Land use effects on tree species diversity in different ecological zones of Ghana

Scan poster

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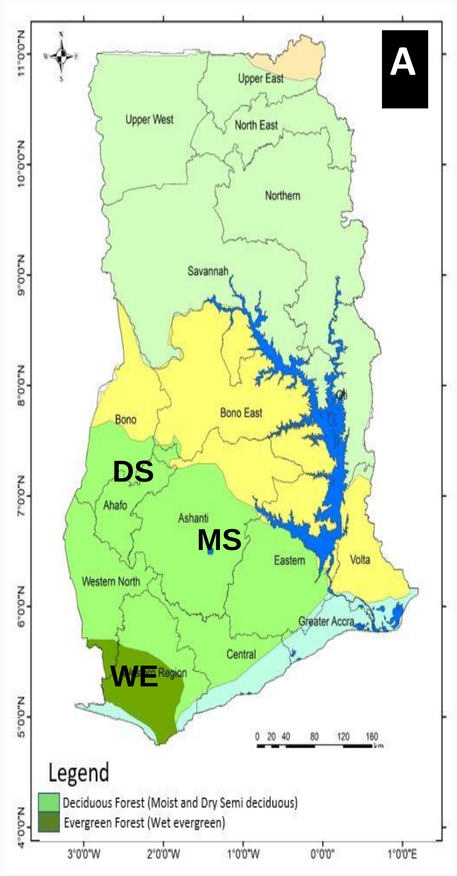
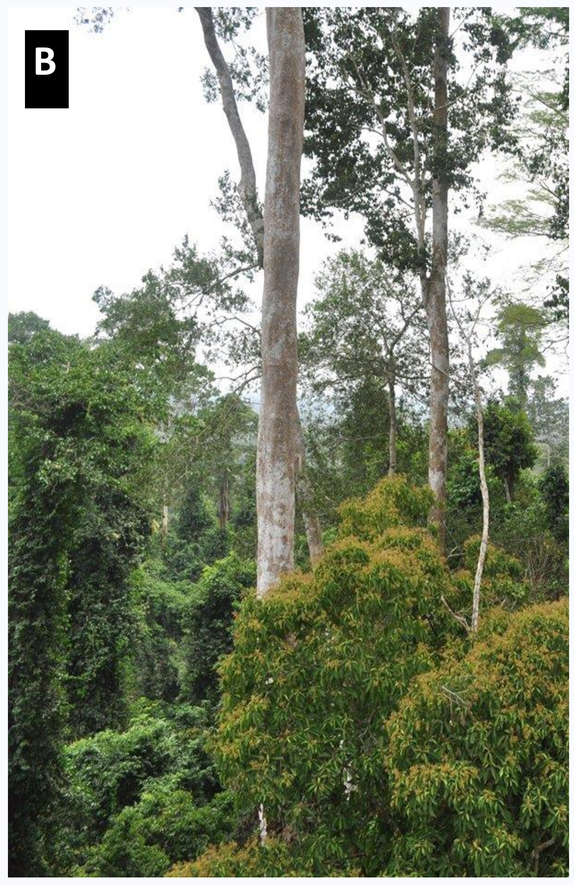
Introduction

- Trees provide a wide range of ecosystem services. Both land use and climatic conditions can affect tree biodiversity.
- We investigated the effects of land use on the population structure and diversity of woody vegetation and on soil fertility attributes in three different agro-ecological zones of Ghana.

Hypotheses

- Tree diversity increases with humidity
- Agricultural land use differentially affects tree species diversity and soil fertility attributes.



