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INDIA'S CARBON SEQUESTRATION POTENTIAL OF AGROFORESTRY

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In the era of climate change, trees are performing key role in agriculture through enhancing resilience against climate variability, sequestering carbon, improving livelihood and food security. Scattered trees on farmer's fields constitute integral part of the farming system, which also have enormous potential to reduce greenhouse gas (GHG) emission through sequestering carbon in the biomass and soil. Thus, extensive survey study was conducted to assess existing agroforestry area and its carbon sequestration potential (CSP) along with GHG mitigation potential in various states of India. The area under agroforestry was estimated by remote sensing data (LISS III, 23.5 m resolution) following supervised method of maximum likelihood. Dynamic CO2FIX model v3.1 has been used to assess the baseline carbon and to estimate the CSP of existing agroforestry systems (AFS) at district level for a simulation period of thirty years in 51 districts from 16 states of India. The area under agroforestry is estimated to be 15.73 m ha in India. The estimated numbers of trees existing in farmer's field on per hectare basis in these states ranged from 1.4 to 204.87 with average 18.42 treesha⁻¹. The baseline standing biomass in the tree components varied from 0.86 to 113.4 MgDMha⁻¹ and the total biomass (tree + crop) from 2.22 to 123.58 MgDMha⁻¹. The soil organic carbon in the baseline ranged from 4.28 to 24.13 Mg C ha⁻¹. The average estimated carbon sequestration potential of the AFS, representing varying edaphoclimatic conditions, on farmer's field at country level is 0.35 Mgha⁻¹year⁻¹. At national level, existing agroforestry systems are estimated to mitigate 142.34 million tons CO₂ equivalent annually, which may offsets one-third of the total GHG emissions from agriculture sector of India. Therefore, an agroforestry system provides win-win opportunity to bridge-up the adaptation and mitigation strategies and helps to reduce the impact of climate change.

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