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Stored Grain

Department of Entomology

Using and Recycling Purdue Improved Crop Storage (PICS) Bags

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The Purdue Improved Crop Storage (PICS) bag is a simple and effective technology for reducing grain losses to insects during postharvest storage. The technology was initially developed for cowpea storage in West Africa but is currently being used to store many different cereal and legume crops including maize, beans, sorghum, mungbean, pigeon pea, wheat, and rice. Its use has spread to many countries in Sub-Saharan Africa and Asia. Since 2007, PICS bags have been disseminated on a large-scale to more than 33,000 villages. By 2013, more than 3.5 million bags have been produced and sold by the private sector to smallholder farmers and other end users. While substantial, the 3.5 million PICS bags represent only 1600 tons of plastic material; this is roughly 1.6 percent of the more than 100,000 tons of plastic produced annually by Nigeria alone (Ogunniyi, 1990).

Given the growing interest in the technology and its potential to reach tens of millions of farmers across the globe, it is both desirable and necessary to (1) promote proper use and (2) encourage recycling or repurposing of PICS bags. Proper management and use of PICS bags can benefit farmers by extending their lifespan, thus increase farmers' incomes and reduce the impact of the PICS bags on the environment.

Proper use of PICS bags

The PICS bag is a composite airtight triple-layer plastic bag consisting of two high density polyethylene (HDPE, 80 microns thick) inner bags and one polypropylene (PP) woven outer bag (Baributsa et al., 2012). The combination of two liners and one woven bag provide a robust composite that can continue to function after handling and minor damage. PICS bags can be used to store grain for multiple seasons. In the Sahel of Africa, with its prevailing extreme weather conditions, farmers have used PICS bags for at least three years to store cowpea (Baributsa et al., 2014; Moussa et al. 2014). PICS bags that have been used for several years have been shown to be as effective as new PICS bags (Baoua et al., 2012). When PICS bags lose their airtightness, farmers use them to store crops that are less susceptible to pests, such as millet in Niger (Baributsa et al., 2014).

To increase the longevity of PICS bags for grain storage, users should:

- Store clean grain containing no debris, which tends to make holes in the bags
- Handle the bags carefully to avoid damaging them, especially when tying and transporting them
- Store bags in clean areas to avoid damage by rodents and other household objects
- Store bags away from direct sunlight and extreme heat
- Patch small holes or tears with tape to maintain airtightness

Recycling of PICS bags

PICS bags should be recycled for other uses when the liners have accumulated numerous holes or tears that can't be repaired with tape. Studies in West Africa revealed that the liners and the woven sack are commonly separated from one another and repurposed differently (Baributsa et al, 2014). PICS bags follow the same recycling path as do other plastic bags such as those used for packaging sugar, salt and cement (James, 2011).

The woven bag is:

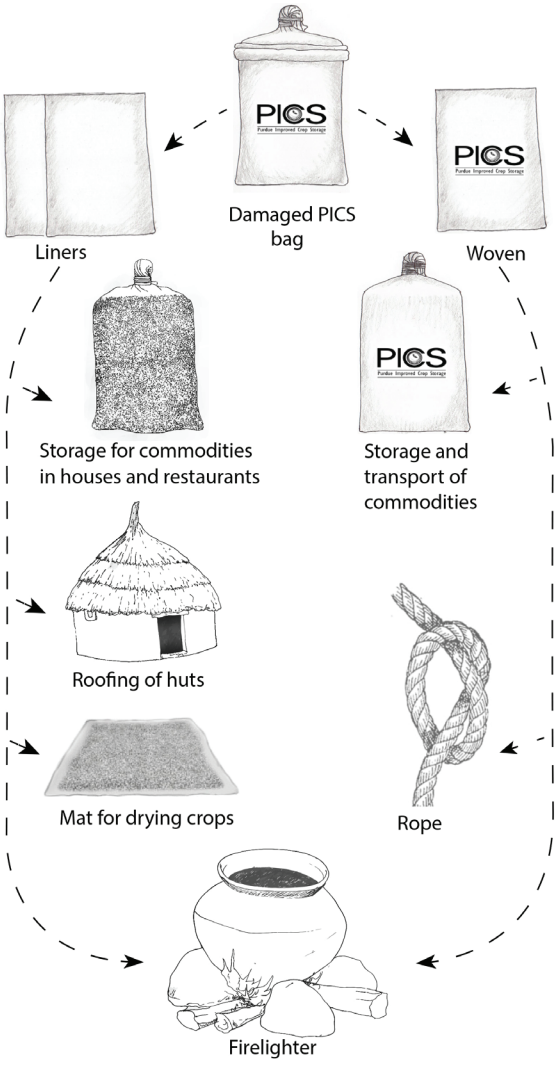
- Already well known to farmers who use such bags for storage and transport of commodities less susceptible to insect infestation.
- Used for producing ropes and mats

The HDPE liners are used to:

- Store commodities less susceptible to insect infestation
- Store and preserve processed food in local restaurants

- Make mats used for drying grain or other purposes
- Make water-repellant roofing materials

When the liners and the woven bags are severely damaged they can be used for other purposes, including lighting cooking fires. Given their substantial useful lifetime for hermetic storage (median is 3 years for cowpea) and repurposing, PICS bags have a limited impact on the environment. The multiyear useful life of PICS bags reduces the demand for other storage containers such as woven bags and reduces the use of other environmentally unfriendly pest control methods such as insecticides.



Recycling path of PICS bags that are no longer hermetic.

The useful lifespan of PICS bags is increased by farmers' good practices. Because PICS bags are not treated with insecticides and pose no hazard, filled bags are usually stored in the living or sleeping rooms on low-resource farms. Most smallholder farmers treat PICS bags as granaries, that is, they do not sell the PICS bags with the grain. Usually, farmers empty the grain into a different container before taking it to the market. The PICS bag is folded and kept to use again in the following storage season.

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PICS
Purdue Improved Crop Storage

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