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“Reconcile land system changes  
with planetary health”

## Addressing land degradation, deforestation, and climate risks in southwestern Nigeria

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### Abstract

Land system changes in Southwestern Nigeria, driven by rapid urbanisation, deforestation, and agricultural expansion, have significant implications for planetary health. Between 2010 and 2019, Nigeria lost approximately 86,700 hectares of tropical forest, contributing to an annual deforestation rate of 3.5 %, equating to a loss of 350,000 to 400,000 hectares per year. These land-use changes have led to increased carbon emissions, with deforestation and soil degradation contributing significantly to Nigeria’s estimated 1.8 gigatons of CO emissions annually. Moreover, about 580 million tons of topsoil are lost each year due to erosion, further depleting soil fertility and reducing agricultural productivity by 18 % in key farming regions such as Oyo, Ogun, and Ondo States.

Biodiversity is also under threat, with over 22 % of species richness lost in high-deforestation zones, affecting pollination, pest control, and overall ecosystem balance. Recent reports suggest that Nigeria’s natural forest cover has declined from 16 % in 2000 to just 9.9 % in 2020, exacerbating desertification and water scarcity issues. Urban expansion, which increased by 15 % between 2000 and 2020, has resulted in uncontrolled land fragmentation, reducing available arable land by 12 %.

However, evidence suggests that sustainable land management strategies can mitigate these negative impacts. Agroforestry, precision farming, and circular bioeconomy models have demonstrated the potential to reduce carbon emissions by 23 %, increase soil fertility by 12 %, and boost crop yields by 15 % over five years. Policies promoting reforestation, sustainable agriculture, and smart urban planning are essential for reversing land degradation trends. This study underscores the urgent need for holistic land governance models that align with planetary health principles to enhance food security, water availability, and climate resilience in Southwestern Nigeria.

**Keywords:** Carbon emission, climate change, deforestation, land degradation, planetary health