

Soil macrofauna and land use in Mékrou watershed: FLR implications

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Introduction

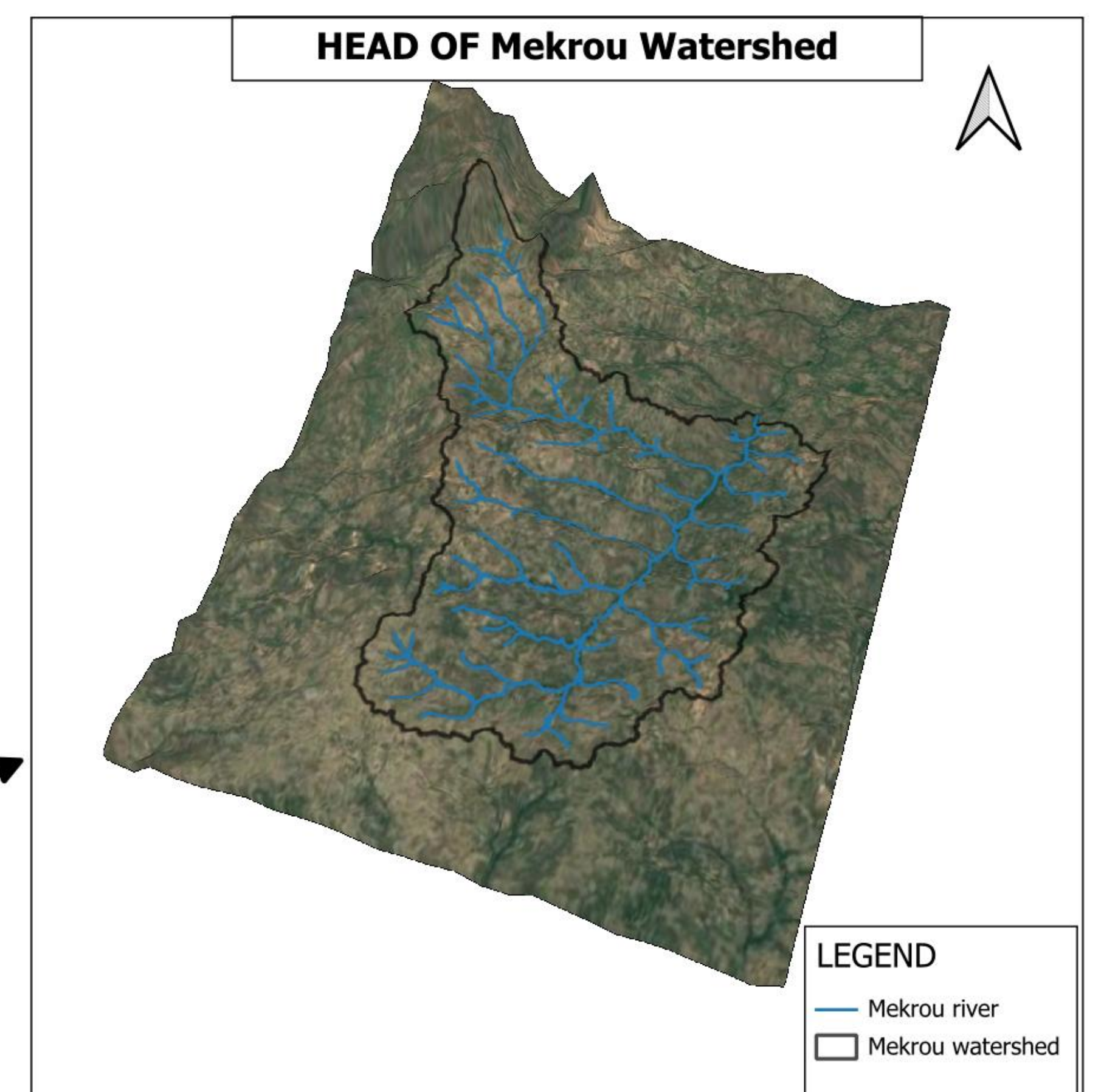
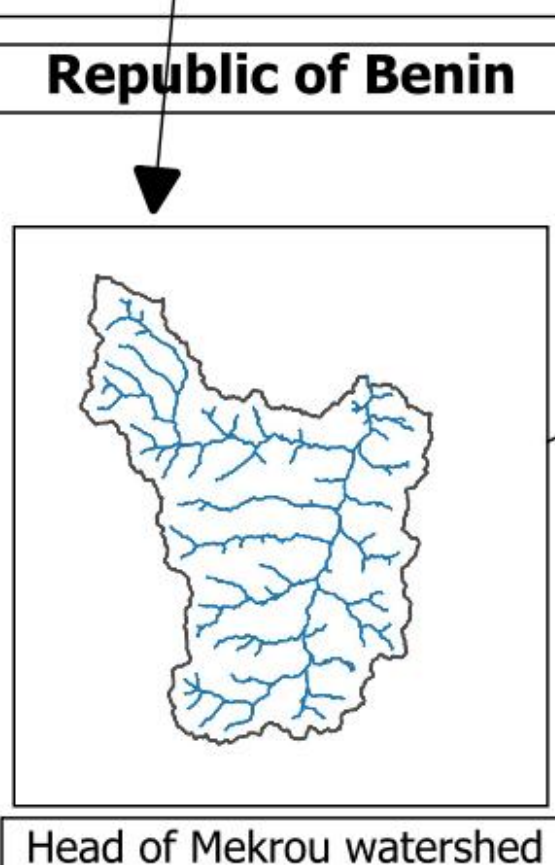
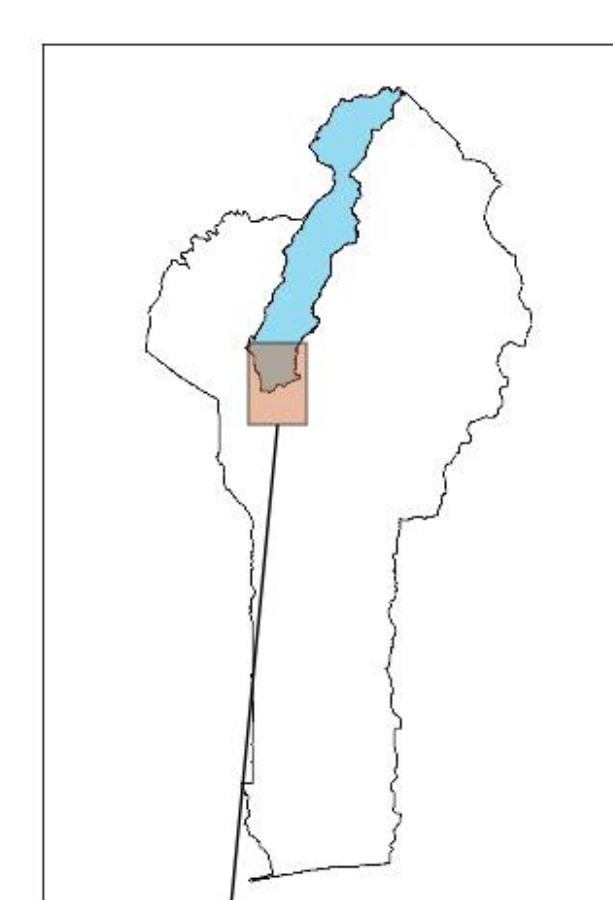
- Soil degradation and drought threaten the sustainability of rural livelihoods in Benin, while agricultural expansion and deforestation can further accelerate land degradation.
- Land-use change can alter soil ecosystem functions and the communities of soil macrofauna that contribute to nutrient cycling, decomposition, and soil structure. However, these responses remain insufficiently studied in the Mékrou watershed.
- This study assessed how three land-use types influence soil macrofauna communities along an altitudinal gradient in the headwaters of the Mékrou watershed, providing insights relevant to Forest Landscape Restoration (FLR).

