Feed the Future Innovation Lab for Collaborative Research on Grain Legumes: Technical Vision for 2013 - 2017

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2012 External Review of Dry Grain Pulses CRSP

• The Dry Grain Pulses CRSP is commended for significant achievements in bean and cowpea research, outreach, dissemination, capacity building and impact.

• The EET recommends that the Dry Grains Pulses CRSP be funded for another phase with “equal or greater total funding”.

USAID Decision

• To extend for 4.5 years
• Based on relevance of grain legumes in Feed the Future
• Re-brand as Feed the Future Innovation Lab for Collaborative Research on Grain Legumes

Technical Vision of Legume Innovation Lab

• Provide international leadership in bean and cowpea research
• Align with USAID’s Feed the Future Research Strategy
• Pursue an innovative refocused research agenda that builds upon past research advances in grain legumes
• Invest in research with high potential for impact
• Complement legume research of CGIAR, USDA/ARS and USAID
• Engage a new generation of scientists in international research
• Contribute to FTF agriculture sector development programs of USAID country and regional missions
International Research Leadership

- Innovative approaches to problem solving
- Applying cutting edge science
- Multi-disciplinary research collaboration
- Addressing knowledge and technology gaps
- Forming strategic partnerships to achieve objectives

Grain Legumes are priority crops in USAID’s Feed the Future “Global Food Security Research Strategy”

Multi-functional Roles of Grain Legumes

- Nutrient-dense staple foods
- Generate income as a profitable cash crops
- Increase sustainability of cropping systems (BNF)
- Enhance livelihoods of women
- Improve child growth, nutrition and health

Legume Innovation Lab Alignment with Feed the Future

- Prioritization of Strategic Research Objectives
- Focus on FTF Countries and Cropping Systems
- All-of-Government Approach
- Advancing Gender Equity
- Establishing Impact Pathways and Monitoring Performance Indicators
Legume Innovation Lab
Strategic Objectives (2013-17)

SO1. Advancing the Productivity Frontier for Grain Legumes
SO2. Transforming Grain Legume Systems and Value Chains
SO3. Enhancing Nutrition
SO4. Improving Outcomes of Research and Capacity Building

SO1. Advancing the Productivity Frontier for Grain Legumes

A- To enhance the genetic yield potential of grain legumes by exploiting new research tools afforded by genomics and molecular breeding approaches with a focus on improving resistances to economically important abiotic and biotic constraints.

SO1.A1 - NDSU (Juan Osorno)
SO1.A3 - MSU (James Kelly)
SO1.A4 - UPR (James Beaver)
SO1.A5 - UCR (Phil Roberts)

SO1.B- To sustainably reduce the yield gap for grain legumes crops produced by smallholder, resource-poor farmers in strategic cropping systems.

SO1.B1 - UIUC (Barry Pittendrigh)

SO2. Transforming Grain Legume Systems and Value Chains

To sustainably improve smallholder farmer production management decision-making and the performance of grain legume value-chains for the benefit of stakeholders.

SO2.1 - ISU (Robert Mazur)
SO2.2 - KSU (Vincent Amanor-Boadu)
SO3. Enhancing Nutrition

To improve the nutritional quality of diets and enhance the nutritional and health status of the poor especially young children and women through the consumption of grain legumes

SO3.1 WUSTL (Mark Manary)

SO4. Improving Outcomes of Research and Capacity Building

Impact assessment of CRSP and Legume Innovation Lab investments in research, institutional capacity building and technology dissemination for improved program effectiveness

SO4.1 MSU (Mywish Maredia)

Salient Features of LIL Portfolio

- Fewer (9) higher funded projects
- Focus on FTF countries and cropping systems
- Balance of continuing (7) and new (2) projects
- Refocused projects
- Strengthened project teams

Partnering U.S. Institutions

- Iowa State University
- Kansas State University
- Michigan State University (ME)
- North Dakota State University
- University of California-Riverside
- University of Illinois
- University of Hawaii
- University of Nebraska - Lincoln
- University of Puerto Rico
- Washington University in St Louis
- USDA-ARS
Legume Innovation Lab Cropping Systems, Regions and Countries

West Africa Sahel cowpea-cereal cropping system
Benin, Burkina Faso, Ghana, Mali, Niger, Senegal

Eastern/Southern Africa bean-maize cropping system
Malawi, Mozambique, Tanzania, Uganda, Zambia

Latin America/Caribbean bean-maize cropping system
Haiti, Honduras, Guatemala and Ecuador

