



Higher Education Solutions Network FY 2016 Mid-year Report

Michigan State University
Global Center for Food Systems Innovation
Agreement No. AID-OAA-A-13-00006



Submitted: May 6, 2016;
Reporting Period: FY 2016, Mid-year Report
This publication was prepared by Michigan State University for review by the
United States Agency for International Development.

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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
CIAT	International Center for Tropical Agriculture (Colombia)
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
MT1	Megatrend 1: 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
O1	Objective (1, 2, 3 or 4)

OST	USAID Office of Science and Technology
PIM	Policies, Institutions and Markets
RAN	Resilient Africa Network
RFA	Request for Application
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
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
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 U.N. University
WUR	Wageningen University - The Netherlands
ZAMSEED	Zambia Seed Company
ZARI	Zambia Agricultural Research Institute

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 (WFD) 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 the first half of year 4 (October 2015-March 2016), GCFSI realigned activities in response to lessons learned from the first three years of implementation. GCFSI is now utilizing the research and lessons learned to launch itself in a new direction. A new goal for GCFSI is to develop a process that could lead to food system innovations capable of solving future challenges around climate change, population growth and other 21st century change drivers. GCFSI will build the capacity of food system innovators and researchers to work together to solve real food system problems.

Under Objective 1, the Decision Support and Informatics system, which was initially developed as ... has now been modified to a “fee for service” model which will assure sustainability based on market demand. We made major progress on our Objective 2 activities by awarding and funding 10 new GCFSI Major Innovation Grants and 9 new GCFSI Student Innovation Grants. In addition, we started a new suite of activities at the Lilongwe University of Agriculture & Natural Resources (LUANAR) focused on establishing a food systems innovation ecosystem at the University. We continued to have strong success under Objective 3 as our Translational Scholars Program made plans to open a “Malawi Bureau” at LUANAR. Based on the great success of last year’s Frugal Innovation Practicum (FIP), a second FIP is planned for August 2016. It is being redesigned to include a greater focus on design thinking, creative problem solving and higher rates of LUANAR student involvement.

2. MAJOR MILESTONES AND ACHIEVEMENTS

- Selected and funded Round 2 GCFSI Major Innovation Grants: The GCFSI Management Team finalized the selection of 10 new Major Innovation Grants, each funded via a sub award process. A complete list of the new grantees and project abstracts is presented in Appendix 1.
- Selected and funded Round 2 GCFSI Student Innovation Grants: The GCFSI Management Team finalized the selection of 9 new Student Innovation Grants, each funded via a sub award process. A complete list of the new student grantees and project abstracts is presented in Appendix 2.
- GCFSI Grantee Workshop: On January 22-23, 2016, GCFSI hosted 25 Innovation Grantee team members at MSU for its first ever two-day workshop on Innovation Thinking. The goal was to introduce design thinking, creative problem solving, end user empathy and other tools utilized by innovators to GCFSI Innovation Grantees. The workshop was a clear

success; participants greatly appreciated the opportunity to network with and learn from their peers, and requested GCFSI to hold another workshop next year.

- Initiated the Human and Institutional Capacity Development (HICD) programs with LUANAR.
 - Innovation Scholars Program (ISP)
 - Identified, built trust, and collaborated with the ISP Design Team, composed of LUANAR faculty and representatives from the public relations office and international programs office;
 - Participatory design of the ISP framework and program documents (concept note, work plan with session content, scope of work, application materials, public relations plan);
 - Gained approval of program documents by LUANAR Management Team;
 - Supported the interim hub coordinator to host multiple awareness meetings on two LUANAR campuses (NRC and Bunda)
 - Launched webpage for ISP including downloadable application materials.
 - Opened the ISP Application Process
 - Small-scale Processing for Pigeon Pea
 - Developed an interdisciplinary team of LUANAR Faculty to assess the potential of a small-scale pigeon pea processing unit to create a market for small-scale pigeon pea production in Malawi.
 - A related goal is to build the capacity of LUANAR faculty to work in interdisciplinary teams to solve real food system problems.
- Revision of LUANAR Faculty Innovation Grants (RFA issued in FY 2015)
 - After review of the revised proposals, three of the six proposals were selected for funding. GCFSI staff then worked with the three research teams to focus their work on specific aspects of the research that are directly applicable to the Malawian food system.
 - GCFSI reduced the funding levels of the Innovation Grants to better match the reality of implementing research in Malawi.
- Redesign of the Frugal Innovation Practicum in Malawi
 - Produced the Frugal Innovation Practicum Final Report, which synthesized the feedback provided by the FIP students gathered from an online evaluation of the FIP program. The report is quite extensive, addressing curriculum, logistics, and learning outcomes.
 - Designed the 2nd Frugal Innovation Practicum based on feedback received, and with the direct input of LUANAR faculty.
- Development of Seed Systems Activities
 - Based on conversations with the Legume Innovation Lab at MSU, GCFSI designed three seed system activities that will support current Malawi seed system work.
 - Seeds 1 was designed to engage interdisciplinary teams of LUANAR faculty in investigating how small-scale processing by women's groups can stimulate a market for processed pigeon pea.

3. SUMMARY OF KEY ACTIVITIES

3.1 Objective 1: Mobilizing data and analytical tools to support development decision-making

DSI is currently working on a “fee for service” basis. A month of DSI staff time was contracted by MSU’s Food Security Policy Innovation Lab to develop spatial distance to market calculations that support a distance to market research project. Other potential clients from MSU’s college of engineering and public health are engaging with DSI to determine how best DSI services and capacity can be utilized to support their work.

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

3.2.1 Major innovation grants

Specific milestones of the selected Round 1 Major Innovation Grants (see details of grants in Appendix 1)

1. *Marketing Food Safety in Kenya*: Project activities were completed in December 2015. The grant proved the “proof of concept” that millers were willing to absorb the cost of testing and certifying that their product is aflatoxin free. However, the producer willingness to pay was less than expected. This design of this intervention is being adapted to do a similar study in West Africa.
2. *Analysis of Integrated Agricultural System, Migration, and Social Protection Strategies to Reduce Vulnerability to Climate Change in East Africa*: Two working papers were completed, and results presented to key staff at AGRA’s headquarters in Nairobi.
3. *Building Market Linkages: A Mobile Marketplace for Smallholder Farmers in Uganda*: Project activities were completed in December 2015. No new field activities were reported as the grantee used the first quarter of FY16 to administratively close the GCFSI grant. End of project activities and impact were reported in the GCFSI FY15 Annual Report.
4. *Building Capacity for Assessing and Deploying Irrigation Technology Innovations in East Africa*: Preparations were made for final seasonal data collection scheduled to start in June 2016.

Specific milestones of selected Round 2 Major Innovation Grants

1. *Human-powered Bean Thresher for Small-scale Legume Production in Zambia*: A working prototype of the bicycle-powered bean thresher was completed. A bean thresher evaluation instrument was developed to establish data for a project baseline, and to collect feedback from target end users (small-scale bean producers).
2. *Towards an improved cassava simulation model to aid management decisions in the tropics*: Completed necessary testing and planning to secure proper start of cassava production and model development. In cooperation with the climate resilient maize (CRM)-4 activity, and in order to strengthen the data available for the cassava growth model, two automated weather stations were purchased and shipped to Vietnam for installation at International Center for Tropical Agriculture (CIAT) field trials sites. These costs were covered through a combination of GCFSI and general MSU funds.
3. *Focusing Global Technology to Magnify Honey Bee Impacts on the Food System; The East African Model*: Recruited 38 beekeepers to participate in project. All recruited beekeepers were interviewed,

hive locations were geo-coded, and hive descriptive information was collected. Kenya-based project managers are compiling beekeeper data into project baseline database.

4. *Linking climate services and soil diagnostics for climate-smart decisions for small-scale farmers and service providers:* Worked with multiple partners to obtain, analyze and map the required climate data and research to establish seasonal climate forecasts in Tanzania. Opportunities for collaboration with the CRM-4 and CRM-5 activities were discussed with the grant PIs.
5. *Low carbon footprint cool storage structures for smallholder farms:* The different designs for the evaporative cooled storage structures using various building materials were modeled based on data generated at Indian Agriculture Research Institute and MSU for various construction materials. Four designs were shortlisted to be tested for effectiveness of the structure for cooling of fruits and vegetables produce.

3.2.2 Center-led projects

3.2.2.1 Climate resilient maize

Participatory Video and Shamba Shape Up for CRM Extension in Kenya, Uganda, and Tanzania (CRM-1)

The team collected a baseline survey that captured data from 625 farmers in Machakos and Makueni counties in Kenya. The team then created a 35-minute video featuring farmers from the Machakos area learning about CRM. The video was screened to 668 farmers in 16 separate villages. After the video screening, the team administered to targeted farmers the first two mobile phone-based voice reminders on CRM improved planting processes. The research goal is to test how the participatory videos impacted farmer management decisions in relations to just mobile phone messaging.

Post-harvest Storage and Marketing Program Factors Affecting Demand for CRM Varieties (CRM-2)

Survey data and surveys and key informant interviews were used to collect information on Ethiopian maize storage business models: Cooperative models, private agribusiness-owned models, and agricultural commodity exchange models. The information will inform how post-harvest storage methods vary across different CRM marketing systems.

Innovation Growth Modeling to Predict Adoption of CRM Varieties: Zambia Case Study (CRM-3)

Maize crop budgets produced in late-FY 2015 were reviewed with USAID/BFS CRM staff. A brief preliminary report was submitted in January 2016. After wider review within BFS, a much-expanded report was prepared and submitted in March.

Using Geophysical “Big Data” to Improve Targeting of CRM Variety Adoption (CRM-4)

Weather stations were set up in Malawi and Tanzania to calibrate climate change models to actual weather data collected at specific points in targeted agro-ecological zones. Due to a connection made between the CRM-4 team and the GCFSI Cassava Modeling group based in Vietnam, GCFSI is funding the establishment of a weather station in Vietnam that will improve the quality of the Cassava Modeling work and lay the foundation for an expansion of CRM-4 into Southeast Asia.

Assessing Drivers of Fertilizer Response in Maize in Tanzania and Malawi: Implications for CRM Scaling Programs (CRM-5)

Initiated collaboration with the “TAMASA” project, a Bill and Melinda Gates Foundation funded project managed through CIMMYT to implement this innovative maize response survey with 780 households located across Tanzania. Survey data collection will start in April 2016. To provide biophysical data to go along with the socioeconomic survey data, soil samples will be collected under

the CRM-5 activity, and complemented by imagery data from drones provided by the CIMMYT project, and by photosynthesis and soil moisture and soil carbon readings taken using MultispeQ devices provided by MSU's PhotosynQ team (recipient of Round 1 Innovation Grant ?).

3.2.2.2 Human and institutional capacity development (HICD)

A four-person team from GCFSI traveled to Malawi from February 19-28, 2016, to hold HICD program planning and implementation discussions with LUANAR personnel. These discussions covered expansion of the activities of the LUANAR Innovation Hub as well as the four HICD-related center-led activities described below.

Innovation Scholars Program (HICD-1)

Recruited and collaborated with an ISP Design Team composed of LUANAR faculty, and representatives from the public relations office and international programs office. Used a participatory design process to prepare the ISP framework and program documents. Opened the ISP Application Process in March 2016.

Private Sector/Researcher Teaming Grants (HICD-2)

This activity is being folded into two other GCFSI-funded activities. Upon review of the package of projects being implemented with LUANAR, it was determined the best path forward to improve the interactions between LUANAR and the private sector was to weave private sector interaction into all of the GCFSI funded LUANAR activities. The ISP will have an expanded private sector research focus because of this change. In addition, the Malawi Faculty Innovation Grants will have an additional link to the private sector which is the second activity to benefit from this shift.

Skill Development for Research Translation and Communication (HICD-3)

Identified key personnel within LUANAR who are teaching within the Agricultural Communications degree program. Established a link with the Feed the Future (FTF) Innovation Lab for Food Security Policy: Malawi to coordinate the GCFSI HICD 3 activities with their work in training Malawi journalists to report on local food security issues. Began establishing the "Malawi Bureau" of the Translational Scholars Program to use LUANAR faculty, staff and students as reporters on food system challenges and interesting research. Worked with the ISP team to incorporate lessons learned from from the Translational Scholars Program into the ISP.

Food, Environment, Agriculture, and Technology (FEAT) Symposium (HICD-4)

This activity was presented to LUANAR. While well received, it is currently being considered for implementation in FY 2017 as the closing event of the Innovation Scholars Program.

LUANAR Innovation Hub (HICD-5)

Following discussions between the GCFSI team and LUANAR personnel in February 2016, steps were taken to recruit an overall Hub Coordinator who would manage the activities of the Innovation Hub, including the specific center-led activities being funded by GCFSI. At the request of the LUANAR Programmes Coordinator, a comprehensive Program Description document was drafted. This document summarized all GCFSI-related activities to be implemented at LUANAR, and their budgets, and set forth principles for collaboration between GCFSI and LUANAR, including consultation, access to resources, authorship, and budgetary guidelines.

3.2.2.3 Workforce development assessment

Oilseed Sector WFD (Food Safety) (WFD-1)

Met with key personnel within LUANAR to arrange for the inclusion of LUANAR student interns into a food safety training program that is being implemented under the USAID-funded Integrating Nutrition into Value Chains (INVC) project. The interns will be identified through an oilseeds sector workforce development project being implemented by LUANAR faculty member Alexander Phiri for the Ministry of Trade. Later in Year 4, based on information gathered by the interns regarding skill needs in the oilseeds companies where they do internships, GCFSI staff will work with Dr. Phiri to identify and food safety training materials that might be added to the LUANAR curriculum.

Employment Trends and WFD Priorities for Food Traders and Processors in Tanzania and Mozambique (WFD-2)

The retail survey in Tanzania was designed and launched. Employment prospects analysis was completed for six countries (including Tanzania and Mozambique), based on projected patterns of growth in consumer demand.

3.2.2.3 Seed systems development

Community-based Legume Seed System Development in Malawi

Small-scale Pigeon Pea Processing (Seed-1): The small-scale pigeon pea processing activity will test and measure the impact of the introduction of appropriate scale technology (bike powered bean thresher) on first, market creation and secondly, improved access to healthy legumes in three test villages. The team developed the concept note in conjunction with LUANAR faculty and Self Help Africa, and designed the initial assessment for the research program.

Promoting Entrepreneurship in Informal Seed Systems for Legumes in Malawi (Seed-2): The goal for this work is to increase the local availability of quality seed of selected legumes at selected sites in Malawi. The primary outcome is strengthened entrepreneurship in informal seed systems for the selected legumes. This work is being developed by the WUR team (Gareth Borman from CDI/ISSD) and will begin implementation in May 2016.

Workforce Skills Needs for CRM Seed Systems (Seed-3): The key goals of this investment include: 1) Mapping the key competencies and skills in high demand in the emerging business models in maize and legume supply chains; 2) Estimating the gaps between demand from the supply chain actors and the supply by agricultural colleges and vocational schools; 3) Drawing implications from results on the key competences in high demand to ground the teaching methodologies in use at LUANAR or to be introduced through the Innovation Scholar Program (ISP). This work is being developed by the WUR team (Domenico Dentoni from the Department of Social Sciences and Renate Wesselink from the Education and Competence Studies Group) and will begin implementation in May 2016.

3.3 Objective 3: Catalyze a global interdisciplinary ecosystem of individuals and institutions that shares knowledge, promotes learning, and builds mutual capacity

We are focusing on student engagement activities here. Other support for “innovation ecosystems” has been covered under Objective 2.

3.3.1 Student engagement

Translational Scholars Corps

The Translational Scholars Corps consisted of 16 students during the first half of FY 16. These students produced 15 videos, 13 podcasts and 6 text stories on different topics around food systems research and GCFSI activities. Almost 13,000 visitors to the site have viewed the content.

