



FEED^{THE}**FUTURE**

The U.S. Government's Global Hunger & Food Security Initiative



Innovation Lab for Nutrition- Africa
Annual Report
October 1st, 2014- September 30th, 2015

**Lessons learned from programs
in Uganda that integrate
agriculture and nutrition actions**

**Award
#AID-OAA-L-10-00006**

**Feed the Future Innovation Lab
for Nutrition-Africa**

U.S. Government Partners



Partners in Uganda



Friedman School
of Nutrition Science
and Policy



HARVARD
UNIVERSITY



TUSKEGEE
UNIVERSITY



Feed the Future Innovation Lab for Collaborative Research on Nutrition

**Harvard TH Chan School of Public Health
Partner Annual Report - Africa
2014-2015**

Map or List of Countries Where Work

Uganda

List of Program Partners

Makerere University, Uganda

Acronyms

BBNC	Bangalore Boston Nutrition Collaborative
Harvard Chan	Harvard TH Chan School of Public Health
ME	Management Entity
NILA	Feed the Future Innovation Lab for Collaborative Research on Nutrition - Africa
UCCP	Uganda Community Connector Project
UNCST	Uganda National Council for Science and Technology

I) Executive Summary

Faculty and staff of the Harvard TH Chan School of Public Health (Harvard Chan) continued their collaboration with Makerere University and broadened their research agenda in Uganda. Harvard Chan research activities in Uganda are closely linked to evaluation of USAID's Uganda Community Connector Project (UCCP). During the project year, data management activities were completed on the baseline of a panel study in northern and southwestern Uganda to evaluate the impact of UCCP on household livelihoods and maternal and child nutritional outcomes, activities were undertaken to support implementation of a second round of data collection for this panel study, and a birth cohort study was initiated to study the mechanisms by which UCCP impacts these outcomes. Capacity building efforts were integrated into research activities, with additional training opportunities for Ugandan students and researchers provided through the Bangalore Boston Nutrition Collaborative (BBNC).

II) Program Activities and Highlights

Harvard Chan, in collaboration with Makerere University and Tufts University, continued implementation of the NILA Uganda Panel Study in rural districts of northern and southwestern Uganda, with finalization of study baseline data and planning and implementation of the second round of data collection. The NILA Uganda Birth Cohort Study also commenced. Training and capacity building for Ugandan scientists were integrated into research activities in Uganda as well as provided through short courses internationally.

III) Key Accomplishments

A draft analysis of the Uganda Panel Study using baseline panel data to evaluate the relationship between linear growth faltering (stunting) in young children and the adoption and use of agricultural technologies and practices is being revised before submission to a peer-reviewed scientific journal. Preliminary results indicate positive linkages between certain crop and livestock activities such as use of improved seed, cultivation of cash crops, and raising of dairy animals and improved linear growth (height-for-age) or reduced risk of stunting in children under two years of age. However, no such relationships were observed with other agricultural technologies, post-harvest activities, or diversification of agricultural production, after controlling for maternal and child characteristics and household wealth. Detailed planning and training of staff were undertaken for the Uganda Birth Cohort study, which also began in the first quarter of Year 5. Specific accomplishments for the Cohort Study included development of the protocol; obtaining of institutional approvals; site selection, visits, and district inception meetings; development, testing, and revision of data collection tools and an electronic data collection application; and training of supervisors and field staff. Short-term trainings for Ugandan students, researchers, and junior faculty were conducted in Bangalore, India.

IV) Research Program Overview and Structure

Harvard Chan research studies in Uganda are linked to the evaluation of the UCCP. All research is conducted in close collaboration with Makerere University and the ME. Effort is made to include training and active involvement of junior staff in research activities to build capacity in research on agriculture, nutrition, and health linkages.

In an effort to streamline reporting lines, the budget line for the Uganda-based Research Specialist responsible for supervising all research activities conducted in collaboration among Harvard, Makerere, and Tufts (Annet Kawuma, MPH) was moved to the ME. Joint supervision of this research specialist continues to occur among the Makerere PI and faculty at Harvard and Tufts through weekly calls and review of data collection progress.

