



SEOSAW Quarterly Newsletter - **October 2023**

For introductory information about SEOSAW, see 'What is SEOSAW?' , 'Who owns the data?' , and 'Request our Data' at the bottom of the newsletter.

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New publications!



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ORIGINAL ARTICLE

OPEN ACCESS

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Simulation of stand dynamics for miombo woodlands in Kitulungalo Forest Reserve, Morogoro, Tanzania

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ABSTRACT

Miombo woodlands constitute the most extensive type of forest cover within South and East Africa, Tanzania in particular, and they are seriously threatened by intensive degradation and deforestation. The dynamics of miombo stands were examined in this study using a simple simulation system applied to experimental stands at the Kitulungalo Forest Reserve (KFR) in Tanzania. Prediction of tree-level diameter increment, mortality, and ingrowth across species groups with empirical models based on data from experimental sites constituted the essential elements of the simulation system. Diameter distribution, stand basal area, volume yield, and above-ground biomass accumulation were assessed in three harvesting alternatives across three species groups. The results indicate a high degree of positive response to careful selective harvesting in lightly degraded, recovering miombo forests. Simulation systems compiled from experimentally based models seem promising as tools for research on stand dynamics and sustainable management alternatives in miombo woodlands.

ARTICLE HISTORY

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KEYWORDS

Simulation; stand dynamics; diameter increment; harvesting alternatives; miombo woodlands

Introduction

Miombo woodland is the most extensive tropical seasonal woodland and dry forest formation in Africa, which is dominated by the legume family (Fabaceae, subfamily Caesalpinioideae) (Tresselt (1996)). Miombo woodlands cover about 270 million ha, extending from Central, Eastern, to Southern African regions (Campbell et al. 2007). Miombo woodlands are a crucial source of a wide range of ecosystems, and environmental services for over 75 million people in the rural settings of Africa, and about 25 million people in urban and suburban areas in the region (Syampungani 2009). The climatic condition of Miombo woodlands is arid and semi-arid, with highly leached soils with poor nutrients where tree growth is relatively slower compared to forests in wetter areas (Backeus et al. 2006; Malmer 2007). Another general distinguishing characteristic of miombo vegetation is the co-dominance of ecosystems of continuous herbaceous cover and sedges (Osborne et al. 2018) marking evident seasonal variations that are related to water stress (Malmer 2007). Unlike the wetter miombo woodlands in the Angolan, Southern miombo, and Zambesian ecoregions receiving over 1000 mm of annual precipitation, the Tanzanian miombo woodlands fall in drier areas receiving less than 1000 mm of rain annually. The Tanzanian miombo occupies about 92% of the forested land, forming the main vegetation type in the country (Munyira et al. 2015; Eze et al. 2017). Generally, the floristic composition and structural variability are so enormous across the landscape (Godlee et al. 2020); with higher species diversity and dimensions in the southern, and northern highlands and the western wet plateaus (Malmer 2007). The central plateaus are dominated by a mosaic of miombo species and other numerous woodland species such as *Combretum*, *Acacia*, and *Commiphora* species (Rajala et al. 2022).

The capacity of the Tanzanian miombo woodlands to provide various ecosystem services is diminishing rapidly due to the escalating anthropogenic activities (Gordon and Eafors 2008) driven by agriculture, illegal logging, wood extraction for poles, bioenergy (charcoal and firewood), unsustainable livestock grazing, and uncontrolled annual fires (Ribeiro et al. 2015a; Doggart et al. 2020). Although forest disturbances that involve opening up the canopy through selective harvesting have been shown to activate regeneration, Chidumayo (1987), Piroinen et al. (2008) urged that regeneration in miombo woodlands may not be fast and abundant enough to cover the losses when anthropogenic disturbances grow beyond the threshold levels, thus making sustainability nearly impossible. The limited and fragmented information on regeneration, tree growth and the overall stand dynamics in miombo woodlands as a result of habitat modifications by human disturbances and climate change constrains the process of sustainable management of these woodlands, and thus the ecosystem services for the well-being of the local communities. The need for whole-stand simulation systems that can predict the stand development under different management and disturbance regimes is therefore essential for resource assessment planning and management of miombo woodlands for improved growth, biodiversity values and ecosystem functioning. It is therefore, so essential to understanding the key ecological processes and how miombo woodlands, which is the largest *Sesuvium* type in

