



Purdue Improved Crop Storage

PICS Supply Chain Actors and Financiers Work Together to Reduce Postharvest Storage Losses

Deudonne Baributsa, PICS3 PI, Purdue University

Supply chain development continues to be the main focus of the commercialization of Purdue Improved Crop Storage (PICS) in Sub-Saharan Africa and Asia. While extension activities to build demand have gone well, some farmers have difficulties finding PICS bags in shops and local markets in their communities. Even so, sales of PICS bags have substantially increased during the 2015 harvest season with more than 2 million bags sold to farmers and other users. Those increased bag sales are due to increased awareness of the technology and to improvements in the supply chain. PICS supply chain actors including manufacturers, distributors, and vendors are getting smarter in response to farmers' demands. They are devising tactics to improve the availability of PICS bags to users. For instance, Bell Industries in Kenya is using express courier services to solve logistical challenges to quickly ship PICS bags to vendors and other customers. Jonel Ltd., a vendor in Uganda, is working with unemployed youth to sell PICS bags in villages and local markets. Hidaya, a 32-year-old woman in Tanzania, pays for fuel for her husband's motorbike to improve her mobility so that she can reach her customers in villages and rural markets. Some of these stories are highlighted here.

bags at the farm level. Participants included PICS supply chain actors from Kenya, Ghana, Ethiopia, Tanzania, Rwanda, and Uganda. Financial institutions participating included Financial Access and Trade Services (FACTS), Umati Capital, Acumen East Africa, and Chase Bank. In addition, there were representatives of the Government of Kenya, international donors, and development organizations including Kenya's Ministry of Agriculture, Bill & Melinda Gates Foundation (BMGF), Alliance for Green Revolution in Africa (AGRA), United States Agency for International Development (USAID) - Kenya Agricultural Value Chain Enterprises (KAVES), East Africa Grain Council (EAGC), Grameen Foundation, World Food Program (WFP), Catholic Relief Services (CRS), and UN Women.



Group photo of the PICS Financial Access Workshop participants in Nairobi, Kenya.

Objectives of the workshop were to: i) Identify financial challenges in the PICS supply chain; ii) Explore financial product/credit access opportunities for PICS supply chain actors; and, iii) Explore grant opportunities to support PICS supply chain development. The four major issues discussed during breakout groups included: i) Access to finance; ii) Financing inventory for manufacturers and distributors; iii) Financing supply chain infrastructure and logistics; and, iv) Providing credit to distributors and vendors. Potential solutions identified included venture capital, impact investment, bank guarantees, extended trade credit, working capital credit, cash payments by downstream buyers to provide liquidity, and external support of infrastructure development (points of sale, and logistics). Flexible short term loans, mostly for working capital, are needed by distributors and vendors because PICS is a seasonal product.



Mr. Phinius Nyaga of Kenya's Ministry of Agriculture, Livestock & Forestry addresses the participants of the PICS Financial Access Workshop during Opening Ceremonies.

To support the supply chain actors and to improve PICS bag availability, the PICS3 project organized the PICS Financial Access Workshop on February 24-25, 2016, in Nairobi, Kenya. The workshop brought together 65 participants to explore innovative financing models and financial products that could be used by manufacturers, distributors and vendors to build a robust PICS supply chain and to improve the availability of the

An additional workshop was organized on February 26, 2016 among PICS supply chain actors from Kenya, Ghana, Ethiopia, Tanzania, Rwanda, and Uganda to foster networking and provide an opportunity to share experiences in commercializing PICS bags in different countries. Challenges and opportunities in developing the supply chain were

PICS Bags Making Their Way into Communities in Ethiopia

Jean Njiru, PICS3 Supply Chain Manager, Kenya

It was all smiles for a PICS vendor in Demesha, Ethiopia after he sold all the PICS bags that he brought to a PICS village demonstration. Sixty farmers placed orders for more bags. This was the first time the vendor had made PICS bag sales. Carole Braund, the PICS3 project administrator and I had traveled to Demesha, which is 200 km out of Bahirda in Ethiopia, to attend the PICS village training. The team included a Sasakawa Global 2000 staff member and government agricultural officials. Sasakawa Global 2000 is one of the partners implementing the PICS extension activities in Ethiopia.

