



Annual Impact Report 2023

ADMI Institute for the Prevention
of Postharvest Loss
University of Illinois





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A NOTE FROM THE DIRECTOR - ALEX WINTER-NELSON



As ADMI continues its work to build food security and environmental sustainability through the reduction of postharvest loss, I am frequently reminded of how small changes can have large impact. For the vulnerable farmers and consumers that are the focus of ADMI's work, the difference between security and impoverishment can often be a matter of a few weeks, a few inches, a few dollars invested or a little information.

While hurricanes, floods and massive wildfires can capture media attention, marginal changes in weather, likely related to climate change, can have measurable effects on the welfare of small-scale farmers who rely on the natural environment for their livelihood. For farmers who must dry their harvested grain in the open air, a few inches of rain a few weeks later than expected can dramatically reduce their usable harvest. For farmers storing their harvest in permeable containers or bins, a small change in humidity or in the pest population can wreak havoc. But just as small shocks can have large effects, seemingly small interventions can make disproportionate contributions to resilience. The small-scale BAU-STR dryer, for example, is a low-cost and simple technology that continues to spread through Bangladesh and is having real impact on the farmers who use it and the service providers who make it available. We now see hundreds of dryers operated by farmers, farmer groups, and private service providers giving thousands of farmers a way to dry grain regardless of the weather. Likewise, a small shift to using a hermetic bag or cocoon is giving farmers and seed suppliers in Africa and Asia a pathway to safely store materials no matter what a changing climate may bring.

Small steps can also come in the form of organizational and knowledge change. Farmers' can build resilience from having choices of what to grow and how to manage and market the harvest. Helping farmer organizations, like those in Indonesia referenced in this report, to better manage their resources and their relations with the market can give members the power to respond to change in ways they may have never known were possible. The training materials developed and shared through ADMI are another small thing that can make a big difference.

The stories and impacts highlighted in this report are only possible because of the support from sponsors like ADM Cares and the United States Agency for International Development, and because of our continued partnerships with institutions around the world including The Bangladesh Agricultural University, The International Food Policy Research Institute, Indian Council for Research on International Economic Relations, Bogor University of Agriculture (Indonesia), The Bangladesh Ministry of Food, and many other institutional partners and collaborators. Looking ahead, ADMI remains committed to working with partners around the globe to continue to make small advances with confidence that they can have big impacts.

BANGLADESH



As part of our work with the Appropriate Scale Mechanization Consortium, an ADMI team visited Bangladesh Agricultural University (BAU) in Mymensingh in February 2023. With our colleagues at BAU, Dr. Monjurul Alam, Dr. Chayan Kumer Saha, and Dr. Lavlu Mozumder, we conducted interviews and focus groups with 28 women from three farm collectives to better understand the gendered dynamics of agricultural machinery access and use in Bangladesh, specifically related to the BAU-STR dryer. These interviews revealed several observations that will inform our work moving forward. [Read more.](#)

INDIA

An ADMI team provided access and training on the use of improved grain storage technology to over 3000 farmers in the state of Bihar in India. The ADMI research team used two randomized controlled trials – the gold standard in impact evaluation – to understand the full benefits of adopting improved grain technology on smallholder farm households. Findings confirmed that past studies had underestimated the wide-ranging benefits of postharvest loss-reduction technologies. [Read more.](#)



SIERRA LEONE



Our team from University of Illinois Urbana-Champaign, engaged with over 400 households in Sierra Leone to understand their perceptions and potential adoption of PICS bags, a solution to post-harvest losses.

PICS bags are a simple technology that reduce post-harvest losses of grains by hermetically sealing out air and insects, eliminating the need for pesticides. Farmers can use the bags to safely store grains for later household use, or to sell when market prices are higher.

Our insights from Sierra Leone are set to shape policies that resonate with the community's needs, ensuring a thoughtful introduction of PICS bags. [Read more.](#)

INDONESIA

Working with Indonesia's Ministry of Agriculture and Bogor Agricultural University, Paul McNamara and Anna Snider explored the effect of the public-private producer partnerships on the resilience of smallholder farmers and value chains.