V) Research Project Reports

a) Research linked to evaluation of the UCCP

i) Uganda Panel Study

NILA's Uganda Panel Study, conducted as a collaborative effort among Harvard, Makerere University, and the ME, aims to evaluate the impact of UCCP on household livelihoods and maternal and child nutritional status. The panel study collects representative data from households in randomly selected districts initiating UCCP activities at varying stages of UCCP's scaling-up plan, thereby creating a natural experiment for evaluating UCCP. Achievements during the project year included extensive data cleaning and documentation of baseline data in partnership with the data manager at Makerere, creation of key analysis variables, and data analysis. A draft analysis using baseline panel data of linkages between linear growth and stunting in young children and the adoption and use of agricultural technologies and practices was presented to the study team in June 2014 and is being revised based on received feedback for submission to a scientific journal. Input was also provided on other analyses being conducted by the Makerere team. Up-to-date institutional approvals for research activities have been maintained over the project year, and technical support was provided for the second round of panel data collection during the project year.

ii) Uganda Birth Cohort Study

NILA's Uganda Birth Cohort Study, also a collaborative effort among Harvard, Makerere University, and the ME, will examine the effect of interventions that integrate nutrition, health, agriculture, and livelihoods on maternal and child nutritional outcomes. Compared with the panel study, the cohort study will use a wider range of nutritional outcomes including biochemical measures and specifically study exposure to UCCP, uptake of its interventions, and mechanisms by which these impact maternal and child nutritional status.

There was extensive planning for this study in Year 5. Site selection was conducted per the study protocol, and all 16 selected sub-counties were visited multiple times by personnel from Harvard, Makerere, and the ME for district inception meetings, outreach to local leaders and communities, assessment of study implementation needs, and interactions with local UCCP staff. Data collection tools were developed, tested, revised, and translated into the four predominant local languages of the study areas. An application for electronic data entry was also developed, tested, and revised as needed. Study supervisor and enumerator positions were advertised, shortlisted candidates were interviewed, and selected candidates were invited for training. Training materials were developed and training was conducted by members of the research team from all three institutions. All trained candidates underwent multiple written examinations, which formed an objective basis for hiring decisions. Harvard provided input and guidance on developing a study implementation plan and associated materials, drafting a study budget, and procurement. The study protocol

maintained approval from the institutional review boards at Harvard Chan, Makerere, and Tufts.

VI) Associate Award Research Project Reports

Harvard Chan was not involved in Associate Awards in Africa.

VII) Human and Institutional Capacity Development

a) Training by Country

i) Short-Term

Christopher Duggan continued his role as Program Director and faculty member for the Bangalore Boston Nutrition Collaborative (BBNC) short course on nutrition research methods in January 2015. This course was attended by four trainees from Uganda as well as four trainees from Nepal who were supported by the Nutrition Innovation Lab, among others. Trainees received two weeks of intensive training on research methods in international nutrition from faculty drawn from Harvard, St. John's Research Institute, and Tufts University.

Nepalese Participants	
Mr. Prem Lal Basel	Maharaj Gunj Medical Campus, Institute of Medicine
Dr. Pranil Man Singh Pradhan	Patan Academy of Health Sciences
Ms. Sriju Sharma	Tufts University/Nutrition Innovation Lab Helen Keller International
Mr. Ashok Pandey	Shakti Milan Samaj
Ugandan Participants	
Dr. Esther Babirekere	Mulago National Referral Hospital/Makerere University
Dr. Lanyero Betty	Mulago National Referral Hospital/Makerere University
Mr. Ronald Wanyama	Gulu University
Mr. Olum Solomon	Makerere University

ii) Long –Term

Harvard Chan did not have long-term trainees during the project year.

b) Institutional Development

i) Description

The Research Specialist, hired by Makerere in partnership with Harvard Chan, received training in her role from researchers at both institutions. Cohort Study supervisors and field staff received extensive training in June and September 2014, respectively, on the study's background, rationale, objectives, and methodology, as well as on ethical conduct of research, details of study implementation, domains of data collection (agriculture, income,

nutrition, health, sanitation, gender, etc.), anthropometric assessment of adults and children, and data collection using electronic tablets, with one-on-one follow-up as needed during the project year. Inception meetings for the Cohort Study, held in each of the 12 participating districts, also informed district leaders and key personnel on the background, rationale, objectives, and methodology of the Cohort Study and more broadly on the need for more research on nutrition, health, and agricultural linkages.

ii) Partners

Partners in training and dissemination activities include Makerere University and Tufts University (ME).

