



FEED THE FUTURE INNOVATION LAB FOR THE REDUCTION OF POST-HARVEST LOSS NEWSLETTER | JANUARY 2017

Our Mission

The Post-Harvest Loss Innovation Lab is a strategic, applied research and education program aimed at providing global leadership in food security by reducing post-harvest loss and food waste of grains, oilseeds, legumes, root crops and seeds.

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Focus on:

 GUATEMALA

 GHANA

 AFGHANISTAN

 BANGLADESH

ETHIOPIA

Ethiopia. It is a land of towering mountains, breathtaking chasms, crystal lakes and simmering volcanoes. The source of the Blue Nile and the Cradle of Humanity, Ethiopia is also an important agricultural nation: the country's livestock population is estimated to be the largest in Africa, and agriculture supports nearly half of its GDP and 80 percent of the labor force. Domestic nutrition challenges and demand for livestock feed in Ethiopia urgently beg for minimizing post-harvest crop loss. The Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss (PHLIL) seeks to address these challenges through integrative research and education programming. In each of the next several newsletters, we will highlight the activities of one of PHLIL's focus countries. We will kick off this series in Ethiopia, where activities are led by Principle Investigator, **Dr. Bhadriraju Subramanyam** (Subi) from Kansas State University, with support from Co-PIs, **Dr. Rizana Mahroof** from South Carolina State University and **Dr. Sajid Alavi** from Kansas State University.



(L-R) Dr. Rizana Mahroof, Dr. Bhadriraju Subramanyam and PHLIL Co-PI, Dr. Prasanta Kalita (University of Illinois), observe traditional drying of chickpea in Ethiopia.

Chickpea and Sesame Storage: It's in the Bag

For cash crops like chickpea and sesame in Ethiopia, post-harvest losses are estimated to average between 10-30 percent, depending on the crop type, but at times can even be as high as 50 percent. In some cases, post-harvest loss for sorghum and maize has been especially high, at 15 and 30 percent, respectively. Understanding the urgent need for intervention, PHLIL has partnered with Mekelle University and Bahir Dar University to develop a first of its kind survey for post-harvest loss assessment. The survey, which is ongoing, covers four regions and utilizes local knowledge, paired with international expertise to examine the effectiveness of different interventions as well as yield baseline information on four identified cash crops: chickpea, maize, sesame and wheat. To date, an overwhelming majority of surveyed farmers have highlighted insect control methods as the most crucial area for improved technologies and management practices. (cont. on pg 2)

Special Note: The articles for this newsletter were written by Melissa Harvey, who generously donated her time and expertise for this publication.

Armed with this knowledge, the PHLIL team has found promising solutions for reducing post-harvest loss in sesame and chickpea. As valuable cash crops – some refer to sesame as “white gold” – they represent an important focus of study. During harvest, farmers experience loss of these key crops as a result of insect spoilage. To combat this, PHLIL researchers have tested interventions with hermetic bags. Hundreds of farmers have received training on benefits and use of hermetic bags and received bags for use on their own farms. PHLIL researchers have teamed with these same farmers to evaluate the bags’ effectiveness and durability. Farmers who use this technology are able to increase their flexibility in marketing and improve food security. Training and on-farm testing of these storage technologies will continue in 2017 and expand to additional regions of Ethiopia.

High and Dry: Technologies to Keep What Farmers Reap

While Ethiopian farmers are successfully planting and growing a variety of key crops, it is estimated by The African Postharvest Loss Information System (APHLIS) that their post-harvest loss is at least one quarter of their yield. The

majority of the loss occurs during on-farm and in-house crop storage. PHLIL is therefore taking a lead role to scientifically assess the causes of crop



Testing of the Solar Bubble Dryer at Bahir Dar University.

damage while providing loss-intervention technologies. The goal? Reduce post-harvest loss in Ethiopia to five percent or lower.

In partnership with Mekelle University and Bahir Dar University, the PHLIL team continues to develop and scale-up crop-loss mitigation technologies,

Building Capacity and Reaching Out

Because post-harvest loss is a long-term issue, it is important to harness the innovations of today and ideas of tomorrow. To do this, the team is committed to building human and institutional capacity for post-harvest loss curricula at both Mekelle University and Bahir Dar University.

