Two Success Stories, One Mission

Effective soybean production involves not only improved germplasm, but also appropriate agronomic practices, environmental stewardship, and seed management. The Soybean Innovation Lab (SIL) utilizes a novel research platform called a SMART Farm (Soybean Management with Appropriate Research and Technology) to identify the best practices for effective soybean cultivation. The SMART Farm system facilitates knowledge and technology transfer in the area of sustainable agronomic and production practices and improved soybean varieties for smallholder farmers producing soybean in the tropics. The SMART Farm platform provides an innovative opportunity to readily translate research into appropriate practices for smallholder production. These practices include research on inoculum usage, soil correction, planting management, fertilization, environmental management as well as varietal selection and use for improved yield.

In 2014, a SMART Farm was implemented in three locations in Ghana in collaboration with the Savanna Agricultural Research Institute (SARI) in Nyankpala (Tamale) in the Northern Region, Bamahu (Wa) in the Upper West Region and Manga (Bawku) in the Upper East Region. Dr. George Awuni and Dr. Dan Reynolds, SIL researchers from Mississippi State University, manage the SMART Farm research. Research from the SMART Farm’s first year has contributed to knowledge on soil health and proper soybean agronomic management practices to improve yield and soil fertility.

The second year of the SMART Farm has begun with management from Dr. Awuni. This year, two agronomic experiments are being conducted: an evaluation of 10 leading soybean cultivars and an evaluation of phosphorous calibration and correlation with the widely used Ghanaian variety Jenguna. Other agronomic experiments include an evaluation of planting date, nutrient amendments and inoculum usage.

Dr. George Awuni, SIL SMART Farm Manager and Dr. Peter Goldsmith, SIL Principal Investigator, discuss plans for the 2015 SMART Farm in Nyankpala (Tamale) in the Northern Region of Ghana. SMART Farm research is conducted in collaboration with research partners at the Savanna Agricultural Research Institute (SARI) and contributes critical research knowledge on soil health and proper soybean agronomic management practices to improve yield and soil fertility. Photo credit: Kendra Davis

Dr. Abush Tesfaye of the Jimma Agricultural Research Center in Ethiopia initiated the N2Africa project to address the phosphorous (P) uptake and efficiency. Dr. Tesfaye leads the SIL breeding and germplasm research efforts in Ethiopia and conducted his PhD dissertation research on the genetics of low and high P availability in soybean. Dr. Peter Goldsmith of the University of Missouri, to develop a combination of both factors.

Dr. Tesfaye and Dr. Fritschi will collaborate in 2015 to conduct research on phosphorous uptake with additional collaboration from the Jimma Agricultural Research Center’s Soils Research Group. The research team intends to focus their efforts on improving soybean adaptation to soils with low P availability. Such soils are common in many tropical environments and are particularly common in Sub-Saharan Africa and across the SIL research countries of Ghana, Ethiopia, Malawi, Mozambique and Zambia. International research is only just beginning to identify soybean germplasm tolerant of low phosphorous soils. SIL research supports the ongoing trials on the phosphorous question being conducted by African collaborators by introducing and testing new germplasm from the United States Department of Agriculture (USDA) Soybean Germplasm Collection, Brazil, and Mozambique.

SIL Research Evaluates Phosphorous Efficiency in Soybean

Results from research efforts like the N2Africa project have shown that soybean can efficiently provide high levels of nitrogen with proper nodulation. Thus, soybean does not require expensive nitrogen fertilizer, giving it an adoption advantage over other more intensive crops. However phosphorous (P), a macro nutrient that needs supplementation, may constrain sustained adoption of soy. Low phosphorous availability can be due to low levels of phosphorous in the soil, acidic soils that tie up phosphorous, or a combination of both factors.

Soybean Innovation Lab (SIL) Researcher Dr. Felix Fritschi with the University of Missouri is collaborating with Dr. Abush Tesfaye of the Jimma Agricultural Research Center in Ethiopia to conduct research focused on soybean phosphorous (P) uptake and efficiency. Dr. Tesfaye leads the SIL breeding and germplasm research efforts in Ethiopia and conducted his PhD dissertation research on the genetics of low and high P availability in soybean. Dr. Fritschi and Tesfaye will collaborate in 2015 to conduct research on phosphorous uptake with additional collaboration from the Jimma Agricultural Research Center’s Soils Research Group. The research team intends to focus their efforts on improving soybean adaptation to soils with low P availability. Such soils are common in many tropical environments and are particularly common in Sub-Saharan Africa and across the SIL research countries of Ghana, Ethiopia, Malawi, Mozambique and Zambia. International research is only just beginning to identify soybean germplasm tolerant of low phosphorous soils. SIL research supports the ongoing trials on the phosphorous question being conducted by African collaborators by introducing and testing new germplasm from the United States Department of Agriculture (USDA) Soybean Germplasm Collection, Brazil, and Mozambique.
The Soybean Innovation Lab (SIL) is to provide the research foundation needed by the development community to boost soybean production and improve the nutrition and market linkages for smallholder farmers globally. The SIL research team comprises experts in the applied and social sciences, all focused on developing the critical research knowledge base to serve practitioners, technicians, non-governmental organizations, governments and the private sector seeking to engage in and improve soybean production.

SIL experts in plant breeding, agronomics and gender research are engaging with practitioners supporting smallholder production of soybean in Africa. Two projects are collaborating with SIL to gain technical information and research knowledge regarding appropriate agronomic practices for tropical soybean development: the Resiliency in Northern Ghana (RING) (www.globalcommunities.org/ghana) and Greater Rural Opportunities for Women (GROW) programs (www.meda.org/about). These programs assist smallholder soybean farmers in improving their production capacity, market linkages and nutrition. SIL is providing the RING and GROW programs with technical extension training, knowledge sharing and capacity building to assist them in achieving their goals of improving smallholder soybean farmer livelihoods.

SIL welcomes partnerships and collaborations with other practitioners, organizations and the private sector engaged in tropical soybean development.

Meet a SIL Researcher & Collaborator

Dr. Marilyn Nash develops and implements international programs for the National Soybean Research Laboratory (NSRL) at the University of Illinois. Dr. Nash manages domestic and international nutrition efforts including recipe development, kitchen training, nutrition analysis and food safety and hygiene training. Dr. Nash also manages the NSRL test kitchens and sensory laboratory, conducts soy food outreach activities and develops international and domestic soy food applications. She has worked in Central America, the Caribbean, Southeast Asia and Africa. Dr. Nash leads the SIL human nutrition research efforts, including the implementation of soy dairy systems in Ghana and Mozambique, and conducts research evaluating soy adoption at the household level.

Flora Amalogho is a Food Scientist with the Savanna Agricultural Research Institute (SARI) in Ghana. Flora conducts food science research on behalf of SARI and collaborates with Dr. Marilyn Nash to research the economic sustainability of local soymilk enterprises. Flora operates a soy dairy enterprise utilizing the SoyCow technology to efficiently produce soymilk and soy by-products. Flora’s facility can produce 35–40 liters of soymilk per hour and can use either an electric or pedal-powered grinder to grind soybeans. Her facility has a boiler, a cooker, a filter press and a tofu box. Flora is in the process of identifying funding to make her facility food-grade certified to enable the sale of soy products to nearby schools, restaurants and hotels.

www.soybeaninnovationlab.illinois.edu
www.tropicalsoybean.com