



Periodic Report

The ADM Institute's Periodic Reports provide updates on recent and upcoming activities, reports, events and accomplishments.

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ADM Institute Joins Power of 3 Initiatives

Late this summer, the ADM Institute became a partner of an innovative initiative called "[The Power of 3: Food, Water, and Energy](#)", with the Institute of Food Technologists (IFT) and others. This partnership unites the strengths of industry and academia behind a science-based effort to develop cross-cutting solutions for global food security. While many projects

and programs in the agricultural sector focus on the food-water-energy nexus, the Power of 3 initiative takes a first look at it in the postharvest phase of food production.

The initiative continued at this year's Borlaug Dialogue, where the ADM Institute co-hosted a side event with IFT titled,

(cont'd on page 2)



The Power of 3 initiative takes a first-time look at food, water, and energy security issues in the postharvest sector.

MOU Signed between Research Center for Rural Economy of China and ADM Institute

Following the ADM Institute staff's visit to Beijing, China, in February, the institute has continued discussion of collaborative opportunities with the Research Center for Rural Economy (RCRE). A Memorandum of Understanding (MOU) was signed between RCRE and the ADM Institute in August. Activities, including joint research endeavors, exchange of personnel and

materials for academic purposes, etc., are made possible between the two organizations within the MOU.

Along with the MOU, the ADM Institute and RCRE are embarking on a project that will develop strategies to reduce postharvest loss in China. The first step is to conduct a baseline survey that focuses on examining the extent of postharvest loss

of wheat in the storage, transportation, and processing stages in the major wheat production areas of China. The institute is currently assisting the center in designing the survey questionnaire, along with key faculty from the University of Illinois at Urbana-Champaign.

For more information on the Beijing visit, please see the [July 2013 Periodic Report](#). ¶

(cont'd) "[*The Role of Science and Innovation on Food, Water, & Energy Security in the Postharvest Sector*](#)". The event featured three expert panelists: Ashok Gulati, Chairman of the Commission for Agricultural Costs and Prices, Government of India; Mark McLellan, Director of Graduate Studies, Utah State University; and John Ruff, former food company executive.

Panelists shared their thoughts on what it would take to curb postharvest losses. Gulati urged for innovations in policy, such as the increased use of public-private partnerships, to engage poor

smallholders who comprise a majority of today's food production system. Ruff gave a private sector point of view to Gulati's point, explaining that because industry *must* be innovative to be successful, it is a natural partner to the public sector for optimizing the food system. McLellan urged for all sectors to agree to an application of appropriate values for food, water, and energy inputs. He suggested water as a good place to start, where a large margin likely exists between social benefits and economic costs of water use.

In their responses to audience questions

on where and how to implement solutions, the panel unanimously concluded *there is no one silver bullet*. The way forward, as noted by Ruff, is through "building coalitions with stakeholders with whom our organizations can make the most impact". Ruff's closing advice highlighted the purpose and significance behind the Power of 3 initiative. The Borlaug Dialogue panel discussion, a great success, marked the strength of this collaboration. As we continue on this exploration, the ADM Institute invites you to engage with us on this important initiative. ¶

External Advisory Board Meeting 2013

The ADM Institute hosted the annual External Advisory Board meeting at the Borlaug Dialogue in Des Moines, Iowa, on October 17 and 18. A tradition started in 2012, the Board Meeting is held each year at this important symposium, where the institute can host a side event on major issues and innovations in postharvest loss, and meeting participants can build and strengthen relationships with others in the agricultural development community. Members of the Steering Committee also joined the meeting to contribute their perspectives to the discussions.

This year's meeting used a unique discussion question format to gather insights from the External Advisory Board on strategic opportunities for the institute. Suggested by the Steering Committee, the discussion question format was well-received by the Board, and allowed both the Board and the Committee to shape key steps the institute should take to move forward.

