PICS Newsletter
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Special Issue

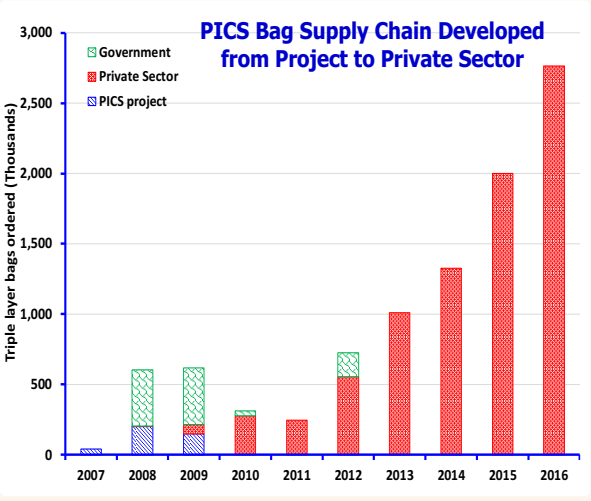
Purdue Improved Crop Storage

PICS3 Project Highlights Year Three

Dieudonné Baributsa, Purdue University

The PICS Program continues to benefit farmers and communities, and engage the private sector in many places around the world. In 2016, we took steps to increase awareness of PICS bags and strengthen the supply chain to increase adoption. Several organizations collaborated with the PICS Program to promote the technology. Our joint aims were to increase incomes and, improve food security and food safety among smallholder farmers. Additional efforts are promoting the technology to help smallholder farmers grapple with climate change.

During 2016, the private sector in Africa and Asia sold 2.8 million PICS bags, representing a 41% increase in sales above those of 2015. This enabled total sales to reach a milestone of 10 million bags sold in all PICS countries in Africa and Asia since 2007. The private sector invested in the PICS business to establish manufacturing capacity to meet domestic and international demand for the technology. In Tanzania, for example, PPTL invested in PICS manufacturing to increase its production capacity to five million bags per year. PICS bags are emerging as the flagship product for several companies in Africa and Asia. The PICS program continues to build and strengthen its distribution networks to increase sales of PICS bags. These efforts include (i) recruiting and training vendors, (ii) meeting with PICS distributors to share experiences and plan for growth, (iii) developing "last mile" distribution, and (iv) using Information and Communication Technology (ICT) to facilitate access to PICS bags.



PICS bag sales progression from 2007 - 2016.

During 2016, our partnerships have continued to grow. Grants by major donors to Purdue and development partners such as the World Food Program (WFP), Food and Agriculture Organizations (FAO) and Catholic Relief Services (CRS) have helped to increase awareness and training of smallholder farmers so they can reduce postharvest storage losses. PICS demonstrations were scaled up in several countries in Sub-Saharan Africa. Thanks to FAO efforts to increase farmers' resilience to climate change, Somalia became the newest member of the PICS family of nations. More than 1,800 extension agents and lead farmers were trained during 54 Training of Trainers (ToTs) events in 2016. PICS field agents trained more than 411,011 farmers through 8,752 demonstrations. Our PICS demonstrations have now reached more than 56,000 villages/farmers' groups since 2007.

S. Munthali, D. Baributsa, C. Woloshuk conducting a Training of Trainers for the Feed the Future Agriculture Diversification (AgDiv) Project in Malawi (May 2017).

PICS3 consultant Barnabas Komakoma demonstrating to farmers how to use a PICS bag after an open-the-bag ceremony in Blantyre Rural, Malawi (December 2016).

This progress owes its success to partnerships among many key players. These include the private sector, governments, Non-Governmental Organizations (NGOs) as well as numerous other development partners, projects and farmers. Collectively, these initiatives have translated into increased use and adoption of PICS bags. That increased adoption and use have, in turn, increased incomes and increased the availability of safe, nutritious, chemical-free food.

