



**Summer 2024**

## Rekindling the Flame with the Purdue Improved Crop Storage Community

By Dieudonne Baributsa, Director, PICS Program, Purdue University

We are delighted to extend a warm welcome back to the Purdue Improved Crop Storage (PICS) newsletter. The last four years have been challenging, marked by crises such as the COVID-19 pandemic, floods, droughts, and wars affecting agriculture worldwide. These events significantly impacted smallholder farmers, restricting market access and reducing crop productivity due to increased input costs (e.g., fertilizers).

Despite these challenges, the spirit of collaboration and determination has remained steadfast within the PICS community, serving as a beacon of hope amid uncertainty. Postharvest storage technologies have helped smallholder farmers cope with these situations. For instance, during the COVID-19 pandemic, despite lockdowns and travel restrictions, PICS bags still reached smallholder farmers. When trade halted during the pandemic, PICS bags played a pivotal role in preserving farmers' commodities until rural markets reopened. Furthermore, farmers have utilized PICS bags to store buffer stocks, helping them cope with no or low grain productivity caused by droughts.



As we revive this newsletter, we are eager to share progress in improving postharvest management on smallholder farms. In this edition, we embark on a journey of rediscovery, celebrating the resilience of our global network of farmers, researchers, extension specialists, private sector (manufacturers, distributors, and vendors), development partners, and other stakeholders. Through the lens of reflection, we revisit past accomplishments, acknowledging the challenges and the lessons learned. Moreover, we cast our gaze forward as we continue our

unwavering commitment to advancing crop storage solutions that empower farmers and promote food security.

As we navigate the road ahead, it is our sincere hope that this newsletter serves as a catalyst for dialogue, innovation, and action. Together, let us harness the power of knowledge and collaboration to cultivate a future where resilient crop storage systems are a cornerstone of sustainable agriculture and global food security.

**Welcome back to the PICS community!**



## Unlocking Access to Hermetic Bags Through Maize for Technology (M4T)

By Thompson Mwakibinga, PPTL Tanzania



During harvest seasons most farmers have maize for home consumption and surplus for sale to settle family financial responsibilities. Farmers hardly have cash to spend during the harvest season. Therefore, liquidity is the one of the challenges farmers face at harvest.

Another challenge that farmers face at harvest is the low price of grain particularly when maize production is good. The law of supply and demand dictates the price of maize and not the actual cost of production. In addition, most farmers borrow input loans during farm preparations which now is due for settling. Under such circumstances farmers are compelled to sell their maize at low price to settle the financial obligations.

Understanding these challenges that many farmers face, a marketing concept called Maize for Technology (M4T) was developed and tested in Ruvuma, Tanzania.

The M4T model starts with PHT manufacturer who supplies the PHT bundles on cash to traders. The traders exchange the bundles with maize from farmers who in turn uses the bags for storing their grains for home consumptions and later sales when the prices are higher. The anticipated impacts of M4T model is to solve farmers' liquidity problem at harvest and increase the adoption of PICS bags. The manufacturer and traders' revenues grow as the outcome of increased sales. Community at large benefits from accessing safe and secure maize that is not chemically treated.

Case study: Testing of the model in Ruvuma

Sr #	Product item	Purchase price for traders	Exchange price for farmer	Market price
1	Grain bag	TZS 640	TZS 700	TZS 750
2	Tarpaulin	TZS 25,000	TZS 28,000/=	TZS 35,000
3	PICS bag	TZS 3,600	TZS 4,000	TZS 5,000
4	PIMA	TZS 10,000	TZS 11,000	TZS 12,000

We tested the M4T model by engaging Yamaha Group, a group of 19 members. Maize from farmer were exchanged with assorted bundles of drying sheet (tarpaulins) and PICS bags. Every stakeholder in the M4T initiative benefited. Traders purchased PICS bag at 3,600, and tarpaulin at TZS 25,000. They exchanged at TZS 4,000 and TZS 28,000 for PICS bags and Tarpaulin respectively.



