



# Sustainable Land Management Practices for Combatting Desertification in the Sahel of Zambia: A Methodological Approach

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## Abstract

This study addresses a current research gap in Environmental Science concerning Sustainable Land Management Practices for Combating Desertification in the Sahel in Zambia. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Sustainable Land Management Practices for Combating Desertification in the Sahel, Zambia, Africa, Environmental Science, methodology paper This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The empirical specification follows  $Y = \beta_{0+\beta} \vec{p} X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** Sahelian, GIS, Remote Sensing, Participatory Mapping, Conservation Agriculture, Soil Erosion, Carbon Sequestration

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