PICS Program Partnerships

Dieudonné Baributsa, Purdue University

Many PICS partners, including donors, relief agencies and the private sector, are playing a significant role in building awareness of PICS bags. These partners are not only buying bags in large quantities for farmers but also providing training, implementing media activities, and conducting road shows in weekly markets to build awareness. PICS bags are being integrated into a variety of programs for (i) postharvest loss mitigation, (ii) food security, (iii) climate change adaptation/resilience, (iv) seed systems, (v) school feeding programs, and (vi) health and nutrition programs.

Opening remarks by representatives of AgDiv project, US Embassy, Ministry of Agriculture, and Purdue University during the ToT in Lilongwe, Malawi (May 2017).

During 2016, funds provided by the Bill & Melinda Gates Foundation (PICS3 project) that support the core of PICS activities were leveraged in a major way. This is helping create awareness, encouraging investments by the private sector in manufacturing and distribution of the PICS bags, and increasing training of farmers. The list of donors and collaborators continues to grow, and include:

USAID Feed the Future
USAID KAVES
Catholic Relief Services (CRS)
World Food Program (WFP)
Sasakawa Africa Association/SG 2000
World Vision International (WV)
Project Concern International (PCI)
Food and Agriculture Organization (FAO)
AGRA
ACDI/VOCA
Chemonics
Palladium
SNV Agritera
BRiTEN
Helvetas
GIZ

Dieudonne Baributsa attending a CRS UBALE Project open-the-bag ceremony in Blantyre Rural, Malawi (December 2016).

Most of these organizations are interested in PICS bags because (i) postharvest loss is a major challenge among smallholder farmers, (ii) PICS is an effective and cost-effective solution, (iii) PICS is cheaper than other viable solutions, including similar competing products, (iv) our effective PICS approach to develop locally sustainable supply chains, and (v) PICS scaling-up strategy provides quick results/impact.

Activities by these partners led to scaling up of PICS trainings and demonstrations. The World Food Program's Zero Food Loss Initiative has been implementing postharvest activities in several countries - Uganda, Ethiopia, Malawi, Tanzania and Burkina Faso. In Kenya, USAID KAVES funded "road shows" to promote hermetic technologies through media activities and market demonstrations in 22 counties. Hermetic technologies that were promoted included PICS, Super Grain, Agro-Z, Elite and Zerofly bags. During the roadshow, PICS technology captured by far the largest share of the total bags sold. FAO has purchased bags for their postharvest and climate change resilience activities in Tanzania and Somalia. In addition, CRS has trained more than 300 extension agents/lead farmers and implemented more than 600 demonstrations in Malawi and in Eastern D.R. Congo. These organizations have helped increase the adoption of PICS bags by farmers and other users. During the last ten years (2007 to May 2017), the PICS Program has reached more than 5 million farmers in 56,000 villages.

Demonstration on how to use PICS bags during the Nane Nane in Songea, Tanzania (August 2017).

Partnerships with the private sector continue to grow. Private companies are investing in manufacturing and distribution of the bags to improve supply and availability of the PICS technology among farmers and other users. PPTL in Tanzania, Polypack in Malawi, Bell Industries in Kenya, as well as others, are expanding their factories to meet the demands of local and international markets. In some instances, PICS bags are emerging as the leading product for several companies in Africa and Asia. Since 2007, the private sector has produced and sold more than 10 million PICS bags. PICS licensees are also investing their own resources to address logistics challenges along the distribution networks to establish a sustainable supply chain. New models to increase bag availability are being tested including working with youth to sell PICS bags to farmers in rural markets, and using ICT such as USSD codes to help farmers locate where PICS bags are sold.

PICS Online

Holly Fletcher-Timmons, Purdue University

To make the PICS technology easily accessible we have created accounts on several social media platforms. Currently we are using Twitter, Instagram, You Tube, WhatsApp and Facebook. Each account offers a different type of accessibility with links to our network website.

Twitter is used to broadcast recent happenings in the PICS world. We can be found here: https://twitter.com/PICS3Project or you can search for "PICS3Project" to follow us.

