

Safeguarding Africa's Harvest: The Potential of Hermetic Storage Bags

Limbikani Matumba, John F. Leslie, Theresa N. Ngoma, Maurice Monjerezi, Brighton M. Mvumi and Jagger JW Harvey

Recommendations

We recommend the following policy interventions to promote the adoption of hermetic bags for grain storage in Africa:

- Raise awareness among smallholder farmers, extension agents, policy makers and other stakeholders about the benefits of hermetic bags for grain storage, including effectiveness, postharvest loss reduction, reduced fungal contamination, increased profitability, and maintenance of seed viability.
- Provide technical support and training to farmers on proper use of hermetic bags through strengthened extension services, including storage practices, monitoring, and maintenance.
- Foster a competitive pricing environment for hermetic storage bags by expanding the supplier base.
- Provide subsidies or financial incentives to offset upfront costs of purchasing hermetic bags.
- Facilitate access to credit for smallholder farmers (equal access for women and men) to purchase hermetic bags through local financial institutions or micro-credit programs.

Introduction

Ensuring an adequate food supply in Africa has become a critical necessity. Post-harvest grain storage is a critical weak point, as up to 37% of food produced in sub-Saharan Africa is lost between production and consumption¹. Hermetic grain storage bags are a cost-effective, pesticide-free solution to protect stored grain against storage fungal and insect infestation, which causes physical and qualitative (nutritional and mycotoxin contamination) grain loss, while maintaining seed viability and preventing physical loss. Unfortunately, the adoption of hermetic bags remains low among smallholder farmers in Africa due to perceived costs and lack of awareness of their benefits. Below, we present data meta-analyzed from research articles indexed in the Web of Science². These data support the adoption of hermetic bags for grain storage, including by smallholder farmers, and highlight the economic and social advantages of their use.

Evidence for the Efficacy of Hermetic Bags

Hermetic bags are efficacious for preserving grain quality and preventing weight loss. Compared to grain stored in conventional bags, grain stored in hermetic bags had 26% higher seed viability and 23-fold lower grain weight loss (Fig. 1). In a Randomized Control Trial in Tanzania, providing hermetic storage bags reduced the proportion of severely food-insecure households by an average of 38% during the lean season and 20% over the full seasonal cycle³. Thus, hermetic storage bags can significantly reduce post-harvest losses and increase food security by preserving grain quantity and quality while maintaining seed viability.

Cost-effectiveness and Profitability

Hermetic bags may be perceived as expensive, but the evidence suggests that they are cost-effective and profitable in the long run. For example, while the initial cost of a hermetic bag is higher (around \$2.00-\$4.00) compared to a conventional bag (\$0.40), the difference in average grain weight between them after storage is about 20% (as shown in Fig. 1), which means an average of 10 kilograms of grain more is lost when the grain is stored in a conventional/non-hermetic 50-kilogram bag. It is a straightforward calculation to determine that if the grain's value is at least \$0.36 per kilogram (\$3.60 for 10 kg), then using a hermetic bag covers the higher upfront expense. Even when considering the 25th percentile value for relative grain weight losses, i.e., the lower end of the differences in weights from conventional and hermetic bags, storing grain valued at at least \$0.72 per kilogram in a hermetic bag is profitable. Hermetic bags are meant to be reused several times, which further increases their financial advantage, since the first year's benefits often cover the entire cost of the bag. Grain stored in hermetic bags also usually retains more nutrients and is of higher quality than that of grain stored in conventional bags.

Such grain commands a better price in the market, which further increases the economic benefit of the hermetic bags.

Advantages for seed grain

Many smallholder farmers in Africa rely on seed they retain from their harvest rather than purchased seed for the next year's planting or for trading in informal seed markets. Seed grain is traditionally more expensive than grain used for food or feed, and hermetic bags again offer significant storage advantages. The higher germination rate (90%) of seed stored in hermetic bags than in conventional bags (64%) (Fig. 1) means fewer seeds must be planted, and perhaps purchased, to obtain the same plant population. Thus, the manual labour of planting and replanting, which usually is done by women and children, is reduced and cost savings and improved productivity result. Moreover, increased seed germination ensures a better crop stand and higher yields, contributing to increased household income and food security.

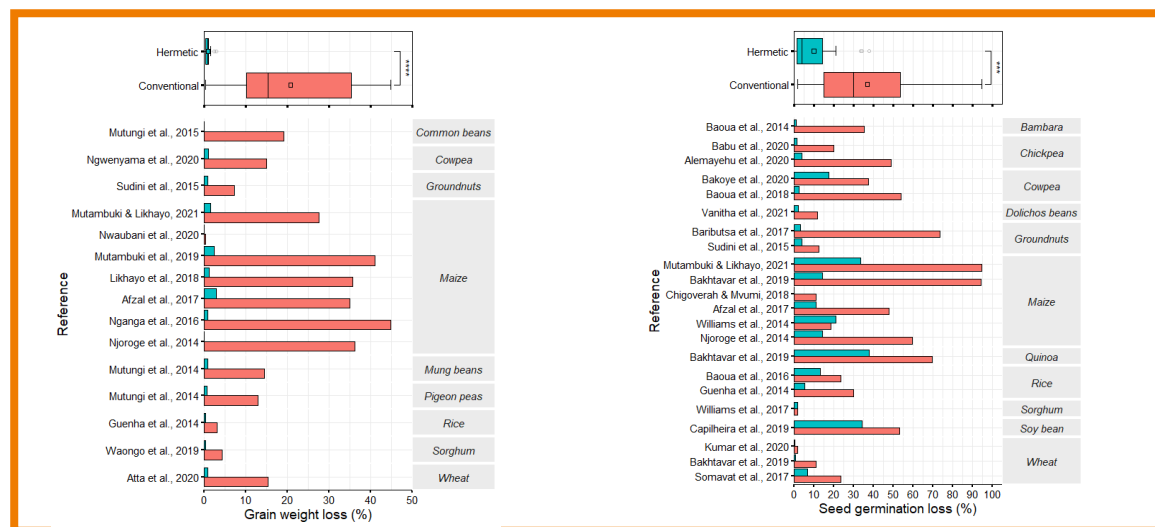


Fig 1. Reduction in seed germination and weight loss in grain stored in hermetic and conventional storage bags (for more visit: <https://doi.org/10.1002/jsfa.12934>)

Conclusion

Hermetic bags promise to reduce postharvest losses, enhance food security, improve livelihoods, and contribute to environmental sustainability in Africa. Policy interventions such as increasing awareness, providing subsidies or access to credit, and strengthening extension services and enabling more suppliers of the bags can promote their adoption and contribute to sustainable agricultural practices and improved food security.

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Affiliations and details of contributors

1. Limbikani Matumba – Prof., Lilongwe Univ. of Agric. & Nat. Res. (LUANAR), Lilongwe, Malawi
2. John F. Leslie – Univ. Dist. Prof., Dept. of Plant Path., Kansas State Univ., Manhattan, Kansas, USA
3. Theresa N. Ngoma – Lecturer, Lilongwe Univ. of Agric. & Nat. Res. (LUANAR), Lilongwe, Malawi
4. Maurice Monjerezi – Prof., Dept. of Chemistry, Univ. of Malawi, Zomba, Malawi
5. Brighton M. Mvumi – Prof., Dept. of Agric. & Biosys. Eng., Univ. of Zimbabwe, Harare, Zimbabwe
6. Jagger JW Harvey – Res. Prof., Dept. of Plant Path., Kansas State Univ., Manhattan, Kansas, USA