Student Innovation Grants (See details of grants in Appendix 2)

Specific milestones of selected Round 2 Student Innovation Grants

1. *Developing a Fast Agricultural Produce Solar Dryer (FAPSOD)*: Completed the baseline survey, developed a 3D model of FAPSOD, and produced the first working FAPSOD prototype.
2. *Traders as Policymakers: Measuring Regulatory Participation and Compliance in the Zambian Maize Sector*: Developed and tested the web-based experiment for usage on any web-connected device, and began preliminary conversations with the Indaba Agricultural Policy Research Institute in Zambia to run field experiments.
3. *Test the Capacity of an Improved Maize Planter/Ripper in Tanzania*: Designed the new improved machine after collecting feedback from farmers on the performance of earlier prototype. Initiated the manufacturing of the improved prototype.
4. *Enhancing Food Security through Gravity Good Ropeways in Nepal*: Completed baseline survey, and literature review, and designed the conceptual framework.

Follow-up to Frugal Innovation Practicum (FIP)

Produced the FIP evaluation report, which captured feedback from FIP students. With the support of the TSC, produced a video feature and other multimedia pieces on the FIP.

HESN Student Internship

GCFSI will support two MSU students in their participation in the HESN Student Internship program during Summer 2016. Jeffy Bloem will intern in the MERLIN Research team and Theresa Abalo will intern with the Higher Education team.

3.3.2 Knowledge management and communication

New GCFSI Website and Integration of the Knowledge Management (KM) Platform and Food Fix Website

GCFSI is finalizing a new website which will incorporate the Food Fix and other GCFSI-sponsored sites in one location. The website will be launched in May 2016.

Improved Knowledge Sharing

GCFSI greatly increased the number of podcasts, videos, blog posts, tweets and Facebook posts in comparison to FY 2015. We are currently coordinating the work of our Communications Director and the Translational Scholars program so both groups cover more topics and work together to increase the total amount of knowledge sharing.

Expand Audience for and Participation in the Translational Scholars Program.

The Translational Scholars program has expanded their audience beyond podcasts into video and text article production. As a result, our website and social media analytics are up relative to our FY 2015 Mid-Year reporting. In addition, the orientation and methods of the Translational Scholars program are being replicated through our activities in Malawi.

3.4 GCFSI management team

Based on feedback from USAID and lessons learned over the first three years of implementation, GCFIS launched a new set of Center-led Projects that work to bring innovation to issues directly impacting food systems in the field. GCFSI reached out to new colleagues from across MSU to

bring expertise in design thinking and entrepreneurship to GCFSI. In an effort to increase our ability to work directly with issues in the field, GCFSI implemented a small program management unit that increased the amount of financial resources available to implement the Center-led Projects.

4. ENGAGEMENT OF PARTNERS AND OTHER ACTORS

4.1 Interdisciplinary collaboration

GCFSI opened a new area of interdisciplinary collaboration with the launch of the HICD activities in Malawi. To date, faculty from five MSU colleges are involved in coordinating the HICD activities with LUANAR. GCFSI tapped entrepreneurship and meeting facilitation experts from across MSU to host the GCFSI Innovation Scholars Workshop in January 2016. Faculty from the MSU Business School, MSU Library, the MSU Hub for Innovation and the MSU Entrepreneurship Program all helped design and lead the workshop.

4.2 Partner engagement

The WUR-based Post-Harvest Marketing/Storage team engaged with Dr. Jacob Ricker-Gilbert (Purdue University) on Feed the Future Food Processing and Post-Harvest Handling Innovation Lab (FPL) on issues related to storage and farmers' improved seed adoption; and with Dr. Tsedeke Abate (CIMMYT/WEMA program and partners at CIMMYT) on sampling design issues.

The participatory video project (CRM-1) is also collaborating with CIMMYT, as is the innovation growth modeling project (CRM-3). In addition, the CRM-3 project obtained data on specific climate resilient varieties available within Zambia from the Zambia Seed Company (ZAMSEED) and from the Zambia Agricultural Research Institute (ZARI). The biophysical sciences team (CRM-4) collaborated with the CIAT team based in Vietnam regarding the funding by MSU of two automatic weather stations to strengthen the data available for CIAT's team working on improved cassava growth modeling under a GCFSI major innovation grant.

4.3 Summary of collaboration across HESN

GCFSI pledged funding to support the Food System Innovation track of the HESN/Big Ideas@Berkeley program. GCFSI will provide up to \$50,000 to support the winners of this program (chosen in April 2016). Over the past year, there has been regular communication between MSU project personnel working on the human-powered bean thresher and the International Development Innovation Network (IDIN), MIT's HESN-supported lab operating in Arusha, Tanzania. Communications have involved potential collaboration strategies, as well as best practices for the development of agricultural technologies in sub-Saharan Africa.

4.4 Student engagement

GCFSI supported the graduate work of 13 graduate students and 9 student Innovation Scholars. In addition, 16 students participated as Translational Scholars during this reporting period.

5. USAID ENGAGEMENT

5.1 USAID/Lab interactions

GCFSI worked with the HESN/Washington team to design and participate in the GCFSI Grantee Workshop that was held at MSU in January, 2016. Three members of USAID/Washington (two from the Lab and one from BFS) participated in the workshop and led specific parts of the

workshop program. GCFSI also holds weekly “Pulse Check” calls with our AOR and BFS Activity Manager.

5.2 Other (non-Lab) USAID/Washington interactions

Several GCFSI faculty members have numerous interactions with the USAID Bureau of Food Security. Some of the BFS staff who have met with GCFSI staff are: Rob Bertram, Jerry Glover, Meredith Soule, Mark Huisenga, John McMurdy, and Noel Gurwick. Eric Crawford, GCFSI Director, interacted several times with Sarah Lane and her staff (E3 bureau) in the context of the CRM-3 project.

5.3 USAID mission interactions

Kurt Richter, GCFSI Assistant Director, met with Lynn Schneider and other members of the USAID/Malawi mission during a trip to Malawi in December 2015. At this meeting, the suite of HICD activities planned for LUANAR was presented. The Employment Trends and WFD Priorities for Food Traders and Processors in Tanzania and Mozambique team met with USAID/Tanzania (Hal Carey) and USAID/Mozambique (Amanda Fong, John Irons, and Nelson Guilaze). The CRM Marketing and Storage team from WUR meet with Dr. Powell and Mr. Getahun of USAID/Ethiopia. Lastly, Joe Messina and Jiaguo Qi met with personnel from USAID/Vietnam to discuss the activities of the bio-physical sciences team of GCFSI (among other topics).

6. MONITORING AND EVALUATION

6.1 Summary

GCFSI made good progress towards meeting most of its Monitoring and Evaluation (M&E) targets for FY16. The new Center-led Projects, Major Innovation Grants, and Student Innovation Grants have greatly increased the number of activities being funded by GCFSI. These additions are generating a lot of new activities that are quickly moving us towards our M&E targets.

6.2 Explanation of deviation from targets

The deviations from targets occurred primarily in the case of M&E targets for activities that are no longer the focus of GCFSI’s work plan. Currently, GCFSI has reprogrammed its activities and is no longer actively supporting many of the indicators associated with Objective 1. Therefore, the targets associated with Objective 1 activities will not be met in FY 2016.

Due to the changes in GCFSI focus, we are reporting fewer outputs than we did at the mid-year point of FY 15. We expect to reach our target for outputs by the end of FY 16 once our new activities are fully engaged and producing outputs.

7 LESSONS LEARNED/BEST PRACTICES

7.1 Objective 1

There is demand for DSI services from a wide range of audiences throughout MSU. However, the DSI team will need to work closely with their potential clients to understand what exactly what the client needs and whether it is possible for DSI to fulfill the need.

7.2 Objective 2

HICD Lessons Learned

- Interdisciplinary collaboration requires investment of time and resources in communication and building understanding of joint objectives
- Participatory design processes (e.g., open design process) create buy-in, build trust, and produce contextualized, relevant outcomes.
- Modeling the desired type of collaboration with a partner institution is therefore done most effectively using an open design process rather than simply talking about it.
- For participatory video creation: A storyboard and rough script are essential, but it is important to leave substantial room for improvisation by local actors so that they can ensure that the content is relevant to the communities in the area.

Biophysical “Big Data” Lessons Learned

- The term ‘scaling up’ in the literature and across research and development institutions, especially those dealing with natural resource management, does not have a universally accepted definition. Also, scaling objectives vary widely. Without clear communication, pathways to achieving impact at scale lack a cohesive direction. Likewise, repercussions are felt when attempting to assess scaling project outcomes across institutions.
- Scale matters – continental solutions are not always feasible for individual countries and country-level solutions are not always feasible for individual districts.
- Geography matters – solutions for one country may not be feasible for another depending on biogeographical differences.

7.3 *Objective 3*

In the Frugal Innovation Practicum held last year, we found that the heavy involvement of community members as student instructors was key to transformational learning. Also, multimedia communication pieces can very effectively convey the profound experiences gained by students participating in experiential learning activities such as the FIP. We plan to continue incorporating both ...

8 FUTURE ACTIVITIES

8.1 *Objective 1*

GCFSI is working with the International Studies and Programs unit at MSU to market DSI services to other colleges and departments around MSU. DSI will continue to operate on a “fee for service” model. In addition, we are working with colleagues from the College of Communications Arts and Sciences at MSU to help us better understand how to improve the user interface and to communicate what DSI has to offer to perspective clients. A possible short video to explain/promote what DSI is and what it has to offer is under discussion.

8.2 *Objective 2*

The Innovation Scholars program at LUANAR will officially launch in June, 2016. The goals for the first set of ISP workshops will introduce Scholars to the process and skills of design thinking, (2) contextualizes design thinking for academics engaged with Malawian food systems, and (3) applies the design thinking process to create design teams.

8.3 *Objective 3*

The second Frugal Innovation Practicum will be held in August 2016 in Malawi. The Translational Scholars Program will open a “Malawi Branch” in April 2016, having LUANAR students and faculty

submit stories to our Food Fix blog. The LUANAR students and faculty will work with MSU communication faculty and students to develop and write their research stories.

9. RISKS AND MITIGATION PLAN

The biggest risk faced by GCFSI in the second half of FY16 is a decrease in the rate of implementation of our work with LUANAR. It is easy for us to assume the rate of implementation and level of engagement at LUANAR is equal to our own.

To combat this, GCFSI is hiring a LUANAR Hub Coordinator to help manage day to day operations of GCFSI activities at LUANAR. The Hub Coordinator has been identified and will start work in LUANAR on May 9, 2016. GCFSI is developing an “Policy and Procedures” manual to help guide the work of the Hub Coordinator and are scheduling weekly calls with Hub Coordinator.

10. ENVIRONMENTAL MONITORING

GCFSI, in conjunction with our HESN AOR and team, successfully walked the “Grasshopper and Locust Farming for Animal and Human Protein Production” project through the Initial Environmental Review process. Based on the ruling of the HESN Environmental Officer, the project required an Environmental Monitoring and Mitigation plan, which we produced. The plan was approved by USAID. This particular grant was recently funded and the team will start their work in April, 2016.

Appendix 1: Awarded Round 2 GCFSI Major Innovation Grant Abstracts

Round 2 Technology Evaluation Grants:

- 1. Implementation of a Human-Powered Bean Thresher for Small-Scale Legume Production in Zambia.** *Ronald C. Averill and James D. Kelly, Michigan State University.* While technology and mechanized innovation are driving advancements and developments of the modern world, the foundation of mechanization is still being established in Sub-Saharan Africa. Low-cost, appropriate technology machines can act as an interim step on the way to improved agricultural production, which then leads to improved food security. In addition, when the technology is designed in cooperation with female heads of household who are responsible for grain processing, then a human-powered bean thresher can become an instrument that brings positive change to women's lives. This GCFSI-funded project will work with women in rural Zambia to develop a low-cost, bicycle-based, human-powered thresher that can process common beans four times faster than the current manual threshing process.
- 2. FarmerLink: Mobile Enabling the Coconut Value Chain in the Philippines.** *Whitney Gantt and Ana Herrera, Grameen Foundation.* In the Philippines, the poorest smallholder farmers are coconut farmers who earn about \$2/day, despite a growing global demand for coconut products. Low productivity and low market prices are the main drivers of this problem. To address this, Grameen Foundation is replicating a solution tested in Uganda and Colombia that leverages field officers and mobile tools to help monitor adopted practices and farm investments required to increase productivity. It will also provide farmers with product standards and certification practices that will enable them to sell directly to buyers. The ultimate goal is to empower smallholder coconut farmers in the Philippines to become productive participants in the global agricultural food system.
- 3. Linking Climate Services and Soil Diagnostics for Climate-Smart Decisions for Small-Scale Farmers and Service Providers in Tanzania.** *Cheryl Palm and Walter Baethgen, The Earth Institute, Columbia University.* Soil Doc is a field-based climate-smart crop and soil management tool for use by agricultural extension service providers, agro-input dealers, and importers for improved, targeted recommendations. The tool currently provides information on field-level soil constraints (fertility status, acidity, and compaction). The GCFSI-funded work will improve the tool through expansive field-testing and a participatory feedback stage and add seasonal climate forecasts to help decision-making that reduces risk in soil and crop investments. Decisions based on site-specific soil conditions and seasonal forecasts will provide cost effective use of inputs and higher returns on investment, combined with surplus production for income generation that will ultimately enhance food security and resiliency.
- 4. Improving Performance of Anaerobic Digestion Systems in Uganda.** *Rebecca Larson, Assistant Professor and Extension Specialist, University of Wisconsin-Madison; and Vianney Tumwesige, CEO of Green Heat, Kampala, Uganda.* The anaerobic digestion sector in East Africa has sustained consistent growth in recent years, transforming wastes to energy in the form of biogas. Although small-scale digestion systems provide valuable biogas for cooking, system limitations can reduce installation potential or the associated environmental benefit. This GCFSI-funded effort will evaluate low-cost slurry separation technology to reduce system

water demands and increase effluent application to agricultural lands, evaluate a new dual fuel stove design, evaluate the use of absorption chillers for refrigeration from biogas, and assess the theoretical potential of heat applications to increase biogas production. The team will field test these innovations at existing biogas systems operated in and around Kampala, Uganda. Working directly with stakeholders to test the innovations enables the research team to translate three years of primary research into sustainable, scalable, commercial outcomes for the biogas sector in East Africa to increase profitability and reduce environmental impacts.

5. **Toward an Improved Cassava Simulation Model to Aid Management Decisions in the Tropics.** *Julian Ramirez-Villegas, International Center for Tropical Agriculture, Colombia; and Tin Maung Aye, International Center for Tropical Agriculture, Vietnam.* Cassava is an important food and income generation crop for smallholders across the tropics due to its drought and heat stress tolerance. However, tools are needed to assist cassava farmers increase productivity sustainably. This GCFSI-funded project will continue the development of a process-based crop model to simulate cassava growth and development in tropical areas. Field trials with an extensive set of fertilizer treatments in Vietnam will help develop and validate the model. The model will accurately simulate above- and below-ground growth, capture the plant's response to water stress, and simulate how nutrient uptake impacts plant development. As a result, cassava agronomists can quickly test different "what if" scenarios of various management practices and select only the most promising options for field testing.

Round 2 Early Stage Innovation Grants:

1. **Low Carbon Footprint Cool Storage Structures to Empower Farmers: Improving Storage and Enabling Processing of Perishable Produce.** *Sangeeta Chopra, Indian Agricultural Research Institute, and Randolph Beaudry, Michigan State University.* This project aims to improve food storage and processing capabilities of smallholder farmers and their villages by constructing and testing two types of evaporative cooling (EC) technologies. The first of the two technologies is the utilization of novel, high porosity bricks in the construction of the EC rooms that should enhance evaporation and cooling potential. The second innovation is the implementation of a solar-powered DC refrigeration module that is specifically designed for and scaled to EC room applications. In addition, the excess power generated by the solar array will provide energy to stimulate value-added processing activities in village communities. The research team is bringing together private business, NGO, governmental and academic partners to developing these two new technologies.
2. **Bringing Farmville to the Tropics: App-based Simulations to Build Farmers' Understanding of Customized Fertilizer Recommendations.** *Travis J. Lybbert, University of California, Davis, and Emilia Tjernström, University of Wisconsin, Madison.* Advanced agricultural technologies hold great promise for unlocking the agricultural production potential found in smallholder plots in the developing world. However, these improved technologies work best when matched to plot-level agronomic conditions. Typically, farmers experiment with technologies over several seasons, slowly adapting new ideas into their plot-level management plan. This is slowed further by adverse weather events, which limit what a farmer can learn. This GCFSI-funded innovation will combine crop models and plot-level soil sample information into an app that will let farmers test new fertilizer combinations to quickly and without cost learn how fertilizer combinations interact with their plot's characteristics. This team will 1) develop the app-based game, which can be calibrated with

plot-level soil test information, 2) test how playing the app affects farmer learning, and 3) evaluate the app predictions and results.