## The Impact of PICS Bags in Ethiopia

By Ephrem G. Meskel & Samrawit Mekbebe, Shayashone PLC (SYS)



Ethiopia's agricultural sector has faced significant challenges, particularly in terms of post-harvest losses, which have traditionally undermined the efforts of farmers across the nation. Traditional storage methods, while rooted in generations of practice, have often fallen short of effectively preserving harvests, sometimes even posing risks to consumer health and the environment. This ongoing struggle has prompted the need for innovative solutions to safeguard the fruits of agricultural labor more effectively.

In the face of these struggles, Purdue Improved Crop Storage (PICS) bags emerged in 2014 to change the narrative of Ethiopian farmers. With Shayashone PLC (SYS) leading the commercializing efforts, and its sister company, PHK Trading PLC, handling the distribution, significant transformations have occurred enriching the lives of numerous farmers in various regions of the country.

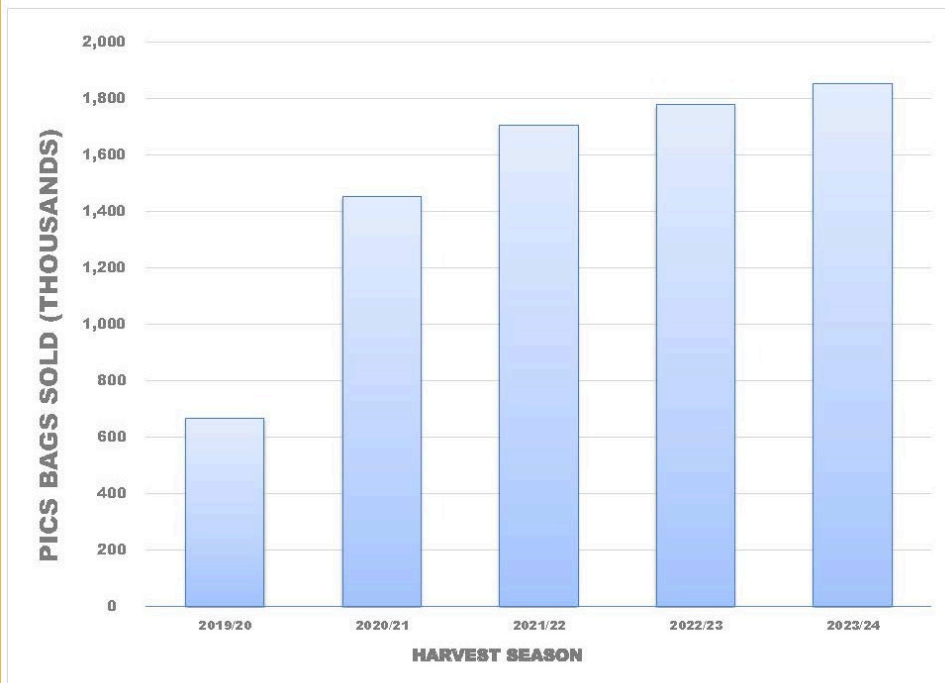
For the last five years, there has been a notable expansion in the distribution of PICS bags by SYS, now reaching remote regions across the country.

Our expansion efforts have undeniably made significant strides, extending our reach to East Africa, specifically Sudan and Somalia. The initial success in expanding the supply chain was achieved through the Union-Cooperative business model and the Private Vendor Youth Reseller models. These proven models continue to be instrumental in reaching new areas for

distributing PICS bags, ensuring wider access and adoption of this innovative technology.

SYS has been collaborating with various governmental and non-governmental organizations to ensure that farmers utilizing PICS bags are equipped with the necessary knowledge for effective use. Capacity-building sessions, including village and market demonstrations, are conducted to educate farmers on proper PICS bag utilization in storing crops. Additionally, bag opening ceremonies are organized to showcase the effectiveness of the bags after a certain period, further reinforcing farmers' confidence in the technology.

These efforts enabled SYS to successfully achieve a substantial increase in sales volume, surpassing the initial phase of the PICS technology's commercialization that was below a million bags in sales. This can be confirmed by the increased sales volume of PICS bags (Figure 1).



Additionally, this increase reflects the saved volume of grains, totaling 112,000 MT, further emphasizing the positive impact of PICS bags in reducing postharvest losses.

The positive increase in sales volume and saved crops could have been even greater if not for the disruptions caused by the COVID-19 pandemic. The pandemic hindered the smooth functioning of the PICS bag supply chain, impacting the ability to reach more farmers and distribute bags efficiently. Despite these challenges, SYS has continued its efforts to reach more regions in the country, following necessary precautions.

