**Feed the Future Innovation Lab for Collaborative Research on Grain Legumes**
***LEGUME INNOVATION LAB***

**2015 ANNUAL TECHNICAL PROGRESS REPORT**
**(October 1, 2014 – September 30, 2015))**

**Project Code and Title:**
SO4.1 Impact Assessment of Dry Grain Pulses CRSP investments in research, institutional capacity building and technology dissemination for improved program effectiveness

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US and HC PIs/collaborators of other Legume Innovation Lab Projects

## I. Abstract of research achievements and impacts

In FY 15, this project worked towards completing or initiating several activities under the three objectives: 1) provide technical leadership in the design, collection and analysis of data for strategic input and impact evaluation; 2) conduct ex ante and ex post impact assessment; and 3) build research capacity in the area of impact assessment. A baseline survey in Guatemala was completed in close collaboration with SO1.A1 team. This survey will help us better understand the current status of the climbing bean/maize intercropping production system. Several research studies on the theme of sustainable seed system were initiated in FY 15. This includes a study on 'willingness to pay' for different types of seeds in northern Tanzania and a case study on a farmer association in Burkina Faso involved in cowpea seed production by training member farmers and providing technical oversight to produce quality declared seed for sale to other farmers in the community. Towards the capacity building goal, two short-term training courses on the theory and methodology of doing impact evaluation were conducted in collaboration with CIAT and other national partners in the LAC region and East and Southern Africa region.

## II. Project Problem Statement and Justification

Impact assessment is essential for evaluating publicly-funded research programs and planning future research. Organizations that implement these programs should be accountable for showing results, demonstrating impacts, and assessing the cost-effectiveness of their implementation strategies. It is therefore essential to document

outputs, outcomes and impacts of public investments in research for development (R4D) activities. Anecdotal data and qualitative information are important in communicating impact to policymakers and the public, but must be augmented with empirical data, and sound and rigorous analysis.

This project is designed to contribute towards evidence-based rigorous ex ante and ex post assessments of outputs, outcomes and impacts with the goal of assisting the Legume Innovation Lab program and its Management Office (MO) to achieve two important goals--accountability and learning. Greater accountability (and strategic validation) is a prerequisite for continued financial support from USAID and better learning is crucial for improving the effectiveness of development projects and ensuring that the lessons from experience – both positive and negative – are heeded. Integrating this culture of 'impact assessment' in publicly funded programs such as the Legume Innovation Lab will ultimately help increase the overall impact of such investments.

## III. Technical Research Progress

**Objective 1:** Provide technical leadership in the design, collection and analysis of data for strategic input and impact evaluation

### 1a. Socio-economic baseline study on the constraints and opportunities for research to contribute to increased productivity of climbing beans in Guatemala:

This is a joint activity with the SO1.A1 project team (Juan Osorno (NDSU), Julio Martinez (ICTA) under their objective '*Genetic improvement of climbing black beans for the highlands of Central America*.' Byron Reyes, who joined CIAT in November 2014 is also a collaborator in this study. This study is designed to establish a baseline about production of climbing beans in the highlands of Guatemala, and to better understand the current status of the climbing bean/maize intercropping production system.

In FY15, data collection from a total of 548 farm households from five FTF Departments in Guatemala representing the highland bean growing regions was completed. A detailed household level survey instrument was developed in Spanish jointly by the SO4-1 and SO1.A1 team. This was then translated into English and submitted to the NDSU's IRB for approval. In March 2015, team members from the SO4.1 team traveled to Guatemala and trained 13 enumerators and 4 supervisors in data collection and data entry. The survey was conducted from March 9-27 by the trained enumerators as per the sampling plan developed by SO4-1. The survey was designed to get a representative picture of the bean growers in the highlands of the five FTF departments of Guatemala defined as areas above 1500 meters above sea level. Data were collected from an average of 6 randomly selected farm households from 87 villages across the Departments of Chimaltenango, Quiché, Huehuetenango, San Marcos and Quetzaltenango.

Data analysis is currently underway and will be completed in the next few months.

The analysis will focus on the current status of the climbing bean/maize intercropping production system (i.e., the *milpa* system) in the highlands of Guatemala. Data concerning cultivated area, production practices, production problems/constraints, seed quality and culinary preferences along with the socio-demographic characteristics of farm households will be analyzed using descriptive and econometric techniques to help establish priorities for the climbing bean breeding program.

**1b. Study on the market potential for biopesticides in Benin:**

This was a collaborative activity with the SO1-B1 project team, specifically with Biaou Agué Eustache and Hinnou C. Léonard from INRAB-Benin, under their objective 3 '*Scaling of solutions.*' This study was designed to serve as a baseline to assess the market potential for biopesticides (e.g., what farmers are willing to pay, what will be the costs to enter the market place for small industries, what are skill-sets that need to be developed for womens' groups to potentially make and profit from selling such materials, etc.) and will determine the networks of NGOs and other organizations where the project can "pass-off" educational approaches (e.g., animations) for scaling.