3. **Grasshopper and Locust Farming as a Sustainable Source of Protein for Non-Ruminant Livestock and Humans in Kenya.** *John Masani Nduko, Anthony Kingori, Faith Toroitich, James Ondiek, Egerton University, Kenya.* Non-ruminant farming (particularly, indigenous chicken, fish, and rabbit) has seen large gains in production yield due to the introduction of intensive management. As a result, the production of these animals for human consumption has played an important role in improving food security in Kenya. However, the rising cost of traditional sources of protein, such as soybeans, cotton seed meal, and sunflower meal, has made the management of these animals unaffordable for smallholder producers. This team will design an inexpensive tool kit for local smallholder farmers to farm local varieties of grasshopper and locust, which can serve as renewable source of protein for non-ruminant livestock. In addition, the viability of grasshopper- and locust-based human food products will be tested.
4. **Cell Phones as a Lifeline for African Beekeepers.** *Maryann Frazier, H. Patch and C. Grozinger Penn State University, E. Muli B.K. Muli and Patrick Kariuki, South Eastern Kenya University.* Recently, the team behind this GCFSI-funded early stage innovation grant discovered that current Kenyan beekeepers cannot keep up with the local demand for both honey and beeswax. At the same time, very little is understood about local best management practices. Most beekeepers have little to no interaction with other beekeepers in Kenya or extension educators. This GCFSI-funded work will construct a knowledge base using data on management practices, health, and production of honey bee colonies, supplied by beekeepers themselves, mainly via text messaging. These data, combined with GIS technology to map hive locations and foraging landscapes, will be used to identify the best management practices and most productive landscapes for honey bees. Beekeepers in turn will receive recommendations, generated from the data they supplied, on improved practices and locations for maximizing honey and wax production via cell phones.
5. **Market Access and Zero Waste through a Green Cassava Processing System.** *Anselm P. Moshi and Humphrey P. Ndossi, Tanzania Industrial Research and Development Organization.* Cassava is an important food crop in many areas of Africa. However, the majority of small and medium sized cassava producers cannot access higher value markets. Its bulkiness and perishable nature make it difficult for these producers to sustainably process cassava into shelf stable product. This GCFSI-funded innovation grant combines two renewable energy sources—solar and biomass based biogas and ethanol—to create a new cassava processing technology. Converting raw cassava into cassava flour/starch produces an enormous amount of bio-waste (peels, fibers and starch rich liquid waste). This processing methodology will convert the bio-waste into ethanol and biogas and then use the ethanol to power the cassava grating machine and the biogas integrated with solar power for an efficient drying system. In addition, the fibrous component of the peels will be used to produce prebiotics to fortify cassava flour to produce a functional food product. Finally, the biogas manure will be evaluated and used as bio-fertilizer thus an absolute zero waste. Ultimately, by employing a mix of different sources of renewable energy, cassava flour with unique health benefits is sustainability produced.

Appendix 2: Awarded Round 2 GCFSI Student Innovation Grant Abstracts

Concentrated Solar Drying of Fresh Agriculture Produce in Uganda. *Project Team: Ssemwanga Mohammed, Swaib Semiyaga, and Nakiguli Fatumah.* In Uganda, more than 30 percent of agricultural products are lost due to inadequate post-harvesting techniques and facilities. This is particularly troublesome for that region, since more than 85 percent of the population in Uganda is fully dependent on agriculture. This team of innovators plans to reduce post-harvest losses due to drying by prototyping a rapid agricultural produce indirect dryer. The technology will reduce cost, labor demands, and drying time while adding a longer shelf life to the products, which will add value and attract better market prices. This technology combines the use of indirect solar drying principle (ISD), with concentrated solar power (CSP) technology to create what is called “indirect concentrated solar dryer technology.” The prototype resembles the shape of an old-school pinball machine containing mirrors that harness and redirect solar radiation to the products in the drying chamber, and then out the chimney. If this technology is successful, the research group plans to determine if it results in an increase in average household savings, climate resilience, market access, food security, and quality of life for farmers.

An Innovative Approach to Producing, Distributing, and Marketing Food in Ghana. *Project Team: Clement Kubuga, Bonnie Bucqueroux, Won O. Song, Katherine Alaimo.* In the upper east area of the Sahel, Northern Ghana, locals are faced with particularly poor soil, a single and increasingly erratic rainy season, and recurrent floods and drought. These argo-ecological characteristics make it extremely difficult for locals to make enough money the feed their own families, which has led to nearly 40 percent of that area’s children under the age of five to be stunted, or chronically malnourished. What this project team will attempt to establish in that area is a “six-pot production system” used for growing produce in a safer and more efficient way than current systems. This “six-pot” system will replace the current approach, in which women use discarded tires to grow food, which offers lower yields and increased toxicity. The new method will use sand to filter water and deliver it to the produce in a more consistent and efficient manner. The team plans to recruit 10-12 women to use the six-pot system by providing the local, handcrafted pots free of charge. The team hopes to see a 20 percent increase in food production after incorporating the six-pot system. Then, within the first six months of the grant year, the team will also train four local men to load and transport the produce onto motorbikes. The women running the small-scale production of the six-pot system will be in charge of hiring and training new young males to transport the produce, which will provide jobs to those otherwise not included in the process.

Molecular Characterization of the Microbial Communities of Traditional Spontaneously Fermented Milk in Kenya. *Project Team: Moses Barasa Sichangi, Phares Muraya, Caroline Chepkemoi, John M. Nduko, Joseph Matofari.* This project team will study microbial diversity in Kenya’s traditional fermented milks, known as *amabere amarurunu*. Using DNA sequencing, microbial culturing, phenotypic characterization, and carbohydrates fermentation, the team plans to isolate potential starter cultures for safe *amabere amarurunu* production. This innovation will lead to improved health and economic status for the rural poor with a heavy emphasis on women. There is a need for this service in Kenya, because the people do not have the technology to perform the DNA sequencing studies that are important for safe and effective starter culture design. The project will also help set up small-scale processing in Kenya, which will promote industrialization while still maintaining African traditions and cultural practices. For the first four months of the project, the team will be purchasing and setting up equipment, and then collecting local samples as data. Those samples then

will be transported to the laboratory at Egerton University where they will be cultivated and analyzed until the potential starter cultures are found. Lastly, the team will spend the final months analyzing their results and creating reports that document their findings.

Avocado Oil Press Trails in Tanzania. *Team Members: Ellie Klose and Elizabeth Hoffecker Moreno.* In a rural farming town in northern Tanzania called Leguruki, there is at least one avocado tree on every farmer's land. Yet, approximately 50 percent of all avocados in Leguruki go to waste. Selling avocados locally with the system in place now is extremely unprofitable because of the fruits overabundance and its short shelf life. As a solution to this problem, the community of Leguruki has shown the most interest in pursuing avocado oil production. The avocado oil also has an expanded shelf life of about one year, and can easily be distributed due to its relatively small volume and improved durability. Since the fall of 2014, a team of students from the Massachusetts Institute of Technology (MIT) and partners in Tanzania have been working towards developing small-scale avocado extraction. With funding from GFCFSI, the team will be able to develop refinement processes, bottling processes, and launch a pilot product. Not only will this help increase food security, but also the project will boost local nutrition and incomes. With support from GFCFSI, the team will further advance the production and marketing of avocado oil. To speed up processing, the team has developed a prototype for a bicycle-powered continuous press technology used to harvest greater amounts of the avocado oil. They plan to implement the prototype bike into personally selected and interested local farmers. The team also plans to use the funding to expand the purposes of avocado oil to cosmetic and body products since Avomeru avocado oil contains high levels of vitamin E and monounsaturated fats. This makes the oil a better option for both food and skin than the usually marketed sunflower oil. Several stores have already shown interest in carrying locally harvested avocado oil once the research team finishes their work developing the value chain is for avocado oil in Tanzania.

Enhancing Food Security through Gravity Goods Ropeways in Nepal. *Project Team: Divakar K.C., Chubamenla Jamir, Ritendra Thapa Magar.* A team of researchers from TERI University in New Delhi, India, is working to improve food security, nutrition, and the financial security of farmers living in the mountainous regions of Nepal through an innovation known as the Gravity Goods Ropeway (GGR). The GGR—a simple means of transporting goods in the hilly communities of Nepal—operates solely by gravitational force without the use of external power. In Nepal, GGR is credited for connecting farmers directly to the market while maintaining low operational costs and prices. GGR has also been credited with improving revenue for the farmers and aiding in food security. Prior to the creation of the GGR in Nepal, data showed that the region's mountainous topography trapped more than 50 percent of the population, leaving them without access to the market and other basic services. The other 50 percent would be forced to carry their products to the market, which often led to the spoiling of degrading of those products. Even though the farmers are growing goods with market value, they are losing bargaining power because of the deteriorated quality from travel. However, the research team found that even with all of the credit given to GGR, there is not enough evidence to convince governments from other mountainous countries to adopt the technology. To help spread affordable transportation to more people, the team will spend eight months in Nepal conducting household surveys, evaluating data, and reporting research results to decision-makers and stakeholders.

Use SMS to Document Maize Trader Participation in Government Reporting Protocols in Zambia.

Project Lead: Stephen Morgan. This project will address Zambia's information gap between private grain traders and agricultural officials, also known as the Food Reserve Agency (FRA). In the past, Zambia has relied on regulations that forced maize traders to report their stock levels post-harvest. A decrease in institutional trust and capacity caused many private traders to stop reporting their stock information. This lack of information led government officials to make inefficient decisions, which included export bans and over-investment in storage that led to 32 percent of purchased maize to go to waste in 2012. The project team will use field-lab experiments to capture the effect of compliance outcomes for a random sample of local, private grain traders. Then the random sample will be divided into two groups. The first group will be invited to make comments on the proposed rule, while the second group (the control group), will consist of traders who are not invited to comment on the enforced rule. Then, both groups will be presented with randomly generated stock information to see how they would be willing to report the data. The experiment will be repeated multiple times with different traders, rules, and levels of enforcement. This set of data will allow the team to develop models of participation allowing them to better predict compliance outcomes in development policy. The goal of this project is to gain a deeper understanding of the systems of governing information transfer from the FRA to the traders in Zambia, while also testing a new mobile technology solution to fill the gap. The technology will offer an SMS reporting mechanism so that traders and other actors can report stock in exchange for up-to-date information on total grain stocks, market prices, and the number of reports. The goal of this new system is to make the FRA more efficient, and to allow individuals to respond to institutional incentives.

Peer Comparisons to Increase Adoption of Sustainable Agriculture Practices in Pakistan.

Project Lead: Joshua Gill. PhD Candidate in Michigan State University's Department of Agriculture, Food and Resource Economics, Joshua Gill will depart to Pakistan after winning a grant to increase agricultural productivity to the local farmers, and food system performance. His project will test whether a system involving peer comparison reports could be effective in a farm setting. The reports would contain information about the sustainable practices from peer farmers, and their product yield. The reports would be shared at different stages in the experiment, and will be used to test whether poor land quality is the sole cause of poor product yields. This experiment is much needed in Pakistan because of the heavy dependence the country has with agriculture. Farming not only provides food to the population of 180 million, jobs to 45% of the workforce, and a livelihood to the 62% that live in the rural areas. Since the agro-climatic conditions that Pakistan must face, locals must adapt to the rapid loss of resources like soil, water, and nutrients needed to grow. However, Gill plans to introduce the concept of sustainable agricultural systems that will improve yields for important local crops such as cotton, wheat, rice, and sugarcane. The systems enforced will include solutions to poor soil quality like cover crops, composted manures, and mention of crop residue. The results of these implementations will be monitored through a number of field experiments to highlight the impact on yields. While in Pakistan, Gill will also administer a survey to people in small wheat-farming households from selected villages in northern Punjab, Pakistan that will collect data on basic household characteristics. These include information on employment, income, consumptions, details of yield, and agricultural practices followed. This survey will also be used to test how male versus female-headed households compare in terms of their own yield and average yield in the village.

Alternative Protein Source for Fish Feeds for Aquaculture in Kenya. *Project Lead: Ngube Ruth Matanda.* In this project, aquaculture production will be used to combat the growing gap in the supply and demand of fish in Africa. Although fish has the potential to be the cheapest protein source available, there is still very low per capita fish consumption in Africa because of its current price. Therefore, there is a need to increase fish production in an effort to lower cost. In 2008, the Government of Kenya identified aquaculture as one of its economic stimulus programs, yet the Ministry of Fisheries Development has not been able to provide enough fish for local markets, making them a highly exclusive good. Currently, the fish feeds available at markets represent 50-60 percent of production costs, which is not efficient for commercial farming. That is why this project also allows for an investment in alternative sources of feed for fish, which will contribute to better aquaculture in Africa, and possibly the world at large. This study, conducted in Sagana through the University of Nairobi, will focus on the growth of catfish using three different fish food sources: marine polychaetes and termites as protein supplement; formulated feeds from a Sagana fish farm; and commercial feeds bought from the local market. After testing which foods yield the biggest, most nutritionally dense fish, the study will determine the food conversion ratio and conversion efficiency rates of the fish to increase efficiency within the process.

Test the Capacity of an Improved Maize Planter/Ripper in Tanzania. *Project Lead: Salim Msury.* A team of three mechanical engineering students from Arusha Technical College in Tanzania are looking to implement a new innovation that will save area farmers money and time working in fields. The maize planter/ripper is seen as a relatively simple and easy switch from the current tool—the ox plow. First, the team will need to train farmers, and their oxen, to use the maize planter/ripper until they are comfortable with the equipment. (Since oxen are a common part of most farms in Tanzania, the team chose to use them to power the tool over a fuel source.) Then the farmers will take turns using it to rip and plant an acre of their land, ultimately comparing the effectiveness of the old and new methods. Currently, the most commonly used ox-plow in Tanzania is sold for about \$70, which also requires labor costs of \$5/day to operate, usually at a pace of six hours per acre. The maize planter/ripper combines the process of ripping and planting process, which shaves hours off of a farmer's workday. The team will continually evaluate the maize planter/ripper and allow for changes in design along the way. The team will work with Arusha Technical College; Twende—Accelerating Innovation and Social Entrepreneurship (AISE); the East African Impact Center (ECHO); and local smallholder farmers to create the ideal maize planter/ripper for Tanzania. These different prototypes will be tested at different seasons in the year, and for different types of crops.

Appendix 3: Frugal Innovation Practicum Final Report

Acknowledgements: The authors wish to thank GCFSI and USAID for the generous funding of the first Frugal Innovation Practicum. We are grateful to the many faculty members at Michigan State University who generously shared their knowledge and time with MSU FIP students, and to the many dedicated individuals working in Detroit to improve the food environment and to provide good food to Detroit's residents. Thanks especially to Gavin at Brightmoor, Dan Carmody and Eitan Sussman at Eastern Market, John Kastner at Gleaners Food Bank, and Tyler and Sarah at Earthworks. In Malawi, we are grateful to Genscher M'bwabwa, Director of Commerce at the Lilongwe City Council and Beatrice Makwenda from the National Association of Smallholder Farmers, both of whom generously engaged with students as they learned about food exchange systems in Lilongwe. Thanks are also due to Alice Chalemba, Catherine Mkwambisi, and James Moyo for going above and beyond the necessary as they supported all the details that made the FIP possible. Last, but definitely not least, thanks to the retailers in Area 47, Area 25A, Tsoka, and Central Markets who welcomed the students into their workspace and took time to answer their many questions.

