

ADMI

The ADM Institute for the
Prevention of Postharvest Loss
University of Illinois at Urbana-Champaign

Annual Report 2016





Letter from the Director



Thank you for your interest in reading our annual report and providing your support to us. We have had a very productive year. We are pleased to report that our research, engagement, and educational projects have started making impacts in reducing postharvest losses in developing countries.

Before we move on, I want to mention few highlights of the institute at the beginning. Many of you know that the ADM Institute has transitioned from the Office of the Chancellor to the College of the Agricultural, Consumer and Environmental Sciences (ACES) at the University of Illinois at Urbana-Champaign. This change has been part of the reorganization of various units at the campus level. While this has been a positive change for the institute, it brought additional work for the staff, and on top of that we have had some staff changes within the institute. The progress of the institute, however, has continued and excelled, thanks to the outstanding work ethic of the staff and help provided by the College of ACES Office of Research - where the institute is currently housed.

Another highlight is the renewal and new funding offered to the institute by the ADM Company. We have had several rounds of discussion last year and this year with our donor (the ADM Company), and we are excited that the ADM has been open to the renewal of funding for the next five years as long as the institute continues to deliver on our mission.

We feel very good that the 2015 First International Congress on Postharvest Loss Reduction in Rome, Italy, was a great success. We thank our co-sponsors for their support - both financially and programmatically. Without the support of the FAO - Save Food program, the Rockefeller Foundation, Bill & Melinda Gates Foundation, John Deere, and several other organizations, we couldn't have made this event a reality. We are very grateful for the support and encouragement these organizations provided us for a very successful Congress. We also want to thank all the participants from many countries - far and near - for joining us and enlightening us with new knowledge, practices, and initiatives. The Congress also helped us develop the first draft roadmap for global postharvest loss reduction, and you can read a summary of the roadmap in this report and view the complete document on the ADMI website.

Our signature project, the "ADMI Village" in the state of Bihar, India, has been progressing very well. Bihar is one of the poorest states of India, with more than 80% of the population dependent on agriculture. Farmers there have a daily income of less than \$1.25. The project "Reduction of Postharvest Loss for Smallholder Farmers" in Bihar expands beyond the ADMI Village in that state. The project focuses on reducing postharvest losses of four major grain crops in collaboration with two Indian agricultural universities: Bihar Agricultural University (BAU) and Dr. Rajendra Prasad Central Agricultural University (Dr. RPCAU), along with the Borlaug Institute for South Asia (BISA).

We continue to work in close collaboration with the USAID-funded Feed the Future Innovation Lab for the Reduction of Postharvest Loss program with Kansas State University. The institute also expanded its current ongoing project "Measurement, Documentation and Postharvest Processing for the Prevention of Postharvest Losses" in Brazil and is collecting more baseline data of losses at various stages in supply chains. The free online Coursera course on Global Postharvest Loss Prevention has been a great hit for our global community. This is the first course of its kind on PHL reduction, and has attracted several thousand participants from more than 160 countries. The course is now being offered every month and we continue to receive comments from our learners on the effectiveness of this course.

We have new partners and collaborators for synergistic efforts in global postharvest loss reduction. The institute has been engaged in dialogues with Monsanto, Forum for Future in Singapore, the Institute of Mechanical Engineers in London, The University of Birmingham, RCRE in China, Njala University in Sierra Leone, and others, and we foresee promising and meaningful partnerships.

In the coming years, the ADM Institute will focus on transforming and scaling up research outcomes to the community and regional scale, more engagement with global partners, and developing further training and education tools. This work would not be possible without the support of the ADM Company, members of the External Advisory Board and Steering Committee of the ADM Institute, and our dedicated staff at the ADM Institute. We look forward to making significant impact on lives and livelihoods of smallholder farmers in developing countries by reducing postharvest losses. Thank you.

A handwritten signature in black ink, appearing to read "Prasanta K. Kalita". The signature is fluid and cursive, written over a white background.

Prasanta K. Kalita

Reduction of Postharvest Losses for Smallholder Farmers

Propelled forward by ADMI's local and international partnerships, the ADMI Village in the state of Bihar is fast become a reality. Bihar is one of the most populous and poorest states in India, so preserving the crops grown there is of the utmost importance to India's food security.

In January 2015, the ADM Institute for the Prevention of Postharvest Loss (ADMI) launched the "Reduction of Postharvest Loss Smallholder Farmers" project in the state of Bihar, India, in collaboration with Bihar Agricultural University, Sabour (BAU), Dr. Rajendra Prasad Central Agricultural University (Dr. RPCAU), the Borlaug Institute for South Asia (BISA), and the University of Illinois at Urbana-Champaign. Bihar is one of the populous and poorest states of India and has been a focus of various national and international organizations focusing on food security and mitigating hunger.