Lessons learned in this project will guide the design of future partnerships for the Government of Indonesia and private sector companies in cocoa and other value chains. [Read more.](#)



BAU TRAINING MANUAL

A team from ADMI provided the Bangladesh Ministry of Food with the final recommendations towards introducing small and medium paddy drying technology in remote areas.

This activity was implemented in collaboration with the Bangladesh Agricultural University (BAU) as part of a joint program with the International Food Policy Research Institute (IFPRI), the University of Illinois, and the Bangladesh Institute for Development Studies under the Government of Bangladesh Modern Food Storage Facilities Project.



Exploring the proof of concept that small-scale dryers could be deployed in rural Bangladesh through private service providers as a way of addressing the grain drying bottleneck in the value chain, the final recommendations summarize how the model of dryer service provision was piloted in Bogura and Rangpur Districts and a scoping mission was launched to assess the relevant conditions in Naogaon District. Twenty service providers were selected to receive training in the use of the BAU-STR dryers and associated business practices.

NJALA POSTHARVEST TRAINING HUB (SIERRA LEONE)

Working in two districts and cooperating with two US-based NGOs, the University of Illinois and Sierra Leone's Njala University provided training directly through video extension materials and workshops to several hundred smallholder farmers.

This project continued the research partnership between the University of Illinois and Njala University on economic and social research related to the dissemination and adoption of postharvest-related technologies and approaches.

- Four SAWBO postharvest videos translated into local Krio language to be used in postharvest activities (linked below)
- Workshop at Njala University, April 2021: 30 people (18 men, 12 women)
- Njala/Illinois student postharvest activity, April 2021: 53 students (35 men, 18 women)
- Village-level trainings, December 2022: 25 people (12 men, 13 women)

In addition to the outcomes above, Njala and Illinois faculty members and staff are exploring future opportunities for collaboration.

COURSERA - GLOBAL POSTHARVEST LOSS PREVENTION: FUNDAMENTALS, TECHNOLOGIES, AND ACTORS

This free, online course provides an overview of the issue of postharvest loss of grains by exploring essential physical, technical, and social dimensions of postharvest supply chains and loss prevention methods globally.

Enroll at <https://www.coursera.org/learn/postharvest>.

- Free
- Beginner level
- Flexible schedule

4.8/5.0 stars from
43 ratings

-2023-

999

Enrolled in course

187

Completed the course

-Total-

9,889

Enrolled in course

1,013

Completed the course

SAMPLE OF PUBLISHED ARTICLES

“Assessing Gendered Impacts of Post-Harvest Technologies in Northern Ghana: Gender Equity and Food Security” A Snider, PK Adraki, V Lolig, and PE McNamara. *Gender, Technology and Development*, October 2023.

“Scaling Strategy of BAU Recirculating Paddy Dryer in Bangladesh: Challenges and Solutions” CK Saha, S Ahamed, S Sarkar, IA Begum, MM Alam. Presented at the 2023 American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting.

“BAU-STR Dryer for Drying Maize for Underserved Community in Bangladesh” CK Saha, S Ahamed, MAY Prodhan, MA Momin, S Islam, MM Alam. Published for the 2023 ASABE Annual International Meeting.

“Agripreneurial Models for Sustainable Agricultural Mechanization in Bangladesh” MM Alam, CK aha, MR Ali, S Ahamed, S Sarkar, L Mozumdar, MM Hussain, N Tasnim, PK Kalita. Published for the 2023 ASABE Annual International Meeting.

“Moisture Transport and Stress Development in Rice During Drying: A Hybrid Mixture Theory-based Model” by F Abedia, S Kumarb, N Kumarb, D Kumarc, and PS Takhara. *Drying Technology* June 2023.

