



SUSAN JOHNSON

Benefiting U.S. Farmers: Increasing yields and reducing drought-related risks

Since the 1980s, when drought in the U.S. and Africa greatly reduced farmers' productivity, the CRSPs have sought scientific solutions to drought-related risks. As the U.S. faces its worst drought in decades, research on drought tolerance is still imperative. CRSP researchers continue to develop better varieties and support alternative crop practices to increase U.S. farmers'

yields and ability to mitigate or adapt to drought-related risks.

Recognizing farmers in developing countries and the U.S. face similar constraints, the Pulse CRSP is developing new cowpea varieties that withstand disease, drought, and low soil fertility in Burkina Faso, Angola, Senegal and in the U.S. Current Pulse

CRSP Principal Investigator (PI) and former Bean/Cowpea CRSP PI Dr. James Kelly, tests germplasm from drought tolerant bean varieties released in Mexico to enhance drought tolerance in U.S. bean varieties.

Through multi-sited research in water-stressed West Texas and West Africa, the

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SANREM CRSP Arresting Environmental Decline in Haiti: Learning about Conservation Agriculture

The farmlands of Haiti's Central Plateau are severely degraded, limiting small-scale farmers' ability to produce food and feed for home and market. SANREM CRSP researchers, together with NGO and government partners, are promoting better environmental stewardship by working with Haitian farmers to apply the concepts and practices of conservation agriculture (CA) and ultimately to increase soil health and farmers' yields.

SANREM CRSP researchers are studying CA components of minimal tillage, permanent soil cover, and crop rotation. In Haiti, SANREM CRSP Assistant Program Director Michael Mulvaney says,

"There's no institutional capacity [and] there's no agronomic awareness of CA. [It] is like hitting farmers with an alternative universe."

In July, Mulvaney visited Haiti with Tom Thompson, Principal Investigator, Conservation Agriculture Production Systems (CAPS) project, and Associate Professor Wade Thomason, all from Virginia Tech. They offered workshops on CA concepts and techniques at the three CAPS project sites in Haiti's Central Plateau (Corporant, Lachateau, and Maïssade). Participants included nearly 200 local farmers, 40 percent of them are

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CRSP Contributions to Food Security: A Conversation with Congressional Staff

On June 5, four of the ten CRSP Directors held an information session with staff representing members participating in both House and Senate Agriculture Committees at the Rayburn House Office Building. The focus of the conversation was on the CRSP contributions to food security, including how they are engaging with the U.S. Government's Feed the Future initiative. USAID and USDA staff members and some representatives of U.S. universities and the Association of Public Land-grant Universities were also in attendance.

On behalf of the larger CRSP community, CRSP Directors Irvin Widders (Pulse CRSP), Elizabeth Mitcham (Horticulture CRSP),

Jonathan "Tim" Williams (Peanut CRSP) and Deputy Director Shana Gillette (LCC CRSP) described how the CRSP approach embodies many desirable traits of collaborative and multidisciplinary work. Working with over 55 host country institutions, and partners in more than 40 U.S. states, the CRSPs develop long-term mutually supportive relationships with scientists and students around the world. Over the years the CRSPs have supported more than 3,700 students; 40 percent of whom have been women scientists and 80 percent of whom are from developing countries.

CRSPs are active in all of the Feed the Future focus countries. They are working to accelerate growth in the

agriculture sector and improve the nutritional status of men, women, and children. Research under the CRSPs has led to the development of innovative solutions to reduce poverty and increase the income of smallholder farmers. For example, as Mitcham noted, the Coolbot™, promoted by the Horticulture CRSP, provides smallholder farmers with inexpensive cold storage that can extend the life of their produce before it reaches the market.

Additionally, the speakers highlighted the CRSPs' attention to nutrition and health in their research. Nutrition is implicitly and explicitly addressed by the CRSPs through their efforts to increase availability and accessibility of a diversity of foods and nutrients. One notable outcome is the CRSP-supported research that demonstrates the importance of animal source proteins to cognitive development.

While much of the conversation focused on the CRSPs' international achievements, several participants were interested in how U.S. farmers benefit from CRSP research. The CRSP Directors pointed to research under the Peanut CRSP, which led to the development of the only black rot resistant variety of peanut available in the U.S., which allows for sustained peanut production in certain areas of southeastern U.S. The Pulse CRSP was instrumental in the development of new cultivars of beans and cowpeas using drought resistant germplasm from developing countries now used by U.S. farmers to increase yields in some states by 20 percent. 🌱

Presentations from this event are available at the crsps.net website.

