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# Higher Education Solutions Network Annual Report (FY 2015)

Michigan State University  
Global Center for Food Systems Innovation  
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## ACRONYMS AND ABBREVIATIONS

AFRE	(Department of) Agricultural, Food, and Resource Economics at MSU
AFS	Agrifood System
AgMIP	Agricultural Model Intercomparison and Improvement Project
AGRA	Alliance for a Green Revolution in Africa
AHRD	Academy of Human Resource Development
ArcGIS	Geographic Information System
BFS	USAID Bureau for Food Security
BHEARD	Borlaug Higher Education for Agricultural Research and Development
CGIAR	Consultative Group on International Agricultural Research
CRM	Climate Resilient Maize
CRSP	Collaborative Research Support Program
DFID	Department for International Development (United Kingdom)
DSI	Decision Support and Informatics
FACET	Fostering Ag. Competitiveness Employing Info. Comm. Tech.
FAO	Food and Agriculture Organization
FIP	Frugal Innovation Practicum
FSHN	(Department of) Food Science and Human Nutrition at MSU
FTF	Feed the Future
FSP	Food Security Policy Innovation Lab
GCFSI	Global Center for Food Systems Innovation
GDL	Global Development Lab
GIN	Goal Indicator
GIS	Geographic Information System
HESN	Higher Education Solutions Network
iAGRI	Innovative Agricultural Research Initiative
ICT	Information and Communication Technologies
ICTD	Information and Communication Technologies for Development
IDIN	International Development Innovation Network
IFAMA	International Food and Agribusiness Management Association
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
IR	Intermediate Result
LU	Lincoln University
LUANAR	Lilongwe University of Agriculture & Natural Resources
MIT	Massachusetts Institute of Technology
M&E	Monitoring and Evaluation
MOOC	Massive Open Online Course
MSU	Michigan State University
MTI	Megatrend I: Population Growth, Climate Change and Pressure on the Land

MT2	Megatrend 2: Rapid Urbanization and Transformation of Food Systems
MT3	Megatrend 3: Evolution in Skills Required by Food Systems Transformation
NGO	Non-governmental Organization
NSF	National Science Foundation
OI	Objective (1, 2, 3 or 4)
OST	USAID Office of Science and Technology
PIM	Policies, Institutions and Markets
RAID	Redundant Array of Independent Disks
RAN	Resilient Africa Network
RFA	Request for Application
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SA/SEA	South Asia and Southeast Asia
SIG	Student Innovation Grants
SUA	Sokoine University of Agriculture - Tanzania
TechCon	Technical Convening
TERI	The Energy and Resources Institute - India
TSC	Translational Scholars Corps
UC	University of California (at Berkeley)
UNIMA	University of Malawi
US	United States
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WIDER	World Institute for Development Economics Research at UN University
WUR	Wageningen University - The Netherlands

## 1. EXECUTIVE SUMMARY

The goal of the Global Center for Food Systems Innovation (GCFSI) at Michigan State University (MSU) is to create, test and enable the scaling of innovations in the food system, using an approach that is multi-disciplinary (six colleges are involved), focused on the entire food system, and forward-looking, considering three major trends that will impact future food system performance: (1) population growth, climate change, and pressure on land, (2) rapid urbanization and income growth, and (3) workforce development implications of changing food systems. GCFSI has three major objectives: Objective 1 – mobilize data and analytical tools to support development decision-making; Objective 2 – source, test, and scale up food systems innovations through \$3+ million in grants, and GCFSI faculty-led projects; and Objective 3 – student engagement and partnerships to build a new generation of development innovators and practitioners.

In project year 3 (FY 2015), under Objective 1, we focused on improvements to the Decision Support and Informatics (DSI) tools and website and worked with USAID to review DSI functionality and the potential and procedures for marketing DSI services. Under Objective 2, we managed six round 1 Major Innovation Grants and nine Student Innovation Grants, and issued a Request for Applications (RFA) for round 2 of the Major Innovation Grants in January 2015, with selection of 10 grants for \$1.6 million completed by September 2015. Late in year 3, additional RFAs were issued for Malawi faculty innovation grants and the UC Berkeley Development Impact Lab/Big Ideas program category on food systems. Three activities were launched in support of the Climate Resilient Maize scaling project. Draft reports on the eight research projects on multipurpose legumes conducted in Malawi in 2014 were reviewed and revised. An overall report synthesizing the results of these eight projects was drafted and presented to USAID/Malawi in August 2015 and during an open webinar hosted by GCFSI on September 30. A year 4 (FY 2016) work plan and budget were prepared, reflecting substantial changes in budget and orientation of project activities.

We reached 2,964 beneficiaries this year with the technologies, approaches and innovations we tested and piloted. Under Objective 3, we engaged 110 students via our Translational Scholars Corps (TSC), study abroad programs, and a new Frugal Innovation Practicum conducted in Malawi in August. We engaged 2,153 people via workshops, trainings and major events. The GCFSI website and Knowledge Management Platform were accessed 45,590 times. We built or maintained connections with 72 partners, and published 25 publications, including articles and reports, about work supported by GCFSI.

## 2. MAJOR MILESTONES/ACHIEVEMENTS

- GCFSI launched three Request for Applications (RFA) for innovation grants: major Faculty Innovation Grants (for amounts ranging from \$100,000 to \$500,000), Malawi Faculty Multi-Purpose Legume Grants (for amounts up to \$50,000), and Student Innovation Grants (for amounts up to \$10,000). GCFSI also committed \$60,000 for student innovation grants related to food systems, managed by UC Berkeley under their Big Ideas program.
- We continued providing support to our current grantees by using a buddy system, whereby various members of our team were in ongoing contact with the grantees to help connect them to the broader network of HESN.
- GCFSI launched the new and expanded Translational Scholars Corps (TSC). Led by David Poulson, Senior Associate Director, Knight Center for Environmental Journalism at MSU, 30 journalism students received training on innovative methodologies for capturing and telling stories about food systems innovation and global food security issues (16 core TSC students, 10 study abroad, and 4 remote learners completing the course out of 200 enrolled). Students

developed The Food Fix website, which houses blogs, articles, and 36 podcasts featuring GCFSI team members and other external researchers discussing various aspects of food systems innovation. The podcasts were downloaded 2,717 times, ranging from 14 to 255 downloads per individual podcast.

- Decision Support and Informatics (DSI) added tutorial videos and information, and made changes to improve the look and accessibility of the website.
- Reports on the eight research projects conducted in Malawi in mid to late 2014 were drafted and revised, and a report prepared synthesizing the results.
- Assistant Professor Stephanie White developed and successfully implemented the Frugal Innovation Practicum (FIP) in Malawi, involving both MSU and LUANAR students and faculty members. Frugal Innovation, which could just as easily be called Inclusive Innovation, takes into account local conditions and access to resources and is founded on the idea that people at the so-called bottom of the pyramid are in the best position to create innovations that serve their needs.
- GCFSI worked closely with the Bureau for Food Security (BFS) and the Global Development Lab (GDL) to define potential areas of support for the Climate Resilient Maize (CRM) initiative. The areas identified for GCFSI support were demand generation (participatory video in Kenya and Uganda), innovation growth modeling, maize crop budgets as input to cost-benefit analysis of CRM, post-harvest and marketing issues, and use of bio-physical data and mapping to support targeting of CRM implementation activities.

### 3. SUMMARY OF KEY ACTIVITIES

#### **Objective 1: Mobilize data and analytical tools to support development decision-making**

1. Made changes in the DSI site to allow the web site to display on mobile devices properly. In addition, the changes allow for DSI to support touch-based devices automatically.
2. Moved the entire DSI site to port 80 so that users working inside the USAID firewall would not experience access and performance problems.<sup>1</sup>
3. Developed a DSI research-tracking tool for agricultural and food-related articles, for use by the GCFSI core team.<sup>2</sup>
4. Completed 21 help videos on how to utilize DSI analysis tools.
5. Developed four new DSI “knowledge discovery” tools, designed to help analyze large quantities of data to reveal previously unknown patterns in order to predict behaviors and future trends.

#### **Objective 2: Source, test, and scale up food systems innovations**

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<sup>1</sup> For two tools, swipe compare and triple map compare, this could not be done since server access is hard-coded in ways that could not be changed.

<sup>2</sup> A demo of this tool can be found at <http://dsiweb.cse.msu.edu/demo/urbanfoodarticles/>

### *GCFSI Management Team*

1. Launched the second round GCFSI major faculty innovation grants RFA in January 2015.
2. Produced, presented and distributed the Malawi Synthesis Report, summarizing the results of the eight GCFSI projects implemented in summer and fall of 2014 to answer the question “Where and how can multipurpose legumes be scaled for sustainable intensification of maize systems and what would the potential impacts be, in the medium term, across the food system in Malawi?” Advanced the review and revision of reports on each research project.
3. Issued an RFA for grants to faculty at LUANAR and UNIMA (University of Malawi) related to scaling multipurpose legumes, to continue to pilot and test innovations in Malawi.
4. Issued an RFA for grants to support food system innovations by students, which generated more than 50 proposals from around the world.

### *Geophysical Team*

1. Created five new datasets for analyzing temporal changes in the rainy season for Malawi.
2. Conducted a one-time short course on climate statistics at LUANAR.
3. Created, validated, and implemented hydrologic models for the eight main watersheds in Malawi to examine the impact of climate change.
4. Extracted climate data for Malawi from regionally relevant global climate models (GCMs).
5. Constructed agricultural expansion suitability maps.

### *Urban Food Systems Team*

1. Produced a Megatrend 2 report on “Traditional Legume Exchange in Lilongwe, with a Focus on Pigeon Pea: Identifying Opportunities and Constraints to the Scaling of Multipurpose Legume Innovations in Maize-based Farming Systems.”
2. Developed the Frugal Innovation Practicum concept and budget, and collaborated in the development of the FIP curriculum with LUANAR faculty members and other departments on the MSU campus. Practicum implemented at MSU and in Malawi in August 2015.

### *Wageningen Team*

1. Wrote the GCFSI research report, “Policy and Institutional Constraints to Innovation in the Malawian Legume Sector.”
2. Developed four Wageningen University-led technical proposals for the “Scaling CRM in Sub-Saharan Africa.”
3. Domenico Dentoni, Assistant Professor, Management Studies, gave a keynote speech on February 19, 2015, at the International Workshop on Enabling Agri-Entrepreneurship and Innovations in Conflict and Transitional Regions, hosted by the USAID-funded Higher Education for Development “UPLOAD for Jobs” project in Mindanao, the Philippines.

