

Business models for reducing greenhouse gas emissions from food loss and waste

Improving cereal storage in Tanzania could reduce food loss and emissions by 14%

October 2018

Value proposition

Farmer investment in hermetically sealed cereal storage bags can greatly reduce farmer losses. The bags protect cereals and other crops from insect infestation and other potential damages, reducing post-harvest loss from an average of 14% to less than 1%. Additionally, the bags enable farmers to store cereals, protecting them from volatile market prices and especially the low prices that occur immediately after harvest and allowing them to sell months later, when prices are higher.

Challenge

Cereal production in Sub-Saharan Africa suffers from 10-20% post-harvest losses, resulting in decreased farmer income and food insecurity on the continent. Available technologies can reduce cereal losses to address this challenge, decreasing greenhouse gas (GHG) emission intensity by 14%.

Financial and GHG analysis for 100 kg hermetically sealed storage bag (US\$ 1 = TZS 2,282)

Costs	Financial returns	Reduced losses	Climate change mitigation potential (0.36 tCO ₂ e per ton of grain)
Upfront cost: US\$ 2.19	Income: US\$ 30.47 after five months IRR: 23% after 3 years	Per bag: 42 kg over 3 years Country potential: 700,000 t per year	GHGs reduced per bag: 0.01 tCO ₂ e GHGs reduced with country-wide implementation: 0.25 tCO ₂ e Marginal abatement cost: - US\$ 275 per tCO ₂ e

Barriers to adoption

- Although relatively inexpensive (US\$ 2-3), the upfront cost discourages adoption by farmers
- Small farmers' access to finance is very low due to perceived risk of agriculture in the financial sector
- Storing the grain, therefore forgoing income, for several months is a strain for farmers with immediate cash needs
- Bags are not widely used, and farmers are not convinced of their effectiveness
- Farmers are located in remote areas, far from distribution centers
- The high volatility of cereal prices in Tanzania makes the return on investment uncertain

Solutions

- Use public funds to absorb the risk of lending to farmers, through local banks and bag distributors and vendors
- Establish a warehouse receipt system, where a warehouse holds farmers' grain as collateral in exchange for storage bags, offering an alternative way of reducing the risk of lending to farmers
- Support companies that promote bags, particularly in their marketing and distribution efforts
- Establish and enforce quality standards for bags to maintain farmer confidence in the technology

Relevant actors

Farmers, farmer organizations, distributors, vendors, warehouses, NGOs involved in bag promotion, national and regional government, and financial intermediaries

More information

Please visit [CCAFS Invest](#) or contact Lini Wollenberg (lini.wollenberg@uvm.edu).

Duncan Gromko (Duncan.gromko@unique-landuse.de) from UNIQUE forestry and land use conducted the research in partnership with CCAFS. CCAFS is carried out with support from the CGIAR Trust Fund and through bilateral funding agreements. For details please visit: <https://ccafs.cgiar.org/donors>.