PICS Newsletter
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In Focus: Leverages

Purdue Improved Crop Storage

Purdue's PICS Grants are Being Leveraged to Reduce Postharvest Storage Losses

Dieudonné Baributsa, Purdue University

Purdue Improved Crop Storage (PICS) is a simple and cost effective technology for grain storage developed to reduce postharvest losses; and hence increase incomes and improve food security of smallholder farmers around the world. PICS bags allow farmers to consume clean grain that is free of chemicals as well as sell quality grain during lean seasons when prices are high. The development and commercialization of the PICS technology has been funded by several donors including USAID and the Bill & Melinda Gates Foundation. These grants laid the foundation for research and dissemination of the technology in several countries, reaching more than five million farmers in about 46,000 villages in rural Africa.

Bell Industries sales agent participating in the USAID KAVES road show in Kenya.

PICS research activities have established the effectiveness of the technology in preserving grain quality for at least 12 crops including cowpea, maize, sorghum, wheat, rice, common beans, mungbean, groundnuts, and millet. PICS bags can also store cereal and legume seeds with little or no effect on germination. Several studies conducted by Purdue, ACDI VOCA/ AflaSTOP Project, the University of Nairobi and others have shown that PICS bags stop mold growth and accumulation of aflatoxin during storage of maize. On the economic front, farmers are the biggest winners. Though the private sector, which manufactures and sells the bags, shares about one US dollar per bag in profit, a farmer using a PICS bag for a single season gets an average return of $27 by storing cowpea in a 100kg PICS bag.

PICS technology confers many benefits including financial and social. These benefits have been the key drivers of leverage efforts by public and private organizations, NGOs, additional projects and new donors to promote the technology to reduce storage losses among smallholder farmers. Beyond Purdue's PICS funded projects, Catholic Relief Services (CRS) has partnered with Purdue to promote the PICS technology in more than 13 countries in Sub-Saharan Africa. Recent investments by CRS in D.R. Congo and Sierra Leone to promote PICS in emergency situations are helping farmers to improve food and seed security, and stimulating the interest of the private sector to commercialize the technology. In Kenya, grassroots NGOs such as the Rural Outreach Program (ROP) are disseminating the bags to reduce food insecurity and mitigate aflatoxin among smallholder farmers. Other examples are the investments by ACDI VOCA in Sierra Leone; Sasakawa Africa Association in Nigeria, Ethiopia, and Uganda; and The World Food Program (WFP) in Uganda, Rwanda, and Zambia to purchase thousands of PICS bags to promote the technology among farmers.

Creating awareness of the PICS bags among farmers is important. But even more important is working with the private sector to improve the availability of the technology in rural areas. For most smallholder farmers who produce enough to store, the price of the PICS bag ($2.00 to $3.00 per 100kg bag) is not a major constraint for adoption. The constraint is rather the unavailability of the technology in or near their communities in rural areas. To leverage the PICS3 project's efforts, several development agencies and projects are supporting PICS manufacturers and distributors to improve the availability of the technology. In Tanzania, UK AID FoodTrade East and Southern Africa (ESA) is supporting PPTL Tansack to develop and expand the distribution of PICS bags in Tanzania and the region. The Kenya Agricultural Value Chains (KAVES) supported Bell Industries with revolving funds for timely production of PICS bags in large quantities. These investments have helped double or triple sales in about one year, while greatly improving the availability of the technology among smallholder farmers.

PICS exhibit during the Kenya Primary School Association (KPSA) meeting in Kabarak, Kenya.

The current newsletter highlights efforts by various partners to leverage on Purdue's PICS funded activities to expand the benefits of the technology to more farmers, private sector actors, and consumers.

Improving Grain and Seed Storage in Sierra Leone

Jim Flock, ACDI/VOCA

In Sierra Leone, seed and harvested cereal and legumes are often stored on dirt floors, in poorly ventilated rooms, causing post-harvest losses and a reduction in subsequent seed germination rates. These conditions contaminate the stored commodities through insect infestation, mold or the application of chemicals meant to reduce post-harvest losses. The Sustainable Nutrition and Agricultural Program Plus (SNAP+), funded by USAID's Food For Peace and implemented by ACDI/VOCA, uses economic recovery grants to restore agricultural activity in markets affected by the Ebola Virus Disease (EVD).

One of SNAP+'s activities focuses on addressing post-harvest losses. ACDI/VOCA is supplying hermetic storage PICS bags to selected agricultural organizations. PICS bags are locally available and affordable (est $2.00) and can be easily adopted by smallholder farmers in Sierra Leone.