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1 - Scientific Steering Committee members, Elisha Njoghomi and Wilson Mugasha, have published a paper on modelling stand dynamics for miombo woodlands in Kitulungalo Forest Reserve, Morogoro, Tanzania.
<https://doi.org/10.1080/13416979.2023.2239136>

SEOSAW-KEFRI workshop, 11 October: **Monitoring Carbon in the woodlands**



We hosted a joint workshop with the Kenyan Forestry Research Institute ([KEFRI](#)) at their headquarters in Nairobi, Kenya on 11 October under the theme: [Monitoring Carbon in the woodlands](#).

Thank you to all who attended, including the representatives from the Kenyan Forestry Service (KFS), National Museums of Kenya ([NMK](#)), the African Forests Forum ([AFF](#)) and [The Wyss Academy for Nature](#).

The hybrid meeting was recorded and can be downloaded [here](#) (Passcode: wDe&7g7M) There are 2 recordings covering the agenda, with the following timestamps:

Recording 1: Session 1 starts 00:15:30 ; Session 2: 00:34:00 ; Session 3: 03:51:40

Recording 2: continues session 3



SEOSAW tree growth rates workshop

John Godlee and Tatenda Gotore coordinated a virtual tree growth rates training workshop in Aug-Sep 2023 for ~12 SEOSAW members. The objectives of the workshop included:

- sharing experiences in processing and analysing tree growth data,
- encouraging data owners to analyse and publish results from their permanent sample plots (PSPs), and
- facilitating collaboration among data owners.

The materials from the workshop are available [here](#). Please share this link with anyone who might be interested in learning how to compute tree growth rates!

Updates from the Field



Pictures from SEOSAW-KEFRI drylands site visit

SEOSAW visited Kenyan Forestry Research Institute's ([KEFRI](#)) dryland PSPs in Tiva and Kibwezi.



3 - View from the tower on KEFRI's Tiva field station



4 - Tiva drylands



5 - SEOSAW-KEFRI field team and the KEFRI Drylands Eco-Region Research Programme members (from left to right; back row: Emily Kitheka, Casey Ryan, Sam Harrison, Francesca Fehlberg, Leila Ndalilo, Sylvia Mwalewa, John Ngugi Kigomo; front row: Mũsingo Mbuvi, Penny Mograbi)



SEOSAW was at FLARE, Nairobi 12 -16 October



SEOSAW members attended the FLARE 2023 conference held in Nairobi, Kenya, in partnership with CIFOR-ICRAF.

For those interested in joining the Forests & Livelihoods: Assessment, Research, and Engagement (FLARE) network, contact them [here](#).

At the meeting, FLARE also announced the release of the [global social-ecological IFRI database](#) which is now open access.

The 2024 FLARE meeting will be held in Rome.



Call for Nominations: SEOSAW Scientific Steering Committee (SSC)

We are looking for *nominations* from enthusiastic SEOSAW members to join our Scientific Steering Committee (SSC).

Steering committee members contribute their time by leading SEOSAW activities including:

1. Setting collective goals for SEOSAW in terms of the research agenda, outreach, and training
2. Growing and maintaining the network by fostering connections with new researchers and other networks in the region
3. Encouraging the set-up of permanent plots and supporting long-term plans for remeasurement
4. Developing, promoting and managing the implementation of standardised methods for plot design and measurement, tailored to the socio-ecology of African woodlands
5. Facilitating the use of SEOSAW data in analyses
6. Planning and organising networking events and training workshops to connect African researchers and build capacity
7. Contributing to obtaining funds to support SEOSAW fieldwork, events, or management.