Nutrition CRSP Workshop Asks "What Works?"

How does a program measure the impacts of complex multi-sector agriculture, nutrition, and health (ANH) programs? How can researchers capture the why and how of a program's successes and failures? On June 21 and 22, 2012, the Global Nutrition Collaborative Research Support Program (N-CRSP) and the Leverhulme Centre for Integrative

Research on Agriculture and Health (LCIRAH) co-hosted a workshop in London seeking to answer these questions. The conference was attended by the two directors of the N-CRSP, Jeffrey K. Griffiths and Patrick Webb, as well as six other PIs and Co-PIs from N-CRSP Programs. Among the twenty-two total

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Nearly two billion people, including 200 million children under the age of five, are undernourished in the world. Knowing "what works" is vital for effective policy and scaling-up innovations.

Margaret Kroma, Ph.D. (SANREM CRSP)

In her position as Program Officer for Gender and Agriculture at the Alliance for a Green Revolution in Africa (AGRA), Dr. Margaret Kroma helps policy makers, development practitioners, and researchers across Africa recognize how policies and programs can expand opportunities for men and women farmers and agro-entrepreneurs. In a recent interview, she said the lessons she learned from her CRSP experience shaped her approach to integrating gender issues across AGRA's major programmatic areas, including soils, seeds, markets, and policies. Kroma earned a Ph.D. in Rural Sociology from Iowa State University and held two research assistantships with the SANREM CRSP at Iowa (1993-4) and Virginia Tech (1992-3), working with Prof. Cornelia Flora (Iowa State University).

Dr. Kroma said her SANREM CRSP experience changed her perspective on agricultural research. "The CRSP model opened my eyes to interdisciplinary research," adding "agricultural scientists find it less complicated to work in disciplinary silos [in Africa]. We are not quite there just yet, although much progress has been made." Dr. Kroma has great appreciation for the CRSPs' support of researchers in African agricultural research institutions through long-term and short-term training opportunities. In her opinion the partnerships built by the CRSPs are a major innovation in agricultural research. She explained that by facilitating the exchange of ideas between scientists from different countries and institutions,

the inclusive and participatory orientation of CRSP research challenges the way African scientists are used to thinking of themselves as sole "arbiters of knowledge."

Before arriving at AGRA, Dr. Kroma taught at Cornell University and later managed the CGIAR's African Women in Agricultural Research and Development (AWARD) program that helps African women professionals. Born in Sierra Leone, she studied at Njala University College for a B.Sc. (Agricultural Education) and a M.Sc. (Agricultural Extension), the latter in a joint program with Virginia Tech.

Dr. Kroma remains a faithful advocate for interdisciplinary research. "Agriculture cannot be put in a box," said Kroma. "You must look at all the interactive components." 🌍

CRSP agricultural research and capacity building has contributed to the success of many accomplished and world-renowned scientists in academics, government, NGOs, and the private sector. To highlight the work of CRSP alumni or current students send a suggestion to crsps@crsps.net.



In the Media

The July/August 2012 edition of *USAID's Frontlines* features the **IPM CRSP's** work with Bangladeshi eggplant farmers. Visit the USAID website to view the story at: transition.usaid.gov/press/frontlines/fl_jul12/FL_jul12_BANGLADESH.html.

Livestock-Climate Change CRSP researcher **Dr. Peter Little** authored the concluding chapter of the newly published book *Pastoralism and Development in Africa: Dynamic Change and the Margins* on pastoralism and the livestock industry in the Horn of Africa. **Dr. Hussein Mahmoud**, who received his PhD with support from the Global Livestock CRSP, also contributed a chapter to the book.

CRSP Digest website is live! The new website features searchable databases with 30 years of data on long-term training students, and information about the current CRSP projects and publications. The site is updated regularly with news, stories and announcements about the CRSPs. Visit the site at crsps.net.

Upcoming Events

The **Livestock Climate Change CRSP** is hosting a **TEDxChange Salon in Kathmandu on October 1-2, 2012**. You do not have to be physically present to participate. For more information and to register, visit lcccrsp.org.

The CRSP Digest will host an exhibit and side event at the World Food Prize in Des Moines, **October 17-19, 2012**. The side event, "**Harnessing US University Partnerships for Climate-smart Agriculture: The USAID-funded CRSPs**" will be held October 17.



Hubs of Activity: The Horticulture CRSP's Regional Centers of Innovation

A variety of tools, techniques, and materials to solve common horticultural problems (e.g., affordable cold storage, pest management, improved germplasm) are being adapted and implemented by the Horticulture CRSP.

