Bamboo for Landscape Restoration

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Introduction

African countries are striving to restore over 100 Million hectares of land by 2030.

- Under this attempt, Nature-based Solutions (NbS) to the benefit of the rural poor societies are much sought after.
- However, in climate policy debates, Bamboo has been neglected as a NbS for landscape restoration following its exceptionality among trees, mostly viewed as a non-ecologically valuable crop.

❑ To break this conceptual barrier, we investigated on bamboo's potential to sequester Carbon in agroecosystems, while presenting variation in Carbon content; (i) Along altitudinal gradient; (ii) Between indigenous and exotic species and; (iii) Between intensive and extensively managed bamboo ecosystems.

Methodology

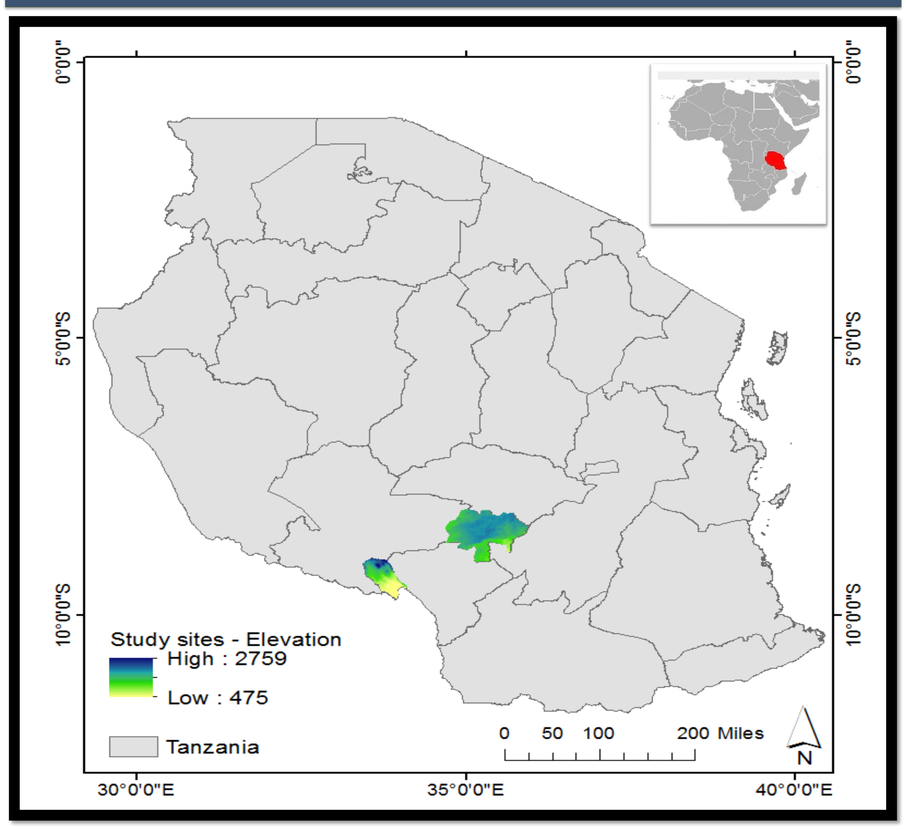

Figure 1: Location of the study sites

Sampling design:

- 60 Sampling plots established,
- 12 distinctive observational units studied,
- 60 bamboo culms harvested and further determine their fresh and dry masses.

Statistical analysis:

- ANOVA with post-hoc Tukey's HSD test

Plate 1: Intensively managed *Oxytenanthera abyssinica*

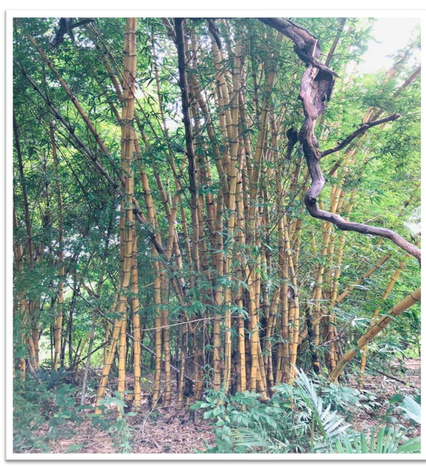

Plate 2: Extensively managed *Bambusa Vulgaris*

Results

Table1: Above ground Biomass Carbon stock and sequestration rate of bamboo across diameter classes

