**LEGUME INNOVATION LAB FOR COLLABORATIVE RESEARCH
ON GRAIN LEGUMES**

**WORK PLAN FOR
APRIL 1 2013 – SEPTEMBER 30, 2014**

<u>**Project Code and Title:**</u> **SO2.2: Enhancing Pulse Value-Chain Performance through Improved Understanding of Consumer Behavior and Decision-Making**

> **Short Title: Grain Legume Value Chain Initiative**

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Collaborating Host Country and U.S. PIs and Institutions:
1. Gelson Tembo, University of Zambia
2. Lawrence Mapemba, Lilongwe University of Agriculture and Natural Resources, Malawi
3. Fredy Kilima, Sokoine University of Agriculture, Tanzania
4. Allen Featherstone, Kansas State University
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I. Project Problem Statement and Justification

Unlike maize, grain legumes (focusing on beans and cowpeas) are not traditional staples in Zambia, Malawi and Tanzania. Thus, increase consumption to support smallholder producer economic wellbeing must be based on clear appreciation of food choices' decision-making processes. The trend in average per capita consumption of grain legumes is declining in Tanzania, flat in Malawi and increasing in Zambia. However, the relative share of grain legumes in Zambian's food basket is very small and not high enough in Malawi. Yet, the nutritional benefits of grain legumes are well-known. Furthermore, the regional trade opportunities for these crops is high given that the region is a net importer of grain legumes from outside the region (CGIAR, 2012). The opportunity for domestic consumption and trade both promise potential economic improvement for smallholder producers. But achieving this requires a careful understanding of how consumer characteristics and food attribute-level combinations shape that consumers' decisions and choices.

The fundamental problem of this project, therefore, is to develop new understanding of the forces and factors shaping and influencing consumers' food choice decisions in eastern and southern Africa and use this understanding to facilitate improvements in legume value chains. The project has three integrated dimensions. First, it develops an empirical foundation for understanding the factors and the extent that these factors influence food choices. This will be the first empirical evaluation of the complex factors influencing consumer choice of grain legumes in eastern and southern Africa. The research then employs the results of the factors and their extent of shaping consumer choices to engage industry stakeholders (private businesses, non-governmental

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organizations, producers, traders, processors, etc.) and public institutions (research institutes, universities, extension, government, etc.) in a search for value creation and value expansion opportunities as well as solutions to challenges preventing value chain effectiveness. The third dimension involves using the information collected on industry capacity gaps to carefully develop and deliver training and outreach programs aimed at enhancing strategy development, management and decision-making. In the end, the project provides innovative and unique pathways that bring smallholder producers and the other stakeholders into specific value chain alliances to help smallholder producers improve their economic wellbeing.

The research's geographic scope covers Zambia, Malawi and Tanzania, all Feed the Future focus countries. These countries represent the different changes that are occurring in eastern and southern Africa: increasing urbanization; economic growth and increasing but unequally distributed incomes; and changing demographics, including in agricultural production. This research's findings will provide insights into how and where these changes are affecting legume consumption. They will provide insights into how to overcome domestic consumption barriers and build stronger value chains to seize new markets, including the $50 billion per annum staple foods' regional trade in eastern and southern Africa (Feed the Future). These improvements should contribute directly to the solutions to age-old challenges facing smallholder producers.

II. Planned Project Activities for the Work plan Period (April 1, 2013 – September 30, 2014)

The research team convened in Lusaka, Zambia from May 24-31 to plan the activities laid out in this plan period. The outcome of that planning process is the project proposal as well as the development of a stronger relationship among the research team.

In the work plan period starting April 1, 2013 to September 30, 2014, we envisage completing the survey work in Zambia and producing the report of the analysis. This deliberate process of completing the survey work in Zambia is to allow for the incorporation of lessons from that activity in the execution of the activities in Tanzania and Malawi, which will run concurrently from October 2014 to June 2015. This is a result of an agreement reached among the research team to minimize errors and risks working across three countries by working out all the 'bugs' in one country before proceeding to the other countries.

