EXECUTIVE SUMMARY

ANNUAL REPORT 2007

Outcome Line

SBA-1

Improved Beans for the Developing World

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1 NARRATIVE PROJECT DESCRIPTION

IP 1 BEAN IMPROVEMENT FOR THE TROPICS

Rationale & Changes

Rationale

The common bean is the world s most important grain legume for direct human consumption Its total production exceeds 12 million MT of which 7 million MT are produced in tropical Latin America and Africa Beans are the poor man s meat and are particularly important in the diet of the underprivileged Beans like other legumes supply proteins carbohydrates vitamins and minerals and complement cereals roots and tubers that compose the bulk of diets in most developing countries

Common bean is also one of the most diverse crops in terms of its cultivation methods and its uses It serves as mature grain as immature seed and as a vegetable (both leaves and pods) It is cultivated from sea level up to 3000 masl in monoculture in association or in rotations The possibility of obtaining a harvest in as little as two months offers quick income quick food supply and also permits rotating with other crops or inter planting among fruit trees or coffee before the primary crop produces income At the other extreme are the aggressive climbing beans that subsistence farmers maintain in the garden for food security and continual harvest over a six month period

Apart from subsistence cultivation beans have become increasingly commercial over the past thirty years in national regional and international markets In Central America beans are the #1 income generator among the traditional field crops In Africa farmers tap into regional bean markets in Nairobi Kinshasa and Johannesburg With the onset of globalization the past decade has seen a growing international market that is now reported to reach 2 4 million MT This heightens issues of equity for the small bean producers that have little other stable source of income but some also see this as an opportunity For example bean represents 6% of external income for Ethiopia and small farmers in Bolivia produce the large white and red mottled classes for export Snap beans are a high value labor intensive crop of small farmers in Kenya and the Andes

Our primary mission is to contribute to household and global food security by assuring an adequate supply of beans as a culturally acceptable and traditional staple and to improve the income of small bean producers of Latin America and Africa by making bean production more profitable We also seek to improve human nutrition both by maintaining the supply of beans and by improvement of their nutritional value

Our outputs are designed to respond in particular to the needs of small resource poor bean farmers in Latin America and Africa Thus we seek to create solutions to biotic and abiotic production limitations that require minimal inputs and in the case of improved germplasm with good market potential **Our research strategy** focuses on the exploitation of the vast genetic resources of bean that exist as a complex array of major and minor gene pools races and sister species CIAT s gene bank with 41 000 accessions of common bean and related species is our most unique resource and has been the source of genes for disease and insect resistance abiotic stress tolerance nutritional quality and yield potential Most traits are still selected by conventional means in field sites (in some cases backed up by greenhouse evaluations) where most important diseases edaphic constraints and drought can be manipulated for purposes of selection However Marker Assisted Selection (MAS) is employed selectively but strategically in most cases for disease resistance genes CIAT pioneered participatory selection with

farmers and this practice is being extended and systematized While most outputs are seed based others involve knowledge intensive agronomic practices Still others are knowledge based Our research is strategic with elements of both basic and applied as called for by the particular challenge

Changes

In Output 1 it appears to be feasible to add an output target of small seeded lines with multiple abiotic stress tolerance based on recent data Also the predicted rate of increase of iron in improved beans has been moderated slightly based on recent experience with genetic gain

CG System Priorities

CIAT s bean project is housed principally under CG System Priority Area 2 Producing more and better food at lower cost through genetic improvements Efforts are dedicated to improving yields through control of diseases and pests tolerance to abiotic stresses (drought and low soil fertility in particular) and expanding the adaptation range of climbing beans The bean project also places heavy emphasis on improvement of nutritional quality especially through increase in iron and zinc content in the grain There is potential to contribute to Priority Area 3A Increasing income from fruits and vegetables through the improvement of snap beans for both Africa and Latin America The bean team collaborates with marketing specialists to create varieties with better market potential including international export markets (Priority Area 5B) Finally strengthening national institutions (Priority Area 5A) continues to be an important output, both in Africa where novel institutional arrangements and relations have been productive to achieve wide impact and in Latin America where staff reductions have weakened national programs On both continents national programs seek support to incorporate modern selection techniques

Impact Pathways

Outputs 1 (Improved small seeded bean germplasm) and 2 (Improved large seeded bean germplasm) have similar beneficiaries end users and uptake chains Both are targeted to small farmers and poor consumers in Africa and Latin America Small seeded germplasm is often targeted to warmer climates or more difficult environments in Central America Mexico Venezuela, East Africa and Brazil Large seeded germplasm is usually cultivated in more temperate climates in the Andean zone the East African highlands and southern Africa, although in the African highlands small and large seeded types overlap sometimes differentiated by soil fertility gradients within the farm prevailing biotic constraints and household preferences Improved germplasm is shared or developed jointly with NARS partners who supply basic seed to a range of organizations interested in production of seed (local seed companies NGO s CBO s women s groups) who in turn distribute to farmers Benefits accrue to farmers through stable food supply and improved income from sale of excess production Urban consumers benefit of increased production through established but largely informal marketing structures Assumptions for the successful delivery of these outputs include institutional and financial stability of partners political stability and institutional support The role of CIAT is that of a primary research provider (of improved germplasm) at times a secondary research provider (backing up national bean improvement programs with technical expertise and training) and catalyzer (to promote downstream alliances in the uptake chain)

Beneficiaries of Output 3 (Strategies developed for managing diseases and pests) are in some cases researchers (both inside and outside of CIAT) and in some cases are bean producers For example molecular markers benefit researchers directly and farmers indirectly as subsequent beneficiaries Uptake pathway for such methodologies is direct communication through workshops and courses and indirectly through publications leading to benefits of more efficient and effective bean research This assumes that partners are in a position to implement such technologies On the other hand crop management practices are of direct benefit to farmers as users potentially across all bean ecosystems Uptake chain for agronomic practices are similar to those for seed based technologies results are communicated to NARS

and other partners (NGO s CBO s etc) who have successfully diffused practices to farmers to the benefit of farmers who enjoy more stable productivity The role of CIAT is that of primary source of research

Output 4 (Approaches and methods developed and available for strengthening institutional organizational and collaborative capacity of NARS and sub regional networks in Africa and Latin America) seeks to benefit partners at multiple levels through facilitated interaction including farmers who are at the end of the organizational chain NGOs government extension agencies farmer organizations local seed companies and non-conventional seed actors such as women groups people living with HIV/AIDS and tobacco companies all participate and benefit The output will generate impact on target beneficiaries through their participation in development of innovations knowledge and technologies in strategic alliances with multidisciplinary research teams and NGOs Scaling out of innovations and best practices to areas with similar environments will be done through strategic alliances of research and development actors The latter will use their network and other communications mechanism to adapt knowledge and results relevant to them Scaling up regionally and internationally will be done through international NGOs advocacy and communication The outcome is enhanced communication and complementarity of actors with resulting cost efficiencies and in the case of technology diffusion increased and diversified adoption Another dimension of this output is support to NARS in development of projects benefiting national program researchers and with the outcome of their integration into the research project mode This assumes a degree of consistency in partner personnel while CIAT s role is that of facilitator

International Public Goods

The IPG of the bean project include

- Improved germplasm with biotic and abiotic stress tolerance and/or enhanced nutritional value drawing upon the genetic resources of CIAT s extensive gene bank pathogen isolate collections and 30 years of experience in bean improvement CIAT s geographical position and access to varied altitudes and research sites facilitates study and selection of germplasm
- Improved practices for the management of pests and diseases including monitoring of pathogen populations with modern molecular tools developed at CIAT
- Knowledge and tools that contribute to the development and implementation of the above IPG s For example molecular markers for useful traits developed with CIAT s in house resources of genetic maps and markers Knowledge of the structure of genetic resources housed in the gene bank and ways to exploit them Participatory breeding methods with varying degrees of involvement of farmers traders and other key actors
- Methods for networking both formal among official sector researchers and less formal among a broader range of partners with special emphasis on research partnerships and on effective and sustainable seed systems reaching a large number of households

Partners

Most important partners and the respective person years of professionals dedicated to bean research within the (several) outputs are

Output 1 NARS in Latin America including those of Mexico (6) Guatemala (2 5) Honduras (2 including EAP Zamorano) El Salvador (2) Cuba (2) Haiti (1) Brazil (4) participate in the AgroSalud project to improve nutritional quality and productivity of bean while Venezuela (2) and Bolivia (2) are partners in a similar project funded by FONTAGRO Nicaragua (4 5) is a partner in breeding for drought tolerance NARS in East Central and Southern Africa including those of Ethiopia (3) Rwanda (4) Malawi and DRCongo (4) participate in the improvement for low soil fertility productivity and drought The University of Hannover Germany participates in a project for transformation methods of bean to improve drought tolerance (2) and in a second project seeking to establish physiological mechanisms of

medium altitude climbing beans (MAC) productivity and improvement of nutritional qualities in large seeded Andean beans
Output 3 NARS in Honduras (Zamorano) (1) Colombia (2) Uganda (3) Rwanda (4) share in the use of markers for MAS especially for resistance South Africa (3) participates in pathogen characterization evaluation and validation of resistance sources Agriculture and Agri Food Canada (AAFC) is a partner in diagnosis and characterization of soil borne pathogens (especially *Pythium* species) using molecular techniques and development of molecular based diagnostic assays for soil borne pathogens

Output 4 NARS as above –plus a wide range of NGOS CBOS farmers groups women s groups – totaling over 300 direct link partnerships to make users aware of technologies and to get these technologies widely disseminated

The ECABREN and SABRN bean networks coordinate nine NARS in East Africa and ten NARS in southern Africa respectively These networks participate in Outputs 1 2 3 and 4 with input from African NARS cited above plus NARS in Burundi (3) Sudan (2) Zambia (1) Zimbabwe (1) Mozambique (3) Lesotho (3) and Swaziland (3)

HarvestPlus Challenge Program IFPRI CIMMYT and CIP are immediate collaborators in the CP and the AgroSalud (Latin American) nutritional improvement project working in the same agro ecological zones while ICRISAT IITA IRRI and ICARDA are indirect collaborators under HarvestPlus ECABREN and SABRN networks in Africa also participate in HarvestPlus

Generation Challenge Program Partners include EMBRAPA Brazil (2) INTA Cuba (1) Pairumani (an NGO) in Bolivia (2) National University in Colombia (2)

Sub Saharan Africa Challenge Program ICIPE AHI and NARS in Rwanda Uganda and D R Congo are immediate partners