1 Executive Summary

During the summer of 2015, students and faculty from Michigan State University (MSU) and Lilongwe University of Agriculture and Natural Resources (LUANAR) embarked upon a unique interdisciplinary learning experience that combined online, in-class, and field activities. The Frugal Innovation Practicum (FIP) was an experiential learning pilot course, designed for advanced undergraduates and master level students, that used urban retail food markets in Lilongwe as a forum to practice interdisciplinary, intercultural, inclusive, and collaborative approaches to problem-solving. Though primarily designed as an educational activity for students interested in community development work, the FIP was intended to have a practical impact and to result in information that guides GCFSI programmatic direction as it relates to urban food security, an area of concern that is under-addressed by the academic community, governments, and development agencies. This comprehensive report provides an overview of the FIP curriculum, the calendar, the results of a student evaluation, and proposed next steps based on faculty and student feedback.

The curriculum's theoretical and practical approach were informed by the latest thinking in post-colonial planning theory and a small, but developing, body of knowledge on urban food systems and urban food security. In addition, students were introduced to innovation systems literature, which was intended to aid their problem definition and analysis. The practicum's field-based activities took place in four of Lilongwe's 'wet' markets, an important locus for urban food security and urban livelihoods, and were conducted through collaborative methods with small-scale retailers, municipal officials, and academics. Students were required to think through problems in small intercultural and interdisciplinary groups, to develop policy ideas, and to present their findings to the Lilongwe City Council and to representatives of the four markets.

For both MSU and LUANAR, the practicum fulfills an objective to provide students with opportunities to apply classroom knowledge to real world settings. As a practicum that was

explicitly designed to explore innovation from the ‘bottom of the pyramid,’ students had the opportunity to experience the complexity of problems associated with food exchange and provisioning. They were also provided a first-hand opportunity to appreciate the circumstances of people whose voices are often not heard in development debates.

Outcomes

The most important outcome of the practicum as it relates to development impact may be the establishment of a line of communication between the municipality, the local academic community, and retailers from the four markets. Keeping this momentum going will be challenging and will rely on meaningful follow-up and investment of resources. Consequently, in addition to creating a sustainable funding model for the student-centered FIP, GCFSI and LUANAR are engaged in a concurrent effort to develop a larger research program and more active engagement with the municipality and retailers.

Time was a limiting factor to developing well-articulated innovations for each market, though the collaborative and inclusive approach was recognized to be an innovative model for how retailers and municipalities interact. Nonetheless, student groups emerged from the practicum with a set of problem diagnoses and ideas for moving forward. Each student group developed a policy brief, which are summarized in the annex. Common themes include:

- Lack of transparency and communication with municipal decision-makers undermine working environments.
- Inadequate sanitation and infrastructure at markets undermine efforts to provide clean food and safe working environment.
- Inadequate security measures and lighting create an environment that is unsafe, especially for women, and which promotes theft.
- Lack of access to capital prevent small-scale retailers from growing their businesses

Students proposed various ideas for addressing these problems, which will be taken up by the second round of FIP students.

Evaluation and Next Steps

Based on lessons learned from FIP 1 and student feedback obtained via an online evaluation, faculty members will design an updated curriculum, as well as make logistical adjustments. In general, students were satisfied with their participation, with some describing the experience and ‘life-changing.’ The interdisciplinary and intercultural dimensions of the practicum were particularly successful, and students commented on how their perspectives had been challenged and changed. Recommended improvements include better logistical planning and small additions to the curriculum. Illustrative quotes are included in this report.

2 Background and Overview

The Frugal Innovation Practicum (FIP) was an experiential learning pilot course, designed for advanced undergraduates and master level students, that used urban retail food markets in Lilongwe as a forum to explore and practice interdisciplinary, intercultural, inclusive, and collaborative approaches to problem-solving. The practicum represents a collaborative effort by faculty members from Michigan State University and Lilongwe University of Agriculture and Natural Resources.

The term ‘frugal innovation’ reflects a philosophical approach to technological change espoused by Anil Gupta, which recognizes that ‘minds on the margins are not marginal minds.’ Frugal innovation refers to the development of technologies, organizational forms, and business models by and for people who generally have minimal access to productive resources. In addition, in contrast to the more prevalent top-down models of innovation development, frugal innovation typically proceeds in an inclusive manner ‘from the ground up,’ and is primarily focused on solving constraints of the poor through the organization and application of readily available resources and knowledge.

Participating students were drawn from a diverse range of disciplines and life experiences, and challenged to think outside their disciplinary and cultural frames. At the same time, they were asked to bring their disciplinary and cultural knowledge to bear on problem-construction, problem-solving, and community engagement. The course had the following objectives:

1. To familiarize students with the dynamics and challenges of urban food provisioning and exchange in the global south, particularly in relation to the ‘traditional’ market sector.
2. To familiarize students with the major economic, social, and environmental trends in food systems, and how these trends are likely to affect urban food provisioning and exchange in the global south.
3. To learn how different people across and within societies and cultures experience food environments, and to understand the necessity of diverse, multi-scalar food systems.
4. To familiarize students with innovation systems theory and practice, with a particular emphasis on inclusive, or frugal, innovation.
5. To improve the communication and negotiation abilities and skills of students working to achieve a common goal.

The practicum proceeded as a mix of online and on-the-ground classes. During the first five weeks, which were conducted at respective institutions, students used an online platform and classroom presentations and discussions to gain some familiarity with urban food-based livelihoods in the global south, and methods to analyze them. During the second two weeks of the practicum, MSU students traveled to Lilongwe, Malawi, where they teamed up with LUANAR students to conduct action research in four of Lilongwe’s ‘wet markets.’ ‘Wet markets’ is the common terminology used to refer to open-aired markets where fresh produce and meat is sold, and which are widespread throughout the global south (and are enjoying a renaissance in the United States). Wet markets were chosen as the forum for learning because they represent an important site of urban food security and livelihood, especially for the urban poor. As Lilongwe urbanizes, it will be important to explore how markets can be developed to support urban well-being.¹

The purpose of this action research was to engage small-scale food retailers to identify and discuss common concerns in markets as they relate to income generation and working conditions. During the in-class time at LUANAR, faculty provided instruction and guidance to support student efforts to make sense of what they were learning in markets and to continue to

¹ “Well-being” risks being an overly broad and ambiguous term, but is used here because of the important role that urban wet markets play in the economic and social life of urban residents. In addition, because they are major sites of urban food exchange, it is important to consider them in relation to food security (access, availability, and utilization) and food safety.

develop the inquiry. In addition, the Director of Commerce from the Lilongwe City Council and a representative from the National Association of Smallholder Farmers (NASFAM) consulted with students to provide a range of perspectives. Students produced presentations, blogs, and policy briefs. The two weeks of action research concluded with presentations to the Lilongwe City Council, followed by discussions that included LUANAR faculty members, FIP students, and representatives from the various markets where students conducted research.

Primary faculty included:

Stephanie White, PhD. MSU Department of Community Sustainability and GCFSI

Jessica Kampanje-Phiri, PhD. LUANAR Food and Human Sciences, Department of Human Ecology

Martin Gulule, PhD. Development Studies, Department of Agribusiness Management

Andrew Safalaoh, PhD. Agriculture, Department of Animal Science

Liveness Banda, PhD. Agriculture, Department of Animal Science

David Mkwambisi, PhD. Natural Resources, Department of Environmental Science and Management

Mrs. Loveness Msofi-Mgalamadzi, Development Studies, Department of Extension

Sera Gondwe, PhD, Development Studies, Department of Agribusiness Management

This report provides a ‘post mortem’ to the Frugal Innovation Practicum. It includes the calendar of activities, the student selection process, the curriculum, student evaluation, and next steps. Appendices include the evaluation protocol, the student recruitment/application documents, and edited policy briefs.

3 Calendar of Activities

The calendar of activities provides the highlights of FIP planning and implementation.

Table 1: FIP Activity Highlights

Date	Activity
March 11	Activity approved by USAID
March 30-mid-April	Student recruitment
April 10-17	Curriculum and logistical planning in Lilongwe
April 20-May 8	Student interviews and selection
June 22	Practicum begins
June 22-July24	Online reading and discussion through D2L
July 30-Aug 4	Classroom (students convene at respective institutions)
August 7-22	Field Practicum in Malawi
August 24-27	Wrap-up week at respective institutions, MSU students present to family, faculty and friends on August 27 th .
August 27	Practicum ends
September 14-October 2	Online evaluation of course, conducted using D2L

The timing of activities was determined by both institutions to be the most mutually acceptable based on the academic calendar and the ability of students to engage in such an intensive learning experience. However, the undergraduate LUANAR students still had classes to attend.

This was an unforeseen and extraordinary circumstance for a course that is usually taught during the semester. The affected students could only attend half of the practicum sessions per day, which may have affected their understanding and application of some of the concepts used in the practicum. However, working in groups served to cover some of those weaknesses. For the future, the group-work model should be maintained while ensuring that students involved are available on full time basis. Hence the timing of the practicum should be critically determined to ensure optimum participation of all.

4 Selection process and applicants

4.1 MSU

Announcements for the FIP were sent out in late March to various on-campus networks through email and by posting on various MSU social media sites. Ideally, this process would have been initiated at the beginning of the spring semester, which is when students begin to look for summer opportunities. Fortunately, a satisfactory number of students applied, and selections were made based on a number of criteria, including grade point average, departmental affiliation (due to the emphasis on interdisciplinary collaboration), past experience in cross-cultural settings, enthusiasm, flexibility, student maturity, and the student's reasons for wanting to participate.

Table 2 shows the distribution of MSU students by department, sex, and academic level. Eight students were originally selected. One student was disqualified at the recommendation of a GCFSI Assistant Director. Two men and five women comprised the final group of selected students. More qualified women than men applied, which explains the disproportionate ratio of men to women. In future practicums, it is expected that a longer recruitment and application period will help to ensure a more equal distribution. In addition, a videographer undergraduate student from the College of Communication Arts & Sciences accompanied the group to document the practicum.

Table 2: MSU FIP Student Distribution by Department, Sex, and Student Level

Department or Program of Study	Sex	Student Level
Community Sustainability	male	Master
James Madison/Broad Business College	male	Undergraduate
Interdisciplinary Studies in Health and Society	female	Undergraduate/Honors College
Economics, Minor in Environment and Sustainability, Specialty in International Development	female	Undergraduate
Agriculture, Food, and Resource Economics	female	(incoming)Master
Agriculture, Food, and Resource Economics	female	Undergraduate
Nursing	female	Undergraduate

4.2 LUANAR

The LUANAR selection process was similar to that of MSU. Adverts of the FIP were circulated around mid-April on LUANAR's intranet and were posted at strategic points around campus. A total of 25 students (14 MSc and 11 BSc) applied and selections were made based on a number of criteria, including grade point average, departmental affiliation (due to the emphasis on interdisciplinary collaboration), degree level, strength of their concept notes, gender, and the student's reasons for wanting to participate. Thus, based on the stated selection criteria, a total of 8 students were identified balancing the degree levels and the gender aspect. Table 3 below shows the distribution of the selected LUANAR students.

Table 3: LUANAR FIP Student Distribution by Department, Sex, and Student Level

Department	Sex	Student Level
Animal Science	male	MSc
Aquaculture and Fishery Science	male	MSc
Human Nutrition	female	MSc
Agricultural Extension	female	MSc
Agriculture, General	male	BSc
Agriculture, General	male	BSc
Agronomy	female	BSc
Agriculture, General	female	BSc

5 Curriculum

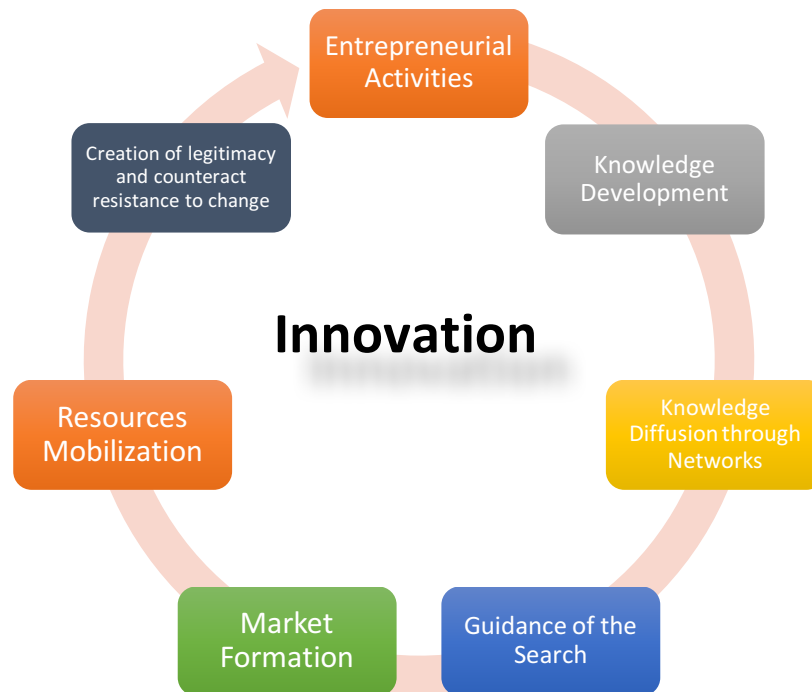
Development of the curriculum was guided by the mutually compatible objectives of GCFSI and LUANAR. In addition, urban food systems and urban food security are emerging areas of concern due to urbanization trends in developing countries. Urban food environments, and the ways in which people experience them, are very different from the rural food environments where, to date, most agrifood research has been conducted. Hence, the FIP created a curriculum that was both responsive to tackling urban agrifood systems issues as well as addressing pertinent food security and educational objectives that are embraced by GCFSI and LUANAR.

For instance, a primary objective of GCFSI is to develop 'multigenerational food systems problem-solvers' and to foster innovative approaches to food systems problems through creative and interdisciplinary approaches. On the other hand LUANAR's primary objective is to enhance the education of its students by providing experiential, field-based learning opportunities. Both institutions have an emerging interest in the development of models and tools that will foster and strengthen the partnership with stakeholders involved in urban food systems, especially the resource poor. This practicum therefore enacted the goals of GCFSI and LUANAR through a curriculum that was designed to teach the value of (1) problem-based, rather than discipline-based, approaches in which students were encouraged to co-create solutions based on lived realities (2) seeing and solving problems from multiple perspectives and (3) inclusive approaches to innovation that recognize and elicit meaningful input from people who are often marginalized. In such an approach to food systems development, there is a dual focus on the creation of

solutions *and* empowerment among people who do not often have a voice in how development happens.

To help students with the analysis of urban food systems and the capacity of retailers and other stakeholders to make meaningful and appropriate improvements, students used the innovation systems framework proposed by Marko Hekkert et al (2007). This framework, illustrated in Figure 1, provides a means of understanding innovation systems in relation to seven functions.

Figure 1: Innovation Systems Functions, based on Hekkert et al (2007)



The curriculum, which is outlined below, was carried out through a blended learning approach, using online, in-class, and field-based methods of delivery. A calendar of activities is located in Annex 7.2.

5.1 Online Reading and Discussion Forum

During the online portion of the practicum, which was conducted over a period of five weeks, students read several articles and/or watched recorded presentations or videos and then responded in writing to question prompts. They and involved faculty were encouraged to interact with each other in a written discussion forum. Readings drew from various areas of scholarship in an attempt to reflect the 'real world' complexity of urban food provisioning and exchange. Each week dealt with an aspect of urban food systems:

Online, Week One: Introduction to Practicum; Innovation and Food Systems

Learning Objective: Students will understand the concepts of frugal, or inclusive, innovation, and to understand food systems as innovation systems.

- Two PowerPoint presentations authored by Stephanie White.
- Hekkert, Marko P., et al. "Functions of innovation systems: A new approach for analysing technological change." *Technological forecasting and social change* 74.4 (2007): 413-432.

- Hall, Jeremy, et al. "Entrepreneurship and innovation at the base of the pyramid: a recipe for inclusive growth or social exclusion?" *Journal of Management Studies* 49.4 (2012): 785-812.
- Optional: Wieczorek, Anna J., and Marko P. Hekkert. "Systemic instruments for systemic innovation problems: A framework for policy makers and innovation scholars." *Science and Public Policy* 39.1 (2012): 74-87.