We are particularly looking for, but are not limited to, expertise in: soils, taxonomy, and social sciences.

Submit your nominations through [this form](#), including your CV and a motivation letter by **8 November**.

Please keep the motivation letter brief (1 page) and include why you are interested in the being part of the SSC and ideas on the potential contributions and expertise you could bring to SEOSAW as a SSC member.

What is SEOSAW?



SEOSAW comprises a network of scientists and also a network of vegetation survey plots across southern and eastern Africa. Members of SEOSAW conduct diverse research and come from a variety of institutions (academic, government, private, etc.), but are unified by a shared interest in the changing socio-ecology of woodlands and savannas.

The long-term goal of SEOSAW is to understand the response of African woodlands to global change.

SEOSAW is managed communally, and the scope of SEOSAW's activities is open to change as the network and its members' research interests develop. SEOSAW's main purpose is to connect researchers and their data, and to facilitate collaborative research via standardised methods and a curated, accessible database. Anybody is welcome to become part of SEOSAW, by contributing data or expertise, or by using the SEOSAW dataset for their research.

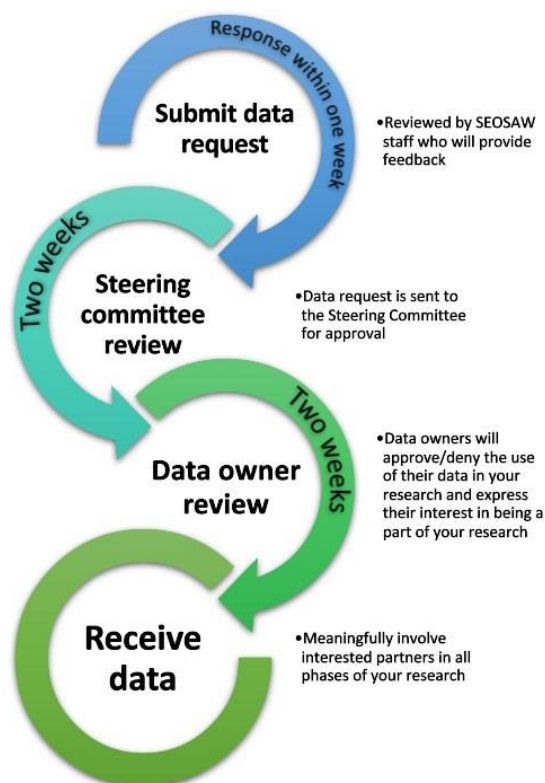
Who owns the data?



SEOSAW data belong to the people who collected it. SEOSAW oils the wheels by standardising the data and storing it in a common database, but the intellectual property belongs to whoever puts the data in, and the data can only be used by others with the owner's permission, and for specific purposes.

Anyone can request to use some or all of the SEOSAW data (see [here](#)). However, we put most of our energy into supporting SEOSAW network members and researchers in the region to make full use of the opportunities the SEOSAW offers. Typically this allows us to scale up our research from site-specific analyses to regional analyses that use data from across all of the woodlands. Or it allows us to use multiple data sets that are hard for one person or group to be expert in (e.g. soils, grass and tree data).

Request the SEOSAW data!



We want the SEOSAW database to be as open and used as possible! If you have science questions, we have data and people willing to help you draft a data request!

To access the SEOSAW data, we require you to draft a data request which is reviewed by the SEOSAW steering committee first and then the data owners. This process takes about a month. The SEOSAW office is here to make this process as easy as possible for you, and will assist you in formulating your data request.

If you are interested, please answer the questions in this [document](#) and get in touch via the [contact form](#) if you would like to use the SEOSAW dataset. A sample of the dataset is freely available [here](#) to help you formulate your data request.