Project Funding

Budgeting 2005 2009

Year	2005 (actual)	2006 (actual)	2007 (actual)	2008 (estimated)	2009 (planned)
US Dollars (millions)	2 941	3 965	3 638	3 510	3 462

LOGFRAME MATRIX IP 1 BEAN IMPROVEMENT FOR THE TROPICS (2007 2009)

Targets	Outputs	Intended user	Outcome	Impact
OUTPUT 1	Improved small seeded, bean germplasm resistant to major biotic and abiotic stresses with greater nutritional and market value	NARS and farmers in Central America the Caribbean Brazil East and Southern Africa	Adoption of improved varieties by farmers	More stable production food availability better nutritional status and income
Output Targets 2007	5 10 interspecific BC1 F3 progeny between common bean and *P coccineus* that broaden the genetic base for tolerance to aluminum resistance to ALS root rots anthracnose and/or high mineral content 10 lines combining drought and low fertility tolerance confirmed beating checks by 40 / under each stress	CIAT breeders NARS breeders Farmers in Latin America	Breeders incorporate broader diversity into populations Farmers adopt drought tolerant lines in drought prone areas of Latin America	Improved productivity in marginal environments
Output Targets 2008	At least 40 lines combining drought tolerance with resistance to BCMNV root rots and/or ALS available for testing in Africa ~30 small seeded F3-derived F5 families developed with tropical adaptation 60 / more minerals abiotic tolerance and 2 resistances (HarvestPlus)	NARS NGO s and CBO s	Drought tolerant lines with critical resistance genes are used in drought prone areas in Africa	Yield stability
Output Targets 2009	50 improved lines with varietal potential and 90 100 ppm iron (ie 80 / more iron) At least 10 genotypes combining drought tolerance with aluminium resistance available for testing in Africa At least 3 snap bean lines with resistance to rust and quality characteristics preferred in regional and export markets	NARS NGO s CBO s health workers and consumers NARS breeders NGO s CBO s and traders and farmers in target countries	Adoption of micronutrient rich beans Adoption of stress tolerant lines in marginal environments Adoption of snap bean and reduced chemical use	Improved household nutrition Improved productivity in marginal soil environments Improved incomes

OUTPUT 2	Improved, large seeded, bean germplasm resistant to major biotic and abiotic stresses with greater nutritional and market value	NARS and farmers in the Andean zone the Caribbean, East and southern Africa	Adoption of improved varieties by farmers	More stable production food availability and income
Output Targets 2007	15 new large seeded bush lines with high mineral trait and resistance to 2 diseases mainly in the red mottled and red seed classes (HarvestPlus)	• NARS and NGO s	• High iron lines adopted	Reduced levels of iron and zinc deficiency
Output Targets 2008	• 15 new large seeded climbing beans with high mineral trait (HarvestPlus) • At least 10 lines in major market classes combining resistance to Pythium root rots BCMV and angular leaf spot	NARS NGO s and farmers groups	Farmers incorporate high mineral and disease resistance lines into diverse production systems	Reduced levels of iron and zinc deficiency • Improved food security & income
Output Targets 2009	Large seeded lines with 50% more iron enter formal varietal release process • More disease resistance genes for anthracnose or ALS introgressed into BCMNV resistant climbing beans	NARS breeders NGO s CBOs and farmer groups	Adoption of micronutrient rich beans	Reduced levels of iron and zinc deficiency
OUTPUT 3	Strategies developed for managing diseases and pests in bean based cropping systems	Breeders entomologists and pathologists in CIAT and NARS	Best bet IDPM practices and genetic combinations for stable resistance deployed	More stable bean yields

Output Targets 2007	Method available to quantify 2 major soil borne pathogens (*Pythium ultimum* and *Fusarium solani*) as a tool to assess disease management strategies and to refine management of resistance breeding nurseries Molecular markers for Pythium root rot resistance used in MAS	• Pathologists in CIAT and NARS	Breeders focus breeding on resistance to relevant pathotypes Breeders deploy markers in genetic improvement	• Reduced yield losses from root rots
Output Targets 2008	Molecular markers linked to ALS implemented in MAS • Molecular tools for detection diagnosis and diversity studies of key ALS and anthracnose pathogens made available	CIAT and NARS breeders NARIs researchers in LAC Africa, IARCs	Breeders deploy markers and enjoy improved efficiency in genetic improvement • Disease and pest characterization tools adopted by researchers	More stable resistance in advanced lines leads to stable yield
Output Targets 2009	Three sustainable crop management options enhancing micronutrient density in beans characterized • Multiple gene combinations to manage ALS developed through MAS	NARS soil scientists pathologists entomologists and food scientists CIAT and NARS breeders	• Increased utilization of integrated management approaches • Breeders use lines with stable resistance in breeding programs	Improve production and nutritional value of bean • Reduced yield losses from ALS
OUTPUT 4	Approaches and methods developed and available for strengthening institutional organizational and collaborative capacity of NARS and sub-regional networks in Africa and Latin America	NARS in Africa and Latin America	Improved institutional performance by NARS NGOs and other partners reflected in more effective technology development and dissemination	More stable production improved food availability income and nutrition, especially for the poor and women farmers

Output Targets 2007	Innovative approaches and tools developed and made widely available to partners in Kenya Malawi Uganda, and Tanzania for IPDM and marker assisted selection of varieties Innovative approaches and tools for attaining wider impact developed and widely available to partners in DRCongo Tanzania, Madagascar and Mozambique • Methods and tools for participatory plant breeding developed and made available in 5 SABRN countries Breeding programs for biofortification firmly established in Honduras Brazil Bolivia Guatemala, Venezuela Kenya and Malawi	NARS NGOs CBOs and farmers NARS NGOs and farmers NARS NGOs and farmers	• Increased use of IPDM strategies that enable R&D institutions to reach more farmers and of marker assisted methods that improve cost effectiveness in breeding new varieties • Partner organizations promote technologies and reach end users more effectively • Partners access tools and methods in multiple languages to empower themselves • National program breeders incorporate biofortification as primary goal	Reduced effect of diseases and pests leading to increased and more stable bean production by farmers Increased production and incomes Increased production and incomes
Output Targets 2008	An IPM system for whiteflies on snap beans refined and promoted in major bean producing areas of the Andean zone Training of trainer cadre set up to serve PABRA countries to assure continuity in methodology innovation in region	• NARS NGO s CBO s	Farmers reduce pesticide use assuring production and profitability • NARS incorporate innovation methods leading to greater breeding impacts	• Less pesticide intoxication in rural communities and urban consumers • Increased production and incomes Needs of more diversified users met

Output Targets 2009	• Fast track micronutrient dense bean varieties disseminated and promoted in eastern and southern Africa • Methodologies for mainstreaming sustained wider impact developed and recommendations availed for East, Central and Southern Africa • An IPDM system for bean root rots implemented and promoted in major bean producing countries in Africa	• NARS NGOs CBOs farmer groups seed certification agencies seed producers NARS NGOs and farmers • NARS NGOs and farmers	• Increased use of iron and zinc rich beans • Increased partner involvement in accessing technologies to a greater number of end users Farmers adopt IPDM practices reducing losses from soil borne pathogens	Reduced incidence of iron and zinc deficiency in target communities and countries • Increased incomes and production, and stable production systems from increased soil microbial diversity

2 RESULTS ASSOCIATED WITH 2007 PROJECT OUTPUT TARGETS

CIAT PROJECT IP 1 BEAN IMPROVEMENT FOR THE TROPICS (2007 2009)

Targets	Outputs	Intended user	Outcome	Impact	Achieved 07 (yes or no)	Proof of achievement (list documentation)
OUTPUT 1	Improved, small-seeded, bean germplasm resistant to major biotic and abiotic stresses with greater nutritional and market value	NARS and farmers in Central America, the Caribbean Brazil East and Southern Africa	Adoption of improved varieties by farmers	More stable production, food availability better nutritional status and income		
Output Targets 2007	5 10 interspecific BC1 F3 progeny between common bean and *P coccineus* that broaden the genetic base for tolerance to aluminum resistance to ALS root rots anthracnose and/or high mineral content	CIAT breeders NARS breeders Farmers in Latin America	Breeders incorporate broader diversity into populations Farmers adopt drought tolerant lines in drought prone areas of Latin America	Improved productivity in marginal environments	Yes	Annual report 2007 sections 1 1 2 2 1 2 2 1 and 1 4 1 3
	10 lines combining drought and low fertility tolerance confirmed beating checks by 40 / under each stress				Yes	Annual report 2006 section 1 1 1 2 Annual report 2007 section 1 1 4 1 and 1 1 4 2
OUTPUT 2	Improved, large seeded, bean germplasm resistant to major biotic and abiotic stresses with greater nutritional and market value	NARS and farmers in the Andean zone the Caribbean East and southern Africa	Adoption of improved varieties by farmers	More stable production food availability and income		

Targets	Outputs	Intended user	Outcome	Impact	Achieved 07 (yes or no)	Proof of achievement (list documentation)
Output Targets 2007	15 new large seeded bush lines with high mineral trait and resistance to 2 diseases mainly in the red mottled and red seed classes (HarvestPlus)	NARS and NGO s	High iron lines adopted	Reduced levels of iron and zinc deficiency	Yes	Annual report 2007 sections 2 4 1 2 4 3 2 4 4 and 2 4 9 HarvestPlus 2007 report section 1 3
OUTPUT 3	Strategies developed for managing diseases and pests in bean based cropping systems	Breeders entomologists and pathologists in CIAT and NARS	Best bet IDPM practices and genetic combinations for stable resistance deployed	More stable bean yields		
Output Targets 2007	Method available to quantify 2 major soil borne pathogens (*Pythium ultimum* and *Fusarium solani*) as a tool to assess disease management strategies and to refine management of resistance breeding nurseries	Pathologists in CIAT and NARS	Breeders focus breeding on resistance to relevant pathotypes Breeders deploy markers in genetic improvement	Reduced yield losses from root rots		
	Molecular markers for Pythium root rot resistance used in MAS				Yes	Annual report 2006 section 2 1 3 p 106 110 Annual report 2007 section 2 1
OUTPUT 4	Approaches and methods developed and available for strengthening institutional organizational and collaborative capacity of NARS and sub-regional networks in Africa and Latin America	NARS in Africa and Latin America	Improved institutional performance by NARS NGOs and other partners reflected in more effective technology development and dissemination	More stable production improved food availability income and nutrition especially for the poor and women farmers		

