UNIVERSITÄT LEIPZIG

Faculty of Life Sciences

Shifts in timber species distribution in Nigeria under climate change and implications for timber availibility

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Introduction

Ongoing climate change, deforestation, and biodiversity loss pose significant conservation challenges as highlighted in the Agenda 2030 (United Nations, 2015). Climate change threatens forest ecosystems and the vital services they provide, disproportionately affecting economies reliant on these resources (Correia and Lopez, 2023). In Nigeria, which produces 9.8 million cubic metres of timber annually, forest cover has declined from 29.1% in 1990 to 23.6% in 2021 (World Bank, 2024). This uncontrolled decline is widening the knowledge gap about the distribution of native timber species, making conservation efforts and sustainable forest management more difficult.

Objectives

Using species distribution modeling with a maximum entropy apporach, we aim to answer the following questions:

I. How are timber species currently distributed in Nigeria and how will the distribution be shift under different climate change scenarios?

II. What are the main drivers of timber distribution in the future in Nigeria?

III. Which timber species are losing and which are gaining habitat under climate change in Nigeria?

Methodology

Timber Species List
Assessment of timber species in Nigeria via the ITTO Tropical Timber Atlas

Data Gathering
Collecting occurrence records for timber species (GBIF) and environmental data (CHELSA, SoilGrids)

Species Distribution Modeling
Assessing timber species current distribution using Maxent

Future Projections
Projecting the species distribution models to different future climate scenarios (SSP126, SSP370, SSP585) for 2041-2070 with five different GMCs

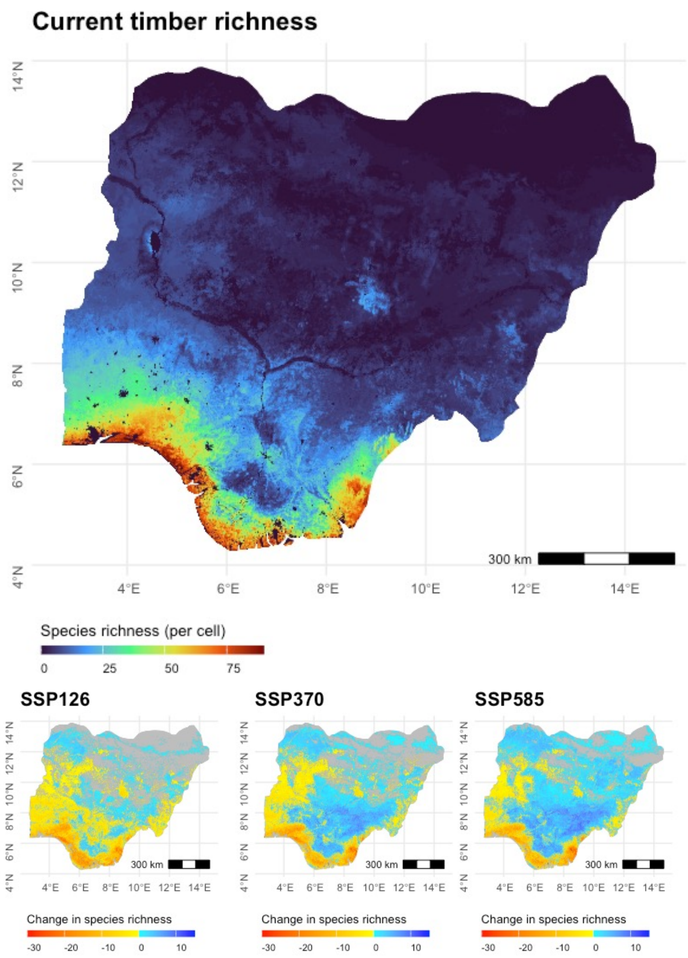
Conclusion & Summary

- Common timber species such as Iroko, African mahogany, and Obeche are abundant and widely harvested, but lesser-used species are increasingly targeted.
- Additionally, shifting agriculture and urbanization drive rapid forest loss putting pressure on species richness.
- Beyond abiotic factors, species dispersal and biotic interactions are essential for understanding timber distribution and should inform forestry management strategies for resilience.