For this study, the plan was for the Impact Assessment team to provide technical support in the form of human resources and professional expertise in data collection (i.e., sample design, evaluation design, designing data collection instruments, training enumerators, data entry templates, etc.) and analysis. However, due to language constraint, the role of SO4.1 project team in providing this technical assistance has been limited. Field work consisting of the following three phases was mostly completed by INRAB (with support from IITA) in FY15 and the progress report of this Activity is reported in the SO1-B1 Annual Report:

1. Documentation phase: collection of secondary information
2. Exploratory survey in main cowpea production areas mainly through group interviews of major stakeholders in the value chain, but also to collect preliminary data for designing the individual survey questionnaire
3. Detailed survey with individual questionnaires administered to key players in the cowpea value chain particularly targeting producers and consumers, and their willingness to pay for biopesticides and biopesticide-treated cowpea, respectively

**Objective 2:** Conduct ex ante and ex post impact assessments

In FY 15 workplan, two research studies (2a-Assessment of willingness to pay for quality seed) and 2b-impact study in Haiti) were included under this objective. A third activity related to the sustainability of seed system was added during FY 15 upon request from the Management Office. We report the progress of the originally planned study 2a as 2a-i and this additional Activity as 2a-ii under the theme of "Sustainability of legume seed system constraints and opportunities to guide policies and programs."

**2a. Sustainability of legume seed system constraints and opportunities to guide policies and programs:**

***Motivation:*** Benefits from plant breeding research can only be transferred to farmers if an 'improved' variety (i.e., a variety that is genetically superior to a local or previously released variety) is released, and good quality seeds of that improved variety are planted by farmers. Thus, gains from investments in plant breeding research depend on both the genetic improvement embodied in the seed as well as on the existence and performance of a seed system that can deliver this improved genetics to farmers in the form of a good quality seed / planting material. Recognizing the importance of the seed system in delivering the benefits of plant breeding research, donors, governments, and research organizations working in development are making significant investments to augment farmers' access to seeds of improved varieties (IVs). Many of these efforts require providing subsidized or free seed to farmers, which may not be sustainable in the long term. Thus, there is a strong interest and need for research in exploring alternative ways of making high-quality low-cost seed locally available to farmers and learning whether a seed market is latent in rural areas of developing countries.

One of the important factors that determine the sustainability of a seed system is the 'effective demand' for seed (i.e., planting material) of improved varieties as reflected in the volume and frequency of purchase of fresh seed by farmers. Even where farmers have adopted improved varieties, the low volume and low frequency of seed demand has been often cited as a major reason for the lack of private sector involvement in the seed system or the development of alternative models of a sustainable seed system. This is especially the case for self-pollinated crops like beans (*Phaseolus vulgaris*), because bean 'seed' of the same variety / type / market class is highly competitive with bean 'grain' as planting material. Since producing and marketing beans as 'seed' involves taking specific and extra measures during seed production and post-harvest processing to ensure quality, it is more costly to produce than bean grain. Also, complying with the country's seed regulatory requirements to be able to sell the seeds labeled and packaged as 'certified seed' or 'quality declared seed' (QDS) increases the cost. Keeping the genetics constant (i.e., for the same improved variety), the viability of a seed market will depend on the co-existence of following demand and supply side conditions. On the demand side, it will depend on: 1) whether farmers are able to perceive the 'seed' product as a quality planting material, and 2) given the perceived quality difference, whether they are willing to pay a premium price for seed compared to grain price. On the supply side, it will depend on: 3) whether the price farmers are willing to pay is high enough to recover the cost of producing quality seed; and 3) whether the quantity and frequency of seed demanded at that price is large enough to attract suppliers to produce and sell quality seed. There are no rigorous studies that have examined these demand and supply side dynamics in a systematic manner. The following two activities (2a-i: assessment of the willingness of small holder farmers to pay for quality seed, and 2a-ii: case study on community based seed system) undertaken by this project are

attempts to address these demand and supply-side research questions in the context of dry grain legumes—beans and cowpeas.

**2a-i. Assessment of the willingness of small holder farmers to pay for quality seed.** This study is conducted in close collaboration with Sokoine University of Agriculture (Paul Kusolwa, Fulgence Mishili and Susan Nchimbi-Msolla) and CIAT (i.e., Byron Reyes and J. C. Rubyogo) in northern Tanzania, where four types of seed products are potential options available to farmers as planting materials—certified seeds produced from foundation seed (certified 1), certified seed produced from certified 1 seed (certified 2), quality declared seeds (QDS) and recycled seeds saved from farmers' own harvested grain. These four types of seeds or planting materials differ in seed input (i.e., which generation of seed is used to produce them), the regulatory supervision they receive or not receive, and technical conditions under which they are produced, and thus vary in cost. However, whether the cost differential across these types of seeds makes them qualitatively different products as reflected in their perceived or actual performance of the plant, and whether that translates into differential price that farmers are willing to pay for these seeds is an empirical question rarely addressed in the literature.

