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Impact of Mangrove Vegetation on Sequestration of Blue-Stock Carbon in Coastal Soils

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Carbon sequestration, which refers to the process of accumulating the atmospheric CO_2 in sinks, has now emerged as an important mitigation measure to combat global warming. Among various plant-based C sequestration systems are coastal vegetations which contribute about 50% of the total "Blue Stock C" stored in the marine sediments. Mangrove forests constitute an important component of this coastal ecosystem occupying a large share of this soil organic C (SOC) reserve.

To assess the potential of mangrove vegetation in sequestering atmospheric C, we reviewed the SOC status of mangrove soils and discussed the results with regard to those in the corresponding non-mangrove ones. The studies revealed the mangrove soils to maintain high status of SOC in different forms, the values depending largely on the nature and magnitude of occurrence of mangrove vegetations and also the soil conditions. Total organic C (TOC), which includes different fractions of SOC and is considered to indicate the total quantity of sequestered C in a soil at any point of time, showed appreciably higher values in mangrove soils over the non-mangroves. Similarly, the non-labile form, representing the calcitrant form of SOC, was also present in substantially higher amount in the mangrove soils. This significant contribution of the mangrove vegetations to C sequestration was attributed to their high efficiency of converting atmospheric CO_2 into plant biomass C through photosynthesis and also the depositional environments which trap particulate C from within the ecosystem and/or the external sources.

In view of the observed importance of mangrove vegetation in retaining atmospheric C as SOC through gross as well as long term sequestration and also the fact that about 50% of the

global mangrove ecosystems have already disappeared due to anthropogenic activities, this communication emphasizes the need for developing robust mangrove management plans for sustenance and restoration of these vegetations leading to upscaling the sequestration of “Blue Stock C”.

Biography

Prof. Gunindra Nath Chattopadhyay (b.1947) obtained his Ph.D. degree in Agricultural Chemistry and Soil Science. He remained engaged in research, development, teaching and extension activities for more than 40 years in Central Inland Fisheries Research Institute of Indian Council of Agricultural Research and Visva-Bharati University, India. After superannuation, he served an industrial house as Technical Adviser for more than seven years. Presently, Dr. Chattopadhyay is associated with Seacom Skills University as an Emeritus Professor. Major areas of his study are soil and water quality management in aquaculture, soil fertility stewardship and waste recycling in agriculture as well as aquaculture.