As part of the project, ADMI created an initiative called the ADMI Village. The name "ADMI" (pronounced as aadmi) in Hindi means "human" or "people." In February 2016, the village of Dih Sarsauna (Dee sar-sauna) in the Tajpur block of Samastipur, Bihar, was selected to be the first ADMI Village based on survey results, accessibility, and location.

The 157-hectare village acts as a model to demonstrate the positive impact of PHL reduction interventions on the food availability, income, and lives and livelihoods of people by identifying hotspots in supply chains, testing suitable technologies, and providing training and education. In the future, more villages will be adopted for a similar implementation.

In Dih Sarsauna, ADMI has set up a facility which serves as a demonstration and community training site. Ongoing extension education to farmers regarding postharvest loss prevention and postharvest primary processing is being done through trainings and demonstrations. Multiple farmer trainings conducted by Dr. RPCAU researchers and field investigators, have reached more than 450 farmers in the area.



Government officials attend these sessions alongside farmers, which disseminate information about using storage bags properly, introducing the low-cost STR dryer, and the benefit of using moisture meters.

In the first wave of storage bag distribution in the village, more than 300 GrainPro storage bags are now being used by 84 farmer households for wheat and maize. Each of these farmers using the storage technology has a sign outside their residence to signify their participation and spread awareness throughout the village. The project's field investigators have been working with the farmer households to ensure proper storage techniques and take accurate moisture content readings on a monthly basis. Moisture content is recorded in the field and at storage by using a USDA engineered Equilibrium Moisture Content (EMC) Meter 4.0. Lab scale storage bag readings and controlled experiments are also being conducted at RAU and BAU for comparative results with the village.



The low-cost STR dryer design will be implemented in four locations throughout the village before the kharif harvest season in October 2016. The dryers will be accompanied by mechanical shellers, providing farmers an easy alternative to hand shelling. Due to the fluctuating power supply, both the STR dryer and sheller will operate on diesel power generators that ADMI supplies.

Throughout the state of Bihar, our collaborators are working to spread awareness of postharvest loss. Researchers, field investigators, and university faculty have been reaching



out on a personal level, visiting farmers in their homes.

Nearly 600 farmers in 13 villages were individually informed about proper storage and the benefits of hermetic bags, in addition to information regarding safe storage practices, drying techniques, and the dangers of mycotoxin.

Once they had this information, the farmers were willing to pay an average of 26.2 rupees per bag, more than three times the price charged for traditional jute bags. Farmers were willing to spend over 30% more when they were provided information about the dangers of mycotoxin contamination in grains and how hermetic bags can reduce this incidence.

The majority of the farmers (85%) reported that they would use these bags for storing grains for food. This, along with the fact that farmers were willing to pay more for health benefits, indicates that postharvest storage technology is particularly valued by farmers for improving their household food security.

So far, more than 1,050 farmers have been contacted. Roughly 1,000 GrainPro storage bags have been handed out. By May 2017, 4,000 farmers will have been informed about PHL.

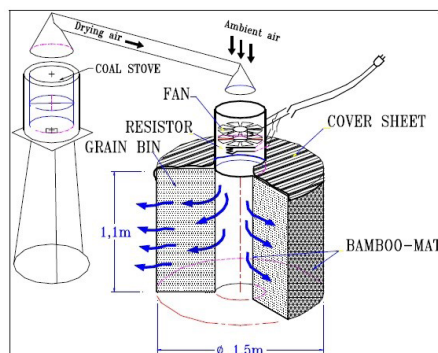
Training/awareness programs organized

With support from ADMI, Bihar Agricultural University organized a one day training/awareness program for the farmers of Bhagalpur and Banka districts. In September, four separate one-day training sessions were conducted within different blocks of the districts with more than 100 farmers participating in each session.

The first training took place in the Kharik block of the Bhagalpur district, where 112 farmers participated from the adopted villages of that block. The farmers in attendance already understood the value of postharvest losses. The session demonstrated how to minimize these losses by the adoption of proven postharvest technologies, including the use and advantages of the STR dryer, super grain bag and dal mill. For example, the use of super grain bag (SGB) can preserve or store commodities for more than 2 years and the possibilities of insect or rodent attack on this type of storage are minimal. The team has fabricated two types of STR dryers (with or without a power-operated fan) that will be shown in field trials in late October. These dryers can be built locally and used after harvesting of paddy crops that occurs in the middle of November.

The progress and success of these training events was published in the local newspaper in regional script (Hindi).

Immediately to the right is a schematic drawing of the STR dryer. At the far right, a farmer in India uses the dryer.



Feed the Future Innovation Lab - Bangladesh

The ADM Institute for the Prevention of Postharvest Loss at the University of Illinois Urbana-Champaign, in collaboration with USAID-funded Feed the Future Innovation Lab for the Reduction of Postharvest Loss program at Kansas State University, funds a rice value chain focused PHL reduction research project to Bangladesh Agricultural University, Mymensingh.