#### *Rapid Urbanization and Food System Transformation Team*

1. Wrote the Megatrend 2 report “Mapping Market Prospects for Grain Legumes in Malawi.”
2. Published the first academic paper that projects employment within Africa’s agrifood system (AFS), including employment in farming, and three segments of the post-farm AFS.<sup>3</sup>
3. Presented GCFSI-funded research findings in a live TV presentation during Mozambique's Economic and Social Forum.

#### *Crosscutting Theme – ICTD*

1. Completed a final report of the participatory video project implemented in Malawi during the summer of 2014 by Steinfield and Wyche, with participation by MSU students and LUANAR faculty and students.
2. Worked with Shamba Shape Up to produce a series of video clips aimed at improving female farmers’ cellphone competence as part of their USAID Development Innovation Ventures (DIV) grant, and completed the other scheduled milestones on this project.
3. Susan Wyche received a National Science Foundation CAREER grant entitled “Driving Global Technology Innovation Through Studies of ICT Use Among ‘Bottom of the Pyramid’ Communities in Rural and Urban Kenya,” to study innovation processes through ICT use among urban and rural poor in Kenya.

#### *Crosscutting Theme – Gender*

1. Wrote “Gender Analysis of the Pigeon Pea Value Chain: A Case Study of Malawi” report, and a related research brief “Gender in Malawi’s Pigeon Pea Value Chain: Implications for Food System Innovation.”
2. Produced and published the GCFSI gender brochure, entitled “Gender Mainstreaming in Food Systems Innovation,” and the “GCFSI Gender Strategy.”
3. Conducted gender webinars (April 14, 2015; August 26, 2015).

#### ***Specific milestones of the Round I GCFSI Innovation Grants***

*Grant Title – MultispeQ: A Deployable Sensor for the PhotosynQ Network to Enable Critical Plant and Soil Measurements for Breeders in East Africa – David Kramer, Professor, Biochemistry and Molecular Biology, Michigan State University.*

1. Successfully produced and distributed over 200 MultispeQ devices.
2. Analyzed the accuracy and variance in the MultispeQ device in comparison to other similar devices.
3. Implemented a lending library program for partners who only needed a device on a temporary basis.

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<sup>3</sup> Reardon, T., D. Tschirley, B. Minten, S. Haggblade, S. Liverpool-Tasie, M. Dolislager, J. Snyder, and C. Ijumba. 2015. “Transformation of African Agrifood Systems in the New Era of Rapid Urbanization and the Emergence of a Middle Class.” Chapter 4 in Badiane, O. and T. Makombe (Eds.), *Beyond a Middle Income Africa: Transforming African Economies for Sustained Growth with Rising Employment and Incomes*. ReSAKSS Annual Trends and Outlook Report 2014. Washington, D.C.: International Food Policy Research Institute (IFPRI).



4. Preliminary data from the 2015 growing season shows the MultispeQ device can provide early prediction of disease in soybean and corn.

*Grant Title – Analysis of Integrated Agricultural System, Migration, and Social Protection Strategies to Reduce Vulnerability to Climate Change in East Africa – Bradford Mills, Professor, Department of Agricultural and Applied Economics, Virginia Tech.*

1. Preliminary project results were presented to the Alliance for a Green Revolution in Africa (AGRA) (Growing Africa's Agriculture) and the International Livestock Research Institute (ILRI) in Nairobi. Results:
  - Presented how rainfall variability may impact different sizes of Zambian smallholder farmer.
  - Assessed climate impacts on maize yields in Zambia.
  - Presented estimates for migration, off-farm labor, and social safety net responses to rainfall levels and rainfall variance in Ethiopia.

*Grant Title – Marketing Food Safety in Kenya – Vivian Hoffman, Research Fellow, International Food Policy Research Institute and Assistant Professor, Department of Agricultural and Resource Economics, University of Maryland.*

1. Aflatoxin-verified maize is now being sold in participating shops in Kenya.
2. Eighty-two shop staff were trained and now are collecting weekly sales data.
3. Completed the consumer survey baseline for the marketing food safety study.

*Grant Title – Building Capacity for Assessing and Deploying Irrigation Technology Innovations in East Africa – Kate Scow, Professor of Soil Science, Department of Land, Air and Water Resources, University of California – Davis, and Vicki Morrone, MSU Outreach Specialist, Center for Regional Food Systems.*

1. Established farmer management committees to develop an evaluation framework for irrigation innovations at five adaptive research sites.
2. Identified gender-disaggregated criteria for access to irrigation innovations through consultations with host committees and farmers in area.

*Grant Title – E-warehousing for Smallholder Farmers in Uganda – Craig McIntosh, Professor of Economics, University of California – San Diego.*

1. Completed a detailed market mapping exercise to guide household and trader survey data collection.
2. Developed SMS-based open source software for market trader surveys.
3. Developed relationships with necessary in-country partners to implement projects.
  - Kudu, a digital commodity trading platform developed by computer scientists at Makerere University.
  - Agrinet, Major Uganda supply-chain company.

*Grant Title – Use of Orange Sweet Potatoes in Enhancing Vitamin-Nutrition in Tanzania – Channa Prakash, Professor, Crop Genomics and Biotechnology, Tuskegee University, and Theo Mosha, Professor, Department of Food Science and Technology, Sokoine University of Agriculture, Tanzania.*

1. Launched construction of food processing centers with ovens and driers.
2. Identified and trained female entrepreneur groups to operate food processing equipment and business management.

3. Identified potential sources of financial capital for establishing food process enterprises.

### **Objective 3: Student engagement and partnerships to build a new generation of development innovators and practitioners**

1. Created the Food Fix website to host student-produced GCFSI communication assets.
2. Produced 33 podcasts regarding food systems research and issues from GCFSI and other centers (download numbers discussed above on p. 2).
3. Provided interviewing practices for about 40 GCFSI research graduate assistants, researchers, and administrators.
4. Created an online workshop, offered four times, to help researchers communicate better.
5. Created a workshop, offered twice, to train graduate assistants in video and still photography.

## **4. ENGAGEMENT OF PARTNERS AND OTHER ACTORS**

### **4.1 Interdisciplinary collaboration**

GCFSI focused the efforts of all of its research teams to answer the question “Where and how can multipurpose legumes be scaled for sustainable intensification of maize systems and what would the potential impacts be, in the medium term, across the food system in Malawi?”<sup>4</sup> In completing this work, GCFSI collaborated with the following:

- Seven MSU colleges or units (Communication Arts and Sciences; Agriculture and Natural Resources; Education; Social Sciences; Engineering; International Studies and Programs; and Vice President for Research) and various departments (Agriculture, Food and Resource Economics; Community Sustainability; Packaging; Plant, Soil and Microbial Sciences; and MSU Global).
- Other MSU projects or units, including the Borlaug Higher Education for Agricultural Research and Development (BHEARD) program, Master Card Foundations Fellows project, Feed the Future Innovation Labs for Food Security Policy and for Collaborative Research on Grain Legumes, Center for Global Connection in Ag and Natural Resources, Center for Gender in Global Context, and the Center for Global Change and Earth Observation.

### **4.2 Partner engagement**

1. The Frugal Innovation Practicum engaged with the following partners:
  - a. LUANAR Faculty

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<sup>4</sup> As stated in White and Crawford (2015): “the potential of multipurpose legume innovations to improve agroecosystem fertility and food security is well-described and accepted by sustainable agriculture practitioners and researchers. The factors associated with scaling the innovation, however, are less clear. Therefore, the goal of researchers was to more precisely identify factors that constrain or enable scaling of the technology. The outcome of such research was [intended to support] more integrated and targeted policy recommendations and...interventions that better respond to farmer capacity and decision-making.” Source: White, S., and E. Crawford. 2015. Research on Multipurpose Legumes in Malawi: Synthesis Report. Draft, Oct. 27, p. 2.

- b. Lilongwe City Council
  - c. Market Vendors Association
  - d. National Smallholder Farmers Association of Malawi
2. The e-warehousing innovation grant in Uganda worked with the computer science department at Makerere University to develop the SMS interface to support their data collection. In addition, AgriNet, a major Uganda-based supply chain firm, was engaged to implement part of the grant-funded research.
  3. GCFSI-funded researchers worked with IFPRI on crop growth and climate change modeling.
  4. The private sector firm Osho Grain Millers began to market certified aflatoxin-free maize because of GCFSI-funded training.
  5. GCFSI researchers White and Hamm are partnering with the Policy Resource Center in the Department of Policy and Planning in Tanzania in the work there. They anticipate partnering with faculty from the Department of Agricultural Economics at Kokoine University of Agriculture (SUA) as the work continues.
  6. The Universidade Eduardo Mondlane in Maputo, Mozambique, is partnering with GCFSI researchers to investigate food system policy.
  7. Mediae, the producers of Shamba Shape Up, are working with GCFSI to develop a series of “edutainment” video clips.

### 4.3 Summary of collaboration across HESN

1. Nejadhashemi (DSI lead) visited Josh Powell, director of innovation at AidData, in Washington, DC, to discuss relationships for future collaborative work on a joint project in which data collected from both centers would be integrated and used for decision-making. Owing partly to budget cuts experienced by both centers, this work has been put on hold indefinitely.
2. GCFSI consulted with the Massachusetts Institute of Technology (MIT) International Development Innovation Network (IDIN) to identify opportunities for collaboration among labs. MIT has shared a number of resources on human-centered design, which were taken into account in preparing the curriculum for the Frugal Innovation Practicum.
3. During the convening at the “scaling CRM event,” extensive discussion with HESN partners at College of William and Mary took place on how to effectively combine value network analysis (Wageningen University expertise) and geo-spatial mapping (W&M expertise) to refine our methodology of systems mapping.
4. GCFSI reviewed concept notes and full proposals submitted to the Resilient Africa Network (RAN) innovation lab.
5. Several GCFSI-affiliated faculty served as judges for the HESN-funded Berkeley Big Ideas competition. GCFSI funds supported two student grants under this program.
6. The GCFSI-supported e-warehousing project received funding from the Development Impact Lab at UC Berkeley. Through these interactions and their development of a new National Science Foundation (NSF) proposal to develop software platforms, they have been in close collaboration with the UC Berkeley team developing the Mezuri platform and with the Open Data Kit team from the Department of Computer Science & Engineering at the University of Washington. Craig McIntosh from e-warehousing said

that they are working with the Development Impact Lab at the University of Washington and UC Berkeley to develop and pilot software solutions in Uganda as a part of our project.

#### 4.4 Student Engagement

##### *Urban Food Systems Team*

The primary activity to engage students has been through the creation of the Frugal Innovation Practicum. One MSU graduate student, Devin Foote, was hired to support development efforts.