“Spectral Kernel Sorting Based on High-Risk Visual Features Associated with Mycotoxin Contamination Reduces Aflatoxin and Fumonisin Contamination in Maize from Ghana” R Chavez, G Opit, B Opoku, MJ Stasiewicz. *Food Control*, September 2023.

“The YieldWise Approach to Post-Harvest Loss Reduction: Creating Market-Driven Supply Chains to Support Sustained Technology Adoption” S Sonka, H Lee, S Shan. *Agriculture*, 2023.

DELEGATION FROM BANGLADESH MINISTRY OF FOOD VISITS ADMI

A group of government officials involved in Bangladesh's effort to modernize public grain storage and the country's grain chain generally visited the University of Illinois in May 2023 for a series of talks and field trips related to postharvest management.

The group included:

- Mr. Md Ismiel Hossain, Secretary, Ministry of Food, Government of Bangladesh (GoB)
- Mr. Md Khurshid Iqbal Rezvi, Additional Secretary, Ministry of Food, GoB
- Dr. Salma Momtaz, Additional Secretary, Ministry of Food, GoB
- Mr. Md Abdullah Al Mamun, Personal Secretary to the Secretary, Ministry of Food, GoB
- Mr. Shoumi Mustafa, Senior Research Coordinator, IFPRI

The visitors met with faculty experts and visited the Integrated Bioprocessing Research Laboratory, the Feed Technology Center and the Kamruzzaman Laboratory. The officials and faculty covered topics from appropriate drying and storage technologies for smallholder farmers to use of data science and automation in large-scale facilities. Other topics for discussion included food safety and the potential for precision fermentation to trigger transformation in food systems.

ADMI has worked closely with the Ministry of Food under the Bangladesh Integrated Food Policy Research Program, a collaborative effort with the International Food Policy Research Institute and the Bangladesh Institute of Development Studies. Under this effort ADMI has conducted a number of research projects and trained three cohorts of civil servants from the Ministry of Food. We look forward to continuing the relationship with the Ministry of Food and project partners in the future.



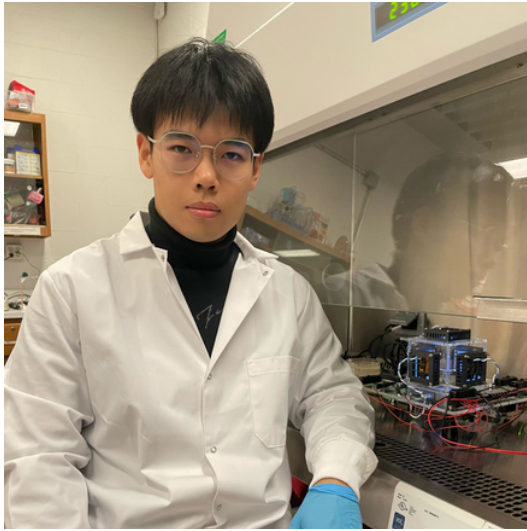
IPB UNIVERSITY VISITS ILLINOIS

In March 2023, a delegation from Bogor University of Agriculture (IPB) in Indonesia visited the University of Illinois, hosted by ADMI.

Professor Ujang Sumarwan, Dean of the College of Human Ecology at IPB, presented a public talk to discuss:

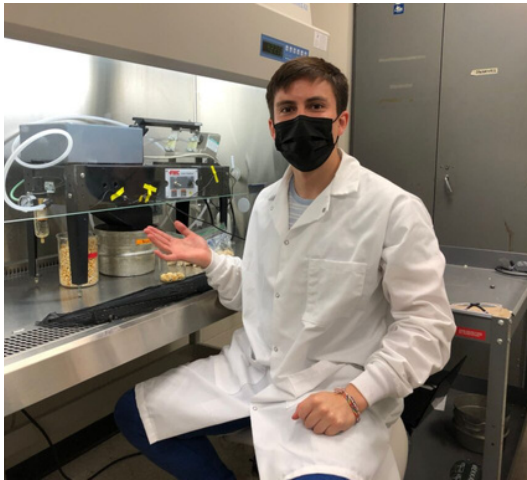
- food consumption changes during the COVID-19 pandemic among rural and urban Indonesians
- research and academics programs at IPB
- potential collaborations between ACES and IPB

IPB conducts research in areas such as food security and food safety; social, economic and cultural studies; conservation and environment; genetic resources, engineering and breeding.



