

Economic Evaluation of Improved Grain Storage Technology in Tanzania



RESEARCH PROGRAM ON Integrated Systems for the Humid Tropics

Introducing the legacy product

Postharvest grain losses are substantially high among smallholder farmers in Sub-Saharan Africa. The losses vary among countries, crops, and between seasons while the average figure ranges from 20 – 40%. This high loss suggests the need for greater attention on postharvest grain losses as it would adversely affect household food security. As an effort to reduce post harvest grain loss, the International Institute of Tropical Agriculture (IITA) has introduced improved hermetic grain storage technologies to smallholder farmers in Tanzania. The improved storage technologies have been tested for their effectiveness in reducing postharvest grain losses. However, their economics is little known. This study has been initiated to quantify the financial gains from the improved storage technologies and to examine how they compare with the traditional technology. Specifically, it focuses on Purdue Improved Crop Storage (PICS) bags.

How does it work?

PICS are used to store grains for longer time without damage. They have sufficiently sealed structures and create a modified atmosphere with low oxygen and higher carbon dioxide concentration through respiratory metabolism of insects, grains itself and other aerobic organisms. The modified atmosphere in the storage structure would kill insect pests through suffocation and desiccation.



Data and Methods

This study is based on data collected through group interviews and a household survey in Babati district of Tanzania. We conducted participatory cost benefit analyses (PCBA) with groups of farmers who had experiences in using both the traditional bags and the improved bags. The PCBA data were supplemented by survey data collected from 175 households using a structured questionnaire. The PCBA data were used particularly to determine the loss levels associated with each storage type and to understand the pattern of loss over time, whereas the survey data were used to identify focus technologies, compute average maize production levels, and identify farmer categories. Partial budget analysis approach was used to evaluate the economic advantage of PICS over the traditional polypropylene (PP) bags. Such a participatory approach would be useful to identify adoptable technologies in a better way because it includes farmers' own perceptions.

Key contacts

Hanney Mbwambo. Email: hanney.mbwambo@yahoo.com
 Bekele Kotu, IITA. Email: b.kotu@cgiar.org
 Zena Mpenda, Sokoine University of Agriculture, Tanzania



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November 2016

Results and outputs

Table 1: Maize production and storage losses

Farmers category (Quantiles)	Quantity produced & stored (kg)	Estimated Quantity of loss (kg)	
		Traditional bags	PICS bags
Low producers (LP)	335	1.6 (0.5%)	0 (0%)
Lower middle producers (LMP)	741	75 (10.1%)	0.9 (0.1%)
Medium producers (MP)	1168	222 (19%)	2.6 (0.2%)
Upper middle producers (UMP)	2024	384 (19%)	4.5 (0.2%)
Top producers (TP)	4782	918 (19.2)	10.7(0.2%)
Average	1826	355(19.4%)	4.1(0.2%)

Table 2: Financial benefits from new storage bags

Farmers Category	Net return (TZS)	BCR	IRR (%)
Low producers (LP)	(1,650)	0.5	(10)
Lower middle producers (LMP)	12,073	2.8	114
Medium producers (MP)	41,582	5.1	228
Upper middle producers (UMP)	71,808	5.1	225
Top producers (TP)	178,810	5.7	254
Average	67,087	5.4	243

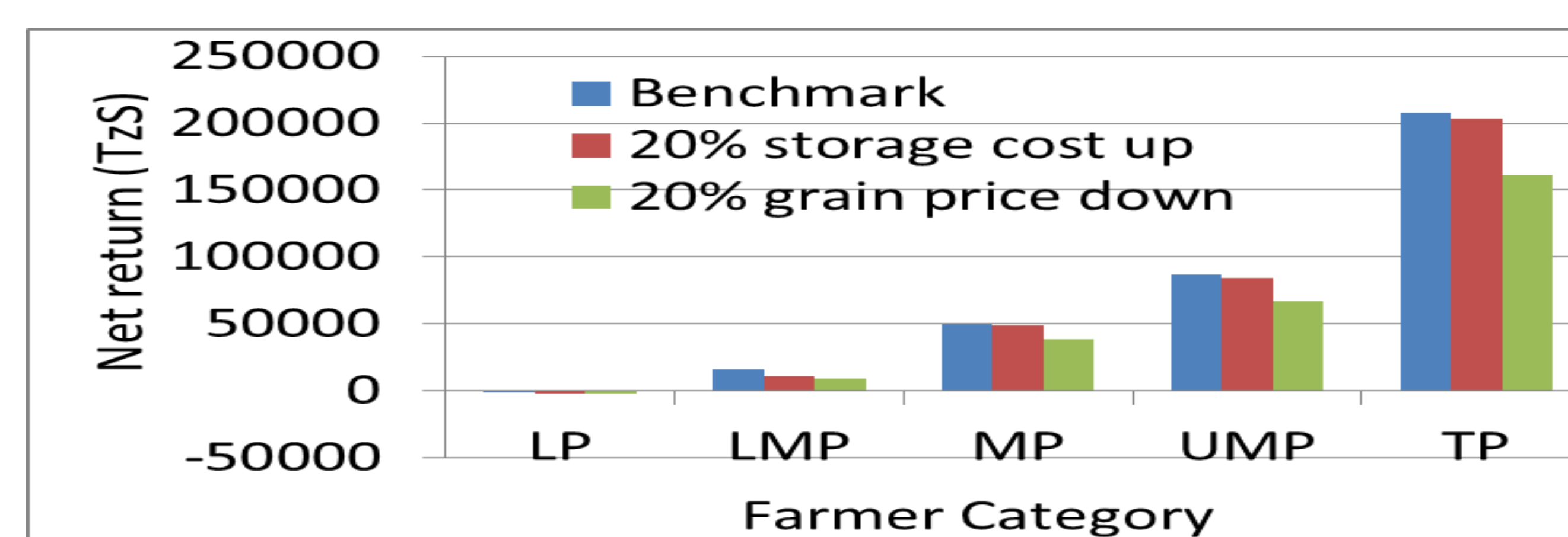


Figure 1: Sensitivity Analysis

Who is the legacy product useful for?

The ultimate beneficiaries are the farmers. Those farmers who have more surplus grain to store will reap higher benefit. Moreover, the information obtained would be useful to policy makers and development practitioners to enhance food security and farm income among smallholders through better post harvest grain management.

Key partners

This study was conducted with the support of United States Agency for International Development under a program known as Africa Research In Sustainable Intensification for the Next Generation (Africa RISING). IITA coordinates the East and Southern Africa Project where this study was conducted.

