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Peer Review

# Review of: "Open-Source Remote Sensing Determination of Carbon Emissions From Tropical Deforestation Scenarios in Southeast Nigeria"

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Ogbodo and colleagues present a timely and policy-relevant assessment of carbon emissions from deforestation in Southeast Nigeria using the open-access **Global Forest Watch (GFW)** platform. The manuscript's central contribution lies in demonstrating the practical utility of open-source remote sensing tools for subnational forest monitoring in data-constrained environments. In regions where access to commercial very-high-resolution imagery is financially prohibitive, the use of GFW-derived Landsat-based products for estimating tree cover loss, gains, and associated greenhouse gas fluxes is both pragmatic and scalable. The study provides quantified estimates of 39.3 kha of tree cover loss (2001–2022), associated emissions averaging ~0.9 Mt $CO_2$ annually (20 Mt over two decades), and concurrent tree cover gains resulting in a reported net carbon sink. These figures are valuable for informing REDD+ monitoring, reporting, and verification (MRV) discussions at subnational levels.

A notable strength of the paper is its integration of spatial statistics, descriptive trend analysis, and limited field validation (DBH measurements of 274 stems) to ground the remote sensing outputs. The emphasis on open-data democratization in forestry science is particularly relevant for developing-country research contexts and aligns well with global calls for transparent, reproducible environmental monitoring.

However, several methodological and interpretative issues warrant clarification:

**Emission Accounting Consistency** – The manuscript reports both 1.20 Mt $CO_2$-eq/year and 909 kt $CO_2$/year as average emissions; the distinction between gross emissions, net flux, and removals should be clarified to avoid confusion.



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**Carbon Stock Assumptions** – It remains unclear whether GFW default biomass-to-carbon conversion factors were used or whether locally calibrated allometric equations informed emission estimates. Field DBH data are described but not explicitly integrated into emission calculations.

**Tree Cover vs. Forest Definition** – GFW "tree cover loss" includes plantation turnover and secondary forest cycles; the manuscript should discuss how this may affect interpretation of "deforestation" versus "temporary canopy disturbance."

**Uncertainty Quantification** – No confidence intervals or error propagation analyses are presented. Given reliance on secondary datasets, uncertainty bounds would strengthen credibility.

**Policy Recommendation Scope** – While bamboo forestry is proposed as a mitigation strategy, the transition from emissions quantification to bamboo advocacy is conceptually abrupt. A clearer linkage between spatial loss patterns and bamboo suitability zones would enhance coherence.

Overall, the study makes a meaningful contribution by highlighting the feasibility of open-source geospatial platforms for carbon monitoring in tropical developing regions. With clearer methodological transparency, reconciliation of emission metrics, and more cautious interpretation of net sink calculations, the manuscript could provide an even stronger foundation for evidence-based forestry policy and REDD+ implementation in Nigeria.

## Declarations

**Potential competing interests:** No potential competing interests to declare.