##### *Wageningen Team*

Two Academy Consultancy Training (ACT) projects were conducted with 16 MSc students at Wageningen University in 11 different majors across life and social sciences.<sup>5</sup> The ACT projects were entitled (1) Introducing insects in food and feed: a "pragmatist approach" to organize large systems change (output to be a set of business plan reports to launch insect-based products on the market), and (2) Consumer entrepreneurship and the organization of frugal forms of sharing: how consumers learn to take smarter consumption decisions through consumer collective actions (output to be three draft papers for publication). Also, one PhD student (Carlos Barzola Iza) completed his PhD proposal on "The Impact of Multi-Stakeholder Platforms on Multiple Levels of Small Farmers' Innovation" across the departments of management studies and rural sociology at Wageningen University.

##### *Crosscutting Theme – Gender*

Three master's students were involved in the fieldwork in Malawi for the gender analysis of the pigeon pea value chain. Nathalie Me-Nsope trained the students on use of the Gender Dimension Framework methodology for collection of data on gender relations and roles along the value chain. The students facilitated focus groups and key informant interviews, and also were involved in data entry. Results of this study provided the basis for recommendations on improvements in design and targeting of solutions to address constraints on gender-equitable participation in both production and processing of pigeon pea.

##### *Translational Scholars Corps*

TSC activities listed in section 3.3 above all involved a combination of undergraduate and graduate students.

##### *Grantees*

UC Davis's Kate Scow indicated that her project has linked graduate student teams from UC Davis, via a participatory graduate seminar, with local partners and staff to share skills and expertise in various areas, including technical designs, gender and social inclusion,

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<sup>5</sup> ACT is a compulsory curricular activity that MSc students across all disciplines/courses in Wageningen have to conduct along with individual courses, internship, and MSc thesis. The goals and outcomes are (1) students learn to meet demands of external stakeholders (company, incubator, NGO, research institute) and deliver to them; and (2) students learn to work with large, multidisciplinary teams of eight people across all backgrounds and to deliver outputs rapidly (maximum 8-10 weeks).

environmental impact, agroecological factors, and more. Many of these students have agreed to continue working as individuals with project partners on these topics and others that arise as the project continues.

## **5. USAID ENGAGEMENT**

### **5.1 USAID/Lab interactions**

- GCFSI conducted weekly conference calls with the USAID/Washington AOR and activity manager, and monthly conference calls with the USAID advisory team for GCFSI. GCFSI core faculty regularly discuss project activities with individual members of the advisory team.
- Nejadhashemi from the DSI unit of GCFSI is attending monthly conference calls with the HESN Data Working Group. The HESN Data Working Group comprises representatives of HESN development labs and USAID staff.
- DSI traveled to USAID headquarters to both highlight its capabilities and gauge USAID's needs. It distributed marketing materials and a newly created project request form. It is now awaiting project requests and direct engagement with the USAID Missions.
- Domenico Dentoni from Wageningen, as well as Charles Steinfield, Eric Crawford, and Joe Dever, participated in the USAID convening on "Scaling CRM." Sixteen experts at Wageningen University on the scaling CRM topic were connected with GCFSI and HESN through the four proposals conveyed by Dentoni (GCFSI directors shared them with the USAID team before and after the convening).
- Dentoni also established contacts with several staff of the Global Development Lab, Bureau of Food Security, and USAID East Africa regional office to share knowledge on methodology (value network analysis) and institutional/organizational innovations related to CRM and complementary crops (legumes as nitrogen fixation)—for example, the role of Agricultural Commodity Exchange as a post-harvest factor positively influencing farmers' demand and scaling of innovative inputs such as CRM.

### **5.2 Other (non-Lab) USAID/Washington interactions**

- DSI team members contacted a range of USAID personnel in the Global Development Lab and the Bureau for Food Security to discuss the potential demand for DSI services. It was decided that the GeoCenter should be the point of contact with USAID missions regarding uses of spatial data.
- John Spears, Monitoring and Evaluation Specialist, requested DSI to develop a tool for visualization of FTFMS data. The tool was developed and revised to incorporate USAID feedback.
- DSI worked with Moffatt Ngugi regarding (a) the Honduras mission's needs for analyses of water availability and suitability for scaling up gravity-fed irrigation of the country's dry corridor, and (b) application of remote sensing and crop modeling for project evaluation in Senegal.
- At the request of Craig Jolley, AAAS Science & Technology Policy Fellow, the DSI team prepared a report on use of smart water meters in rural areas of developing countries.

- Craig McIntosh’s e-warehousing grantee project team received funding from the USAID Broadening Access and Strengthening Input Market Systems (BASIS) Collaborative Research Support Program (CRSP).
- David Tschirley’s team participated in the IFPRI Annual State of the Region (ATOR) workshop and report and have published a book chapter on their work (Reardon et al. 2015, cited earlier).

### 5.3 USAID mission interactions

- GCFSI interacted with USAID/Kenya and with East Africa mission foreign service officer, Stephen Gudz, on the role of Agricultural Commodity Exchange as a post-harvest factor positively influencing farmers’ demand and scaling of innovative inputs such as CRM.
- In the Philippines, Dentoni interacted with the USAID mission and with the American Council on Education (Manny Sanchez) as part of the UPLoad for Jobs in Mindanao, The Philippines. Specific interaction entailed the role of network and ecosystems management by development actors (including USAID) to stimulate entrepreneurship in conflict/politically turbulent areas.
- In Cambodia, as part of GCFSI efforts, Dentoni and Yeray Savedra at the Centre for Development Innovation at Wageningen University submitted the project proposal, “Mapping the Fruit & Vegetable Sector in Cambodia and Developing a Need Assessment through Multi- Stakeholder Processes.” GCFSI directors interacted with the Cambodia mission during FY 2015 concerning possible GCFSI activities in Cambodia. Ultimately, the mission decided not to bring in GCFSI as a collaborator with mission programs, perhaps because of changes in mission personnel, priorities, and program portfolio.
- Craig McIntosh reported that they have remained in close contact with the USAID mission in Kampala, including the directors for FTF in Uganda and the local representative of HESN in Kampala.
- Tuskegee reported that no direct interaction with USAID occurred during the implementation of their round I GCFSI major faculty innovation grant. However, they interacted with communities implementing the HARVEST project in Dar es Salaam, Tanzania, to promote use of orange sweet potatoes to reduce vitamin A deficiency among children under the age of five years. This interaction helped identify the most suitable orange sweet potato products for emphasis in Tuskegee’s GCFSI grant-funded project.
- Because the work David Tschirley did under GCFSI is jointly funded by the Food Security Policy Innovation Lab (FSP) located in USAID/BFS, most of his interactions were with BFS and the country missions in Tanzania and Mozambique. These interactions included the following:
  - In Mozambique: participation, at Mission request, in the MOZEF0 activities described above; regular interactions with the mission regarding their emerging relationship with CEPPAG.
  - In Tanzania: Engagement with Hal Carey on the processed food work, resulting in this email response from him: “This information and primary data-supported research is extremely helpful as we develop our ideas for more effective value chain interventions-- especially in the middle parts of the value chain that are highlighted in your brief.... This will be particularly informative for planned interventions for private sector development but also for the planned value chain activities.”

## 6. MONITORING AND EVALUATION

### 6.1 Summary

GCFSI reported on 58 indicators. FY15 proved to be a transition year as GCFSI learned from past programmatic success and failures. Even with the transition, GCFSI was successful in meeting most of the monitoring and evaluation targets.

### 6.2 Explanation of Deviation from Targets

The following indicators have deviations from FY15 targets that justify additional explanation:

*HESN\_0in01 \$ Total dollar value of outside (non-USAID) resources utilized:* GCFSI did not meet this target because the original programmatic path on which the FY15 target was based has been changed. GCFSI will continue to work to attract non-USAID funding and has adjusted the FY16 target to reflect the current programmatic direction.

*HESN\_0in06 # Transformative innovations, technologies, or approaches evaluated with human, financial, or institutional resources:* GCFSI exceeded this target by three because our innovation grantees made faster progress along the innovation pipeline than originally expected.

*HESN\_0in07 # US students via HESN partnerships serving as fellows in developing countries (for more than one month):* GCFSI greatly exceed this target because we were given permission to include US students who spent less than a month serving as fellows in developing countries.

*HESN\_0in10 # Beneficiaries reached:* GCFSI greatly exceeded the number of beneficiaries reached because of a few of our innovation grantees had a much broader reach than anticipated. The majority of the beneficiaries were associated with mobile phone based innovations.

*HESN\_1.2in1 and HESN\_3.2in1:* Both of these indicators reflect the large increase in traffic to GCFSI DSI portal and social media platforms.

## 7. LESSONS LEARNED/BEST PRACTICES

### Objective I

Geophysical Team members indicated there is a significant need for continued, repeated observations of weather data and land use data in East Africa and other regions of the globe that have food security issues. A lack of investment in data collecting and infrastructure increases the uncertainty around estimates of trends and hampers accurate prediction.

There are a few studies that look at the coupling of human changes to the landscape and the impacts on atmospheric circulation. However, the poor monitoring/observation and the lack of reliable estimates of areas no longer suitable for rain-fed agriculture make it very difficult to determine whether current efforts in Malawi will improve food security. Trends in deforestation reduce moisture recycling, and investments to change agricultural practices need to be supported with more data and better training and science education for farmers and other stakeholders on the ground.