VIII) Technology Transfer and Scaling Partnerships

NILA is not involved in technology development, transfer, or scaling.

IX) Governance and Management Entity Activity

Wafaie Fawzi continued his role on the Board of Directors, and Christopher Duggan continued his role on the Technical Advisory Committee during the project year.

X) Other Topics

None to report.

XI) Issues

None to report.

XII) Future Directions

The Birth Cohort Study and Panel Study will generate a wealth of data on agriculture, nutrition, and health linkages in rural Uganda and allow detailed investigation of mechanisms by which integrated interventions impact maternal and child nutritional outcomes in particular. Capacity building will continue to be integrated into research activities, and additional training opportunities will be offered through BBNC and at Harvard Chan.

**Feed the Future Innovation Lab
For Collaborative Research on Nutrition – Africa
Makerere University
Annual Report – Year 5**

Management Entity Information

Principal Investigators:

Prof. Bernard Bashaasha

College of Agricultural and Environmental Sciences,
Makerere University, Kampala.

Email: bashaasha@caes.maka.ac.ug

Other team Members

Florence M. Turyashemerwa (PhD)

Nassul Kabunga (PhD)

Annet Kawuma (Msc)

Agaba Edgar (Msc)

Technical and/or Advisory Committee Information

Shibani Ghosh (PhD)

Jeffrey Griffiths (MD, PhD)

Map or List of Countries Where Work

Uganda



List of Program Partners¹

Friedman School of Nutrition, Tufts University, Boston USA
Harvard School of Public Health, Boston USA

International Food Policy Research Institute (IFPRI)
Gulu University

Local government administrations
Uganda Chartered Health-Net (UCH)

¹U.S. universities and international partners by country.

Acronyms

IFPRI International Food Policy Research Institute (IFPRI)

UCH Uganda Chartered Health-Net (UCH)

Table of Contents

I) **Executive Summary**

Makerere University, in collaboration with Tufts University and Harvard School of Public Health, implemented the birth cohort in year 5 with recruitment beginning in October 2014. The birth cohort, where pregnant women are followed from the second trimester until their children make two years of age, is an evaluation of USAID's Uganda Community Connector Project. The birth cohort complements the Panel survey that was launched in 2012 and repeated in 2014. The aim is to assess the effectiveness of integrated actions in agriculture, nutrition and health on the maternal and child nutrition and health status.

Capacity building in the form of training of enumerators to implement the cohort was done. These included 10 males and 26 females representing the North and South Western Uganda where the birth cohort is being implemented. The total number of phlebotomists whose skill-set to draw blood from the cohort of mothers and children was 27. Only one of these was female. Selected hospitals laboratories were supported with equipment to process and analyze blood samples.

A total of 5,044 mothers (98% of the target) have been enrolled and so far 3,815 infants (76%) have been born. Followed up over nine time point period, the cohort has so far reached time point 5 where most infants are just under nine months of age. Drawn over three different time points to understand the changes in selected biomarkers of nutritional status, 4745; 3722 and 605 mothers have had their first, second and third blood draws, respectively. Children have their first blood draw over four time points, the first being at visit 5 when they are 6 months of age. Only 485 children have so far had their first blood draw.

Dissemination of preliminary findings from the birth cohort was done in different districts across the North and South Western regions of the country.

Aside the birth cohort, the Nutrition Innovation Lab also conducted a cross sectional midline nutrition, health, and agriculture assessment in six Uganda Community Connector Project districts (3,600 households).

