African Fisheries Science (Fisheries/Aquatic)

Agroecological Practices and Soil Health Enhancement in Ghana: A Meta-Analysis

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Abstract

Agroecological practices have emerged as promising strategies for enhancing soil health in Ghana's agricultural landscapes. The analysis employs comprehensive literature review methods, synthesizing quantitative data from multiple studies examining the effects of agroecological practices on soil health in Ghana. Statistical models are applied to aggregate findings across studies, accounting for variability in methodologies and outcomes. A key finding is that the integration of organic matter addition with intercropping significantly increases soil organic carbon (SOC) levels by an average of 20% over baseline conditions, suggesting a robust positive effect on SOC enhancement. The findings indicate substantial potential for agroecological practices to improve soil health in Ghanaian agricultural settings through targeted interventions. Policy makers and farmers should consider adopting these practices to enhance soil fertility sustainably. Future research should explore the long-term impacts of such interventions on ecosystem services and yield stability. The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agroecology, soil health indicators, meta-analysis, sustainable agriculture, biodiversity impacts, ecosystem services, soil fertility enhancement*

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