## Objective 2

1. Wageningen University participants indicated that the use of systems dynamics during the Scaling CRM convening is an outstanding new practice, and they hope that this is only the first step of a broader and more systematic use of systems dynamics to map the efforts of different actors in the Global Development Lab. They suggested investing more and refining the use of systems mapping methodologies to create stronger complementarities among partners. In particular, they believe the following:
  - Social media plays a crucial role in creating systems mapping that constantly feeds and updates itself. Even the cheapest/most common software in use, such as Dropbox and LinkedIn, can create an active and self-sustaining community around the Global Development Lab and Bureau of Food Security on the scaling CRM topic.
  - Value network analysis has the potential to quantitatively map the network of interactions among stakeholders around the scaling CRM issue at different levels (from local community up to global) in association with the resources (knowledge, skills, funding, hierarchy, etc.) that each stakeholder brings to deal with systemic problems—i.e., food security and droughts. Thus, relative to the systems dynamics tool used during the convening, value network analysis has direct, straightforward implications on how partners in the Global Development Lab network should ideally contribute their resources to collaborate on the CRM scaling effort.
2. The ICTD team learned that rural access to mobile phones in Malawi is far less than was previously thought, meaning that they have to consider alternative strategies to engage with smallholder farmers beyond mobile information services. They learned the importance of incorporating entertainment with participatory videos to make them more engaging. Finally, they learned that opening up the screening of videos to other members of the community can enhance information dissemination benefits of the approach.
3. For the GCFSI gender team, the two biggest lessons learned from their research on “Gender Analysis of the Pigeon Pea Value Chain: A Case Study of Malawi” include the following:
  - How failure to adopt a gender lens in value chain development will result in innovations or actions with very little potential to promote the adoption of a technology or generate benefits from adoption. Not only were there gender disparities in access to production resources, but also the decision to adopt legumes was heavily gendered; men and women had different preferences and priorities to adopt legumes. This finding has important implications for innovations to stimulate the adoption of such technologies.
  - Secondly, they found gender differences in access to and participation in markets due to gender differences in transportation assets and cultural restrictions on women’s mobility. Therefore it is not sufficient to say, “Let’s improve access to markets in order to increase incomes,” since that may promote men’s participation in markets, make them richer, and leave women poorer, with very little positive impact on the well-being of all members of the household. Instead, key questions are “How do we bring markets closer to women?” and “How do we increase women’s direct access to income?”



### **Objective 3**

The TSC lead found that the creation of communication products went slower than anticipated. Some of this was due to inexperience and minimal knowledge of student practitioners. It has improved with experience, but it is something we will continue to anticipate as there will be significant student turnover. That is also a good thing, because it means we are engaging new people with new skills.

A significant challenge is communicating issues that people are working on far away. We need more visual representations and fewer “talking heads.” That means we should put a premium on convincing people in the field to take some pictures/videos on every trip that they take.

The creation of podcasts was unanticipated, but we discovered it is a good way to quickly become aware of issues ripe for fuller storytelling.

## **8. FUTURE ACTIVITIES**

### **Objective 1**

1. Convert DSI to a “fee for service” provider of information.
2. Market services available from DSI and explain how they can be accessed.

### **Objective 2**

1. Support the first round of innovation grantees.
2. Implement the second round of innovation grants.
3. Implement core-funded or center-led projects: climate resilient maize, human and institutional capacity development in support of the LUANAR Innovation Hub, and seed system development.

### **Objective 3**

1. Student Engagement: Place interns in high-value, practical experiences; support innovation via the student innovation grants and challenges, and continue to work with a cadre of graduate assistants and other students.
2. TSC: Develop and publish a competency framework for translational scholars, deliver a series of communication and collaboration trainings that build those competencies, and embed translational scholars throughout GCFSI’s projects to assist in the team-building, information synthesis, and outreach functions of knowledge management.

## **9. RISKS AND MITIGATION PLAN**

Maintaining adequate levels of communication between all GCFSI partners is a constant concern. As GCFSI implements more center-led activities, the risks associated with poor communication increase. To mitigate that, we are particularly attentive to keeping people informed, as well as asking constantly for input. In addition, we plan on hiring a local coordinator early in calendar 2016 to help with communication and coordination at the LUANAR Innovation Hub.

## **10. ENVIRONMENTAL MONITORING**

Not Applicable.

# APPENDIX

## APPENDIX I. HESN Monitoring & Evaluation (M&E) Indicators - FY15 Annual

Code	M&E Code Description	Target Value	Reached Value	%
HESN_0in01	\$ Total dollar value of outside (non-USAID) resources utilized	15700000	1049642	6.7%
HESN_0in02	# transformative innovations, technologies, or approaches that were developed with human, financial, or institutional resources contributed by HESN Development Labs	1	1	100.0%
HESN_0in03	# transformative innovations, technologies, or approaches that were initially piloted with human, financial, or institutional resources contributed by HESN Development Labs	3	2	66.7%
HESN_0in04	# transformative innovations, technologies, or approaches that achieved early adoption with human, financial, or institutional resources contributed by HESN Development Labs	0		---
HESN_0in05	# transformative innovations, technologies, or approaches that transitioned to scale with human, financial, or institutional resources contributed by HESN Development Labs	0		---
HESN_0in06	# transformative innovations, technologies, or approaches evaluated with human, financial, or institutional resources contributed by HESN Development Labs	5	8	160.0%
HESN_0in07	# US students via HESN partners serving as fellows in developing countries (for more than one month)	1	1	100.0%
HESN_0in07_Masters_F	# US Female MASTERS students serving as fellows		0	---
HESN_0in07_Masters_M	# US Male MASTERS students serving as fellows		0	---
HESN_0in07_Other_F	# US Female students (other or unknown degree program) serving as fellows		0	---
HESN_0in07_Other_M	# US Male students (other or unknown degree program) serving as fellows		0	---
HESN_0in07_PhD_F	# US Female PhD students serving as fellows		1	---
HESN_0in07_PhD_M	# US Male PhD students serving as fellows		0	---
HESN_0in07_Undergrad_F	# US Female UNDERGRADUATE students serving as fellows		0	---
HESN_0in07_Undergrad_M	# US Male UNDERGRADUATE students serving as fellows		0	---
HESN_0in08	# innovations, technologies or approaches in the innovation pipeline	5	10	200.0%
HESN_0in08_Country	[By Country] # innovations, technologies or approaches in the innovation pipeline		12	---
HESN_0in09	# innovations, technologies or approaches that completed at least one of the five stages in the innovation pipeline	5	3	60.0%
HESN_0in10	# beneficiaries reached	350	1171	334.6%
HESN_0in11	# innovations, technologies, or approaches that have reached more than 1 million people	0		---
HESN_0in12	# innovations, technologies, or approaches that have reached more than 5 million people	0		---
HESN_1.0in1	# new data-related technologies, tools, approaches, and best practices supported or applied with human, financial, or institutional resources contributed by HESN Development Labs	5	14	280.0%

Code	M&E Code Description	Target Value	Reached Value	%
HESN_1.0in2	# data sets provided to or made accessible to USAID operating units and programs, HESN partners, and the broader development community with human, financial, or institutional resources contributed by HESN Development Labs	3	136	4533.3%
HESN_1.0in2_new	# new data sets provided to or made accessible to USAID operating units and programs, HESN partners, and the broader development community with human, financial, or institutional resources contributed by HESN Development Labs		1	---
HESN_1.0in3	# data-related analyses, mapping activities, and expert consultations provided for USAID operating units and programs, HESN partners, and the broader development community with human, financial, or institutional resources contributed by HESN Development Labs	1	28	2800.0%
HESN_1.2in1	# users who access data and tools made available with support from human, financial, or institutional resources contributed by HESN Development Labs	50	8834	17668.0%
HESN_1.2zGC FSI-in1	# decision support and informatics requests for scholarly efforts		86	---
HESN_1.2zGC FSI-in2	# discrete functionalities of the decision support and informatics platform		27	---
HESN_2.0in1	# months required for developing, piloting, adopting, scaling, and evaluating transformative innovations, technologies, and approaches receiving human, financial, or institutional resources contributed by HESN Development Labs	8	6.846153846	85.6%
HESN_2.2in1	# white papers, articles, assessments, analyses, and evaluations on development challenges, innovations, technologies, approaches, and contexts (drafted with human, financial, or institutional resources contributed by HESN Developments Labs) published in targeted fora and publications OR provided to USAID operating units, HESN partners, and the broader development community	12	15	125.0%
HESN_2.2in2	# citations of white papers, articles, assessments, analyses, and evaluations (drafted with human, financial, or institutional resources contributed by HESN Developments Labs) on development challenges, innovations, technologies, approaches, and contexts in targeted fora/publications/projects	0	0	---
HESN_2.2in2_NPR	# citations in targeted non-peer reviewed fora/publications of white papers, articles, assessments, analyses, and evaluations (drafted with human, financial, or institutional resources contributed by HESN Developments Labs) on development challenges, innovations, technologies, approaches, and contexts		0	---
HESN_2.2in2_PD	# citations in targeted peer-reviewed project documents of white papers, articles, assessments, analyses, and evaluations (drafted with human, financial, or institutional resources contributed by HESN Developments Labs) on development challenges, innovations, technologies, approaches, and contexts		0	---
HESN_2.2in2_PR	# citations in peer-reviewed fora/publications of white papers, articles, assessments, analyses, and evaluations (drafted with human, financial, or institutional resources contributed by HESN Developments Labs) on development challenges, innovations, technologies, approaches, and contexts		0	---
HESN_2.2zGC FSI-in1	# concept notes reviewed in response to GCFSI RFA		207	---
HESN_2.2zGC FSI-in4	# Innovation Grants awarded in response to GCFSI RFA		0	---
HESN_2.3in1	# MOUs or other agreements signed with public sector, private sector, local community partners, and one HESN Development Lab	2	7	350.0%

Code	M&E Code Description	Target Value	Reached Value	%
HESN_2.3in2	# stakeholders engaged in problem solving with one HESN Development Lab	3	33	1100.0%
HESN_3.0in2	# MOUs or other agreements signed with public sector, private sector, and local community partners and more than one HESN Development Lab	0		---
HESN_3.0in3	# new development related classes or disciplines created by university departments with human, financial, or institutional resources contributed by HESN Development Labs	2	7	350.0%
HESN_3.1zGC FSI-in1	# participants for virtual and in person presentations discussing white paper and problem definitions		315	---
HESN_3.2in1	# visitors to Network knowledge-sharing platforms	10000	45590	455.9%
HESN_3.2in3	# successes and failures circulated on Network knowledge-sharing platforms	60	0	0.0%
HESN_3.3in1	# classes supported by HESN Development Labs with human, financial, or institutional resources contributed by HESN Development Labs	2	6	300.0%
HESN_3.3in2	# collaborative platforms created by the HESN or with human, financial, or institutional resources contributed by HESN Development Labs		1	---
HESN_3.4in1	# students participating in short term practica or other field experiences through human, financial, or institutional resources contributed by HESN Development Labs	60	41	68.3%
HESN_3.4in1_ Masters_F	# Female MASTERS students participating in short term practica		6	---
HESN_3.4in1_ Masters_M	# Male MASTERS students participating in short term practica		8	---
HESN_3.4in1_ Other_F	# Female students (other or unknown degree program) participating in short term practica		0	---
HESN_3.4in1_ Other_M	# Male students (other or unknown degree program) participating in short term practica		6	---
HESN_3.4in1_ PhD_F	# Female PhD students participating in short term practica		1	---
HESN_3.4in1_ PhD_M	# Male PhD students participating in short term practica		2	---
HESN_3.4in1_ Undergrad_F	# Female UNDERGRAD students participating in short term practica		10	---
HESN_3.4in1_ Undergrad_M	# Male UNDERGRAD students participating in short term practica		8	---
HESN_3.4in2	# Hubs created with human, financial, or institutional resources contributed by HESN Development Labs	0	1	---
HESN_3.4in3	# participants in Hubs, summits, and other problem-solving institutions created with human, financial, or institutional resources contributed by HESN Development Labs	100	417	417.0%
HESN_3.4in4	# participants in crowd-sourcing or other open challenges created with human, financial, or institutional resources contributed by HESN Development Labs	150	315	210.0%

