

The Role of Disturbed Dry Afromontane Forest of Ethiopia for Biodiversity Conservation and Carbon Storage

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Abstract : Arbagugu forest is one of the remnant dry Afromontane forests under severe anthropogenic disturbances in central Ethiopia. Despite this fact, up-to-date information is lacking about the status of the forest and its role in climate change mitigation. In this study, we evaluated the woody species composition, structure, biomass, and carbon stock in this forest. We employed a systematic random sampling design and established fifty-three sample plots (20 × 100 m) to collect the vegetation data. A total of 37 woody species belonging to 25 families were recorded. The density of seedlings, saplings, and matured trees were 1174, 101, and 84 stems ha⁻¹, respectively. The total basal area of trees with DBH (diameter at breast height) ≥ 2 cm was 21.3 m² ha⁻¹. The characteristic trees of dry Afromontane Forest such as *Podocarpus falcatus*, *Juniperus procera*, and *Olea europaea* subsp. *cuspidata* exhibited a fair regeneration status. On the contrary, the least abundant species *Lepidotrachelia volkensii*, *Canthium oligocarpum*, *Dovyalis verrucosa*, *Calpurnia aurea*, and *Maesa lanceolata* exhibited good regeneration status. Some tree species such as *Polyscias fulva*, *Schefflera abyssinica*, *Erythrina brucei*, and *Apodytes dimidiata* lack regeneration. The total carbon stored in the forest ranged between 6.3 Mg C ha⁻¹ and 835.6 Mg C ha⁻¹. This value is equivalent to 639.6 Mg C ha⁻¹. The forest had a very low number of woody species composition and diversity. The regeneration study also revealed that a significant number of tree species had unsatisfactory regeneration status. Besides, the forest had a lower carbon stock density compared with other dry Afromontane forests. This implies the urgent need for forest conservation and restoration activities by the local government, conservation practitioners, and other concerned bodies to maintain the forest and sustain the various ecosystem goods and services provided by the Arbagugu forest.

Keywords : aboveground biomass, forest regeneration, climate change, biodiversity conservation, restoration

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