

**Annual Report**  
**Harvard School of Public Health (HSPH)**  
**Year 2 (2011/2012)**  
**Nutrition CRSP - Africa**

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**Overview of HSPH CRSP-Africa Activities**

In its activities for CRSP-Africa, HSPH has developed a strong and diverse collaboration with colleagues at CRSP/Tufts University, based in both Boston and Kampala, and at Makerere University in the School of Food Technology, Nutrition, and Bioengineering, the School of Public Health, and the School of Agricultural Sciences. Leadership of CRSP activities in Uganda changed in June 2012 when Prof. Joyce Kikafunda from the School of Food Technology, Nutrition, and Bioengineering became Principal Investigator, and our collaboration has continued smoothly through this transition.

CRSP-Africa activities in Uganda are focused around the implementation and evaluation of the Uganda Community Connector (UCC), which CRSP will assess through a household panel survey and a cohort study. The objectives of the panel survey are:

- To independently evaluate key agricultural, livelihood, food security, nutritional, health, and gender outcomes in vulnerable households and populations, in order to provide a framework for evaluating the UCC (and other programs/interventions) as well as to inform future interventions and policy
- To examine the interactions among agriculture, nutrition, and health in these populations.

In June-July 2012, the design of the panel survey was revised to include three districts beginning UCC activities in Phase I and three districts beginning UCC activities in Phase II. This change allows more rigorous evaluation of how well UCC meets its Phase I objectives. The

cohort study, which is currently being planned, will meanwhile enroll women who are followed through pregnancy, and their children will form a cohort that is intensively followed from birth. Interests are in:

- Quantifying the coverage and intensity of exposure to UCC within target populations at different life cycle stages (pregnancy, the first two years of life, possibly peri-conception)
- Assessing the effect of UCC exposure and intensity of exposure on nutrition, health, and livelihood outcomes within target populations at different life cycle stages, considering specific interventions/intervention packages and modifying factors both within the project and externally.

### **Research Activities**

In Year 2, HSPH built and strengthened collaborations with new and continuing Ugandan partners at CRSP and the three participating schools at Makerere University. We have also had positive meetings and interactions with leadership at UCC. A contract between HSPH and Makerere was established for initial work on the panel survey, utilizing Year 1 funds that had been obligated for the purpose.

The scope of the panel survey increased from one to three and now to six districts, and the specification of the districts also changed first to include only UCC Phase I districts, then to exclude districts where Innovations for Poverty Action (IPA) were considering work, and now to include both UCC Phase I and II districts. The current protocol, which has been amended accordingly, uses an improved design to evaluate Phase I of the UCC. Among the Phase I districts, the panel survey will be conducted in Agago and Dokolo in northern Uganda and in Kisoro in southwestern Uganda. The remaining districts will be randomly sampled from the list of Phase II districts when these are identified by the UCC.

A framework describing how agriculture, nutrition, and health were hypothesized to interact in the target populations was discussed and used to develop data collection tools for the panel survey. Gender issues, which were to be investigated using qualitative methods in Year 2, were incorporated into the tools. These will be studied quantitatively in the panel survey and the team will proceed with qualitative work based on the timing of the panel survey and cohort study. In the development of the panel survey tools, care was taken to capture outcomes and indicators needed by the UCC or relevant to its evaluation and to harmonize aspects of data collection with other groups within CRSP. The tools were tested in the field in May 2012, revised, and translated into appropriate local languages. The electronic data collection application and database have been developed in collaboration with SATELLIFE and are undergoing testing and revision. Data checks are being incorporated into the application to minimize errors in data entry. Procedures are also being developed to manage flow of collected data from mobile devices in the field to a central repository.

Ethical approvals for the panel survey have been received from the Higher Degrees, Research, and Ethics Committee at Makerere University and are pending at the Uganda National Council of Science and Technology, Harvard School of Public Health, and Tufts University. A training manual has been developed and procurement done for the panel survey. A field coordinator (Richard Kajura) has been hired, with hiring of field supervisors and staff and a data manager ongoing. Districts introductions and background information and data gathering have been performed in the three Phase I districts (as well as other Phase I districts that will no longer be part of the panel survey) to facilitate district entry and sampling for the panel survey. Training of staff is planned for September 2012, with data collection to begin afterwards, prior to the end of Year 2. Meanwhile, a draft protocol for the cohort study is under development.

### **Capacity Building Activities**

Capacity building activities in Year 2 included intensive working sessions to develop, test, and refine research protocols and data collection tools. These sessions occurred during six trips by HSPH researchers to Uganda within Year 2 to date, and interactions continue through periodic online meetings.