Main Outcomes

The discussion drew strong consensus that the institute should develop a framework for conceptualizing postharvest loss. The Institute Director presented a systems dynamics model approach, which separates loss events or problem areas from underlying patterns and structures. More than just mapping food systems, the framework would employ quantitative tools that analyze actual supply chains. Meeting participants unanimously agreed this approach is essential to postharvest loss prevention, and will be an important model for the institute to produce.



Some members of the EAB and Steering Committee, with ADM Institute staff member Kari Wozniak, in center

This linked to the question of how to communicate the 'economics of loss', a concept which, as Dr. Peter Goldsmith of the Steering Committee explained, illustrates that loss is only sustainably preventable to the extent that the benefits of doing so are greater than the costs. The Board suggested that pursuing a systems dynamics approach would allow the institute to easily communicate that postharvest loss prevention is a matter of optimizing systems which will benefit people's lives.

Another key outcome came from discussion on the measurement of postharvest losses. With data still a major impediment to research and interventions of loss, the institute plans to be involved in a measurement-focused conference with different stakeholders and partners such as the Bill & Melinda Gates Foundation. The Board sees the institute as a leader in this area that can use its foundation in science, technology, and evidence-based research to develop measurement

techniques that generate appropriate data. Complete goals of the event are still to be finalized, but include defining what to measure, how to best measure it, how to ensure dissemination and use of best practices of methodologies, toolkits, and more.

In addition to conceptual discussions, meeting participants also addressed the institute's plans for practical application of knowledge. Dr. KC Ting explained the idea of developing a demonstration site for simultaneous research,

demonstration, and training of postharvest prevention methods and techniques. The Board agreed that a practical outlet would be an important addition, and suggested that the institute proceed with creating the development site. Another idea discussed was the opportunity to bundle various "soft infrastructure" developments like online marketing tools and ICT as opposed to just hard infrastructure—i.e. roads, canals, and buildings. The Board advised to keep this in sight as the institute moves forward

for future application of the knowledge generated from the framework and workshop.

The ADM Institute engages with the External Advisory Board and Steering Committee several times throughout the year in various capacities. The annual meeting alongside the Borlaug Dialogue, the premier conference on food security and agricultural development, is a unique opportunity and plays an essential role in driving the institute forward to bring knowledge and innovation to PHL prevention. ¶

Student Innovations to Prevent Postharvest Loss

Illinois PhD student Abhishek Dhoble went to India on a trip with Dr. Madhu Visnawathan's class on Sustainable Product and Market Development for Subsistence Marketplaces last January. He and his team spent the previous fall semester studying major postharvest loss issues in India, developing conceptual plans for potential innovations, and then acquired more data and understanding on their trip over winter break. Upon return, Dhoble and his colleagues developed what they thought would be a supportive 'in-between' solution for postharvest losses during storage, particularly in Southern India: neem paint for jute bags.

Neem oil is well known in developing countries for its insecticidal properties and in this case, is extracted and mixed with sustainable ingredients to form a type of 'paint'. It is then applied to the exteriors of jute bags, let to dry, which then provides protection of grain stored



Dhoble, left, and Bekal, right, in front of ongoing tests at the laboratory

in the bags from pests which often invade bags during short-term storage.

Dhoble and his colleagues developed a design based off initial testing in a laboratory for their product, a business plan, and a plan for product entry to India. Upon presentation to the ADM Institute, it was decided that this innovative product would move to the next level for more testing.

In the first test, Dhoble tested neem against e. Coli and cyanobacteria; soon

he will be testing the mixture against the soybean cyst nematode, with Sadia Bekal, a postdoctoral student specializing in nematodes. So far the findings have indicated that, at high concentration, neem oil does deter the growth of the tested organisms. They will also be testing different solution concentrations and versions to find a longer shelf life for the paint.

As this solution is made of locally-available materials, the paint will not only be easy to make locally, but also be inexpensive. The paint ultimately will help farmers store their grain for a longer time, which will allow them to compete for better prices after the bulk of harvest has arrived at the market.