SNAP+ Ebola Recovery Grant Recipients participate in a 2-day training event on how to properly use PICS bags they received to assist their Ebola recovery efforts.

In May 2016, the 10-member ACDI/VOCA SNAP+ team participated in a two-day training of trainers workshop that explained how to appropriately use the PICS bags. The ACDI/VOCA SNAP+ staff then led their own training of trainers in September for 28 members of seven agricultural-based organizations (~ 200 members each). These trainees were all leaders of agricultural-based organizations that received economic recovery grants under SNAP+ to restore food stocks lost during the EVD outbreak. With the grants, these agricultural-based organizations procured new seed and distributed it to their members on a loan share scheme, providing sustainable income to the groups and assisting in the restoration of household food security and income-generation activities.

Trainer demonstrating how to use a PICS bag.

After the training, each group received at least 100 PICS bags that they then distributed to their members. The agricultural groups conducted a training for their members on how to use the PICS bags. The training shows the farmers how to store their crops to the specifications received during the training. The trainers also store some crop in a jute bag, for comparison's sake. Given that the benefits of hermetic storage can be visually measured over time (e.g., through levels of mold, infestation), the group will reconvene one to three months later for an "Open Bag Ceremony," during which the trainers will open both bags so that farmers can visually inspect the quality of the grains, further aiding the effort to encourage farmers to adopt PICS technology.

Voices From the Fields of Ethiopia: "Not one bean lost - something we never thought would be possible!"

Zecharias Getahun, Sasakawa Africa Association (SSA) - Sasakawa African Fund for Extention Education (SAFE)

Grain storage loss to insects is a major challenge for smallholder farmers, at times estimated to be at least 20 percent for major crops such as corn and common beans. Without crop-saving bags, farmers need to sell their crops soon after harvest or use insecticides which are not necessarily effective or may not be safe due to improper use.

Abadi Redahegn, a farmer from Tahtay Maychew, displays his clean grains at a Farmer Field Day in Ethiopia.

Ethiopian farmers, as in many other African countries, store their grains in traditional storage facilities constructed from mud, clay, dung, plant materials, or mixtures of these. Cognizant of the challenges of postharvest losses and with the aim of addressing the problems faced by the farmers during storage, the Sasakawa Africa Association (SAA), in collaboration with Development and Extension Agents of the Ministry of Agriculture and Natural Resources (MANR) who work directly with farmers, started implementing a program to reach 3155 villages to introduce and disseminate PICS3 bags for a year from September 2015.

Purdue University of Indiana, USA, received a $10 million grant from the Bill & Melinda Gates Foundation to develop a program that will put the crop-saving bags into the hands of more farmers in Sub-Saharan African countries to improve their food security and income. It is called PICS, Purdue Improved Crop Storage. PICS is a simple, proven technology that has helped millions of African farmers dramatically reduce their storage losses. The hermetic triple bagging – a chemical-free storage method – enables farmers to store a variety of major crops for more than one year after harvest.

VOICES FROM THE FIELD continued from page 2

The technology helps improve food availability and increase the income of smallholder farmers. When using PICS bags, farmers no longer need chemicals to control grain storage pests.

In June 2016, Farmers' Field Days "Open-the-bag ceremonies" (OBC) were held in Hawassa Zurya Woreda, Sidama Zone, SNNPR; and in Tigray Region, Central Zone Tahtay Maychew Woreda, and Mayberaziyo Kebele. Several different crops were demonstrated: maize, beans, sorghum and rice were kept in PICS bags by host farmers, and no insects were found after 6 months of storage; the grains maintained their original quality.

Abadi Redahegn, a farmer from Tahtay Maychew, said he and fellow farmers are now "primarily saved from pests and we no longer apply chemicals before storage. To understand the significance of this, one had to see the losses we used to suffer when our beans and peas were attacked by pests. The loss could amount to half of the harvest. Our joy is twofold: thanks to these bags, the grains have maintained 100% of their quality, and secondly it is chemical-free. At the beginning of the trials we hesitated to adopt the technology, because we thought it was strange to use one outer sack and two inner bags to store grains! But we opened them after two months, and we had not lost one bean. The same was true after four months; something we never thought would be possible. We thank Sasakawa for their intervention in introducing us to these bags. All of us in the farmers' network here now use them."