II) **Program Activities and Highlights²**

In year 5, capacity building for enumerators to collect data for the birth cohort study was done. The birth cohort study is following 5,044 mother-child pairs to understand the linkages between agriculture, nutrition and health. The trainings

²Summary of program activities for the year, no more than one page in length.

were focused on the linkages between agriculture, nutrition, health and other key areas that are integral to these linkages including but not limited to water sanitation and hygiene; infant and young child feeding practices and nutritional status.

The training for the enumerators happened in the North and South Western Uganda, representing the two regions where the birth cohort is implemented. In addition, training across the two regions was also given to phlebotomists that are involved in blood sample collection for the birth cohort. The training for this group, in addition to the above, focused on improving the skill set to use modern techniques and equipment for blood draw. For example use of vacutainer and butterfly needles was not a common practice before. Moreover, most of the group were also not conversant in drawing blood from infants and young children.

A total of 37 enumerators and 26 phlebotomists were trained and deployed across the 16 sub-counties where the birth cohort is implemented. The birth cohort study has enrolled and is following up 5, 044 pregnant women (98% of the target) and their children in 12 districts across 16 sub-counties in the North and South Western Uganda. The visits for the cohort are over a nine time point period that covers a period from the second trimester of a woman's pregnancy to a time when her child is two years of age. So far time points one to four have been completed fully and the data are uploaded. The number of babies born so far total up to 3,815.

In order to understand the biochemical changes in selected biomarkers of nutritional status that take place at the different time points, 4745; 3722 and 605 mothers have had their first, second and third blood draws, respectively. Blood for mothers is drawn over three time points. Of the 3, 815 children only 485 have so far had their first blood draw. Children have their blood draw over four time points, the first being at visit 5 when they are 6 months of age.

In order to support districts to use data from the birth cohort study for programming and decision making, preliminary findings have been disseminated with some of the district administrations. The dissemination meetings involved all district leadership including technical and administrative staff including representatives from the sub-counties.

As a requirement, annual renewal from the institutional board for both the birth cohort and panel surveys was obtained. The material transfer agreement has also been approved by the Uganda National Council of Science and Technology.

Key Accomplishments³

Key accomplishments include training of 36 field enumerators for the birth cohort. Of these, 10 were male and 26 are females. Of the phlebotomists trained, 26 were male and only one is female.

A total of 5,044 mothers have been enrolled. Of these, 3,185 babies have been born. In order to understand the changes in biochemical markers of nutrition and aflatoxin status at different levels of gestation and child growth, 4,745; 3,722 and 605 mothers have had their first, second and third blood draws, respectively. Only 485 children have had their first blood draw.

Across the entire nine time point visits, so far four visits have been done to completion.

The panel midline survey conducted interviews on 3,600 households. The data have been cleaned and analysis is on-going.

III) Research Program Overview and Structure

The year 5 research program is an evaluation of the effectiveness of the integrated livelihood and nutrition interventions to improve maternal and child nutrition and health in rural Uganda. This work is an evaluation of the Uganda USAID Community Connector Project that implements these integrated activities. This evaluation takes on the form of a birth cohort and panel survey.

IV) Research Project Reports⁴

a) Theme A

Project I: The Birth Cohort Study

The birth cohort study looks at the effectiveness of the integrated livelihood and nutrition interventions to improve maternal and child nutrition and health in rural Uganda, activities implemented by the USAID Community Connector project. The study assesses the effectiveness of integration and or collation of interventions, aflatoxin exposure and environmental enteropathy and coverage, uptake and adherence to intervention messages and activities and how these impact on the maternal and child health and nutritional status. The cohort is implemented in both USAID Community Connector Intervention and non intervention districts; that are serving as controls.

³Concise statement of achievements, limited to one page in length that focuses on outputs, not process, such as Feed the Future indicators and distillation of program achievements across all program activities. Reporting on numbers of project meetings is not an output.

⁴Summaries of project activities, highlights and outcomes, not scientific reports or long detailed research papers, no more than one page per project.

