Sustainable Agriculture and Natural Resource Management
Collaborative Research Support Program

SANREM CRSP Newsletter

August 2010

Contents

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USAID FROM THE AMERICAN PEOPLE

SANREM CRSP

VirginiaTech Invent the Future

Program Director's message

The past eight months have been exciting and productive for SANREM CRSP with the establishment of seven new Phase IV long-term research activities (LTRAs) focusing on conservation agriculture production systems (CAPS). The CAPS research is designed to develop and test agricultural production systems for smallholders that will increase agricultural production, reduce food insecurity, and improve soil quality.

The CAPS research activities are led by Virginia Tech (Bolivia, Ecuador, and Haiti), Kansas State University (Ghana and Mali), University of Tennessee (Lesotho and Mozambique), University of Wyoming (Kenya and Uganda), University of Hawaii at Manoa (India and Nepal), and North Carolina Agricultural and Technical State University (Cambodia and the Philippines).

The Haiti team got off to a rough start as they were on location when the devastating earthquake hit Port-au-Prince on Jan. 12. Virginia Tech faculty Maria Elisa Christie, Jim McKenna, Keith Moore, Katy Rainey, and Wade Thomason and graduate student Nathan Kennedy left Port-au-Prince for the country side shortly before the earthquake and fortunately did not even feel the quake. They were safely evacuated through the Dominican Republic and the project was temporarily suspended but is now back in full swing.

Along with our new projects, we also welcome a new face to the SANREM CRSP team. Michael Mulvaney joined our team on March 1 as assistant program director. He is a recent Auburn University graduate and a specialist in sustainable agriculture. We are very happy to have Michael on the SANREM CRSP team.

I am also pleased to announce that a SANREM affiliated paper, *Beyond yield: Plant disease in the context of ecosystem services*, was hailed as one of the top 9 papers of 2009 in *Phytopathology* by the American Phytopathological Society.

Along with the recognized paper, SANREM CRSP also completed the Phase III annual report and Phase IV semi-annual report, and both can be found online. SANREM also completed an associate award for the USAID Sudan Mission, which involved an assessment of the higher education needs of the Southern Sudan in agriculture.

While we are extremely excited about recent SANREM CRSP accomplishments, we must also reflect on a loss. In late March, Dr. Robert Rhoades, a principle investigator in the SANREM-Andes projects, passed away. He conducted research in Ecuador and Peru for almost 10 years and was a professor at the University of Georgia. He will be greatly missed.

News

New long-term research activities

SANREM CRSP begins its Phase IV research on conservation agriculture in Haiti, South America, South and Southeast Asia, and South, West and East Africa. Of 15 proposals, seven projects were chosen on the basis of scientific merit, research impact, capacity building, participatory partnerships and inclusion of gender and minority issues.

"The next phase of our research will emphasize increasing food production through the introduction of conservation agriculture principles into existing agricultural systems of smallholders in food-insecure developing countries," Program Director Dillaha said. "We will partner with host country universities, institutes, and non-governmental agencies in 13 countries. We hope to develop new conservation agriculture technologies and techniques that small-scale farmers can use to make the transition to more sustainable, resilient, and productive agricultural systems."

The following are brief descriptions of the seven projects:

A CAPS program for the Central Plateau of Haiti (LTRA-6)

Lead PI: Steven Hodges, Professor of Crop and Soil Environmental Sciences, Virginia Tech

Host country: Haiti

After decades of violent conflict and political upheaval, Haiti's agricultural sector is unable to produce sufficient food for its 9 million citizens. Low input/low output agriculture predominates and is generally on severely degraded mountainous and/or deforested land that is susceptible to natural disasters - such as flooding and mudslides. Productivity in this terrain is low and hunger is common, especially in rural areas. As a consequence, Haiti depends on food aid and must use 80% of its export earnings to import agricultural commodities and products.

The goal of this project is to reduce food insecurity for small-scale farmers in the Central Plateau of Haiti. The three main objectives are to assess the adaptability of existing farm and livelihood practices for transformation

into conservation agricultural production systems (CAPS), to improve crop production through development of CAPS, and to increase the capacity of small-scale farmers to adapt and improve CAPS. These objectives will be achieved through a collaborative effort with Haiti's Ministry of Agriculture, Natural Resources, and Rural Development; the State University of Haiti's Faculty of Agronomy and Veterinary Medicine; and with non-governmental organizations Zanmi Agrikol and Caritas/Hinche. Research will be done at three sites: Corporant, Boucan Carré, and Maïssade. Zanmi Agrikol and Caritas will operate research and demonstration farms and work with local farmers to develop locally adapted CAPS. Central to this effort will be the implementation of "best bet" options to improve water productivity, soil quality and fertility, soil organic matter and to develop more productive crop rotations. The expected results are increased farm income, reduced erosion and improved soil quality.