Targets	Outputs	Intended user	Outcome	Impact	Achieved 07 (yes or no)	Proof of achievement (list documentation)
Output Targets 2007	Innovative approaches and tools developed and made widely available to partners in Kenya, Malawi Uganda, and Tanzania for IPDM and marker assisted selection of varieties	NARS NGOs CBOs and farmers NARS NGOs and farmers NARS NGOs and farmers	Increased use of IPDM strategies that enable R&D institutions to reach more farmers and of marker assisted methods that improve cost-effectiveness in breeding new varieties Partner organizations promote technologies and reach end users more effectively Partners access tools and methods in multiple languages to empower themselves National program breeders incorporate biofortification as primary goal	Reduced effect of diseases and pests leading to increased and more stable bean production by farmers Increased production and incomes Increased production and incomes	Yes	Annual report 2006 section 4 1 2 p 207 210 Annual report 2007 section 4 1 2
	Innovative approaches and tools for attaining wider impact developed and widely available to partners in DRCongo Tanzania, Madagascar and Mozambique				Yes	Annual report 2006 section 4 4 1 p 247 9 Annual report 2007 sections 4 4 1 and 4 4 2
	Methods and tools for participatory plant breeding developed and made available in				Yes	Annual report 2006 sections 4 1 2 p 207

Targets	Outputs	Intended user	Outcome	Impact	Achieved 07 (yes or no)	Proof of achievement (list documentation)
	5 SABRN countries					4 1 5 p 216 9 4 2 13 p 223 Annual report 2007 section 4 2 1 2 Project Reports submitted to donors (BMZ and McKnight) Refereed Publications (Sperling) Workshop proceedings (Rubyogo) Trip Reports PABRA logframe and annual Reports 2004 2007 Listserve documentation
	Breeding programs for biofortification firmly established in Honduras Brazil Bolivia, Guatemala, Venezuela, Kenya and Malawi				Yes	Annual report 2007 section 4 3 4 Blair MW C Astudillo A Hoyos Y Viera, O Mosquera (2007) Seed iron and zinc levels in a collection of Colombian released

Targets	Outputs	Intended user	Outcome	Impact	Achieved 07 (yes or no)	Proof of achievement (list documentation)
						varieties grown at two levels of phosphorus fertilization Annual Report of the Bean Improvement Cooperative 50 43-45 Caldas GV Blair MW Restrepo J (2008) Análisis de taninos condensados en genotipos de fríjol comun sembrados en tres localidades del departamento de Nariño Fitotecnia Colombiana (in press)

3 RESEARCH HIGHLIGHTS IN 2007

We will highlight 2 areas of our current research portfolio

3 1 Stability and geographic systems analysis of NUA advanced lines in Colombia and Bolivia

Contributors F Monserrate G Hyman (GIS Unit CIAT) M W Blair (IP 1 CIAT)

NUA advanced lines of common bean have been developed for enhanced levels of Fe and Zn in the commercial Andean red mottled calima types in Colombia These lines have been in agronomic trials since 2003 and are currently being considered for release During the testing process genotype environment (GxE) interaction has been found to be an important factor in the accumulation of these nutrients An analysis of multilocational trials identified those lines with higher stability and sought to determine which soil or climatic variables are associated with the GxE An additional objective was to predict the geographic regions in which to deploy these genotypes NUA35 presented the highest stability and average content of Fe and Zn in all environments A principal component analysis (PCA) with soil climate and yield variables of trial sites two groups of sites the first related with pH value and cation exchange and the second with organic matter content, precipitation and soil Fe content High seed Fe content was found in places with high soil Fe content or higher pH values Finally using Homologue™ and other spatial analysis tools it was possible to identify potential production zones to continue with experimentation and release of these genotypes NUA lines are also being considered for varietal release in Malawi and Zimbabwe

3 2 Physiological evaluation of drought resistance in elite bean lines under field conditions

Contributors J Polania, M Grajales C Cajiao R Garcia S Beebe and I M Rao

Twenty elite breeding lines and cultivars were evaluated to define the physiological basis of drought adaptation Seed yield under drought ranged from 1320 to 2317 kg ha^{-1} with commercial cultivars Tio Canela 75 Perola and Carioca yielding the least Correlation coefficients between yield and shoot attributes indicated that yield was positively related to pod harvest index stem biomass reduction pod N uptake shoot N uptake pod P uptake and shoot P uptake leaf area index canopy temperature and canopy temperature depression (CTD canopy temperature – ambient temperature) at 1 p m Since CTD is a negative value a positive correlation with yield implies that more negative values (i e more canopy cooling) correspond to low yield CTD reflects the ability of transpiration to cool the leaves and should be an indicator of the ability to access more soil moisture Perola Carioca SEA 5 and Tio Canela showed more negative values of CTD but three of these were poor yielding This was corroborated by studies of root distribution of 4 genotypes through the soil profile indicating a negative correlation between root production and grain yield In contrast drought resistant SER 16 presented relatively less roots and less negative CTD with higher grain yield compared with the other 3 genotypes SER 16 was more water use efficient than DOR 390 and Tio Canela 75 due to its greater ability to mobilize photosynthates to grain Greater rooting depth alone will not assure good yield under drought Further work is needed to verify these observations

4 PROJECT OUTCOME

Outcome statement Participatory Plant Breeding (PPB) and Participatory Variety Selection (PVS) methods have been promoted within the CIAT African bean networks to focus research on specific client needs and to hasten the uptake of breeding products

MTP target 2004 (materials) 2005 (12 countries) 2006 (10 countries)

PPB/PVS methods and tools have been diffused in 12 PABRA countries (or 14 major breeding NARS) Training included field courses monitoring tours and project development where PPB/PVS processes served as central R&D elements Twenty seven out of 53 breeders in the African networks regularly employ PPB/PVS methods with about half publishing on this theme Detailed M+E shows PPB/PVS approaches used at some point in all 18 of PABRA countries between 2003 and 2006 Eighteen PPB/PVS linked varieties have been released in 5 countries (Kenya, Ethiopia, DRC Tanzania and Uganda) in 4 years (2003 – 2006) with another 12 varieties near release Direct links with traders during variety selection lead to dramatic cases of variety adoption and the identification of lucrative market linkages As examples in Southern Ethiopia regional traders have moved PPB varieties southward in Ethiopia and into Kenya (a distance of 400 km) The red mottled and red kidneys sell at US$4 5 per 100 kg more than local beans and farmers liken them to meat without blood, due to their dietary boost In Southern Uganda (Bukora) traders sell PPB varieties to points 450 km distant—in Uganda and Rwanda. These red kidney shaped varieties bring local farmers 1500 USh/kg (versus 500 for the local) and are sold in more distant markets for 2000 USh

The PPB training and implementation has resulted in distinct information and process outcomes for different actors

NARS Breeders Variety criteria of different groups and uses (women/men market orientation/home consumption) are now understood across agro ecological zones Such information feeds back to finetune programs While yield and disease resistance remain important, three others stand out across sites *Early maturity* (for drought escape and to fill the hunger gap) *marketability* (both domestic and export) and *cooking time* (as well as *taste*) as rural farmers increasingly supply town/urban markets and as fuelwood becomes scarce

Farmers In many sites farmers gain faster access to germplasm and hasten diffusion Their sense of greater research ownership is clear varieties are baptized after the selector the village of selection or according to farmer sentiment e g in northern Tanzania, the variety Ushindi or Victory

Traders Traders involved are getting access to varieties early moving them quickly and widely and earning important profit margins

NGOs Partners are catalyzing the on farm testing and bringing farmers new germplasm and experimentation methods to build community capacity and to enrich food security (common NGO goals) Such collaborations also help defray NARS costs for on farm research

The use of PPB/PVS methods has been a win win win win situation for breeders farmers traders and NGOs Because PPB encourages co-learning and can unfold even in marginal areas it is a prime vehicle for exploring varieties whose value added traits may be hidden (e g biofortification) or most visible in high stress zones (e g in drought prone areas or those experiencing climate change) Further as PPB/PVS seeks to meet enduser preferences (e g traders processors) it is an important vehicle for expanding private sector and other uptake (e g farmer cooperative) linkages

This PPB outcome is documented in detail via PABRA M+E databases (drawn from national program reports 2003 2006) workshop proceedings and refereed articles A full list of articles has been compiled

5 LIST OF 2007 PUBLICATIONS

(includes in press in review and submitted) see complete list

5 1 Book chapters and books (all in English)

Book chapters published	5
Book chapters in press	1

5 2 Refereed and non refereed journal articles

Papers published in English	23
Papers submitted in English	2
Papers in press in English	1
Papers in review in English	1
Papers published in Spanish	4
Papers in review in Spanish	1

5.3 Workshop and conference papers

Papers in English	43
Papers in French	2
Papers in Spanish	11

5 4 Proceedings, posters abstracts others

Proceedings	in English	3
Posters	in English	13
	in Spanish	2
Abstracts	in English	2
Others	in English	1
	in Spanish	1
	in others	1 (African languages)

5 5 Editorial Contributions

Reviewed articles for
- World Development
- Human Ecology
- Agricultural Systems
- Euphytica

5 1 Book Chapters and Books

Ayarza, M E Barrios I Rao E Amezquita and M Rondon 2007 Advances in improving agricultural profitability and overcoming land degradation in savanna and hillside agroecosystems of tropical America In A Bationo B Waswa, J Kihara and J Kimetu (Eds) Advances in integrated soil fertility research in sub Saharan Africa challenges and opportunities Springer Dordrecht the Netherlands p 209 229 [ISBN 978 1-4020 57595]

Blair M W Fregene M A Beebe S E Ceballos L H 2007 Marker assisted selection in common beans and cassava In Guimaraes E P Ruane J Scherf B D Sonnino A Dargie J D (eds) Marker assisted selection Current status and future perspectives in crops livestock forestry and fish Organizacion de las Naciones Unidas para la Agricultura y la Alimentación (FAO) Rome IT p 81 115

Dwivedi S L Upadhyaya H D Stalker H T Blair M W Bertioli D Nielen, S Ortiz R 2007 Enhancing crop gene pools of cereals and legumes with beneficial traits using wild relatives Plant Breeding Reviews v 30

Fortmann L H Ballard and L Sperling 2007 Change around the Edges Gender Analysis Feminist Methods and Sciences of Terrestrial Environments In L Schiebinger ed Gendered Innovations, Stanford University Press

Lubanga, L P M Kimani R Ngatoluwa, B Rabary G O Rachier M M Ugen, V Ruganzu and E Awad Elkarim 2007 Bean improvement for low soil fertility adaptation in Eastern and Central Africa In A Bationo B Waswa, J Kihara and J Kimetu (Eds) Advances in integrated soil fertility research in sub Saharan Africa challenges and opportunities Springer the Netherlands p 325 332 [ISBN 978 1-4020 57595]