Instagram is used to share our favorite photos of the many aspects of the PICS project. The PICS technology has touched the lives of so many people we feel the best way to translate that impact is through photographs of those people. Search "pics_3_project" on Instagram and follow us for a view inside the PICS world

YouTube hosts a large library of PICS videos from farmer's stories to demonstrations on how to use the PICS bags. We have many useful videos in many different languages that can be viewed from a traditional computer or on a mobile phone. These videos assist in training farmers on how to properly close and store the PICS bags and much more. Find us here: https://www.youtube.com/channel/UCeM0TjP8ilrEbhDNuVOszZA

WhatsApp is a mobile app designed to host group chats. We currently have six open group chats set up. This platform is used to share photos and videos as well as information on events, progress, success stories, and questions and answers. Inclusion in the group chat requires an invitation. You must download the WhatsApp Messenger app to your mobile phone then contact us via email at picsinfo@purdue.edu and request to be added to a group; you will need to supply your mobile number in the email. Once you have been accepted to the chat, it will appear in your WhatsApp chat list. Current groups are: PICS3 Media Hub (Malawi); PICS3 PROJECT (Tanzania); PICS Nigeria; PICS Worldwide Family; PICS GH Team (Ghana); and PICS Bell Kenya.

Facebook is our most frequently used account. You will find links to Instagram and You Tube with the newest posts as well as the most recent updates, photos and videos that come in on WhatsApp. You can contact us through the Facebook Messenger feature with any questions. You can locate our page here: https://www.facebook.com/PICS-3-Project-474553959343821/ Be sure to like us and share any posts you find interesting.

The PICS Network Website is located at www.PICSnetwork.org Here you will find a wealth of helpful information including detailed information on our projects, news, past and upcoming events, our scientific publications, as well as more practical resources such as demonstration posters in 14 languages, extension publications, newsletters and brochures. In addition, under the subheading "Where We Work", you will find an interactive map with detailed information on our projects as well as locations of distributors. Finally, under the subheading "Partner With Us" you will find information on donating to the PICS project as well as the option to contact us to inquire about becoming part of our team.

Locations of lincensed PICS bag distributors across Africa and Asia (June 2017).

We have found that utilizing these social media outlets is a great way to share the most up-to-date project developments. We believe that the PICS technology can improve the lives of millions across Africa and beyond. So join us, like us and make sure to share!

Community Voices

Stories from Ghana

Outreach Activities in the U.S.

Bradley W. Smith, Purdue University

Purdue Improved Crop Storage (PICS) bags have been widely acclaimed and adopted by farmers in Africa and Asia. More than 10 million bags have been sold and more than five million farmers trained on how to use PICS bags. The PICS technology has improved the economic standing and quality of life for both farmers and the private sector in Sub-Saharan Africa. However, something else has been happening that is not as well-known, namely our PICS efforts to educate local farmers, business leaders and everyday citizens in West Lafayette and Indiana, home to Purdue University and the birthplace of the PICS technology. We are doing our best to make people aware of the PICS bags and the impact that local research and initiatives are bringing to the world stage. Hoosiers (those people who call Indiana home) and Purdue supporters everywhere deserve to be aware and proud of the part they and their university are doing to make the world a little bit better.

Spring Fest participants compete to see who can tie a PICS bag the fastest.

Each year in Indiana, two large and widely advertised events are held where thousands of Hoosiers come to spend their weekends and their time – the Indiana State Fair and Purdue's Spring Fest. These events regularly attract more than 700,000 and 25,000 people, respectively. They showcase the best in agriculture that Indiana and Purdue have to offer, both locally and internationally. These large-scale events give the Purdue PICS team, led by Dr. Dieudonné Baributsa, a platform from which to showcase the PICS technology. They also highlight new research being done by current graduate students, such as Hannah Quellhorst and Kabita Kharel, and actively engage the attendees in using the PICS technology by participating in an event called the PICS challenge. Participants in this challenge race to see who can close the PICS bags the fastest while still having the bags maintain an effective hermetic seal. These challenges make people aware of how the technology functions in a realistic setting and encourages active engagement with the project to help promote the PICS brand. Through the PICS team's annual participation in the Indiana State Fair and Purdue's Spring Fest, thousands of local Indiana residents are made aware of the immediate and long-lasting positive effects that the research efforts of one of their local universities have made on the world stage.