Wade Thomason, Virginia Tech, talks with LTRA-6 partner Robert Badio, Haiti Ministry of Agriculture, Natural Resources and Rural Development, while taking a soil sample on Haiti's Central Plateau.

Besides transforming farming systems, the project will build local capacity for agricultural research, adaptation and extension.

Pathways to CAPS in the Andes (LTRA-7)

Lead PI: Jeffrey Alwang, Professor of Agricultural and Applied Economics, Virginia Tech

Host countries: Bolivia, Ecuador

Rural populations in the Andean Region of South America are highly dependent on a single food crop - potatoes. The keys to addressing food insecurity in the area are improving potato yields, reducing yield variability and introducing companion crops and activities to raise farm families' incomes.

A major challenge is to find agricultural technologies and innovative practices that raise farm income, increase production, and improve the environment. The region has many areas where productivity is low due to poor soils and erratic rainfall.

People in the region have adapted to environmental challenges by expanding the agricultural frontier into fragile highland areas. These practices - while solving short-term problems - contribute in the long run to poverty, increasing rates of soil degradation and food insecurity.

Cultivated steep slope in Ecuador.

This project will use research in soil sciences, cropping systems, plant pathology and economic and social sciences to design, evaluate, and disseminate CAPS for the region. A number of CAPS will be examined and adapted to build a more productive, resilient farming system. Developed CAPS will involve maintenance of an organic soil cover; improved crop rotations, including introduction of disease-resistant bean varieties and pest-free planting stocks; integrated pest management; use of cover crops, green manures and biological soil and seed amendments; and higher-value crops such as medicinal herbs and Andean fruits. The two research sites will be in the Upper Chimbo River area in central Ecuador, and Tiraque near Cochabamba in Bolivia.

Improving soil quality and crop productivity through CAPS in Ghana and Mali (LTRA-8)

Lead PI: P.V. Vara Prasad, Associate Professor of Agronomy, Kansas State University

Host countries: Ghana, Mali

For West African countries such as Ghana and Mali, investment in agriculture is critical to reduce poverty and stimulate economic growth. The challenge is to strike a balance between increasing farm productivity and income and protecting the environment.

Improved soil quality and water retention can be achieved through reduced tillage, perennial ground cover through legumes and crop residue and integrated nutrient, water and pest management practices.

This project will focus on increasing food security by raising the incomes of smallholders dependent on rain-fed agriculture. Research will focus on sustainable CAPS that improve soil quality, water capture, water-use efficiency, crop productivity, ecosystem services and efficient use of farm inputs and labor. The project will answer critical questions associated with CAPS for resource-poor smallholders: Which CAPS positively contribute to productivity, address needs of farmers and under what specific conditions? What are positive and negative aspects (tradeoffs) of CAPS in both the short and long term? Can CAPS be economically beneficial in the short run? Can CAPS be adopted by small-scale farmers? Do preconditions for adoption exist? Which types of processes are most efficient in assessing CAPS with farmers and extending them to a larger scale? Outreach, networking and capacity-building will be integral to the project, which will conduct research on farms in Wa Municipal, Wa West, Lawra and Sissala districts in Ghana; and Bankass, Cinzana, Koutiala, Kita and Bougouni in Mali. Among crops to be examined for system integration are millet, maize, sorghum, cowpeas, groundnuts, cotton and cassava.

Dr. Jesse B. Naab (far right), Soil and Cropping Systems Scientist and colleagues, Savanna Agricultural Research Institute, Wa, Ghana.

Developing sustainable CAPS for smallholder farmers in Southern Africa (LTRA-9)

Lead PI: Neal Eash, Associate Professor and Soil Scientist, Department of Biosystems Engineering and Soil Science, University of Tennessee

Host countries: Lesotho, Mozambique

Subsistence farmers across Southern Africa struggle with food security and often address the shortfall by plowing more land. This approach usually results in fewer crops due to less timely weeding, limited inputs such as fertilizer being spread across a larger area and higher erosion rates due to larger tracts of erodible, residue-free land. The continued use of this approach has resulted in degraded soils that further limit crop potential. To address these challenges, this project will research the effectiveness of different CAPS. The goal is to find appropriate cereal, grass and legume cover-crop mixes that protect the soil surface from erosion, build soil organic matter, sequester carbon, limit weed germination, enhance soil fertility and increase yields and income through adaptation of conservation agriculture systems to local conditions.

