Feed the Future Innovation Lab for Soybean Value Chain Research

Est. November 2013

Web: http://soybeaninnovationlab.illinois.edu
Twitter: @tropicalsoylab
SIL Research Pillars

**Sustainable Soy in Africa**

- **Plant Breeding and Germplasm Management**
- **Training and Education**
- **Soybean Management with Appropriate Research and Technology (SMART) Farms**
- **Households**
- **Soy Sustainability**
- **Value Chains**
- **Soy Foods**
- **Gender Equity**

**Cross-Cutting: Scientific Quality, Gender Equity, Capacity-Building, Nutrition and Environment**

- **Pillar I**
  - Genetic Improvement
- **Pillar II**
  - Crop Productivity and Quality
- **Pillar III**
  - Nutrition
- **Pillar IV**
  - Value Chains and Socio-Economic Research

**The Foundations Project**
Soybeans in Africa: The Soybean Innovation Lab

- Peter Goldsmith: PI
- Courtney Tamimie: Program Manager

**Plant Breeding and Germplasm:** Brian Diers and Randy Nelson, University of Illinois

**Production and Agronomy:** Dan Reynolds, Mississippi State University

**Plant Breeder Education:** Rita Mumm, University of Illinois

**Grain and Seed Quality:** Kristin Bilyeu, USDA/ARS and University of Missouri

**Utilization for Human Nutrition:** Craig Gunderson and Marilyn Nash, National Soybean Research Laboratory

**Utilization for Livestock Nutrition:** Mike Lacy, University of Georgia

**Economic Impacts:** Jill Findeis, University of Missouri

**Gender Impacts:** Kathleen Ragsdale and Lindsey Peterson, Mississippi State University

**Environmental Impacts:** Jeremy Guest, University of Illinois

**Seed Scaling:** Dennis Thompson, University of Illinois
Where we work: 2014
### Table 1. Funds Dedicated and Activities by Country

<table>
<thead>
<tr>
<th>Funds Dedicated (%)</th>
<th>Ghana</th>
<th>Mozambique</th>
<th>Zambia</th>
<th>Malawi</th>
<th>Ethiopia</th>
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<tbody>
<tr>
<td></td>
<td>67%</td>
<td>23%</td>
<td>8%</td>
<td>1%</td>
<td>1%</td>
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</tbody>
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#### Activity List

1. Plant breeding testing sites
2. Implementation of the Integrated Breeding Platform
3. Upgraded plant breeding capacities and equipment
4. Master's program in plant breeding
5. SMART Farm research center
6. Environmental Practices and Impact Assessments
7. Human Nutrition with "At Home" interventions (3 villages)
8. Soy in weaning foods study (2 villages)
9. VitaGoat enterprises (case study)
10. Savings and Internal Loan Community (case study)
11. Controlled study on soy sustainability (9 villages: 3 control; 6 test sites)
12. Women's Empowerment in Agriculture Index (9 villages: 3 control; 6 test sites)
Pillar I: Breeding and Genetic Improvement

The development and distribution of new varieties is critical to the profitability of soybean.
Breeding and Genetic Improvement

- Goal is to help enable breeders in Africa to develop high yielding, nutritious, and climate change resilient varieties.

- Africa has depended on the IITA breeding program for new soybean varieties.

- SARI has mostly tested and released IITA lines adapted to Ghana.

- We are helping the SARI program to be more effective in developing varieties for northern Ghana.
Soybean Breeding at SARI

Nicholas Denwar is the soybean breeder at SARI.

SIL is providing Nicholas with:

- Basic equipment for breeding.
  - Threshers, planters, vehicle, push planters.
- Elite germplasm that can feed into the breeding effort.
- Technical expertise to help in the breeding effort.
Soybean Breeding at SARI

- Needs for the breeding program.
  - Training for technical staff.
  - Resources and equipment to produce high quality breeder’s seed.
- Infrastructure including:
  - Seed lab
  - Irrigation capacity for off season generation advancement.
  - Additional screen house space.
SIL Plant Breeding MS Program

- The goal is to educate African students in an MS program so they can become effective managers of breeding programs.
- Program will be taught at WACCI and include internships in the USA.
- First class of student will start July 2015.
- There is a need for scholarships for the program.
Pillar II: Crop Productivity, Seed Management, and Quality

- The SMART (Soybean Management with Appropriate Research and Technology) Farms are at the Ghanaian Government’s Savanna Agricultural Research Institute (SARI) in northern Ghana (Tamale, Wa & Bawku).
Smart Farm Experiments

- Experiments have started for the summer of 2014.
- George Awuni hired to run the tests.
- Tests being done to study:
  - Germination evaluation
  - Planting date
  - Varieties
  - Amendments
    - Phosphorus
    - Inoculum
  - Planting methods.
Pillar III: Nutrition

- Develop seed composition traits to support soybean development in Africa
- Develop molecular tools, germplasm, and extension to support soybean systems
- Increase soy utilization and integration in household diets
Develop seed composition traits to support soybean development in Africa

- The “low processing” soybean
  - Reduce heat labile anti-nutritionals
  - Kunitz trypsin inhibitor (kti3)
  - Lectin (le)

- Introgress into African-released variety
  - SARI/IITA ‘Jenguma’
  - Ghana: “stay and wait for me”- (non-shattering)
Pillar IV: Increase soy utilization and integration in household diets

Social Science Research-Surveys

Seed kit explanation by IIAM extension agent
Social Science Experiment: What is responsible for success with soybean?

- Nine villages selected in Mozambique and Ghana (three villages in three regions)
- Baseline household surveys
- Variable=Soybean Success Kits (5 lbs seed, 4 lbs P fertilizer, small pack inoculum, seed bag with printed extension material)
- Kits distributed to every household in 2/3 of villages (1200 kits per country)
- Follow up surveys each year-social science research
Mozambique: 1200 kits distributed!

Extension

400 kits for one region

Distribution lessons
Ghana: Social Science/Gender/Seed systems

Growing season: June - October
Micro Credit Pilot Program

- Soybean is a commercial crop that sells for cash, requires inputs and therefore requires credit.

- A total of six Savings and Internal Loans Communities (SILCs) have been developed in collaboration with Catholic Relief Services in three communities located in one district in northern Ghana.

- Baseline data will be collected among the SILCs on group savings, loans and spending. Data on household agronomic practices and food expenditure will also be recorded.

- SILCs are being evaluated as an opportunity for small-scale soybean producers to access credit.

- This is being done as a test case.
Tropical Soybean for Development Workshop

- Focus is to support soybean practitioners including researchers, extensionists, and agronomists.
- Will be held October 28 in Washington DC.
- Sign up for webcast of the event at http://soybeaninnovationlab.illinois.edu/tropical-soybean-development-workshop
- More information available on twitter at @tropicalsoylab or our website at http://soybeaninnovationlab.illinois.edu/
Questions?