This study is based on field experiments (FE) and bidding experimental auctions (BEA) proposed to be conducted in two districts in northern Tanzania to gauge the demand for bean seed of different types, and to collect systematic data from seed consumers (i.e., farmers) to understand the economics of seed system from the demand side. The study is designed to address the following research questions:

1. For a given improved variety, what is the difference in the performance (as measured by yield and other characteristics important to farmers) of bean crop across four seed types – certified 1, certified 2, QDS and farmer saved bean grain when the seeds are planted and managed by farmers under their conditions?
2. How does the observed differential performance of different types of seeds translate into farmers' willingness to pay (WTP) for these seeds?

Due to delays in finalizing the contractual mode for transferring the funds to SUA, the FEs were conducted only in one district in this reporting year. The FEs and BEA auction experiments in the second district will be conducted in the long-rain season in FY 16. The FEs were planted in July 2015 under irrigated conditions and were based on the following methodology.

*Methodology:* To address research questions 1 and 2, a two-step approach was used. First, double-blind field experiments were established in six hamlets across Kawaya, Kikavu chini and Chemka villages in Hai district (in Kilimanjaro region, northern Tanzania). The FE (also called demonstration plots) were used to demonstrate the value of planting certified 1 vs. certified 2 vs. QDS vs. recycled seed of the bean variety, Jesca, so farmers can see first-hand the difference in agronomic performance of the plants, the amount (that could be) harvested and the quality of the beans. Through these experiments farmers were able to learn first-hand how different types/grades of seeds of the same improved variety perform in a location that is close

to their farm. Second, once farmers observed how different types of seeds of a particular variety perform, bidding experimental auctions were carried out to extract information about how much they are willing to pay for these seeds based on the perceived / observed differences in their performance.

The FEs were established as a double blind experiment, where neither the farmers nor the agricultural extension officers knew the types of seeds included in the study. Technical staff implementing the FE and farmers knew the variety (i.e., Jesca), and also knew that there are four types of seeds, namely certified 1, certified 2, QDS and recycled seed planted on that plot, and each were randomly labeled A, B, C and D, but they were not told which code is for which seed type. The reason for doing the FE as a double blind experiment is to reduce any systematic bias on the part of the technical staff or the farmer managing the plot towards or against any pre-conceived higher and lower quality seed type (this is called the Hawthorne effect in the economics literature). The blind experiment reduced any bias farmers as observers may have towards a specific seed type based on their prior personal experience or 'hearsay.' The same seed codes used in the FE were used throughout the study to be able to match all the information collected.

The FEs were planted on a 100 sq. m. (10m x 10m) sub-plot with a total plot of 400 sq m of land. The amount of seed required for this area was 1 kg (at a planting rate of 40 kg/acre) or 4 kg of seed in total (i.e., 1 kg of each grade). The seeds of different grades were obtained from appropriate seed source prior to the planting.

The field experiments were planted in a farmer's field. Farmers hosting the FE were in charge of planting and managing the FE following their own management practices (i.e., these were not managed as 'experimental trials'). Partners (SUA and agricultural extension officers from selected districts) selected the host farmers, delivered the seed for the FE to selected farmers, and supervised the establishment of the field experiments. During the production cycle, two field days were carried out in the two best performing fields in each village. All farmers living in the village were invited to these field days to see the bean plots and learn about their performance, first-hand. The first field day was conducted around the flowering stage (or soon after) (i.e., first week of September), and the second field day occurred just before or after harvest (i.e., second week of October). Attendees in the first Field Day were given a sheet where they ranked the sub-plots according to a set of criteria agreed upon by the farmers as a group. During the second field day, the same attendees were asked to rank the best and the worst sub-plots and the reason for their ranking. The data collected from the FE during the two field days and the yield data from the harvest will be used to estimate the 'per unit gain' from planting different types of seeds under farmer conditions (i.e., certified 1, certified 2, QDS, recycled).

The Bidding Experimental Auctions (BEA) were conducted to determine how much farmers are willing to pay for the different types of seeds (i.e., planting materials, not food grain). These took place during the second field day in October 2015. We followed the Becker-DeGroot-Marschak (BDM, 1964) method, where participants

did not bid against other people, but only against themselves. Prior to the seed BDM auction, a 'practice BDM' was conducted with a bar of soap to make sure farmers understood the auction mechanism.

