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Methodological Assessment and Efficiency Gains in Smallholder Farms Systems in Kenya,

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Abstract

Smallholder farms systems in Kenya have been identified as crucial for agricultural productivity and poverty reduction. Panel-data estimation techniques were employed to analyse data from a representative sample of Kenyan farms over two years. Efficiency gains varied significantly across different regions; the average improvement was estimated at 12% with a standard error of ±3%. This suggests substantial room for optimization in energy use efficiency. The methodological assessment highlighted significant regional differences in efficiency, which can inform targeted interventions to enhance productivity and sustainability. Investment should be directed towards regions where efficiency gains are notably lower, with a focus on improving access to technology and training for smallholder farmers. The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, Africa, Empirical, Econometrics, Input-Output, Stochastic Frontier, Panel Analysis*

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