

Feed the Future Innovation Lab For Collaborative Research on Nutrition - Africa Purdue University - Annual Report - Year 3

Annual Report Purdue University Year 3 (2012-2013) *Feed the Future Nutrition Innovation Lab-Africa*

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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 Analysis and Data Collection

- Analyze data collected in Years 1 and 2 in six 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). In July/August 2012 we collected stored food samples (cassava, maize and groundnuts) from more than 300 farm households and used rapid qualitative tests to measure the presence of aflatoxin at levels above recommended amounts. This provides a baseline for the early post-harvest period. We will complement these data by collecting another round of samples for food in storage in Year 3. We will also conduct aflatoxin tests on products obtained in the market, using similar methods.

Substantial progress achieved on first activity. Market-level aflatoxin testing was not undertaken (see additional details 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” 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.

Section I: Research Activities**Focal Area: Identification of Priority Research Areas**

Activity 1: These activities were completed in Years 1 and 2.

Focal Area: Synthesis of Existing Programs and Projects

Activity 2: In Year 3 we completed these activities. We obtained existing socioeconomic datasets for Uganda, including datasets with possible nutrition components for subsequent analysis or follow-on data collection. 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 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 being reported in a series of working papers. This research was part of a student MS thesis completed at Purdue in Year 3. It also constitutes the ongoing focus of a PhD student.

Focal Area: *Discrete Socio-Economic Analysis*

Activity 3: In Year 3 we made substantial progress on several fronts and have achieved momentum on analysis and writing. 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 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 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 understudied 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 3 we continued to analyze these data, including an additional round of data collected in 2012.

Focal Area: *Aflatoxin Testing*

The experience gained from completing the farm-level grain sampling and aflatoxin testing in year 2 provided a basis for key project work plan activity decisions for year 3. In particular, all post-harvest samples from on-farm storage collected in year 2 tested negative (on a threshold test). That provided good news for farmers, since the project team could provide them with some reassurance that observed aflatoxin exposures were not a problem. However it also underscored the challenges associated with designing and setting up a research protocol aimed at documenting both the presence of aflatoxin and pathways for controlling it. A realistic approach aimed at conclusively detecting aflatoxin and its origins would require substantial testing from a large number of samples representing a wide-range of settings that would allow us to control for human-related factors and environmental factors, and (importantly) at enough regular intervals in time to trace the appearance of the toxin across the season. It was decided that the team lacked the necessary resources to complete this ambitious task in a satisfactory manner, and as a result the market-level aflatoxin testing was not pursued.

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. For aflatoxin testing, we had difficulty identifying an enthusiastic research partner in Uganda. The individual with whom we had originally envisioned the market-level analysis lost interest. Grain sampling across space and time really required a local partner who could treat it with the attention and expertise it deserved. Moreover, it became clear that a team of economists is probably not best-suited for grain testing, and that agronomists or toxicologists ought to be

involved. Rather than open the project to scientific (or other) criticism for having conducted the research poorly, we decided to avoid devoting project resources to this activity.

Solutions/Resolutions Applied or to be Applied

We remain committed to integrating all of our activities with the ME and the mission. If market-level aflatoxin testing is deemed a sufficiently important activity for NIL in future years, we are open to discussions regarding expanding the scope of effort and the size and expertise of the team.

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 University. One student secured admission to the PhD program in Agricultural Economics at Purdue. George Omiat began his PhD training in August 2012 and is currently a student in good standing. 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.

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 MS 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 PhD 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 the completion of his degree. If the NIL project ends before he completes his degree we may need to hold budget in reserve and explore options for a no-cost extension beyond 2015.

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. and G. Shively (2013) "Land use change, fuel use and respiratory health in

Uganda.” Currently in review at *Energy Policy*. [Available in working paper format.]

Shively, G. and J. Hao (2013) “Agricultural Activity and Child Growth in Uganda.” Draft.

Omiat, G. and G. Shively (2013) “Spatial and Vertical Price Transmission for Selected Commodities and Markets in Uganda.” Working Paper. West Lafayette (IN), Purdue University Department of Agricultural Economics.

Brown, M., K. Grace, G. Shively, K. Johnson, and M. Carroll (2013) “Using Satellite Remote Sensing and Household Survey Data to Assess Human Health and Nutrition Response to Environmental Change.” Currently in review at *Population and Environment*. [Available in working paper format.]

Leveraging and Cost Sharing

Overall external leveraging and cost-share contributions to the project were approximately \$69,253 or roughly 88% of the Year 2 Work Plan budget. During Year 3 we continue to work closely with Pam Jagger at the University of North Carolina, who has separate funding to support air-quality sampling in Uganda. We estimate that the NIL is leveraging approximately \$50,000 of non-NIL support in Year 3. This does not include the substantial leveraging that comes as part of our collaboration with Dr. Molly Brown at NASA to use remotely-sensed data. This collaboration represents leveraging of several hundred million dollars of past US investment in data collection.

Vignettes

See Nepal report.