Online, Week Two: Urbanization and Food Security

Learning Objective: Students will understand how urbanization can affect food security and change food environments.

- Battersby, Jane, and Jonathan Crush. "Africa's Urban Food Deserts." *Urban Forum*. Vol. 25. No. 2. Springer Netherlands, (2014).
- Mvula, P., and A. Chiweza. "The state of food insecurity in Blantyre City, Malawi." *AFSUN Urban Food Security Series* 18 (2013).
- Tacoli, Cecilia, Budoor Bukhari, and Susannah Fisher. "Urban poverty, food security and climate change." *International Institute for Environment and Development, London* (2013).

Online, Week Three: Informal Economy

Learning Objective: Students will become familiar with alternative forms of economic relationships, and the value of the 'affective' or 'informal' economy to urban livelihoods and food security.

- Chen, Martha Alter. "The informal economy: Definitions, theories and policies." *Women in informal economy globalizing and organizing: WIEGO Working Paper* 1 (2012).
- Hyden, Goran. "The Economy of Affection Revisited." *African Rural and Urban Studies* 4.2-3 (1997): 19-34.
- Optional: Lourenço-Lindell, Ilda. "Walking the tight rope: Informal livelihoods and social networks in a West African city." (2002).
- Optional: Fraser, Elizabeth, Malambo Moonga, and Johanna Wilkes. *The Role of the Informal Economy in Addressing Urban Food Security in Sub-Saharan Africa*. (2014).

Online, Week Four: Food Safety in Context

Learning Objective: Students will understand the necessity of finding locally relevant approaches to food safety that take into account access to food and livelihood.

- Grace, Delia, Kristina Roesel, and Tezira Lore. *Poverty and gender aspects of food safety and informal markets in sub-Saharan Africa*. Vol. 21. ILRI (aka ILCA and ILRAD), (2014).
- Kang'ethe, Erastus, Delia Grace, Kristina Roesel, Saskia Hendrickx and Kohei Makita. "Safety of animal-source foods in informal markets in the East African Community: Policy engagements" *ILRI Policy Brief* 13. (2014)
- Grace, Delia, Kristina Roesel, and Tezira Lore. "Food safety in informal markets in developing countries: An overview." (2014). (Chapters 1-3)

Online, Week Five: Food and Municipal Planning

Learning Objective: Students will understand the role of municipal planning in promoting food security.

- Watson, Vanessa, and Babatunde Agbola. *Who Will Plan Africa's Cities?*. 2013.
- WIEGO. "The Urban Informal Workforce: Street Vendors." *Findings from the Informal Economy Monitoring Study*. (2013)
- Riley, Liam, and Alexander Legwegoh. "Comparative urban food geographies in Blantyre and Gaborone." *African Geographical Review* 33.1 (2014): 52-66.
- Optional: White, Stephanie, and Michael W. Hamm. "Urban Agriculture and a Planning Approach to Urban Food Systems." (2015)

5.2 Classroom

Following the online work, students attended classroom sessions, where they heard from a number of faculty members on different subjects. During this time, students also took a field trip to a local market to begin to see how urban food exchange can be viewed as a system. The activities conducted at each institution are outlined below.

5.2.1 Michigan State University

Students met over a period of five days and received instruction in inclusive and critical pedagogy, communication techniques, human-centered design, gender analysis, and methods. In addition, students took the ISPI (Innovation Strengths Preference Indicator) and had a session with a trained facilitator to interpret findings in relation to the FIP.² This is an assessment used to understand how different people work to solve problems, and is described as tool to help teams to "manage the process that makes innovation happen" and to help people in teams to "recognize and appreciate the different strengths that each of us possess."

MSU Faculty were invited into the classroom to lead a number of different discussions:

- Nathalie Me-Nsope from GCFSI led a session on gender analysis
- Susan Wyche from the Department of Media and Information led a session on human-centered design
- David Poulson from the School of Journalism led a session on communication skills
- Jessy Sielski and Syed Ali Hussain from GCFSI led a session on communication forums
- Lorie Neuman and Jessica McFarland of GCFSI led a session on administrative

MSU students also traveled to Detroit to practice applying the innovation systems framework to a local food system. Table 4 provides the calendar of activities for the Detroit field trip.

Table 4: Schedule of Activities for Detroit Food System Field Trip

Date	Friday, July 31				Saturday, August 1					
Time	3:00 PM	5:00 PM	5:30 PM	7:00PM	6:30 AM	8:00 AM	9:00-12:00PM	Lunch	1:45-2:45 PM	3:30-4:30 PM

² Information about this tool is here: <http://www.innovating.com/innovation-strengths-preference-indicator/>

		Bright- moor neighbor- hood in Detroit	Plum Street Market Garden/ Keep Growing Detroit	Dinner	Breakfast	Casual walk through Eastern Market	Eastern Market Tour	Lunch from Russel Street Deli	Gleaners Food Bank Tour	Earth- Works and Capuchin Soup Kitchen Tour
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Reading List for the Classroom Portion

- Biggs, Stephen, and Harriet Matsaert. *Strengthening poverty reduction programmes using an actor-oriented approach: examples from natural resources innovation systems*. Overseas development institute (ODI). Agricultural research & extension network (AgREN), 2004.
- Elias, M. 2013. Practical Tips for Conducting Gender-responsive Data Collection. Bioversity International, Rome.
- Freire, Paulo. *Pedagogy of the oppressed*. Bloomsbury Publishing, 2000. (excerpts)
- Meinzen-Dick, Ruth, et al. *Engendering agricultural research, development and extension*. Vol. 176. Intl Food Policy Res Inst, 2011.
- Padilla, Raymond V. "Using dialogical research methods in group interviews." *Successful focus groups: Advancing the state of the art* (1993): 153-166.

5.2.2 LUANAR

A group of seven students and two faculty members traveled to the Dedza District Council market which is located about 85 km away from Lilongwe City. The team met with District officials to provide a briefing about the project and then went round the market in three teams for about an hour. Students observed transactions and asked questions. The students also visited supermarkets. The group reconvened to talk about their observations and experiences.

5.3 Field Practicum

The field practicum was structured to give the students a balance of field-based activities and classroom-based activities. After two visits to the markets, students were grouped into teams and assigned to one of four markets where they would conduct their collaborative action research. During the first part of the practicum, students spent 3-4 hours in markets each day, and another 3-4 hours in the classroom. During the latter part of the practicum, they stayed at the training site to develop presentations and policy recommendations.

While in the classroom, students teams initially worked to develop their inquiries and, later, to develop their presentations. Faculty members from both LUANAR and MSU presented seven units:

- Unit1: Innovation Systems
- Unit 2: Action Research Methods and Approaches
- Unit 3: Understanding the Urban Market System
- Unit 4: Urban Planning and Food Systems
- Unit 5: Resource Flow and Actor Social Networks in Urban Food Markets
- Unit 6: Entrepreneurship and Livelihoods in Urban Food Markets

- Unit 7: Policy and Development Strategies in Urban Market and Food Systems

In addition, Gensch M'bwabwa, the Director of Commerce at the Lilongwe City Council, and Beatrice Makwenda, from the National Association of Smallholder Farmers (NASFAM), visited to discuss urban food exchange from their perspective. In this way, students were encouraged to think about the issues they were discovering from multiple perspectives.

Though faculty members were generally present, students were encouraged to 'think through the data' in conversation with each other and with people working in markets. The field practicum culminated with student presentations at the Lilongwe City Council to city decision-makers, faculty members, and several market representatives who were involved in the inquiry. In addition, a small ceremony was conducted in which students received certificates of completion.

Each team developed a written output that includes policy suggestions, which are summarized in Annex 7.1.

5.4 Wrap-up Week

5.4.1 MSU

During the final week of the practicum, students developed short presentations for the campus community and their families that were focused more on their personal learning experiences. A question and answer session followed presentations.

6 Final Evaluation and Next Steps

6.1 Evaluation Results and Analysis

The primary method used to evaluate the FIP was through an evaluation conducted on D2L, MSU's remote learning platform. The primary purpose of this evaluation was to determine, through student feedback, the effectiveness of the FIP content and approach, and to elicit suggestions about how to modify it in ensuing years.

In addition, several students conducted a series of two-minute 'selfie' videos, an experimental method to gauge what are referred to as 'T-shaped' employee job skills. 'T-shaped' is a metaphor used to describe the kinds of skills needed by people in the workforce in order to work creatively in interdisciplinary teams. As a course explicitly designed to foster interdisciplinary collaboration, the Frugal Innovation Practicum provided a good 'petri dish' for testing out the method.

6.2 D2L Evaluation

The evaluation protocol is located in Annex 7.6.

Eleven out of 15 students responded. All seven MSU students responded, while only four of eight LUANAR students responded. In personal emails, the non-responding students said they'd had trouble accessing the internet. This was an issue that complicated LUANAR participation throughout the practicum and one that requires some consistent troubleshooting until it is solved.

This section follows the chronological order of the practicum. Areas for improvement or concern are noted in each section, and highlighted using bold text. The overall learning model and facilities/logistics are discussed last.

6.2.1 Online Portion of FIP

Most students rated the choice of readings as *important or very important* (average of 90.4% across the 5 subject matter areas) to their learning and to their work in markets. In general, they *agreed or strongly agreed* (average of 92% across the 5 subject matter areas) with including the same or similar readings in future courses, and were *satisfied or very satisfied* (81% of students) with the ordering of subject matter. When asked what subject matter should be included in future FIPs, three major areas were suggested:

- More cultural, social, and historical background on Malawi and Lilongwe, including a lesson in basic Chichewa.
- More discussion of issues as they are directly relevant to urban food retailers working in wet markets, such as the organizational dimensions of urban markets and the conditions that foster an environment that makes it difficult to access capital and infrastructure.

Four out of eleven respondents said that the reading load was *too much*, while six said it was *just right*. One person said it was *too little*. Though the majority said it was acceptable, enough students found the load to be at least slightly overwhelming. The reading subject matter was intended to foment weekly discussions. Six out of eleven students gave only a middling grade to the quality of the discussion forum, while three said it was good, and two said it was excellent. Six out of eleven students gave faculty participation a 'good' grade, two said it was 'excellent,' while one said it was rather poor. Four students specifically mentioned that they would have liked to hear more from LUANAR faculty members, rather than primarily from the MSU faculty member who was mainly responsible for managing the site.

Consideration for future FIPs:

- **The first cohort of FIP students should be invited to counsel and interact with ensuing groups of FIP students. In addition, those students have produced written outputs that will be helpful to future FIPs**
- **A basic Chichewa session can be provided, and introductory exercises at LUANAR might include some language and have students practice with their Malawian counterparts as an introductory exercise.**
- **Malawian students at MSU can be invited to discuss cultural issues with MSU students prior to departure.**
- **Future FIPs will provide some readings on relevant cultural, political, and economic issues.**
- **Faculty should reassess reading load. One solution may be to substitute one article with another form of media.**
- **Clearly, there is room for improving the quality of the discussion forum. A very significant part of this was attributed to the internet connection, which made it difficult for LUANAR students and faculty to participate. Apart from that technical problem, LUANAR faculty also had challenges with time. The online session started when the semester was still in session (exams period) and this affected their participation in the online sessions.**

- There is also a need to improve the discussion as it pertains to (1) the interrelatedness of subject matter, and (2) the perspectives and participation of LUANAR faculty. LUANAR and MSU faculty members will need to discuss ways of making this subject matter more exciting. In addition, several students noted that it would have been helpful to be more methodical about relating theory to practice and the actual field activities. Towards that end, one student suggested that there be one responsible person each week to compile the major points from that week's reading and discussion, and to reintroduce it during the practicum. In this way, students would be more likely to be able to relate the collective body of knowledge to their individual project.

6.2.2 Classroom Portion of FIP

It was the intent of the evaluation for questions concerning the classroom portion to address the pre-field practicum portion of the FIP, but most students commented on the quality of the classroom sessions overall, which included sessions carried out during the field portion of the practicum in Malawi. Accordingly some responses from students are reported in the next subsection.

For the most part, students were *satisfied* or *very satisfied* with the classroom portion of the FIP. However, students again observe that, like the reading in discussion forums, areas covered in class sessions were not clearly connected to the overall objectives of the class. For example, one student said, "We covered a lot of great topics, but it felt like we stopped talking about them once the presentations were over. They felt a little disjointed given our short time-line and limited information on Malawi itself. (We covered gender, but not gender in Malawi, etc)."

Another student suggested that classroom sessions should have more clearly related to the eventual work to be done in Malawi: "I think the communication techniques made sense on paper, but found that it was difficult to keep up with them after being in the field."

Several LUANAR students noted they would have liked to have classroom sessions that more closely mirrored the MSU class session. For example, several LUANAR students completed the ISPI Assessment, but were never given the opportunity to get feedback about the implications. Again, this was due to the inadequacy of the communication infrastructure that would have made this possible. Though the lead faculty member at LUANAR inquired about finding a space where LUANAR students could connect via Skype or another conferencing technology, that effort was unsuccessful. This is clearly a weak area that needs some attention.

Considerations for Future FIPs:

- The primary need is to more clearly relate the subject matter discussed in the classroom and online to the Malawian context. This can probably be done in a number of ways, including (1) using the Malawian context to discuss specific theoretical issues, and, more importantly, (2) creating a better interaction between and among all those enrolled in the FIP, including faculty members.
- LUANAR students would like more instruction in the classroom and would like it to more clearly mirror the MSU sessions.

6.2.3 *Field Practicum Portion*

Students enthusiastically support the idea of using urban food markets as a forum for learning and conducting action research. As students explain, this is because:

- "...we got to experience the roadblocks and achievements that re true to the area. The markets bring together so many pieces of a society – entrepreneurship, local government policies/procedures, consumers, etc – so it was the perfect place to try and understand how to resolve challenges in an effective, longstanding way.”
- “Engaging with vendors whose problems we are attempting to solve in conjunction with them is key to dialogue around development.”
- “Seeing is better than reading in books, and engaging with vendors brings new insights.”
- “Markets are an excellent forum for this!!! I had never really fully realized the life, the potential for understanding the systems, relationships, and individuals within the markets. With all these ways of connecting, there are clearly issues that compound and complicate one another. Because it is social and interdependent by nature, it is the perfect medium for measuring, analyzing, and pursuing community engagement.”

The innovation systems framework also elicited some positive feedback, though slightly more measured:

- “I felt like the innovation systems framework gave me the background I needed to understand what entrepreneurs and markets need in order to become a functional piece of the overarching system.”
- “The innovation systems framework was helpful at first. In class, the framework seemed easy to relate to. Later on the trip, as we moved into the markets, and started with policy brief, this framework did not come in as handy.”
- “I appreciated how the framework allowed me to categorize in a systematic way what I saw in the markets. Rather than be overwhelmed by all of my observations of the markets, I could use the framework to analyze and better comprehend all of the facets of the markets.”

In terms of how it helped students with their inquiries:

- “..it gave us a strong foundation to begin asking questions. Ex: do you feel like you can take risks? Is there a place that you can seek information, resources, help from?”
- “I think it did help us to plan our inquiry...For example, the framework encouraged me to think of one of our market's problems as one of poor planning - i.e., a systematic problem that also had consequences in other markets, rather than a one-off problem that affected just our market.”
- “I think, overall, the framework served as a platform for beginning with entrepreneurial activities; it emphasized the interconnectedness of the health of the system; and it was an underlying force for questions throughout the process.”

Though other students did not find it so helpful:

- “In developing inquiry, our group was not clear where it comes in.”

One student said: “I think that I don't feel very strongly about the framework! I love theories and ideas, and I love seeing how they are actualized. However, when reflecting on this question, I cannot honestly say that this particular framework was of essential importance. I believe that perhaps unconsciously it was, but I think other methods of framing student inquiries that are rooted in activities, interactions, and how leadership is formed should be considered.”