For smallholder farmers, these innovative tools can improve product quantity and quality, facilitating their entry into the market. Too often high costs or lack of supply keep new technologies such as the CoolBot™ cold-storage technology, pest exclusion nets, and seed-drying beads out of reach. Through three Regional Centers of Innovation the

Horticulture CRSP is putting these technologies into developing country farmers' hands. The centers provide a place in which research partners, the private sector, and farmers can come together to see, test, and modify the technologies and share information on horticultural solutions.

The centers will also offer training and capacity-building. This year, the Regional Center of Innovation at Kasetsart University in Bangkok will host a workshop to highlight zeolite drying beads, a new technology used with airtight containers that are a simple and inexpensive method for drying fruit and vegetable seeds.

The center will also be involved in a vegetable production training course led by the World Vegetable Center (AVRDC). These workshops target members of the international agricultural community, local and regional government agencies, farmer groups, and businesses. Students from the University of California, Davis' Program for International Energy Technologies (D-Lab) will also visit the center to meet with students from other countries.

The Horticulture CRSP will establish three regional centers in total. In February 2012, the first regional center was inaugurated in Bangkok, Thailand. The second, at Zamorano University in Honduras will officially open September 28, 2012. This will be followed by the opening of the third regional center at the Kenya Agriculture Research Institute (KARI) in Nairobi by the end of 2012. 🌍

The Horticulture CRSP is managed by the University of California, Davis. For more information on the centers or the CRSP, visit their website at hortcrsp.ucdavis.edu.



Zeolite beads quickly remove water from stored seeds and can be reused at least 10,000 times without loss of function, by simply baking them in an oven for an hour between uses.

Photos courtesy of Horticulture CRSP.

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Learning about Conservation Agriculture in Haiti

women. Women are a key audience because they tend to be early adopters of new technology even if they are not the primary household decisionmakers, according to Mulvaney.

The workshop featured instructors from both Virginia Tech and SANREM's in-country partners, Zanmi Agrikol, Caritas/Hinche, the Ministry of Agriculture, and the State University of Haiti's Faculty of Agronomy and Veterinary Medicine. It included lectures, discussions, and demonstrations.

Farmers also visited demonstrations of successful trial plots comparing improved and local maize varieties. "We are trying to identify varieties that are going to maximize yields in Haiti," said Mulvaney. "The farmers

are very interested because they can go in the field and see the corn that grows well and say "I want that seed." He added, "Engaging local farmers in our research is a valuable feedback loop for determining what works, what doesn't work, what's adoptable." For example, farmers did not like a tropical legume [*mucuna pruriens*] thought by researchers to be a promising cover crop. Mulvaney noted, "If the farmers aren't interested in it, that's good for us to know. Farmer feedback is invaluable for designing an adoptable CA system," since an ineffective recommendation can have disastrous results.

The success of these CA workshops suggests that future workshops will be well-attended and that adoption of CA will lead to greater food security for these Haitian communities. 🌾



MICHAEL MULVANEY/SANREM CRSP

A CRSP-trainee from Zanmi Agrikol collects soil samples for soil fertility analysis.

The Sustainable Agriculture and Natural Resource Management (SANREM) CRSP is managed by Virginia Tech. Visit their website at www.oired.vt.edu/sanremcrsp.

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U.S. Farmers Benefiting from CRSP Research in Developing Countries

Peanut CRSP is currently working on creating drought resistant peanuts and has identified a U.S. peanut subset with better water use efficiency and heat tolerance.

Through traditional plant-breeding methods INTSORMIL research is also enhancing the drought resistance of pearl millet, a growing alternative to crops that require more water like soybeans and corn. Additionally, "stay-green" sorghum varieties developed in collaboration with INTSORMIL have led to significantly higher yields than standard hybrids under drought-like conditions in the U.S.

Bean/Cowpea, Pulse, and INTSORMIL CRSPs' collaborations with breeding

programs have also produced disease resistant and higher yielding crops, benefiting many U.S. farmers. In 2005 INTSORMIL's work on new germplasms contributed to \$680 million worth of grain production in the U.S. The Bean/Cowpea CRSP, the predecessor of the Pulse CRSP, has a long history of using cutting edge research to benefit U.S. farmers. Its researchers at the University of Wisconsin in collaboration with Agracetus, Inc. developed the first transgenic beans, which significantly reduced U.S. farmers' pest problems

and saves them millions of dollars each year. After the CRSP's release of a new bean cultivar, yields increased by 20 to 25 percent on about 80,000 acres in Michigan. Overall, the CRSP's bean breeding program at Michigan State University contributed to an estimated \$30 million from 1986 to 2002 (\$1.9 million per year for Michigan bean growers). Bean/Cowpea CRSP research has also benefited bean growers in California, Idaho, Washington, Michigan, Minnesota, New York, and North Dakota. 🌾

This article is the first of a series examining the impact of the research of different CRSPs in the U.S. and overseas. The current drought affecting U.S. grain harvests is the backdrop for this review of selected CRSP impacts on U.S. production. More information on these projects can be found on crsps.net as well as on the individual CRSP websites.

