

Carbon Sequestration in Terrestrial Vegetation and Soils: A Review

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ABSTRACT

In recent years carbon sequestration became a famous statement among the climatologists, environmentalists, geologists and ecologists. The aim of this paper is to introduce the readers, especially for plant biologists, to the concept of carbon sequestration and the overview of the current status of carbon sequestration research and the level of understanding. Carbon sequestration is captured and storage of atmospheric carbon dioxide (CO₂) into vegetation, soils, geologic basalts and oceans for a long time by biotic and abiotic strategies. In the biotic strategy, the atmospheric CO₂ is naturally fixed into the terrestrial/aquatic ecosystems by photosynthesis process. In the abiotic strategy, the atmospheric CO₂ is transferred into deep-ocean and geologic basalts by mechanical/chemical transformation. Biotic strategy is much safer than the abiotic strategy of carbon sequestration. Global forests and soils are considered the potential sinks for atmospheric CO₂ to mitigate the climate change. Carbon density and sequestered carbon varied significantly in above ground biomass (53-157 Mg C ha⁻¹) and soils (122-1222 Mg C ha⁻¹) among different types of biomes. Global soils are considered as a major reservoir for terrestrial carbon and it can act as a source and sink depending upon the land management activities. Global plantations alone contribute about 205.2 Mg C ha⁻¹ by their above and belowground biomass. The potential sequestration of Indian forests is 0.039 to 0.049 Pg C y⁻¹. Still there is a lack of clarity on carbon sequestration potential, in above and belowground, of plantations across India. Most of the carbon sequestration research in India focused only on estimating the carbon stocks in above ground biomass. There are few studies on carbon sequestration and sink potential of different types of soils under different types of ecosystems. Understanding carbon sequestration in different types of soils across India is quite exigent but this will be very helpful to climate change and soil fertility programme.

Key words: Carbon sequestration, climate change, litter decomposition and soil respiration, plantation, SOC pools

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