In addition to these large-scale events, smaller activities stimulate local interest and exposure to the PICS project. Many of these events are focused on high school students in the West Lafayette and surrounding areas. They highlight the impact that PICS research and outreach has throughout the world and encourages students to attend Purdue. National and international proceedings held at Purdue, such as the World Food Prize Youth Institute, the Purdue Agribusiness Science Academy (PASA) Summer Institute, and the Purdue Pest Management Conference also provide venues through which the PICS team promotes its technology. In addition, PICS has been promoted during the World Food Prize annual event in Des Moines, Iowa.

Three winners of the PICS bag tying competion are awarded prizes.

These efforts to educate residents of Indiana and those throughout the US are an important aspect to the overall PICS goal. Local and national recognition of the PICS project provides the means by which to recruit high quality students and investigators to continue the world-class research done by the PICS team. Promoting the PICS brand to Indiana residents also helps to highlight the effectiveness of local research in effecting real and positive change in postharvest storage loss reduction around the world.

Bradley Smith and Anastasia Njoroge running the PICS booth at the 2017 Bug Bowl.

Supply Chain Workshop in Uganda

Jean Njiru, PICS3 Supply Chain Manager

The PICS3 project and our partners organized a supply chain workshop in Kampala, Uganda on February 20-22, 2017. The workshop was attended by 72 participants from 18 countries in Africa, Asia and America. Participants included PICS licensees, vendors, PICS3 business and media consultants, partners funding or promoting PICS bags, and representatives from Purdue and the Purdue Research Foundation. Partners included World Food Program-Uganda, AGRA, USAID-KAVES, Chemonics, Sasakawa Global, Catholic Relief Services, Food Trade, Palladium and CLUSA. Mrs. Beatrice Byarugaba, a Ministry of Agriculture representative, opened the workshop and expressed the need for partnership among crop value chains to increase awareness and availability of PICS bags to farmers in rural areas.

The goal of the workshop was to plan for growth of the supply chain to meet the demand for PICS bags by smallholder farmers. We reviewed successes, challenges, lessons learned, and explored opportunities to improve the availability of PICS bags to farmers in rural areas. The workshop also provided a platform for sharing experiences among the supply chain actors. Many participants appreciated the regional depot model implemented in Tanzania, which addresses logistical challenges. In Ethiopia, the youth have been engaged as retailers of PICS bags in rural markets; this is another model some participants wanted to try in their countries. Some country teams shared what they learned in collaborating with organizations to build awareness and develop the supply chain.

Participants of the PICS Supply Chain Workshop during a presentation. Kampala, Uganda (February 2017).

Participants addressed three key elements to improve efficiency of the PICS distribution network: (i) how to improve the PICS supply chain to reach scale, (ii) elements that contributed to the current success -- building demand and supply, and (iii) ways to effectively scale up PICS distribution. Recommendations by the participants included (i) increasing the number of vendors to reduce the distance travelled by farmers to buy bags, (ii) strengthening the regional distributors to ensure that the supply of bags is not interrupt-

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Alex Bokuma, PICS3 Business consultant in Ghana, presenting during the PICS Supply Chain Workshop in Kampala, Uganda (February 2017).

"It was an extremely useful exercise as it afforded participants the opportunity to share experiences, strategies and best practices in driving sales and also to build networks for further collaboration and cross-fertilization of ideas. It also provided the intrinsic motivation for countries that are not doing so well in terms of sales to re-strategize as to how to achieve their targets for 2017. By and large, a very, very worthy venture." - ALEX BOKUMA

"The workshop was very good as it enabled the sharing of experiences and how to scale up adoption of the technologies that will reduce food loss and safety. It was very informative and [gave participants the opportunity to] network." - GEORGE ODINGO - USAID KAVES - FINTRAC INC, KENYA

"It was really [educational]. I got to learn of scientific ways of how to store produce after harvest which is really important to the local farmer. And above all I was able to network with the different people from all over the world and share with them and also learn from them. I am glad I attended the workshop". - CONSOLATE AKWII - DANIEL CHOUDRY SALES INSTITUTE, UGANDA

PICS Supply Chain Workshop participants visiting a poultry farm using PICS bags for maize storage for animal feed. Kampala, Uganda (February 2017).