HSPH and Makerere investigators presented on various research methodologies at the Workshop on Development of Evaluation Research Design of Integrated Nutrition and Agriculture Programs, held in March 2012 in Jinja, Uganda. Staff from UCC Phase I districts and students from Makerere University and other academic institutions attended this workshop. HSPH investigators also participated in the Workshop on Integrating Agriculture and Nutrition Actions to Improve Maternal and Child Nutrition: Research on Program Impact Pathways in June 2012 in London.

For training, Dr. Nassul Kabunga attended the Bangalore Boston Nutrition Collaborative (BBNC) short course in nutrition research methods in January 2012. All arrangements were also made for Dr. Henry Wamani to attend a Summer 2012 session at HSPH. However, this latter activity was cancelled due to ramping up of field activities and other issues related to the panel survey. Going forward, we plan to conduct training activities in January 2013 at BBNC and during the 2012-2013 academic year at HSPH.

### **Outputs**

No outputs are expected in Year 2. Data collection for the panel survey is expected to begin before the end of Year 2 and last approximately two months. The first year of the panel study will provide rich cross-sectional data. Upon completion of data collection and cleaning, a report with descriptive analysis will be prepared and shared with the Government of Uganda, USAID, UCC, and other stakeholders. Some ideas for scientific manuscripts have been proposed, and these will be discussed more formally with the research team so that manuscripts can be prepared soon after the conclusion of data collection and cleaning.

**Annual Report**  
***Purdue University***  
***Year 2 (2011/2012)***  
***Nutrition CRSP - Africa***

**Principal Investigator: Gerald Shively, Purdue University**

**Objective 1 (as stated in Year 2 work plan): research**

Understand and measure the connections between agricultural capacity, technology adoption, nutrition outcomes, and conditioning factors at levels of aggregation ranging from household to district levels. The key objective is to develop an empirically-based and data-driven understanding of the overlap between agricultural issues and health/nutrition issues in Uganda, so as to improve the effectiveness of nutrition policy in Uganda.

*Substantial progress achieved, as detailed below.*

**Objective 2 (as stated in Year 2 work plan): data collection and analysis**

Conduct data analysis using household survey data collected in year 1 in 6 villages of Western Uganda. The questionnaire extends a panel (with earlier rounds in 2003 and 2007) with new information on cooking technology, meal response to fuel price changes and health impacts (primarily respiratory disease). Extend and expand the geographic coverage of the sample with an additional round of data collection in 2012.

*Substantial progress achieved, as detailed below.*

**Objective 3 (as stated in Year 2 work plan): capacity building**

Increase the capacity and effectiveness of research institutions in Uganda, especially in the College of Agriculture at Makerere University. Train students at the graduate level to become contributing members of the global community fighting against hunger and malnutrition.

*Activities initiated, as detailed below.*

## **Introduction/Overview of Work plan rationale/objectives**

Uganda faces a number of development challenges, including chronic and widespread child malnutrition. Current knowledge and national capacity to address these challenges is insufficient. This work plan focuses on studying available evidence regarding food security, malnutrition and related topics in Uganda and to undertake primary research and data collection to fill knowledge gaps on key issues related to agriculture, health and nutrition, and to simultaneously engage in training to improve knowledge and capacity in Uganda. Research and capacity building are being undertaken in a manner that aims to be synergistic with USAID “Community Connector” priorities and sites. Activities are closely aligned with the Feed-the-Future orientation of delivering “Purpose-driven Research” by (1) directly addressing socio-behavioral and economic factors related to technology and practice adoption; (2) targeting efforts in areas where the poor and malnourished are concentrated; and (3) transforming production systems to ensure enhanced food safety and nutrition.

## **Section I: Research Activities**

Focal area: *Identification of priority research areas*

Activity 1: In year 1 we proposed to initiate a review of the literature on nutrition, agriculture and relevant topics for Uganda, including published (peer reviewed) literature and unpublished (gray cover) documents. Work on this review was completed in year 2, resulting in a paper entitled “A Review of Food Security and Human Nutrition Issues in Uganda.” The intent has been for this to be issued as a Global Nutrition CRSP project working paper, when such a series becomes established.

The paper is also being targeted for publication in an appropriate peer-reviewed journal. Additionally, we developed a research note on aflatoxin, which contains general information on aflatoxin, as well as a review of the current state of knowledge regarding aflatoxin in Uganda. This would be appropriate for distribution as a short “policy brief.”

