

ENHANCED SOIL DEVELOPMENT AND CARBON SEQUESTRATION POTENTIAL OF REVEGETATED COAL MINE SPOILS IN INDIA

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Carbon sequestration is the net removal of carbon dioxide from the atmosphere into above-ground plant biomass, below ground root biomass and soil organisms, as well as into stable forms of soil organic carbon (SOC) and soil inorganic carbon (SIC). Revegetation in mine spoils can accelerate recovery along with increased biomass and hence carbon sequestration. In the present paper, a case study performed in different age revegetated mine spoils of dry tropical environment of India for their carbon sequestration potential only through plant components has been discussed. Variations of mean girth, diameter, height, wood density and biomass of plant species in revegetated mine spoils along an age gradient have been studied. Plant biomass results have shown that there was an increase in above ground, below ground and total biomass from 2 to 19 years of revegetation by 2481% (26 times), 2248% (23 times) and 2444% (25 times), respectively. There was an increase in above ground, below ground biomass with age of revegetated mine spoil. This may be due to increase in leaf litter fall with age of the plantation and its decomposition, higher root turn over leading to increased microbial biomass and N-mineralisation rate resulting into greater availability of inorganic nutrients, with increasing age of the spoil. Revegetated nitrogen fixers might have further added N for the growth of the plants which were lacking in the early stage of mine spoils. Revegetation can reverse the degradation occurred due to mining activities process by stabilizing soils through development of extensive root systems. Age of revegetated mine spoil is also very important, that can be envisaged through the increased plant biomass, organic matter and microbial biomass carbon (MBC) along an age gradient of the revegetated mine spoil. In early growing woody trees, there is more carbon sequestration potential as compared to the mature trees.

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