Nandwa, S M A Bationo S N Obanyi I M Rao N Sanginga and B Vanlauwe 2007 Inter and intra specific variation of legumes and mechanisms to access and adapt to less available soil phosphorus and rock phosphate In A Bationo (Ed) Fighting Poverty in Sub Saharan Africa The Multiple Roles of Legumes in Integrated Soil Fertility Management Springer Verlag New York (in press)

5 2 Refereed and Non Refereed Journal articles

Refereed Journals

Ariza Nieto M Blair M W Welch R M Glahn R P 2007 Screening of bioavailability patterns in eight bean (*Phaseolus vulgaris* L) genotypes using the Caco-2 cell in vitro model J Agr Food Sci 55 7950 7956

Beebe S I M Rao C Cajiao and M Grajales 2007 Selection for drought resistance in common bean also improves yield in phosphorus limited and favorable environments Crop Science (in press)

Blair M W Diaz J M Duque M C Hidalgo R 2007 Evidencia molecular de diferenciacion genetica e introgresión entre razas de frijol comun del acervo Andino Acta Agronomica 56 165 170

Blair M W Diaz J M Hidalgo R Diaz L M Duque M C 2007 Microsatellite characterization of Andean races of common bean (*Phaseolus vulgaris* L) Theor Appl Genet 116 29 43

Blair M W Hoyos A Cajiao C Kornegay J 2007 Registration of two mid altitude climbing beans with yellow grain color MAC56 and MAC57 Crop Science J Crop Reg 1 (2) 143 144

Blair M W Pantoja, W Hidalgo R 2007 Diversidad de faseolina de frijol comun cultivado del Caribe Acta Agronomica 56 171 176

Blair M W Rodriguez, L M Pedraza, F Morales F Beebe S E 2007 Genetic mapping of the bean golden yellow mosaic geminivirus resistance gene bgm 1 and linkage with potyvirus resistance in common bean (*Phaseolus vulgaris* L) Theor Appl Genet 114 261 271

Dwivedi S L Crouch, J H Mackill D J Xu Y Blair M W Ragot, M Upadhyaya H D Ortiz R 2007 The molecularization of public sector crop breeding progress problems and prospects Advances in Agronomy 95 163 318

Garzón L N Blair M W Ligaretto G 2007 Uso de selección asistida con marcadores para resistencia a antracnosis en frijol Agronomia Colombiana 25 207 214

Graham R D Welch Ross M Saunders D A Ortiz Monasterio I Bouis H E Bonierbale M de Haan S Burgos G Thiele G Liria, R. Meisner C A Beebe S E Potts M J Kadian M Hobbs P R Gupta, R J Twomlow S 2007 Nutritious subsistence food systems Advances in Agronomy 92 1 74

Grisi M C M Blair M W Gepts P Brondani C Pereira, P A A Brondani R P V 2007 Genetic mapping of microsatellite markers in common bean (*Phaseolus vulgaris*) population BAT93 x Jalo EEP558 Genetics and Molecular Research 6 691 706

Hannah M A Krämer K M Geffroy V Kopka J Blair M W Erban A Vallejos C E Heyer A G Sanders F E T Millner P A Pilbeam D J 2007 Hybrid weakness controlled by the dosage dependent lethal (DL) gene system in common bean (*Phaseolus vulgaris*) is caused by a shoot derived inhibitory signal leading to salicylicacid associated root death New Phytologist 176(3) 537 549

Kimani J M P M Kimani S M Githiri and J W Kimenju 2007 Mode of inheritance of common bean (*Phaseolus vulgaris* L) traits for tolerance to low soil phosphorus Euphytica 155 225 234

McGuire S and L Sperling Seed aid the view from farmers fields (submitted to Agricultural Systems)

Montoya C A Gomez A S Lalles J P W B Souffrant, S Beebe P Leterme 2007 In vitro and in vivo hydrolysis of beans (*Phaseolus vulgaris* L) genetically modified to express different phaseolin types Food Chemistry Doi 10 1016/j foodchem 2007 07 016

Montoya C A P Leterme S Beebe W B Souffrant D Molle and Lalles J P 2007 Phaseolin type and heat treatment influence the biochemistry of protein digestion in the rat intestine British Journal of Nutrition doi 10 1017/S0007114507819179

Oberthur T Cock J Andersson M S Naranjo R N Castañeda D Blair M W 2007 Acquisition of low altitude digital imagery for local monitoring and management of genetic resources Computers and Electronics in Agriculture 58(1) 60 77

Polania J I M Rao S Beebe and R Garcia 2007 Desarrollo y distribucion de raices bajo estres por sequia en frijol comun usando tubos con suelo en condiciones de invernadero Agrociencia (in review)

Rangel I Rao and W Horst 2007 Spatial aluminum sensitivity of root apices of two common bean (*Phaseolus vulgaris* L) genotypes with contrasting aluminium resistance J Exp Bot 58(14) 3895 3904

Rangel A F I M Rao and W J Horst 2007 Cellular distribution and binding stage of aluminum in root apices of common bean (*Phaseolus vulgaris* L) genotypes differing in aluminum resistance Planta (in review)

Rubyogo J C L Sperling R Muthoni and R Buruchara 2007 Bean seed delivery for small farmers in sub Saharan Africa the power of partnerships (submitted to Society and Natural Resources)

NON REFEREED JOURNALS

Blair M W C Astudillo A Hoyos Y Viera O Mosquera 2007 Seed iron and zinc levels in a collection of Colombian released varieties grown at two levels of phosphorus fertilization Bean Improvement Cooperative 50 43-45

Blair M W Rodriguez, L M Pedraza, F Morales F Beebe S E P Miklas J Beaver 2007 Development and genetic mapping of a SCAR marker for the bean golden yellow mosaic geminivirus resistance gene bgm 1 Bean Improvement Cooperative 50 77 78

Cardona, C Rodriguez, I 2007 Resistencia a insecticidas en el biotipo B de Bemisia tabaci estado actual e implicaciones para el manejo de esta importante plaga En Memorias XXXIV Congreso Sociedad Colombiana de Entomologia Cartagena 25 27 Julio pp 12 21

Checa, O E Ceballos H Blair M W 2007 Inheritance of plant height, internode length and branch number in climbing common bean populations (*Phaseolus vulgaris* L) Bean Improvement Cooperative 50 25 26

Diaz L M Blair M W 2007 Microsatellite diversity of Mesoamerican common beans (*Phaseolus vulgaris* L) Bean Improvement Cooperative 50 17 19

Kimani P M G K Gicharu N Mburugu H Boga and R Cheruiyot 2007 Nodulation and yield of bush and climbing bean s inoculated with rhizobia strains Bean Improvement Cooperative 50 195 196

Kimani P M J P Lodi Lama Matondo Nsebua and Lunze Lubanga 2007 Bean varieties for humid tropical lowlands Bean Improvement Cooperative 50 181 182

Makunde G C Beebe S E Blair M W Chirwa, R Lungu D 2007 Inheritance of drought tolerance traits in Andean x Andean and Andean x Mesoamerican F_2 Populations Bean Improvement Cooperative 50 159 160

Rubyogo J C Sperling L and Assefa, T 2007 A new approach for facilitating farmers access to bean seed LEISA 23(2) 27 29

Tofino A P Calderón J F Palacio J D Blair M W 2007 Variability study of 89 snap bean genotypes using the AFLP molecular technique Bean Improvement Cooperative 50 67 68

Tofiño A P Ocampo C Blair M W 2007 Association between biochemical descriptors and the pod fibrousness in the characterization of snap bean germoplasm for latin american fresh consumption Bean Improvement Cooperative 50 63 64

5 3 WORKSHOP AND CONFERENCE PAPERS

Avila, T Astudillo C Davila, A Reyes X Blair M W 2007 Analisis del contenido de hierro y zinc en semilla de la coleccion boliviana de frijol (*Phaseolus* spp) Presentado en X Congreso Asociacion Colombiana de Fitomejoramiento y Produccion de Cultivos Pasto Nariño 5 7 June

Beebe S Rao I Polonia J A Grajales M Cajiao C 2007 Improved harvest index in drought resistant common beans and possible effects on combining ability Paper presented at the Semi annual Meeting of the Bean Improvement Cooperative Madison WI 28 Oct 1 Nov

Beebe S I M Rao M Á Grajales y C Cajiao 2007 Evaluacion de lineas de frijol desarrolladas para resistencia a sequia en combinación con el gen bc 3 para resistencia a BCMV Paper presented at the LIII Reunion del PCCMCA (Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos y Animales) Antigua Guatemala, Guatemala 23 27 April

Beebe S I M Rao M Á Grajales y C Cajiao 2007 Preparando para el cambio de clima y la escasez de lluvia mejoramiento del frijol para resistencia a la sequia Paper presented at the LIII Reunión del PCCMCA (Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos y Animales) Antigua Guatemala, Guatemala 23 27 April

Blair M W 2007 Bean Genomics at CIAT Sequencing project planning meeting Cuernavaca Mexico 29 Jan

Blair M W 2007 Common Bean Ferritins Harvest Plus Workshop on Plant Ferritin as a Bioavailable Source of Iron Washington DC 25 26 Jan

Blair M W 2007 From genes to beans platform for marker utilization in breeding Kirkhouse Trust Meeting Nairobi Kenya, 19 Feb

Blair M W P M Kimani N Moreno H F Buendia and R Chirwa 2007 Genetic diversity in common bean (*Phaseolus vulgaris* L) from eastern and southern Africa and its relationship with nutritional quality Rockeller Foundation Meeting on Biotechnology Breeding and Seed Systems for African crops Maputo Mozambique 26 29 March

Blair M W 2007 Discovery and utilization of common bean genetic diversity Phaseomics V meeting Varenna Italy 24 26 May

Blair M W 2007 Contribucion del frijol silvestre en el mejoramiento de caracteristicas agronomicos en el cultivo de frijol comun In X Congreso Asociacion Colombiana de Fitomejoramiento y Produccion de Cultivos Pasto Nariño 5 7 June

Blair M W Restrepo J Pradilla A Gracia, B Araujo C de Plata, C Mosquera M Ariza Nieto M Glahn R P Pachón, H Astudillo C Caldas G V 2007 Desarrollo y utilizacion de frijoles con alto contenido de minerales y maiz de alta calidad proteica en un programa de intervencion nutricional en el sur occidente de Colombia Presentado en X Congreso Asociacion Colombiana de Fitomejoramiento y Produccion de Cultivos Pasto Nariño 5 7 June Awarded 2 ^{d} prize for presentations

