



# Improving Soil Health and Fertility Through Agroecological Practices in Ghana: An Intervention Study

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## Abstract

Soil degradation is a significant challenge in Ghana's agricultural landscapes, affecting crop yields and ecosystem health. A randomized controlled trial was conducted across four eco-agricultural zones in Ghana, with treatment groups receiving integrated agroforestry and conservation farming techniques. Significant increases ( $p < 0.05$ ) were observed in soil organic carbon content by an average of 28% within the first year of intervention, correlating with enhanced microbial biomass activity. Agroecological practices significantly improved soil health and fertility indicators, demonstrating their potential for sustainable agricultural development in Ghana. Further research should focus on scaling up these interventions to broader regions and exploring longer-term impacts. Soil Health, Fertility, Agroecology, Conservation Farming, Organic Matter Management The empirical specification follows  $Y = \beta_{0+\beta} X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African, agroecology, biodiversity, conservation agriculture, ecosystem services, farm management, soil health*

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