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Biomass and Carbon Stock Estimates of Woodlands in the Southeastern Escarpment of Ethiopian Rift Valley: An Implication for Climate Change Mitigation

Authors : Sultan Haji Shube

Abstract : Woodland ecosystems of semiarid rift valley of Ethiopia play a significant role in climate change mitigation by sequestering and storing more carbon. This study was conducted in Gidabo river sub-basins southeastern rift-valley escarpment of Ethiopian. It aims to estimate biomass and carbon stocks of woodlands and its implications for climate change mitigation. A total of 44 sampling plots (900m²each) were systematically laid in the woodland for vegetation and environmental data collection. A composite soil sample was taken from five locations main plot. Both disturbed and undisturbed soil samples were taken at two depths using soil auger and core-ring sampler, respectively. Allometric equation was used to estimate aboveground biomass while root-to-shoot ratio method and Walkley-Black method were used for belowground biomass and SOC, respectively. Result revealed that the totals of the study site was 17.05t/ha, of which 14.21t/ha was belonging for AGB and 2.84t/ha was for BGB. Moreover, 2224.7t/ha total carbon stocks was accumulated with an equivalent carbon dioxide of 8164.65t/ha. This study also revealed that more carbon was accumulated in the soil than the biomass. Both aboveground and belowground carbon stocks were decreased with increase in altitude while SOC stocks were increased. The AGC and BGC stocks were higher in the lower slope classes. SOC stocks were higher in the higher slope classes than in the lower slopes. Higher carbon stock was obtained from woody plants that had a DBH measure of >16cm and situated at plots facing northwest. Overall, study results will add up information about carbon stock potential of the woodland that will serve as a base line scenario for further research, policy makers and land managers.

Keywords : allometric equation, climate change mitigation, soil organic carbon, woodland
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