CAPS field in Lesotho.

The project will include a detailed collaboration and consultation so that researchers understand the farm family structure - including gender roles, the markets for purchase of inputs and sales of crops, and the reasons why certain technologies are adopted or abandoned. Accomplishing these objectives would be a significant step toward increasing incomes, food security and gender equity for small-scale farmers in the region.

CAPS for smallholder farms in Eastern Uganda and Western Kenya (LTRA-10)

Lead PI: Jay Norton, Assistant Professor of Soil Fertility, Department of Renewable Resources, University of Wyoming

Host countries: Kenya, Uganda

Sub-Saharan Africa (SSA) faces formidable food security and environmental challenges. Population pressure, agricultural intensification, market distortions, an unevenly supportive policy climate and inherently unproductive soils create a degradation spiral that underlies declining food security and environmental quality. While conservation farming systems that are capable of improving productivity have been developed,

several broad constraints impede adoption for many of the 60 million smallholder farmers across SSA.

This project proposes to develop CAPS through a participatory process that incorporates concepts of co-innovation and co-design among researchers, advisors and stakeholders in agriculture. The research team combines experienced non-governmental and university partners in Kenya and Uganda with a soil scientist, an agroecologist, an agricultural economist and two experts in sustainable business management from the University of Wyoming. All are eager to apply participatory design, analytical and outreach approaches.

Weeding of conventional tillage field in Kenya.

The catalysts for this proposal are Kenyan directors of two well-established non-governmental organizations who are completing Ph.D.s in agronomy and soil science at the University of Wyoming. Both will complete Ph.D.s that integrate cropping systems studies in the United States and Kenya early in 2011 and already have many years' experience implementing agricultural training programs for smallholder farmers in Kenya. Professors at Moi and Makerere universities round out the host-country teams.

To address a spectrum of economic and environmental conditions in Eastern Africa, this project will be replicated in four areas: the Tororo and Kapchorwa districts in eastern Uganda and the adjacent Trans-Nzoia and Bungoma districts in western Kenya. Tororo and Bungoma are highly degraded lowlands with sandy soils of low fertility. In contrast, Kapchorwa and Trans-Nzoia are highlands that have more commercial agricultural systems but face serious soil erosion challenges. Farmers in Kapchorwa and Trans-Nzoia are generally more innovative and accepting of improved agricultural systems, while in Tororo and Bungoma work on conservation tillage has been undertaken for quite some time using farmer field schools with limited impact.

This project's approach incorporates components of co-innovation in which end users of technology become active participants in its development through frequent interaction, monitoring and redesign. On-station replicated trials combined with on-farm pilot plots in the four districts of Kenya and Uganda will provide multiple settings for engagement and participation among the research team, regional and national officials, local community leaders, local/regional agricultural educators and local farmers. This proven approach will foster broad participation for the basic redesign of agricultural livelihoods that is necessary for improvements in SSA farming. By structuring the pre-experiment survey and design activities to target both men and women in different types of households and agricultural settings, at least one prototype CAPS and one pilot farm in each study area will focus on particular issues faced by women farmers.

CAPS among tribal societies in India and Nepal (LTRA-11)

Lead PI: Travis W. Idol, Associate Professor of Natural Resources and Environmental Management, University of Hawaii at Manoa

Host countries: India, Nepal

Traditional agriculture in tribal and ethnic agricultural societies in India and Nepal is increasingly relegated to less productive land, often on steep slopes. The result is lower productivity, degradation of soil and water resources, health impairment and loss of livelihood options. Particularly affected are the smallholder tribal communities of Orissa state, India, and the Arun River Valley and Trishuli watershed of Nepal. Environmental degradation has driven these tribal and ethnic communities engaged in subsistence agriculture into severe malnutrition and loss of livelihood options.

LTRA-11 Co-PI Catherine Chan-Halbrendt, Professor of Natural Resources and Environmental Management, University of Hawaii at Manoa in Orissa State, India.