Overall, students recommended that the framework continue to be used to help students understand the conditions that provide an environment for innovation, as well as to help inform their inquiries. The final comment, however, gets at the necessity of better putting the framework to use in order to perceive “activities, interactions, and how leadership is formed.” In terms of the methods and approach to learning in markets, students would have liked more time and more guidance in order to make the inquiry more efficient. In general, they agreed that methods such as mapping, observation, and focus groups are helpful, but that they could have put them to better use with a better introduction to their individual markets. One student suggested that participatory mapping would yield more important information and reflect improved inclusiveness: “For example, organizing a few days to get volunteers, equip them, and have the vendors themselves draw maps (this would perhaps require payment, but I think allocating this in the budget would reveal a lot more than students going in for the first time!) It would also authentically actualize the entrepreneurs' themselves as equal participants within the project.” The same student suggested that more time for interviews is necessary, and better coordinating teams to more fully consider the views of people who would not necessarily speak out during focus groups.

Though students wished they'd had more time in markets, they generally agreed that the expectations for the practicum were reasonable. However, several stressed that their outputs could not be regarded as definitive due to the constrained time frame for carrying out the inquiry.

Considerations for future FIPs

- While most students regarded the innovation systems framework as a useful tool, it could be put to better use. In future FIPs, faculty can use the lessons and outputs of past FIPs and frame them with the innovation systems framework. Over a period of years, it would be useful to characterize food exchange systems in relation to this framework, and to continue to explore how it might be useful (or not) to learning, analysis, and decision-making.
- Continue to use the framework to understand the conditions that promote innovation, but put the framework to better use. Students should be encouraged to link the framework to their inquiries and how they frame their policies and presentations.
- Two of the inquiry days were spent with all students going to all markets. This, perhaps, can be cut to one day. Having faculty guides to the markets may be one way to improve the efficiency of the learning process. However, the promise of the FIP is that students learn in collaborative and inclusive processes; it is not that they reach definitive answers. It is not surprising that they would feel that the process is incomplete given that they engaged in this process for such a short time.

- **More intensive ground work before students arrive could also enhance the efficiency of the process. For example, several retailers at each market could be given (and compensated for) a short orientation about what students are doing and why, and perhaps trained in some of the methods, such as participatory mapping. They might then serve as a guide to help enable smoother interactions.**
- **A refined policy brief is clearly beyond the scope of the FIP. However, students effectively understood complex environments, organized their findings, and were able to articulate some very clear directions for problem-solving.**

6.2.4 *Wrap-up Portion*

At MSU, students were asked to reflect on their personal learning experiences. This was a presentation that provided an opportunity to share aspects of the practicum that were meaningful with peers, parents, interested faculty members, and others what about the FIP was meaningful to them as an individual. Students were given ample flexibility in what they wanted to present, which was appreciated by some of the students, but not others, who asked for more definite guidelines about content.

One LUANAR student would really have liked the opportunity to present to GCFSI management, but for lack of access to conferencing facilities, was unable.

Considerations for future FIPs

- **LUANAR students would like to have the opportunity to report back to their peers and to those in management positions. This is an important point that must be addressed by both MSU and LUANAR.**
- **A consideration for LUANAR students to visit markets in the USA or another is needed**

6.2.5 *Overall Learning Model*

Students were asked to evaluate how the course achieved its goal of providing an interdisciplinary, critical problem-solving, cross-cultural, and collaborative experiential learning model.

When asked how the practicum challenged their pre-existing assumptions, students emphasized that the ‘real life’ forum and community engagement provided the opportunity to contend with complexity. Many noted how it was ‘messy’ and difficult, but were encouraged by the fact that out of that messy difficulty, they were able to reach some understanding.

Some feedback that encapsulates this idea follows:

- “Bringing a humble mindset to the task - like what Freire talks about in Pedagogy of the Oppressed, with the teachers becoming students and vice versa - helped me to frame my inquiry and calm my nerves (I wasn't going to the markets to pretend to be an expert, so nothing was really expected of me other than being an attentive, thoughtful student - a role I'm used to!)”
- “I'm very much an idealist person, and the practicum enabled me to realize the beautiful messiness of working with people. What was particularly unique about this "real-life" experience, as it is typically referred to, was the multiple lenses it provided...The practicum

provided a space to engage with real problems; rethink how to think about them from different perspectives; integrate these perspectives; and pursue solutions with people of different backgrounds and experiences, but of similar intentionality.”

- “The practicum changed my assumption about how to work in and with the communities through the focus group discussion and the interviews which were conducted in the markets. I can say that the FIP has help me to realise that working with communities is not just a simple matter, but requires to work with people who are open minded...The better the approach the greater the participation.”

In general, students thought that using multiple forms of content delivery was effective because it (1) catered to students’ varied learning preferences, and (2) provided a means of reinforcing subject matter.

Students valued the intercultural and interdisciplinary dimensions of the course because collaborating with people of varying backgrounds brings a “fresh” perspective to discussions. Based on their cultural or disciplinary backgrounds, students understood subject matter differently, which was noted as useful when analyzing markets and writing policy briefs. For example, one student said, “we could talk in different terms but end up agree on important focus and bringing different ideas to problems.” MSU students were particularly appreciative of the LUANAR students, not only in relation to their depth of knowledge about markets, but their role as cultural ambassadors: “As an MSU student, it's impossible to ignore how valuable Malawian students were to our learning and problem-solving. They understand, culturally/socially/politically, what actually makes sense to ask and expect of people.”

One important point to note: the interactions among students during the practicum were not without friction. Students suggested some ways to minimize this in the future, such as creating a task prior to team formation, which would allow them to practice teamwork or to more clearly state directions and expectations, which could help to “bypass conflict and aid collaboration.” But, given that they were a captive audience with a task to complete in a short time, they persevered, and as one student put it, “Interaction and tolerance took its course which in the long run ended up brining sophisticated ideas together to produce one tangible output.”

On the specific assignments, students had mixed feelings about blog writing, with three students rating the task as *unimportant or neutral*, seven students rating it as *important*, and one student rating it as *very important*. Selfie reflections also received mixed reviews: five students said it was either *unimportant* or were *neutral*, three said it was *important*, and one said it was *very important*. The two remaining students said it was N/A, suggesting they did not complete this task. Mapping the markets was regarded as having a *neutral* impact by three students, while eight students rated it as either *important or very important*. Ten students said writing policy briefs was *important or very important*, while one student felt the task had a *neutral* impact. The final presentations at the Lilongwe City Council was the highest rated task, receiving a unanimous rating of *important (2) or very important (9)*.

Considerations for future FIPs

- It may be possible to minimize group friction and encourage more efficient problem solving with specific processes that propel action and decision-making.
- Faculty should be more intentional about checking in with teams and individuals about what is going on in their particular groups, and be prepared to suggest some methods for working through friction.
- LUANAR students, in particular, noted that some aspects of the workload were overly heavy. A conversation among MSU and LUANAR faculty can address this complaint.

6.2.6 Facilities and Logistics

Out of eleven responses, two students were either *dissatisfied* or *very dissatisfied* with lodging accommodations, three were *neutral*, and six were *satisfied* or *very satisfied*. On conference facilities, two students were *neutral*, four were *satisfied*, and five were *very satisfied*. In general, students were *satisfied* (5) or *very satisfied* (5) with the food.

Students stayed at Bunda campus, while faculty members stayed in Lilongwe, about a 45 minute drive. Several MSU students would have preferred to have MSU faculty lodging in closer proximity. In general, MSU and LUANAR students enjoyed staying at Bunda campus because they could collaborate during the evening hours.

Transportation was an ongoing concern throughout the field practicum, and there were several instances where cars were not available to take students where they needed to go.

Considerations for future FIPs

- It would be better to go with a private transportation service in which drivers and cars are assigned to the FIP for the duration of the practicum. There were too many competing demands for LUANAR cars, and too difficult to balance them, which reduced the time students could spend at the markets, and increased the time the spent waiting to be transported somewhere.
- The lodging location of MSU faculty can be revisited, but it is necessary for faculty members to have internet access in the evening. Internet access is not reliable at Bunda campus.
- MSU faculty needs to better prepare students so that they understand conditions at Bunda campus so that they can properly prepare. Students suggested providing a document that provided “timelines, packing lists, accommodation/transportation/food information.”

6.3 Selfie Video Analysis

This analysis was completed by MSU’s Hub for Innovation in Learning and Technology, which is piloting the video reflection method as a way to understand how learning experiences promote and/or allow students to use “highly valued job skills, such as communication, global awareness, and critical thinking.”

Over the course of the practicum four MSU students recorded themselves reflecting on the learning experience. Each video was just several minutes long. The numbers in the tables represent the number of times each skill was observed in the videos. For example, if the

student analyzed something, it would be checked off as having critical thinking skills; if he/she continued to analyze it, it would be checked off again as exhibiting critical thinking. Multiple skills could be checked off per sentence or groups of sentences, usually 15-45 second segments. The skills selected for Table 5 were identified during the T-Summit at MSU in 2014 (see tsummit.org/t) by academics, government, and industry leaders as being the most sought-after job skills for the 21st century employee.

Table 5: Number of Times Each Job Skill was Observed in Selfie Videos

Highly valued job skills for the 21st century employee:	Student 1	Student 2	Student 3	Student 4	TOTAL (n=4)
Communication skills	8	9	19	8	44
Global awareness	5	14	12	13	44
Project management	2	5	6	3	16
Teamwork skills	2	5	2	7	16
Networks & outreach	1	5	1	5	12
Critical thinking skills	6	16	13	13	48
Put things in perspective	2	4	1	1	8
Communication skills	<p>Good communication skills in general (could be oral, written, people skills)</p> <ul style="list-style-type: none"> • Very articulate: smooth, clear, organized, concise; very little stuttering, repetition or wandering off the topic • Big picture summary to situate the viewer as to where they were, what was happening, what was on the day's agenda; always considerate to update the viewer or keep the audience informed • Engages the audience, makes good connection to the audience through humor or anecdotes or talking directly to the camera 				
Global awareness	<p>Has global awareness or thinks on a big global scale, someone who has had a multicultural-foreign-study-abroad kind of experience</p> <ul style="list-style-type: none"> • Talks about culture-related events, customs, the foreign setting, or offers cultural insights • Talks about past travel experiences • Talks about other points of view • Talks about culture shock • Talks about meeting the locals, participating in daily life 				

Project management	Increasing workflow through efficient use of time, manpower and resources; anything related to organizing a job so that it gets done	<ul style="list-style-type: none"> • Talks about time frames or benchmarks • Talks about what to do next • Talks about one or multiple solutions, action plans, etc. • Discusses plans for big innovative steps or small feasible steps
Teamwork skills	The process of working collaboratively with a group of people in order to achieve a goal, cooperative or coordinated effort on the part of people acting together as a team or in the interest of a common cause	
Network and outreach	Exchange of info or services among people, groups, or institutions; cultivation of productive relationships	
Critical thinking skills	When presented with problems, solutions need to be able to address problems; analytical skills to put together 'big picture'; ability to reason; evidence of brainpower	<ul style="list-style-type: none"> • Person is looking for (not necessarily found) lessons learned or what he/she gained from the experience • Gives a big overall picture of what is going on, updating the audience about what is going on; similar to "communication skills; oral communication; keeps you informed of the big picture" • Can see how other people are relating to each other; ability to analyze other people, can identify other people's strengths & weaknesses; • Gives examples rather than non-specific statements

Put things into perspective	Able to see things in relation to the problem	<ul style="list-style-type: none"> • Mentions parallels to other situations, similar problems, past experiences; • reflects on past travel experiences" and "social awareness; displays professional attitude and work ethic; reflects on personal background"
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6.4 Observations of Faculty Members

6.4.1 Stephanie White (Program Lead)

It became clear early on that a reciprocal visit that brought LUANAR students to Michigan would be an important addition to the practicum or as a separate stand-alone initiative. The local and regional food systems in Michigan have undergone a lot of innovation in recent years, and unpacking those processes would provide instructional value to students and faculty members seeking to better understand how such change was facilitated. Importantly, this does not mean that what has evolved in Michigan should necessarily occur in Malawi, but understanding the evolution *in relation to* the innovation systems framework can help to see what sorts of functions and activities promoted such change.

The course was expensive. Unlike many study abroad courses, the FIP was fully funded. This allowed me to choose participants based on merit and my assessment of their ability to contribute to outcomes. As a course that deals with 'real life' situations, and engages people in processes that are expected to have meaningful impacts on their lives, it is important for students to be serious, motivated, and committed to proposing solutions that will be considered, discussed, and possibly emerge as an area where resources will be invested. The course was only funded for the first year, and as of this writing, it is not funded for 2016. I'd initially thought there might be more innovation and problem-solving. Students and retailers were certainly on their way to doing so, but the model we are encouraging is one that advocates for a communicative approach with city decision-makers. Two weeks was enough time to construct and articulate concerns, and to start a dialogue between retailers and the city, but refined and conclusive solutions will take time.

Through this process, we have created a base for further collaborative and inclusive engagement as it relates to food and livelihood security in Lilongwe. The Lilongwe City Council is using the results from the practicum for engaging retailers. Currently, there is not much donor interest in urban food systems and private capital may be more interested in creating supermarkets. However, given the ongoing and future challenges in cities of the global south that include energy shortages, climate change, and poverty, decentralized food systems that provide a livelihood for many urban residents, especially women, need increased attention and support.

Lastly, at the conclusion of the practicum, I told students that it had been the best experience of my professional life. That holds true and it only holds true because of the way in which the students embraced the effort, despite its (sometimes) messiness. They were all amazing, each and every one.

6.4.2 LUANAR FACULTY

An FIP postmortem meeting by LUANAR faculty members raised the following observations as lessons learned and areas that needed to be improved in a future practicum:

- Selection criteria for LUANAR students need to be specially considered based on the different challenges that MSc and undergraduate faced during the practicum. Since most of the undergraduate selected were in their final year and were preparing to write their end of year exams, the faculty felt that the practicum pressed more demands on such students and could potentially have compromised their end of year grades.
- The faculty members also felt that there was a need for clear definition of roles, especially in terms of leadership and management of the practicum on LUANAR side. This was also important in terms of clarifying participation and remuneration terms, since some of the faculty members that invested more of their time in the practicum and those that did not were compensated equally.
- There is need to develop clear terms of reference for each faculty member involved in the practicum, should it be delivered again next time
- Members of faculty felt that there is need to assess if giving informants some money had any impact for future researchers
- Timing for both the online and field sessions of the practicum needs to take into consideration of the LUANAR teaching calendar and massive workloads that LUANAR faculty usually have. This was observed as being a challenge to participate a straight seven week period for most the LUANAR faculty due to other academic obligations.
- Overall, faculty members felt like the practicum was a success and indeed worth replicating due to the experiential learning objectives that were achieved. Mentoring an international student audience was also a fulfilling experience for most faculty members.
- Most of the LUANAR faculty members expressed that personally, they gained a new perspective in viewing urban retailers than they did before. Now that they have specific insights to the different challenges that urban retailers face, every time they visit these markets, they think beyond purchasing the commodities they need and think of more on what can be done to improve the livelihoods of urban retailers
- Internet access is still a challenge at LUANAR. Though available, it is too slow and for students and staff to get faster internet, they resolved in paying for private internet providers, which was an expensive option for most students and staff.

6.5 The Way Forward

Important for continuing and improving upon the FIP are the following:

- FIP faculty believe that it is important to avoid squandering the trust built with retailers in the four markets that served as the study sites for FIP 1. Therefore, FIP 2 will take place in the same markets and work to bring retailers and municipal officials through a process that builds on the problem analysis of FIP 1, and which results in more well-articulated innovations that improve urban food provisioning and exchange in Lilongwe's markets.