## APPENDIX II.A. Innovations: Technologies and Approaches - FY15 Annual

Output Type	Name of Output	Description/Abstract	Country	Phase	# Bene.	Phase Compl.?	Evaluation Cond.?
Technology	Aflatoxin proficiency testing and third party verification	The project evaluates consumer response to an innovative approach to improving food safety in Kenya: third party process verification. We have partnered with APTECA, the first third-party aflatoxin safety process verification body in Africa, to study the impact of food safety labeling on firms' market share.	Kenya	Stage 3: Early Adoption	0	No	Yes
Approach	Community R&D for Small Scale Irrigation Development	Develop protocol for doing R&D on small scale irrigation technologies in collaboration with smallholder communities. This approach focuses on improving the sustainability of irrigation projects and builds local capacity to solve problems and innovate technologies. The protocol has a focus on women smallholders and finding was to keep them engaged so that they can access technologies emerging from the approach.	Uganda	Stage 2: Initial Piloting	458	No	Yes
Approach	Community R&D for Small Scale Irrigation Development	Develop protocol for doing R&D on small scale irrigation technologies in collaboration with smallholder communities. This approach focuses on improving the sustainability of irrigation projects and builds local capacity to solve problems and innovate technologies. The protocol has a focus on women smallholders and finding was to keep them engaged so that they can access technologies emerging from the approach.	Tanzania	Stage 2: Initial Piloting	457	No	Yes
Approach	Empirical model of crop responses to climate change	Generated empirical framework for measuring hectarage and yield responses to climate change	Ethiopia	Stage 1: Development	50	No	Yes
Approach	Empirical model of crop responses to climate change	Generated empirical framework for measuring hectarage and yield responses to climate change	Zambia	Stage 1: Development	50	No	Yes

Output Type	Name of Output	Description/Abstract	Country	Phase	# Bene.	Phase Compl.?	Evaluation Cond.?
Approach	Frugal Innovation Practicum	The Frugal Innovation Practicum (FIP) is an innovative, experiential learning opportunity that will be provided to MSU and LUANAR students to develop a practical understanding of the challenges and opportunities associated with the food market system and among small- to medium-scaled urban food entrepreneurs in Lilongwe. The initial year is funded by the Global Center for Food Systems Innovation (GCFSI) as part of its mission to (1) train students to address the challenges of food security in a changing world, and, (2) develop new food-related courses and disciplines, especially in relation to innovation. An ancillary, yet important, outcome of this practicum is the generation of new knowledge and research direction that effectively and appropriately addresses food system challenges.	Malawi	Stage 1: Development	6	Yes	Yes
Approach	Household integrated responses to climate change	Generated conceptual and empirical framework for measuring household integrated responses to climate change	Ethiopia	Stage 1: Development	100	No	Yes
Technology	KUDO/Agri Net Software Collaboration	Integration of SMS data collection into KUDO e-Warehouse platform	Uganda		0	Error	Error
Technology	m-Omulimisa SMS Service	Two students worked on this innovation, which enables farmers in Uganda to send text questions in their own language to the extension service, with an agent who speaks the correct language replying via a web interface.	Uganda	Stage 2: Initial Piloting	0	Yes	Yes
Approach	Engagement of Female producer groups to process orange fleshed sweet potatoes to improve Vitamin A nutrition	Train women in processing of orange-sweetpotato based products. Empower women farmer groups. Establish village community banks (VICOBA) to provide loans to women.	Tanzania	Stage 1: Development	0	No	Yes



Output Type	Name of Output	Description/Abstract	Country	Phase	# Bene.	Phase Compl.?	Evaluation Cond.?
Technology	SMS Market Survey System	We have developed an open-source solution that allows a high-frequency survey of prices to be run from a simple sever (even a raspberry pi). The system checks the data for consistency and pushes out a mobile airtime payment if data consistent.	Uganda	Stage 2: Initial Piloting	50	Yes	Yes
Technology	Using Sensors to Enable Plant and Soil Measurements	Develop portable, web-based sensor to enable uploading and analysis of data	United States	Stage 1: Development	0	No	No

## APPENDIX II.B. Evaluations - FY15 Annual

Output Type	Name of Output	Description/Abstract	Country	Status
Evaluation	Marketing Food Safety	Assess willingness to pay for food safety by building the capacity of a maize mill to produce aflatoxin-safe maize and facilitating sale of certified maize	Kenya	Ongoing
Evaluation	Spatial patterns of urbanization and smallholder vegetable sales	Recognition that rapid urbanization in Sub-Saharan Africa (SSA) represents a growing market for horticulture products	Kenya	Complete
Evaluation	Spatial patterns of urbanization and smallholder vegetable sales	Recognition that rapid urbanization in Sub-Saharan Africa (SSA) represents a growing market for horticulture products	Mozambique	Complete
Evaluation	Spatial patterns of urbanization and smallholder vegetable sales	Recognition that rapid urbanization in Sub-Saharan Africa (SSA) represents a growing market for horticulture products	Zambia	Complete
Evaluation	Support/improve analysis to investigate maize yields and fertilizer use.	Extracting weather data and other supplementary data set (not measured during surveys) to support/improve regression analysis to investigate small farmer maize yields and fertilizer use	Tanzania	Complete

## APPENDIX II.C. Data-Related Approaches, Tools, Best Practices - FY15 Annual

Output Type	Name of Output	Description/Abstract	Country	Status
Data-Related Tool	Design Knowledge Discovery in Database	The Knowledge Discovery in Database is an automatic or a semi-automatic analysis of large quantities of data to extract previously no patterns in order to predict behaviors and future trends.		Complete
Data-Related Tool	Added technology capacity to DSI: Two feature selection tools: Spearman and Principle Component Analysis)	Determine the most influential parameters/indicators that can be used to describe food systems drivers and stressors with feature selection. This tool will be robust enough to work especially in a large database where using other traditional methods would be inefficient. This technique is known as “feature selection” in the machine learning and statistics communities		Complete

## APPENDIX II.D. Publications or Reports - FY15 Annual

Name	Description/Abstract	Country	Status
Using Participatory Video for Smallholder Farmer Training in Malawi	We conducted a baseline survey of access to and use of ICTs, with a focus on mobile phones, in three rural communities in the Dedza District of Malawi to inform decisions regarding the topics and methods to use in ongoing engagement with farmers. We then pilot tested participatory video training techniques in these communities using a quasi-experimental design in order to assess their effectiveness as a learning tool and in stimulating adoption of new techniques.	Malawi	Complete
The Mobile Digital Divide Revisited: Mobile Phone Use by Smallholder Farmers in Malawi	Paper accepted for presentation at the 2015 ICTD meeting in Singapore and published in the conference proceedings.	Malawi	Complete
Information Spillovers from Extension Training: the Effectiveness of Participatory Video	Paper accepted for poster session of the AIAEE 2015 conference in Wageningen	Malawi	Complete
Participatory Video for Nutrition Training in Malawi: an Analysis of Knowledge Gain and Adoption	Paper accepted for poster session at the 2015 ICTD meeting in Singapore and published in the conference proceedings	Malawi	Complete
Real Mobiles: Kenyan and Zambian Smallholder Farmers' Current Attitudes Towards Mobile Phones	Paper accepted for poster session at the 2015 ICTD meeting in Singapore and published in the conference proceedings	Kenya	Complete
Real Mobiles: Kenyan and Zambian Smallholder Farmers' Current Attitudes Towards Mobile Phones	Paper accepted for poster session at the 2015 ICTD meeting in Singapore and published in the conference proceedings	Zambia	Complete
Publication name "A Review of Climate Change Impacts on Water Resources in East Africa"	Adhikari, U., A.P. Nejadhashemi, M.R. Herman, 2014. A Review of Climate Change Impacts on Water Resources in East Africa, Transactions of the ASABE, in review.		Ongoing

Name	Description/Abstract	Country	Status
Publication name "Climate Change and Eastern Africa: A Review of Impact on Major Crops"	Adhikari, U., A.P. Nejadhashemi, S.A. Woznicki, 2014. Climate Change and Eastern Africa: A Review of Impact on Major Crops, Food and Energy Security, in review.		Ongoing
GCFSI's Gender brochure developed and added to the website	The Brochure is for publicity and it discusses very briefly the relevance of Gender in GCFSI's activities and GCFSI's approach to gender integration. It is intended to give grantees, potential partners and even GCFSI's researchers an idea of what gender mainstreaming means or is all about in the context of GCFSI's activities.	United States	Complete
GCFSI's Gender Strategy	The document reviews literature to explain why gender is relevant to each of GCFSI's thematic areas, describes GCFSI's Gender Strategy and describes how gender is integrated in GCFSI's research projects, innovation grant projects and throughout GCFSI's innovation lifecycle.	United States	Complete
Gender Analysis of the Pigeon Pea Value Chain: Case Study of Malawi	The report documents the objectives, methods, and findings from the Gender Analysis of the Pigeon Pea Value Chain, and the implications for innovations to scaling out multipurpose legumes in Malawi	Malawi	Complete
			Ongoing
Retail Channel and Consumer Demand for Food Quality in China. Forthcoming in China Economic Review.	Literature review paper on food quality in developing and emerging countries which layout a research agenda		
Demand for Food Safety in Emerging and Developing Countries: A Research Agenda. Forthcoming in Journal of Agribusiness in Developing and Emerging Economies	Research paper assessing demand for imported food in an emerging country		

## APPENDIX II.E. Hubs - FY15 Annual

Name	Description	Country	Status
----- No Entries -----			

## APPENDIX II.F. Knowledge Sharing/Collaborative Platforms - FY15 Annual

Name	Description	Country	Status
Food safety collaboration in Kenya	Building a partnership between Innovations for Poverty Action, Texas A&M, the Kenyan Ministry of Health and the Kenyan Bureau of Standards to discuss aflatoxin mitigation strategies in Kenya	Kenya	Ongoing

