

FOREST DEGRADATION AND CARBON SEQUESTRATION IN EFFAN FOREST RESERVE, EDU LOCAL GOVERNMENT AREA, KWARA STATE

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ABSTRACT

This study estimated the forest degradation, carbon dioxide sequestered and stored in the forest trees of Effan Forest Reserve using Remote Sensing/GIS techniques. LandSat Enhanced Thematic Mapper (ETM⁺) of 2001 and 2006 were sourced, 14-sampled plots were randomly taken as reference points and above-ground biomass and carbon sink were estimated. Remote Sensing – Land Use/Land Cover based method was used for change detection, Vegetation Difference Normalized Index (NDVI) used to determine vegetation reflectance, field data and allometric model equation were used for biomass and carbon sink estimation. The Results revealed that there was decrease in the Gmelina arborea plantation in which so many trees were harvested, thereby converting part of the reserve to Sapling/Shrubs (re-generating part). Despite the fast regenerating capacity of Gmelina arborea, there was increase in the number of Sapling/Shrubs size in the Reserve which is an evidence of forest degradation between 2001 and 2006. The vegetation reflectance also revealed that vegetation reflectance was high in 2001 but low in 2006 which also confirms an evidence of forest degradation. The total above-ground biomass and carbon sink of the Reserve estimated showed that Standard trees class tripled that of Sapling size class. The carbon sequestration capacity is expressed in the following order of magnitude: Standard > Pole > Sapling sized trees. Standard – sized trees have better CO₂ sequestration potential than the Sapling and Pole – sized. However, both will have high carbon sequestration potential in the future due to presence of large number of trees belonging to small Diameter at Breast Height (DBH) size classes. Moreover, the forest stand of Effan Reserve has a total sequestration capacity of 40,294.8 metric tons of CO₂.

Keywords: Degradation, *Gmelina arborea*, Above-ground biomass, carbon sequestration, climate change.