Misrak from Sasakawa Global (SG) 2000 invited a vendor to the demonstration and asked him to bring bags for sale. This was an opportunity for the vendor to connect with farmers and extension agents. The vendor was reluctant to travel 17 km to attend the demonstration because he would miss a market day at Demesha- a day he makes most of his major agricultural input sales. Not sure that farmers would buy bags, the vendor took only 20 PICS bags out of 50 PICS bags he procured from a distributor.



Pilot farmers make their way home after a PICS village demonstration.

During the demonstration, farmers bought all the 20 bags and 60 farmers placed orders for more. Once they understood the concept of the PICS technology, the farmers did not want to wait for the Open the Bag Ceremony that would happen after four months to demonstrate the effectiveness of the bags. It was agreed that the extension agent would coordinate with the vendor to ensure the farmers got the bags they wanted.

In the beginning, when vendors are recruited to sell PICS bags they are reluctant to do so as they do not wish to tie their capital in a new product that farmers do not know about. They ask that the bags be supplied to them on consignment so they can pay after selling the bags. The manufacturer does not wish to take risk with new customers. Moreover, the manufacturer argues he has already invested in producing the bags and the logistics involved in delivering the bags to the vendors. However, vendors will place orders for the bags when the farmers start inquiring about the bags. The PICS3 Project is working to build awareness of the bags among farmers and agrodealers to increase the demand needed to sustain the supply chain.

Profile of a PICS Partner - PEE PEE (TANZANIA) LTD (PPTL)

Suraj Devani, PPTL Marketing Manager, Tanzania

Pee Pee (Tanzania) Ltd is a manufacturer of woven packaging and plastic sheets based in Tanga, Tanzania. The company's product range includes bags to pack cement, sugar, fertilizer, chemicals, agricultural produce and tarpaulin sheeting.

In mid-2014 PPTL signed a trademark and license agreement with Purdue Research Foundation for the distribution and sale of PICS bags. Commercial manufacture of the PICS bags commenced in 2015 and so far over 150,000 PICS bags have been distributed in Tanzania and the region.

Production capacity now stands at 2 million bags per annum.

The PICS bags is a hermetic technology generally unknown in the region. Marketing, therefore, involves (1) identifying prospective users, (2) training them in the use and benefits of the bags and (3) organizing detailed demonstrations on the correct method of use.

PPTL has adopted a multifaceted approach to dissemination of the PICS technology with the support of Purdue. Training has been carried out at various levels in close cooperation with governmental and non-governmental organizations. Regional training workshops have been conducted for groups of potential vendors and end-users. The company has been using TV and radio regionally and has also participated in regional agricultural shows.

These activities have allowed PPTL to identify the regions with most potential need and we are now in the process of signing up dealers who will effectively represent the company and run wholesale depots.

PICS technology is well accepted as it has proved successful wherever it has been tried. It is also cost effective and easy to adopt for small holder farmers compared to other hermetic technologies. The PICS bag forms an ideal solution to tackle the regional problems of post-harvest losses and allows chemical-free storage. PPTL is proud to be associated with the PICS team and be part of the solution.

PICS QUICK FACTS

There are:

-  **23 countries with PICS activities in Africa & Asia**
-  **15 private local companies already licensed to commercialize PICS bags in Africa and Asia**
-  **46,000 villages that have been reached by PICS demonstration activities**
-  **3.0 million farmers directly trained in the proper use of PICS bags**
-  **7.0 million bags sold to smallholder farmers and other users by March 2016**
-  **US \$27 average additional cash flow for storing cowpeas in a 100kg PICS bag**

Ms. Alice Ojiambo's Story- The Experience of Jonel Ltd. in Uganda

Elinor Wanyama Chemonges, PICS Vendor, Uganda

The majority of Ugandan smallholder farmers rely heavily on crops such as maize, beans, ground nuts, sim sim (sesame) and millet. One of the challenges farmers grapple with is post-harvest storage losses due to insects. Farmers are forced to sell their grains at harvest at very low prices rather than risk a total loss. Busia district which lies just east of the Kenyan border was struggling with the same post-harvest losses. Jonel Ltd. introduced PICS bags into the market in August 2015 and began working with youth to sell PICS bags to farmers in the district.