PICS bags in Rural Outreach Program (ROP) Africa, Kenya

Ruth Khasaya Oniang'o, Rural Outreach Program (ROP)

When I first encountered the PICS bags of Purdue in 2011, I knew I had found a solution to the challenges facing my farmers affiliated with Rural Outreach Program (ROP) Africa. In pursuit to mitigate food insecurity in Kenya, ROP recruited smallholder farmers to capacity build them with knowledge, information and inputs necessary to increase their grain yields. With high yields came the challenge of proper storage; bigger still was the challenge of finding an effective and affordable method suitable for smallholder farmers. The PICS bags mitigated this challenge and have revolutionized the post-harvest storage of our farmers in Western Kenya. Initially, it was difficult to convince our farmers that the PICS bags would store their grains and prevent them from having issues of aflatoxins. Like other parts of the country, Western Kenya does not have cases of aflatoxins and so our farmers had not seen or heard of it. However, our program on Post-Harvest Management was keen to create awareness, demonstrate and educate our farmers on aflatoxins and Good Post Harvest Management Practices, in which PICS bags played a key role. This was done during field days, field visits and training farmers who in turn, trained their fellow farmers.

ROP staff explaining and demonstrating how to use a PICS bag to interested farmers.

ROP farmer standing next to her harvest in a bulk storage facility.

As of now, ROP is one of the main suppliers of PICS bags in Western Kenya with orders and sales increasing with each season. Sales increased from 100 to more than 400 PICS bags per season (2 months), which is a 400% increase since we introduced it. Sales peaked during short rains in 2013 and we exhibited high sales during long rains in 2015. Now sales are at their highest not because of long rains alone, but due to demand from farmers. It is worth noting that 60% of the buyers were women who are quite active in promoting the PICS bags through information sharing. They are also keen to report to our organization their experiences with the bags. Through Bell Industries Limited, which was the first in Kenya to start producing the PICS bags, we are able to have a stable supply of PICS bags for the whole country. In all the success stories we get from our happy farmers and schools there is always a mention of the PICS bags; this encourages us as an organization and affirms that we are on the right track in improving their livelihoods.

"Now we can eat ugali [local staple made from maizemeal] that does not smell of chemicals, and we can eat a dish of maize and beans where you can identify a whole maize grain" - Kenyan farmer

PICS bags on display during field day in Western Kenya.

Farewell to Charlene McKoin

PICS Team Members

"I would like to thank Charlene for helping to develop and secure the PICS3 Project. Charlene and I worked on the PICS3 concept in Dresden, Germany in 2013 while attending the "Cracking the Nuts" conference (the discussion went on and we were chased out of a restaurant around midnight). She was passionate and committed to getting PICS bags in the hands of farmers- especially women. She went the extra mile, sometimes traveling and sleeping in difficult conditions, to help the project succeed. Charlene was more than a Program Officer- she was an integral part of the PICS team and family." Dieudonné Baributsa, Purdue University

Charlene and Dieudonné Baributsa at World Food Prize.

"I always thought that Charlene McKoin was the very best a project manager could be, involved, knowledgeable, helpful, responsible, caring. She is a woman with a big heart. It was as if it was HER project too, and she did everything she could -- and more -- to make it work. I often felt that she wanted as deeply and sincerely for us to succeed as we did ourselves -- and that was badly indeed." Larry Murdock, Purdue University

"Thank you Charlene, your years of hard work on PICS has given us an opportunity to make a difference." Suraj Devani, PPTL Tanga, Tanzania

"The few times I met and worked with you on the PICS project were inspiring and a great pleasure. These include Arusha, Tanzania June 2015, Hawassa, Ethiopia January 2016 and Nairobi, Kenya February 2016. As you leave the Foundation I take this opportunity to wish you the very best in your plans which I hope will include Africa. My best wishes!" Jean Njiru, PICS3 Project, Kenya

Charlene with Bernadette Majebelle, Susie Murdock and women farmers in Burkina Faso

"Juste un petit mot, avec quelques photos- Charlene a fait fi des menaces sécuritaires qui pesaient sur la régions Ouest du Burkina Faso pour être témoin de la mobilisation des femmes partenaires de PICS3 stockant leurs diverses denrées dans les sacs PICS."
Clementine Dabire

Charlene McKoin

"I remember fondly two special meals I shared with Charlene. One was a dinner for the PICS3 team at the home of Dieudonné Baributsa (in West Lafayette). This was the last time any of us saw Dr. Corinne Alexander, who passed away unexpectedly the next day. Wonderfully fond memories of dinner with two incredible women role models. The second meal was at the Muthaiga Country Club in Nairobi. Mr. Titus Ibui from Bell Industries hosted the PICS team for a spectacular dinner. We shared wonderful stories in this historic setting and I was again impressed with the breadth of Charlene's experience and talent. The attached photo was taken at Muthaiga. Best wishes to Charlene!" Carole Braund, PICS3 Program Administrator