In 2015, the ADM Institute for the Prevention of Postharvest Loss at the University of Illinois Urbana-Champaign, in collaboration with USAID-funded Feed the Future Innovation Lab for the Reduction of Postharvest Loss program at Kansas State University, funds a rice value chain focused PHL reduction research project to Bangladesh Agricultural University (BAU), Mymensingh.

The project encompasses three main components: i) mycotoxin detection, ii) appropriate drying and storage technologies, and iii) gender issues in postharvest loss prevention.

The loss of rice grain or seed due to mycotoxins development is a major concern in Bangladesh, and there is a demand for establishing a national database on mycotoxins production in rice grains. Our work in Bangladesh will help in forming the database through conducting a baseline survey on mycotoxins development in Boro paddy. We have already established laboratory facilities to conduct research on detection and remediation of mycotoxins at Bangladesh Agricultural University.

A comprehensive study was conducted during Boro 2014-15 in two districts in Bangladesh, Jessore and Mymensingh. It was observed that both mold and insect infestation was higher in grains stored at high moisture content. About 25% of paddy samples were found with aflatoxin levels higher than recommended (20 ppb). Currently, BAU faculty members are working to collect more mycotoxin data and also investigating their aflatoxin stability on grains before and after milling and boiling.

Most of the postharvest losses of grain crops happen during the drying and storage operations. Farmers in Bangladesh experience huge



losses of paddy due to delayed or improper drying caused by inadequate knowledge and drying facilities. It is necessary to adapt drying technologies for paddy at small scale traders and farmers' level to reduce postharvest losses and produce high quality paddy seed. Team of researchers at BAU successfully modified and tested a low cost STR dryer (0.5 ton capacity) for paddy drying. The dryer was able to reduce moisture content of paddy from about 22% to 10% in 4-5 hours with drying efficiency of more than 70%. The dryer was also found to provide uniform heating, which is necessary to maintain grain quality. Considering the issue of electricity shortage, the dryer was also successfully tested to work with diesel generator. This dryer can be locally manufactured in less than \$400, and has significant potential to be adopted by smallholders. Currently, the BAU team is working to scale up the STR dryer at farm fields in Jessore and Mymensingh.

Like other developing countries, rice grains are mostly stored in porous gunny bags/sacks in Bangladesh. The most common traditional storage technologies used by the farmers were Gola, Dole, Motka, Dhari, Gunny/Plastic bag or sacks in Bangladesh. Under hot and humid weather, rice



হাণ্ডেটিক (হাণ্ডেটেক) ব্যাগে ধান সংরক্ষণের কৌশল ও সুফল

হাণ্ডেটেক (হাণ্ডেটেক) ব্যাগ

- হাণ্ডেটেক ব্যাগের করা হয় এবং সুন্দারবাহার উপস্থাপিত
- ধান, গা, খুঁট, সারফিন, কঠিন প্রকৃতির সুরক্ষাকারকীয় অংশের হয় না বলেই চলে
- শস্যের গুণ ও গুণগত মান ঠিক থাকে
- হাঁসের মত অসুস্থ ও স্তূট থাকে
- কোন প্রকার রাসায়নিক ব্যবহারের প্রয়োজন হয় না তাই এটি অস্বাস্থ্যকর এবং পরিবেশ বান্ধব

ধান সংরক্ষণের পদ্ধতি

- হাণ্ডেটেক ব্যাগে ধান সংরক্ষণ করা হয় এবং সুন্দারবাহার উপস্থাপিত
- হাণ্ডেটেক ব্যাগে ধান সংরক্ষণ করা হয় এবং সুন্দারবাহার উপস্থাপিত
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Documenting Postharvest Loss in Brazil

A research team from various departments of the University of Illinois and three universities in Brazil (Universidade Federal de Viçosa, Universidade Federal de Goiás, and Federal University of Mato Grosso) are working on the research project “Measurement and Documentation of Brazilian Postharvest Loss”, funded by the ADM Institute.

During the first phase of the project, research activities were focused on determining the extent and economic cost of grain losses at three stages of the supply chain – harvest, transportation, and storage in the Mato Grosso and Goiás states in Brazil. A comprehensive study was conducted to estimate the harvesting losses during combine harvesting of corn and soybean. Eight and 11 different combines were tested for estimating losses during soybean and corn harvesting, respectively, in the states of Goiás and Mato Grosso. The combine losses for soybean ranged from 47.4 to 260.5 kg/ha (1.2% to 5.5% of yield), with header loss as the primary contributor.