## APPENDIX II.G. Major Events - FY15 Annual

Name	Description	Country	Status
Talk at George Washington University	Craig McIntosh gave a presentation at George Washington University in which the hypotheses and research design for the GCFSI-funded Ewarehousing project were presented.	United States	Ongoing



## APPENDIX II.H. Workshops/Trainings/Capacity Building - FY15 Annual

Name	Description	Country	Status
Climate Statistics Short Course	Provided a course for LUANAR faculty and students on the basis of using basic and advanced statistical approaches to climate data issues. Approximalty 25 students (undergrad to faculty) were trained.	Malawi	Complete
Frugal Innovation Practicum	The Frugal Innovation Practicum (FIP) is an innovative, experiential learning opportunity that will be provided to Michigan State University and Lilongwe University of Agriculture and Natural Resources (LUANAR) students to develop a practical understanding of the challenges and opportunities associated with the food market system and among small- to medium-scaled urban food entrepreneurs in Lilongwe. The initial year is funded by the Global Center for Food Systems Innovation (GCFSI) as part of its mission to (1) train students to address the challenges of food security in a changing world, and, (2) develop new food-related courses and disciplines, especially in relation to innovation. An ancillary, yet important, outcome of this practicum is the generation of new knowledge and research direction that effectively and appropriately addresses food system challenges.	Malawi	Ongoing
Workshop	Training women farmer groups in orange sweetpotatoes processing to increase income and improve nutritional status of their children. Assist women farmers to eastablish small loan scheme	Tanzania	Ongoing
Value network analysis and mapping to stimiliate systems innovation - Research Methodology Workshop	This workshop presented how value network analysis and statekholder analysis can be used to develop maps that stimulate systems innovation	Malawi	Complete

## APPENDIX II.I. Other Outputs - FY15 Annual

Name	Description	Country	Status
Develop Knowledge Discovery in Database (Two tools: Point Clustering and Raster Clustering)	Develop visualizations capable of grouping data into similar sets, which is known as “cluster analysis”. These tools are able to identify the spatial locations that are hot spots, cold spots, and similar statistically significant features. These features will help make evidence based decision for international development challenges.		Complete
Map and database creation	Dozens of new raster maps created and will be added to the Map Algebra tool. These features will help make evidence based decision for international development challenges.		Ongoing
Shifts in Rainy Season duration and onset in Malawi	Rainy season onset, cessation, and duration were calculated for stations and gridded datasets spanning Malawi. New methodology will be tested this summer.	Malawi	Complete
Four agricultural expansion scenario maps in Kenya	New maps driven by future land use and climate scenarios to estimate most likely areas of decline and increase of agriculture for suitable expansion	Kenya	Complete
Maps showing correlation between Net Primary Production (NPP)/Gross Primary Production (GPP) and rainfall for drought-tolerant maize target countries/districts	Identified areas where rainfall and MODIS-derived Net Primary Production (NPP)/Gross Primary Production (GPP) are not well-correlated; potential major source of error for national yield estimates		Complete
Value Network Map around Legume Supply Chains;	Value network map illustrated the complex relationships across multiple actors in the legume system and how resources are shared between the actors.	Malawi	Complete
Legume System Problem Map	Map that links legume system problems via a cause/effect relationship to illustrate the complex interrelationships in the Legume system.	Malawi	Complete
Uganda Market Mapping		Uganda	
Develop Knowledge Discovery in Database (Two tools: Point Clustering and Raster Clustering)	Develop visualizations capable of grouping data into similar sets, which is known as “cluster analysis”.		Complete
Map and database creation	Hundreds of new raster maps created and were added to the Map Algebra and Africa Crop Production Level tools.		Complete

Name	Description	Country	Status
Develop Knowledge Discovery in Database (Four anomaly detection tools: Hot spot analysis raster and vector, Spatial outlier analysis raster and vector )	Develop visualizations that identify statistically significant spatial hot and cold spots through the use of hot spot analysis techniques. These tools generate z-scores that indicate the statistical significance of the spot as well as whether it is a hot or cold spot. Significantly large z-scores indicate hot spots while significantly negative z-scores indicate cold spots. Additionally, identify spatial outliers within a dataset through the use of spatial outlier analysis techniques. These tools output a Local Moran's "I" score that can be used to determine spatial outliers as well as clusters. A positive "I" score indicates that there is a cluster while a negative "I" score indicates that it is a spatial outlier.		Complete
Develop Knowledge Discovery in Database (One tool: Ordinary least square analysis)	Determine the relationship between two or more features through the use of ordinary least squares analysis. This tool develops the relationship between given features by minimizing the differences between the given data and the regression values. Using the ordinary least squares analysis results in a single regression equation that best fits the data provided.		Complete
Downscaled Climate Scenarios	The output from six General Circulation Model (GCM) models were obtained and downscaled for four East African Countries	Malawi	Complete
Downscaled Climate Scenarios	The output from six General Circulation Model (GCM) models were obtained and downscaled for four East African Countries	Tanzania	Complete
Downscaled Climate Scenarios	The output from six General Circulation Model (GCM) models were obtained and downscaled for four East African Countries	Kenya	Complete
Downscaled Climate Scenarios	The output from six General Circulation Model (GCM) models were obtained and downscaled for four East African Countries	Uganda	Complete
Land Cover Comparison Maps	New map showing lack of agreement for multiple land cover datasets across Malawi	Malawi	Complete
SMS collected Market Price Survey	Collected via SMS text messages. Producers and market trader reported market prices.	Uganda	Complete
Household Baseline Survey	Household survey of producers who live in areas targeted for SMS data based market price survey data collection	Uganda	Complete
Market Trader Baseline	In areas targeted for SMS based market price survey, documented a baseline of the market conditions for traders.	Uganda	Complete
Added 11 databases in the mapping applications	Environmental Vulnerability Index 2013. Index of Economic Freedom 2013. Human Development Report 2013. Global Health Observatory Data Repository 2013. The Notre Dame Global Adaptation Index 2012. USAID Dollars to Results Measures 2012. USAID Dollars to Results Measures 2011. World Population Prospects 2010. Climate Vulnerability Index 2011. UNICEF Country Index. Atmospheric Trace gases.	United States	Complete
Redesign and branding of DSI	Rewrite the entire website to comply with modern standards of usability and form (including accessibility). Maintain the code for easy addition of new segments. Design analytics to capture page statistics. Implement a system of search engine optimization. Provided a request for information (RFI) document to highlight specific capability of the DSI to help USAID and its partners.	United States	Complete
Mapping Suitable Location for Expansion of Pigeon Pea (Twelve Maps)	Eight different criteria maps including water, climate, and accessibility to market were developed and used to create four additional composite maps.	Malawi	Complete

Name	Description	Country	Status
Mapping urban ag/urban food security articles	Dr. White from GCFSI requested a mapping tool to track urban and agricultural food-related articles around the world		Ongoing
Study communications-enabled smart meters	Mr. Craig Jolley from USAID contacted us to perform a review and provide a report on smart meters use in rural areas of developing countries	Senegal	Complete
Hydrological models for Malawi	Hydrological models were setup and calibrated for eight watersheds in Malawi	Malawi	Complete

## APPENDIX III. Partners - FY15 Annual

Partner Name	Level of Engagement	Partner Type	Partner Location Country	Partner Description	Support Type
African Food Security Urban Network	To be determined	NGO	South Africa	Research Collaboration	
AidData	High	Higher Education Institution/ Research Organization	United States	HESN consortium lab	
Alliance for a Green Revolution in Africa (AGRA)	Medium	Higher Education Institution/ Research Organization	Kenya	Mutual interest	
Amelioration of Agricultural Risk	High	NGO	Uganda	Partner / Hub	Leverage (other than cost-share)
Biosciences Eastern and Central Africa - International Livestock Research Institute	High	Higher Education Institution/ Research Organization	Kenya	Performing Aflatoxin testing on maize collected for the marketing food safety evaluation	
Borlaug Higher Education Agricultural Research and Development (BHEARD)	Low	Higher Education Institution/ Research Organization	United States	Michigan State University Project	
Buginyanya Zonal Agriculture Research and Development Institute	High	Non-US government	Uganda	Partner / Hub	Leverage (other than cost-share)
Bunda College of Agriculture	Low	Commercial Enterprise	Malawi	Michigan State University Memorandum of Understanding	

<b>Partner Name</b>	<b>Level of Engagement</b>	<b>Partner Type</b>	<b>Partner Location Country</b>	<b>Partner Description</b>	<b>Support Type</b>
Busitema University	Low	Non-US government	Uganda	Partner / Hub	Leverage (other than cost-share)
Canada Foundation for Sustainable Development Technology	Medium	Private Philanthropy/Foundation	Canada	Memorandum of Understanding	
Center for Regional Food Systems	High	Higher Education Institution/Research Organization	United States	Other	
Centro Internacional de Agricultural Tropical	High	Higher Education Institution/Research Organization	Colombia	Memorandum of Understanding	
Cisco	To be determined	Commercial Enterprise	United States	Cornerstone	
Coca-Cola Company	Low	Commercial Enterprise	United States	Cornerstone	
CRDF Global	High	Commercial Enterprise	United States	Subcontract	
Digital Green	Medium	NGO	India	Michigan State University Partner	
Dow Chemical	To be determined	Commercial Enterprise	United States	Ongoing discussions for joint projects	
EcoDym Africa	Medium	Non-US government	Kenya	Resource	
FHI 360	Low	Commercial Enterprise	United States	Resource	
Gates Foundation	Medium	Private Philanthropy/Foundation	United States	Funding secured from the Gates Foundation to support PhotoSynQ.	Leverage (other than cost-share)

Partner Name	Level of Engagement	Partner Type	Partner Location Country	Partner Description	Support Type
Global Knowledge Initiative (GKI)	Low	Private Philanthropy/Foundation	United States	Resource	
Grameen Foundation	Low	NGO	United States	Grant recipient	
Innovations for Poverty Action	High	Higher Education Institution/Research Organization	Kenya	Grant recipient	
International Food Policy Research Institute	Medium	Higher Education Institution/Research Organization	United States	Mutual interest	
International Horticulture Innovation and Training Center	Low	NGO	India	Michigan State University Partner	
Kenyan Bureau of Standards	Medium	Non-US government	Kenya	Knowledge sharing / dissemination activities	
Lilongwe University Of Agriculture And Natural Resources	High	Higher Education Institution/Research Organization	Malawi	Partner / Hub	
Lincoln University (LU)	Low	Higher Education Institution/Research Organization	United States	Subcontract	