Impacts of PICS Hermetic Storage Bags: Experimental Evidence from Uganda

Oluwatoba Omotilewa, Jacob Ricker-Gilbert, Dieudonne Baributsa; Purdue University

Background

Smallholder farm households in sub-Saharan Africa (SSA) typically store their grain for consumption, sale or both. The vast majority use traditional storage technologies, such as granaries, heaping maize in the house, hanging it in the open air, or storing it in woven plastic bags. Unfortunately, these technologies and practices offer little grain protection against insect pests in storage. In fact, the World Bank (2011) estimates that storage loss is the point where the majority of food is lost in developing countries.

Fortunately, storage losses can be greatly reduced or eliminated with efficient storage technology, such as the Purdue Improved Crop Storage (PICS) hermetic bags. Other benefits resulting from the use of improved storage technology by smallholder farmers include (i) making it possible to store the grain for a much longer time until it is consumed or sold; (ii) reducing the use of storage chemicals; and (iii) making it profitable to adopt hybrid or high-yielding seed varieties that are usually more susceptible than local varieties to insect attack during storage.

Experimental Design

With funding from the Bill and Melinda Gates Foundation under the PICS3 project, we designed an experiment to examine how using PICS bags affects smallholder farmers. We implemented a randomized control trial in Uganda where 240 out of 1,200 smallholder households in our sample were chosen in a lottery to receive one PICS bag each. We implemented the experiment in July 2015, and the post-intervention surveys were conducted between October and December 2016, after two complete cropping cycles post-intervention.

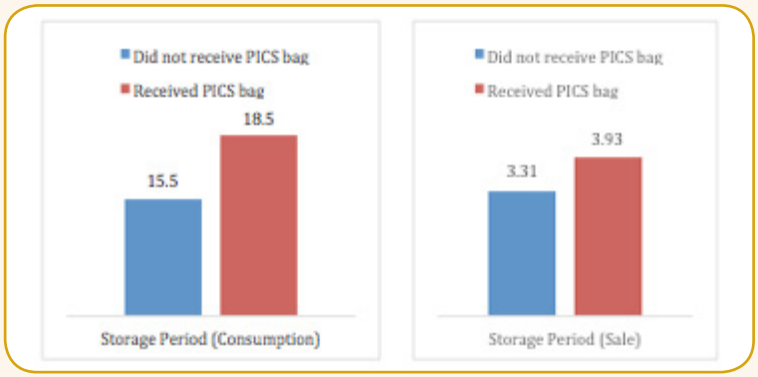

Figure 1a & 1b

Results

Our experiments showed that on average, households who got one PICS bag store their grain for 3 weeks longer than the control households that received none (Figure 1a). Given that the control group stored for about 15 weeks, treated households stored about 20-percent longer. In addition, given that the average length of the lean period (period of food scarcity) is 8 weeks in our sample, we hypothesize that increased length of storage for consumption using PICS bags could reduce the lean period by up to 38 percent {(3/8) *100}. These findings have implications on whether a household is food secure or not, especially, during the lean period of food scarcity. As regards the length of storage of grain for sale, households marginally increased their storage period by about 1 week (Figure 1b), an 18-percentage point increase.

On storage losses, we find evidence showing that PICS bags reduced self-reported actual postharvest losses by 2.4-percentage points (Figure 2). This indicates that for treated households, 67 percent of reported losses were eradicated by using PICS technology. In a country where drought and lack of rainfall has adversely impacted production in the past two years (Daily Monitor Uganda, 2017), reduction of maize postharvest losses in storage by 67 percent is very meaningful.