Project 2: The Panel Study

The panel study aims to evaluate the effectiveness of the USAID Community Connector interventions on household livelihoods. Contrary to the birth cohort, the panel survey is cross-sectional and collects data from a representation of randomly selected households in selected districts. Some key findings from the panel survey include a high association between malaria and livestock ownership; and drivers of child malnutrition differing by poverty categories.

V) Name of Mission and Award Number

USAID Washington, award number AID-OAA-L-10-00006; CFDA number 98.0001

VI) Human and Institutional Capacity Development⁵

a) Training by Country

i) **Short-Term**

None for this year

ii) **Long -Term**

None for this year.

b) **Institutional Development**

Training on agriculture, nutrition, and health linkages as well as key related areas including but not limited to sanitation, water and hygiene, infant and young child feeding practices, and intra-household decision making on aspects of agriculture, nutrition, and health linkages was given to 36 field enumerators for the birth cohort (10 males and 26 females). Of the phlebotomists trained, 26 were male and only one is female. The number of phlebotomists whose skill-set to use modern blood drawing equipment and techniques was 27. Only one of these was female.

VII) Technology Transfer and Scaling Partnerships

We concluded 7 memorandum of understandings with seven Regional Hospitals. We mobilised, activated and recruited village Health Teams to actively participate in the birth cohort as 'foot soldiers' on the ground. We also facilitate district medical staff as study focal persons.

VIII) Governance and Management Entity Activity

Prof. Bernard Bashaasha continued to serve in his role as the Principal Investigator at Makerere. Dr. Florence M. Turyashemererwa serves as the Project Coordinator;

⁵ This section is to serve as a compilation of all program training activities and not meant to duplicate the Capacity Building section under individual Research Project Reports. It can be in chart format.

Ms. Annet Kawuma as a Research Specialist while Dr. Nassul Kabunga is a post doctoral fellow. Ms. Miriam Nakyambadde is the project administrator. Dr. Shibani Ghosh and Prof. Jeffrey Griffiths, based at Tufts University, are the associate director and director, respectively. Dr. Chris Duggan and Wafai Fawzie are counterpart principal investigators based at the Harvard School of Public Health.

IX) Other Topics⁶

We have introduced water quality testing to the districts for the first time in Uganda.

X) Issues⁷

Challenges

- So far we have lost 296 children born to women in the birth cohort
- Most sub-counties where the birth cohort is implemented have power problems.
- In addition they subcounties are extremely very remote making transport a challenge in most cases.

XI) Future Directions

Makerere University will continue with the birth cohort implementation and panel surveys to evaluate the effectiveness of integrated agriculture, nutrition, and health linkages in year 6. While the panel survey is bi-annual, the birth cohort is multiyear to allow a detailed investigation of the integrated nature of agriculture, health and nutrition interventions on maternal and child health and nutrition outcomes. Manuscript/ dissemination from both the cohort and panel data will be intensified in Year 6.

⁶ Such as Regional Centers of Excellence, impact assessment, gender initiatives

⁷ Such as financial, management, regulatory

Annual Report
Purdue University
Year 5 (2014-2015)
Feed the Future Nutrition Innovation Lab-Africa

Principal Investigator:

Gerald Shively
Purdue University, Department of Agriculture Economics
403 West State Street
West Lafayette, IN 47907
Email: shivelyg@purdue.edu

Objective 1 (from Year 5 Implementation Plan): Research

Understand and measure the connections between agricultural capacity and performance, technology adoption, nutrition outcomes, and conditioning factors at levels of aggregation ranging from household to district, region and nation. 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 and elsewhere, especially in the USAID Feed the Future countries of east Africa.

Substantial progress achieved, as detailed below.

Objective 2 (from Year 5 Implementation Plan): Data Collection and Analysis

Obtain datasets maintained in government offices and not available electronically or by other means. Continue to work with a collaborator at the University of North Carolina to analyze data from a small household panel survey conducted in 6 villages of Western Uganda to study respiratory illness and supplement this analysis with studies using nationally-representative DHS data.

