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Editorial

Editorial Note on Variation of carbon stock over altitudinal and slope gradients

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EDITORIAL

By sequestering fuel in the environment and acting as a carbon trap, forests play a crucial role in battling climate change. The structure of the organisms and the carbon stock were analyzed using a standardized sampling approach over environmental gradients. In the 36 quadrant plots of 20 x 20 m each spread along transect lines, data was collected. Breast diameter ≥ 5cm and overall measured height for each tree in the main map. Using the allometric equation, above and below land biomass was measured, while the litter carbon was estimated as carbon by taking 50 percent of dry biomass. Soil samples were obtained using an auguring process and carbon was analyzed using the Walkley-Black method, while bulk density was analyzed using the oven-dried method. The data was analyzed using R software's one-way ANOVA. The carbon stocks showed distinct differences in environmental gradients in the aboveground, belowground, litter biomass and soil organic carbon. The carbon stock above and below ground has shown a declining pattern along with rising altitude, although organic soil carbon and liter carbon showed a rising pattern along with altitude rise. The mean above and below field carbon stocks were respectively 156.60 t C ha-1 and 31.32 t C ha-1 while the stocks of litter carbon and soil organic carbon were respectively 2.72 t C ha-1 and 125.86 t C ha-1. The Gara-Mukitar forest's overall carbon stock density was found to be 316.6±67.15 t C ha-11. Similarly, in the above ground biomass, 49.5 percent of carbon was found, 9.9 percent in underground biomass, 0.9 percent in litter carbon and 39.8 percent in soil organic carbon (0-30 cm deep).

The study of the variation of the carbon stock of numerous carbon pools along the forest altitude revealed a large variation in forest altitude, whereas, except for soil organic carbon and liter carbon, the above and below-ground carbon stock difference with slope gradient was also important. In conclusion, Gara-muktar forest is a high-carbon repository, since it has a strong potential to sink ambient carbon with a constructive role in lowering greenhouse gases. Effective community-based forest management solutions for its continuity should also be introduced.

Forests, wood and non-wood forest products (NFPs) provide essential ecological resources for human well-being at local, national and global levels, such as lumber, firewood, NTFPs, pasture land, fodder and recreation. Forests, acting as reservoirs and sources of fossil stocks, reduce global climate change. The IPCC has estimated that global forests occupy more than 4 billion ha and lead to global greenhouse gas reduction of about 50 percent. Tropical forests cover 13.76 million km2 globally and account for around 60% of the world's land cover and contain an estimated 193-229 Pg of biomass per year, by photosynthesis and net primary productivity, 915Gt of carbon is recycled in overground biomass and recycled.

Gara-Mukitar forest is a type of dry afromontane forest found in the district of Gemechis and managed by Oromia Forest and Wildlife Enterprise, which advocates natural forest conservation and protection through a participatory approach to forest management. Accordingly, the unauthorized removal of trees in the natural forest is forbidden by the undertaking's community bylaw and the allowance for the use of natural forest products is enforced selectively on the basis of tree age and composition. Plantation forests are also developed and maintained by the company. However, no studies have been carried out to examine the ability of the Gara-Muktar forest for carbon sequestration.

Study of carbon stock variation in various Gara-Mukitar forest carbon pools reacted over altitudinal gradients to different carbon storage capacities. The dominant species in the region are Maesa lanceolata, Juniperus procera, and Rhusglutinosa. The forest analysis was mostly dominated by tiny tree species, while tree species with a lower diameter range had more diversity than the higher diameter class. The amount of carbon stock per species varied, with Schefflera abssinica recording the highest carbon stock, followed by Podocarpus falcatus. 316.6t C ha-1 of carbon and 1161.59t C ha-1 of CO2eq is the cumulative carbon stock of the research forest. The carbon density, debris and soil carbon density above and below ground displayed different variations along the altitudinal gradient, so the forest has an important role in carbon sequestration.

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