The table below identifies the specific tasks and their time lines as well as the team members who have the primary responsibility or oversight responsibility for delivering the requisite results. The table shows the components of the different objectives that are scheduled to be completed in this reporting period. The second column indicates the objective to which the task is related. The first three rows labelled 'A' are related to the planning and preparation for undertaking the tasks associated with this project.

The host country production situation analyses as defined under Objective 2 are led in each country by the HC PI with direct support from the U.S. PIs in terms of supporting and helping with modeling and writing in order to achieve the timely delivery of the reports. Objective 3 activities that would be commenced in this reporting period include recruiting students for both the HC MS programs and the MAB program. The staggered nature of the recruitment as well as ensuring that HC PIs are not overwhelmed by supervisory responsibilities support the performance and reporting process. Therefore, it

is expected that by the end of September 30, 2014, we would have two MS students at each institution and two industry professionals enrolled in the MAB program.[1] We also anticipate having started the train-the-trainer programs to help expand our outreach initiatives in the development of effective governance mechanisms to unlock value in this industry. We also envisage having started building/facilitating new governance systems in the industry in Zambia through our industry short courses

Task		Start	End	Responsibility
Team building and project planning meeting	A	May-13	May-13	Research Team, Amanor-Boadu leading
Team capacity development	A	Jun-13	Dec-13	Amanor-Boadu leading with Research Team support
Case-based workshop on DCE	A	Jan-14	Jan-4	U.S. PIs (Amanor-Boadu & Ross lead)
Develop survey instrument	1	Jan-14	Jan-14	Research Team with Amanor-Boadu leading
Test & refine the instrument	1	Jan-14	Jan-14	Research Team with Amanor-Boadu leading
Conduct survey in Zambia	1	Jan-14	Mar-14	Research Team with Tembo, Amanor-Boadu & Ross leading
Analyze Zambian survey data	1	Apr-14	Jun-14	Tembo, Amanor-Boadu & Ross with Research Team Support
Produce report for Zambia	1	Jul-14	Sep-14	Tembo, Amanor-Boadu & Ross with Research Team support
Primary production situation analysis in Zambia, Malawi and Tanzania using secondary data	2	Oct-13	Dec-14	Research Team with HC PIs in lead in their countries and Amanor-Boadu coordinating
Degree Programs (MS, MAB)	3	Jan-14	Sep-17	HC PIs with Amanor-Boadu support
Conduct train-the-trainer sessions in all countries	3	Apr-14	Jun-17	U.S. PIs with HC PI support
Facilitate of governance systems in all countries	3	May-14	Sep-17	U.S. PIs with HC PI support

III.   Collaborators

- Mr. Chance Kabeghe, IAPRI, Zambia {Policy Advocate}
- Mr. Simon Mwale, CCARDESA, Botswana {Policy Advocate}
- Ms. Grace Mijiga Mhango, Grain Traders and Processors Association, Malawi {Private Sector}
- Dr. Kennedy Muimui, ZARI, Zambia {Breeder}
- Dr. Susan Nchimbi-Msola, SUA, Tanzania {Breeder}
- Dr. Rowland Chirwa, CIAT, Malawi {Breeder}
- Others in the CIAT/PBRA/SABRN research community

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[1]   Nyumbani Moyo and Timothy Sichilima are scheduled to join the program at LUANAR as soon as funds become available. The former is a Malawian and the latter Zambian and they will be co-supervised by Dr. Lawrence Mapemba and Dr. Gelson Tembo.

We are still working on recruiting other private sector participants to engage them more intensely in the project over the course of our activities.

IV.   Approaches and Methods for Objective 1 and Objective 2

Objective 1 employs a Discrete Choice Experiment method to compete Objective 1. This method is superior to others (such as conjoint analysis) in that it is rooted in stated preference theory, which has its foundation in random utility theory. Additionally, statistical methods are employed to conduct the ranking of beans/cowpeas in consumers' food baskets in Zambia.