Focal area: *Synthesis of existing programs and projects*

Activity 2: In year 2 we planned to review existing socioeconomic datasets for Uganda, including datasets with possible nutrition components for subsequent analysis or follow-on data collection. We have secured access to a number of datasets, including multiple rounds of the Uganda National Household Survey (UNHS), Uganda Demographic and Health Survey (DHS) data, and remotely sensed satellite data (maximum value Advanced Very High Resolution Radiometer (AVHRR) Normalized Difference Vegetation Index (NDVI) composites from the NASA Global Inventory Monitoring and Modeling Systems (GIMMS) group at NASA’s Biospheric Sciences Branch). We have supplemented these data with agricultural commodity price data from Uganda with both spatial and temporal resolution. This multi-layered dataset is being analyzed and preliminary findings are reported in a working paper entitled “Measuring the connections between agriculture and child health in Uganda.” This research is part of a student MS thesis being completed at Purdue. We anticipate deriving a number of journal publications from this effort and are willing to work with the ME in year 3 to develop research briefs based on findings.

Focal area: *Discrete socio-economic analysis*

Activity 3: Although it was not part of the original year 1 work plan, during year 1 we capitalized on an opportunity to leverage USAID BASIS AMA financial resources (approx. \$30K) to collect survey data in 6 villages of Western Uganda. The survey was used to extend a household panel (with earlier rounds in 2003 and 2007) adding new information on cooking technology, meal response to fuel price changes and health impacts (primarily respiratory disease). Leveraging these data to measure health and nutrition interactions in the face of rising fuel prices and associated changes in household cooking behavior provides insights into an under-studied aspect of nutrition in Uganda, in particular as it impinges on home preparation of infant weaning foods. Activities undertaken directly address food quantity and quality concerns as articulated in the Feed-the-Future program. They also place agricultural production and household decision making within a larger context that spans biophysical, policy and social elements of household health and nutrition production systems where the poor and undernourished are concentrated. During year 2 we analyzed these data, which resulted in a paper entitled “Land use change, biomass consumption and health outcomes in western Uganda.” Also during year 2 we conducted an additional round of the survey, extending the three-round panel to a fourth round (2012) and expanding somewhat the geographic coverage of the sample. Working with our project partner at the University of North Carolina we were

successful in securing additional funds to field test newly-developed passive aerosol samplers and passive diffusion tubes to collect household-specific particulate matter air quality measures. We also collected stored food samples from 320 households in Kibaale district and conducted aflatoxin tests using qualitative aflatoxin test kits sourced in Uganda.

### *Lessons learned and challenges in implementing proposed activities*

Delays in initial approval and launch of the project created impediments to project start-up that have had lingering effects. Communication with the USAID mission has been difficult, and repeated attempts to schedule meetings with USAID mission staff in Kampala have failed. Although we have been very successful in working with our NCRSP project partner IFPRI, in Uganda, it remains extremely unclear whether, and to what extent, work plan activities can be dovetailed with the Community Connector project.

### *Solutions/resolutions applied or to be applied*

We remain committed to integrating activities with the ME and the mission, but will require guidance from the ME. In the meantime, we will continue to make progress on research initiated in years 1 and 2, and move research findings into appropriate outlets, including peer reviewed journals and outreach publications.

## **Section II: Capacity Building Activities**

Focal area: *Degree training*

Activities: Considerable effort was devoted to identifying a student from Uganda for degree training at Purdue. At the time of writing last year's work plan, several Ugandan students were considering applications but questions remained regarding their preparation and suitability for graduate study in the U.S. Eventually, one student secured admission to the Ph.D. program in Agricultural Economics at Purdue. George Omiat began his Ph.D. training in August 2012. Mr. Omiat was formerly a junior faculty member at Makerere University, and has been granted leave from that

institution to complete his studies in the U.S. It is expected that upon completion, he will be absorbed back into the teaching/research faculty at Makerere.

### *Lessons learned and challenges in implementing proposed activities*

Identifying well-prepared Ugandan students for graduate degree training in the U.S. has been a significant challenge. From a logistical point of view, it would have been desirable to train several M.S. students under the project, but early project delays and the substantial investment in student recruitment, screening and processing has meant that we are likely to train a single student at the Ph.D. level. The student has been processed through TraiNet, and we have made a commitment to funding the student as part of the Nutrition CRSP project. Hence it is essential that we maintain continuity of funding to support the student through completion of his degree. This creates a complication, in that the current phase of the NCRSP project is likely to end before the student's degree will be completed.

