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FEED THE FUTURE INNOVATION LAB FOR LEGUME SYSTEMS RESEARCH

July 2021



The Feed the Future Innovation Lab for Legume Systems Research fosters dynamic, profitable, and environmentally sustainable approaches that contribute to resilience, productivity, and better nutrition and economic opportunities. The lab is managed by Michigan State University.

From the Management Office

Legume Lab project releases working paper: "Fertilizer subsidy effects on cowpea areas and spatial crop diversity in Malian villages"

Extensive literature assesses the productivity, farm income and fiscal impacts of agricultural input subsidy programs reintroduced during the 2000s throughout Sub-Saharan Africa, as well as their fiscal sustainability, but less is known about how they affect cropping systems. We examine how fertilizer subsidies relate to one component of agricultural biodiversity - crop species diversity - by applying econometric models to nationally representative, village panel data in Mali.

Total subsidized fertilizer received is strongly and negatively associated with crop richness at the village scale, incentivizing the allocation of land to targeted crops away from other crops. These include cowpea, a neglected species which is grown as both a primary crop and intercrop and has agronomic,

nutritional, and income-generating benefits for farming families. The richer the crop species in a village, the more probable that cowpea is still grown. Findings are important for food policy in this agriculturally dependent nation with numerous smallholders living below the poverty line.

A working paper, "[Fertilizer subsidy effects on cowpea areas and spatial crop diversity in Malian villages](#)", authored by Amidou Assima, Melinda Smale, and Bourema Kone is an output of the Legume Lab project, "[How Input Subsidy Policies Change the Legume Farming Landscape](#)". The project is led by Dr. Melinda Smale, Michigan State University.



Cowpea plants in research experiment, National Research Program, Cinzana Research Station, Segou, Mali. Photo courtesy of Mamadou Sissoko.

From the Field

Project Final Reports

To kick start activities the Legume Systems Innovation Lab awarded six initial project grants. These short-term non-competitive awards were selected based on their research concepts and alignment with overarching innovation lab research goals. All six of these projects have concluded and submitted final reports which we will share over the next several months.

Measuring Cowpea Consumption

Led by Dr. Mark Manary, Washington University in Saint Louis

At present, there is no reliable, convenient way to measure the quantity of cowpea consumed by an individual. This limits the ability to assess the

effectiveness of projects which promote legume consumption, as well as compliance of nutrition education efforts. Without reliable consumption data, it is difficult to commit the resources necessary to take cowpea projects to scale in developing countries with any certainty.

This project, 'Measuring Cowpea Consumption', developed a method using a urinary metabolites unique to cowpea to identify dietary exposure and quantify levels of dietary intake for children and adults. The objective of this project was to identify a novel set of dietary biomarkers that would measure cowpea consumption, be free from participant recall bias, and serve to quantify legume intake.

The varieties of cowpea in use in Ghana were first explored. Then a supervised feeding exercise was undertaken in northern Ghana. For five day periods the subjects consumed a fixed amount of cowpea ranging from none to large amounts. Urine and blood samples were collected liberally. These samples were interrogated using untargeted metabolomics to discern patterns of phytochemicals indicative of cowpea consumption in a quantitative manner.

Because pigeon pea consumption is inextricably associated with cowpea consumption, this study afforded the opportunity to consider biomarkers for this food as well. And the untargeted metabolomic data yielded insight to the effect of cowpea on human energy metabolism. The deliverable from this start up project is a urinary biomarker for cowpea consumption utilizing 2-hexenoylcarnitine, ginkgoic acid and UNPD175583.

Through the process the project was able to identify 10 candidate biomarkers for cowpea consumption. These 10 biomarkers include phytochemicals unique to plants and other biomarkers that indicate what the effect is of cowpea in human metabolism and provides a little insight into how cowpeas strengthen human nutrition. In addition, 4 variety specific biomarkers were identified. Variety biomarkers could prove to be an important tool if a specific variety is shown to be more nutritious or provide a benefit.

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In the News

Stories, blogs, papers & publications by legume lab researchers and their colleagues

[Feed the Future Innovation Lab for Legume Systems Research Semi-Annual Report, Fiscal Year 2021](#)

Featured Legume of the Month

COWPEA



Cowpea is a vital crop in many African communities. A popular variety is white in color with black marking. This variety is commonly known as black eyed peas in the U.S.

In many rural African regions, cowpea is a vital nutritional food source providing low cost protein. Cowpea often matures faster than other staple crops providing an early harvest for hungry families.

Cooking with Cowpeas...

ROASTED COWPEAS

Cowpeas can be prepared many different ways and can be found on breakfast, lunch and dinner plates. They also make a great snack when roasted.

Roasting cowpeas is as easy as washing, soaking and cooking. Visit the recipe link below for a detailed recipe from the Food and Agriculture Organization of the United Nations (FAO) on this tasty snack.



[Get recipe here](#)

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Feed the Future Innovation Lab for Legume Systems Research**

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