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Food for All

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In just over two years, Kansas State University has become a major player in implementing the U.S. Agency for International Development goal to reduce hunger and improve food security in the most impoverished nations of the world.

In two years, USAID has committed more than $100 million to Kansas State University under its Feed the Future initiative, creating four innovation labs.

Kansas State University is responsible for managing the funds, most of which are distributed to partner universities to conduct research in nations where hunger is prevalent. The university benefits by acquiring new resources and employees, and is at the forefront of research that can be applied in Kansas and around the U.S.

The following is a look at how the projects have helped so far.

**Applied Wheat Genomics**

Kansas State University’s Feed the Future Innovation Lab for Applied Wheat Genomics was funded in 2013 for $5 million. The project’s main goal is to develop heat-tolerant, high-yielding and farmer-accepted wheat varieties for South Asia, where approximately 20 percent of the world’s wheat is grown.

University wheat geneticist Jesse Poland, the lab’s director, said the project has made significant progress in the past year, including establishing field trials in India and Pakistan; generating genetic profiles for more than 25,000 wheat varieties; and implementing high-throughput phenotyping to more accurately assess plant growth and performance.

Poland said that work in India and Pakistan is complimentary to ongoing work in the Kansas State University wheat breeding programs, adding that local breeding work supported by the Kansas Wheat Commission and Kansas Wheat Alliance is very synergistic and that the same tools and new breeding technologies are being applied.

“The project is off to a great start,” he said. “It is an exciting time to apply leading genomics to accelerate the breeding process, particularly with the goal of increasing food security in the places that it is most needed.”

**Sorghum and Millet**

Kansas State University’s reputation as a leading center for international sorghum and millet research got a big boost in 2013 when USAID awarded the university $13.7 million for the Innovation Lab for Collaborative Research on Sorghum and Millet.

Since then, the university has worked aggressively to improve the productivity, disease resistance, agronomy and economic value of sorghum and millet in Ethiopia, Senegal and Niger.

In 2014, Kansas State University awarded $8.5 million in funding to U.S. universities and international partners to conduct research in the focus countries. Their projects will promote food security, household resilience and private sector growth in the region.

Of that money, 57 percent is dedicated to genetic enhancement of sorghum and millet; 23 percent toward value-added uses; and 20 percent to improve production systems. Forty-two percent of the money is for projects in Ethiopia.

According to Timothy Dalton, project director and professor of agricultural economics, scientists have conducted research on one year’s growing cycle, and crops are now being planted for the second year.

“Our first year of research was a resounding success with field trials conducted in more than 30 sites in Africa, and food products evaluated by urban and rural consumers in West Africa and Ethiopia,” Dalton said. “Much of the seed development work will be long-term and requires patience, but we expect to launch new pest management techniques, cropping practices and new food products in the near future.”

Related projects in the past year include training scientists in the focus countries; developing research methods that appropriately integrate women into production agriculture and processing; and improving crop resistance to heat, drought, insects and disease.

**Preventing Loss**

In 2013, Kansas State University received $8.5 million to establish the Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss. As much as one-third to one-half of the world’s
harvest is lost every year for a variety of reasons, from transportation to storage to consumer waste.

The project’s work is focused on Bangladesh, Ethiopia, Ghana and Guatemala. Major crops being studied include wheat, maize, sesame and chickpea.

Surveys with smallholder farmers in those countries indicate the major causes of food loss are weather, termites, theft, rodents, and insects in fields and storage bins.

Kansas State University and Oklahoma State University faculty have traveled to the host countries to help lead projects that include international universities and U.S. government agencies. Some of the research planned in the next two years:

- Identifying insects causing food losses.
- Employing low-cost microchip-based sensors for measuring grain moisture.
- Drying techniques for stored grain, including greenhouse drying and solar drying.
- Proper storage techniques, including bags that help prevent infestations.
- Determining proper clothing when applying pesticides.
- Identifying farmers’ trusted information sources.

### Sustainable Intensification

At $50 million, the Feed the Future Innovation Lab for Sustainable Intensification is the university’s biggest USAID award. The grant was received in fall 2014 for work in Cambodia, Bangladesh, Senegal, Burkina Faso, Tanzania and Ethiopia.

Sustainable intensification means producing more food and nutrition on the same land base while protecting the natural resources on which the food system depends.

Here’s what Kansas State University has done since being awarded the funds:

- Renovated space in Waters Hall and hired four staff members on campus. The project also has hired three regional coordinators in Bangladesh, Senegal and Tanzania.
- Began a process to select a university to lead the Appropriate Scale Mechanization Consortium, which will identify the appropriate tools to help small landholders in the focus countries.
- Initiated the Geospatial and Farming Systems Consortium, which uses satellite images and advanced technology to map land that is targeted for research in the focus countries.
- Conducted meetings with partners in the host countries to identify their research and capacity-building needs.

Project director Vara Prasad, professor of crop ecophysiology, said the information gathered so far will help to select U.S. and international universities for research awards, which will be announced soon.

“We are closely working with all of our partner institutions and USAID to ensure that all the objectives during the first year are met,” Prasad said. “The project is on track, and we are excited to complete the establishment phase and move into research and capacity-building. It is truly a collaborative effort, with multiple national and international organizations working toward common goals of improving food and nutritional security of smallholder farmers.”

By Pat Melgares, Communications and Agricultural Education