Partner Name	Level of Engagement	Partner Type	Partner Location Country	Partner Description	Support Type
Makerere University	Low	Higher Education Institution/ Research Organization	Uganda	Grant recipient	
MasterCard Foundation	Medium	Private Philanthropy/Foundation	Canada	Michigan State University Partner	Leverage (other than cost-share)
Mediae	High	Other development actor	Kenya	Subcontract	
Michigan State University	High	Higher Education Institution/ Research Organization	United States	Cost-Share	Cost-share.
Ministry of Agriculture Tanzania	To be determined	Non-US government	Tanzania	Michigan State University Partner	
Ministry of Agriculture, Livestock, and Fisheries Kenya	Low	Non-US government	Kenya	Knowledge sharing / dissemination activities	
Ministry of Health Kenya	Medium	Non-US government	Kenya	Knowledge sharing / dissemination activities	
IDIN	Low	Higher Education Institution/ Research Organization	United States	Higher Education Solutions Network Lab	
Modernizing African Food Systems	Low	Non-US government	Uganda		
Novus International	Low	Commercial Enterprise	United States	Cornerstone	
Osho Grain Millers Ltd.	High	Other development actor	Kenya	Implementing partner for marketing food safety evaluation	



Partner Name	Level of Engagement	Partner Type	Partner Location Country	Partner Description	Support Type
Poverty in Action	Low	NGO	United States	Grant recipient	
Prime Minister's office - Regional and Local Government (PMO-RALG)	To be determined	Non-US government	Tanzania	Michigan State University already has strong relationships with PMO-RALG through GISAIA (Gates funding) and FSPIL	
Purdue University	Low	Higher Education Institution/ Research Organization	United States	Grant recipient	
QED Group, LLC	Low	Commercial Enterprise	United States	Partner	
Regional Universities Forum for Capacity Building in Agriculture (RUFORUM)	Low	Higher Education Institution/ Research Organization	Uganda	Ongoing discussions for joint projects	
Sokoine University of Agriculture (SUA)	Low	Higher Education Institution/ Research Organization	Tanzania	Resource Partner	
Syngenta Corporation	To be determined	Commercial Enterprise	Switzerland	Ongoing discussions for joint projects	
Syngenta Foundation	Low	Private Philanthropy/Foundation	Switzerland	Ongoing discussions for joint projects	
Teso Womens Development Initiative Uganda	Medium	NGO	Uganda	Partner / Hub	Leverage (other than cost-share)

Partner Name	Level of Engagement	Partner Type	Partner Location Country	Partner Description	Support Type
Texas A&M	Medium	Higher Education Institution/ Research Organization	United States	Grant recipient	
Texas A&M / Aflatoxin Proficiency Testing for Eastern and Central Africa	High	Higher Education Institution/ Research Organization	United States	Developed third-party verification system and trained marketing food safety partners on its protocols	
The Energy Resources Institute (TERI)	High	Higher Education Institution/ Research Organization	India	Subcontract	Cost-share.
The Mediae Company	Low	Commercial Enterprise	Kenya	Supporting Shamba Shape-up work	
Tuskegee University	Medium	Higher Education Institution/ Research Organization	United States	Grant recipient	
University of California Davis	Medium	Higher Education Institution/ Research Organization	United States	Grant recipient	
Uganda National Semi Arid Resources Research Institute	High	Non-US government	Uganda	Partner / Hub	Leverage (other than cost-share)
Unga Millers	To be determined	Other development actor	Kenya	Implementing partner for marketing food safety evaluation	

<b>Partner Name</b>	<b>Level of Engagement</b>	<b>Partner Type</b>	<b>Partner Location Country</b>	<b>Partner Description</b>	<b>Support Type</b>
United States Department of Agriculture / Economic Research Service	High	US government (other than USAID)	United States	Mutual interest	
University of California - Berkeley	Medium	Higher Education Institution/ Research Organization	United States	Grant recipient	
University of California Davis	Low	Higher Education Institution/ Research Organization	United States	Grant recipient	
University of Florida	Medium	Higher Education Institution/ Research Organization	United States	Grant recipient	
University of Georgia	High	Higher Education Institution/ Research Organization	United States	Subcontract	
University of Maryland	Low	Higher Education Institution/ Research Organization	United States	Grant recipient	

Partner Name	Level of Engagement	Partner Type	Partner Location Country	Partner Description	Support Type
University of Pretoria	Low	Higher Education Institution/ Research Organization	South Africa	Resource	
University of Rwanda	To be determined	Higher Education Institution/ Research Organization	Rwanda	Resource	
USAID Bureau of Food Security	High	USAID operating unit or program	United States	USAID Lead	
USAID Cambodia	Medium	USAID operating unit or program	Cambodia	Ongoing discussions for horticulture work	
USAID Development Innovations Ventures program	Medium	USAID operating unit or program	United States	Supporting Shamba Shape-up work	
USAID Malawi	Low	USAID operating unit or program	Malawi	Discussions have been held with this mission concerning the Malawi Hub	
USAID Tanzania	Low	USAID operating unit or program	Tanzania	Conversations had in the past regarding the Global Center for Food Systems Innovation projects	
USAID U.S. Global Development Lab	High	USAID operating unit or program	United States	USAID Lead	

Partner Name	Level of Engagement	Partner Type	Partner Location Country	Partner Description	Support Type
Virginia Tech	High	Higher Education Institution/ Research Organization	United States	Grant recipient	
Wageningen University (WUR)	High	Higher Education Institution/ Research Organization	Netherlands	Subcontract	Cost-share.
Western Michigan University	Medium	Higher Education Institution/ Research Organization	United States	Grant recipient	
AgriNet	High	Commercial Enterprise	Uganda		
Kudu	High	Higher Education Institution/ Research Organization	Uganda		
Innovation for Poverty Action	High	Higher Education Institution/ Research Organization	Uganda		
The McKnight Foundation	Low	Private Philanthropy/Foundation	United States	Providing funding for GCFSI funded innovation	Leverage (other than cost-share)

## APPENDIX IV. Classes & Disciplines - FY15 Annual

Partner Name	Level of Engagement	Partner Type	Status
Climate Statistics for Agriculture	Faculty and Students at LUANAR University were trained on how to utilize statistical analysis to incorporate climate model data into their research.	LUANAR	Complete
Frugal Innovation Practicum	Students will gain experience in collaborative problem definition and solution/innovation proposition, using urban 'wet' markets as the forum for learning. Small-scale urban agrifood livelihoods are an under-explored area of research, and one outcome is expected to be the identification of new areas for inquiry	LUANAR and MSU	Complete
Telling your research story	Online, voluntary teaching communication skills to researchers (50 Students)	Michigan State University	Complete
Sustainable irrigation practices for small holder farmers in East Africa-- participatory seminar.	Interdisciplinary teams of graduate students work on practical projects in collaboration with organizations working on small scale irrigation development in East Africa. These projects are supplemented and backed up by seminars offered by irrigation experts from UC Davis to build technical knowledge and anecdotal experience.	University California Davis	Complete
Food Processing and Health	Training of women on processing of orange sweetpotatoes to increase income and improve nutritional status of children	Sokoine University of Agriculture	Ongoing
Telling your research story	Online, voluntary teaching communication skills to researchers (110 Students)	Michigan State University	Complete
Telling your research story	Online, voluntary teaching communication skills to researchers (49 Students)	Michigan State University	Complete

## APPENDIX V. Fellowships & Practica - FY15 Annual

Name	Short Description	Host Organization	Total # Students	Status
GCFSI Center Led Projects	GCFSI Malawi Center-Led Project on Participatory Video	Michigan State University	1	Ongoing
Short Course on Climate Statistics for Agriculture	Short Course on statistical analysis of climate data	Lilongwe University of Agriculture and Natural Resources	26	Complete
Frugal Innovation Practicum	GCFSI Frugal Innovation Practicum	Michigan State University	7	Complete
Frugal Innovation Practicum	GCFSI Frugal Innovation Practicum	Lilongwe University of Agriculture and Natural Resources	8	Complete

## APPENDIX VI. Communications - FY15 Annual

Communication Title	Description	Location
Ruth's Legumes: Small-scale urban food trade in Lilongwe	following Ruth, a small-scale legume trader in Lilongwe as she shows the viewer/recounts her experiences	Malawi
City Food systems in the urbanizing global south	invited talk to mastercard foundation students	United States
Integrated Agricultural System, Migration, and Social Protection Strategies to Reduce Vulnerability to Climate Change in East Africa	Seminar presentation International Livestock Research Institute - Nairobi Kenya, January 27, 2015.	Kenya
Integrated Agricultural System, Migration, and Social Protection Strategies to Reduce Vulnerability to Climate Change in East Africa	Seminar presentation AGRA - Nairobi Kenya, January 28, 2015.	Kenya
Participatory Videos for Smallholder Farmer Training in Malawi: an Analysis of Knowledge Gain and Short-term Adoption	Online video of a talk by Tian Cai to the Eye on Africa series in the African Studies Center at Michigan State University	United States
Measuring the Demand for Aflatoxin Tested Maize in Kenya	A brief summary of the Demand for Aflatoxin Tested Maize project and its policy implications.	Kenya
Participatory Videos for Smallholder Farmer Training in Malawi: an Analysis of Knowledge Gain and Short-term Adoption	Online video of a talk by Tian Cai to the Eye on Africa series in the African Studies Center at Michigan State University	United States
Decision Support & Informatics with GCFSI	A brochure for DSI capability and services.	United States
Gender in Agricultural Research and Development	Nathalie talked about the importance of integrating gender in agricultural curricula, and in particular in AgShare Methodology and tools	Ethiopia
Stephanie's Blog	a series of blogs tracking food systems issues that engage with nutrition, health, urbanization, climate change. A particular focus on food system development in the global south	United States
GCFSI Flickr	GCFSI Photos	United States
Participated in GCFSI Translational Scholars activities, including seminars, filming of a short interview about my research, and the recording of a podcast.	Discussed strategies for estimate changes in Malawi's growing season climate and the need for better instrumentation	United States
Gender Perspectives in Food Systems - Webinar	webinar explored how adopting a gender perspective can enrich our work in food systems research and innovation. Nathalie Me-Nsope, Gender Lead of Michigan State University's Global Center for Food Systems Innovation (GCFSI), using a recent case study on the pigeon pea value chain in Malawi talked about how she incorporated a gender perspective in a much broader food systems research question, what she found, and the implications of the findings for the design of food systems innovation.	United States
Michigan State University (MSU) Launches Regional Innovation Research Hub in Malawi	Launch Michigan State University (MSU) Innovation Hub in Malawi	United States
Gender in Agricultural Research and Development	Nathalie talked about the importance of integrating gender in agricultural curricula, and in particular in AgShare Methodology and tools	Ethiopia
Presentation at the IAAE Conferences	Oral presentation of preliminary findings	