This project will apply a participatory agroecological framework to prioritize local resource use preferences,

develop improved conservation practices and identify market opportunities to enhance livelihood options. It will identify spaces of opportunities as well as structural barriers to women's participation in sustainable agricultural production to ensure that the project's recommendations stay relevant to tribal women's realities.

Results will be documented in baseline surveys and follow-up evaluations of conservation practices, with particular attention to women's participation in management and decision-making.

University of Hawaii faculty will collaborate with Orissa University of Agricultural Technology in India and the Institute of Agriculture and Animal Science (IAAS) of Tribhuvan University in Nepal and local non-governmental organizations, including the Local Initiatives for Biodiversity, Research and Development (LI-BIRD) in Nepal.

Conservation agriculture for food security in Cambodia and the Philippines (LTRA-12)

Lead PI: Manuel R. Reyes, Professor of Biological Engineering, North Carolina Agricultural and Technical State University (NCA&T)

Host countries: Cambodia, Philippines

Degraded landscapes are expanding annually in Cambodia and the Philippines, decreasing agricultural productivity. This heightens food insecurity and exacerbates poverty. In both countries, rural poverty is increasing pressure on natural resources like forests, soil, and water. This project will show how CAPS and practices of minimal soil disturbance, continual mulching and crop rotations can be adapted for local conditions as the best practices to create sustainable, permanent cropping systems for annual crop production under wet tropical conditions.

Key project partners include USDA-Natural Resources Conservation Service East National Tech Support Center, Cambodian Royal University of Agriculture, Project to Support Agricultural Development in Cambodia (PADAC) / Centre de Coopération International en Recherche Agronomique pour le Développement (CIRAD), University of the Philippines-Los Baños and the Landcare Foundation of the Philippines.

The project's hypothesis is that CAPS are technologically feasible, economically viable, environmentally sustainable and gender-responsive - not only contributing to the food security of small farming communities in Cambodia and the Philippines, but also reducing the labor burden on women. This hypothesis will be tested by the following research objectives:

- Assess soil quality and measure crop yield and biomass from CAPS and compare them with results from conventional plow-based systems in Cambodia and the Philippines;
- Identify field- and farm-level CAPS that will minimize costs and risks for small-scale farmers while maximizing benefits and adoption;
- Pinpoint gendered limitations and advantages that can promote adoption of CAPS and determine how CAPS will affect farm women's situations;
- Quantify the effectiveness of SANREM-supported farmer groups in training knowledge leaders, being a means of knowledge transmission, and facilitating network connections leading to widespread adoption of CAPS; and
- Find out whether a microcredit approach and a method to facilitate access to mechanized direct seed drilling and spraying can be successful in promoting adoption of conservation agriculture in Cambodia.

Conservation agriculture soybeans in Brachiaria residue in Cambodia.

SANREM team escapes Haiti quake

A team of SANREM CRSP researchers from LTRA-6 was in Haiti when the devastating earthquake struck the island nation on Jan. 12, 2010. The six Virginia Tech faculty members and one graduate student had left Port-au-Prince less than an hour before the disaster and were driving to the Central Plateau north of the city to begin field work.

Associate Program Director Keith M. Moore e-mailed these details: *"We climbed the mountain face across from Port-au-Prince, and sometime near or after we reached the top, the earthquake must have hit. On the very winding and rough road, we didn't feel anything. When we arrived at the hotel in Mirebalais at 6 p.m. we learned of the earthquake, but the extent of the disaster was not apparent. The swimming pool at the hotel had become a tidal wave, the staff said, and we could see water around the pool that had sloshed out."*

Earthquake damage to Ministry of Agriculture, Natural Resources, and Rural Development offices in Port-au-Prince.

The next morning, the team was evacuated by driving overland to the Dominican Republic. A Haitian Ministry of Agriculture chauffeur drove the SANREM team to the border before heading back to find his family in Port-au-Prince.

"Before leaving we checked in with a local partner at the Zanmi Lasante headquarters in nearby Cange." Moore e-mailed. *"They had sent doctors down to Port-au-Prince to help with the emergency during the night. SUVs were lined up in their compound with Haitians waiting to climb aboard to head down to Port-au-Prince to find and learn what had happened to their families and protect their property if they had any. It was a desperate situation with little or no knowledge."*

The SANREM team managed to get a flight from Santo Domingo to the United States the next day. The team included professors James McKenna, Wade Thomason and Katy Martin Rainey of Virginia Tech's Department of Crop and Soil Environmental Sciences; Maria Elisa Christie and Keith Moore of the SANREM CRSP ME, and Nathan Kennedy, a graduate student in Virginia Tech's College of Natural Resources. Nathan, a former Peace Corps volunteer in Dominican Republic, stayed to help with relief efforts. Professor Mark Alley of Virginia Tech had traveled to Haiti with the group but departed before the earthquake struck.

