

Land Use, Land Cover Changes and Woody Vegetation Status of Tsimur Saint Gebriel Monastery, in Tigray Region, Northern Ethiopia

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Abstract : Ethiopian Orthodox Tewahido Church has a long tradition of conserving the Church vegetation and is an area treated as a refugee camp for many endangered indigenous tree species in Northern Ethiopia. Though around 36,000 churches exist in Ethiopia, only a few churches have been studied so far. Thus, this study assessed the land use land cover change of 3km buffer (1986-2018) and the woody species diversity and regeneration status of Tsimur St. Gebriel monastery in Tigray region, Northern Ethiopia. For vegetation study, systematic sampling was used with 100m spacing between plots and between transects. Plot size was 20m*20m for the main plot and 2 subplots (5m*5m each) for the regeneration study. Tree height, diameter at breast height(DBH) and crown area were measured in the main plot for all trees with DBH \geq 5cm. In the subplots, all seedlings and saplings were counted with DBH < 5cm. The data was analyzed on excel and Pass biodiversity software for diversity and evenness analysis. The major land cover classes identified include bare land, farmland, forest, shrubland and wetland. The extents of forest and shrubland were declined considerably due to bare land and agricultural land expansions within the 3km buffer, indicating an increasing pressure on the church forest. Regarding the vegetation status, A total of 19 species belonging to 13 families were recorded in the monastery. The diversity (H') and evenness recorded were 2.4 and 0.5, respectively. The tree density (DBH \geq 5cm) was 336/ha and a crown cover of 65%. *Olea europaea* was the dominant (6.4m²/ha out of 10.5m² total basal area) and a frequent species (100%) with good regeneration in the monastery. The rest of the species are less frequent and are mostly confined to water sources with good site conditions. *Juniperus procera* (overharvested) and the other indigenous species were with few trees left and with no/very poor regeneration status. The species having poor density, frequency and regeneration (*Juniperus procera*, *Nuxia congesta* Fersen and *Jasminium abyssinica*) need prior conservation and enrichment planting. The indigenous species could also serve as a potential seed source for the reproduction and restoration of nearby degraded landscapes. The buffer study also demonstrated expansion of agriculture and bare land, which could be a threat to the forest of the isolated monastery. Hence, restoring the buffer zone is the only guarantee for the healthy existence of the church forest.

Keywords : church forests, regeneration, land use change, vegetation status

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