In addition to its regular utilization for grain storage in Ethiopia, PICS bags have new application- the fermentation of Enset, a plant commonly known as false banana. Enset is often referred to as the "Tree against Hunger". The edible part of Enset, primarily its stem, undergoes a unique transformation through squeezing and fermentation, resulting in a versatile food product known as "Kocho."

The implementation of PICS bags for Kocho is a labor saving. It does not only reduce water use during processing but also alleviates the workload of women involved in the traditional fermentation. Furthermore, the Kocho fermented in PICS bags exhibits a distinct white color, setting it apart from Kocho that undergoes pit fermentation that experiences discoloration.

For the past year, SYS has been engaged in manufacturing the polyethylene inner liners of PICS bags, a notable advancement from our previous practice of outsourcing. Additionally, the company is planning on investing in acquiring machinery to enable in-house production of the polypropylene outer bags. This strategic move is not only enhancing the company's operational efficiency but also strengthening its supply chain resilience. It is also possible for SYS to ensure consistent quality control and timely delivery thereby increasing its ability to efficiently reach farmers in various regions of Ethiopia and beyond.

The journey toward reducing postharvest losses is an ongoing effort, marked by continuous progress and determination. SYS aims for a future where communities can achieve food and nutritional security while increasing their income; ensuring that their basic needs are met and sustainable practices are in place.



## **Thetheke Club Success Story on PICS bags at Mkhomo in Salima, Malawi**

By Masautso Phiri, Extension Officer



Members of Thetheke Club from Mkhomo village, Kalambe Center Section of Chinguluwe EPA in Salima district have been expressing thanks to their participation in the Growth Poles project facilitated by the USAID Feed the Future. With 30 dedicated members, the club has been at the forefront of embracing innovative agricultural practices that enhance crop productivity and profitability.

In the previous season, the club members were provided with PICS bags through the project to test their effectiveness in grain storage. The results were nothing short of impressive, with all members reporting significant benefits and improvements in their storage practices. The PICS bags proved to be a game-changer for farmers, offering a more reliable and cost-effective solution compared to ordinary bags.

By using PICS bags, farmers were able to safeguard their maize harvest from insect infestations, resulting in reduced grain losses and higher-quality produce. The bags' ability to preserve grain over an extended period meant that the farmers saved on the costs associated with purchasing and applying chemical insecticides regularly. This translated into increased profits for

the farmers when selling their stored maize during periods of short supply.

Also, farmers appreciated the environmental benefits PICS bags offered. By opting for PICS bags, farmers were contributing to sustainable agricultural practices and reducing the impact chemical insecticides on the environment.

Encouraged by their success and convinced of the advantages of PICS bags, the members have decided to purchase the bags for themselves this year. The club's decision to invest in PICS bags demonstrates their commitment in adopting modern and efficient storage solutions that enhance their agricultural practices and improve their livelihoods.

Thetheke Club's experience with the Growth Poles project and PICS bags has not only improved their storage practices but has also boosted their confidence in adopting new technologies and methods to enhance their agricultural productivity. By sharing their success story, the club hopes to inspire other farmers across the country to explore and embrace innovative solutions that can lead to sustainable development and improved livelihoods.

The success of Thetheke Club in embracing innovative solutions like PICS bags serves as a testament to the transformative power of effective partnerships and collaboration in driving sustainable agricultural development. By working together and sharing best practices, farming communities like Thetheke Club can unlock their full potential and create a brighter future for themselves and future generations.



## PICS Bags Aim to Improve Food Security for Central American Smallholder Farmers

By Rachael Cox, PICS Global



Extensive research, extension and market development has been done since the induction of PICS bags. Most of this work has been done in Sub-Saharan Africa with government agencies and international donors. The process of building the market for PICS bags in Central America has been a distinct experience.

Long used in other parts of the world, PICS bags have proven highly effective at minimizing post-harvest losses of staple crops like maize and beans - crops that form an important part of the Central American diet. Maize is important for food security in the

region. Some parts of the region boast of being the center of origin of maize. Thus, maize crops play a strong role in culture and tradition.