Results

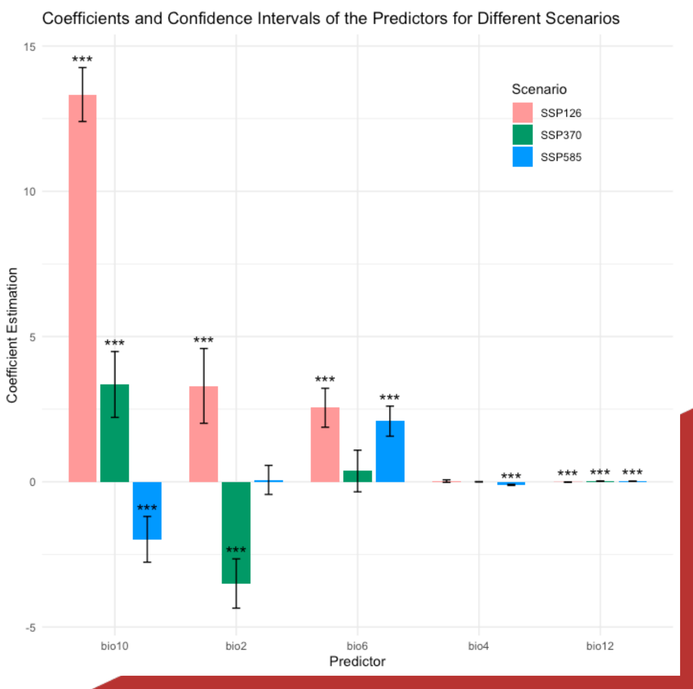
I. Timber species distribution

- Timber species richness is highest in Nigeria's southern and coastal forests, where high rainfall supports rapid tree growth and yield.
- Future projections show that timber richness shifts slightly to the north.



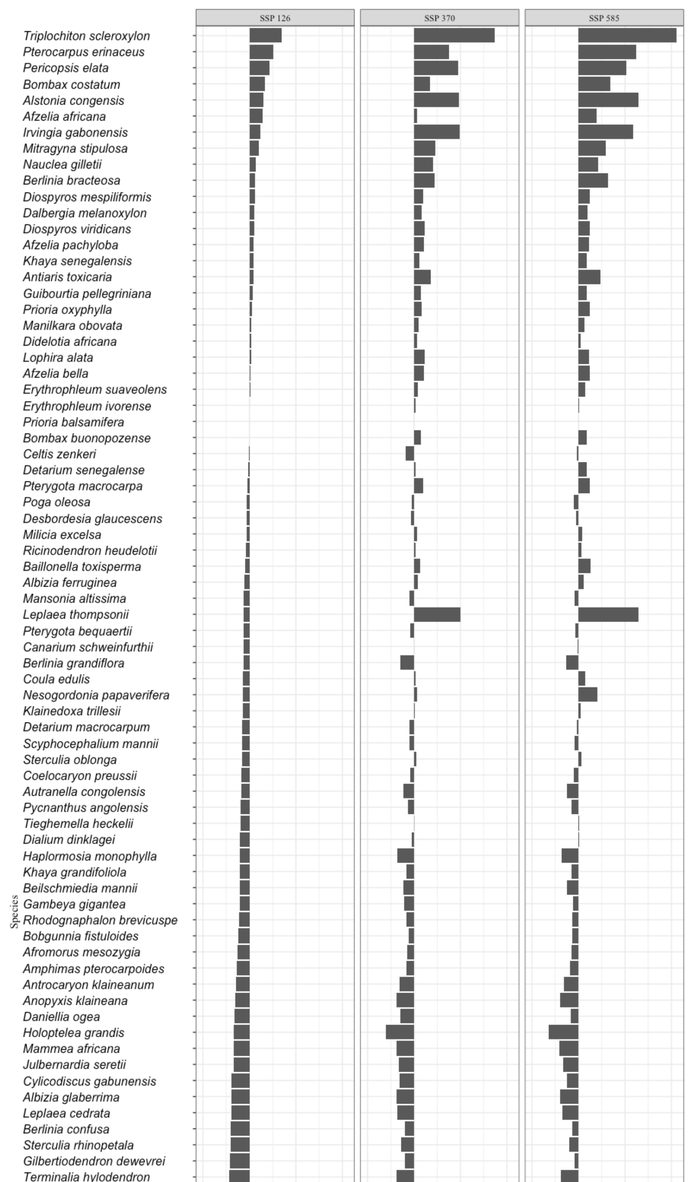
II. Major drivers in the future

- Precipitation (bio10), diurnal range (bio2) and minimum temperature (bio6) explain main differences between the SSP scenarios.
- Combination of these factors leads to an increased species richness in the central regions of Nigeria.



III. Changes in species suitable habitat

- Up to 77% of the species will experience habitat loss in the future.
- Gain of habitat due to increased suitability in the central and northern regions of Nigeria.



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