### *Solutions/resolutions applied or to be applied*

We anticipate seeking additional non-CRSP sources of follow-on funding for this student, as necessary, beyond 2015.

## **Outputs**

Jagger, P., S. Elmer, and G. Shively (2012) "Land use change, biomass consumption and health outcomes in western Uganda." Working paper.

Shively, G. and J. Hao (2012) "A Review of Food Security and Human Nutrition Issues in Uganda." West Lafayette, IN: Purdue University Department of Agricultural Economics.

Shively, G., J. Hao, and M. Brown (2012) "Measuring the connections between agriculture and child health in Uganda." West Lafayette, IN: Purdue University Department of Agricultural Economics.



Shively, G., C. Sununtnasuk, and J. Hao (2012) "Aflatoxin Research Note." West Lafayette, IN: Purdue University Department of Agricultural Economics.

## **Vignettes**

In Uganda we have studied the links between fuel portfolios and health outcomes among smallholder farmers. Our hypothesis is that the type, quantity and quality of biomass fuels may influence health outcomes by determining the exposure of individuals to smoke and airborne pollutants originating from the burning of biomass fuels. Our interest in this question is the connection between agriculture-driven land use change and the supply of available fuels. We observe relatively high incidence of fever (37 per cent), cough (45 per cent) and breathing difficulty (32 per cent) for the youngest child under 5. Youngest children are frequently swaddled to mother's backs throughout the day meaning they have higher exposure rates than siblings who are older and more independent. Frequency of fever is similar for the primary cook, while cough and breathing difficulty are less common. Overall we estimate that approximately 24 per cent of youngest children and 11 per cent of primary cooks have symptoms of acute respiratory infection. Estimated rates of ARI are lower for second youngest children (13 per cent) and secondary cooks (2.5 per cent) suggesting that frequent and prolonged exposure to biomass fuels leads to increased likelihood of ARI.

**Annual Report  
Tuskegee University  
Year 2 (2011-2012)  
NCRSP Africa**

**Principal Investigator: Eunice Bonsi, Tuskegee University**

In Year 2 of the Nutrition CRSP Asia project, the main goal was to achieve the multiple objectives of building capacity and conducting research that assesses agriculture, health and nutrition interventions in Uganda.

Thus the following was accomplished in Year 2:

1. Tuskegee recruited Joel Tumwebazi to the graduate program in Foods and Nutritional Sciences at the university. This student will finish his course work and return to work with Dr. Kabahenda from the College of Food Technology at Makerere University in partnership with the USAID Community Connectors project with Harvard and Tufts in collecting preliminary data at survey locations for his thesis work. Another student was identified but was unable to process his application and TraiNET on time, so he may be coming next year.
2. It was agreed that Tuskegee University will support five graduate students who have gained admission to the Department of Food Technology and Nutrition in the College of Agricultural and Environmental Sciences at Makerere University to work on NCRSP related research generated by their advisors and me. These five graduate students have been identified and being sponsored this year in related disciplines at Makerere University. The five students will be working with Margaret Kabahenda, Joyce Kikafunda and Edgar Agaba.
3. Dr. Margaret Kabahenda was invited to attend a short course at Tuskegee to gain training in food processing and sanitation that would allow her to co-organize a training course at the university with me. However this was cancelled and scheduled for next year as a result of processing TraiNET entry and visa acquisition.
4. Conducted training on NCRSP to faculty and students at the Department of Food Technology and Nutrition, in the College of Agricultural and Environmental Sciences, Makerere University. In that case there will be a greater awareness for the NCRSP project and faculty and students will gain a better understand of the scope of nutritional and health issues in their own country and help to identify realistic solutions.

Future possibilities: Dr. Kabahenda and I have had discussions of possible research project where an Msc graduate could work on conducting research in Southern Uganda. To align the project to the N/CRSP objectives and the activities of the RFA project, it was decided to include Professor Kikafunda in a meeting we had in Kampala, to involve the five students in

the Harvard and Makerere RFA project to be trained to participate and utilizing some of the data for their thesis research.

Furthermore, Dr. Margret Kabahenda is interested in researching and developing food-based dietary guidelines for Uganda as a pilot project to be presented to the Ugandan government.

**Annual Report**  
**DAI**  
**Year 2 (2011/2012)**  
**Nutrition CRSP Africa**  
**October 2, 2012**

Principal Investigator: Kathleen Kurz

Team members: Barbara Seligman

DAI's activity under the Nutrition CRSP Africa was to participate in N/CRSP meetings. Kathleen Kurz and Barbara Seligman participated in the N/CRSP partners meeting on September 17, 2012.