Dynamics of land productivity in the Maradi region, Republic of Niger

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Introduction

Since the 1970s, the Sahel is confronted by recurrent droughts, land degradation, rapid population growth and overexploitation of soils and forest resources.

This situation poses a threat to agropastoral production, food security, and rural livelihoods.

However, recent studies in the Sahel (Sultan, 2020; Abasse et al., 2023) indicate an upward trend in rainfall. Moreover, the government and NGOs implemented several agroecological practices such as Farmer Managed Natural Regeneration (FMNR) and Forage seeding to reverse land degradation.

FMNR

Forage seeding

Objective of study: To assess land productivity in the Maradi region between 2001-2020

Methodology
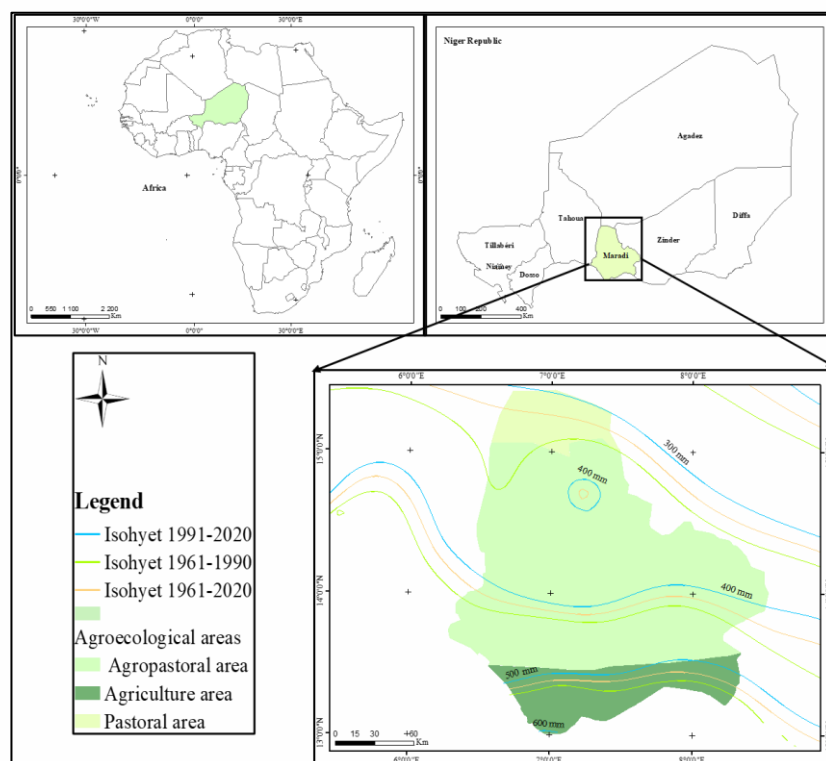
1. **MODIS Data>** MOD13Q1-061 with 250 m
2. **Vegetation Cover Change Analysis**: 5-year intervals: 2001–2005, 2006–2010, 2011–2015, 2016–2020
3. **Change Detection Analysis**: Cross-map using MOLUSCE

Table 1: Vegetation classes

Vegetation cover class	Echelle	Description
Bare soil	[0 - 0.15]	Bare soil ~ non vegetation
Very low	[0.15 - 0.25]	Continuous rainfed cultivation/ Low silvopastoral area
Low	[0.25 - 0.35]	
Moderate	[0.35 - 0.45]	Cultivation in a shrubland / Medium silvopastoral area
Dense	[0.45 - 0.55]	Cultivation in a parkland / Dense silvopastoral area
Very dense	[0.55 - 1]	Very dense silvopastoral area
Water	[-1 - 0]	Water ~ non vegetation

