FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

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.

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PROJECT OVERVIEW:

Optimized Shrub System: Improving Cowpea Yields And Strengthening Smallholder Resilience

Principal investigator/Lead institution
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Project Overview

West Africa suffers from recurring drought and degraded soils, which limits productivity of cowpea, an important source of protein and income for rural households in the Sahel. This project will pilot test and adapt the Optimized Shrub-intercropping System (OSS) to improve cowpea production.

OSS utilizes 2 indigenous shrubs (Guiera senegalensis and Piliostigma reticulatum) at densities of 1200-1500 shrubs/ha that includes annual incorporation of aboveground biomass – a system our research (31+ refereed journal articles) has shown dramatically increases crop yields (millet and peanut), remediates degraded soils, and profoundly, we have shown that shrubs "bioirrigate" adjacent crops – a powerful mechanism to combat in-season drought.

The productivity of this cowpea system will be evaluated under OSS management in comparison to the traditional management system (low or zero shrub density/burning of shrub residue) under farmer management.

We will also test an intriguing option for double cropping cowpea - determining if a second cowpea crop can produce harvestable yields at the beginning of the dry season by utilizing "shrub bioirrigated" water. A screening of cowpea cultivars that range in duration and phenotypic characteristics to identify superior lines for OSS will be done.

This project works in Senegal.