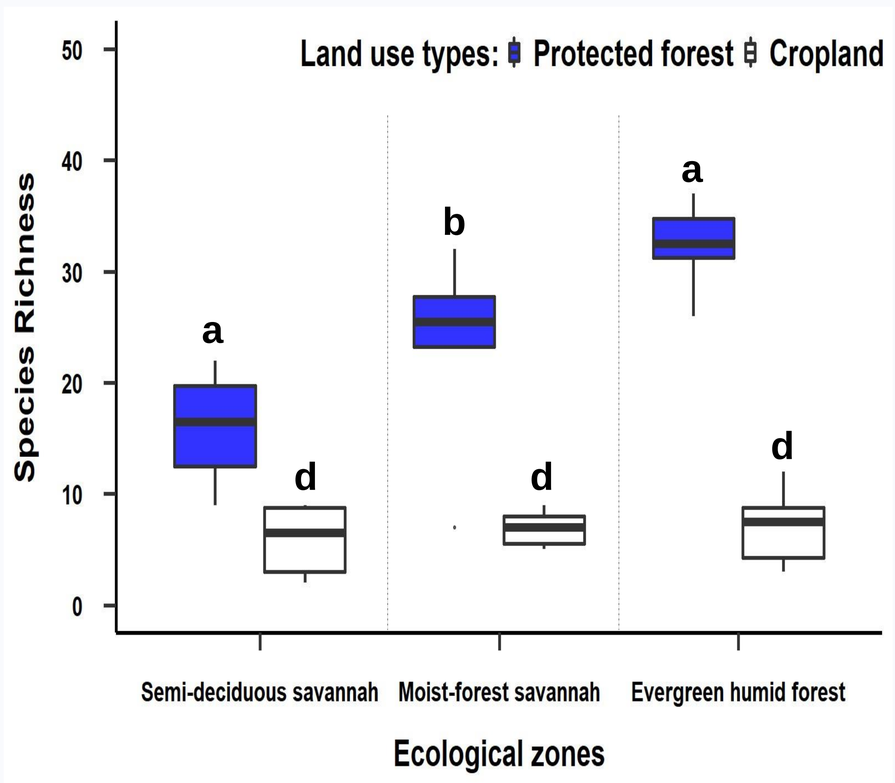


Sampling sites in three ecological zones (A) and undisturbed forest (B) in Ghana

Material & Methods

- The study was performed in: i) the semi deciduous savanna zone (DS), ii) in the moist forest-savanna transition zone (MS) and iii) in the evergreen humid forest zone (WE). following a gradient of decreasing aridity. We compared protected forest areas with the surrounding non-protected agriculturally used areas along a humidity gradient with aridity indices ranging from 0.9 (dry savanna) to 1.2 (humid forest).
- Ten survey plots of 50x20 m (0.1 ha) were randomly selected in each of the six site, using a nested plot design. In each of the 60 observation plots, we assessed tree species richness and Shannon diversity indices, and selected soil fertility attributes (0-20 cm).

Results

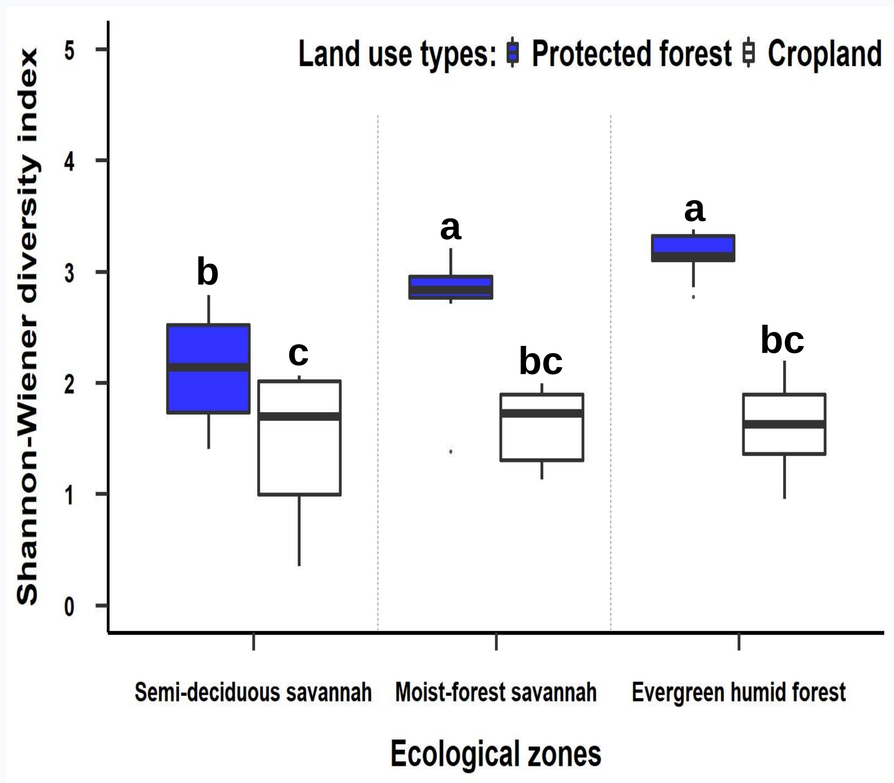


Species richness in different ecological zones and under different land uses (Tukey multiple comparisons of means , n = 10)