Last harvest season, farmers in Busia sold maize at UGX 400 per kilogram. Only three months later, some farmers were selling maize flour for as much as UGX. 1200 per kilogram. After PICS bags were introduced, farmers were reluctant to purchase them at the price of UGX. 7000 per bag because they felt it was too expensive. Ms. Alice Ojiambo was one of the first farmers to buy and store her maize in the PICS bags. After six months of storage, she sold her maize grain at UGX. 1,000 per kilogram. Little did Ms. Alice Ojiambo know that her story would be the convincing element that spurred those reluctant farmers to give PICS bags a try. The youths selling the bags in mobile markets told Ms. Ojiambo's story to illustrate that PICS bags help farmers make more money as well as secure safe food for their own consumption. They now explain to potential buyers that selling at harvest, a farmer earned UGX. 40,000 for a bag containing 100 kilograms of maize, but Ms. Ojiambo received UGX. 100,000 for the same 100 kilograms of maize stored in PICS bag after six month. They also noted that Ms. Ojiambo will re-use the same bags for the next season. PICS bag sales are increasing as a result.

Another farmer, One Nabwire Juliet, harvested six bags of millet and sold off a bag of 100 kilograms at UGX. 60,000. When she later learned that she could have earned more than twice the price she lamented the loss and decided that she was going to store her grains in PICS bags.

Financing Increase Sales of Hermetic Storage Technology in Kenya

George Odingo, USAID-KAVES Project, Kenya

Postharvest grain loss is a significant barrier to household food security across Kenya. Statistics collected by the Kenya Agricultural Value Chain Enterprises (USAID-KAVES) a five-year activity funded by USAID confirmed that current levels of postharvest losses are at least 15 percent in strategic maize production zones. In 2013, KAVES embarked on field

Cost (Kes)	Insecticide Treated Bag	PICS bag
Bag	40	250
Actellic dust	27	0
Dust application labour	96	0
Bagging labour	50	50
Total Cost (Kes)	213	300

trial to test 2,500 of Purdue Improved Crop Storage (PICS) bag compared to insecticide treatment methods. Maize grain dried to appropriate moisture levels and stored in PICS bags showed constant moisture and no live insect infestation after six months.

Period	Market Price	Insecticide Treatment		PICS Brand Bag	
		Cost	Net Benefit	Cost	Net Benefit
Harvest	260	N/A	N/A	N/A	N/A
+3 Months	+100	213	-113	300	-200
+6 Months	+166	386	-220	300	-134
+9 Months	+325	559	-234	300	+25
+12 Months	+593	732	-139	300	293

The cost of storing grain with chemical treatment is 25 percent lower than using PICS bag if the chemical application is done only once (Table 1). But multiple applications are commonly needed. But a chemical treatment method is not economically rational at any point over a 12 month period as the costs of reapplying chemical and labour every three months exceeds the average marginal price increases of maize at three month intervals (Table 2). The results as shown in Table 2 confirmed the insecticide treatment as an inefficient method against market shocks while Hermetic Storage Technology (HST) was technically efficient for small-scale farming communities.



Kennedy uses the PICS bags to store his produce without risk of pest infestation rather than selling his maize at harvest time.

Despite the efficacy, market awareness and behavior change campaign was necessary to show the longer term comparative advantages of the HST bags. To this end, KAVES initiated farmer training, demonstrations, field days, and media messaging. Even with the rapid growth in end market demand, significant constraints to commercializing of HST bags in Kenya were distribution and value chain finance. Therefore, KAVES was in a unique position to facilitate access for distributors of HST bags to agro-dealers within those communities.

KAVES provided a working capital fund of \$120,000 to Bell Industries Ltd, the licensed distributor of the PICS bags in Kenya. Bell Industries Ltd used the funds to finance inventory and on-lend to stockists. Sales of PICS bags significantly increased from 2014 (69,209 bags) to 2015 (215,248 bags). By the end of January 2016, total unit sales of PICS bags had reached 304,683 equalling 49.1 million Kenyan Shilling (\$481,000), representing up to 27,421MT of maize stored by small-scale farming families. KAVES is currently working with a number of financial institutions to institutionalize the concept of a revolving credit fund for HST distribution.

PICS Manufacturing and Distribution in Ghana

Alex Bokuma, PICS3 Business Consultant, Ghana

In 2010, Purdue University collaborated with World Vision International to stimulate demand and build a sustainable supply chain for the PICS bags in the Northern Savannah Ecological Zone using a three pronged approach - sensitization, demonstrations and open-the-bag ceremonies in close to 2,300 villages. Cumulatively, 365,713 small holder farmers were reached.

Poly Sacks Ghana Limited based in Accra was identified as the manufacturer. To help bring the bags to the door steps of the farmer, Simple Prince Enterprise based in the Upper East Region of Ghana was licenced to take over the distribution and marketing of the bags. In 2015, Purdue University licenced Agyaarku Farms and Trading Limited based in Techiman to support the distribution of the bags in the transition zone to further address the problem of access. Simple Prince Enterprise and Agyaarku Farms work with a wide network of regional, district and community based distributors to bring the bags to the door steps of farmers.

In 2015, Simple Prince Enterprise distributed 30,000 bags while Agyaarku Farms sold 10,000 bags. The former has distributed 110,000 bags to date. The 2 distributors envision raising sales volume to about 100,000 per season but will need to address the challenges of limited access to affordable credits, low farmer adoption, limited outlets against high transport cost and availability of cheaper alternatives.



Walter Nunez-Rodriguez, (extreme left) Chief of Party, Agricultural Policy Support Program & Alumni of Purdue University and the Regional Director of Agriculture (second left) @ PICS3 stand during the 2015 Northern Ghana Agricultural Pre-season event organized by UsAID ADVANCE II and UsAID Agricultural Technology Transfer Project in Tamale

The PICS3 Business Consultant for Ghana is supporting the distributors to address these challenges as well as exploiting the numerous opportunities in the Ghanaian market such the village/market demonstrations conducted by IITA and its local partners, media awareness and the interest of large donor projects such as USAID Resiliency in Northern Ghana Project (USAID -RING).

Spreading the Word and the Wealth in Tanzania

Bernadette Majabelle, PICS3 Business Consultant, Tanzania

Hidaya Laurence, a young woman of 32, lives in Mandera Mnazi Village, Bagamoyo district located about 130kms from Dar es Salaam, Tanzania. Hidaya has a family of four children for whom she provides by doing a variety of small menial jobs. Her income provides food for her children as well as covering their costs for school needs.



Hidaya Laurence using the proper method to close a PICS bag to insure a tight seal.

Hidaya attended a PICS vendors training in Dodoma, Tanzania last year. From there I facilitated her to access 500 PICS bags to sell in her village and neighbouring ones. She started marketing the bags to teachers at the local school. The school was easily accessible as it was walking distance from her home and she could enlist the assistance of her two daughters to help carry the bags when going to school. Hidaya demonstrated the proper method of tying the bags to teachers. Since it was their first experience with PICS bags the teachers asked her to tie all of the bags and agreed to pay her a fee for the service. Hidaya earned between Tshs 3000-5000 on each visit - depending on the number of bags that needed tying. The word got out and she started receiving calls to supply PICS bags to farmers -mainly women- from other villages. She also received very good responses from women pastoralists.

To supply PICS bags to faraway villages, Hidaya needed transport. Luckily, Hidaya's husband owns a motorbike and would require fuel for the bike. She was able to comfortably pay for this from the money she earned tying PICS bags. She sold off all of the 500 bags and added 200 during the off-season. At this point, her challenge is transportation because it has been difficult to rely on her husband. If she had a motorbike of her own, she would be able to participate in all market days in her district this year. Also, she would be able to provide PICS bags to all schools in her district as most teachers cultivate maize.