Result and Discussion
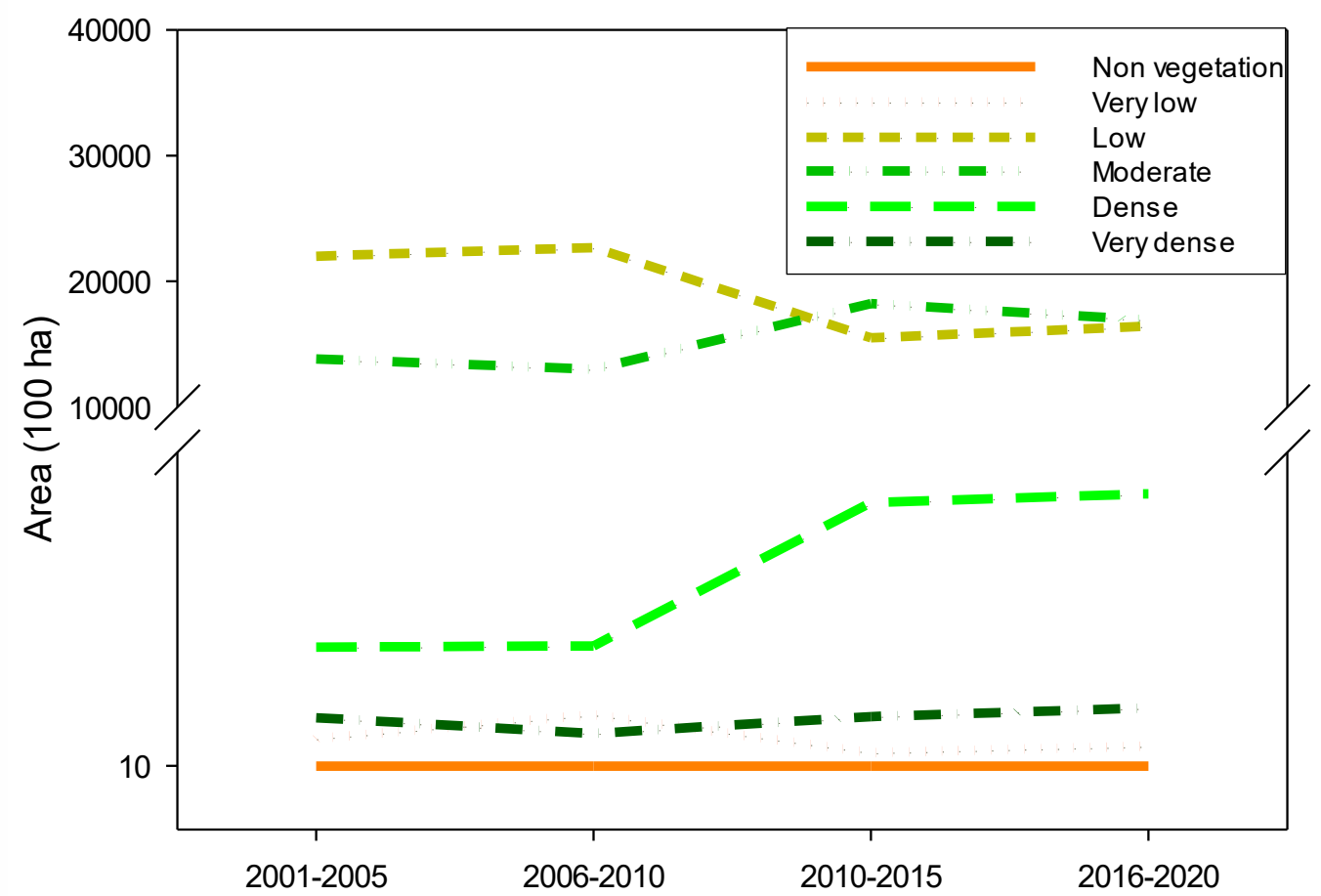
Figure 1: Dynamic of vegetation classes in Maradi region, Niger
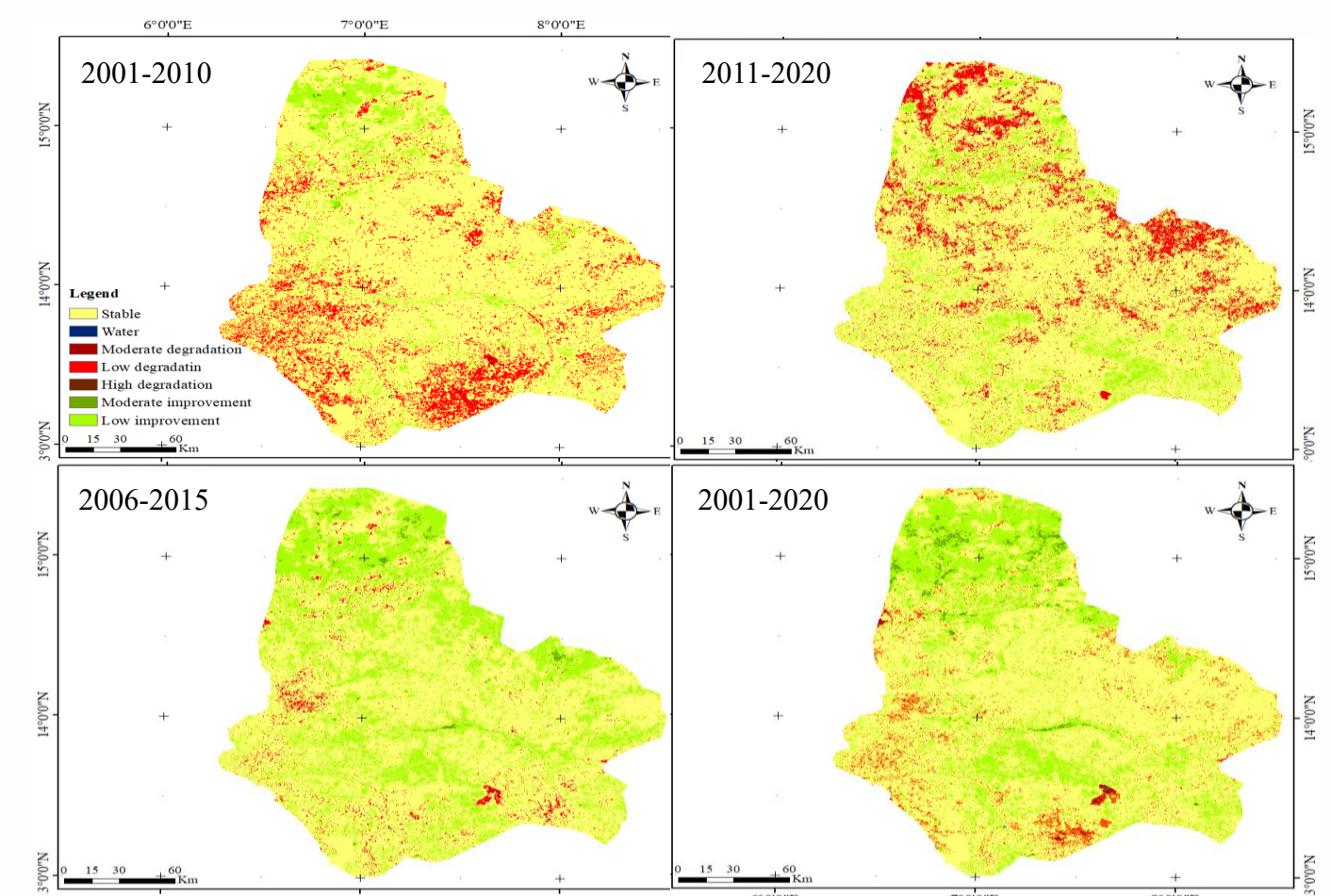
Figure 2: Map of productivity classes

The increase in moderate and dense vegetation is likely linked to the adoption of agroecological practices, consistent with the observations of Botoni et al. (2016), who reported that over 5 million hectares have been revegetated in Niger since 2015. This reflects a broader trend across many parts of West Africa that warrants further detailed investigation

Conclusion and future perspectives

This study showed that over the past two decades, regreening has predominated over degradation. Correlation analysis of land productivity, rainfall variability, and agroecological practices could support the hypothesis of land degradation neutrality and inform decision-making regarding sustainable land management in Maradi.

Reference

References: Abasse, Rabiou, H., Idrissa, S., & Iro, D. G. (2023). Régénération naturelle assistée au Niger: l'état des connaissances. *Tropenbos International*, 65.
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Sultan, B., Bossa, A. Y., Salack, S., & Sanon, M. (2020). *Risques climatiques et agriculture en Afrique de l'Ouest. Researchgate 104*