Blair M W 2007 Race structure and relationships among ecotypes in cultivated common bean (*Phaseolus vulgaris* L) Presented at the Annual General Meeting Generation Challenge Program Benoni South Africa 12 16 Sept

Blair M W 2007 Fitomejoramiento nutricional y uso de caraota biofortificada y maiz QPM para la nutricion humana Caso Proyecto Fontagro Maracay Venezuela, 3 Oct

Blair M W 2007 Bean genetics and genomics at CIAT Chinese Academy of Agricultural Science Beijing China 10 Oct

Blair M W 2007 Bean genetics and genomics at CIAT Kazusa Institute Tokyo Japan 23 Oct

Blair M W 2007 Microsatellite marker diversity in common bean (*Phaseolus vulgaris* L) Paper presented at the Bean Improvement Cooperative Meeting Madison USA 28 Oct 1st Nov

Blair M W C Astudillo G V Caldas J Rengifo S E Beebe P Kimani R Graham, M Grusak, M Ariza Nieto R. Glahn R Welch 2007 Progress and potential for improving micronutrient content in common beans Bean Biofortification Harvest Plus Challenge Program Purdue University West Lafayette USA 2 Nov

Bueno J M 2007 Manejo de la mosca blanca en habichuela In Taller de capacitación Prácticas de Manejo en tomate y habichuela, Bañado de la Cruz Comarapa Bolivia, 2 Dic

Bueno J M 2007 Manejo de plagas del frijol Presentado en Taller de capacitación para tecnicos agricolas San Isidro Comarapa Bolivia, 4 Dic

Chemining wa, G N J H Nderitu P M Kimani O L E Mbatia and A Ndegwa 2007 Progress in snap bean research at the University of Nairobi Eastern and Central Africa Bean Research Network review and planning workshop Arusha Tanzania,12 16 March

Chirwa, R M J C Rubyogo E Mazuma, M Amane and C Madata 2007 Creating Impact Oriented Bean Seed Delivery Systems for the Poor in Malawi Mozambique and Tanzania Presentation during the McKnight Foundation – Collaborative Crop Research Programme Grantees Conference From Community to Community Chantilly France 1 6 Dec

Kandie P K J H Nderitu G H N Nyamasyo and P M Kimani 2007 Bean bruchid (*Acanthoscelides obtectus* say) management technologies on stored beans in eastern Kenya Eastern and Central Africa Bean Research Network review and planning workshop Arusha Tanzania, 12 16 March

Kimani P M 2007 Bean breeding in Kenya An Overview Kirkhouse Trust East African Bean Workshop Nairobi Kenya 18 20 March

Kimani P M 2007 Collection and characterization of bean germplasm Training in Research Methods Workshop for WECABREN Bafassoum Cameroon 19 24 Nov

Kimani P M 2007 Participatory plant breeding Theory and Practice Training in Research Methods Workshop for WECABREN Bafassoum Cameroon 19 24 Nov

Kimani P M 2007 Participatory plant breeding Some practical issues Training in Research Methods Workshop for WECABREN Bafassoum Cameroon 19 24 Nov

Kimani P M 2007 Germplasm sources for bean breeding programs Training in Research Methods Workshop for WECABREN Bafassoum Cameroon, 19 24 Nov

Kimani P M 2007 Standard evaluation system for bean germplasm Implications for West African Bean Research Network. Training in Research Methods Workshop for WECABREN Bafassoum, Cameroon 19 24 Nov

Kimani P M S Beebe and M Blair 2007 Breeding micronutrient dense bean varieties in East and Central Africa Presented at BIC/NAPIA 50th Anniversary Conference Madison Wisconsin USA 29 Oct 2 Nov

Kimani P M and A W Mwang ombe 2007 Yield stability in bean lines with multiple disease resistance The Rockefeller Foundation Third Biotechnology Breeding and Seed Systems conference Maputo Mozambique 26 29 March

Kimani P M 2007 Overview of micronutrient rich (Biofortified) beans project Eastern and Central Africa Bean Research Network review and planning workshop Arusha Tanzania 12 16 March

Kimani P M 2007 Breeding Micronutrient Dense Bean Varieties in East and Central Africa Eastern and Central Africa Bean Research Network review and planning workshop Arusha, Tanzania 12 16 March

Musoni A P M Kimani R D Narla and R. Buruchara 2007 Inheritance of resistance against Fusarium wilt disease in climbing beans The Rockefeller Foundation Third Biotechnology Breeding and Seed Systems conference Maputo Mozambique 26 29 March

Muthoni R and Rubyogo J C 2007 Progress towards PABRA Framework 2003 2006 Proceedings of the 2007 PABRA Steering Committee Meeting Nazareth Ethiopia

Muthoni R 2007 Assessing Reaching End User Programs CIAT EPMR presentation Cali Colombia 21 May

Muthoni R 2007 Experiences from the Bean Program CIAT Africa Strategy Meeting Nairobi Kenya
14 Sept

Muthoni R 2007 Methodologies for Monitoring & Evaluation Surveys in PABRA Selected member countries PABRA steering Committee meeting Mbeya Tanzania, 3 Nov

Namayanja, A F Opio R Buruchara R Otsyula M Ugen P M Kimani R. Takusenya and F Bagazonzya 2007 Participatory selection identification and release of common bean (*Phaseolus vulgaris* L) genotypes tolerant to low soil fertility and bean root rot disease in Uganda The Rockefeller Foundation Third Biotechnology Breeding and Seed Systems conference Maputo Mozambique 26 29 March

Navia M Mahuku G and Henriquez M A 2007 Perfiles de expresión de la respuesta incompatible entre el frijol comun y *Phaeoisariopsis griseola* XXVIII Congreso de Ascolfi Asociacion Colombiana de Fitopatologia y Ciencias Afines CIAT Palmira. Colombia 1 6 Oct

Okonda B P M Kimani and J K Keter 2007 Effect of liming on seed iron and zinc concentration and grain yield of common bean grown in some Kenyan soils Presented at the International Symposium on Innovations for the Green revolution in Africa Arusha Tanzania, 17 23 Sept

Polania J I M Rao S Beebe and R Garcia 2007 Evaluacion del desarrollo y distribucion de raices bajo estres por sequia en 16 genotipos de frijol comun (*Phaseolus vulgaris* L) usando cilindros plasticos en condiciones de invernadero Paper presented at the XXXVII Congreso Anual de COMALFI Sociedad Colombiana de Control de Malezas y Fisiologia Vegetal Santa Marta Colombia 2 4 May

Pyndji M 2007 Brief Overview of PABRA Networks and Achievement Highlights Presented at PABRA Proposal Writing Workshop CMRT Egerton University Njoro Kenya 26 30 Nov

Pyndji M and R Buruchara 2007 Evaluation du germplasme resistant aux contraintes de production de haricot WECABREN Training Workshop on Bean Research Methodologies Bafoussam, Cameroon 19 24 Nov

Pyndji M and R Buruchara 2007 La Lutte Integree Contre les Maladies du Haricot Commun WECABREN Training Workshop on Bean Research Methodologies Bafoussam Cameroon, 19 24 Nov

Pyndji M 2007 ECABREN Achievement Highlights and Impact Presentation at the ASARECA Network Review Arusha, Tanzania, 6 Aug

Pyndji M 2007 ECABREN Research Highlights 2006 Presented to the PABRA Steering Committee Meeting Nazareth Ethiopia 25 28 March

Pyndji M 2007 ECABREN Overview and Objectives of the 2nd Projects Review and Planning Meeting Presentation at the Second Biofortification and Snap Bean Projects Review & Planning Meeting Arusha, Tanzania, 12 15 March

Pyndji M 2007 Introduction to the Eastern and Central Africa Bean Research Network (ECABREN) Presentation at the Joint ECABREN SABRN Review and Planning Meeting Outspan Hotel Nyeri Kenya, 21 27 Jan

Rangel A F I M Rao and W J Horst 2007 Spatial aluminum sensitivity of root apices of two common bean (*Phaseolus vulgaris* L) genotypes with contrasting aluminum resistance In Jahrestagung der Deutschen Gesellschaft für Pflanzenernährung Berlin, Humbolt Universität zu Berlin

Rao I M S Beebe J Ricaurte C Cajiao J Polania and R Garcia 2007 Phenotypic evaluation of drought resistance in advanced lines of common bean (*Phaseolus vulgaris* L) Paper presented at ASA CSSA SSSA International Annual Meeting New Orleans LA USA 4-8 Nov

Rao I M J Polania, R Garcia and S Beebe 2007 Desarrollo de un metodo en invernadero usando tubos con suelo para cuantificar diferencias fenotipicas en desarrollo y distribución de raices en lineas avanzadas de frijol comun bajo condiciones de estrés por sequía Paper presented at the LIII Reunion Anual de PCCMCA (Program Cooperativo Centroamericano para el Mejoramiento de Cultivos y Animales) Antigua Guatemala Guatemala 23 27 April

Rubyogo J C L Sperling L Nasirumbi and Cindi Kasambara 2007 Developing seed systems with and for the poor and marginalized Case of beans (*Phaseolus vulgaris* L) in eastern central and southern Africa. Paper presented in Workshop on Farmer First Revisited Farmer Participatory Research for Development Institute of Development Studies (IDS) University of Sussex –UK 12 14 Dec

Rubyogo J C 2007 Farmers Bean Seed Quality Concerns Myth or Reality? Case Studies from the East and Central Africa Regions CIAT internal Seminar Cali CO 15 May

Rubyogo J C 2007 Seed systems Development Reliable avenue to assess improved bean varieties with farmers and accelerating seed access Training module for WECABREN scientists at Golden Center Baffoussam, Cameroon 19 24 Nov

Rubyogo J C 2007 Wider Impact Approach to Supply Bean Seed Quickly and Efficiently Training module for WECABREN scientists at Golden Center Baffoussam Cameroon 19 24 Nov

Wagara I N and P M Kimani 2007 Field evaluation of micronutrient rich beans for resistance to biotic stresses Eastern and Central Africa Bean Research Network review and planning workshop Arusha, Tanzania 12 16 March

5 4 PROCEEDINGS POSTERS ABSTRACTS AND OTHERS

PROCEEDINGS

Habtu Assefa D Dauro M Tariku S Gebeyehu A Asfaw B Tesso and P M Kimani 2007 Participatory plant breeding with women and small scale farmers A case study in Haricot bean in Ethiopia pages 30 94 In Food and Forage Legume of Ethiopia Progress and Prospects ICARDA Allepo Syria