Substantial progress achieved, as detailed below.

Objective 3 (as stated in Year 5 Implementation 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 ongoing, 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 research focuses on 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 goals and objectives. Activities are closely aligned with the Feed-the-Future orientation of delivering “Purpose-Driven Research” by: (1) directly addressing socio-behavioral, economic and market 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. Activities outlined below build upon prior efforts and have been designed through discussions with fellow researchers and NIL partners. We seek to leverage investments in data collection, student training and data analysis to inform agriculture and nutrition policy in Uganda and elsewhere. Several allied research activities, including work on vulnerability and safety-net programs in Ethiopia, have been facilitated by project support for Shively. Outputs are listed below.

Section I: Research Activities

Focal area: Policy-relevant, hypothesis-driven research on agriculture and nutrition

Activity 1: In previous years, we 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 supplemented these data with agricultural commodity price data from Uganda with both spatial and temporal resolution. Our efforts focus on analyzing this complex, multi-layered dataset using innovative approaches and to report findings in a series of working papers, journal articles and policy briefs. This research was part of two student M.S. theses (completed at Purdue University in years 3 and 4) and constitutes the ongoing focus of one Ph.D. student, George Omiat, at Purdue. Mr. Omiat is on track to complete his program in 2016.

Focal area: Discrete socio-economic analysis on key topics

Activity 2a (Price Analysis): In many settings, nutrition outcomes have been shown to be sensitive to levels and variability of food prices. During year 4 we completed the

compilation, cleaning and analysis of monthly price data for the period 1999 to 2008. These were obtained with the help of project partners at IFPRI and cover 23 markets and 29 commodities. During year 5 these price data were linked with remotely-sensed data (MODIS) on vegetative health and also combined with rainfall data and DHS child-growth data. Research on the drivers of food prices, the cost of nutritionally adequate diets over time and space, and the connections between food prices and child nutrition are the subject of the first essay in George Omiat's Ph.D. dissertation.

Activity 2b (Fuel Use and Upper Respiratory Disease): In the early years of the project, we capitalized on an opportunity to leverage USAID BASIS AMA CRSP financial resources to collect survey data in six 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 acute respiratory infection (ARI). 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. During Year 5, we continued to analyze these data, including an additional round of data collected in 2012, building on our previously published findings. In addition, as a synergistic activity, an M.S. student extended the analysis using a nationally-representative sample of DHS households, thereby expanding the scope of the investigation to measure connections between ARI evidence and child growth outcomes. This student, Onyekachi Aghasili, successfully completed and defended her M.S. thesis in May 2015.

Lessons learned and challenges in implementing proposed activities

Delays in initial approval and launch of the project created impediments to project start-up, but these have mostly been overcome. However, one consequence is that the Ph.D. student from Uganda who is studying at Purdue will not complete his degree during Year 5 of the project. He is expected to complete his degree in the second half of 2016.

Solutions/resolutions applied or to be applied

We will integrate our activities with the Management Entity (ME) and the mission.

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. George Omiat was admitted to the Ph.D. program in Agricultural Economics at Purdue University in August 2012 and passed his qualifying examination in the summer of 2014. 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 US. It is expected that upon completion he will be absorbed back into the teaching/research faculty at Makerere. In year 5, a Nigerian student completed her M.S. in Agricultural Economics at Purdue. She studied connections between acute respiratory infection and child growth outcomes. She was partially supported by the NIL project.

Lessons learned and challenges in implementing proposed activities

Identifying well-prepared Ugandan candidates for graduate-degree training in the US was a significant early 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 meant that we have been able to train only one student at the Ph.D. level.

Solutions/resolutions applied or to be applied

Mr. Omiat has been processed through TraiNet, and we have made a commitment to maintain continuity of funding to support him through completion of his degree. We have taken steps to use unexpended funds from year 5, in conjunction with partial university fellowship support, to fund him through the completion of his degree in 2016.

Outputs (not previously or elsewhere reported)

Aghasili, O. 2015. Fuel Choice, Acute Respiratory Infection and Child Growth in Uganda. Unpublished M.S. thesis. West Lafayette, IN. Purdue University Department of Agricultural Economics.