LCC CRSP's Climate-smart Approaches to Managing Livestock Systems

Livestock production systems and the forces of climate change exist in a dynamic relationship: not only does climate change impact herders and other large and small stock producers' strategies, but their management practices also affect some factors causing climate change. Patterns of water use and pasture management, disposition of animal wastes, and the carbon sequestration potential of rangelands, for example, can exacerbate or mitigate climate shifts. Human intervention and the development of adaptive responses are key to stemming the rate of climate change and enhancing the sustainability of livestock-based livelihoods in developing countries.

The Adapting Livestock Systems to Climate Change (LCC) CRSP, managed by Colorado State University (CSU), leads research activities on the complex relationships between livestock and

climate change. These are conducted in Africa (Ethiopia, Kenya, Mali, Senegal, and Tanzania) and in Asia (Mongolia and Nepal).

Several of the research projects investigate both how livestock and human populations are experiencing the impacts of climate change and how communities can mobilize to adopt adaptive measures to minimize these effects. Several pilot and longer-term activities focus on Nepal, a mountainous Asian country where livestock production

is integrated into other farming activities. The "Past and Future Climate Assessments of Livestock Vulnerability in Nepal," led by Robert Gillies (Utah State), is working with the government and the NGO Helen Keller Institute to conduct climate assessments across the country and to use the information about current conditions to design livestock management and feeding practices that can adapt to climate change.

Other LCC CRSP supported pilot research in Nepal carried out under the leadership of Durga Poudel (U of Louisiana at Lafayette) is studying the incidence of livestock disease. The research is finding high levels of both intestinal and skin diseases and poor water quality, conditions that are likely to worsen with decreasing rainfall. The project has formed community groups to improve watershed management to maintain water sources and improve water quality.

The LCC CRSP will be hosting a simulcast discussion of experts on various aspects of the interaction of livestock systems and climate change in a TedXChange salon in Kathmandu, Nepal on October 1-2, 2012. 🌍

For more information, visit lcccrsp.org or crsp.net. Registration for listening to the TedXChange Salon is available at the LCC CRSP website, lcccrsp.org.

Both commercial and household farmers must adapt to Nepal's changing disease patterns. Better disease screening, education about herd selection and improved sanitation conditions are among the solutions proposed.

PHOTO COURTESY OF LCC CRSP



CRSP-trained veterinarian and researcher Tara Nath Gaire (bottom right) meets with livestock owners and farmers to identify ways to help them adapt to climate change.

TARANATH GAIRE/LCC CRSP





Symposium participants visited a local market in Coimbatore observing vegetables with preventable plant diseases.

IPM CRSP Symposium Held in India

In July 2012, a symposium organized by the Integrated Pest Management (IPM) CRSP brought together experts in plant virology and entomology to discuss plant virus disease management. The symposium was hosted at Tamil Nadu Agricultural University (TNAU) in India. Participants attended workshops and presentations and also made visits to local markets, farms, and IPM CRSP and TNAU test sites to learn about the successes and challenges related to crop production. 🌍

Photos by Miriam Rich and Amer Fayad, IPM CRSP.



A farmer waters a cucurbit field with a traditional method called furrow irrigation. A drip irrigation system, an IPM component, could conserve water and prevent the spread of diseases.

An estimated 40 percent of crops in tropical Asia are lost due to pests.



Entomologist Dewi Sartiami (Bogor Agricultural University) collects insect specimens—in this case, an invasive pest called thrips—from potato plants. Assisting Dewi are Naidu Rayapati (Washington State) and Gandhi Karthikeyan (TNAU).

TNAU – IPM CRSP
 Integrated Pest Management in Bittergourd
 Variety : Palee F1 Date of Sowing : 14.06.2012

- Soil application of Neemcake @250kg/ha
- Soil application of *Pseudomonas fluorescens* @ 2.5kg/ha
- Soil application of *Trichoderma viride* @ 2.5kg/ha
- Keeping yellow sticky traps
- Setting of pheromone traps
- Application of botanical pesticides (NSKE 5%/Neem oil)
- Release of biocontrol agents (*Trichogramma*, *Chrysoperla*)
- Need based application of Insecticide/ Acaricide / Fungicide)

IPM-CRSP Scientists
 TNAU, Coimbatore

The IPM CRSP is managed by Virginia Tech. For more information on the symposium or the CRSP, visit www.oired.vt.edu/ipmcrsp.