The result will be robust post-harvest graduate programs that will include topics in post-harvest loss and full-fledged laboratory training facilities to train next-generation Ethiopian students and extension agents. As part of that vision, two professors and one PhD student from Bahir Dar University visited the Department of Grain Science and Industry at Kansas State University to gain training in extrusion and grain processing in August 2016. This visit not only offered hands-on experience with the extrusion process, but also allowed participants to visit Wenger Manufacturing in Sebeta, Kansas, where the various extrusion components are manufactured, assembled, tested and commissioned.



Partners from Bahir Dar University participate in an extrusion short course at Kansas State University.

including drying and baseline mycotoxin assessment research. Using three different drying methods for chickpea and sesame – Solar Bubble Dryer, Cabinet Solar Dryer and Open Sun Drying – researchers are taking a closer look at the most effective and efficient drying

techniques in order to pass that knowledge to local farmers. Current findings determine not only an optimum drying time for both types of

crop, but also

the best time of day for drying a specific amount of either chickpea or sesame. The team also designed and manufactured a new cabinet solar dryer, as the previous model was too small to effectively dry large amounts.

To bridge the gap between research and on-farm applications, the PHLIL

team hosted a demonstration of solar drying technologies in Mohoni, Ethiopia. Representatives from 15 farmer cooperatives, various government delegates and other stakeholders were able to meet with the PHLIL team and see the work on drying techniques first hand. The team also participated in a three-day workshop and exhibition in Axum city, where they were able to demonstrate use of the Solar Bubble Dryer to a broad audience. This forum was an opportunity to educate the public about the issues of post-harvest loss and to inform the public about current projects on the ground in Ethiopia.

Finding Fungus: A search for mycotoxin in Ethiopia

The PHLIL team at Mekelle and Bahir Dar Universities are taking a closer look at the important issue of mycotoxin contamination as well. Mycotoxins are caused by fungi that infect crops at different stages – including post-harvest – which then lead to risk of human and livestock disease and serious economic losses at different stages of the value chain. To combat (cont. on pg 3)

this, PHLIL is collecting knowledge of molds affecting food grains in Ethiopia, both in the field and in storage. Mekelle University scientists are testing sesame and chickpea samples from regions around the country to determine

contamination and levels of toxin, while scientists at Bahir Dar University are testing wheat and maize. Discovering the extent of contamination and identifying specific fungi will be among the next steps in the study. With this key knowledge,

we can help create post-harvest solutions – namely storage intervention – that can help reduce the levels of mycotoxin contamination for these key Ethiopian crops.

Leaders in the Field

In addition to highlighting stories from our projects, we will also feature in each edition some of our key team members who are working to make our program a success on the ground in their home countries.



Professor Fetien Abay

Dr. Fetien Abay is the in-country principal research investigator of the Ethiopia component of PHLIL, guiding her team in effective testing and data collection of post-harvest technologies. She also plays a key role in PHLIL's capacity building by advising Ethiopian students and researchers. Professor Abay received her MSc in Rural Resource Management from the University of Wales and her PhD in Plant and Seed Sciences from the Norwegian University of Life Sciences. Professor Abay was the first female lecturer at Mekelle University and the first woman in Ethiopia to be a full Professor in Plant Breeding and Seed Agriculture. In 2009 she was named among the top five African women scientists by African Women Professionals in Science and has received numerous other awards.

Aynadis Molla

Aynadis Molla is a PhD student in Post-Harvest Technology at Bahir Dar University Institute of Technology and a current PHLIL researcher on sustainable crop solar drying technology. With an MSc degree in Chemical Engineering from Addis Ababa Institute of Technology, she is a leader of next-generation Ethiopian scientists and agricultural engineers. She recently presented her work on solar bubble and cabinet dryers for grain drying. In addition, Aynadis is a Lecturer in the Food Engineering Department at Bahir Dar Institute of Technology, where she was awarded the Best Teacher Award in the Chemical and Food Engineering Department.



New Faces of PHLIL

Over the last several months, PHLIL has seen the introduction of an entirely new team in the Management Entity. Meet the new team supporting PHLIL activities:



Dr. Jagger Harvey, Director | Dena Bunnel, Program Coordinator | Catherine Hickman, Business Financial Specialist
Learn more about the new team at: k-state.edu/phl/about-the-lab/team.html

www.feedthefuture.gov



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