The students' goal is to come up with a solution that is sustainable, environmentally-friendly, has a long shelf life, and successfully repels insects for a long period of time. ¶

Farmers' Perceptions of Postharvest Loss

Dr. Peter Goldsmith and graduate student, Anamaria Gaudencio Martins, presented their work on a survey of farmers' perceptions of postharvest loss at the 72nd annual meeting of Western Education and Research Activities in Las Vegas, Nevada, this summer. Goldsmith and Martins identified that there is a lack of postharvest loss research on farmers and on-farm management practices. Their project focused on farmers' perceptions of the extent and causes of loss on their farms, especially farmers' roles in loss management and how loss measurement affects loss reduction.



An interviewed farmer's on-farm silos

Goldsmith and Martins believe farmers' perceptions of loss are a combination of farmers' demographic characteristics, management characteristics, and awareness of factors affecting postharvest loss. They designed a questionnaire to examine the aforementioned elements focusing on three on-farm processing stages: harvesting, short-haul, and storage. At the end of 2012, Goldsmith and Martins conducted a survey in Mato Grosso, Brazil. 158 farmers participated in the survey, and 94 farmers completely answered the questions.

According to the survey, participants perceived an average 10.37% of loss at these three stages, in which harvesting loss accounts for more than half of the loss. About half of the participants were younger than 40 years old, and only 2% of them were older than 60. Most participants had obtained a bachelor's degree. More than 60% of the participants harvested over 1,000 hectares of soybean, and about one-third of them used on-farm storage and contracted workers. An interesting finding was that about 36% of the participant farmers did measure loss, which indicates that some farmers did include loss management in their operations.

Goldsmith and Martins also examined the factors affecting postharvest loss at the harvesting and short-haul stages. Over 70% of the participants considered lack of needed adjustment at the platform and bad weather conditions as the two main factors for loss at the harvesting stage. However, 64% of respondents viewed natural causes, such as insects and rodents, as an unimportant factor. At the short-haul stage, 73% of the participants believed that bad road conditions affected loss, and over 60% of them considered truck condition and type of truck body as important factors affecting short-haul loss.

To examine the model of loss perceptions, Goldsmith and Martins ran correlation and regression analyses to identify how each variable influenced farmers' perceptions of loss. The results showed that variables, including age, on-farm storage, as well as awareness of

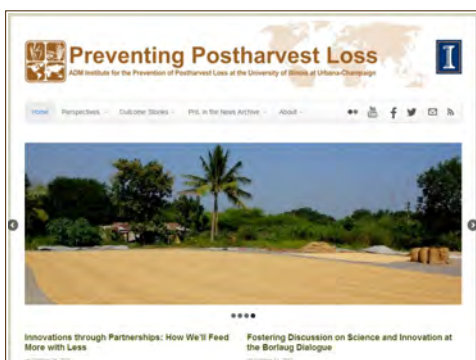
harvesting speed, combine adjustment, and bad weather conditions, were all significant at the 10% level. The model indicated that older farmers perceived less on-farm loss, farmers having on-farm storage perceived less on-farm loss, farmers who were aware of harvesting speed had lower perceptions of loss, farmers who were aware of the importance of combine adjustments perceived less loss, and farmers who were aware of bad weather conditions held lower perceptions of loss.

Goldsmith and Martins further classified harvest speed and combine adjustments as controlled factors, and weather conditions as an uncontrolled factor. They found out that participants perceived less on-farm loss if they identified controlled factors as more important causes of loss than uncontrolled factors.

In conclusion, Goldsmith and Martins deduced that postharvest loss reduction is a management issue. Although farmers may not consider loss reduction as the highest priority, future policy for loss reduction may take a management-oriented approach.

