Horticulture CRSP Projects - Uganda, Rwanda, Zambia, and Tanzania
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UGANDA

Increasing the Capacity of Smallholder Farmers to Produce and Market Vegetable Crops in Uganda and Democratic Republic of Congo - *Ending Fall 2013*

PI and Partners:

- Kate Scow, University of California, Davis
- Johan Six, Mark Van Horn, Heidi Ballard, and Stephen Boucher, University of California, Davis
- Edith Naggenda and Ignitius Bwoogi, Rural Agency for Sustainable Development, Uganda
- Michael Masanza, Uganda Christian University, Uganda
- Beatrice Akello and Peter Lusembo, National Agricultural Research Organization, Uganda
- Harriet Nsubuga Mpanga, Agribusiness Initiative Trust, Uganda
- Prossy Isubikalu, Makerere University, Uganda
- Dennis Yiga, Mukono District Local Government, Uganda
- Karel Van Laer, Scheut Tshilomba, Democratic Republic of Congo

Although the growing market for horticultural products in Uganda offers an opportunity for smallholder farmers to improve their income, their access to these markets is still limited. This project will develop a participatory extension model to rapidly improve smallholder linkages to horticultural markets, which will be achieved by merging and supplementing two agricultural development models - Farmer Field Schools (FFS) with the Participatory Market Chain Approach (PMCA). We will work with Farmer Groups established in our pilot project in Nkokonjeru, Uganda and evaluate the potential of our adapted FFS methodology to a pilot community in the Democratic Republic of Congo.

Specific objectives are to strengthen farmer groups' capacity to produce indigenous leafy green vegetables and tomatoes for the market and improve farmers' ability to use their farm as an income generating asset. Research in small plots and on farmers' fields of economically appropriate soil fertility management technologies, including micro-dosing, improved varieties, irrigation, and safe pesticide use, will help identify ways to increase vegetable yields and quality. Curriculum enhancement with a local university (Uganda Christian) and Uganda's primary agricultural university (Makerere), as well as with governmental and NGO agricultural extension, will strengthen the region's capacity to carry out and sustain research and extension activities for horticultural crops.

http://hortcrsp.ucdavis.edu/main/28prod_uganda.html

Coolrooms and Cool Transport for Small-Scale Farmers - *Ending Summer 2011*
Using solar power and innovative cooling technology to create storage and transport coolrooms in infrastructure and electricity limited areas of India, Uganda and Honduras.

PIs and Partners:

- Michael Reid and James Thompson, University of California, Davis
- Cecilia Chi-Ham, University of California, Davis
- Neeru Dubey, Amity University, India
- Royce Gloria Androa, Reach Your Destiny Consult, Ltd., Uganda
- Bal Vipan Chander Mahajan, Punjab Agricultural University, India
- Dinie Espinal-Rueda, Zamorano University, Honduras
- Ron Khosla, Store-it-cool, LLC

Temperature management is the key tool for reducing temperature losses in the developing world. Very few smallholder farmers have access to cooling or cool storage facilities, and even refrigerated transportation is a rarity. The unreliability of local electricity supplies, the expense of conventional coolers, and the lack of technical expertise for the installation and maintenance all have led to the search for alternative solutions

such as evaporative cooling systems. Nevertheless, mechanical refrigeration still represents a simple and efficient solution to cooling produce, and is usually the only practical means for cooling to temperatures near freezing. For resource-limited farmers in the developing world, coolrooms and transportation systems employing mechanical refrigeration are economically and practically infeasible. We are testing an innovative system, the 'Cool-bot'(TM), which uses an intelligent thermostat system controlling a standard room air conditioner to create a small-scale cooler out of a well-insulated room. Experiments include testing a range of potential insulating materials that might be used in installing or retrofitting coolrooms, evaluation of the Cool-bot(TM)/window air conditioner combination, and evaluation of the use of photovoltaic panels to power the system. For short-distance transport to local markets, cool transit can be achieved by placing properly-cooled produce in a well insulated truck or cart. Studies on novel insulating materials will also be applicable to such transportation systems.

http://hortcrsp.ucdavis.edu/main/9Coolrooms.html

Promoting Fruit and Vegetable Production to Improve Nutrition in Nkokonjeru, Uganda - *Ending Summer 2011*
Improving community nutrition in Nkokonjeru, Uganda by promoting fruit and vegetable production through local university research and partnerships, demonstration gardens, Farmer Field Schools, and nursery expansion.