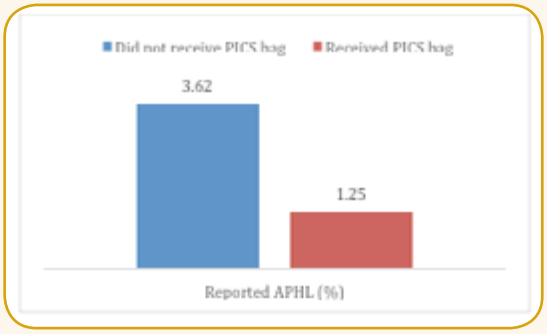

Figure 2: Self-reported actual postharvest losses in percentage

An additional advantage of PICS bags is that they enable farmers to store grain without using storage chemicals and so avoiding their potential health hazards. Households using PICS bags were 4-percentage points less likely to use storage chemicals (Figure 3).

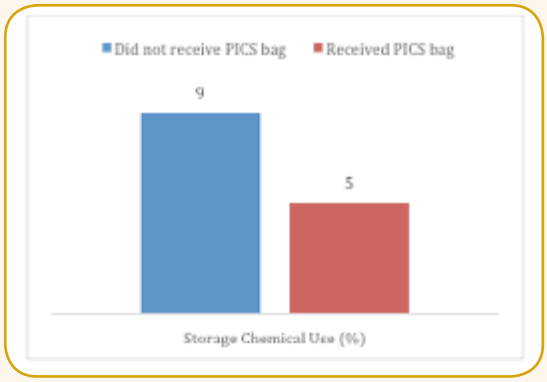

Figure 3: Storage chemical use on maize by percentage

We found evidence that efficient storage technology has a direct linkage with agricultural productivity through input use. Knowing that the hybrid or high-yielding maize varieties popularly promoted in sub-Saharan African (SSA) countries are highly susceptible to pest attacks in storage, we tested the hypothesis that if households are able to preserve their grains efficiently in the postharvest period, they might be encouraged to adopt high yielding varieties of maize. Indeed, treated households with PICS hermetic bags are 10-percentage points more likely to plant improved maize varieties the following season (see Figure 4).

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Impacts of PICS Hermetic Storage…

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This result is intuitive because if a rational household uses improved seed varieties to increase productivity only to be lost in storage, they simply do not adopt the seed variety. However, if the household or farmer can effectively store the increased yield, they can plant the improved variety. Hence, we recommend that researchers, development agents and policy makers promoting high-yielding maize varieties in SSA consider promoting efficient storage technologies such as PICS bags as a complement when promoting these high-yielding varieties.

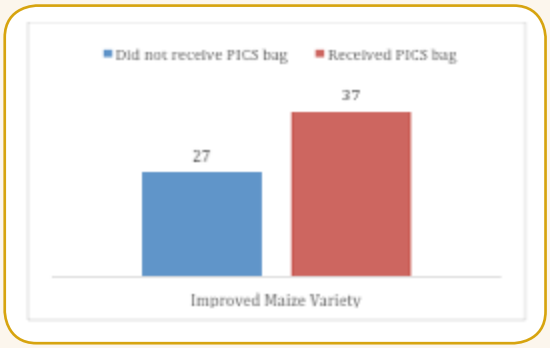

Figure 4: Percentage of Households planting high-yielding maize varieties two seasons after treatment intervention

Lastly, we investigated the impact of getting a free bag on whether the recipient households would subsequently buy an additional bag in the commercial marketplace. In other words, we tested if "subsidizing" PICS bags "crowds-in" or crowds-out commercial buying. Our results indicate that a treated household is more likely to buy additional bags commercially. The likelihood, on average, is 4-percentage points margin provided the technology is available commercially in the household's community (Figure 5).