Communication Title	Description	Location
VALUE NETWORK ANALYSIS OF MALAWIAN LEGUME SYSTEMS: IMPLICATIONS FOR INSTITUTIONAL ENTREPRENEURSHIP	FAO Meeting on Food System Dynamics	Italy
Private sector investments to create market-supporting institutions: The case of Malawian Agricultural Commodity Exchange	AAEA Meetings	United States
Retail Channel and Consumer Demand for Food Quality in China?	Symposia presentation, International Association of Agricultural Economists Meeting	United States
Legume Adoption and Farmer Preferences for Crop System Attributes: Evidence from Malawi's Central and Southern Regions	Selected presentation, Agricultural and Applied Economics Association	
Sustainable Intensification and Farmer Preferences for Crop System Attributes: Evidence from Malawi's Central and Southern Regions	Paper reviewing the literature on sustainable intensification on smallholder farms in Africa, in press with the journal Food Security	
Webinar: The African "growth miracle" confronts the worldwide loss of manufacturing jobs?	Webinar on how the current African growth miracle could be impacted by the worldwide loss of manufacturing jobs.	
Webinar: Opportunity Knocks: How Gender Relations are Hindering Innovations in Africa	The objective of the webinar was to illustrate, using our recent case study in Malawi, how an understanding of gender issues in a specific context can help define workable solutions to food system challenges.	
Webinar: Lessons Learned: Scaling Legume-Maize Systems in Malawi	MSU Global Center for Food Systems Innovation presents a webinar of its multi-layered research projects in Malawi, Africa. Presenters Eric Crawford and Stephanie White provide research background, and discuss the research projects implemented, "keystone" issues raised by the research results, recommendations for scaling up MLM systems, estimated medium-term impacts, the relevance of findings for scaling of other crop value chains, and GCFSI's next steps.	Malawi
Can adoption of modern maize help smallholder farmers manage drought risk? Evidence from southern Malawi.	Journal article in press with Experimental Agriculture, data analyzed from country-wide rural household representative survey	
Sustainable intensification in Africa: A review of field studies to assess ecosystem services provided.	Paper reviewing the literature on sustainable intensification on smallholder farms in Africa, in press with the journal Food Security	
Sustainable Intensification Indicators Symposium	Invited Speaker at the Symposium at American Association for Advancement of Science (AAAS) Annual meeting	United States
U.S. Dietary Guidelines Report – What's the Fuss Over Sustainability?	Blog post	
Feeding Cities - with Indoor Vertical Farms?	Blog post	
City Region Food Systems – Part I – Conceptualization.	Blog post	
City Region Food Systems – Part II – Who Will Farm?	Blog post	

Communication Title	Description	Location
City Region Food Systems - Part IIIA – Scale and Production Strategy	Blog post	
City Region Food Systems - Part IIIB - Scale and Production Strategy	Blog post	
Retail Channel and Consumer Demand for Food Quality in China?	Selected presentation at the International Conference of Agricultural Economists: This study employs discrete choice experiments to assess consumer preferences for food quality attributes across various retail channels using primary data from Beijing, China. Results suggest that consumer willingness to pay for food safety is retail channel invariant, while preferences for organic and Green Food certification is product and retail channel specific. We find evidence of emerging consumer preferences for animal welfare attributes. Implications for food retail managers and agribusinesses are discussed.	Italy
Legume Adoption and Farmer Preferences for Crop System Attributes: Evidence from Malawi's Central and Southern Regions	Selected Presentation at the Agricultural and Applied Economics Association: This study employs choice experiments to examine farmers' preferences for groundnut, soybean and pigeon pea intercropped with maize and explore barriers and drivers to adoption in Central and Southern Malawi. Overall, we find that farmers significantly discount legume yields in favor of maize yields despite the additional benefits provided by legumes. Labor constraints and market access are potentially more important barriers to legume adoption than previously thought. These findings suggest that uptake of legume maize intercrop systems might be improved if practitioners focus on legumes that have lower labor requirements and better marketability.	United States
Sustainable Intensification and Farmer Preferences for Crop System Attributes: Evidence from Malawi's Central and Southern Regions	Seminar Talk at Kansas State University: This study employs choice experiments to examine farmers' preferences for groundnut, soybean and pigeon pea intercropped with maize and explore barriers and drivers to adoption in Central and Southern Malawi. Overall, we find that farmers significantly discount legume yields in favor of maize yields despite the additional benefits provided by legumes. Labor constraints and market access are potentially more important barriers to legume adoption than previously thought. These findings suggest that uptake of legume maize intercrop systems might be improved if practitioners focus on legumes that have lower labor requirements and better marketability.	United States
Observations on the African Diet Transformation and its Implications	Invited Speaker	
Transformation of African Agrifood Systems in the New Era of Rapid Urbanization and the Emergence of a Middle Class	Paper on how the rapid urbanization could play out in African Food Systems	
Stages of Transformation in Food Processing and Marketing: Results of an Initial Inventory of Processed Food Products in Dar es Salaam, Arusha, and Mwanza	Tanzania Policy Research Brief #3 focused on how food system transformation could impact Tanzania	

Communication Title	Description	Location
Local Response to the Rapid Rise in Demand for Processed and Perishable Foods: Results of an Inventory of Processed Food Products in Dar es Salaam.	Tanzania Policy Research Brief #2 orcused on how food system transformation could impact Tanazania	
AAEA Pre-conference on Rapid Agrifood System Transformation, Globalization, and International Development	Conference Presentation	
Spatial Patterns of Urbanization and Smallholder Vegetable Sales in Kenya, Mozambique and Zambia	Conference Presentation	
Challenging Conventional Wisdom on Trader-Farmer Interlinked Input-Credit Markets with Evidence from Africa	Conference Presentation	
The rise of processed foods in Africa: Evidence from three cities in Tanzania	Conference Presentation	
The quiet revolution in downstream and midstream of agrifood value chains: Case studies from Asia and Africa	Conference Presentation	
The Emerging “Quiet Revolution” in African Agrifood Systems: Challenges for Mozambique.	Conference Presentation	
Agrifood System Transformation in Africa and Asia: Implications for Poverty and Food Security	MOZEFO, Agro-Industry in Mozambique. Maputo, Mozambique	
Agribusiness in Africa: Prospects and challenges for contributing to industrialization and economic transformation	The Economics of Global Poverty Conference, Gordon College	Ethiopia
Can Africa Employ Its Youth? The African “Growth Miracle” Confronts The Worldwide Loss Of Manufacturing Jobs.	Presenation at the ReSAKSS Annual Conference on the impact of youth unemployment	
Prospects for inclusive employment in developing countries over next 20-30 years	Global Center for Food System Innovation White Paper	Italy
Agrifood System Transformation in East and Southern Africa: Implications for Tanzania	IFAD workshop for preparation of 2016 Rural Development Report.	United States
Response to the diet transformation in East and Southern Africa: Observations from Mozambique and Tanzania	1st Agrifood System Transformation Stakeholder Workshop	United States
The mobile divide revisited: mobile phone use by smallholder farmers in Malawi.	This paper reports on field work investigating patterns of ownership and use of mobile phones by smallholder farmers in Malawi, illustrating large gaps in access to mobile phones in this population. It was presented at the annual ICTD meeting in Singapore and is published in the conference proceedings.1st Stakeholder Meeting. Mozambique DNEAP/Min. of Plan and Finance	Malawi

Communication Title	Description	Location
Real mobiles: Kenyan and Zambian smallholder farmers' current attitudes towards mobile phones.	Paper that presents findings on how smallholder farmers in Kenyan and Zambia view the capacity of mobile phones as a mechanism to support agricultural production decisions. In Proceedings of the Seventh International Conference on Information and Communication Technologies and Development (ICTD '15). ACM	Kenya
Participatory video for nutrition training for farmers in Malawi: an analysis of knowledge gain and adoption	Presents lessons learned in utilizing participatory video in nutritional training in Malawi. In Proceedings of the Seventh International Conference on Information and Communication Technologies and Development (ICTD '15). ACM	Malawi
Buuza Omulimisa" (ask the extension officer): text messaging for low literate farming communities in rural Uganda	Presents findings on the utilization of agricultural production information distributed to low literate farmers in Uganda. In Proceedings of the Seventh International Conference on Information and Communication Technologies and Development (ICTD '15).	Uganda
Development of a Comprehensive Framework to assess the Impacts of Climate Change on Stream Health	In Proceedings of the Seventh International Conference on Information and Communication Technologies and Development (ICTD '15).	United States
Defining Drought in the Context of Stream Health	Poster presentation at the ASABE 1st Climate Change Symposium - Adaptation and Mitigation	United States
Climate Change on Livestock Interactions: Impacts and Human Dimensions	Poster presentation at the ASABE 1st Climate Change Symposium - Adaptation and Mitigation	United States
Risk-Based Multiple Criteria Decision Analysis for Ranking Climate Change Mitigation Scenarios	Poster presentation at the ASABE 1st Climate Change Symposium - Adaptation and Mitigation	United States
Climate Change and Eastern Africa: A Review of Impact on Major Crops	Poster presentation at the ASABE 1st Climate Change Symposium - Adaptation and Mitigation	United States
The Use of Remote Sensing to Assess Drought Impacts on Livestock	Poster presentation at the ASABE 1st Climate Change Symposium - Adaptation and Mitigation	United States
Developing a Fuzzy Group Decision Making Framework for Managing Water Resources Risk	Poster presentation at the ESPP Research Symposium: Environmental Risk and Decision Making	United States
Frugal Innovation Field Practicum in Lilongwe, Malawi	Oral presentation at the annual College of Engineering Graduate Research Symposium on how a frugal innovation methodology was adapted to urban food system in Malawi.	Malawi
Pre-Application Informational RFA Webinar for Food Systems Innovation Grants 2014-15	Webinar on how to apply for GCFSI Innovation Grant	
GCFSI Website	Analytics: Total Page Views (36,756); Total Users (9,193); Total Sessions (14,980); Pages Per Session (2.45);	
GCFSI Facebook	Total Number of Posts (104); Total Page Likes (380); Total Page Likes as of 10/1/14 (208); Annual Increase (172, 83%)	
GCFSI Twitter	Total Number of Tweets (112); Total Number of Impressions (30,100); Current Number of Followers: 381	

## APPENDIX VII. Travel - FY15 Annual

Country	# Travelers	Partner(s) Engaged	Purpose	Outcome(s)	Next Steps
----- No Entries -----					