Ward, P. and G. Shively. "Disaster Risk, Social Vulnerability and Economic Development." Forthcoming in *Disasters*.

Debela, B. L., G. Shively and S. Holden. "Does Ethiopia's Productive Safety Net Program improve child nutrition?" Forthcoming in *Food Security*.

Brown, M., K. Grace, G. Shively, K. Johnson and M. Carroll. 2014. "Using Satellite Remote Sensing and Household Survey Data to Assess Human Health and Nutrition Response to Environmental Change." *Population and Environment* **36**(1): 48-72.

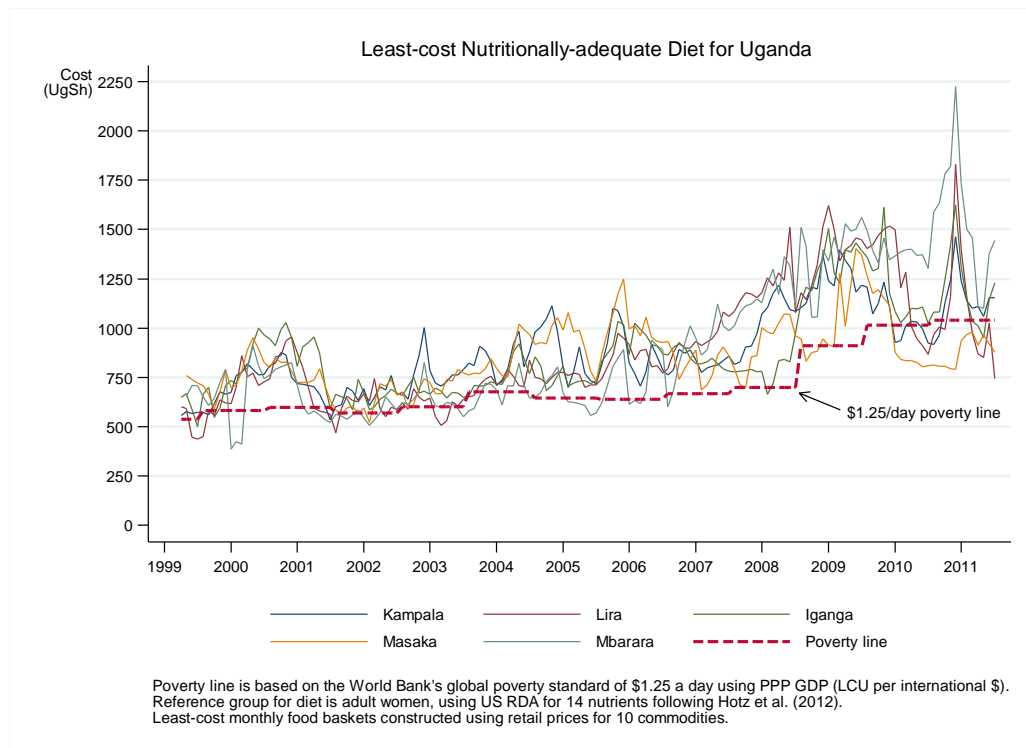
Leveraging and Cost Sharing

We continue to find ways to leverage non-project resources and cost-share contributions to the project. These include one M.S. student who was cost-shared by

Purdue University and a second M.S. student who is partially funded by Purdue. We continue to work closely with Pamela Jagger at the University of North Carolina, who has separate funding to support her research in Uganda. We estimate that the NIL has leveraged approximately \$50,000 of non-NIL support in Year 5. This does not include the substantial leveraging that came as part of our collaboration with Dr. Molly Brown (formerly at NASA) to use remotely-sensed data. That collaboration represents leveraging of several hundred millions of dollars of past US investment in data collection at NASA.