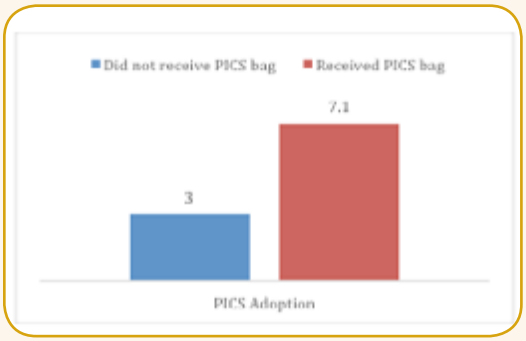

Figure 5: Likelihood of buying additional PICS bag after receiving a free one. Expressed as a percentage

That is, if a household received one PICS bag, the household is 4-percentage points more likely to buy an additional bag.

References

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Supply Chain Workshop in Uganda

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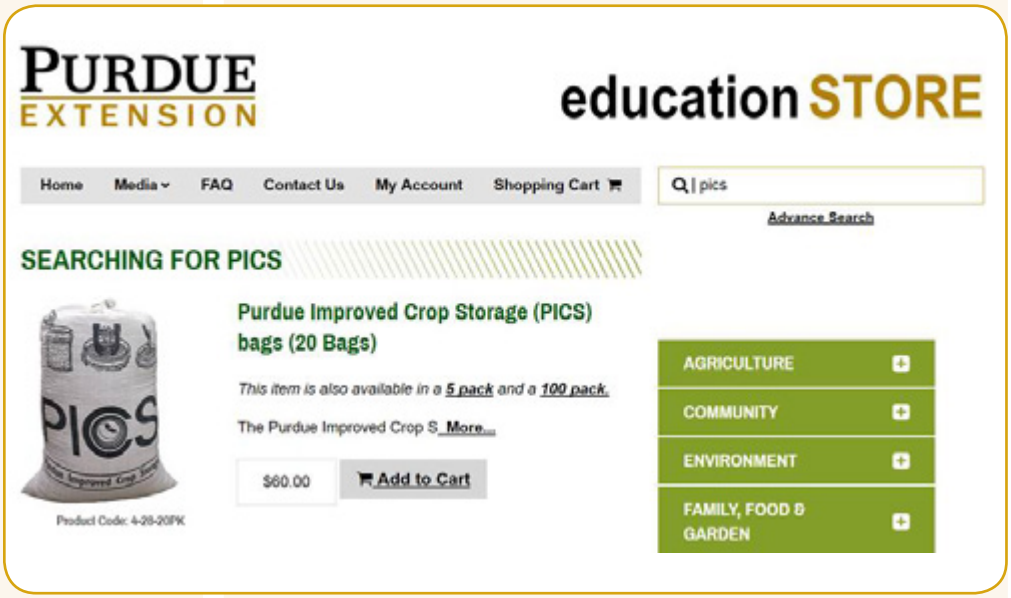
ed, (iii) engaging governments for tax waivers to reduce the cost of bags, (iv) ensuring incentives to everyone in the supply chain; (vi) building partnerships and enhancing promotional activities, training and demonstrations for continued awareness, and (viii) using village sales agents.

Participants noted that key elements for the success of PICS bags include (i) adhering to product quality standards, (ii) simplicity and effectiveness of the technology, (iii) private sector involvement in the project, (iv) local or regional manufacturing of bags in most countries, and (v) PICS bags being a profitable business opportunity. Target sales were set for each country for the 2017 season. The PICS3 teams agreed to develop strategies to reach the target sales in each of the countries.

PICS in the Education Store

Carole Braund, Purdue University

The PICS message is spreading! Many NGOs, development agencies and individuals operating in areas other than Africa have shown interest in incorporating PICS into their programs. This increased demand has created a need for PICS bags to be available for distribution from the U.S.A. We are happy to announce that PICS bags may now be purchased from the Purdue Extension Education Store (https://mdc.itap.purdue.edu/item.asp?Item_Number=4-28-20PK). The bags are sold in bundles of 5 bags ($20.00), 20 bags ($60.00), and 100 bags ($280.00). The bags can be shipped anywhere in the U.S.A. and the Americas.



Screenshot of the online PICS bag display on the Purdue Education Store.

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If you have a PICS story to share,
please contact us at
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