Methods

- Three land-use types: 2–4-year-old cropland, fallow land and shea-tree agroforestry, sampled along the altitudinal gradient of the head Mékrou watershed.
- Surface-active soil macrofauna collected using pitfall traps and identified taxonomically.
- Abundance, richness and community composition were compared among land-use types and watershed sections (upper, middle and downstream) using statistical and multivariate approaches.



PITFALL
TRAP



Map 1: Sampling area in the Mékrou watershed

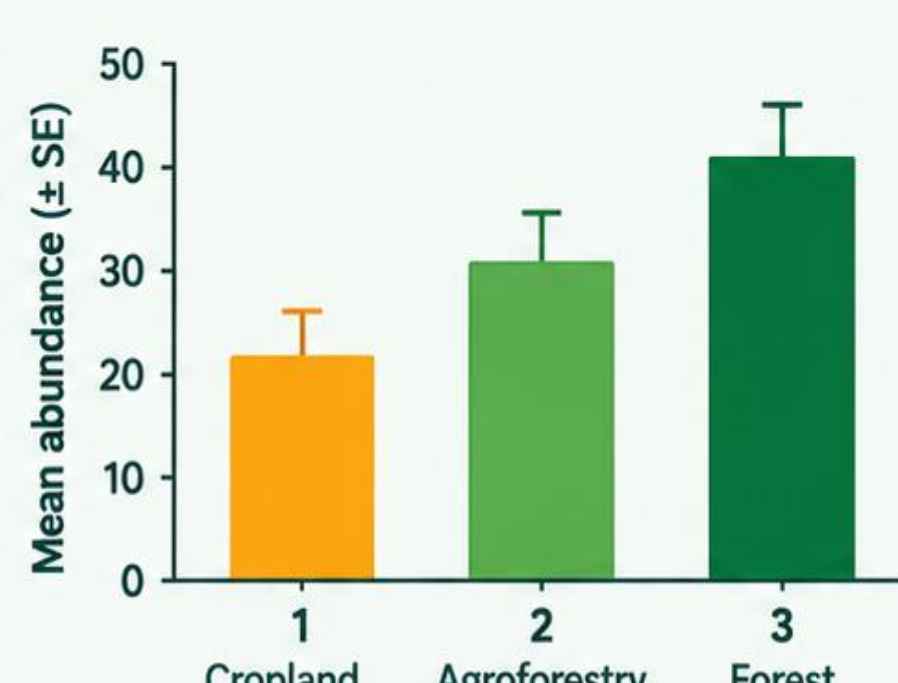
Results



KEY FINDINGS

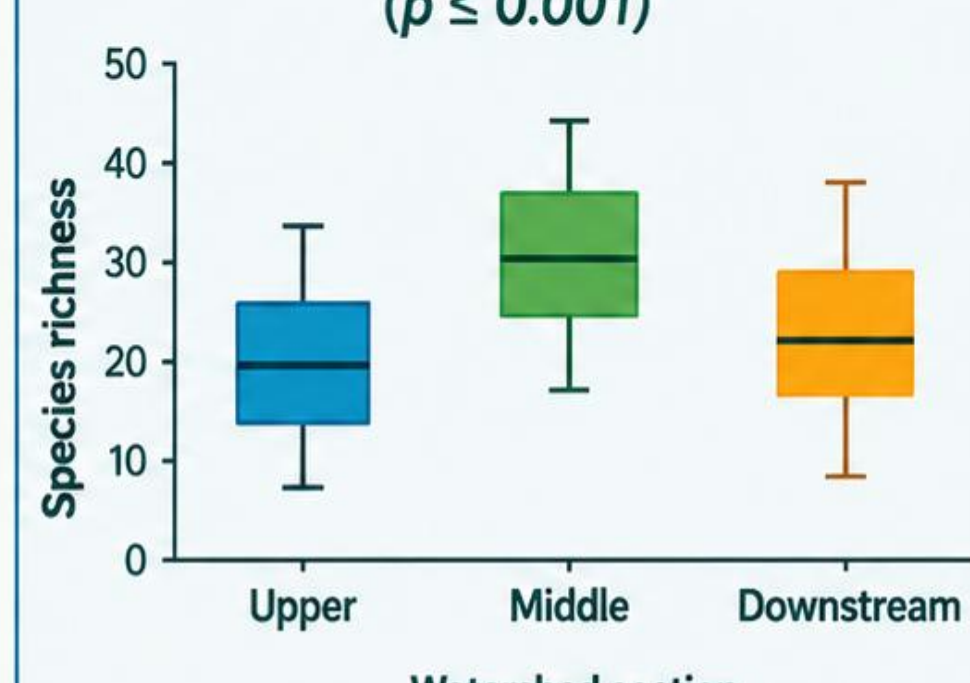
ABUNDANCE

Lower in cropland
than in agroforestry
($p = 0.041$)