COLLABORATIVE RESEARCH SUPPORT PROGRAMS (CRSPs)

Aquaculture and Fisheries (AquaFish)

Oregon State University, Management Entity
Dr. Hillary S. Egna, Director
aquafishcrsp.oregonstate.edu

BASIS Assets and Market Access (BASIS/AMA)

University of California, Davis, Management Entity
Dr. Michael Carter, Director
basis.ucdavis.edu

Dry Grain Pulses (Pulse)

Michigan State University, Management Office
Dr. Irvin E. Widders, Director
pulsecrsp.msu.edu

Global Nutrition

Tufts University, Management Entity
Dr. Patrick Webb, Program Director Asia
Dr. Jeffrey Griffiths, Program Director Africa
nutritioncrsp.org

Horticulture

University of California, Davis, Management Entity
Dr. Elizabeth Mitcham, Director
hortcrsp.ucdavis.edu

Integrated Pest Management (IPM)

Virginia Tech, Management Entity
Dr. R. Muni Muniappan, Director
www.oired.vt.edu/ipmcrsp

Livestock-Climate Change (LCC)

Colorado State University, Management Entity
Dr. Richard Bowen, Director
lcccrsp.org

Peanut

University of Georgia, Management Entity
Dr. Jonathan (Tim) Williams, Director
peanutcrsp.org

Sorghum, Millet and Other Grains (INTSORMIL)

University of Nebraska, Management Entity
Dr. John Yohe, Director
intsormil.org

Sustainable Agriculture and Natural Resource Management (SANREM)

Virginia Tech, Management Entity
Dr. Adrian Ares, Director
www.oired.vt.edu/sanremcrsp

Initiated by Title XII of the Foreign Assistance Act, **Collaborative Research Support Programs** mobilize the capacities of land-grant universities to address issues of food security, human health, agricultural growth, trade expansion, and sustainable use of natural resources in the developing world.

www.crsp.net

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N-CRSP Workshop Asks “What Works?”

attendees were researchers from twelve different organizations including International Food Policy Research Institute (IFPRI), Concern Worldwide, and U.S. Universities as well as USAID CRSP AORs Maura Mack and Pascasie Adedze, and DfID representative Rachel Lambert. This workshop allowed the N-CRSP to widen their circle of researchers and to link to top research organizations in the UK.

The workshop built on the findings of a May 2011 workshop hosted by LCIRAH and IFPRI that focused on IFPRI's 2020 Vision initiatives on measuring the impacts of multi-sector initiatives. Participants used four case studies from different multi-sector ANH programs to develop lists of key questions, challenges, and opportunities for developing appropriate indicators. The projects are all based in U.S. Government Feed the Future Initiative countries. They include Realigning Agriculture to Improve Nutrition (RAIN) in Zambia, Home Grown School Feeding (HGSF) in Mali, several different integrated agri-health programs in Nepal, and the Community Connector Program (CCP) in Uganda. The exercise reinforced the importance of using both quantitative and qualitative methods for answering both *what* and *how* questions on “what works” in agriculture-nutrition oriented programs. Participants noted that the context in which a program operates should influence the choice and design of the specific interventions. The meeting was designed as an opportunity for researchers to share research protocols and approaches. Participants committed to continuing to share methods and extending their findings to practitioners in the future.

Launched in 2010, the N-CRSP works with USAID missions, development partners, and host countries to determine the most effective avenues for investment in agriculture, health, and nutrition. 🌍

For more information about the Global Nutrition CRSP, please visit nutritioncrsp.org, and for more information specific to the workshop, visit www.lidc.org.uk/assets/NCRSP%20LCIRAH%20workshop%20report%202012.pdf.

The CRSP Digest Project is supported by individual CRSPs as a joint knowledge management activity. Implemented by Cultural Practice LLC, the Digest Project compiles, synthesizes, and disseminates data about CRSP activities and achievements to stakeholders such as development practitioners, USAID staff, students, researchers, and others. It organizes outreach events to circulate research findings among the agricultural research and development community. For more information visit www.crsp.net. Check the website for updates or sign up to receive news via the email (crsp@crsp.net), Twitter, and Facebook.