The SANREM research was temporarily discontinued in Haiti, but SANREM PIs returned to Haiti in March, research plots were planted in May, and the research is proceeding as planned.

Watershed Technology Conference

The SANREM CRSP co-sponsored the 21st Century Watershed Technology: Improving Water Quality and the Environment Conference Feb. 21-24, 2010, at Earth University in Guácimo, Costa Rica. The conference provided a forum for natural resource management researchers and practitioners to exchange information on science, applications and developments in the use of watershed science and technology.

Organized by the American Society of Agricultural and Biological Engineers (ASABE) and Earth University, the event was one of a series on watershed technologies covering topics ranging from new applications of well-established practices to applications of emerging technologies, policy issues and knowledge dissemination. The Costa Rica conference focused on emerging problems and new solutions to managing watersheds to meet water quality and quantity standards. SANREM CRSP researchers Theo Dillaha, Brian Benham, Saied Mostaghimi, Conrad Heatwole, Victor Barrera, Manuel Reyes and Carlos Montufar made presentations at the meeting.

SANREM CRSP Phase III FY2009 Annual Report

The SANREM CRSP completed and submitted the final FY2009 Annual Report for Phase III report to USAID. The report contains key findings of the Phase III long-term research and the cross-cutting research programs. The report is available at: http://www.oired.vt.edu/sanremcrsp/documents/reports/2009AnnualReport.pdf

SANREM CRSP Phase IV FY2010 Semi-Annual Report

The SANREM CRSP Phase IV FY2010 Semi-Annual Report was submitted to USAID in May. The report describes the closeout of Phase III activities as well as the initiation of Phase IV activities. The report is available online at: http://www.oired.vt.edu/sanremcrsp/documents/SANREMCRSPMidyear2010.pdf

Agronomist joins SANREM CRSP ME

Michael (Mike) Mulvaney joined the SANREM CRSP Management Entity on March 1 as assistant program director and a senior research associate. He received a Ph.D. in agronomy and soils last December from Auburn University and holds a bachelor's degree in chemistry from the University of Connecticut. Mulvaney's experience includes an adjunct professorship in the Department of Social Work at Tuskegee University and service in the U.S. Peace Corps in Bolivia. His work has been published in the *Journal of Environmental Quality* and *Tetrahedron Letters*.

Research areas for his doctorate were no-till systems for sustainable vegetable production, carbon and nitrogen mineralization under conservation tillage, ammonia emissions from cattle operations and alley cropping for soil conservation. Mike will lead the SANREM CRSP Phase IV C-sequestration and soil quality cross-cutting research activity.

Mike Mulvaney tending a community garden in Auburn, Alabama.

Southern Sudan Associate Award

The SANREM CRSP completed an associate award for the USAID Sudan Mission. The associate award involved an assessment of Southern Sudan's higher education needs in agriculture and environmental science. The greatest needs identified were:

- Deficiency in numbers of current and projected university-trained agriculturalists,
- Universally recognized urgent need for practical, field-based training for degree candidates at all levels,
- Urgent need for shorter-term certificate and diploma programs,
- Shorter-term development needs require many more bachelors degree graduates with broad-based, general agricultural training,
- Facilities and faculty training needs are acute and general,
- Higher education to increase regional food security is priority number one.

Higher education needs assessment workshop in Juba, Sudan.

Key recommendations include:

- Short-term agricultural tertiary education efforts should focus on the training of agricultural generalists who could function as extensionists to assist smallholders and medium sized farmers and herders to improve their productivity and general food security in the region.
- Agricultural field experiences need to be fully integrated into the curriculum.
- Early incorporation of credited practical field experience into the curriculum is highly desirable.
- The University of Juba College of Natural Resources and Environmental Studies campus on the other side of the Nile should be rebuilt and be used to initiate short-term agricultural certificate and diploma programs.

The complete final report is available online at: http://www.oired.vt.edu/sanremcrsp/menu_research/Sudan.php.