“Game-Changing” Research with High Impact Potential

- Molecular markers developed for drought tolerance, CBB resistances, and cooking time in the Andean common bean gene pool (SO1.A3)
- QTLs identified for nitrogen fixation and associated traits in the Andean common bean gene pool (SO1.A3)
- Genetically improved tepary beans for improved seed and agronomic traits (SO1.A4)
- Bruchid resistance genes introgressed into commercial common bean seed types for Central America, Haiti and Eastern Africa (SO1.A5)
- Genetically improved middle-American climbing-bean lines for highland agro-ecologies of Guatemala (SO1.A1)
- Resistance traits and genes identified for increased resistances to aphids, thrips and pod-sucking insects in cowpea (SO1.A5)

Game-Changing Research with High Impact Potential

- Sustainable cowpea IPM solutions utilizing biological controls validated for scaling-up in West Africa (SO1.B1)
- Diagnostic tools and decision support aids developed to improve smallholder farmer soil fertility management (SO2.1)
- Factors influence food choices understood and performance of grain-legume value chains improved (SO2.2)
- Influence of common bean and cowpea in diets of children on growth, amelioration of Environmental Enteropathy, and on the intestinal micro-biome ecology

Tepary Bean - A solution to climate change
New Trait Discovery and Molecular Markers

- Biological Nitrogen Fixation in Common Bean
- Thrips and Pod-Sucking Insect Resistance in Cowpea

Strategic Partnerships

- U.S. universities & NARS
- CGIAR Grain Legume Program
- USDA-ARS
- USAID Climate Resilient Legumes Programs
- Foundations (BMGF, McKnight, etc.)

Improving Yield and Productivity of Middle American Climbing Beans

Leveraging legumes to combat poverty, hunger, malnutrition and environmental degradation

In collaboration with

- Generation Challenge Program (GCP)
- Brazilian Agricultural Research Corporation (EMBRAPA)
- Ethiopian Institute of Agricultural Research (EIAR)
- Indian Council of Agricultural Research (ICAR)
- Turkish General Directorate of Agricultural Research (GDA)
- Dry Grain Pulses Collaborative Research Support Program (Pulse CRSP)
- National agricultural research and extension systems in Africa, Asia and Latin America and the Caribbean
- National and international public and private sector research and development partners
Global Scope of CG Grain Legume Program

Achieving Synergies between LIL and CG Grain Legume Program

- **Collaborative research** toward common goals
- **Complementary research** to address strategic constraints and priorities
- **Beneficial research** by Legume Innovation Lab projects to address knowledge and technical gaps and opportunities

Legume Scholars Program

**Objectives**-

- To build human resource capacity of NARS in applying cutting-edge science to address future challenges facing the legume sector
- To facilitate greater collaboration in research between CGIAR and U.S. university scientists

Features of Legume Scholars Program

- Support for PhD and MSc graduate study at U.S. universities in disciplines of strategic need
- Identify bright young developing country professionals with interest in grain legumes
- Nominations made by CGIAR, Innovation Lab, or NARS scientists
- Field research to be conducted at CG center or in home country
Contribute to USAID Country and Regional Mission FTF Ag Sector Development Programming

**Associate Awards**
- Dissemination of improved varieties
- Seed systems
- Integrated crop management
- Integrated pest management
- Value-chain governance
- Nutrition education
- Institutional strengthening

Bean Technology Dissemination (BTD) Project-Honduras, Guatemala, Nicaragua, Haiti

- Beneficiaries reached with 5-20 lb sacks of bean seed
- Number of varieties disseminated
- Number of farmer organizations benefitted
- Number of farmers trained in seed production
- Productivity increased (%)

BTD Seed Multiplication and Dissemination Strategy

“Community Seed Banks”
- Leader farmers identified to receive training in seed production
- Provided “registered” seed to plant 0.5 – 1.0 ha
- Produced “Quality-Declared” seed for 20 – 40 smallholder farmers in a community
- Stored seed for future planting seasons

“MasFrijol” - Guatemala

Increasing Bean Productivity
- Promote locally adapted and preferred varieties
- Establish community seed banks (“Almacenes”)
- Access to PICS sacks for household storage

Improving Nutrition through Increased Bean Consumption
- Increase appreciation of beans as an “ancestral” staple crop and food
- Nutrition education focused on women’s groups
- Recipe competition, videos, mobile education units
MasFrijol Partnership

Community Almacenes and Health Posts

Public Health Technicians

Extension Agronomists

Expectations for Global Meeting

• Collective execution of LIL vision
• Team planning and coordination of projects
• Strengthening strategic partnerships
• Scaling-up for increased impact
• Contemplating future research agendas

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