- Finding funding and creating a sustainable funding model. As action research, it may be possible to roll the activity into a larger research proposal that seeks to better understand and implement sustainable food provisioning and exchange processes in cities of the global south.
- Following up on the issues identified by students and providing a means to address them. The Lilongwe City Council is using the practicum as a starting point for engaging retailers and creating a common foundation for improving urban food environments, which will be necessary for moving forward.
- Addressing points that are bolded throughout the report. Overall, the first FIP went extremely well, but there are many areas for improvement.
- In particular, the connectivity issues that negatively affected the experience of LUANAR students must be addressed. It is a testament to their commitment that they persevered despite these difficulties. Access to private internet needs to be specially budgeted and considered in delivering the next FIP.
- Work in groups can be difficult, especially for strong personalities. We might consider providing a unit on conflict management and resolution.
- A better online platform might be considered for the final course evaluation. The D2L evaluation was somewhat limited in its capacity to keep student answers anonymous, but also to attach a unique identifier to responses that would allow the analysis to determine response patterns. The next evaluation would be more helpful if it could organize responses so that it is possible to perceive (1) patterns that might emerge which are unique to LUANAR and MSU students, and (2) relationship of answers from a particular respondent, e.g. if they have been unsatisfied with classroom work, are they also unsatisfied with market work?
- Location of the next FIP should be on campus to save extra costs on fuel and time
- Student welfare (such as sickness and conflict resolution mechanisms) should be specially considered
- Management arrangements (both administrative and monetary) of the next frugal should be clarified to faculty members prior to implementation

7 Annex Attachments

7.1 Summaries of Student Policy Recommendations

What follows are very brief outlines of more comprehensive policy recommendations by students. It is stressed that the points made in these documents are starting points for conversations between retailers and the city council.

As a result of these studies, the Lilongwe City Council has proposed to improve communication and transparency in relation to how dues are spent. Concerted follow-up efforts will be required to ensure that these proposed efforts are implemented.

7.1.1 Area 25A Market

Major Problems:

- **Visibility:** Retailers said that customers were unable to see and access the area of the market that provided food commodities. Vendors responded by moving out of the market into temporary shops close to the road, or to sell out of their homes.
- **Infrastructure and sanitation:** Retailers complained of the inadequacy of basic infrastructure and sanitation. Many questioned why they were paying dues for 25A when the market is being cleaned on a weekly basis rather than a daily one. In addition, the market has lacked access to electricity for seven years. Food shelters are in disrepair. Toilets that are maintained by the City Council cost money to use, but retailers prefer not to pay given their very thin profit margins.
- **Space:** Vendors are allocated only a small area in which to do business, which limits their options.
- **Number of vendors:** Due to the inadequacy of the work environment, many retailers simply choose to do business elsewhere.
- **Access to capital:** Vendors are unable to access capital in order to grow or diversify their businesses.

Possible Policy Recommendations:

Students identified a number of incentives and disincentives that could help to improve the conditions at Area 25A Market.

Incentives:

- **Provide access to microfinance:** institutions providing low-interest microfinance can demand that any vendor seeking funding must be registered in a designated market with a designated area within the market. To avoid the common problem whereby retailers use loans for purposes other than business, arrangements can be provided that provide raw materials for the business instead of credit, e.g. materials to improve infrastructure.
- **Provide training:** A number of retailers suggested that training on basic business skills could be helpful. Training should be oriented towards the particular issues in that market.
- **Provide a more direct line of communication with City Council:** Retailers suggested a public forum whereby their concerns could be heard. Registered vendors only would be able to attend. In addition, re-establishing the intended role of the Trade Officer would be an

important step in enabling this process. The Investment Promotion Officer, a position yet to be filled, would also be helpful to developing the capacity of the market.

Disincentives

- Vendors who sell in the streets could be subject to an increased fee, which could help drive them back into the market.

Retailers suggested that a free toilet, which is not cleaned by the City Council, would be helpful. Lastly, because visibility is an issue for this market, students suggested that some creative advertising might help to draw people into the market and boost sales for vendors.

7.1.2 Central Market

Major Problems

- **Lack of transparency on the part of the city council:** The market committee identified lack of transparency as the most important issue, and referred back to a time when decision-making and use of collected fees was clearer. In addition, those interviewees running restaurants were required to pay higher fees, but do not feel like they gained additional services.
- **Poor sanitation:** Poor sanitation creates an unpleasant and unhealthy working environment. Such an environment reduces the quality of food that retailers can provide and increases food safety risks. In additions, the quality of the food exchange environment has implication for incomes since many consumers do not want to enter the market. Retailers complained that health departments in the city council are not as active as they once were.
- **Security:** Lack of lighting and basic infrastructure enable theft.
- **Inadequate access to capital:** Lack of access to affordable credit prevents many vendors from expanding their businesses.

Policy Recommendations:

In their policy document, students discussed how addressing retailers' concerns were reflective of needs outlined in several policy documents, including the Lilongwe City Development Strategy (2010-2015), the Malawi Government Vision 2020, and the 2015 National Market Situation Analysis. They proposed five policy recommendations:

- **Governance:** Retailers would like to see the reintroduction of routine food inspectors, transparency in the flow of collected market fees, use of market fees for infrastructure maintenance, and that there should be improved oversight by city council of city workers with responsibilities at the market, such as cleaners.
- **Fees:** Fees should be equalized.
- **Water service and sanitation:** Water taps should be installed in each section of the market, and should be individually metered so that each section can control water usage and billing. Toilet use fees should be lowered, especially since they were not being serviced on a regular basis. Management of toilets, both in terms of use and maintenance, needs to be addressed.
- **Security, Electricity, and Infrastructure:** Lights and infrastructure should be upgraded and maintained to address theft issue, to improve market environment and working

conditions, and to manage water flow, e.g. installing sieves so that pipe blockages can be avoided.

- **Access to Capital:** Providing access to capital and credit options need to be investigated. This might be accomplished by working with relevant local organizations and NGOs, such as Village Savings and Loans, Malawi Union of Savings and Cooperatives, and Concern Universal

Innovation Recommendations

In addition to policy recommendations, students proposed several technologies that could be useful:

- **Fish dehydration:** Simple dehydrators could expand livelihood options for those working in the fish trade and improve shelf life of fish.
- **Cold storage:** If a stable source of power can be provided, the use of a [CoolBot](#) can compound the cooling power of a regular air conditioner and transform a shipping container into a cold storage refrigerator at a reasonable cost.
- **Restaurants:** Management of restaurant waste could be improved through the introduction of sieves that would reduce the incidence of clogging the pipes.

7.1.3 Tsoka Market

Tsoka Market stood out as an exceptional case. This market developed when the municipality, after several attempts, relocated a particular group of vendors from Central Market to the area that is now known as Tsoka Market. Any infrastructure that is present at Tsoka Market is largely due to the coordinated efforts of the vendors themselves, who have self-organized into groups based on the kind of food they sell. Students were impressed by the drive and positive risk-taking they encountered among retailers at this market.

Major Problems

- **Sanitation and water:** The one toilet is inadequate for the number of people who use the market. It is also not maintained well, leading to extremely unhygienic conditions. Water is only sporadically available, and insufficient drainage throughout the market create an unsafe and unsanitary working and food exchange environment.
- **Security and infrastructure:** Sheds have been constructed by retailers, using their own scarce resources, and are therefore do not provide adequate security. Lack of lighting creates an environment that women feel unsafe in, and which does not adequately prevent theft.
- **Transportation:** The sloped terrain makes unloading of goods from trucks difficult. Each individual bears the cost of their own movement of goods, which is inefficient.
- **Communication and transparency:** While communication with the municipality was cited as a major problem, retailers demonstrated effective communication within the market. Students noted how effective communication fosters accountability. Retailers are not aware how their collected dues, which go into a general market fund that contains dues from all 39 Lilongwe markets, are being spent

Policy Recommendations

- **Creation of MIPA-Dues** should go into a market-specific account, and should be separate from a general City Council Fund. This fund, referred to as a Market Infrastructure Project Account, or MIPA, should be drawn upon for market specific concerns as determined by market committees at the respective markets.
- **Monthly Financial Reports:** A monthly report should detail MIPA expenditures and savings, and should catalog expenses for any project. Each market should have a monthly schedule and process for communicating such expenditures and savings.
- **Town Meetings:** The City Council should hold quarterly meetings with market personnel so that issues of concern can be raised and addressed.
- **Evaluation:** New processes should be monitored and evaluated.

Innovation Recommendations

- **Mobilizing Market Masters:** Market Masters could be enrolled in a process of eliciting feedback from the community who uses the market, and evaluating their interest in training market workers with specific sought after skills.
- **Support development of cooperatives:** The Malawi Ministry of Industry and Trade has necessary guidelines in place for developing cooperatives, and provides free trainings which could be carried out with urban retailers. Market Masters should be actively involved in promoting cooperatives and recruiting motivated individuals to form them.
- **Access to collective bank accounts:** In conjunction with cooperative formation, bank accounts should be created that cooperatives can use towards specific projects and goals
- **Building partnerships with academic community:** MSU and LUANAR are interested in working with urban retailers to develop a knowledge base and approaches that can facilitate improved incomes and urban food security. In order to address the concerns and serve the needs of those engaged in food-based livelihoods, research agendas could be constructed in a collaborative way.

7.1.4 Area 47

Major Problems

- **Location-Visibility and Proximity:** Passers-by are unable to see market and retailers believe that many potential customers do not even realize the market is there. In addition, the market entrance is close to a neighboring bar, which is reported to discourage women from going to the market, for fear that it will give the impression that they are going to the bar.
- **Infrastructure and Sanitation:** Presence of unpaved areas results in dust covering the food and very muddy conditions in the rainy season. One toilet serves the whole market, which is considered insufficient by retailers. In addition, the single toilet and sinks are poorly maintained.
- **Water:** The well within the market is broken, which leaves just a single tap for people to use, which, like the toilets and sinks, is poorly managed and maintained.

- **Communication:** Like other markets, retailers are unaware how their dues are used by the municipality, and are concerned by lack of responsiveness to their needs.

Policy Recommendations

- **Consultation:** Municipality should consult with local populace before designing a market.
- **Supervision:** Toilets and access to water should be locally controlled.
- **Infrastructure:** Grounds in markets located in low density suburbs should be improved.

Innovation Recommendations

- **Contract selling:** Vendors might look at alternative buying and selling arrangements, such as contract selling to local residents.
- **Control over local facilities:** Local control would enable better maintenance of toilets and water facilities
- **Publicity:** Signposts or other forms of publicity should draw attention to market, and encourage more consumers from the neighborhood to shop here.
- **Communication:** Quarterly or monthly verbal and written communication should be established to provide information on the expenditure of collected market fees.

7.2 Calendar of activities

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
June	June						
	22	23	24	25	26	27	28
	Week One Topic: Innovation and Food Systems						Submission of W1 Essay and Online Discussion
	July						
	29	30	1	2	3	4	5
Week Two Topic: Food and the City (?--- combine with Food security?)							Submission of W2 Essay and Online Discussion
July	6	7	8	9	10	11	12
	Week Three Topic: Planning in African Cities						Submission of W3 Essay and Online Discussion
	13	14	15	16	17	18	19
	Week Four Topic: Informality and Informal Food Systems						Submission of W4 Essay and Online Discussion
	20	21	22	23	24	25	26
	Week Five Topic: Malawi and Food Security in African Cities						Submission of W5 Essay and Online Discussion
August	August						
	27	28	29	30	31	1	2
				Communications Bootcamp			

			Classroom ³ (Freire, role of the outsider, critical pedagogy) Human-Centered Design ISPI Assessment	MSU Field Trip to Detroit: A practical example of food system innovation		
3	4	5	6	7	8	9
Methods and Gender	ISPI Debrief	MSU Preparation for Travel	MSU Preparation for Travel	MSU Departs DTW	MSU Travel	MSU Arrives (around 2am) Afternoon: Introductions BBQ
10	11	12	13	14	15	16
<p>Morning: Unit 1- Discusson on Innovation Systems (Stephanie White) Unit 2-Methods and Approaches (Martin Gulule)</p> <p>Afternoon: Afternoon: Market Observations (3 hours) (all groups go to Tsoka, Central) Debrief</p>	<p>Morning: (9:00-10:00): Unit 3- Understanding the Urban Market System (Sera Gondwe) (10:00-11:00) Mr. Mbwabwa, Lilongwe City Council, Market System in Lilongwe/interacts with students</p> <p>Afternoon: (11:30-15:00):Market visit (all groups go to Area 25A and 47), Debrief, "Making Sense"/ (15:00-17:00) Divide groups/assign markets.</p>	<p>Morning: (9:00-10:00): Unit 4: Urban Planning and Food Systems (Jessica Kampanje)(10:00-11:00)Unit 5-Resource Flow and Actor Social Networks in Urban Food Market (Liveness Banda)</p> <p>Afternoon: (11:30-15:00):Market Mapping of resource flows (15:00-17:00): "Making Sense"/ recording results from market mapping.</p>	<p>Morning (9:00-13:00): Markets; Market Mapping</p> <p>Afternoon :(13:30-14:30). Unit 6: Entrepreneurship and Livelihoods in Urban Food Markets (Andrew Safalaoh) 14:30 -15:30: Debriefing and guidance to Sketching Market Maps (Social/physical). 15:30-17:00: Students starts drafting market maps</p>	<p>Morning: market visit</p> <p>Afternoon: Unit 7: Policy and Development Strategies in Urban Market and Food Systems (David Mkwambisi) 14:30-16:00: Students develop research questions and plans for next week interviews</p>	<p>Field Trip to Lake and market garden on road to Salima</p>	<p>Independent work day. Students work on focus group and interview questions. At least one faculty member available to work through ideas.</p>

³ May differ at respective institutions

	17	18	19	20	21	22	23
	Morning: Market Focus Group Discussion and individual interviews	Morning: Market Focus Group discussions and individual interviews	Presentation preparation Visit by representative from NASFAM to discuss agrifood livelihoods and to help students think through data.	Morning (9:00-13:00): Presentation Preparation Cont Afternoon: (13:30-17:00): Tracking progress on the presentations or deliverables made (each group of students presents to faculty members)	Morning: Final Presentations/discussion Afternoon: Free	MSU Departs	MSU Arrives home
	24	25	26	27	28	29	30
	Develop final presentations for academic and family audience	Develop final presentations for academic and family audience	Develop final presentations for academic and family audience	Final presentations for academic and family audience			

7.3 Application

7.3.1 Program Description

Frugal Innovation Field Practicum in Lilongwe, Malawi

An interdisciplinary experiential learning opportunity in community engagement, inter-institutional collaboration, and urban food systems

A five-week intensive course, Summer 2015

The Global Center for Food Systems Innovation (GCFSI) at Michigan State University is piloting an innovative experiential learning course that focuses on building skills in collaborative community engagement in the context of urban food exchange and provisioning in Lilongwe, Malawi. Students from MSU and Lilongwe University of Agriculture and Natural Resources

(LUANAR) will work together to engage small- to medium-scaled food entrepreneurs to identify, articulate, and propose appropriate (or *frugal*) solutions to common problems in urban markets, which, if properly addressed, would allow improved livelihoods and/or food security.

Course Description

The purpose of this course is to (1) develop a deeper understanding of urban food environments in urban Africa, (2) build critical skills in community engagement, interdisciplinary problem-solving and collaboration, and, (3) co-produce appropriate innovations to critical food system problems as they are identified by those working in food-based livelihoods.

Course Aims

- To develop an understanding of alternative food system arrangements, specifically ‘wet-markets.’⁴
- To build civic engagement skills
- To provide a practical forum for applying disciplinary perspectives to interdisciplinary problem-solving.
- To provide a practical forum for co-creating and presenting appropriate innovations to decision-makers.

Course (Tentative) Calendar

The course is 5 weeks long. The first week (5 learning days) will be spread out over a 5-week period to occur from the end of June through July, and will be conducted through an online platform. Students will convene at the MSU campus about 9 days prior to departing for Malawi.

June 22-July 24: 5 learning days comprised of reading and online interaction

July 30-August 4: MSU campus for field trip, in-class discussions/activities



⁴ “Wet markets” refers to the open air food markets where people throughout sub-Saharan Africa commonly acquire food. They are sometimes referred to as ‘wet markets’ because they often are.

August 7-22: Lilongwe, Malawi-Field Practicum

August 25-27: Wrap-up and presentations at MSU campus

Requirements

Students must be able to be on the MSU campus beginning July 30th, 2015.

Students must be able to travel to Malawi between August 7th-22nd.

Students must agree to complete course requirements.