In the case of corn, total combine losses ranged from 36.2 to 320.6 kg/ha (0.3% to 3.6% of yield). It was concluded that combine harvesting at high moisture (more than 14%) and at low combine ground speed can reduce shattering and stubble losses in soybean, two biggest losses during the harvesting. The careful operation (making needed adjustments) of combine by the operator can save about 2 bags/ha of soybean (operator hourly value of USD \$238 to \$277/h). As the part of the project, grain monitoring probes were developed to measure logistical aspects of grain handling and transportation conditions (temperature, relative humidity, and carbon dioxide from grain respiration).

The activities in the second phase of this project involve i) exploring the opportunities for future PHL field measurements through a comprehensive survey of smallholder farmers in Paraná state and exploratory data collection in Mato Grosso state in Brazil, ii) determining the best management practices of hermetic storage

of soybeans and corn in tropical climates, iii) developing maximum allowable storage time (MAST) guidelines of soybeans and corn, and iv) measurements of PHL during handling and transportation of soybeans. Due to lack of on-farm storage facilities, soybeans are often transported immediately after harvest to storage facilities for drying. Conditions in the grain trailer during transport, which could range from 5 to 125 km and take 0.5 to 30 h, are not well documented but are essential to understand and reduce losses. The grain monitoring probe will be used to measure and record temperature, relative humidity, carbon dioxide levels resulting from grain respiration, and GPS data will be used to describe grain trailer and handling conditions, such as loading, transit, unloading, and waiting times at the farm and at storage facility. This data, along with harvest moisture content and grain classification, can be used to ascertain inefficient handling and transportation practices that lead to postharvest losses and recommendations for reducing these losses.

Field experiment involving storing high moisture soybeans in hermetic silo bags for three weeks at a farm in Sinop, Mato Grosso showed no reduction in soybean quality metrics from using this temporary storage in silo bags. An extension publication demonstrating temporary storage of corn, wheat, and soybeans in silo bags has been planned. The publication will be bilingual (Portuguese, English) or two versions will be produced.

A grain respiration measurement system was designed, fabricated and tested with low moisture soybeans. Experiments have been conducted to measure dry matter loss rates of soybeans over a wide range of moisture contents and temperatures - we anticipate experiments will be completed by December 2016 and data analyses and thesis will be completed by August 2017. Development of a grain monitoring probe to measure temperature, relative humidity, carbon dioxide levels and logistical information during handling and transportation of soybeans has been completed.

grains are infected by mold, which leads to the production of mycotoxins. A detailed study was performed to compare storage losses between grains stored in traditional storage structures vs. grains stored in hermetic bags, both in a controlled environment (labs in BAU) and in actual conditions (farmer’s house). In both lab and field settings, the hermetic bags were able to maintain moisture at lower levels than traditional structures, which led to very low levels of insect infestation and grain quality losses. Considering the usefulness and increasing interest of farmers in hermetic technology, the BAU team has developed a brochure that explains the benefits and use of hermetic bags in the local language, which is pictured at left.

Researchers at Bangladesh Agricultural University hosted a workshop to discuss the project in September 2016. The picture at right is from the invitation.



Mechanization Symposium in July Advances the Aims of ASMC

Members of the Appropriate Scale Mechanization Consortium (ASMC) brought together researchers from around the world to talk about the challenges of implementing technology to reduce postharvest losses in the the regions of the world where these techniques have been most lacking.

Dr. Prasanta Kalita, director of the ADM Institute for the Prevention of Postharvest Loss (ADMI), and Dr. Alan Hansen, director of the Appropriate Scale Mechanization Consortium (ASMC), highlighted how mechanization and postharvest technologies are critical components for the sustainable intensification of agricultural production during their welcoming address for the Mechanization and Postharvest Opportunities for Smallholders in Sustainable Agriculture Symposium, held July 22 at the University of Illinois.

This symposium brought together researchers from around the world working on mechanization and postharvest loss-reducing technologies to strengthen synergistic partnerships between ADMI at the University of Illinois, and two Feed the Future Innovation labs: the Innovation Lab for Collaborative Research on Sustainable Intensification and the Reduction of Post-Harvest Loss (PHL) Lab, both housed at Kansas State University.

At the symposium, the ASMC led discussions on appropriate scale mechanization in Cambodia, Bangladesh, Burkina Faso and Ethiopia. The ADMI highlighted their work in Bangladesh and India including a new initiative in the Bihar region of India. This project focuses on implementing postharvest loss-reducing technologies that match Bihar's specific challenges related to drying, cleaning, storage, transportation and milling of crops.



This project focus is very similar to the activities being pursued by the ASMC, and thus there is opportunity to share resources and lessons learned. Given that both programs are housed at the University of Illinois and hold similar goals, ADMI and ASMC are able to collaborate on research that focuses on reducing PHL. In a joint effort, the entities have been developing small-scale dryers to reduce the amount of postharvest loss in countries that rely on high-yielding agricultural practices like Bihar.