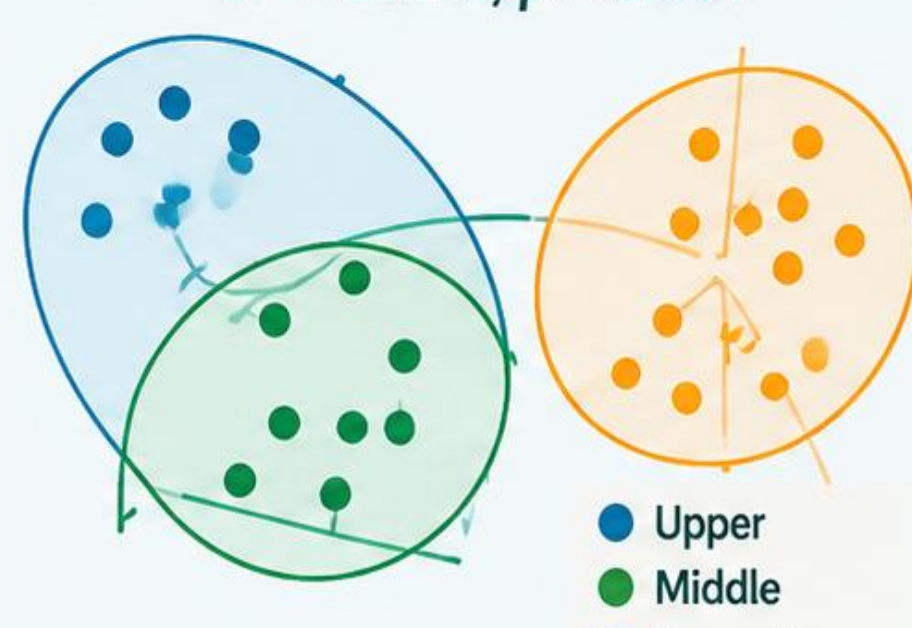
RICHNESS

Varies significantly
across watershed
sections
($p \leq 0.001$)



COMMUNITY COMPOSITION

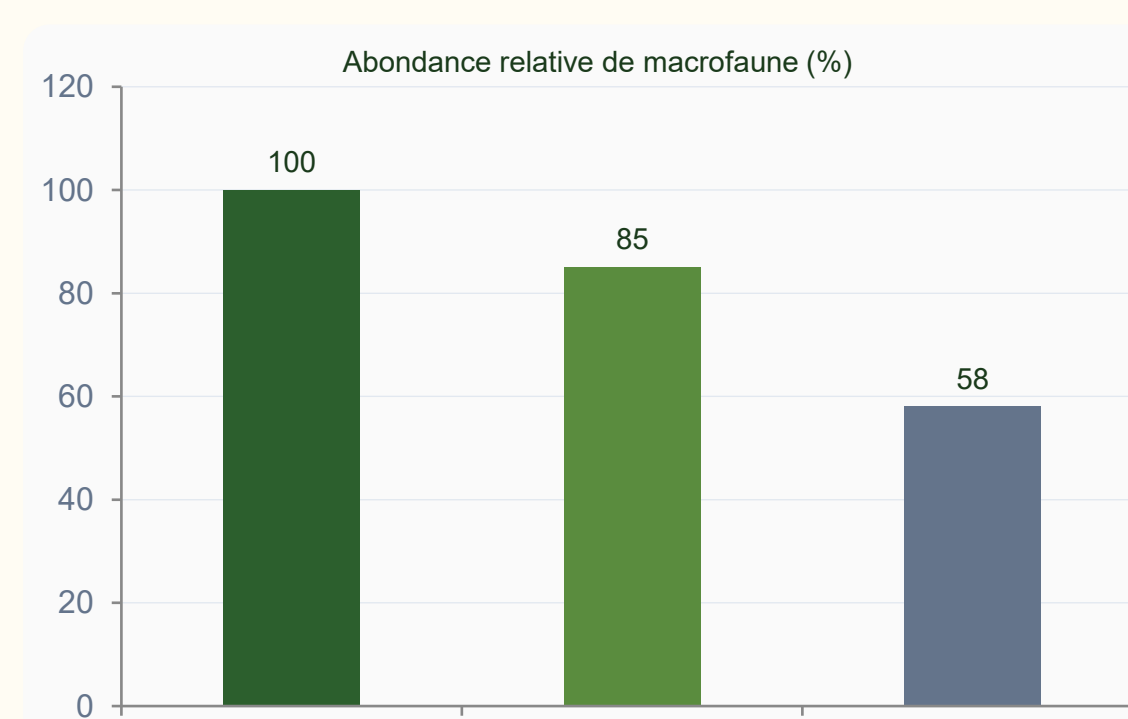
Significantly structured
by watershed location
(PERMANOVA)
 $R^2 = 21.7\%$, $p = 0.001$



$p \leq 0,001$

Richness Abundance
Community Composition

Structured primarily by the Hydrological gradient



Conclusion

- Soil macrofauna communities varied across watershed sections and land-use types: Shea and néré agroforestry and natural regeneration were associated with greater surface-active soil macrofauna abundance than cultivated land.
- Maintaining trees and promoting natural regeneration can support soil biodiversity and strengthen FLR outcomes in the Mékrou watershed..
- Soil macrofauna may serve as early indicators of restoration-related changes in soil health.