The DCE method has not been used by HC PIs before even though they are all extremely well-verse in econometrics. Therefore, we intend to do capacity building in this area by conducting training on DCE in Zambia. The training session will be open to faculty members of the University of Zambia and staff of our partner institutions who are interested to participate.

Two groups of variables are included in the experiment (1) The different product attributes (availability, accessibility, perceived nutritional characteristics (fiber, protein, etc.), preparation time and preparation options, color, storage characteristics, taste and size as well as prices); (2) Consumer characteristics (including frequency of consumption, quantities consumed and expenditure shares) and preference influencers (cultural, and biologic ecologic variables) (after Parraga, 1990). Its unique theoretical strength is that the choice set always includes at least one feasible alternative.

Because there is random component in random utility theory, preferences are inherently stochastic. Therefore, the foregoing analytical approach facilitates only the prediction of the probability that an individual i will choose beans/cowpeas. The approach, thus, leads to the development of a family of probabilistic discreet choice models that describe how probabilities respond to changes in the choice options (attributes) and/or the covariates representing differences in individual consumers. Therefore, the probability (ρ) that individual i chooses option j from her set of competing options, C_i, equals the probability that systematic (V) and random (ε) components of option j are larger than the systematic and random components of all other options competing with j. That is:

$$\rho(j|C_i) = \rho[(V_{ji} + \varepsilon_{ji}) > \max(V_{ki} + \varepsilon_{ki})] \quad \forall\, j,k \in \{C_i\} \tag{1}$$

The systematic components include attributes explaining differences in the choice alternatives and covariates explain differences across individuals. The random components, a fundamental aspect of the model's authenticity, capture all the unidentified factors that influence choices. Together, they define the latent utility, u_{ji}, individuals associate with each alternative as follows:

$$u_{ji} = V_{ji} + \varepsilon_{ji} \tag{2}$$

The approach, thus, provides an opportunity to provide empirical foundations for both business strategy and public policies once the desired objectives are stated. The results also provide empirical information for breeders to determine the characteristics and attribute sets of existing technologies that can be brought to market or what needs to be developed for specific markets and consumer profiles.

Objective 2 employs econometric analyses on secondary data collected by various institutions in the partner countries to develop a deeper appreciation of the grain legume

production environment, including the gender issues underscoring the environment. In Zambia, we are using the Food Security Research Project and the Central Statistics Office of Zambia's data (2008) to explore the latest situation regarding grain legume production. In Malawi and Tanzania, we use the data from the Third Integrated Household Survey (2010/2011) and the World Bank's National Panel Survey (2010/2011) respectively to develop insights into factors that are influencing consumption of particular foods as well as production of grain legumes vis-à-vis other crops. There are a number of specific questions that we seek answers to:

- What is the relative position of grain legumes in producers' production portfolios in the different countries?
- To what extent are females engaged in grain legume production in the focus countries?
- What is the extent of market participation among grain legume producers in the different countries and how do females compare to males in market participation?
- What is the relative position of grain legumes in consumers' food choices in Malawi and Tanzania (because we have the secondary data for these two countries)?

The results from the choice experiments and the situation analyses would feed into the industry focus group that will be conducted in the next reporting period in all three countries to develop a full picture of the grain legume industry – producers, traders, processors, policymakers, supporters, consumers. This knowledge would help in identifying the outreach and intervention initiatives that may be implemented to enhance investments in the industry from breeders and producers to processors and the governments.

V. Contribution of Project to USAID Feed the Future Performance Indicators

Participants in the Discrete Choice Experiments will be provided training on the importance and role of grain legumes in diets with the help of a nutritionists from the Host Country institution's relevant department or its Ministry of Health. It is expected that participants in this capacity building exercise who are rural residents will count towards Indicator # 3 in the Performance Indicators Handbook. This is the only relevant indicator for this period.