Overall, Hidaya collected Tshs 390,000 (about US \$200) from the sale of 700 PICS bags.

In Memoriam Dr. Corinne Alexander



The PICS family has suffered a terrible loss with the passing of our colleague Professor Corinne Alexander. Corinne was a passionate member of the Purdue Improved Crop Storage (PICS) Team and worked tirelessly to improve food security in Sub-Saharan Africa. She was a friend, a colleague, and a mentor to many.

Donations can be made to the Corinne E.N. Alexander Memorial Fund which will be used to support an endowment titled The Corinne Alexander Spirit of the Land Grant Mission Award. To donate: send a check directly to Purdue Foundation, 403 West Wood Street, West Lafayette, IN 47907 with "Dr. Corinne Alexander Memorial Fund" or [click here to contribute online](#).

Friends and colleagues have shared their memories:

"When I close my eyes and think of Corinne, I can hear her laugh, which seemed to be with her always and so distinct that I could find her in any crowd. I will miss that most."

"She was such an amazing teacher. I loved her style of teaching and the passion that she had for all of us as students."

"She was curious as a scientist and used that curiosity to push the boundaries of knowledge in all the projects she touched."

"Her intelligence, experience, insight, and humor kept me on my toes."

"The last time I talked with Corinne she was a bubbling, effervescent, volcano of enthusiasm describing to me a future project related to PICS. I was in thrall, thrilled at her energy and her hope. All I could wedge into the conversation from time to time was the word "Yes!" and later "Yes!" We have lost so much with her passing -- losing as we have this great lady at the heart of the PICS family. Yet we will strive on. She would have wanted that and to which thought she would have said "Yes!"

[Click here to view or add additional memories.](#)



Trust Kasambala, Anastasia Ngorgo, and Corinne Alexander during the 2014 Training of Trainers workshop in Malawi.

FINANCIERS (continued from page 1)

discussed. One of the key recommendations was the creation of a platform to foster dialogue and collaboration among PICS manufacturers and distributors in Sub-Saharan Africa.

Demand for PICS technology continues to expand within and beyond Sub-Saharan Africa and Asia. In addition, PICS bags are also being promoted to deal with emergency situations. In 2015, we introduced PICS bags to farmers in Sierra Leone for seed and grain storage. This was needed because markets were disrupted due to the Ebola crisis ([read more here](#)). One reason for the expanding demand is that farmers like PICS bags due to their simplicity and effectiveness – they can reduce grain storage losses from 30-40% to less than 1%. The private sector is being licensed around the world to commercialize the PICS technology.

PICS Network Website Launched

Holly Fletcher-Timmons, PICS3 Project, Purdue University

We are happy to announce the launch of our new website: PICSNetwork.org. One interesting feature is our interactive map which provides details of distributors along with their contact information for those looking to purchase PICS bags. The website highlights all of the PICS projects, current and past, on a map that shows locations of the different projects across Africa and Asia. In addition, we have included many resources including links to videos, training posters (currently available in 14 different languages), publications, etc. Visit our website to learn more the PICS Program. For information on where to buy PICS bags [click here](#) and select "Distributors" on the right side of the screen.

Upcoming Events

APRIL

- 7th Cowpea Fair, Association YIYE; Burkina Faso

MAY

- PICS Training of Trainers CRS UBALÉ Project; Malawi
- PICS Training of Trainers CRS DRC Project; DR Congo

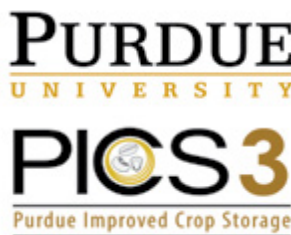
JUNE

- Open the Bag Ceremony, PICS3 Project; Ethiopia
- Open the Bag Ceremony, PICS3 Project; Ghana

Community Voices



[Kagoya's Story](#)



From the Editor:

If you have a PICS story for possible publication in our newsletter, please contact us at PICSinfo@purdue.edu



Purdue University | Department of Entomology
901 West State Street | West Lafayette, Indiana, USA

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