing
Korir, Mark	Completed	Moi University	MSc Agric Marketing
Mathias Zulu	Graduated	University of Zambia	Bean anthracnose *(Colletotrichum lindemuthianum)* study and determination and distribution of races prevalent in Zambia
Charles Kapapa	In year 2	Univ. of Malawi (Bunda College of Agriculture)	Use of molecular markers in breeding common bacterial blight resistant varieties in Malawi.
Godwill Makunde	Started	University of Zambia	Inheritance studies ion drought resistance in common beans
David R. Macharia	Continuing	University of Nairobi	*Transfer of* angular leaf spot, anthracnose and tolerance to low soil fertility in red mottled and red kidney beans
Lunjalu, S	Continuing	University of Nairobi	Effects of cooking on nutritional value of high iron and zinc beans
Walter Ocimati	Continuing	Makerere	Effects of management options for Pythium root rots on selected crops grown in association with beans in southwest Uganda
Augustine Musoni	Continuing	University of Nairobi	Inheritance of *fusarium* wilt (*F. oxysporum f.sp. phaseoli*) and selection for multiple disease resistant and marketable climbing bean varieties
Ngongo Mulangwa	Continuing	Institut des Sciences Agronomiques	degree training program for the 'Diplôme d'Etudes Approfondies'
Frida Bengtsson	Continuing	Norway University of Life Sciences	The wider context of seed vouchers and fairs
Jennifer Joy West	Continuing	Norway University of Life Sciences	" (joint thesis)
Sophia Komba	Near completion	Open University of Tanzania and New Hampshire University (USA)	Socio-economic benefits and impact of IPDM technologies to farming communities in Hai district, northern Tanzania
3 new students at BS degree started		Univ. of Nairobi	Topic not decided

Total number of higher degree students supervised: 50

a) completed thesis students in 2005
- One PhD candidate in Africa and one in Latin America finished their thesis work
- Five MSc candidates in Africa and four in Latin America finished their thesis studies
- Four pregraduate students finished their degree research at CIAT headquarters

b) continuing thesis students
- Five PhD candidates in Africa and six in Latin America are continuing their studies.
- Ten African and seven Latin American candidates to the M.Sc. degree are continuing their studies.
- Seven pregraduate students continue to work towards their degrees at CIAT headquarters

8. Released varieties during 2003-2005 in Latin America and Africa

8.1 Latin America:

Country	Name	Origin	Year of release
ARGENTINA	A 281		2003
BRAZIL	BRS GRAFITE (Black)	(AN 512567 x Mexico 168)	2003
	BRS REQUINTE (Carioca type)	(Carioca MG//POT 94/AN 91052)	2003
	BRS PONTAL (Carioca type)	(BZ3836//FEB 166/AN 910523)	2003
	BRS HORIZONTEL (Carioca type)	(EMP 250/4/A 769///XAN 252)	2004
	BRSMG TALISMA (Carioca type)	BAT 477, IAPAR 14, FT 8429, JALO EEP 558, A 252, A 77, Ojo de Liebre, ESAL 645	2004
	BRS PITANGA (Roxino)	(FEB 163/AN 512879)	2004
	BRS TROPICAL	FEB 208*	2004
ECUADOR	CANARIO "SIETE COLINAS"	(INIAP 426) TIB 3042 x G11732	2004
HONDURAS	MACUZALITO**		2004
PERU	INIA 408 "Sumac Puka"	(INIA 17 x Catrachita)	2004

* CIAT line tested in the framework of EMBRAPA's common bean breeding network
** participatory breeding with CIAL's farmers from Yoro region (ASOCIAL-FIPAH-EAP)

8.2 Africa:

Country	Varietal name	Line code or G number	Year of release	Source
D.R. CONGO	LSA 144		2003	
	M50/98		2003	
	ACC 714 (INERA)		2003	
	GR 13P		2003	
	CNF 5520		2003	
	G1810		2003	
	NAMULENGA		2003	
	G11460		2003	
	DOR 71		2005	CIAT Line
	DB 196			
	UBR (92) 244/11		2005	CIAT cross
ETHIOPIA	DICTA 105		2003	
	DOR 554		2003	
	MAM 48		2003	
	AR04GY		2005	
	TA04JI		2005	
MALAWI		BCMV-B2	2005	Bean-Cowpea
		BCMV-B4	2005	Bean-Cowpea
		F7 BC D/O 19	2005	Bean-Cowpea
RWANDA	RWV 992		2005	Line with CIAT
	RWV1129			parents
RWANDA	RWR 2142		2005	Line with CIAT
	RWR 2155			parents
SOUTH AFRICA		Teebus-RCR 2	2005	Breeding line from South Africa
TANZANIA	WANJA		2003	(A 197)
	Uyole 03		2003	(DRK 124)
	Urafiki		2003	(Kabanima x Canadian Wonder)
	Uyole 04	BILFA	2004	CIAT line Rowland)
UGANDA	NABE 4		2003	(POA 2)
	(MAC 31)		2003	
	NABE 5		2003	(Sugar 73)
ZAMBIA	Kalunga	SPS2-4 P24	2004	Breeding line from Zambia