Diameter class (Dbh cm)	Biomass (t ha $^{-1}$)	Biomass Carbon (t C ha $^{-1}$)	Biomass C sequestration rate (t C ha^{-1} year^{-1})	Culm density (Culms ha $^{-1}$)
Dbh ≤ 4	19.4	9.7	7.5	9122.8
Dbh > 4≤ 8	56.4	28.2	20.4	5064.6
Dbh > 8	91.0	45.5	29.4	10824.4
TOTAL	55.6	27.8	19.1	8337.3

Variation in Carbon content

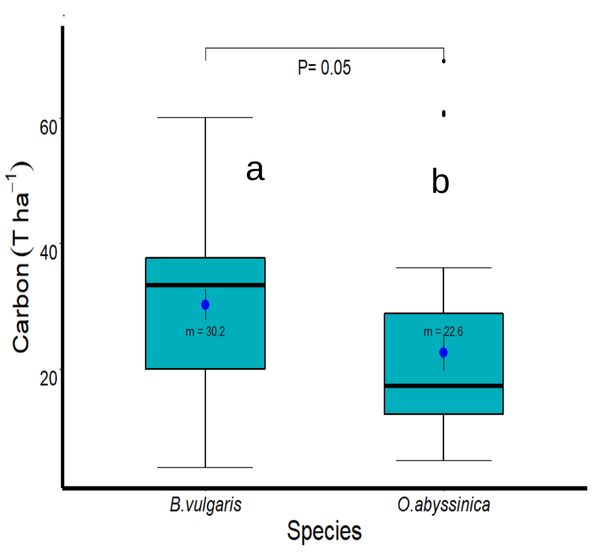

Figure 2: Variation in bamboo Carbon content between exotic species (*B.vulgaris*) and indigenous (*O.abyssinica*)

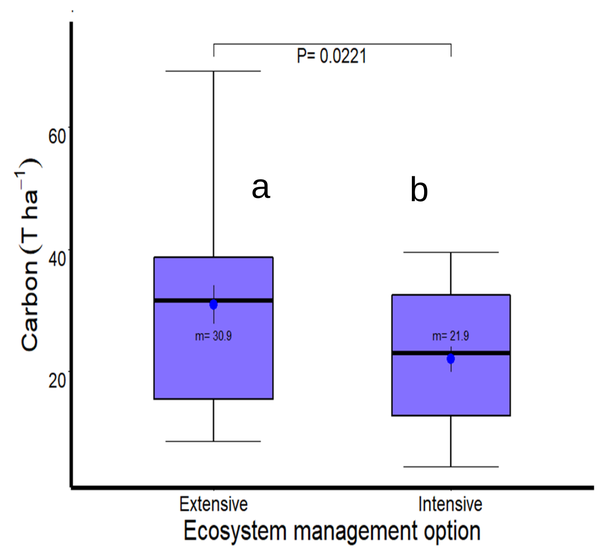

Figure 3: Variation in bamboo carbon content between intensively and extensively managed ecosystems

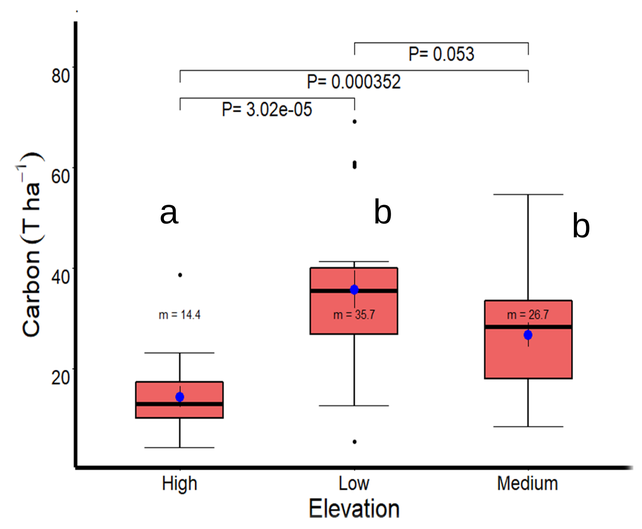

Figure 3: Variation in bamboo Carbon content across elevation gradients

Figure 2, 3 and 4 present ANOVA with post-hoc Tukey's HSD comparison test results.

- From each plot, Observations with the same letters are not significantly different.
- Where, m = Mean, P is P-value

(Significance level, p = 0.05)

Conclusions

- Bamboo can sequester a significant amount of carbon, with altitude, Species and ecosystem management options being significant sources of variation in carbon stored.
- Considering its potential for climate change resilience and landscape restoration, perceptual biases against bamboo should be eliminated.
- These findings unveils an important step towards unlocking future climate finances from bamboo-based ecosystems in Africa.
- However, following its rapid expansion, bamboo ecosystems must be managed sustainably to avoid a shift to monoculture.

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