Implementation Plan for Year 1 (FY 2012)

**Improved Modeling of Household Food Security Decision Making
and Investments Given Climate Change Uncertainty:**

**Associate Award AIDOAA-LA-11-00010
under Food Security III, CDG-A-00-02-00021-00**

Background

This project covers a three-year period from October 1, 2011, through September 29, 2014. The implementation plan presented here for Year 1 (October 1, 2011, through September 30, 2012) is a revised version of the work plan included in Annex B of the Technical Application.

Proposed Activities and Outputs

1. Initial contacts with USAID and consortium members
This activity was conducted in November 2011, and included confirmation of the choice of Zambia as a pilot country for testing and refining the combined household and climate-crop models, and formation of a consortium of research entities, including individuals and organizations with whom the Michigan State University (MSU)[1] team will collaborate in implementing project activities.

2. Travel to Zambia to initiate research activities
Co-PIs Crawford and Olson traveled to Zambia from November 5-15, 2011, to meet and discuss joint research activities with individuals involved in climate change and agricultural development research at the University of Zambia (UNZA), agricultural research institutions, ministries and the Food Security Research Project and Indaba Agricultural Policy Research Institute (FSRP/IAPRI) team. For activities and outcomes, see the "Report on Trip to Zambia: Climate Change and Household Modeling Project, November 7-14, 2011,"by Jennifer Olson and Eric Crawford. A Zambian researcher for the project, Brian Mulenga, was identified during this visit and hired in early December 2011.

3. Revision and approval of work plan
Originally planned for October 2011, and now proposed for completion in January 2012.

Output 1:   Approved Year 1 Implementation Plan.
Expected by: January 30, 2012

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[1] See Annex C for an annotated list of acronyms.

4. Compilation and evaluation of existing Zambia data
Collection of data available in Zambia was initiated during the November 2011 trip to Zambia by Decision Support System for Agrotechnology Transfer Olson and Crawford. Compilation of meteorological station data is continuing, through contacts by Zambia project researcher, Brian Mulenga, with staff of the Zambia Meteorological Service (ZMS) and UNZA. Soils, crop variety characteristics, and other data are also being collected through collaborations with the Golden Valley Agricultural Research Trust (GART) and the Zambia Agricultural Research Institute (ZARI), and university and other scientists. Other spatial datasets—soils from the WISE (World Inventory of Soil Emission) soils database, FAO, and local sources, and current climate from WorldClim—are being collected and prepared for use in the project's modeling and mapping.

5. Calibration and initial use of crop-climate model
MSU project staff will carry out this activity based on meteorological station data, other climate data, soils, crop characteristics and other data for the country of Zambia. Once calibrated using meteorological station and satellite data, the crop-climate model will be used to estimate yields of different maize varieties during the historical periods of interest (when household surveys were conducted), and to analyze their vulnerability to future climate change and variability. Maize varieties of interest will include those most commonly grown, and new varieties being developed by GART/ZARI for resistance to drought and acid soils. The principal activities during Year 1 will include:
    a. Collecting and compiling point-specific and spatial climate and other data for Zambia.
    b. Developing and calibrating the DSSAT (Decision Support System for Agrotechnology Transfer) crop model for maize in Zambia, and running DSSAT for Zambia.
    c. Preparation of maps of seasonal maize yields (kg/ha) for the historical periods of interest.

Output 2:   Calibrated and functioning DSSAT model for maize for Zambia.
Expected by: April 2012

Output 3:   Results of DSSAT model: data and maps of yield during periods of historical interest when household surveys were conducted.
Expected by: May 2012

6. Initiate collection of data to supplement existing surveys
This activity will focus on collecting cost and price data for agricultural inputs and outputs, and data on crop-specific production input use, drawn from a variety of published and unpublished materials, information from the Zambia market information service, and estimates obtained from knowledgeable local agricultural scientists and from farmer focus groups.

Output 4:   Preliminary crop budgets for the key crops
Expected by: May 2012

7. Gender-disaggregated focus groups on impacts of climate change and variability, current coping and adaptation practices, and costs and returns of key production activities.
These focus groups are planned for February and March 2012, and will be conducted in the three selected zones.

Output 5:   Report of focus group results on gender-disaggregated impacts of climate change and variability, and current coping or adaptation practices.
Expected by: April 2012.

8. Analysis of Zambia weather station and African Rainfall Estimation Algorithm (RFE) data
Statistical analysis to identify trends in temperature and precipitation using weather station data and the African Rainfall Estimation Algorithm RFE 2.0 gridded (GIS) 1982-2010 climate database. The analyses will identify changes in:
   a. Frequency, length and severity of droughts;
   b. Changes in amounts and timing of rainfall;
   c. Growing season precipitation totals, and variability between years;
   d. Onset, end and duration of rainy seasons

Output 6:   Technical report on the above.
Expected by: August 2012.

9. Design of gender analysis and integration
Design of gender, regional and wealth category analysis of the household survey data, and choice of gender-related variables and activities to include in the household models.

10. Initial design of household models
Activities during Year 1 will include:
   a. Analysis of existing household survey data in the three target zones to determine representative farm household types in terms of family and farm size, resource levels, and principal agricultural and nonagricultural production or income-earning activities. Existing reports on food economy zoning in Zambia will be another source used in determining representative household types.[2]
   b. Incorporation of crop budget information from Output 4, as appropriate for each household type.
   c. Construction of initial pilot household models for each target zone, in the form of whole-farm budgets or linear programming models.

Output 7:   Pilot household models for each target zone
Expected by: June 2012

11. Design of procedures to link climate-crop-household models
The analysis and integration of the climate, crop-climate and household modeling results will be informed by the focus group discussions. For example, information on whether and how communities are coping with climate variability or extremes may help inform the modeling of

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[2] See http://www.fews.net/pages/livelihoods-country.aspx?loc=6&gb=zm&l=en

how households choose maize varieties. Also, the results of analysis of drought trends may inform interpretation of household modeling results. During Year 1, climate data and crop-climate modeling results will be inserted in the household models to examine the importance of climate relative to other production factors in determining crop mix and household output and income.

12. Downscale general climate models for future scenarios for Zambia
General Climate Models (GCMs) will be downscaled to the selected resolution (i.e., 6 km) and run to produce data to inform the crop modeling and other project GIS work. The GCMs to be used are CSIRO, CCSM, HadCM and ECHAM (SRES A1B). See Annex C for explanations regarding these models.

Output 8:   Current and projected climate data layers from four GSMs for Zambia.
Expected by: June 2012.

13. Testing and initial use of the household models
The purpose of this activity is to validate the performance of the household models with respect to observed mix of farm household activities, and to identify needed changes in model structure or values of key input/output variables or starting levels of household resources.

14. Outreach on project progress in Zambia and Washington, D.C.
Outreach will include informal seminars in Zambia, trip reports on travel to Zambia and Kenya, and an outreach seminar in Washington, D.C., before September 30, 2012.

Output 9:   Trip reports and PowerPoint presentations.
Expected by: September 2012.

15. Review discussions, budgeting and work plan for Year 2
To be conducted during the last quarter of FY 2012.

Output 10:   Work plan and revised budget for Year 2
Expected by: September 2012.

Implementation Timeline

The proposed implementation timeline for Year 1 is shown in Annex A.

Proposed Reporting Indicators and Targets

FTF performance indicators and targets for FY 2012 to 2014 are listed in Annex B.