Additionally, Goldsmith and Martins indicated that the reason why farmers accept controllable factors still remains unexplained. Further research is needed to understand farmers' incentives for loss reduction. ¶

ADM Institute Launches a Blog



Homepage of the ADM Institute's blog, "Preventing Postharvest Loss"

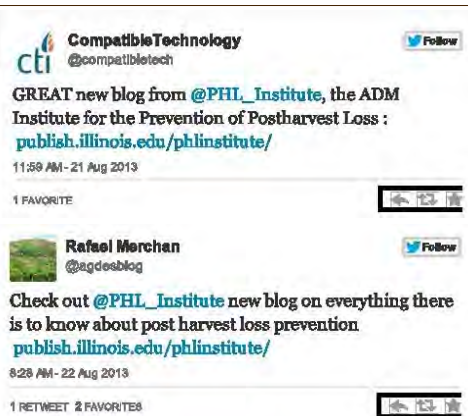
In recent years, awareness has grown of the impact and issues of losses in the food chain. Many recognize that the problem of postharvest loss is complex, and mitigating it requires collaboration across all sectors. The ADM Institute launched a blog, [Preventing Postharvest Loss](http://publish.illinois.edu/phlinstitute/), in August 2013 to foster active dialogue among stakeholders. The advanced information-sharing capabilities of a blog platform allow the institute and others in the PHL community to engage in discussion and debate on action steps and practical approaches to reducing loss.

The first featured post was published on August 22nd, titled, "[Food Security, Postharvest Loss, and Henry Kissinger](#)." A compelling anecdote on the history of postharvest loss prevention, it stirred a conversation people are excited to have.



First topic: Kissinger charged us to cut it by half, but did we do it?

Since its launch, the ADM Institute has established its perspective on postharvest loss prevention, as well as initiated conversations on how to use science, data, and innovation to develop solutions. Social media platforms such as Twitter and Facebook have served as essential tools in disseminating posts as they are published, helping reach readers from every continent in over 100 countries.



Twitter was a key tool that led to a successful blog launch.

With 8 posts published, the ADM Institute will focus next on sharing the important lessons and outcomes from its funded research projects. Starting in November, the ADM Institute will publish outcome stories describing what it is like to perform research on postharvest loss, identifying the major issues researchers are currently trying to tackle, and how they are using expert knowledge from business, engineering, social sciences, and other disciplines to address problems of postharvest loss.

The current categories provide a range of information, from director's perspectives to media trends analysis, which serve as a needed outlet for

dynamic and accessible postharvest loss dialogue and learning.

Categories:

- **Perspectives:**

Direct engagement with thoughts and views of experts in postharvest loss research and prevention.

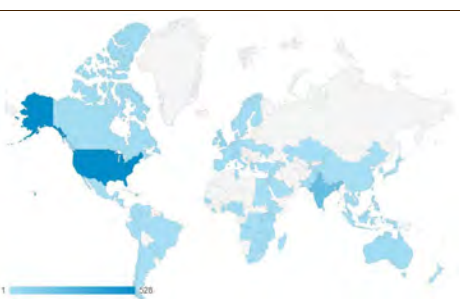
- **Outcome stories:**

Real-time sharing of lessons learned throughout the process of research, projects, field visits, and outreach events.

- **PHL in the News Archive:**

Repository for online media featured in the PHL in the News weekly digest. To-date, 85 editions have been published, which include over 1,000 articles that will be searchable by topic, location, issue, and other categories.

As the ADM Institute grows in its outreach and impact, the blog will play a foundational role in fulfilling its mission as an international information hub.¶



Readers from all over the world can access perspectives and information shared on the ADM Institute blog.

Recent Events

To raise awareness of postharvest loss as well as enhance collaboration with other organizations, representatives of the ADM Institute participate in events concerning postharvest loss and agricultural development.

Representatives of other institutes also visit the ADM Institute and the University of Illinois to explore potential collaborative opportunities. Below is a partial listing of recent events in which representatives of the ADM Institute have participated:

July

16th – The ADM Institute partnered with the Institute of Food Technologists for an initiative called, “[The Power of 3: Food, Water, & Energy](#)”, which was an invitation-only event held in conjunction with the 2013 IFT Annual Meeting and Food Expo in Chicago, IL.

