



Solar-Powered Cold Storage and Post-Harvest Losses

A Comparative Supply Chain Analysis of Mango Marketable Surplus in Sikasso, Mali

Boubacar Keita¹, Adama Traoré^{1,2}, Fatoumata Dembélé^{2,3}

Aminata Coulibaly⁴

¹ University of Bamako (consolidated)

² International Center for Tropical Agriculture (CIAT), Mali

³ Rural Polytechnic Institute (IPR/IFRA) of Katibougou

⁴ Department of Soil Science, Rural Polytechnic Institute (IPR/IFRA) of Katibougou

Correspondence: bkeita@aol.com

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Author notes

Boubacar Keita is affiliated with University of Bamako (consolidated) and focuses on Agriculture research in Africa.

Adama Traoré is affiliated with International Center for Tropical Agriculture (CIAT), Mali and focuses on Agriculture research in Africa.

Fatoumata Dembélé is affiliated with Rural Polytechnic Institute (IPR/IFRA) of Katibougou and focuses on Agriculture research in Africa.

Aminata Coulibaly is affiliated with Department of Soil Science, Rural Polytechnic Institute (IPR/IFRA) of Katibougou and focuses on Agriculture research in Africa.

ABSTRACT

Background: Post-harvest losses of perishable fruits, particularly mangoes, represent a critical constraint to farmer livelihoods and food security in sub-Saharan Africa. In Mali, the Sikasso region is a major production zone, but significant volumes are lost due to inadequate storage and spoilage along traditional supply chains.

Purpose and objectives: This study conducts a comparative supply chain analysis to quantify the impact of introducing decentralised, solar-powered cold storage units on the marketable surplus and economic wastage of mangoes for smallholder growers.

Keywords: *Post-harvest losses, Solar-powered cold storage, Marketable surplus, Supply chain analysis, Sub-Saharan Africa*

Article Highlights

- Quasi-experimental design compared solar cold storage with conventional methods
- Difference-in-differences model with cluster-robust standard errors
- 18.7 percentage point increase in marketable surplus for treated farmers
- Reduced spoilage between harvest and intermediary collection

Methodological Approach

Quasi-experimental design comparing treatment group (solar cold storage access) with control group (ambient storage) using difference-in-differences estimation with cluster-robust inference.

This study provides empirical evidence for solar cold storage as a viable loss-reduction intervention.

ABSTRACT-ONLY PUBLICATION

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