Symposium attendees had the opportunity to examine one of these dryers first-hand and engage with the ADMI and ASMC researchers who developed it. Strengthening the synergies between sustainable intensification, postharvest loss and mechanization, the two groups will continue to engage in projects that aim to ultimately reduce global hunger and poverty.

For more information about work of the Feed the Future Innovation Lab for Collaborative Research on Sustainable Intensification, visit their website at: www.k-state.edu/siil

Above, symposium attendees take a little time at the end of a full day for a photo in the ACES Funk Library at the University of Illinois.

At left, ADM Institute staff members demonstrate the low-cost STR dryer for symposium attendees.



See more symposium photos

<https://www.flickr.com/gp/phlinstitute/4939fZ>

About the Appropriate Scale Mechanization Consortium

The Appropriate Scale Mechanization Consortium (ASMC), initiated on October 1, 2015, and led by University of Illinois at Urbana-Champaign, is a sub-grant under the USAID Feed the Future Sustainable Intensification Innovation Lab (SIIL) at Kansas State University. ADMI is a partner of the Consortium that includes Michigan State University, Kansas State University, and North Carolina A&T University.

The ADM Institute is substantially involved in the project in terms of expertise, human resources and financial contributions.

The overall objective of the Consortium is to develop and deploy scalable mechanization technologies to enhance sustainable intensification in Burkina Faso and Ethiopia in Africa, Bangladesh in South Asia and Cambodia in Southeast Asia. The key concept of ASMC is to create an ecosystem of innovation such that in-country



Collaborative Research on Sustainable Intensification

institutions will seek mechanization solutions to improve intensification in a sustainable manner. To this effect, the ASMC is establishing innovation hubs at each in-country participating institution. The mechanism for launching the hub has been the completion of a pre-launch survey by

the host institution followed by a visit by the ASMC team with a two-day workshop and field visits. A strong emphasis was placed on having a broad range of participants representing all the key stakeholders in the region with a particular focus on smallholder farmers and women.

Each country identified key challenges and opportunities that can be influenced by mechanization. Some examples of mechanization projects that will be implemented in the coming year include direct seeding and land preparation for rice paddy production in Cambodia, evaluation of available rice transplanters in Bangladesh, adaptation of a rotary maize sheller in Ethiopia, and development of animal drawn seed planters and fertilizer applicators in Burkina Faso.

The ASMC will be conducting a baseline survey, leveraging efforts from other institutions and non-government organizations interested in similar information. The timing of the surveys will take into account farming operations and the availability of farmers. The ASMC will also finalize the establishment of the Innovation Hubs in each country and identify suitable sites for farm-based satellite hubs. These latter hubs will be an effective resource for conducting demonstration, outreach and project activities associated with the smallholder farming communities.

Appreciation from an inspired symposium attendee

Ogunranti Feyisara was visiting Illinois for another reason, but he happened to be in Urbana-Champaign at just the right time, and attended the ASMC Symposium as the guest of University of Illinois emeritus faculty member Paul Hixson. After he returned to Nigeria, he wrote to his new friends in Illinois to express what the experience had meant to him.

Dear all,

My recent visit to the United States was full of many electrifying moments which is difficult to forget. From meeting a lot of professionals from different backgrounds to meeting important personnel in the US government especially Mr. President himself is a feat I never thought I will achieve. Going through the U.S. system is also amazing, seeing how things work and how much is invested to make things work as well as the crack lines in the system was also very great.

Much more amazing however are the people I met in Urbana-Champaign, Illinois, especially During the University of Illinois' ADM Postharvest Institute Symposium which I was "lucky" to attend by a slim chance. I saw amazing things being worked on by professionals that gave answers to most of my curiosity on how to go about improving the food sector here in Nigeria. That was a wow moment for me, something that I will never forget - having so much power and knowledge in one room for that long!

True I am but a drop in the ocean of 7 billion people but I want everyone to know that you made a whole lot of difference in my life. From going to cookouts to taking me around the town and treating me like a friend, now I can say I have a home in Urbana-Champaign.

You have invested in me and going forward, I will make sure it is not in vain! Attached is the poster I came up with on improving the food safety in Nigeria. Going forward, I will work on reducing mechanization in farming, building STR dryers, working more with



Ogunranti Feyisara (right) and Paul Hixson at the symposium.

women farmer groups and ensuring that farmers have value for their production as discussed at the symposium. I will also work on using videos and animations for training and sensitization of the populace.

You didn't just host a friend, you all planted a seed, it will come up and become a forest someday. Please do not stop in investing in me, send me any form of advice you think I may need. I will also keep updating on progress made at all times.

I didn't mention any name because the list is long, but if you find this message in your box, you planted a seed in me.

Thank you.

