



Woody biomass trends in Rwanda: Combining stock and land cover change between forests, shrublands, and agroforestry

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Introduction

- ❑ Forests are widely recognized for their vital role in climate change mitigation and promoting socioeconomic prosperity and ecological stability.
- ❑ Population growth leads to high demand for biomass energy and puts pressure on forest resources (Drigo et al., 2013).
- ❑ This high dependence critically contributes to land degradation, low forest productivity, and biodiversity loss (MOE, 2019).
- ❑ This study aims to assess the current potential of woody biomass and its trends from 2015 to 2021 in Rwanda.

Materials and methods

- ❑ This study was conducted in 3 Land Cover Types (LCT) within 7 districts of EP, Rwanda.
- ❑ Plot-level inventory was used, with 1,427 plots in total (564 in forest, 520 in agroforestry, and 343 in shrubland), randomly distributed over EP.
- ❑ Trees with DBH >5 cm were measured
- ❑ To ensure consistency same methodologies as NFI (2025) were used to estimate current biomass stock
- ❑ Stock change due to volume increase/decrease (SCV) within the three LCTs was estimated
- ❑ Stock change due to land cover type (SCL) change (2009-2019) was estimated
- ❑ Overall net stock change = $SCL + SCV$



Figure 1: Eastern Province landscape

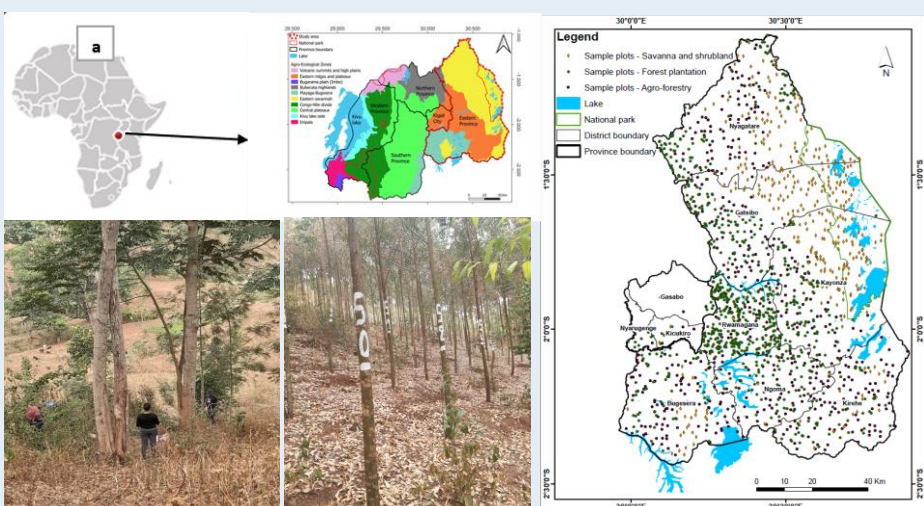


Figure 2: Left: Location of Rwanda in Africa; Upper right: Plots distribution; Lower Left: Plot demarcation

Results

The results reveal that the combined current stock for the three LCT amounts to 5.8 Mm³. forest exhibited the largest stock of 2.5 Mm³ (43%), followed by agroforestry with 2.1 Mm³ (36%), and shrubland and wooded savanna with 1.2 Mm³ (21%).

- ❑ The estimated stock change resulting from the increase/decrease in standing wood volume within the three distinct LCT was a slight decrease of -0.2 Mm³, but with large variation between districts.
- ❑ The estimated total stock change resulting from the cover change between the three LCT is an increase of 1,2 Mm³.
- ❑ The total net stock change amounted to 1 Mm³.

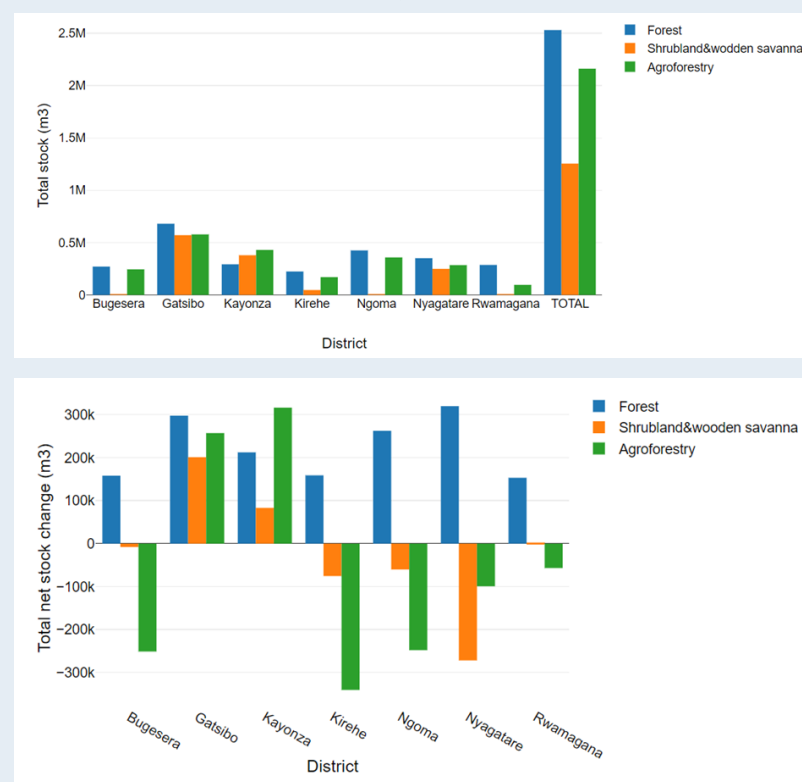


Figure 3: Biomass stock and stock change for 3 LCTs districts of Eastern Province. **Upper pane:** Current total stock; **Lower pane:** Total net stock variation due to stock and cover changes

Conclusion and Recommendation

An accurate estimation of woody biomass stock change is crucial for effectively addressing the challenges associated with biomass energy and environmental issues in Rwanda. The findings demonstrate a net stock change of +1 Mm³ across three LCTs. However, a decline of 0.1 and 0.4 million m³ was observed in the agroforestry and shrubland, respectively. The study recommends promoting and allocating resources towards restoring degraded landscapes. It suggests promoting the use of improved cooking technology and adopting alternative energy sources for cooking.

References

1. Ministry of Environment, (2019). Rwanda Forest Cover Mapping.
2. Drigo, R., Munyehirwe, A., Nzabanita, V., & Munyampundu, A. (2013). Rwanda Supply Master Plan for fuelwood and charcoal Final report Update and upgrade of WISDOM Rwanda.

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