August

16-22nd – A delegation from Tamil Nadu Agricultural University (TNAU) visited the University of Illinois at Urbana-Champaign. On August 19th, they gave a talk on TNAU’s extension and technology work in helping small farmers in Tamil Nadu. Director Sonka and institute staff had a meeting with the delegation to discuss interventions for postharvest loss reduction and collaborative opportunities.

21st – The ADM Institute launched its official blog, [Preventing Postharvest Loss](#).

September

12th — Dr. Gopa Sabharwal, Vice Chancellor, and Dr. Anjana Sharma, Academic Dean, from Nalanda University visited the ADM Institute to discuss collaborative opportunities.

18th – The ADM Institute held a researchers’ working luncheon event. Dr. Tarek Abdelzaher from the Department of Computer Science presented his work on crowd-sourcing data and its potential to be applied to real-time postharvest loss data collection.

26th – Director Steve Sonka conducted a discussion session at the MFEAS seminar at Purdue University titled, “Beyond Precision Ag: If Big Data is the Solution, What’s the Question?”

October

10th – A delegation from GSI Group, LLC, met with several institute research faculty to discuss their current research and identify collaborative opportunities.



Dr. Gulati speaks on India and the Food Security Act at a Seminar hosted by College of ACES

14-15th – Dr. Ashok Gulati, Chairman of the Commission for Agricultural Costs

and Prices (CACP) of the Government of India, visited the University of Illinois at Urbana-Champaign. He gave a speech titled “[Indian Agriculture and the Right to Food](#)” on the 14th, focusing on the critical role of agriculture in India, the growth of India, and the recently passed Food Security Bill.



Panelists gave important insights on the role of science and innovation in curbing postharvest losses.

17th – The ADM Institute hosted a breakfast side event panel, “[The Role of Science and Innovation on Food, Water, & Energy Security in the Postharvest Sector](#)”, at the 2013 Borlaug Dialogue in Des Moines, IA.

17-18th – The ADM Institute held its annual meeting of the External Advisory Board in conjunction with the 2013 Borlaug Dialogue.



The External Advisory Board and Steering Committee members in the annual meeting

Upcoming Events

The ADM Institute has been involved both domestically and internationally in events concerning postharvest loss and agricultural development. Below is a partial listing of upcoming events in which representatives of the ADM Institute will participate:

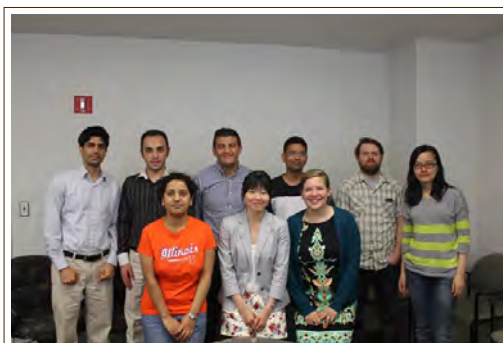
November

- 4-8th Director Sonka will visit the Research Center for Rural Economy in Beijing, China, to discuss the approach on a joint research survey on wheat postharvest loss in China.
- 12-17th Kari Wozniak, Project Coordinator at the institute, will participate in the [COP19 Social Media Boot Camp program](#) organized by CGIAR in Warsaw, Poland. The hands-on training course will provide knowledge and skills on the theory and practices of social media and reporting.
- 13th Project Coordinator Grace Kenney will be part of an '[Ideation Jam](#)' hosted by the Department of State to identify key improvement opportunities in the nexus of postharvest loss, publically available data, and technology in Washington, D.C.

December

- 1-13th Director Sonka will visit Patna and Chennai, India, and Manila, Philippines, with IRRI staff to look for future collaborative opportunities, as well as visit sites from the current joint project.

If there is a conference or event that should be brought to the ADM Institute's attention, please do not hesitate to inform us.



The ADM Institute hosted a meet-and-greet for research assistants and graduate students of affiliate faculty members



Dhoble and Bekal examine tests of bacteria and effectivity of neem oil as a bio-insecticide and repellent



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