ZHENHUI JIN

Doctoral student Zhenhui Jin and his advisor Dr. Yi-Cheng Wang are trying to address fungi-related cereal PHL issues using microplasma-based lamps that emit 222 nm far ultraviolet C (far-UVC) irradiation.



RUBEN CHAVEZ

Doctoral student Ruben Chavez is working with his advisor Dr. Matthew Stasiewicz on refining single-kernel maize sorting to reduce mycotoxin contamination.



GHAIDA ALRAWASHDEH

Doctoral student Ghaida Alrawashdeh is working with her advisor Dr. Samantha Lindgren on developing sustainable and culturally appropriate models of mechanization and entrepreneurship.

ADMI RECEIVES FUNDING FOR TWO NEW PROJECTS IN INDONESIA

ADM Cares has funded two additional postharvest-loss related projects that will build on the previous work of the ADM Institute for the Prevention of Postharvest Loss (ADMI), which is housed in the College of Agricultural, Consumer and Environmental Sciences (ACES) at the University of Illinois.

Empowering Smallholders in Indonesia through Strengthening Female Led Farmer Organizations

The ADMI team will work with the Indonesian Agency for Agricultural Extension and Human Resource Development (IAAEHRD) and Bogor University of Agriculture (IPB) in Java to pilot a program of extension strengthening to support the needs of farmer groups serving mainly women farmers. Farmers groups will receive training in identifying and implementing small-scale income generating agricultural activities, climate smart agricultural practices that promote soil health and increase yields, human nutrition, and organizational practices to harness the power of groups for marketing, finance, and access to technologies. Strengthening the ability of these groups to engage in agricultural value chains can raise members' incomes while reducing postharvest losses.

This effort will reach 50 extension workers and approximately 500 smallholder farmers, the majority of which will be women, to increase their capacity for higher incomes and more sustainable agricultural activities.

Women's Participation on Indonesian Oil Palm Plantations: How Can Plantations and Policy Support Gender Equity?

The ADMI team will collaborate with partners at IPB University Bogor to investigate gender issues on oil palm plantations. This research will use a case study approach to investigate, for example: How widespread is sexual harassment, gender-based violence, and discrimination on plantations and how does this intersect with ethnicity? What examples are there of strategies to address inequality? What are possible entry points for women's involvement in decision-making processes? What resources are available/needed for corporations to help address inequality?

The research methods will include collecting a total of 600 household surveys and case studies from both cooperative and corporate plantations. A feedback session to stakeholders and policy makers will present the research findings and offer recommendations for empowering women. This work will bring increased attention to issues of gender equity in Indonesia's Oil Palm industry and help identify additional training and resource needs.

ADMI STAFF

Director: Alex Winter-Nelson

Associate Director: Anna Snider

Lead for Market Systems, Extension, and Innovation Scaling: Paul McNamara

Communications Coordinator: Leslie Myrick

ACKNOWLEDGEMENT OF SUPPORT

ADMI was established in 2011 with a gift from the Archer Daniels Midland (ADM) Company to the University of Illinois in order to promote research, outreach, education, and capacity building to reduce postharvest losses in grains and oilseeds and enhance global food security and environmental sustainability. Continued support from ADM Cares, the social responsibility arm of ADM, is gratefully acknowledged.

CONTACT US

1301 W. Gregory Dr.
60 Mumford Hall
Urbana IL 61801

+1 217-333-5115

postharvestinstitute@illinois.edu



**College of Agricultural,
Consumer &
Environmental Sciences**

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN