Demographic structure and population biology of *Albizia amara* and *Terminalia brownii* as the dominant tree species in *Elsareef* Reserved Forest, Kordofan Region, Sudan

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Tropentag 2012: Resilience of agricultural systems against crises

Organized by the Georg-August-Universität Göttingen and the University of Kassel / Witzenhausen 19-21 Sept. 2012

Introduction

Demographic analysis includes the sets of methods that allow us to measure the dimensions and dynamics of populations. Biologically, in order to attain an extractive management use that sustains the resource base or even increases it, a detailed knowledge of species life history and demographic behavior is essential (Sunderland and Dransfield, 2002).

In natural forests, without any intervention, the diameter distribution resulted from competition and the number of trees per hectare may vary according to many factors.

Objectives: To assess the current structure of *Albizia amara* and *Terminalia brownii* and their demography in natural part of *Elsareef* Reserved Forest (ERF) and to examine the potential effects and relationship between the regeneration and the mother trees on the capability of for continuity and recruitment.

Study area

E*lsareef* reserved forest is located in North Kordofan, 133km western Elobied. It is estimated by approximately 1812.12 ha (FNC, 2009). The forest was reserved to protect the area from desertification and desert encroachment, shelter belt, and to supply the people with fuel wood, timber and NTFPs. In 2009, the forest was subjected to thunders and recurrent wind storms which resulted in falling of 132 and 73 trees of *Terminalia brownii* and *Albizia amara* respectively. The forest suffered from fires and grazing.

Methodology

Systematic sampling was applied; 40 square plots of 20 m² in size were spaced every 100 m along linear and parallel transects separated by 200 m. Demographic structure, recruitment, and growth performance were assessed. DBH of ≥5 cm were measured using caliper. Species, height, crown condition growth form and vitality were recorded too. Regenerations were classified in three categories (Fig. 3), according to age, size and morphology and according to Starfinger 1991 and Chinchilla 1994 and Siebert, 2000.

Data Analysis

Demographic and structural analyses of the tree species were done. Demographic parameters were determined with reference to Starfinger (1991) while structural parameters were determined with reference to Lamprecht (1989). SPSS and Excel sheet were used too.

Results

Diameter class distribution of *Albizia amara*

The lowest diameter class showed high density of individuals, Zero density was recorded for the diameter classes 45-50 and 50-55 cm. The distribution showed near regular diameter structure suggesting a good recruitment (Figure,1).

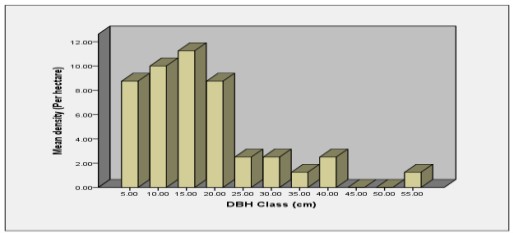

Fig 1. Diameter classes distribution of (≥5cm) *Albizia amara* in *ERF*.

Diameter class distribution of *Terminalia brownii*

The diameter classes' distribution of *Terminalia brownii* represented irregular picture. It showed irregular diameter structure suggesting unsuccessful recruitment. The density of small trees was high, A gradual increase happened for medium diameter classes.

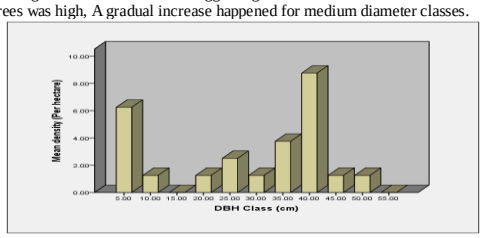

Fig 2. Diameter classes distribution of (≥5cm) Terminalia *brownii* in *ERF*.

Regeneration density of *Albizia amara* and *Terminalia brownii*

The seedling's density of *Terminalia brownii* was lower than the seedlings density of *Albizia amara*. The density of 1st year germinated seedlings of *Albizia amara* was low compared with the 2nd and 3rd ones.

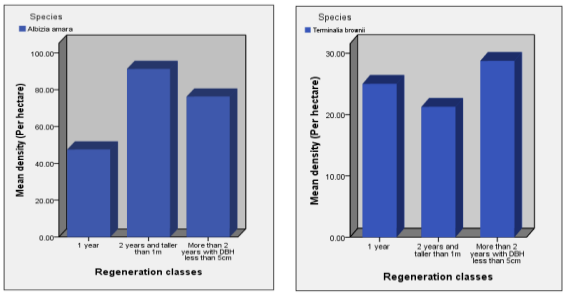

Fig. 3 Regeneration density of Albizia amara (Left) and Terminalia brownii (right) in *ERF*.

DBH Measurement Observations

Conclusion

- ✓ *ERF* is considered the most important forest in Kordofan region. The demographic structure and distribution of the *Albizia amara* is progressing however, the demographic structure and distribution of *Terminalia brownii* is indicating unstable situation, which means the trees are subjected to disturbance.
- ✓ The highest regeneration % of *Albizia amara*, *Boscia senegalensis* and *Terminalia brownii* in natural part of the forest is indication of the good recruitment and sustainability.
- ✓ Illegal logging is a major problem faces *ERF*, The reduction of tree numbers is not only due to illegal logging, but recurrent wind storms too.
- ✓ Active management plan and people participation is recommended.

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