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Cost effectiveness and adoption of post-harvest handling technologies and practices among smallholder farmers in Uganda

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Abstract

Poor post-harvest handling and resulting losses remain a major challenge for smallholder farmers in sub-Saharan Africa, undermining food security, farm incomes, and the sustainability of food systems. Despite the availability of improved post-harvest handling (PHH) technologies and practices, adoption rates remain low, often due to limited knowledge of their economic viability and benefits. This study examined the cost effectiveness of PHH technologies and practices for legumes and vegetables and the factors influencing their adoption among smallholder farmers in Kapchorwa district, Uganda, to identify pathways to reduce losses, increase income, and enhance the sustainability of food systems.

A cross-sectional survey was conducted with 196 randomly selected smallholder farmers. Data were collected on PHH technologies and practices adopted, associated costs, and perceived benefits. Cost effectiveness analysis was employed to compare improved and traditional PHH technologies, while a Probit regression model identified socio-economic, institutional, and perception-based factors affecting adoption.

Findings revealed persistently low uptake of improved PHH technologies, with most farmers relying on traditional methods. However, improved PHH technologies, and practices such as washing, grading, and packaging proved more cost effective, with packaging emerging as the most economically viable. Adoption decisions were significantly influenced by farmers' perceptions of future food supplies, marital status, off-farm income activities, and group membership.

The study concludes that promoting awareness of the economic and food security benefits of improved PHH practices can enhance adoption, contributing to reduced post-harvest losses, stabilised food availability during lean seasons, and improved livelihoods. The study recommends targeted awareness campaigns, perception change interventions, and policy support as essential strategies for scaling up cost-effective post-harvest innovations.

Keywords: Adoption, cost effectiveness, perceived benefits, post-harvest handling, post-harvest technologies, practices