"Charlene was a down to earth professional who always advocated women support through agriculture. She worked hard at the Foundation to promote what she believed in particularly "market access" and credit support to small holder farmers. The visit to Burkina Faso was evidenced. Success of PICS3 project was Charlene's agenda and in a way the project has taken momentum." Bernadette, Majebelle, PICS3 Business Consultant, Tanzania

"Charlene is a person who can easily and perfectly fit well in a multicultural environment. She is very jovial. She has not allowed distance to limit her. She regularly traversed countries to participate in development conferences particularly by attending the PICS conference in Kenya earlier this year 2016. She demonstrates a clear understanding of how new and improved technologies in Agriculture influence development goals. She recognized the potential in the PICS hermetic technology and was very energetic about its commercialization so that the small scale holder farmers can get access to the technology for food security. Not only food security, but safe and secure food preserved in the chemical free bags." Titus Ibui, Kenya

The PICS Team is Happy to Welcome Rico Natali as the New PICS3 Program Officer.

Rico Natali's passion for working in agricultural development began in 2008 when he started working with a small NGO in rural Uganda that put him to work on their model farm. He has been involved in agricultural development ever since as an analyst, consultant, and beginning in 2014, a program officer at the Bill and Melinda Gates Foundation where his work primarily focuses on strengthening agricultural systems in East Africa. Rico has a BA in International Studies from the University of Washington and an MPA with a focus on policy and development from the Evans School of Public Policy and Governance.

PICS Bags Used in School Feeding Program in Kenya

Sister Teresa, Queen of Angels Academy

I am the principal of Queen of Angels Academy in Eldoret. Queen of Angels is a Catholic sponsored school located in Eldoret town. It is a fairly large school, four streamed, with an average of forty pupils per class. I joined the school in late 2014 when I succeeded Sister Njoki as the principal of the school.

Queen Angel's Academy warehouse with grains stored in PICS bags.

The biggest challenge for our school has been how to store our grains, both beans and maize, which we store in fairly large quantities. Githeri (a mixture of maize and beans cooked together and then fried) is a popular meal in our schools. However, githeri turns unpleasant when the stored grains become infested with weevils. Most of the time, we are forced to store the grains and pulses with actellic chemicals to prevent deterioration by the weevils. This leads the majority of our pupils to dislike the popular food and in turn a lot went to waste. Thanks to PICS bags this problem is now a thing of the past. I was introduced to the bags by one of our parents, Mr. John Mahugu, whom I later learned had played a role in the introduction of this technology in this region of Kenya.

Mr. Mahugu at first explained to me how the technology worked but I was not able to conceptualize how the technology worked. At first, I disregarded what he was saying and imagined it was a marketing gimmick just like any other. It was not until one of my teachers told me how Mr. Mahugu's technology worked wonders and I decided to invite him to our school once more – this time I gave him my keen ear. He took us through the process and even carried out a demonstration for us. He then ordered the bags for us over the phone and within a week's time, 1000 PICS bags were availed through courier services to our school. The school paid for the bags and invited Mr. Mahugu to come back to the school and demonstrate the same to the entire school staff on the storage process.

All the grain in the school's possession was stored in the bags and placed on pallets. As usual, I was skeptical about the storage technique and was filled with fearful thoughts, such as - "suppose it doesn't work?" I consulted Mr. Mahugu every time we wanted to get grains from the bags for use in the school kitchen. I witnessed the bag opening and every time was a joyous moment to observe the grain quality was sustained and no losses were being incurred. In fact our losses which were above 40% annually had dropped to a negligible level only accounted for by spillage.

Githeri has become a popular meal again and there are no more complaints on the quality of the foodstuffs. I have now become a crusader for PICS bag use. I am introducing it to the parents in my school, colleagues in others schools under our mandate and many other school heads. Long live PICS bags! God bless the inventor of the PICS bag technology, it has saved our school the mammoth losses we have had to bear year in and year out. The losses have become a thing of the past as it is so much easier to use and a sure way of storing our produce. The bags are still in very good shape for use in the next season and we intend to buy more so that we can store more grain. We expect to harvest additional grain from our school farm so we can sell when there are better market prices.

Community Voices

Vanessa Chatuma's Story

Upcoming Events

February 20-22, 2017
PICS Supply Chain Workshop, Uganda

March 28-31, 2017
1st All Africa Post Harvest Congress & Exhibition; Nairobi, Kenya

Happy Holidays from the PICS Team!

May your Holiday Season be filled with Joy.

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If you have a PICS story to share,
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