The willingness to pay (WTP) elicitation mechanism was performed using a full bidding method (e.g., Lusk and Shogren 2007, and Alfnes 2009). In this method, farmers were first endowed with TS 4000 (equivalent to about US$2) to make their decisions more realistic (and not be constrained by available cash) and then asked to participate in four auctions by "bidding" their maximum willingness to pay (WTP) for a one kg of seed for each seed type A, B, C and D. Farmers were told that one of the four auctions will be chosen randomly and the bid for that seed would then be compared to a randomly drawn number from a given revealed price range of TS 0 to 3950. If the bid is greater than or equal to the randomly drawn price, then the farmer buys that seed at the randomly drawn price (NOT his/her bid price). The difference in the bids between the four auctions reveals the premium (or discount) due to the different seed type attributes (QDS vs. certified 1 vs. certified 2 vs. recycled). In this method, the farmer is likely to pay less than his/her bid (unless the bid and random price are equal) and thus the auctions are theoretically incentive compatible with regards to eliciting true farmer WTP.

A total of 114 farmers participated in the BEA across the 3 villages. Survey data were collected from each farmer that participated in the auction experiment to capture their socio-economic household characteristics, and experience with producing beans, varietal use and prior use of different types of seed. Analysis of data is currently ongoing. The results of these auctions will reveal how much farmers would be willing to pay for the different types of seed.

The reason for selecting Tanzania for this study is because it is one of the few countries in the ESA region that officially recognizes quality declared seed (QDS), and it will be interesting to compare the performance of QDS vs. certified seed and then assess farmers' willingness to pay for these two types of seed, which have different cost of production associated with them.

**2a-ii. Case study on community based seed system:** In FY 15, in response to a request from the Management Office, this project initiated a case study of a farmer association in Burkina Faso called *Association Song Koaadba* (ASK), which was established more than 20 years ago with the goal of promoting food self-sufficiency and food security in rural farming communities. It currently has about 7500 members spread over 58 villages in the provinces of Oubritenga, Kourweogo, Kouritenga, Ganzourgou, Sanmatenga, Passore and Sissili. According to the ASK management team, in 2014, a total of about 80 ha of land was devoted to cowpea seed production by about 125 members. ASK members involved in seed production mostly produce QDS seeds of cowpea for sale to other ASK members and non-member farmers in their communities. Over the past 20 years, ASK has had strong ties with INERA and has received continuous guidance and technical support from them in strengthening their cowpea seed production activities. In turn, ASK has served as an effective organization for INERA to channel new and improved cowpea varieties generated by

its cowpea breeding program.

The long-term sustainability of ASK's business model is rare to encounter in a developing country context. This study was thus motivated by the longevity of ASK's involvement in cowpea seed production and sale, and is designed to achieve the following objectives: a) Document the cowpea seed production and distribution model used by ASK; b) Collect and analyze data / information to: understand the economics of community based smallholder seed production, and identify strengths and weaknesses of the model used by ASK; and, c) Derive principles of sustainability underlying the model used by ASK for broader applicability within Burkina Faso and other countries. This study was initiated in early 2015 in close collaboration with INERA socio-economist (Dieudonne Ilboudo) and host country PIs of other Legume Lab projects (Issa Drabo and Clementine Dabire).

*Methodology:* The case study uses a combination of qualitative and quantitative methods to achieve the above objectives. Qualitative method includes conducting key informant interviews (KII) with the management and technical team of ASK and their backward linkage partners, such as the suppliers of foundation seed (i.e., INERA) and forward linkage partners, such as the buyers of the seed produced by ASK. The following KII were completed by the host country collaborators between February to June 2015.

a. KII with ASK management team: Types of information collected from these interviews include, ASK's history, current operation, aspirations for future, and a descriptions of its activities, sources of financial support, organizational and governance structure, seed production and marketing activities, and management teams' perception and opinion on key challenges, strengths and weaknesses.
b. KII with INERA: The cowpea seed program management staff were interviewed to get their perspectives on the demand for foundation seed by ASK, and their perspective on key challenges to meet this demand, and the strengths and weaknesses of the ASK model.
c. KII with SNS (National Seed Service) and UNPS-Union Nationale des Production Semenciers de Burkina. Representatives of these agencies were interviewed to gather information to better understand the formal seed system in Burkina Faso, get an overview of the annual production and sale of certified seeds of cowpea in the country, the certified seed production value chain, seed policy environment, key challenges, strengths and weakness of the formal seed system, and their perspective on the role played by ASK in the seed system.
d. KII with two organizational buyers of seed produced by ASK to gauge their evaluation of the seed quality, ability of ASK to meet their need for cowpea seed, and their perspective on key challenges to meet this demand, and the strengths and weaknesses of the ASK model.

Quantitative method used to achieve the objectives of this study included following types of data collection: secondary data from the Ministry of Agriculture, SNS, UNPS, etc. on: cowpea area, production, yield (most recent year by district or lowest administrative unit); historical price data of cowpea grain; historical price data of certified seeds of cowpea; historical data of certified cowpea seed production; and

conducting surveys of a sample of cowpea seed producers and seed buyers using structured questionnaires. For this later activity, a list of all the villages where ASK members reside was obtained from ASK with the following information—year in which that village became a member of ASK, number of ASK membership, and number of cowpea seed producers (as of 2014). Twenty five out of 58 villages were randomly selected from the list of seed producing villages (14 villages selected) and non-seed producing villages (11 villages selected). In each village 9 farmers were randomly selected to represent seed producers (in villages where seed producers were located), ASK members and non-ASK cowpea farmers. In total 225 farmers comprised of 54 seed producing farmers, 98 ASK member farmers, and 73 non-ASK member farmers were surveyed in May-June 2015 using a structured questionnaire. A community level questionnaire was also completed for each of the 25 villages visited. The distribution of these 25 village communities surveyed is given in Figure 1. Data entry of the completed survey was completed in September. Analysis of the information obtained through KII and farmer survey is planned over the next few months and a report summarizing the results of this case study will be shared with the management office and USAID in early 2016.

**2b. Impact study in Haiti:**

During the past 20 years, with support from USAID, the National Seed Service of the Ministry of Agriculture in Haiti has conducted bean research in collaboration with the University of Puerto Rico, the USDA-ARS and Zamorano. This collaboration resulted in the development and release of bean cultivars such as DPC-40, XRAV-40-4, MEN 2201-64ML and Aifi Wuriti that have greater disease resistance, improved agronomic traits and higher seed yield potential than local landrace varieties of beans. In recent years, the Bean Technology Dissemination (BTD) project in Haiti received funding from USAID to produce and distribute 69 MT of seed of these improved bean cultivars to > 25,000 farmers. Some of the NGO's such as Zanmi Agrikol and Helping Hands that participated in the production of bean seed continue to produce seed of the improved bean cultivars after the BTD project ended.

Despite these recent and long-term investments in bean research and dissemination of improved variety seeds, there is no study conducted by NSS, the Ministry of Agriculture or the National Agricultural Statistics Service in Haiti to assess the adoption of these technologies and its impact. A major reason for this is the lack of capacity within the national system in Haiti to conduct rigorous adoption and impact studies based on farm household surveys. Hence, last year the SO1-A4 team expressed a strong interest in conducting an impact study in Haiti through technical assistance from this project team. As a result, this activity was included in the FY15 workplan of this project. Only partial funding was available at the time of developing the FY 15 workplan, and the plan was to do this study in FY 15 only if funding was secured to meet the total estimated budget. Funding was secured in May 2015 when the proposal jointly submitted by SO1-A4 and SO4.1 to the Legume Innovation Lab in response to the *Call for Proposal to Strengthen Host Country Institutional Capacity* was approved.

Due to elections in Haiti this year, the host country collaborators suggested doing this study in 2016 instead of summer/fall 2015. Thus, no activities were undertaken in FY 15. The plan is to implement the survey next year in the following 5 Departments in areas where the BTD project and NSS have disseminated improved bean varieties—Artibonite, South, Grand Anse, Central Plateau, and Northeast. The plan is to randomly select about 450 beneficiary farmers and 350 non-beneficiary farmers that share similar characteristics as the beneficiary farmers, and establish a counterfactual using the Propensity Score Matching statistical technique (Cochran and Rubin, 1973; Rosenbaum and Rubin, 1983). In addition to the impact study, there is also a need for a rapid study on grain legume seed systems to understand potential changes in these systems and the opportunities for enhancing seed systems and scaling up these technologies for grain legumes. Thus, rapid reconnaissance of the main stakeholders in Haitian legume seed systems, including NSS, IICA, NGOs, and private sector agents are planned in the second quarter of FY 16.

Field activities for the impact study will be led by the National Agricultural Statistics Service with technical support and guidance from MSU. All other activities will be a joint collaboration between SO4.1 and the host country partners.

**Objective 3:** Build institutional capacity and develop human resources in the area of impact assessment research

This project addressed the objective of institutional capacity building and human resource development through the following activities implemented in FY 15:

a. Research studies conducted in Guatemala, Burkina Faso and Tanzania under objectives 1 and 2 (described above) involved host country PIs/collaborators/students in the planning and execution of field data collection. Host country collaborators from Legume Innovation Lab projects participated in the rapid appraisal visits, development of research design, and training enumerators and field staff in data collection, data entry and analysis.
b. Activities planned under this project involved graduate students in the planning and conduct of field research and write-up of research results. These students were recruited from within the Department of Agricultural, Food and Resource Economics at MSU (see the details on trainees in the Training section).
**c.** Short courses on impact assessment. Two short-term training workshops (one funded by LIL and the other funded through external funds) to build capacity of local partners were implemented in collaboration with CIAT and other NARS partners as described in the Training section. These training workshops focused on teaching theoretical concepts and demonstrating practical applications of these concepts to rigorously assess the impact of agricultural projects and programs. The topics included current theory and methods on impact evaluation, sampling methods, data collection instrument design, data collection using computer assisted personal interviewing software and paper questionnaires, and the use of statistical software for data cleaning and analysis.

## IV. Major Achievements

We would like to highlight the following emerging 'messages' about factors contributing to the sustainability of community seed banks based on the thesis research completed in FY 15.

- Factors positively contributing to the sustainability of community based seed production include: the importance of training (seed marketing and business skills), ownership of productive asset (especially silos), experience of leadership, cost recovery, quality and quantity of seed produced, and operational formality in the form of conducting meetings and documenting decisions made at meetings.
- Community based seed bank models provided a production and delivery model that lasted longer than individual banks. The policy implication of these results is that CSBs present a more sustainable dissemination channel of improved variety seed to farmers than small scale contract-based seed production by individual farmers.

## V. Research Capacity Strengthening

Unlike other Legume Innovation Lab projects, this project does not have a country-specific collaborating HC institution. We serve as the cross-cutting project that works towards building the institutional capacity and human resources in the area of impact assessment across all the projects of the Legume Innovation Lab. In FY 15, an intensive one week short term training workshop was implemented towards this broader goal of capacity strengthening in the area of monitoring and impact evaluation. This was funded through Supplemental Institutional Capacity Strengthening funds provided to ZARI. Researchers and economists from IIAM, LUANR, ZARI, SUA, Makere University and EIAR were invited to attend this training workshop that took place in Lusaka, Zambia in September 2015. This course was be led by Legume Innovation PI and economists from CIAT. Additional details are provided in Section VI.

## VI. Human Resource and Institution Capacity Development

### 1. Short-Term Training

**Training 1:**

i. Purpose of Training: to strengthen the capacity of research and development organizations to document the results and impacts related to the development of agricultural technologies
ii. Type of Training: Training workshop
iii. Country Benefiting: Uruguay, Argentina, Brazil
iv. Location and dates of training: Montevideo, May 18-22 2015
v. Number receiving training (by gender): 10 males; 9 females
vi. Home institution(s) (if applicable)
vii. Institution providing training or mechanism: CIAT (with technical input from MSU)

**Training 2:**

i. Purpose of Training: to strengthen the capacity of research and development organizations to document the results and impacts related to the development of agricultural technologies
ii. Type of Training: Training workshop
iii. Country Benefiting: Zambia, Mozambique, Malawi, Tanzania, Uganda and Ethiopia
iv. Location and dates of training: Lusaka, September 21-25 2015
v. Number receiving training (by gender): 12 males; 4 females
vi. Home institution(s) (if applicable): ZARI
*vii.* Institution providing training or mechanism: MSU and CIAT

**2. Degree Training**

i. First and Other Given Names: David
Last Name: DeYoung
ii. Citizenship: USA
iii. Gender: Male
iv. Host Country Institution Benefitting from Training: None directly
v. Training Institution: Michigan State University
vi. Supervising CRSP PI: Mywish Maredia
vii. Degree Program for training: M.S.
viii. Program Areas or Discipline: Agricultural Economics
ix. Thesis Title/Research Area: Determinants of sustainability of community seed banks in Nicaragua: A duration analysis approach
x. Start Date: Fall 2011
xi. Projected Completion Date: Fall 2015 (thesis defense exam completed in August 2015)
xii. If enrolled at a US university, will Trainee be a "Participant Trainee" as defined by USAID? No
xiii. Training status (Active, completed, pending, discontinued or delayed): Completed

## VII. Achievement of Gender Equity Goals

This project is designed to assess how the technologies and knowledge generated by the Legume Innovation Lab (and its predecessor CRSP) benefits both men and women farmers, entrepreneurs and consumers. Thus, where applicable, 'gender equity' is used as one of the metrics in evaluating the impact of Legume Innovation Lab research. Survey instruments are designed to collect gender disaggregated data on beneficiaries. Where applicable, results of analysis based on primary data are reported by gender to assess the impact on women farmers and other potential beneficiaries of Legume research.

## VIII. Achievement and Progress Along the Impact Pathway

For this project we have identified two project outputs to be achieved over the life of the project that will contribute towards developing an impact oriented research program that features: 1) Greater awareness among researchers of the importance of achieving developmental outcomes; and 2) Better design of research programs that incorporate strategies and partnerships to transfer research outputs into outcomes and impacts; and 3) Continued and increased support for investments in agricultural research in general, and on legume crops in particular. Towards the impact pathway of achieving this 'vision of success', the following was achieved (cumulatively) as of the end of FY 2015 for each output:

1. Output 1: development of impact pathway analytical tools and guidelines:
    a. Transfer of analytical tools to project PIs and research teams: Completed as planned (in FY 14)
    b. Input and feedback to research teams on their impact pathway: Completed as planned (in FY 14)
    c. Monitor the progress towards projected outputs and strategies to achieving the vision of success as laid down in the impact pathways: Ongoing
2. Output 2: Evidence based assessments of potential and realized impacts of investments in agricultural research:
    a. Publication of results of the assessments in technical reports and peer reviewed venues: Three technical reports, one thesis, and two manuscripts for peer reviewed venue have been completed.

## IX. Explanation for Changes

The following outputs targeted to be achieved by the end of FY 2015 have been delayed:

1. One manuscript for journal submission: We had set a target of one manuscript for journal submission and/or presentation at professional meetings. Two Abstracts based on research results of this project were submitted for the AAEA professional meeting in 2015, but were not accepted. A manuscript or a professional meeting presentation based on the recently completed MS thesis paper by David DeYoung is planned by early 2016.
2. Impact Briefs: We had planned to develop two Impact briefs in FY 2014 and one in FY 2015. To date these outputs have not been achieved. We are waiting for the research studies to be published in peer reviewed venue before developing the Impact Briefs. We plan to do this soon after the manuscripts are published.
3. Haiti impact study: As indicated before, due to elections in Haiti, the host country collaborators proposed doing this study in 2016 instead of 2015.
4. Tanzania study on willingness to pay: Due to delays in finding a suitable mode of transferring the funds to SUA, the field activities could not take place as planned in the Long-rainy season. Only one set of field experiments has been completed in FY 15. The other set is planned to be completed in FY 16.
5. One of the short-term training courses anticipated to be conducted through external funding in Mozambique did not take place as planned. With the departure of B. Reyes (collaborator on this project) and R. Benfica (a faculty member in AFRE who was going to be the collaborator in organizing the training workshop

in Mozambique) from MSU early FY 2015, this workshop never materialized.

## X. Self-Evaluation and Lessons-Learned

- **Challenges:**
  - Our project is a collaborative project cutting across all the other projects funded by the Legume Innovation Lab. We depend on the support and collaboration of the lead US and HC PIs in implementing our workplan. In some cases, we have to rely on the existing contractual agreements between the US and HC institutions of other LIL projects to channel the funds for field research. As such delays in the contract amendments between these institutional partners (which is not in our control) impacts our workplan.
  - In the case of the Benin study, the lack of French language skills on our part was also a challenge in engaging with the HC collaborator in planning this activity and contributing to this study as we had planned.
  - In November 2014, a key collaborator at MSU on this project (B. Reyes) joined CIAT. His departure from MSU has had an impact on available human resources for this project, and contributed to some of the delays in completing the workplan.
- **Failures:** Although, there are no 'failures' in doing research, we do consider the 'delays' in implementing the workplan or 'incomplete' activities reported in this Annual Report as a failure on our part to properly manage time and available resources to meet the outputs set for this project.
- **Successes/Strengths:** The support and collaboration we have received from other project teams in the implementation of research and capacity building activities is greatly appreciated. This spirit of cross-disciplinary collaboration evident in the activities reported in this project's annual report is a strength of this program.

## XI. Scholarly Accomplishments

Publications and Manuscripts:

Maredia, M., Reyes, B., D. DeYoung. 2014. Farmer perspective on the use of and demand for seeds of improved bean varieties: Results of beneficiary surveys in Guatemala, Honduras and Nicaragua. Staff Paper 2014-04. Department of Agricultural, Food and Resource Economics, Michigan State University, East Lansing. http://ageconsearch.umn.edu/bitstream/196540/2/MSU%20AFRE%20Staff%20Paper%202014-04%20BTD%20Report%20Beneficiary%20Survey_final.pdf

Reyes, B., D. DeYoung and M. Maredia. 2014. Effectiveness of the bean seed dissemination models implemented under the Bean Technology Dissemination (BTD) Project: Results of key informant interviews in Guatemala, Honduras and Nicaragua. Staff Paper 2014-03. Department of Agricultural, Food and Resource Economics, Michigan State University, East Lansing.

http://ageconsearch.umn.edu/bitstream/196539/2/MSU%20AFRE%20Staff%20Paper%202014-03%20BTD%20Report%20KII_final.pdf

Maredia, M. K., Reyes, B. A., Ba, M., C. Dabire, Pittendrigh, B., & Bello-Bravo, J. Effectiveness of animation videos in inducing technology adoption: A field experiment in Burkina Faso. (Revise and re-submit to *Journal of Agricultural Economics*)

Thesis:
DeYoung, David. 2015. Determinants of sustainability of community seed banks in Nicaragua: A duration analysis approach. Thesis for partial fulfillment of MS degree in Agricultural, Food and Resource Economics, Michigan State University (to be submitted in December 2015).

Presentations
Maredia, M., Reyes, B. A., Ba, M., Dabire, C., Pittendrigh, B., Bello-Bravo, J. 2014. *Are Animation Videos Effective in Inducing Technology Adoption? A Field Experiment in Burkina Faso*. presented at Department of Economics Research Seminar, Western Michigan University, Kalamazoo, Michigan (November)

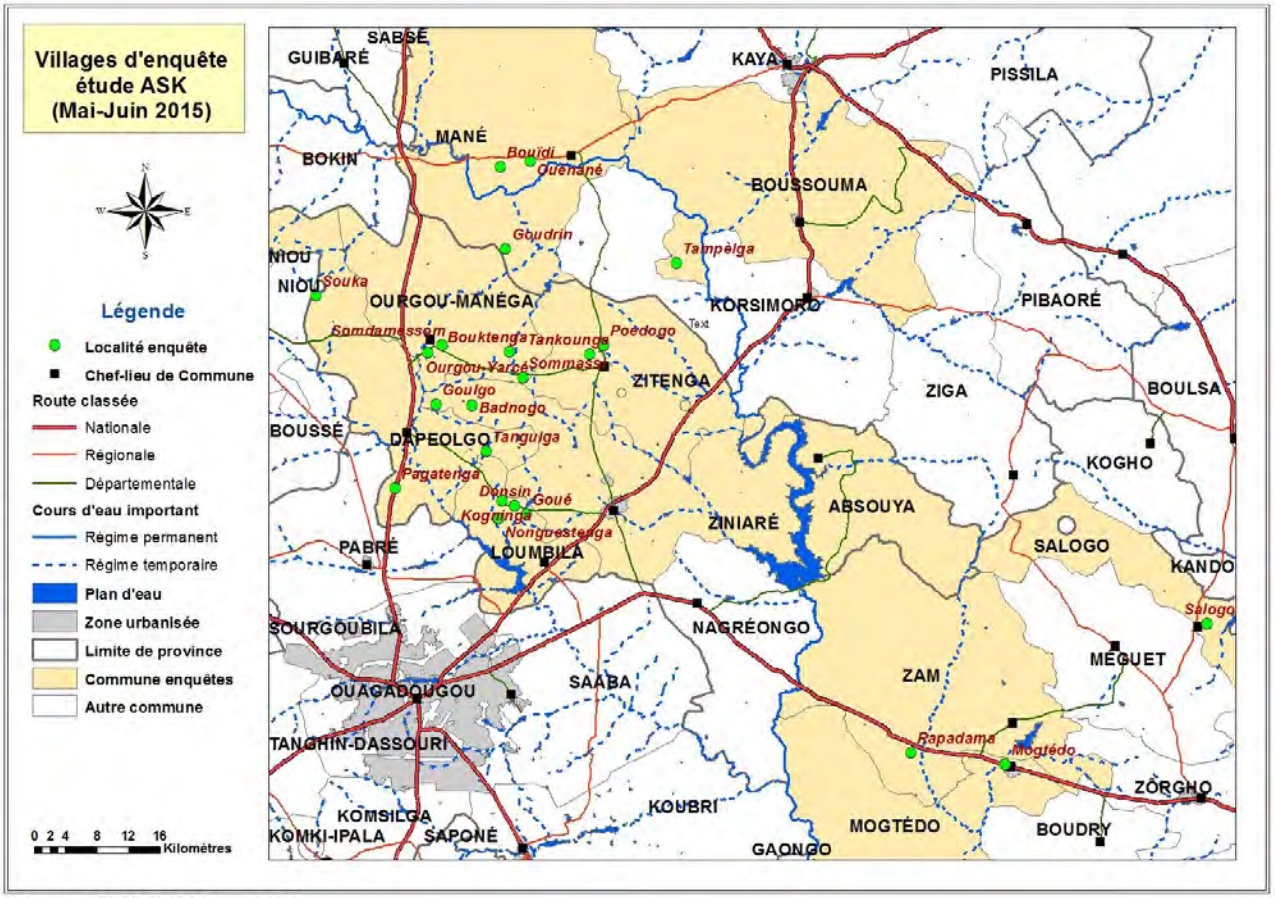
## XII. Data Management

A data management plan was submitted to LIL Management Office in July 2014 which outlined the plan for making 8 datasets generated by this project public over the next 3 years. No datasets have been submitted to publically accessible data bases in this reporting period (FY2015).

**ANNEXES:**

## Annex 1. Tables, Figures and Photos Cited in the Report

***Figure 1. Location of villages selected for ASK seed producer and member surveys in Burkina Faso (villages are indicated by green dots)***




Sources : BNDT_MajBGB, projet ASK

**Annex 2. Literature Cited**

Alfnes, F. 2009. Valuing Product Attributes in Vickrey Auctions when Market Substitutes are Available, *European Review of Agricultural Economics*, 36, 133–149.

Becker G.M., DeGroot M.H., Marschak J. 1964. "Measuring utility by a single-response sequential method". *Behav Sci* **9** (3): 226–32. *doi*:*10.1002/bs.3830090304*

Cochran, W. and Rubin, D.B. 1973. "Controlling Bias in Observational Studies", *Sankyha*, 35, 417-446.

Lusk, J.L. and J. Shogren. 2007. *Experimental Auctions: Methods and Applications in Economic and Marketing Research*. Cambridge: Cambridge University Press.

Rosenbaum, P.R. and Rubin, D.B. 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects", *Biometrika*, 70, 1, 41-55.