After successfully disseminating the technology in several African countries, PICS bags have now been introduced in Central America through a strategic collaboration. This partnership involved the bag manufacturer Sacos Industriales, the regional distributor DisAgro, and several NGOs working with smallholder farmers in the region. DisAgro is an international corporation founded in Guatemala whose business focuses on agricultural inputs, digital agriculture, and plastic products for agriculture. DisAgro works in Central and South America to boost agriculture's competitiveness by delivering innovative and effective products to their customers.

While DisAgro works with larger scale commercial farmers, it has a corporate social responsibility program designed to work with smallholder farmers. Through this work, the need for a solution to post-harvest losses has emerged. After a meeting with PICS Global, DisAgro was convinced that PICS bags are the best technology to promote and distribute to address post-harvest challenges. In 2021, DisAgro launched PICS bags on the market in Central America. PICS Global is assisting DisAgro to design strategies to effectively promote and distribute PICS bags to smallholder farmers. DisAgro is working to identify key areas of demand, understand pricing dynamics, and streamline distribution channels.

Collaborating with NGOs adds another layer of support to the initiative, particularly in reaching small-scale farmers who may lack access to traditional distribution channels. Many non-profits in the region working in the agricultural sector have relationships with local farming communities and possess valuable insights into their needs and challenges. By partnering with these organizations, we can tailor our approach to ensure that PICS bags reach those who need them the most.



## PICS Adoption in Zambia

By Douglas Mwasi & Elizabeth Chiyende, Catholic Relief Services Zambia



In Zambia, agriculture is the second-largest contributor to the economy after mining. Smallholder farmers, who produce over 80 percent of the food in the country, face challenges due to their heavy reliance on rain-fed agriculture, making them vulnerable to climate change and pest and disease infestations. Limited access to inputs, credit, input and output markets, and appropriate production and storage technologies further compounds these challenges. Post-harvest losses are a significant issue, leading to food insecurity and income loss. The Zambia Agricultural Research Institute (ZARI) estimates that farmers in Zambia lose about 25% of their harvested grain if not properly managed.

To address these issues, particularly post-harvest losses, CRS, with support from Purdue University, collaborates with local partner organizations to assist farmers and communities in Eastern, Lusaka, and Southern provinces. The project aims to disseminate Purdue Improved Crop Storage (PICS) bags, a hermetic storage technology, to enable smallholder farmers to store grain and seed more effectively without chemical insecticides, thereby improving their resilience, household food security, and seed quality for crop production.

In the target areas, CRS and partners trained community volunteers and Agriculture Development Agents (ADAs) who introduced PICS bags to smallholder farmers, equipping them with knowledge on the technology. CRS has trained and introduced 340 ADAs in PICS bags across the three provinces, recruiting 379 pilot farmers in twenty-three communities. Through various activities such as radio broadcasts, community engagement events, demonstrations, and door-to-door sensitization, CRS promotes the adoption of PICS bags. 3,512 community members have been educated on post-harvest management using hermetic technologies through community events, 2,791 individuals were reached via social media, and 4.8 million through radio broadcasts.



*During the last season, I bought 100 PICS bags, sold grain in 33 of the bags at K350 each. I later sold 47 bags (50 kg each) of the stored grain at K23,500 (US\$ 1,175). I have reserved 20 (50kg) bags for home consumption, especially with this year's drought in the country.*  
- Payitana Mwanza

Despite initial challenges with product availability, CRS collaborated with local suppliers Kushee Investments and Animive enterprise and distributed 1,600 PICS bags procured for technology demonstration. During the Open the bag ceremonies, samples were taken from 230 bags to assess the PICS bags effectiveness in protecting stored grain against post-harvest losses during the 2023/2024 season.



The project's success is evident through stories shared by ADAs, one of which is about Payitana Mwanza, a 58-year-old farmer from Chigumani village in Eastern Zambia who transitioned from traditional grain storage methods to PICS bags. By selling stored grain and investing in a bull for his farm, Payitana has confirmed the positive impact of adopting modern agricultural technologies. Paitana not only utilizes the PICS bags but actively encourages communities to embrace and use them for improved health and prosperity.

CRS hopes to reach 25,000 smallholder farmers with PICS bags. In collaboration with ZARI, we have undertaken research to inform policy and scale the adoption of PICS bags.



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