Kimani P M L Lubanga, G Rachier and V Ruganzu 2007 Breeding common bean for tolerance to low fertility acid soils in East and Central Africa In Bationo A et al (eds) Innovations for the Green Revolution in Africa. Proceedings of an International Symposium, Arusha, Tanzania, 17 23 Sept

MAJOR PROJECT REPORT

Sperling L Aberra Deressa, Solomon Assefa, Teshale Assefa S J McGuire Berhanu Amsalu Gebremichael Negusse Asrat Asfaw Wendafrash Mulugeta Belete Dagne Gebrehiwot Hailemariam Anbes Tenaye Beneberu Teferra Chimdo Anchala, Habtamu Admassu Hadush Tsehaye Endrias Geta Daniel Dauro and Yealembirhan Molla 2007 Long Term Seed Aid in Ethiopia Past present and future perspectives Addis Ababa and Rome Ethiopian Institute of Agricultural Research International Center for Tropical Agriculture and Overseas Development Group Project and report funded by the International Development Research Centre and the US Agency for International Development Office of Foreign Disaster Assistance 141 pp

Websites where report is posted

IDRC http //www idrc ca/uploads/user S/11954879961Long_Term_Seed_Aid_in_Ethiopia _full_report pdf

And http //shorterlink co uk/13257

CIAT http //www ciat cgiar org/africa/pdf/long_term_seed_aid_Eth07

University of East Anglia (new as of last Friday) DEV/ODG Report and Policy Papers No 1 http //www1 uea ac uk/cm/home/schools/ssf/dev/research/publications/rpp

Databases where report can also be found

ALNAP Active Learning Network for Accountability and Performance in Humanitarian Action on their Evaluative Reports Database
http //apps odi org uk/erd/ReportDetail aspx?reportID=3557

ELDIS Resource guide database for Aid Link at
http //www eldis org/go/topics/resource guides/aid&id=34306&type=Document

ELDIS also listed it under Agriculture + Aid
http //www eldis org/go/topics/resource guides/agriculture&id=34306&type=Document

A posting to NATURAL HAZARDS DISASTERS list serv (mainly UK, includes activists scholars and practitioners announcing the report)

POSTERS

Astudillo C A Hoyos M W Blair 2007 Evaluacion del contenido de hierro y cinc y su respuesta al nivel de fertilizacion con fósforo en 40 variedades de frijol colombiano X Congreso Asociacion Colombiana de Fitomejoramiento y Produccion de Cultivos Pasto Nariño CO

Blair M W Hector F Buendia, Lucy Diaz Juan M Diaz Myriam C Duque Steve Kresovich Sharon Mitchell Maria J Peloso Rosana Brondani Xiaoyan Zhang Shumin Wang Teresa Avila, Ximena Rojas Andrea Davila Sandra Lorigados 2007 Race structure and relationships among ecotypes in cultivated common bean (*Phaseolus vulgaris* L) Annual General Meeting Generation Challenge Program Benoni South Africa.

Blair M W Restrepo J Pradilla, A Gracia, B Araujo C de Plata C Mosquera, M Ariza Nieto M Glahn R P Pachón H 2007 Development and Utilization of High Mineral Beans in Combination with Quality Protein Maize as a Nutritional Intervention in Southwestern Colombia Micronutrient Forum 2007 Ankara, Turkey

Caldas G V Blair M W Restrepo J Villada D Ojeda, P Bravo L C 2007 Análisis multilocacional del contenido de taninos condensados en variedades de frijol comun X Congreso Asociacion Colombiana de Fitomejoramiento y Produccion de Cultivos Pasto Nariño

Del Peloso Maria José Priscila, Z Bassinello Leonardo Cunha Melo Luis Cláudio de Faria, Cleber Morais Guimarães Steve Beebe Rosana Brondani Mathew Blair José Luiz Viana de Carvalho Marília R. Nutti 2007 Germplasm identification and development of common bean cultivars with high Zinc contents Harvest Plus Meeting Rio de Janeiro Brazil

Eticha D I M Rao and W J Horst 2007 Interaction between aluminium toxicity and drought stress in common bean (*Phaseolus vulgaris* L) genotypes Poster presented on the Annual Meeting of the German Society of Plant Nutrition, DGP in Berlin Germany

Kimani P M B Okonda and J P Keter 2007 Influence of fertilization with inorganic macroelements on micronutrient density in common bean genotypes Eastern and Central Africa Bean Research Network review and planning workshop Arusha, Tanzania

Montoya C A Leterme P Souffrant W B Victoria N F Beebe S and Lalles J P 2007 The biochemical type of phaseolin affects its enzymatic hydrolysis *in vitro* Poster presented in 6th European Conference on Grain Legumes GLIP Lisbon

Pyndji M 2007 Series of posters prepared for 3rd ASARECA Board of Directors held in Entebbe Uganda, 21 25 July

1 Eastern and Central Africa Bean Research Network
2 Navy Bean Production in Ethiopia A success Story
3 ECABREN Research Priorities
4 Enhanced Utilization of Micronutrient Rich Beans for Improved Nutrition and Income
5 Enhancing Competitiveness of Snap Bean for Domestic and Export Markets
6 ECABREN 2007 Eastern and Central Africa Bean Research Network www ecabren org

Rubyogo J C Tembo F Chirwa, R Mazuma, E Amane M and C Madata 2007 Collaborative Research Programm for creating impact oriented bean seed delivery systems for the poor in Malawi Mozambique and Tanzania

ABSTRACTS

Mahuku G S Navia, M Buruchara, R Matta, A and Otsyula R 2007 Development of PCR markers tightly linked to *Pyult1* a gene that confers *Pythium* root rot resistance in the common bean genotype AND1062 Phytopathology 97 S69

Mahuku G Buruchara, R Navia M and Otsyula R 2007 Genes that confer resistance to *Pythium* root rot in common bean genetic characterization and development of molecular markers 3 d general meeting of the Rockefeller Foundation supported program on Biotechnology Breeding and Seed systems for African crops Maputo Mozambique 26 29 March p 123

OTHERS

Jaimes H 2007 Evaluation of bean interspecific hybrids for resistence to *Acanthoscelides obtectus* Tesis de Maestria en Fitomejoramiento Universidad Nacional de Colombia Sede Palmira (in press)

Sotelo P 2007 Herencia de la resistencia a un nuevo begomovirus en habichuela (*Phaseolus vulgaris* L) en el Valle del Cauca Tesis de Maestría en Fitomejoramiento Universidad Nacional de Colombia Sede Palmira (in press)

5 5 EDITORIAL CONTRIBUTION

Sperling L 2007 Reviewed articles for World Development Human Ecology Agricultural Systems Euphytica

6 LIST OF SPECIAL PROJECTS

6 1 AT HEADQUARTERS

6 1 1 New proposals approved in 2007

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available in 2007 (US$)
Improved beans for Africa and Latin America	DFID UK	2007	112 973		112 973
TL1 Improving tropical legume productivity for marginal environments in sub-Saharan Africa (Headquarters component)	BMGF grant to GCP	2007 2010	1 867 328	115 000	307 601
TL2 Enhancing grain legumes productivity production and income of poor farmers in drought prone areas of sub Saharan Africa and South Asia (HQ component)	BMGF grant to CGIAR	2007 2010	3 454 802	2 866 084	127 456
Nutritional Improvement of the important pulse legume the common bean, through the reduction of seed tannin content, for the benefits of people diet in Africa and Latin America	CIDA/Univ of Saskatchewan	2007 2010	CAD 225 000	CAD 65 400	CAD 54 200
Variedades de frijol tolerantes al estres abiotico de la baja fertilidad y la sequia, y a la sostenibilidad productive y alimentaria de Centroamerica	Red SICTA SDC	Mayo 2007 Sept. 2008	246 100		35 350

6 1 2 List of ongoing special projects in 2007

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available in 2007 (US$)
Commissioned Research-GCP Consortium Members TILLING mutagenesis and drought gene analysis	Generation Challenge Program	2006-2007	103 879		36 074
Reducing pesticide use and pesticide resistance in rice and beans in the Andean zone	FONTAGRO	2006 2009	125 000	17 000	12 100
Fighting Drought and Aluminium Toxicity Integrating Genomics Phenotypic Screening and Participatory Research with Women and Small Scale Farmers to Development Stress Resistant Common Bean and Brachiaria for the Tropics	BMZ	2006-2009	€ 1 100 000	€ 344 560	€ 251 577

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available in 2007 (US$)
Bean genomics for improved drought tolerance in Latin America	BMZ Germany (no cost extension)	2003 2007	€ 740 000	27,274	
Biofortified Crops for Improved Human Nutrition – Harvest Plus Challenge Program (Yearly contracts)	Gates Foundation World Bank DANIDA Denmark	2003 2008	305 000	50 000	255 000
Obtencion de nuevas variedades de frijol comun con atributos de rendimiento y potencial para nuevos mercados utilizando selección convencional y asistida por marcadores moleculares	COLCIENCIAS/ Universidad Nacional de Colombia	2004 2007	8 235		1 330
Mejoramiento de la nutrición humana en comunidades pobres de América Latina utilizando maiz (QPM) y frijol comun biofortificados con micronutrientes	FONTAGRO	2004 2007	350 000	36 701	53 384
Combating hidden hunger in Latin America Biofortified crops with improved vitamin A essential minerals and quality protein (AgroSalud)	CIDA	2004 2010	20 000 000		228 140
Integrated management of whiteflies in the tropics	DFID	2005 2008	80 610	27 893	50 946
Increasing Food Security and Rural Incomes in Eastern Central and Southern Africa through Genetic Improvement of Bush and Climbing Beans (Headquarters component)	RF	2005 2008	US 254 000		43 750

6 2 In Africa

6 2 1 New proposals approved in 2007

Title	Donor	Funding period	Total Amount US	Amount to partners US$	Available in 2007 US$
TL1 Improving tropical legume productivity for marginal environments in sub-Saharan Africa (African component)	BGMF	2007 2010	115 000		115 000
TL2 Enhancing grain legumes productivity production and the incomes of poor farmers in drought prone areas of sub Saharan Africa and South Asia Seed Systems (African component)	BGMF	2007 2010	2 866 084 1 368 000 million seed systems	631 000	433 110
Intensification of climbing bean based agro ecosystems (Great Lakes region backstopped by ECABREN Funding to NARS to resume in 2008)	EU/ ASAREC A	2007 2010	€ 419 568		
Putting Seed Security at the Heart of Agricultural Relief and Recovery Response (Focus on SSSA and Tool Development)	USAID/ OFDA Cost extension	2007 2008	409 000		
Export marketing of beans in ECABREN countries (Not implemented by ECAPAPA due to internal reorganization)	USAID/ REDSO/ EA	Ending by 9/07	25 000		
Marker assisted bean breeding	Kirkhouse Trust	3 years	$180 000 (excluding equipment)	To be determined in March 2008	To be determine d in March 2008

