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The socioeconomic performance of agroecology case of dr congo, burundi, and Cameroon in central Africa

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Abstract

The global agricultural sector faces unprecedented challenges as a result of climate change, soil degradation, and food insecurity, necessitating a transition toward sustainable food systems. While agroecological practices offer a promising ecological alternative to smallholder farmers. However, their economic performance and business viability remain underexplored in Sub-Saharan Africa. This study evaluated the socioeconomic performance of agroecological practices, drivers of context-specific agroecological practices (AEPs) implemented across the Kabare-Biega, Bujumbura (Burundi), and Ntui (Cameroon) Agroecological Living Labs (ALLs) within the CANALLs project.

The research employed a mixed-methods approach, integrating quantitative household surveys with qualitative focus group discussions (FGDs). Primary data were collected from 50 households in Kabare-Biega (coffee-based), 60 in Bujumbura (maize-based), and 66 in Ntui (cacao-based), totaling a robust representative sample across Central Africa. Statistical analysis included descriptive methods, t-test for gender disparities, and a double-censored Tobit model to identify determinants of farmer profitability. Additionally, a detailed cost-benefit analysis (CBA) was conducted to assess the financial viability of prioritised practices.

Preliminary results demonstrate significant productivity gains across all ALLs. In Kabare-Biega, coffee yields rose from 0.8 to 3 kg/plant, and beans surged from 2.5 to 22 kg/plot through composting and cover cropping. In Bujumbura, maize productivity increased through the innovative use of human urine as biofertiliser, reducing dependence on synthetic inputs. In Ntui, AEP-driven crop diversification improved food security and cacao quality, although it induced high labour requirements. Despite these benefits, structural constraints including limited equipment access, high labour intensity, and fragmented market organisation persist.

The findings suggested that AEPs are economically superior to conventional methods when yield improvements offset labour costs. To ensure long-term adoption, policies must prioritise specialised market linkages for agroecological products and strengthen cooperative training on biofertiliser products. Scaling these transitions requires an integrated policy framework that addresses land tenure security and provides financial incentives for sustainable practices.

Keywords: Agroecological transition, Central Africa, Living Lab, smallholder farmers, socioeconomic performances