



Deforestation and Land Degradation's Century-Long Impacts on Madagascar's Ecosystem Services

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Abstract

This study addresses a current research gap in Environmental Science concerning Impact of Deforestation and Land Degradation on Ecosystem Services in Madagascar in Madagascar. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A mixed-methods design was used, combining survey and interview data collected over the study period. 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. Impact of Deforestation and Land Degradation on Ecosystem Services in Madagascar, Madagascar, Africa, Environmental Science, longitudinal study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Madagascar, deforestation, land degradation, ecosystem services, sustainability, GIS, remote sensing

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