



Soil Health and Yield Variability in Sustainable Agriculture Practices among Smallholder Farmers in Zimbabwe's Central Highlands,

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Published: 26 November 2007 | **Received:** 18 August 2007 | **Accepted:** 29 October 2007

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DOI: [10.5281/zenodo.18849000](https://doi.org/10.5281/zenodo.18849000)

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Abstract

Soil health is a critical component of sustainable agriculture in Zimbabwe's Central Highlands, influencing crop yields and overall productivity among smallholder farmers. A comparative study employing a mixed-methods approach including surveys, interviews, and soil analysis to evaluate the effectiveness of various sustainable farming techniques. Farmers practicing conservation agriculture showed significant improvements in soil organic matter content (25% increase) compared to conventional methods. Yield variability decreased by 10% among those using cover cropping. Conservation agriculture and cover cropping were found to enhance soil health, reduce yield variability, and improve overall agricultural productivity for smallholder farmers in the region. Policy makers should promote conservation agriculture through subsidies and training programmes to support sustainable farming practices. The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geography, Africa, Sustainable Agriculture, Humidtropics, Tillage Systems, Variability Analysis, Soil Fertility*

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