Ogunranti Feyisara,
Standards Organisation of Nigeria

Educating Students about Postharvest Loss

A group of 12 students participated in the ACES 298: Postharvest Loss Prevention study abroad program, which introduces participants to postharvest processes of grains and perishables and loss prevention in the Bihar and Punjab areas of India. The group spent a total of 12 days in India, visiting sites in the states of Bihar and Punjab. They traveled to the location of the new ADM Village in Bihar, and worked with Indian student counterparts from Dr. Rajendra Prasad Central Agricultural University (Dr. RPCAU). They also had opportunities to interact with policy makers and agriculture industry representatives. Students wrote about their experiences for the ADM Institute blog, and one entry is reprinted here.

Seeing the villages of Bihar

By Whitney Kwok, University of Illinois senior

The RAU students joined us for breakfast at our guesthouse this morning. We walked to the agricultural engineering building together. Dr. Kent Rausch started us off with his lecture – “Fundamentals of Grain Drying and Storage.” We covered some basic information regarding grain drying and storage such as why and how it is beneficial to both the farmers, consumers, and everyone else in between. We also talked about the mechanism of water movement and action within grains which led to the discussion on various methods of minimizing moisture content. Rausch brought a moisture meter to accompany his lecture which gave us a visual on how moisture content can be measured in a grain sample. A quick lecture about hermetic storage bags followed. We took a brief tour of some processing equipment and had a demonstration of how digital moisture meters and an economical grain dryer that will be commonly used throughout the villages.

After lunch, we embarked on a trip to the potential site of the ADMI Village. What was supposed to be a 50km trip ended up being a two- to three-hour trip which we were sure was 70km or more. Nonetheless, the ride was scenic and eventful as we drove past markets, farms, and curious faces peering into our cars.

When we arrived in the village, it quickly began to resemble a parade as the villagers started to trail behind us. We got to see



a variety of things at the village – grain storage and traditional grain milling and grinding methods. One of our students got a cow named after her by the villagers – “Ashley Cow.” A villager who taught us the traditional method of grinding grains showed extreme gratitude to one of our students and was almost on the verge of crying from happiness and pride to know that she has imparted knowledge to our group. Although it was a bit hectic at times, I was glad that we were able to amuse and make the villagers’ day a little more interesting – hopefully as much as they have made ours.

We drove back to RAU with promise of a “surprise” when we got back. With the RAU students asking us what we will perform tonight, we were getting a bit nervous about this surprise. We got back to campus to find a bonfire and food prepared for us. We all gathered around the fire as dance and singing quickly ensued. The RAU students were not shy about their talents at all. After a while they requested that we perform a song for them. We were able to muster up a group performance of “Hail to the Orange”, our university’s alma mater. After much dancing and food, we finally returned to the guesthouse as we prepared for another exciting day in India tomorrow.

Pictured above, a mix of local villagers and university students from India and Illinois make their way around a village pond at a potential ADMI Village location in Bihar.

At left, Er. Vishal Kumar demonstrates the USDA EMC 4.0 moisture meter at the Dr. RPCAU agricultural engineering building.



Read more student blog entries here

<http://bit.ly/1VN6ldd>

Postharvest Green Technologies for Urban Farms

Postharvest Loss Avoidance through Technology and Education (PLATE) is a two-year research and development project funded by the ADM Institute at the University of Illinois that aims to minimize postharvest loss while revitalizing urban land. Experts at Chanute Fields and Prosperity Gardens in Champaign County are researching, implementing, and teaching best practices for food harvesting. Mobile wash stations and cooling units are being created to extend crop availability through proper washing and packing for long term storage and sale.

Once the stations have been built and tested, there are plans to make the research and development available worldwide. It is hoped that poor areas in our community and across the globe will be able to utilize similar structures where they experience their own food deserts, enriching the diets of residents. PLATE will bring safe, fresh, affordable, and nutritious food to families and individuals throughout the local community and worldwide.

At Chanute Fields near Rantoul, construction is planned on a portable cooling trailer and a wash station. The trailer, used to remove field heat from freshly-harvested produce, is built into an enclosed trailer and powered by a generator. The portable wash station is built onto a flatbed trailer, which allows on-site washing and drying.



University of Illinois Extension staff and ADM Institute team members are pictured at a recent Chanute Fields open house event.

At Prosperity Gardens, a community garden project on reclaimed urban property in a low-income food desert, storage units will be utilized to create a cold storage unit with a chiller. This unit will allow varying temperatures and humidity for different specialty crops while using renewable energy sources, such as solar panels.

After construction on the cooling trailer and wash and dry stations is completed, feedback concerning the use of the stations will be compiled and adjustments will be made as recommended and required. Workers at Prosperity Gardens will research the cold storage unit at their facility through daily use and will make changes as possible.

