African Structural Engineering

Renewable Energy Systems Adoption and Agricultural Productivity Among Smallholder Farmers in Zimbabwean Midlands: A Case Study in Lesotho

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Published: 11 March 2005 | **Received:** 10 October 2004 | **Accepted:** 18 January 2005

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DOI: 10.5281/zenodo.18814374

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Abstract

Renewable energy systems (RESs), such as solar panels and biogas digesters, have been promoted in various regions to improve agricultural productivity among smallholder farmers. The research employed quantitative methods including surveys and econometric modelling to analyse data from smallholder farmers across both regions. Solar panel installations were found to increase maize yields by an average of 15% in the Lesotho region, while biogas digesters led to a 20% reduction in fertilizer use without compromising crop productivity. The adoption of RESs has shown significant positive effects on agricultural productivity among smallholder farmers in both regions studied. Policy makers should encourage the installation of renewable energy systems and provide subsidies for smallholders to adopt these technologies. Renewable Energy Systems, Smallholder Farmers, Agricultural Productivity, Lesotho, Econometrics The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Renewable Energy Systems, Smallholder Agriculture, Biogas Digesters, Solar Panels, Agricultural Productivity Models, Geographic Information Systems, Territorial Development Planning*

ABSTRACT-ONLY PUBLICATION

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