



Adoption, Livelihoods, and Returns

A Survey of Improved Beekeeping Technologies in Kakamega Forest-adjacent Communities, Kenya

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ABSTRACT

{ "background": "The Kakamega Forest is a critical biodiversity hotspot where adjacent communities rely on natural resources for livelihoods. Beekeeping is a traditional practice, but adoption of improved technologies, such as modern hives and protective gear, remains uneven. Understanding the drivers of adoption and associated economic returns is essential for designing effective community development and forest conservation policies.", "purpose and objectives": "This study aimed to assess the rate and determinants of adoption of improved beekeeping technologies, and to quantify their impact on household income and perceived livelihood benefits within forest-adjacent communities.", "methodology": "A cross-sectional survey was administered to a stratified random sample of 285 beekeeping households across 12 villages. Data were collected via structured questionnaires on technology use, production metrics, and household economics. Adoption rates were calculated, and multivariate regression analysis was employed to identify significant predictors of adoption and to estimate income differentials.", "findings": "Adoption of modern hives was 42%, primarily driven by access to extension services and group membership. Adopters reported a mean annual honey income 2.3 times higher than non-adopters using traditional log hives. A key thematic finding was that technology adoption was perceived to enhance safety and reduce human-wildlife conflict, not just increase yields.", "conclusion": "Improved beekeeping technologies offer significant potential for enhancing rural livelihoods and can align economic incentives with forest conservation. However, adoption is constrained by knowledge gaps and limited institutional support.", "recommendations": "Policy should prioritise strengthening beekeeping extension services and facilitating access to credit for technology acquisition. Development programmes should foster beekeeper cooperatives to improve knowledge sharing and market access.", "key words": "technology adoption, apiculture, rural livelihoods, forest-adjacent communities, household income, Kenya", "contribution statement": "This paper provides novel empirical evidence on the specific income multiplier effect of modern hive adoption in this region and introduces the mechanism of reduced human-wildlife conflict as a significant, under

Keywords: *Adoption, Livelihoods, Technology Transfer, Beekeeping, Kakamega Forest, Rural Development, Economic*

<i>Returns</i>	
Article Highlights <ul style="list-style-type: none">• 42% adoption rate of modern hives driven by extension access and group membership.• Modern hive adopters achieved 2.3x higher mean annual honey income than traditional beekeepers.• Adoption perceived to enhance safety and reduce human-wildlife conflict, beyond yield increases.• Adoption constrained by knowledge gaps and limited institutional support.	Policy Implication <p>Strengthening extension services and facilitating credit access for technology acquisition are critical to scaling adoption and aligning livelihoods with forest conservation.</p> <p><i>This study provides empirical evidence on income multipliers and safety benefits from modern beekeeping technology adoption.</i></p>

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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