8.3 Germplasm distributed

8.3.1 At Headquarters

Purpose	No. of nurseries	No. of lines
Participatory breeding	1	2
Local evaluation	51	2245
Biotic stress evaluation	2	75
Abiotic stress evaluation	19	847
Miscellaneous research purposes	48	1650
Total	**121**	**4819**

8.3.2 Within the ECABREN regional project

Purpose	No. of nurseries	No. of lines
Adaptability	13	844
Early maturity	2	26
Drought lines	7	100
Regional trials	3	269
Rust nursery	10	34
Mineral and protein analysis	2	404
Harvestplus nursery	8	205
AYT-Kenya	4	64
BCMV	1	50
Participatory Breeding	4	196 + 12 sets
Biofortification lines seed increase	1	14
Further selections	8	219
Marker	1	22
Homogeneity studies	1	111
Resistance development	1	100
Total	**66**	**2658 + 12 sets**

8.3.3 Within the SABRN network

Purpose	No. of nurseries	No. of lines
Yield and adaptation	39	289
Resist. to moisture stress	6	30
Resist. to Root rot	3	43
Resist. to ALS	3	54
Resist. to Bean Stem Maggot	3	38
Tolerance to soil fertility	4	105
Total	**58**	**559**

9. Staff list

9.1 Staff at Headquarters:

Stephen Beebe, PhD, Breeder, Geneticist, Project Manager (**70% IP-1**, 30% SB-2)
Matthew Blair, PhD, Germplasm Characterization Specialist, Bean Breeder (70% SB-2, **30% IP-1**)
César Cardona, PhD, Entomologist, (**37.5% IP-1**, 37.5% IP-5)
George Mahuku, PhD, Plant Pathologist (**100% IP-1**)
Francisco Morales, PhD, Virologist (**30% IP-1**, 20% Special Projects, 50% PE-1)
Idupulapati Rao, PhD, Plant Nutritionist, Physiologist (**30% IP-1**, 30% IP-5, 40% PE-2)

9.2 Staff in Africa:

Robin Buruchara, PhD, Plant Pathologist/PABRA Coordinator (stationed in Kampala, Uganda - **65% IP-1**, 35% PE-1)
Rowland Chirwa, PhD, Plant Breeder/SABRN Coordinator (stationed in Lilongwe, Malawi - **100% IP-1**)
Paul Kimani, PhD, Plant Breeder for ECABREN (University of Nairobi/CIAT, stationed in Nairobi, Kenya - **75% IP-1**)
Eliaineny Minja, PhD, IPM Specialist (stationed in Arusha, Tanzania - **100% PE-1**)
Rachel Muthoni, BSc, MPA, Monitoring and Evaluation Specialist, (stationed in Kampala, Uganda - **100% IP-1**)
Mukishi Pyndji, PhD, Plant Pathologist, ECABREN Coordinator (stationed in Arusha, Tanzania - **100% IP-1**)
Jean Claude Rubyogo, BSc., Seed System Specialist (stationed in Malawi – **100% IP-1**)
Louise Sperling, PhD, Social Scientist, (stationed in Rome, Italy- CP-1 62%, **IP-1 38%**)

10. Budget 2005: Actual Expenditures 2005

	Headquarter & Latin America		PROJECT AFRICA	
SOURCE	AMOUNT (US$)	PROPORTION (%)	AMOUNT (US$)	PROPORTION (%)
Unrestricted Core	142,048	47%	156,544	5%
Restricted Core	0	0%	0	0%
Sub-total	**142,048**	**47%**	**156,544**	**5%**
Special Projects	150,263	49%	2,860,869	95%
Generation Challenge Program	12,596	4%		
Sub-total	**162,859**	**53%**	2,860,869	**95%**
Total Project	**304,907**	**100%**	**3,017,413**	**100%**