For more information, or for a copy of the concept note, please contact Dr. Stephanie White at whites25@anr.msu.edu or Devin Foote at footedev@msu.edu and Dr David Mkwambisi at david.mkwambisi@bunda.luanar.mw

7.3.2 Application Cover

Malawi Frugal Innovation Practicum in Lilongwe, Malawi Global Center for Food Systems Innovation, Michigan State University

PRACTICUM INFORMATION:

This is a 5-week experiential learning opportunity designed to improve skills in community engagement in the context of urban food systems in Lilongwe, Malawi (see the cover page for more information about course timing, content, and goals).

To apply you must be a full time undergraduate or full/part-time graduate student in good academic standing. There are a limited number of positions available for this practicum. This is **NOT an academic credit-bearing program. However**, in-country costs for program participants will be covered, including airfare, meals, and lodging. All participants will be expected to participate in pre-planning activities either online through hybrid learning or on campus from May-August (see cover page for calendar). In addition, participants will be expected to provide feedback and interviews that will (1) improve future iterations of the course, and (2) share your learning experience with the wider MSU and GCFSI community. **Without exception participants are required to be in Malawi from Aug 7-22, 2015, and need to have all immigration requirements to travel internationally (such as a passport, visas if needed, or immigration permits for travel if needed for foreign citizens).**

To be considered, submit:

- (1) this form,
- (2) your written answer to the essay question, and
- (3) your resume and one letter of recommendation from a faculty member.

Applications should be submitted **by Friday, April 10, 2015** to: Dr. Stephanie White, whites25@msu.edu with the subject heading: Frugal Innovation Practicum Application.

PERSONAL INFORMATION:

Name: _____ MSU PID: _____
Address: _____ City, State, and Zip: _____
Phone: _____ E-Mail: _____
Home Country: _____

ACADEMIC INFORMATION:

Course Plan: (circle) Undergraduate Masters PhD
Department: _____ Major/Area of Study: _____
Total Credits Earned: _____ MSU GPA: _____

SELECTION CRITERIA:

There are a limited number of positions available for involvement in this practicum. GCFSI is seeking students who:

- Offer a unique perspective in the areas of business, marketing, urban planning, agriculture, food systems, community engagement, and sustainability
- Have demonstrated a commitment to their chosen field
- Are well-rounded in their academic and non-academic pursuits
- Have a vision for their future careers that involve the areas of study mentioned above
- Have a demonstrated commitment to the process of collaboration, inclusion and information exchange

ESSAY QUESTION:

In one page or less describe your interests in this practicum and how your participation will contribute to enriching the experience of other members of the class; how it relates to your academic or personal aspirations; and any experience you have in collaborating in an international setting. In your essay, include any experience that you've had in promoting or enabling positive change on behalf of others.

If you have any questions please feel free to contact

Dr. Stephanie White at whites25@anr.msu.edu or Devin Foote at footedev@msu.edu

7.4 Checklist Used by LUANAR Students during Dedza Market Visit

Prior to visiting the market, LUANAR faculty members contacted the Director of Planning and Development to make them aware of the visit. In turn, he was asked to inform the chairperson of the market committees that students would be arriving to learn about the market. When the faculty members and students arrived in Dedza, they visited the Director, who had made arrangements for a guide to take students to the market. Upon their arrival at the market, students met the chairperson who explained the structure of the market. Students then divided into teams of two and used the following guide (Table 6) to make observations and inquiries of retailers.

Table 6: Checklist for Dedza market visit⁵

Activity/ focus	Place/Individuals	Method
Planning issues	Officials, market place	Observation, informal interviews
Market associations	Market place, leaders of associations	Informal interviews
Process and activities in buying, selling of food markets	Supermarket, local market	Observations, listening and critiquing
Infrastructures and institutional constraints	Market place	Observations, listening, informal interviews
Innovative way of marketing (packaging, preventability, displaying, customer care)	Local market	Observation
Quality control, food safety issues	Local market and supermarket	Observations
Any other things/area student wish to research on towards improvement of the market	Local and super market	Observations, informal interviews

While students explored the markets, faculty members spoke with the chairperson, who explained more about the structure and relationships that govern how the market functions. The chairperson also discussed challenges, such as sanitation, vendors selling at illegal places, and payment of market fees.

The team also visited a local supermarket (Chipiku) and again used the guide provided in Table 6. Students and faculty debriefed on their findings on the return trip to Lilongwe.

7.5 Invitation to Final Presentations at Lilongwe

⁵ This guide proved to be helpful during the combined MSU/LUANAR preliminary visits to markets on the first days of the practicum.



August 13, 2014

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Dear Sir or Madam

INVITATION TO THE WORKSHOP ON URBAN FRUGAL INNOVATION PRACTICUM (URBAN MARKETS AND FOOD SYSTEMS)

Lilongwe University of Agriculture and Natural Resources in partnership with Michigan State University (MSU) in the United States of America have been implementing a Frugal Innovation Practicum on Urban Markets and Food Systems. In the practicum, students and faculty members have been interacting with stakeholders from four urban markets - Tsoka, Central, Area 47 and Area 25. The aims of the frugal innovation practicum were:

1. To familiarize students with the dynamics and challenges of urban food provisioning and exchange in the global south, particularly in relation to the ‘traditional’ market sector.
2. To familiarize students with the major economic, social, and environmental trends in food systems, and how these trends are likely to affect urban food provisioning and exchange in the global south.
3. To learn how different people across and within societies and cultures experience food environments, and will understand the necessity of diverse, multi-scalar food systems.
4. To familiarize students with innovation systems theory and practice, with a particular emphasis on inclusive, or frugal, innovation.
5. To improve the communication and negotiation abilities and skills of students working to achieve a common goal.

The students have now generated information, findings and observations through the practicum that they would like to share with stakeholders.

As a key stakeholder of LUANAR, and the role of your organisation in areas of urban food system sustainability, I therefore invite you to the practicum workshop to be held at Lilongwe City Assembly Chamber on 21 August 2015 from 9am to 12 noon.

For confirmation to participate, may you please contact Mrs. Alice Chalemba on 0888 895 634 or email: pco@bunda.luanar.mw

Yours faithfully

Prof. George Y Kanyama-Phiri
VICE CHANCELLOR

cc: Deputy Vice Chancellor
University Registrar
Director, GCFSI

Encls. : Tentative programmes



MSU/LUANAR FRUGAL INNOVATION PRACTICUM RESULTS DISSEMINATION ON 21st AUGUST 2015 AT LILONGWE CITY COUNCIL CHAMBER, MALAWI

TENTATIVE PROGRAMME

TIME (HRS)	ACTIVITY
09.00 – 09.30	Introductions
09.30 – 09.45	Welcome Remarks by Dr M. Gulule/Prof Stephanie White
09.45 – 10.00	Student Team 1 presentation
10.00 – 10.15	Student Team 2 presentation
10.15 – 10.30	Student Team 3 presentation
10.30 – 10.45	Student Team 4 presentation
10.45 – 11.45	Stakeholder feedback and question time
11.45 – 12.00	Official Address - Honourable Mayor/Dr J. Valeta and Presentation of Certificates of Participation to MSU and LUANAR Students
12.00 – 12.10	Group photographs and interviews
12.10 – 12.30	Lunch or snack

End of programme

7.6 D2L Evaluation

The following survey was posted on D2L on September 14th, 2015 and was closed on October 2nd. Raw data is available upon request.

1. I am an (MSU or LUANAR)_____ student

Online portion of practicum: Each week focused on a particular theme. In the following questions, please think about how relevant those themes and readings were to both your learning AND your work in Lilongwe's markets.

2. First week: Introduction and Innovation Systems
 - a. How important was the innovation systems framework to your learning? (Very unimportant, unimportant, neutral, important, very important)
 - b. How important were the innovation systems readings to the work you did in Lilongwe markets? (Very unimportant, unimportant, neutral, important, very important)
 - c. Innovation Systems and future courses: Would you agree or disagree with the idea of including these are similar readings in future FIP courses? (strongly disagree, disagree, neutral, agree, strongly agree)
3. Second week: Urbanization and Food Security
 - a. How important were the readings and discussion on urbanization and food security to your learning? (Very unimportant, unimportant, neutral, important, very important)
 - b. How important were the reading and discussion on urbanization and food security to the work you did in Lilongwe markets? (Very unimportant, unimportant, neutral, important, very important)
 - c. Urbanization and Food Security in Future Courses: Would you agree or disagree with the idea of including these are similar readings in future FIP courses? (strongly disagree, disagree, neutral, agree, strongly agree)
4. Third week: Informal Economy
 - a. How important were the reading and discussion on the informal economy to your learning? (Very unimportant, unimportant, neutral, important, very important)
 - b. How important were the reading and discussion on informal economies to the work you did in Lilongwe markets? (Very unimportant, unimportant, neutral, important, very important)
 - c. Informal Economy in Future Courses: Would you agree or disagree with the idea of including these are similar readings in future FIP courses? (strongly disagree, disagree, neutral, agree, strongly agree)
5. Fourth week: Food Safety in Context
 - a. How important were the reading and discussion on food safety in context to your learning? (Very unimportant, unimportant, neutral, important, very important)
 - b. How important were the reading and discussion on food safety in context to the work you did in Lilongwe markets? (Very unimportant, unimportant, neutral, important, very important)
 - c. Food Safety in Context in Future Courses: Would you agree or disagree with the idea of including these are similar readings in future FIP courses? (strongly disagree, disagree, neutral, agree, strongly agree)
6. Fifth week: Municipal Planning

- a. How important were the reading and discussion on food and municipal planning to your learning? (Very unimportant, unimportant, neutral, important, very important)
 - b. How important were the reading and discussion on food and municipal planning to the work you did in Lilongwe markets? (Very unimportant, unimportant, neutral, important, very important)
 - c. Food and Municipal Planning in Future Courses: Would you agree or disagree with the idea of including these are similar readings in future FIP courses? (strongly disagree, disagree, neutral, agree, strongly agree)
7. Logic of the order in which the subject matter was presented: Were you satisfied with the way the subject matter was presented? (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied)
 8. Did you feel as though there were subject matter that should have been included, but which wasn't? Please explain briefly. (short answer)
 9. In general, the reading load was (too little/just right/too much)_____.
 10. If you thought the reading load was too much or too little, please give some ideas for how to do better next time (e.g. what would you discard? What would you add?)
 11. Quality of discussion forum
 - a. On a scale of 1-5, with 1 indicating 'poor,' and 5 indicating 'excellent,' how do you rate the quality of discussion in the online forum?
 - b. On a scale of 1-5, with 1 indicating 'poor,' and 5 indicating 'excellent,' how do you rate the quality of faculty participation in the online forum?
 - c. If you rated either the quality of the online discussion or the participation of faculty as 1, 2, or 3, please explain what you would like to see improved and/or offer any suggestions for improvement. (short answer)
 - d. On a scale of 1-5, with 1 being 'difficult' and 5 being 'easy,' please rate how easy-to-use the D2L platform was.
 - e. Please make any additional recommendations or comments for improving the online portion of the practicum. (short answer)

Classroom Portion of Practicum: In this section, you'll be asked to evaluate the classroom portion of the practicum. This was the portion of the practicum that occurred just before we brought the MSU and LUANAR students together in Malawi. The classroom portion of the practicum were relatively different for MSU and LUANAR students, so mark NA if the question is not applicable to you.

12. Faculty preparedness
 - a. In general, how prepared were faculty during the classroom portion of the practicum? Please rate on a scale from 1-5, with 1 being 'totally unprepared,' and 5 being 'totally prepared.'
 - b. If you have additional comments or suggestions about faculty preparedness, please add them here. (short answer)
13. Quality of classroom sessions (N/A was included because sessions conducted at MSU and LUANAR diverged from each other)

- a. Please rate how satisfied you were with the market field trips (Detroit for MSU, Blantyre for LUANAR). (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied, N/A)
- b. Please rate how satisfied you were with the gender presentation. (For MSU students, this was provided by Nathalie Me-Nsope) (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied, N/A)
- c. Please rate how satisfied you were with the session on communication techniques provided by David Poulson (this was uploaded to YouTube for LUANAR students) (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied, N/A)
- d. Please rate how satisfied you were with the Human-Centered Design Session provided by Susan Wyche. (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied, N/A)
- e. Please rate how satisfied you were with the Administrative session. (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied, N/A)
- f. Please rate how satisfied you were with the ISPI session provided by Bill Heinrich. (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied, N/A)
- g. If you have any additional comments to add about the classroom sessions, please add them here. (short answer)

Field Practicum Portion of the Practicum: In this section, you'll be asked to evaluate the quality of the field practicum, which took place in Malawi. We would like you to mainly focus on your personal learning experience and what can be improved in coming years.

14. Are markets a good forum for learning about problem-solving and community engagement? Why or why not? (short answer)
15. Did the innovations systems framework help you to understand how markets function? How or how not? (short answer)
16. Did the innovation systems framework help you to frame or plan your inquiry? If so, in what ways? (short answer)
17. Would you recommend continuing to use the innovation systems framework as a way to frame student inquiries in markets? Why or why not? (short answer)
18. Did we spend (too little/the right amount of/too much) _____ time in markets?
19. We used a variety of methods to learn what was going on in markets, including observation, mapping, interviews, and focus groups. What would you change about the methods we used? Can you suggest ways to improve these methods so that the learning process is more efficient or profound? (short answer)
20. Were the objectives for the two-week practicum reasonable? That is, was it a reasonable expectation that students could produce a policy brief and a final presentation? If not, please suggest a more reasonable final outcome. (short answer)

Wrap-up Week: From what I can tell, it appears that MSU students were required to give final presentations on the MSU campus, but that LUANAR students were not. In this section, please discuss how a final wrap-up week might reinforce what you learned or help you to frame your learning in ways most meaningful to your personal goals.

21. Please discuss how you would change the tasks for the final wrap-up week. For example, would you suggest modifying the format for final presentations? Did you need more or different guidance? Would you suggest different content for final presentations?

Overall Learning Model: The following questions ask you to evaluate how the course put into action its overall goal of providing an interdisciplinary, critical problem-solving, cross-cultural, and collaborative experiential learning model.

22. In what ways, if any, did the practicum challenge or change your assumptions about how to work in and with communities? (short answer)
23. In what ways was using multiple forms of content delivery effective or not effective (i.e. using D2L, classroom session, and field practicums)? (short answer)
24. What value, if any, was there to having students from multiple disciplines participate and collaborate with each other? (short answer)
25. Do you have any ideas for improving the interdisciplinary aspect of the course?
26. In what ways do you think having students from different cultural backgrounds and different institutions affected the inquiry and problem-solving process? (short answer)
27. We put you in groups and expected that you would collaborate to come up with a unified output. How realistic was this? Do you think we should pay more attention to group dynamics and how conflict can be handled? Please provide your ideas on improving the collaborative aspects of the course. (short answer)
28. What do you think was the most important learning outcome that you will bring with you into your future career and/or studies? (short answer)

Assignments: We asked you to do a lot of different things during this practicum, and now would like to understand which ones had a significant impact on bringing you through a learning process.

29. Was the overall workload (too little, just right, too much)_____? Keep in mind that this was supposed to be a very intense experience.
30. Please rate how important the assignments were to your learning experience (very unimportant, unimportant, neutral, important, very important, N/A)
 - a. Writing blogs
 - b. Selfie reflections
 - c. Market mapping
 - d. Policy briefs
 - e. Final presentations to Lilongwe City Council
 - f. Final presentations to faculty, friends, and family (perhaps only happened at MSU)
31. Please provide additional comments on the assignments and learning experience. (short answer)

Facilities and Logistics

32. Please rate your satisfaction with the following, (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied).
 - a. Lodging accommodations

- b. Conference facilities
 - c. Food
33. Do you think it was important to the goals of the program for both MSU and LUANAR students to be housed at Bunda campus? Why or why not? (short answer)
 34. Please discuss any additional concerns you had with the accommodations, transportation, food, etc. (short answer)
 35. Please discuss how your overall expectations were/were not met. If they were exceeded, how? (short answer)
 36. Think about what components of the practicum should be modified/eliminated/added. What are some of the critical qualities of the practicum that should remain the same? What components are not very important? Why or why not should the FIP remain free to students? Here's your chance to say anything that hasn't already been said above. Let us know what you think! (short answer)