Once research is completed, it will be shared with the public through in-person field days, on-site demonstrations, videos and webinars. Information will be made available within our community and worldwide.

Coursera PHL 101 course now available on-demand around the world

The ADM Institute Coursera course “Global Postharvest Loss Prevention: Fundamentals, Technologies, and Actors” has been a success since it was launched in early 2015. This summer, we upgraded the course to a new format that allows learners to join an active course every four weeks.

In the past, a cohort was formed only occasionally, although the information could be accessed at any time. Now a group of learners begins every four weeks. Since the new on-demand course format began on July 11, we have 528 enrolled learners.

Informally referred to as “PHL 101”, the course targets four key knowledge areas: an overview of postharvest loss; supply chain activities including harvesting, drying, and storage; economics and markets; and an introduction to the network of actors working in the field of PHL prevention. Learners, or course participants, from all backgrounds and professions were exposed to the most fundamental topics and concepts to understand about postharvest loss.

The course received a tremendous response when it was offered in 2015, with more than 6,000 learners from 166 countries participating. From the new group of learners, we have received

overwhelming positive feedback left on our website. “There are a lot of aspects of PHL that is not taught to Agricultural Engineers in India,” wrote one learner. “This course is an excellent way of understanding some of those aspects such as economical value of PHL and the role of Extension workers in PHL. The course also opened my mind to the many available resources online and also to the problem of PHL as a global aspect.”

Information about the course, course materials, and course discussions from the previous offering can all be accessed by joining at www.coursera.org/learn/postharvest

Coursera is a leading provider of MOOCs, partnering with top universities and organizations worldwide to offer courses online for anyone to take. The University of Illinois at Urbana-Champaign partnered with Coursera in the summer of 2012, the first U.S. land-grant institution to join the consortium of more than a dozen global universities.



Other Research Projects

In addition to the institute's large projects in India and Bangladesh, the institute funds many other, smaller projects to address specific problems all over the world. This provides a sampling of the smaller but still important projects supported by the ADM Institute.

Development of an Integrated Stored Solar Dryer and Cooker

The ADMI-funded project focuses on developing an integrated dryer and cooker using solar energy on a small farm/household scale. The product uses low-cost, readily-available salts that store large amounts of thermal energy when they are heated and change from solid to liquid.

In the first year of this project, University of Illinois researcher Dr. Bruce Litchfield and his team executed international field tests this summer, with positive results. Using a common household drier (pictured below), lab results showed that heat from stored solar vessels is sufficient to dry food property, and that the temperature can be effectively regulated.



Drying is a crucial step in the postharvest processing of grain crops to reduce the moisture content to the safe storage limits. This helps minimize postharvest losses. However, the drying process is energy intensive and can cause quantity and quality losses, especially using traditional methods. Open-air sun drying, the most commonly-used method in developing nations, suffers from limitations, including capacity, labor requirement, contamination from dust/stones, non-uniform drying, losses due to birds/rodents, etc.



Most applications that use thermal energy in the developing world rely on combustion-based processes, often burning solid fuels. The stored solar heat can be used to dry grains, as well as cook meals. The product will be remarkably different in that it uses no fuel, has no flame, and creates no emissions. The expected product from this project will have high value for smallholder farmers in developing countries.

Plans to continue partnership with China RCRC

The Research Center for Rural Economy (RCRE) in China has conducted research that identifies the loss rate of wheat after harvest in Henan Province is highest immediately after harvest, when compared to losses during transportation, drying, storage and other links.

The ADM Institute plans to continue a research partnership with RCRE to produce more data about postharvest losses in China. ADMI director Prasanta Kalita visited China earlier this year and met with RCRE and ADM China representatives (above) to discuss future plans.

ADMI to sponsor event at ASABE 2016 South Africa

The ADM Institute will be a silver sponsor at the upcoming inaugural ASABE Engineering and Technology Innovation for Global Food Security Conference, which will be held Oct. 24-27 in Stellenbosch, South Africa.

The conference will focus on engineering and technology necessary to ensure the availability of a consistent food supply; access to sufficient resources to produce or purchase food; ability to store and preserve food for an adequate shelf life; and opportunity to make healthy, nutritious dietary choices. These include food productivity, reduction of post-harvest losses and food wastage, improvements in agricultural technology and informatics, the need for climate adaptation of agriculture, benefit international development projects, and facilitate technology scale-up.

ADMI will also lead a forum discussion about postharvest loss at the event, which will be moderated by University of Illinois president emeritus and ADMI External Advisory Board president Dr. Robert Easter. Panelists will include Rafael Flor, Rockefeller Foundation Africa; Dr. Dirk Maier, Iowa State University; and Dr. Prasanta Kalita, ADM Institute director.

