

Impact of Land-Use and Climate Change on the Population Structure and Distribution Range of the Rare and Endangered *Dracaena ombet* and *Dobera glabra* in Northern Ethiopia

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Abstract : *Dracaena ombet* and *Dobera glabra* are two of the most rare and endangered tree species in dryland areas. Unfortunately, their sustainability is being compromised by different anthropogenic and natural factors. However, the impacts of ongoing land use and climate change on the population structure and distribution of the species are less explored. This study was carried out in the grazing lands and hillside areas of the Desa'a dry Afromontane forest, northern Ethiopia, to characterize the population structure of the species and predict the impact of climate change on their potential distributions. In each land-use type, abundance, diameter at breast height, and height of the trees were collected using 70 sampling plots distributed over seven transects spaced one km apart. The geographic coordinates of each individual tree were also recorded. The results showed that the species populations were characterized by low abundance and unstable population structure. The latter was evinced by a lack of seedlings and mature trees. The study also revealed that the total abundance and dendrometric traits of the trees were significantly different between the two land uses. The hillside areas had a denser abundance of bigger and taller trees than the grazing lands. Climate change predictions using the MaxEnt model highlighted that future temperature increases coupled with reduced precipitation would lead to significant reductions in the suitable habitats of the species in northern Ethiopia. The species' suitable habitats were predicted to decline by 48-83% for *D. ombet* and 35-87% for *D. glabra*. Hence, to sustain the species populations, different strategies should be adopted, namely the introduction of alternative livelihoods (e.g., gathering NTFP) to reduce the overexploitation of the species for subsistence income and the protection of the current habitats that will remain suitable in the future using community-based exclosures. Additionally, the preservation of the species' seeds in gene banks is crucial to ensure their long-term conservation.

Keywords : grazing lands, hillside areas, land-use change, MaxEnt, range limitation, rare and endangered tree species

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