FEED THE FUTURE INNOVATION LAB
FOR LEGUME SYSTEMS RESEARCH

The Feed the Future Innovation Lab for Legume Systems Research is a five-year research capacity building development program managed by Michigan State University that focuses on grain legumes in West and Southern Africa. Legumes are a nutrient-dense staple crop that have multifunctional roles in smallholder farm systems in developing countries including food and nutrition security, generating income, providing livestock feed and fodder, and contributing to the sustainability of soil systems through their nitrogen-fixing capabilities. Cowpea and common bean are the focal crops of the Legume Systems Innovation Lab.

The Legume Systems Innovation Lab goals include:

Inclusive and sustainable agriculture-led economic growth

Strengthened resilience among people and systems

A well-nourished population, especially among women & young children

The strength of the Legume Systems Innovation Lab's design lies in its innovative and vibrant research to scaling strategy using a systems approach. Supported projects are diverse in research focus and address both the development and placement of innovative technologies with a thorough understanding of the systems they will impact thus leading to successful adoption. Projects are focused in three areas of inquiry:

- Integration of legumes into sustainable smallholder farming systems and agricultural landscapes
- Integration of legumes within local and regional market systems, including trade
- Analysis of sociocultural and/or economic motivators or barriers to legume utilization at various stages and scales within production and market systems

In addition, the Legume Systems Innovation Lab will focus on opportunities that address nutrition; the unique needs of women and youth; ensure greater resilience of people and systems under stress and shocks; and contribute to the development of human and institutional capacity for a resilient agricultural innovation system. Project activities are focused in the Feed the Future target and aligned countries of Benin, Burkina Faso, Ghana, Mali, Malawi, Mozambique, Niger, Nigeria, Senegal, and Zambia.

The Legume Systems Innovation Lab is funded by USAID under the Feed the Future Initiative.

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PROJECT OVERVIEW:

Development of Market-Driven Improved Cowpea Varieties Using Mature-Markers

Principal investigator/Lead institution
Dr. Philip Roberts, University of California, Riverside

Collaborating institutions
- Centre National Recherches Agronomie, Bambey, Senegal
- Institut Senegalais de Recherches Agricole (ISRA) & Dry Cereal Research Center (CERAAS), Senegal
- CSIR-Savanna Agricultural Research Institute (SARI), Ghana
- Institut de l'Environnement e Agricole (INERA), Burkina Faso

Project Overview

Cowpea is a highly nutritious legume crop vitally important to food security in the Sudano-Sahel of West Africa, especially for women and children. However, typical smallholder farmer yields are 10-20% of potential, mainly due to insect pests, pathogens, parasites, and drought.

This project focuses on Ghana, Senegal, and Burkina Faso; three countries in the West Africa cowpea production region that provide a broader regional representation of West Africa cowpea production systems.

Cowpea downstream breeding will utilize previously discovered SNP marker haplotypes linked to target traits. A suite of marker-trait pairs is being used in improvement of elite varieties and lines through indirect selection for enhanced variety release.

Tolerance/resistance to aphids, thrips, Macrophomina, and Striga, together with drought tolerance and preferred grain quality (large seed, rough seed-coat, seed color) are being targeted to improve current popular varieties, and in advanced breeding population lines selected for market-driven preferred grain types.

In California, cowpea dry grain novel market classes of breeding lines will be advanced, utilizing marker resources and advanced breeding lines for overlapping trait targets with the West Africa targets.

Primary capacity building will be achieved by graduate degree training in cowpea breeding and genetics, coupled with short-term annual training of NARO scientists in molecular breeding.

The outputs and associated capacity building will increase pulse productivity via yield gain, thereby promoting dietary nutritional value and the livelihoods of women and youth, and resilience by increased household incomes.

This project works in Senegal, Ghana, and Burkina Faso.