6 2 2 List of ongoing special projects in 2007

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available to CIAT (US$)
Effects of root rots on beans on Biodiversity	Gines Mera Fellowship	2006 2008	10 000		
Enhancing competitiveness of snap bean for domestic and export markets	ASARECA/EU Funding suspended in June 2007 and could resume in early 2008	2006-2009	€419 754		
Getting back to basics creating impact-oriented bean seed delivery systems for the poor in Malawi Mozambique and Tanzania	McKnight CIAT/SABRN in partnership with NARS in Malawi Tanzania and Mozambique	2006-2010	US$ 418 940		
Improved Smallholder food Security Nutrition and Income through Increased Production and Marketing of Climbing Beans	McKnight Initiated by ICRAF in partnership with NARS in Malawi and Mozambique and CIAT TSBF/SABRN	2006 2010	US$ 418 940		

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available to CIAT (US$)
Nutribean	VLIR/ Belgium	2006 2011	US$ 384 000		
Improving Resilience of production systems in Great Lakes Region	DGDC/ Belgium	2006-2011	€ 1 938 392		
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	107 661		40 000
Enhanced utilization of nutrient rich beans for nutrition and income	ASARECA/ USAID	2005 2007	US 280 000	280 000	
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 No cost extension	2005 2007	US 232 705	66 932	49 420
Increasing Food Security and Rural Incomes in Eastern Central and Southern Africa through Genetic Improvement of Bush and Climbing Beans (African component)	RF	2005 2008	US 254 000		62 048
East and Central Africa Bean Research Network – ECABREN Phase III	USAID/ REDSO	2007 One year No cost extension	US 301 000		
Supporting improved nutrition food security and community empowerment for poverty alleviation – PABRA	SDC	2004 2007	US2 165 139	90 000	600 590
Application of marker assisted selection (MAS) for the improvement of bean common mosaic necrotic virus resistance in common bean (*P vulgaris)*	USAID/ through ASARECA Competitive Grant System	2004-2007	US 150 000	147 818	
Climbing bean & agroforestry interventions	FARM AFRICA MATF	2004-2006	UK £59 997	UK £59 997	
Supporting improved nutrition food security and community empowerment for poverty alleviation – PABRA III	CIDA	2003 2008	US5 298 787	155 000	1 269 992
Assessing The Effect of Long Term Seed Aid in Ethiopia	IDRC	2005 2007	US 232 705	66 932	49 420

Title	Donor	Funding period	Total amount	Amount to Partners (US $)	Available in 2006 (US$)
Increasing Food Security and Rural Incomes in Eastern Central and Southern Africa through Genetic Improvement of Bush and Climbing Beans	RF	2005 2008	US 254 000	34 000	83 738
East and Central Africa Bean Research Network	ASARECA/ USAID	2003 2006	US 319 000		239 500
East and Central Africa Bean Research Network – ECABREN Phase III	USAID/ REDSO	2007 One year No cost extension	US 301 000		
Supporting improved nutrition, food security and community empowerment for poverty alleviation – PABRA Phase III	CIDA	2003 2008	US5 298 787	155 000	1 269 992
Supporting improved nutrition food security and community empowerment for poverty alleviation – PABRA	SDC	2004 2007	US2 165 139	90 000	600 590
Climbing bean & agroforestry interventions	FARM AFRICA MATF	2004 2006	UK £59 997	UK£59 997	
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	

6 2 3 Regional research subprojects under SABRN

6 2 3 1 Financed through PABRA with funding from CIDA-Canada and SDC Switzerland

Activity set 1 1	Value $	Country
1 1 1 Continue collection, characterization of the African land races for agronomic and mineral traits	500	Angola
	500	D R Congo
	500	Tanzania
	500	Zambia
	500	Zimbabwe
1 1 2 Conduct participatory variety selection for fast track lines in ECABREN (Burundi Rwanda Uganda, Kenya Tanzania, Madagascar and Ethiopia) and SABRN	1000	Angola
	1000	D R congo
	1000	Malawi
	1000	Mozambique
	1000	Swaziland
	1000	Tanzania
	1000	Zambia
	1000	Zimbabwe
1 1 3 Increase seed of promising fast track lines for PYT/AYT for on farm testing with partners	500	Angola
	500	D R congo
	500	Malawi
	500	Mozambique
	500	Swaziland
	500	Tanzania
	500	Zambia
	500	Zimbabwe

1 1 4 Develop segregating populations for micronutrient	500	Malawi
	500	South Africa
	500	Tanzania
	500	Zambia
	500	Zimbabwe
Activity set 1 2		
1 2 1 Continue to characterize generate and evaluate segregating populations for resistance to major diseases low soil fertility moisture stress and BSM	500	Angola
	500	D R Congo
	500	Malawi
	500	Mozambique
	500	South Africa
	500	Swaziland
	500	Tanzania
	500	Zambia
	500	Zimbabwe
1 2 2 Conduct regional evaluations with farmers for low soil fertility BILFA selections	500	Angola
	500	D R Congo
	500	Malawi
	500	Mozambique
	500	Tanzania
	500	Zambia
1 2 3 Develop and/or validate screening technique for BSM resistance	2000	Zimbabwe
1 2 8 Evaluate F_5 and F_7 families of derived from crosses and backcrosses with Pythium and ALS resistance parents with partners	1000	Angola
	1000	Tanzania
	1000	Zambia
1 2 9 Characterize the diversity of Pythium spp in Malawi S Africa & other countries	3000	South Africa
1 2 12 Increase seed of drought tolerant materials and test with farmers in target areas across the PABRA region	1000	Angola
1 2 14 Develop and test bean materials for adaptation to the humid tropical lowlands (below 1000 m)	500	Angola
	500	Malawi
1 2 21 Evaluate F_4 families of medium large seeded Andean beans bred for drought tolerance (CIAT HQ)	500	Angola
	500	D R Congo
	500	Swaziland
	500	Zambia
	500	Zimbabwe
1 2 23 Selection and test climbing beans adapted to mid low altitudes (down to 1200 500 masl) (CIAT HQ and Africa)	500	Angola
	500	D R congo
	500	Zambia
	500	Zimbabwe
Activity set 1.3		
1 3 3 Conduct market chain analyses and identification of market opportunities in Madagascar DRC Uganda Rwanda, Burundi and South Ethiopia/northern Kenya border {ERI and partners} also in Zambia, south DRC and Mozambique	3000	D R Congo
	3000	Tanzania
	3000	Zambia

Activity set 1.4		
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	1000	Malawi
	1000	South Africa
	1000	Tanzania
	1000	Zambia
	1000	Zimbabwe
1 4 2 Continue evaluation and select for tolerance to low soil fertility and root rots from new multiple constraint populations of major market classes (red mottled, red kidney small red, large white and navy)	500	Angola
	500	D R Congo
	500	Lesotho
	500	Malawi
	500	Mozambique
	500	South Africa
	500	Swaziland
	500	Tanzania
	500	Zambia
	500	Zimbabwe
1 4 5 Continue with advanced yield trials of medium altitude climbing/bush/snap lines in both networks (ECABREN and SABRN countries) and identify candidate lines for release	1000	Angola
	1000	D R Congo
	1000	Lesotho
	1000	Malawi
	1000	Mozambique
	1000	South Africa
	1000	Swaziland
	1000	Tanzania
	1000	Zambia
	1000	Zimbabwe
1 4 7 Conduct more rapid eco-regional evaluations of best advanced lines and nurseries and identify candidate lines in major market classes for release	1000	Angola
	1000	D R Congo
	1000	Lesotho
	1000	Malawi
	1000	Mozambique
	1000	South Africa
	1000	Swaziland
	1000	Tanzania
	1000	Zambia
	1000	Zimbabwe
1 4 8 Continue to generate and select from segregating populations of climbing bean lines for priority trait combinations and grain types adapted to diverse agro ecological zones	1000	Angola
	1000	D R Congo
	1000	Malawi
	1000	Mozambique
	1000	Tanzania
	1000	Zambia
1 4 9 Apply participatory variety evaluation (PVS) of promising materials with end users especially women traders processors and exporters and thereby assess their acceptability	1000	Angola
	1000	D R Congo
	1000	Lesotho
	1000	Malawi
	1000	Mozambique
	1000	South Africa
	1000	Swaziland
	1000	Tanzania
	1000	Zambia
	1000	Zimbabwe
1 4 10 Produce adequate seed of all breeding materials for on station and on farm regional trials including PPB or PVS	500	Angola
	500	D R Congo
	500	Lesotho
	500	Malawi
	500	Mozambique
	500	South Africa

	500	Swaziland
	500	Tanzania
	500	Zambia
	500	Zimbabwe
1 4 15 Production of breeders and foundation seed to feed adequate amounts into seed supply chains with provision of variety descriptors	1000	Angola
	1000	D R Congo
	1000	Lesotho
	1000	Malawi
	1000	Mozambique
	1000	South Africa
	1000	Swaziland
	1000	Tanzania
	1000	Zambia
	1000	Zimbabwe
Activity set 2 1		
2 1 1 Sensitize trainers/extension service providers on participatory approaches in developing learning and dissemination of IPDM and ISFM	1000	D R congo
	1000	Malawi
	1000	Tanzania
2 1 2 Catalyze establishment and use of alternative learning approaches (e g demonstration plots) IPDM and ISFM technologies	500	D R Congo
	500	Malawi
	500	Swaziland
	500	Tanzania
2 1 3 Conduct analysis and bioassays on botanical pesticides and other farm products to determine active ingredient and appropriate application doses [Malawi to collect samples for analysis in at central lab in Kenya]	500	Malawi
2 1 5 Conduct uptake studies (socio-economic characterization dissemination and adoption) and assess the economic returns for ISFM and IPDM strategies	2000	Malawi
	2000	Tanzania
2 1 8 Assess the economic returns for utilization of Tithonia and other green manures DRC and Swaziland	1000	Swaziland
Activity set 3		
3 1 1 Continue wide national and regional dissemination of bean based technologies in ECABREN (8 countries) SABRN (7 countries) and CORAF (1 country) through fostering nationally facilitated strategic alliances with a variety of partners (NGOs CBOs) in sustainable seed production	1000	Angola
	1000	D R Congo
	1000	Malawi
	1000	Mozambique
	1000	Swaziland
	1000	Tanzania
	1000	Zambia
	1000	Zimbabwe
3 1 5 Facilitate production of promotional publications and translations in both networks (centrally produced)	3000	D R Congo
	2000	Malawi
	2000	Mozambique
	2000	Swaziland
	3000	Tanzania
	2000	Zambia
	2000	Zimbabwe