VI. Outputs

Three specific outputs will be completed this Work plan period:
- A reporting detailing the relative position of beans/cowpeas in consumers' food ranking in Zambia
- Report describing the factors that define consumption of beans/cowpeas in Zambia and the attendant response of consumption to changes in the various factors (elasticities)
- The draft of a policy brief report on addressing the bean/cowpea consumption challenge in Zambia and its potential implications for production and smallholder producer wellbeing. This draft policy document will be in circulation for

comments by collaborators and other parties awaiting finalization and release by end of Q1-2015

VII.   Engagement of USAID Field Mission(s)

Our previous activities in Zambia have already provided us with some level of relationships with some of the Mission Staff. However, with the turnover that is the reality of the Missions, we have been lucky to have national staff who are already familiar with our work.

To this end, meetings have already been arranged with the USAID/Zambia Mission to inform them about this project and its expected outputs and impacts. During this meeting, PIs will also seek how the Mission's activities could be helped by the activities defined in this project. Together, we intend to explore ways of leveraging our collective resources to enhance the effective impact of this project and those being undertaken by the Mission through associate awards or similar structures. Similar meetings are planned for Malawi and Tanzania.

VIII.   Partnering and Networking Activities

There are three important partners who can carry the outputs from this stage of the work forward and the US PI is collaboration with the Zambia PI will passionately pursue the development and nurturing of their relationship with these partners:

- Researchers, such as Dr. Kennedy Muimui, who is collaborating with us on this project. (This relationship is anchored by our ongoing work with SABRN in Zambia).
- Policy advocacy institutes, IAPRI and CCARDESA
- Relationship with nutrition outreach specialists in Host Country Institutions and government agencies.

By engaging these organizations at this stage of the project, we ensure that they will support the development of sustained impact by:

1. Facilitating the wide distribution of the policy reports that emerge from this research
2. Facilitate the wide distribution of the research reports that are developed on the position of beans/cowpeas and the factors shaping decisions for these food products in Zambia
3. Find ways to incorporate the results into breeding and nutrition programs

IX.   Leveraging of CRSP Resources

The Gates Foundation is currently funding a capacity building initiative in the agri-food and agribusiness sector in Africa. The US Lead PI is an advisor to this initiative and will explore opportunities to leverage resources from this initiative to complement the development and capacity building efforts in later stages of this project. We will continue to explore other initiatives in other agencies of the US Government, private foundations, development partners and donor agencies working in the region whose vision are congruent with ours.

X.   Timeline for Achievement of Milestones of Technical Progress

See Milestones for Technical Progress Worksheet

XI.   Training/Capacity Building Work Plan for FY 2013 – 2014

<u>**Degree Training**</u>**:**

Recruitment in process. No data to report. However, it is expected that at least 50% of recruited students will be female. It is also expected that there will two MS students each in this reporting year in each of the Host Countries. They will be supervised by the respective HC PI and their program area of study will be agricultural economics or agribusiness. They will not be enrolled in US institution and their projected completion dates will be academic year 2015. The support provided will be partial of the total cost of their training cost. (As soon as data becomes available, this section of the work plan will be updated).

<u>**Short-term Training**</u>**:**

Type of training: Workshop on Discrete Choice Experiments

Description of training activity: This is a program that is specifically developed for the HC PIs to enhance their capacity to use the primary tool for undertaking the analyses of Objective 1. It will, however be open to other interested parties from the university, including collaborating institutions, such as IAPRI, USAID Mission, UN Mission and WFP.

Location: University of Zambia, Lusaka

Duration: 1 Week

Date: January 6-12, 2014 (Specific dates to be determined)

Participants/Beneficiaries of Training Activity:

Anticipated numbers of Beneficiaries (male and female): 10 (7 Males and 3 Females)

PI/Collaborator responsible for this training activity: Vincent Amanor-Boadu

List other funding sources that will be sought (if any): None

Training justification: Research team needs to develop the skills in DCE to enable it perform its responsibilities under Objective 1.

<u>**Equipment (costing >$5,000)**</u>**:** None