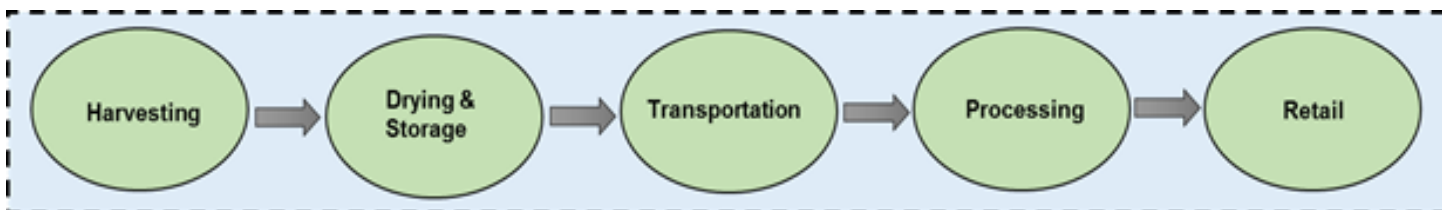
Information: <http://asabe2016.co.za/>

ADM Institute for the Prevention of Postharvest Loss

A Consensus-based Roadmap for Reducing Global Postharvest Loss

By Dr. Prasanta Kalita, Director, ADM Institute for the Prevention of Postharvest Loss

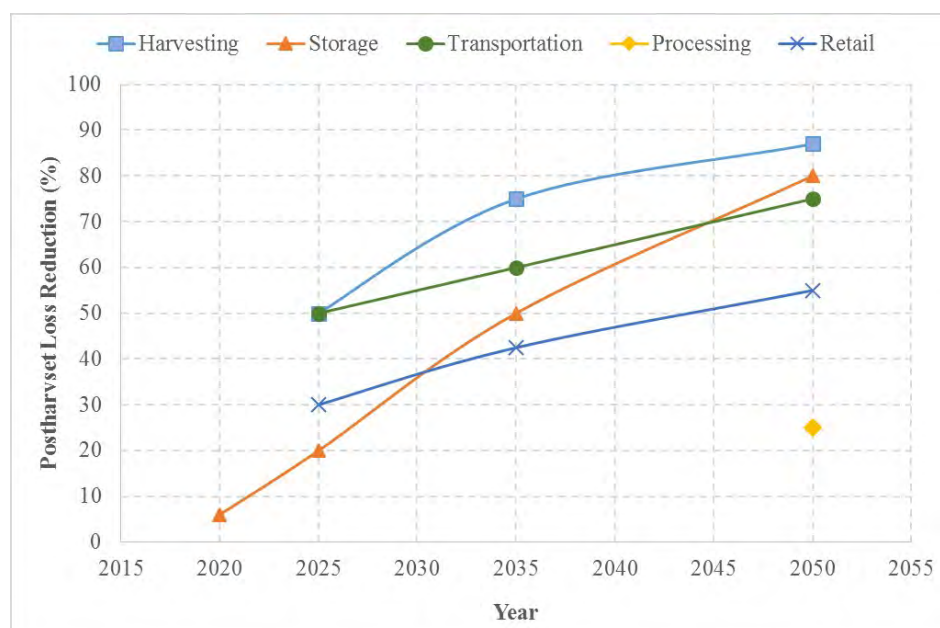
At the First International Congress on Postharvest Loss Prevention in Rome last year, we initiated a discussion to develop a road map to chart the pathways toward improving lives and livelihoods of a large number of smallholder farmers sustainably through postharvest loss reduction of key crops with minimal environmental impact. We targeted to focus the roadmap development within the scope of the following broader stages of the supply chain:



Postharvest losses can be reduced from each of the above supply chain stages by interventions that are defined as target intervention areas (TIA). The TIAs are Markets, Technology, Policy, and Education and Training. We had 5 breakout groups based on the five supply chain stages. Each group focused on one of the supply chains and answered the following questions:

1. What are the 3-5 major causes of postharvest losses in this stage?
2. For the first most critical TIA, what are/could be the 3-5 best practices and/or most promising approaches?
3. For the first most critical TIA and the approaches identified, what is needed to implement these solutions with significant impact?
4. Based on answers to the above questions, by how much can postharvest losses be reduced by 2050 to improve the quality of lives and livelihoods of a large number of smallholder farmers?

Each group identified the major causes of postharvest losses in developing countries, ranked the TIAs (1 = most critical to 4 = least critical) and proposed best practices and/or most promising approaches for loss reduction solutions for key crops. The groups then presented their findings to the entire Congress attendees, and based on feedback from the entire audience, modified their findings. The final task of the group was to present % postharvest loss reduction for each supply chain stage. The following graph presents the consensus reached by all groups on postharvest loss reduction.



Download the complete roadmap from the ADM Institute website at postharvestinstitute.illinois.edu

Notes

Notes

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