Vignettes

The following figure displays the historical cost of obtaining a nutritionally adequate diet in Uganda. The data in the graph are constructed by iteratively solving a series of 780 distinct linear programming “cost-minimization” problems, one for each month for each of five regional markets, using a basket of 10 major foods and a set of 14 nutrient requirements. The figure includes a poverty line and shows that for a substantial portion of time during the period 1999-2012, the lowest daily cost at which one could obtain a nutritionally-adequate diet in Uganda exceeded the World Bank poverty line by 25-100%.



**Feed the Future Innovation Lab for Collaborative Research on
Nutrition**

**Tuskegee University
Partner Annual Report- Africa
2014-2015**

List of Countries Where the Project Works

Nepal and Uganda

List of Program Partners

Makerere University

I) Program Activities and Highlights

Tuskegee worked with the graduate student from Uganda at Tuskegee University and the 5 students working on their thesis in Uganda to complete their studies or be near completion.

II) Key Accomplishments

Tuskegee saw the graduation of Joakin Mori, his graduate thesis completed, and defined focus for the 5 students.

III) Research Program Overview and Structure

Students were involved in the following research activities:

- ✓ The effect of agriculture extension approaches in influencing nutrition knowledge and dietary practices among farming households: A case study of VEDCO Mukono district, central Uganda
- ✓ The effect of women participation on agriculture decision making on household food security: a case study of Luwero sub-county, Luwero district
- ✓ Significance of dietary guidance on caregivers' food selection practices and nutritional status of children 6-18 months in Luwero district
- ✓ A critical path for maximum retention and enhancement of micronutrients in maize flour for complementary porridges using orange sweet potato flour: A Case study of Mubende district
- ✓ Infant feeding Practices and traditional Processing Procedures of the most Commonly Consumed Complimentary Foods in Kasambya
- ✓ Developing Nutrient Dense Complementary Porridges from locally Available Foods.
- ✓ Microbial Decontamination of fresh Produce Using washing Solutions

IV) Human and Institutional Capacity Development

a) Long-term training

Name	Sex	University	Degree	Major	Graduation Date (month/year)	Home Country
ASIIMWE ELIZABETH	F	Makerere	MSc	Agricultural Extension Education	December 31, 2015	Uganda
ATIM ELIZABETH 2012/ HD02/96U	F	Makerere	MSc	Applied Human Nutrition	December 31, 2015	Uganda
GALIWANGO HENRY 2012/HD02/74U	M	Makerere	MSc	Agricultural Extension Education	December 31, 2015	Uganda

KANSIIME EDWARD 2012/HD02/86U	M	Makerere	MSc	Applied Human Nutrition	December 31, 2015	Uganda
SSEMAKULA JOSHUA 2012/HD02/94U	M	Makerere	MSc	Applied Human Nutrition	December 31, 2015	Uganda

b) **Employment among students who have completed their training and returned to their home country:**

PROGRESS FOR THE 2 STUDENTS THAT WERE SPONSORED TO STUDY AT TUSKEGEE UNIVERSITY:		
NARESH SHAHI	Completed his MSc and graduated in August, 2014	<ul style="list-style-type: none"> Completed his MSc and went back to Nepal in August 2014. Worked former Employer until the earthquake and now works with the International Medical Corps (IMC) as a National Nutrition Manager Has published his dissertation manuscript.
JOEL TUMWEBAZE	Completed his MSc and graduated in August, 2014	<ul style="list-style-type: none"> Returned to the US in Fall 2014 for his PhD at Auburn University, Alabama Did not serve the J-Visa requirement for 2-years in country work Completed his MSc and went back to Uganda in August 2014. Worked with an NGO in Field Clinical Nutrition Has not yet drafted a manuscript from his dissertation.
JOAKIM MORI	Completed his MSc and graduated in May 2015	<ul style="list-style-type: none"> Completed his MSc and went back to Uganda in August 2014. Has not yet drafted a manuscript from his dissertation. Has not yet secured a job Volunteers at Department to teach the BSc Clinical Nutrition course

V) Governance and Management Entity Activity

Eunice Bonsi serves at the Program Director and liaison between the Management Entity and Tuskegee University. Her email is: ebonsi@mytu.tuskegee.edu