3 1 6 Catalyze scaling up of ISFM & IPDM technologies (i e non seed partnerships) Target areas Kenya, northern Tanzania, Eastern Congo Burundi Uganda and Madagascar	1000 500 500 1000 500 500	D R Congo Malawi Swaziland Tanzania Zambia Zimbabwe
3 1 7 Organize train and technically backstop community seed producers to bulk seeds	1000 1000 500 500 1000 1000	Angola D R Congo Lesotho Swaziland Zambia Zimbabwe
3 2.2 Analyze the different uptake pathways used (including schools) by the various partners in dissemination of technologies in southern Tanzania	2000	Tanzania
3 2 3 Support community seed banks in partnership with NGOs CBOs	500 500 500 500 500 500	Angola D R Congo Lesotho Swaziland Zambia Zimbabwe
3 3 1 Post harvest bean processing products for income generation & food diversification and promote new recipes (Ethiopia Uganda, Tanzania and Malawi)	2000 2000	Malawi Tanzania
TOTAL	**121500**	

6 2 3 2 Funded through the legumes crops collaborative research program (CCRP) under McKnight Foundation

Activity	Value $	Country
1 1 1 Identify potential germplasm for on farm testing	770 770 770	Malawi Mozambique Tanzania
1 1 2 Multiply germplasm to be used in PVS and on station yield trials	2343 2343 2343	Malawi Mozambique Tanzania
1 2 1 Train men and women partners/scientists in PVS (3 countries)	3000 3000 3000	Malawi Mozambique Tanzania
1 2 2 Strengthen partnerships for carrying out PVS (multiple sites per country)	2489 2489 2489	Malawi Mozambique Tanzania
1 3 1 Introduce partner farmer groups to the project & select trial sites	2109 2109 2109	Malawi Mozambique Tanzania
1 3 2 Package/label seeds and transport to local sites	2109 2109 2109	Malawi Mozambique Tanzania
1 3 3 Carry out PVS & on station yield trials (multiple sites per country)	4326 4326 4326	Malawi Mozambique Tanzania
1 3 4 Analyze results to highlight varietal preferences	1650 1650 1650	Malawi Mozambique Tanzania
2 1 1 Planning meeting with partners involved in seed	770 770 770	Malawi Mozambique Tanzania

2 1 2 Inventory of existing seed systems diffusion channels and acquisition means	1161	Malawi
	1161	Mozambique
	1161	Tanzania
2 2 1 Bulk up foundation seeds of client oriented bean varieties	3630	Malawi
	3630	Mozambique
	3630	Tanzania
3 1 1 Introduce the project to all partners 3 countries	1338	Malawi
	1338	Mozambique
	1338	Tanzania
Total	**77082**	

6 2 4 Regional research for development projects in ECABREN

Research for Development activities	Total amount (US$)	Countries/or institution
Developing acceptable bean varieties rich in protein and micro nutrients	54 600	Uganda, Burundi Madagscar DRC Rwanda, Sudan
Characterization of bean accessions and micronutrient analysis	16 800	Ethiopia, DRC Tanzania, Burundi
Dissemination of bush and climbing bean technologies	5 000	Rwanda
Exploiting genetic diversity of beans to address marginal environments	13 400	Uganda DRC Tanzania
On farm and national performance trials	12 500	Burundi Kenya
Evaluation and maintenance of BILFA/BIWADA materials	8 620	DR Congo Tanzania
Multiplication and increase of bean seed	8 000	Sudan DRC
Production of breeder/ foundation seed	43 140	Burundi Kenya, Madagascar Uganda, Univ of Nairobi
Validation and scaling up of developed ISFM/IDPM options	32 000	DRC Kenya, Madagascar Tanzania
Enhancing capacity of farmers in grain quality for processing	4 000	Ethiopia
Organizing stakeholders and scientists meetings	8 850	Kenya Uganda
Training in preparation of nutritive and income generating bean recipes	3 500	Burundi
Production and translation of promotional materials and bean materials	10 715	DR Congo Kenya, Sudan SARI Tanzania, SUA Tanzania
Facilitating technology uptake and scaling up through partnerships using PM&E in national bean programs	20 000	DRC Ethiopia Kenya, Madagascar & Rwanda,
Facilitating NARS information communication	3 400	Uganda Madagascar DRC

6 3 LIST OF PROJECTS SUBMITTED PROPOSALS AND CONCEPT NOTES PREPARED

6 3 1 AT HEADQUARTERS

Title	Donor	Comments	Funding period	Total amount US
Obtención y evaluacion de *Phaseolus vulgaris* y Zea mays tolerantes a la sequia	CYTED Spain	Approved	4 years	1 000 000
Development of a handling system of *Bemisia tabaci* in paprika and pepper in the Cauca Valley	MADR	Approved	2008 2011	US$ 65 000
Improvement of Chitti bean in Iran SPII Iran	Iranian government	Under negotiation	4 years	240 000
Integrated soil fertility management in the tropics Realizing the benefits of abiotic stress adapted common bean and forage germplasm in smallholder crop-livestock systems of Africa, Asia and Latin America	MOFF of Japan	(in review)		

6 3 2 IN AFRICA

Title	Donor	Comments	Funding period	Total amount US
Sustainable Community Based, Farmer Led Bean Seed Enterprises to Reach Communities Not Served By the Formal Seed Sector for Improved Income and Livelihoods in Uganda	NARO-Bean Programme Lead Proposal Target ProAGRA seed systems	Submitted (in support to NARS)		160 000
Improving smallholder farmer incomes and livelihoods through support towards the development of a sustainable community based supply and marketing chain of a sugar climbing bean variety NABE 12C for the canning industry	ProAGRA and DIFD Jointly developed by NARO- Bean Programme North East Chillie Producers Association Limited, ACOS International and CIAT PABRA	Submitted (in support to NARS)		523 288
Enhancing productivity nutrition and incomes through improved marketable climbing bean and biofortified bean varieties	Government of Kenya	In review	2008 2011	$110 000
Improving Food and Nutrition Security and Incomes of Smallholder Farmers in East and Central Africa through increased access to Markets and Technology Innovation	Belgium Development Cooperation (BADC)	Unsuccessful	2008 2011	$3 148 632
Climbing out from poverty Realizing the benefits from high yield potential of Climbing beans for smallholder farmers in Africa	JIRCA	Presented to donor in Jan 2008		

7 PROBLEMS ENCOUNTERED AND THEIR SOLUTION

Adjustments to financial limitations continued to distract from the basic research agenda at all levels of staff Ex post rechanneling of funds raised concerns with donors partners and staff including the use of funds for the newly implemented Research and Technical Support Negotiations on RTS extended through most of the year but a viable and more coherent system seems to be in place at present

CIAT infrastructure is in need of renovation and its state is beginning to affect the effectiveness of research especially for field research A project was submitted to the Bill and Melinda Gates Foundation that includes funds to renovate planting and irrigation equipment, and purchases have initiated

The retirement of the team entomologist and the closure of the bean pathologist position have left a vacuum with regard to the capacity to write and submit projects for funding for these areas thus the human resources in these sections are underused at present This is a continuing problem to be resolved with CIAT management

8 STAFF LIST (INCLUDING % TIME ASSIGNMENT)

8 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**)
*George Mahuku PhD Plant Pathologist (**80 / IP 1** 20/ PE 1)
Francisco Morales PhD Virologist (**70 % IP 1** 30% PE 1)
Idupulapati Rao PhD Plant Nutritionist, Physiologist (**30 / IP 1** 30/ IP 5 40/ PE 2)

8 2 STAFF IN AFRICA

Robin Buruchara Ph D Plant Pathologist/CIAT Africa Coordinator (stationed in Kampala, Uganda **65% IP 1** 35/ PE 1)
Rowland Chirwa, Ph D Plant Breeder/SABRN Coordinator (stationed in Lilongwe Malawi **100 % IP 1**)
Paul Kimani Ph D Plant Breeder for ECABREN (University of Nairobi/CIAT stationed in Nairobi Kenya **75 / IP 1**)
Rachel Muthoni B Sc MPA Monitoring and Evaluation Specialist (stationed in Kampala, Uganda **50 / IP 1** 50/ SN3)
Jemimah Njuki Ph D ERI Specialist (stationed in Malawi) – **50 / IP 1** 50/ PRGA
Martha Nyang aya M Sc Nutrition (stationed in Kampala Uganda) – **30 % IP 1** 70% ATDT
Mukishi Pyndji Ph D Plant Pathologist, ECABREN Coordinator (stationed in Arusha Tanzania **100 / IP 1**)
Jean Claude Rubyogo M Sc Seed System Specialist (stationed in Malawi – **100% IP 1**)
Louise Sperling Ph D Social Scientist, (stationed in Rome Italy **80 % IP 1** 20% SB 2)

9 SUMMARY 2007 BUDGET PREPARED BY FINANCES ACTUAL EXPENDITURES 2007

Outcome Line SBA 1 Beans

SOURCE	Bean Program			Total US$	(/)
	HQ + LAC	Africa	URG + Biotech		
Unrestricted Core	89 298		487 228	576,526	7/
Restricted Core C E + Japan	630 381			630 381	8/
Sub-total Core	**719,679**		**487,228**	**1,206,906**	**15/**
Restricted					
Special Projects	660,105	2,892 111	1,599,790	5,152,006	64/
Generation Challenge Program			187,290	187,290	2/
Harvest Plus	370 019			370 019	5/
Sub Total Restricted	**1,030,125**	**2,892,111**	**1,787,080**	**5,709,315**	**71/**
Direct Expenditures	**1 749,803**	**2,892,111**	**2,274,307**	**6,916,221**	**86/**
Non Research Cost	276 421	456,874	359,278	1,092 572	14/
Total Expenditures	**2,026,224**	**3,348,984**	**2,633,585**	**8,008,794**	**100/**

(1) Excluding Non Operational expenses Phase out and Fixed Assets adjustment

* Left in 2007