Robert Rhoades, SANREM researcher dies at 68

Robert E. Rhoades, a principle investigator of SANREM CRSP Phase I, II, and III projects in the Andes, passed away in late March. Dr. Rhodes, known as one of the founders of agricultural anthropology, was a professor at the University of Georgia. He conducted research in the Andes of Ecuador and Peru for almost 10 years under the SANREM CRSP program. His research, supported through three separate grants, explored the connections between land use and natural resources. Dr. Rhoades and others worked with communities, NGOs and various levels of government to develop sustainable agriculture systems, land use plans and public policies to protect natural resources. His work in the Andean region also placed a special focus on gender roles in the agricultural sector and increased access to knowledge gained during the SANREM-Andes program.

Notables

Zanmi Agrikol expanding role in rural Haiti

Zanmi Agrikol, one of the project partners in the LTRA- 6 project in Haiti, is aiming to feed thousands of people impacted by the earth quake. Their work, recently highlighted in *The Wall Street Journal*, could be key to revitalizing Haiti's agricultural sector and sustaining families migrating back to the rural areas from Port-Au-Prince. The article can be found online at: http://online.wsj.com/article/SB10001424052748703494404575081744058479892.html?KEYWORDS=Zanmi+Agrikol

SANREM CRSP 2010 Annual Meeting

The SANREM CRSP Phase IV Kick-Off and 2010 Annual meeting took place May 5-7 in Blacksburg, VA. The meeting gave each of the LTRA's an opportunity to meet each other and the Management Entity (ME) staff. The ME staff reviewed the SANREM CRSP program objectives and requirements. Each LTRA also presented the specifics of their research project to the other participants. The LTRA teams discussed cross-cutting research opportunities and established the next technical committee. More information and presentations from the annual meeting can be found online at: http://www.oired.vt.edu/sanremcrsp/AM2010/Home.php

2011 SWAT-SEA conference

The 2011 Soil and Water Assessment Tool -Southeast Asia Conference is scheduled for Jan. 4-8 in Ho Chi Minh City, Vietnam. This is the second year of the conference, a follow-up to the successful event in January, 2010 in Chiang Mai, Thailand.

The 2011 conference will include a series of SWAT training workshops scheduled to take place January 4 and 5, followed by the SWAT conference on January 6 and 7 and a tour of the Mekong Delta on January 8.

SWAT Training topics and presenters include:

- Introduction to SWAT, Dr. R. Srinivasan, Texas A&M
- Advanced SWAT, Dr. Ann van Griensven, UNESCO, Delft, Netherlands, and Dr. Karim Abbaspour, EAWAG, Switzerland
- Stream Restoration, Dr. Greg Jennings, North Carolina State University
- MapWindows, Dr. Daniel Ames, Idaho State University

SWAT Conference topics include:

- Climate Change Applications
- Sensitivity Calibration and Uncertainty
- Sediment, Nutrients, and Carbon
- Pesticides, Bacteria, Metals, and Pharmaceuticals
- Database and GIS Application and Development

Up-to-date information on the 2011 SWAT-SEA conference can be found online at http://ssc.hcmuaf.edu.vn/

SANREM CRSP is on Facebook

You can now find SANREM CRSP on Facebook. Become a fan of our page to receive updates on SANREM CRSP research, programs, and news as well as information on conservation agriculture and related topics from around the world. You can find us at http://www.facebook.com/pages/SANREM-CRSP/69503719402 or by searching for SANREM CRSP on Facebook.

SANREM CRSP Calendar

2010	
Aug. 15	Annual LTRA and CCRA work plans due
Aug. 31	Annual LTRA and CCRA USAID indicator reports due
2011	
Jan. 4-8	Soil and Water Assessment Tool - Southeast Asia Conference, Ho Chi Minh City, Vietnam

Kudos

The *American Phytopathological Society* designated the SANREM-associated paper "Cheatham, M.R., M.N. Rouse, P.D. Esker, S. Ignacio, W. Pradel, R. Raymundo, A.H. Sparks, G.A. Forbes, T.R. Gordon and K.A. Garrett. 2009. Beyond yield: Plant disease in the context of ecosystem services. Phytopathology 99:1228-1236" as one of the top 9 papers of 2009 in the journal *Phytopathology*.

The paper is about plant disease and how it can affect ecosystem services. The paper was developed in collaboration with SANREM partners at CIP in Peru and is available online at: http://apsjournals.apsnet.org/doi/abs/10.1094/PHYTO-99-11-1228.