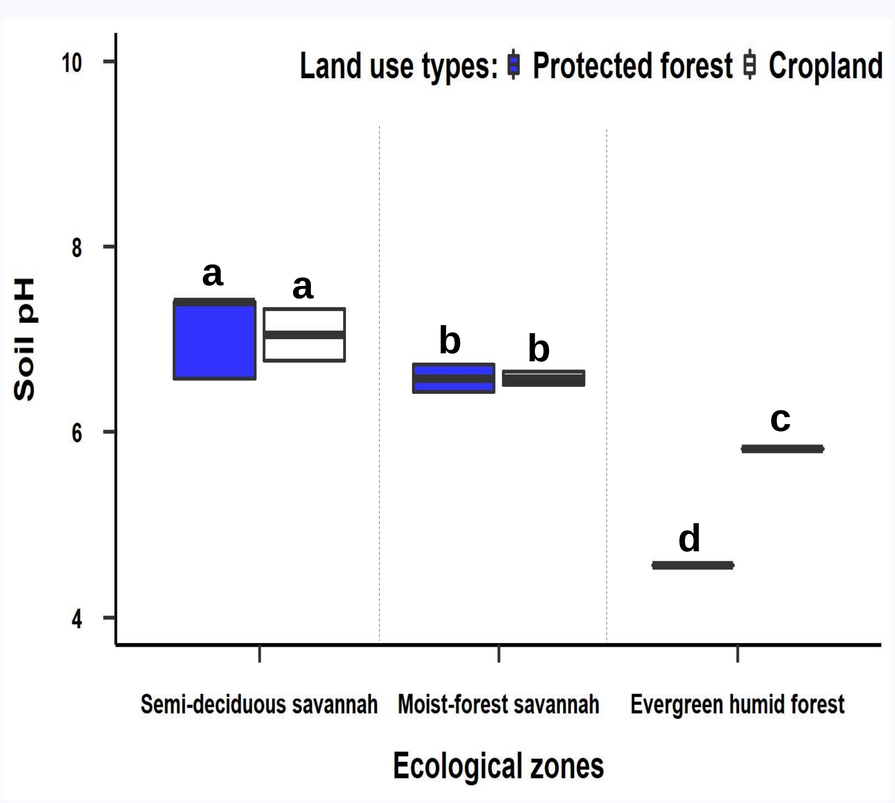
Conclusions

- Species richness and diversity increase with rainfall.
- Agricultural land use affects tree biodiversity most in the humid forest zone
- Land use changes negatively affects soil organic matter quality in savanna and positively in forest environments.

Focus agroforestry approaches to the humid forest environment

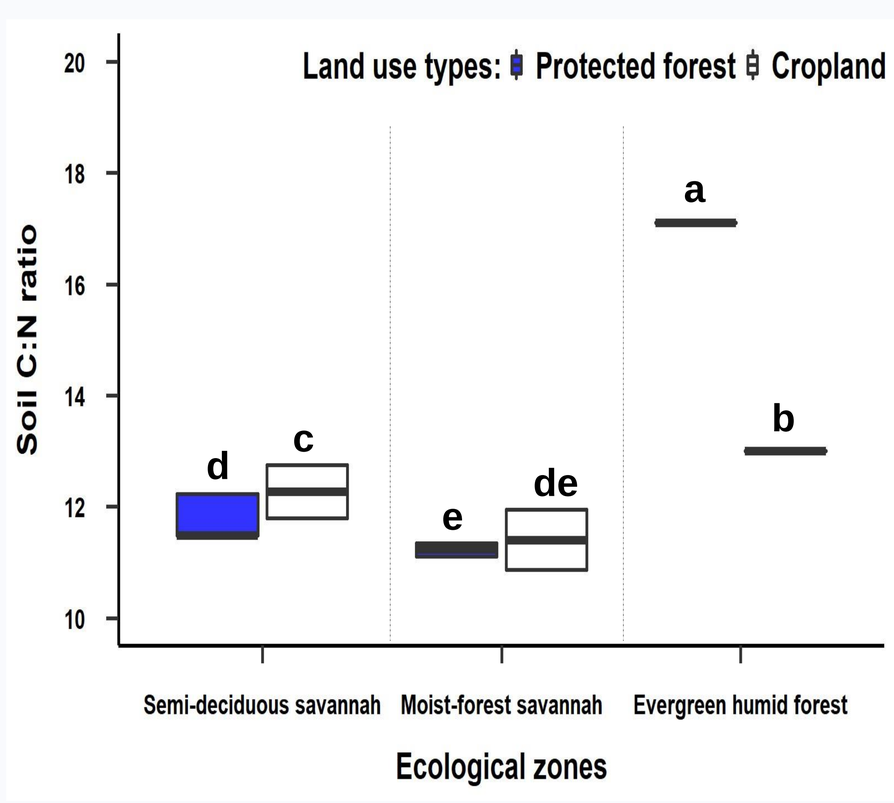


Shannon-Wiener diversity index in different ecological zones and under different land uses (Tukey multiple comparisons of means , n = 10)



Soil pH values richness in different ecological zones and under different land uses (Tukey multiple comparisons of means , n = 10)

Agricultural land use system in Ghana



Soil Carbon:Nitrogen ratio (proxi of soil organic matter quality) in different ecological zones and under different land uses (Tukey multiple comparisons of means , n = 10)

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