PIs and Partners:

- Kate Scow and Johan Six, University of California, Davis
- Edith Naggenda, Farmer Field School Trainer
- Ignitius Bwoogi - Rural Agency for Sustainable Development
- Charles Jjemba, Our Lady Queen of Apostles Nkokonjeru Parish
- Michael Masanza, Uganda Christian University
- Peter Lusembo, ZARDI

This project facilitates the organization and strengthening of small holder farmer groups in the Nkokonjeru region of Uganda by providing technical training in fruit and vegetable management and improving farmers' access to simple and innovative production technologies. The specific project objectives are: i) Increase vegetable and fruit production through farmer field schools and strengthen farmers' access to local and regional markets for vegetables and fruits; ii) Strengthen local farmer group structure and capacity of local partners to support farmer groups; iii) Increase participation of women in agricultural activities (research, education, outreach) in Nkokonjeru township and Mukono; and iv) Enhance institutional capacity in agriculture at Uganda Christian University (UCU) and promote research and education exchange among UC Davis, UCU and other collaborating institutions. Project activities are to: i) expand local nursery to serve as information center and source for fruit and vegetable production; ii) use farmer field schools to train farmers and strengthen farmer groups; iii) provide research experience and outreach training to UCU students; iv) engage in participatory research of disruptive technologies within the farmer group framework; v) build capacity of RASD to support farmers through improved communication and institutional organization.

http://hortcrsp.ucdavis.edu/main/12Nutrition.html

RWANDA

Extension of Appropriate Postharvest Technology in Sub-Saharan Africa: A Postharvest Training and Services Center - *Ending Fall 2013*

PI and Partners:

- Diane M. Barrett, University of California, Davis
- Lisa Kitinoja, World Food Logistics Organization
- Dan MacLean, University of Georgia
- Hilda Vasanthakaalam, Kigali Institute of Science and Technology, Rwanda

Physical losses of horticultural crops postharvest continue to range from 30-80% in Sub-Saharan Africa (SSA), and problems with food quality, safety and nutritional value are well documented. While past projects have identified appropriate postharvest technologies and recommended a variety of training, capacity building and small-scale infrastructure development, no single project has integrated all of this information and offered a locally based solution.

This unique pilot project will combine a wide variety of training programs, adaptive research and demonstrations of postharvest services. It will also provide access to needed tools and supplies in order to reduce postharvest losses and improve market access and incomes for small women farmers in Rwanda affiliated with established cooperatives near Kigali.

The project site in Rwanda will serve as a model for postharvest development in 5 additional SSA countries, whose representatives will participate via collaboration with African partners. By the close of project, 30 postharvest specialists from the 6 SSA countries involved will be well-qualified to implement enhanced postharvest handling techniques. They will be charged to teach these techniques to approximately 1,000 women farmers in their home countries. This will result in increased consumption of higher quality produce and better returns on investment to women farmers.

http://hortcrsp.ucdavis.edu/main/26pharvest_train.html

ZAMBIA

Sustainable Development of Horticultural Crops in Zambia for Food Security, Income Generation and in Support of the Tourism Industry - *Ending Summer 2011*
Helping farmers in Zambia develop consistent vegetable products to market to hotels and other tourist industries.

PI and Partners:

- James E. Simon, Rutgers, The State University of New Jersey
- Bismarck Diawuo, ASNAPP-Zambia
- Elton Jefthas, ASNAPP-South Africa
- Petrus Lanenhoven, Stellenbosch University
- Hector Rodolfo Juliani and Ramu Govindasamy, Rutgers

This project increases food security and generates income for rural farmers through quality production of vegetables. This project enables communities to have access to appropriate germplasm and involves them in the production, post-harvest handling and commercialization of high value produce to diversify their incomes. Growers are introduced to and trained in greenhouse tunnel construction and systems to produce vegetables in open field and under controlled greenhouse conditions. Access to information is an important component of this project. Farmers are trained not only in production and commercialization of fresh produce but also on business skill development. This project impacts 100 farmers (55% women) from the communities in the Livingstone region to produce 100 metric tons of vegetables valued of $125,000. This project uses a market-first science based approach involving private sector buyers including the Zambezi Sun, Royal Sun, Spar and Shoprite supermarkets, David Livingstone Hotel, Chrismar Hotel and lodges in Livingstone.

http://hortcrsp.ucdavis.edu/main/14Tourism.html

TANZANIA

Concentrated Solar Drying of Mango and Tomato - *Ending Summer 2011*
Developing a concentrated solar drying unit for mango and tomato in Tanzania to improve off-season food security.

PI and Partners:

- Diane Barrett, University of California, Davis
- Pieter Stroeve, University of California, Davis
- Jim Thompson, University of California, Davis
- Kurt Kornbluth, University of California, Davis Program for International Energy Technologies
- Bertha J. Mjawa, Ministry of Agriculture Food Security and Cooperatives, United Republic of Tanzania

Women carry out most production of horticultural crops in Tanzania and other developing countries. Harvest periods are short but less than 1% of the crop is processed for off-season consumption. Previous attempts at establishing solar drying have been unsuccessful due to their expense, low throughput capacity and inability to operate in cloudy environments.

Concentrated solar power (CSP) utilizes reflective surfaces to increase solar heat gain. CSP is less expensive than glazed solar collectors but has never been applied to food drying. It may also improve dried product color and color retention without addition of sulfites, improve texture, nutrient retention and rehydration properties and therefore will add value to the product, reduce the current 50-80% postharvest loss and increase product value.

This project designs and tests a batch CSP dryer for mangoes and tomatoes in simulated cloudy environments. CSP will be evaluated in terms of drying efficiency, cost and product quality.

http://hortcrsp.ucdavis.edu/main/1Drying.html