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| Title | Fractionation of Organic Carbon and Stock Measurement in the Sundarbans Mangrove Soils of Bangladesh. | | |
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| Abstract |  |
| Mangrove soils are well known for their high capacity of storing organic car-bon (SOC) in various pools; however, a relatively small change in SOC pools could cause significant impacts on greenhouse gas concentrations. Thus, for an in-depth understanding of SOC distribution and stock to predict the role of Sundarbans mangrove in mitigating global warming and greenhouse effects, different extraction methods were employed to fractionate the SOC of Sundarbans soils into cold-water (CWSC) and hot-water (HWSC) soluble, moderately labile (MLF), microbial biomass carbon (MBC), and resistant fractions (RF) using a newly developed modified-method. A significant variation in total SOC (p < 0.001), SOC stock (p < 0.001) and soil bulk density (p <0.05) at the Sundarbans mangrove forest were observed. In most soils, bulk density increased from the surface to 100 cm depth. The total SOC concentrations were higher in most surface soils and ranged from 1.21% ± 0.02% to8.19% ± 0.09%. However, C in lower layers may be more resistant than that of upper soils because of differences in compositions, sources and environmental conditions. SOC was predominately associated with the resistant fraction (81% - 97%), followed by MLF (2% - 10%), HWSC (1% - 4%), MBC (~0% -4%), and CWSC (~0% - 3%). The significant positive correlations between different C fractions suggested that C pools are interdependent and need proper management plans to increase these pools in Sundarbans soils. The SOC stock of the studied areas ranged between 16.75 ± 3.83 to 135.12 ± 28.61kg·C·m−2 in 1 m soil profile and has an average of 31.80 kg·C·m−2. The sub-stratum soils had more carbon than the upper layers in the Sundarbans wet-land due to burial and preservation of carbon by frequent tidal inundation. A higher SOC stock in the soil profile and its primary association in resistant fractions suggested that Sundarbans mangrove soil is sequestering carbon and thereby serving as a significant carbon sink in Bangladesh. | |

**Please specify which Sustainable Development Goal (SDG) (s) falls under your research:**

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| Goal 5 | Gender Equality | Goal 6 | Clean Water and Sanitation |
| Goal 7 | Affordable and Clean Energy | Goal 8 | Decent Work and Economic Growth |
| Goal 9 | Industry, Innovation and Infrastructure | Goal 10 | Reduced Inequalities |
| Goal 11 | Sustainable Cities and Communities | Goal 12 | Responsible Consumption and Production |
| Goal 13 | Climate Action | Goal 14 | Life below Water |
| Goal 15 | Life on Land | Goal 16 | Peace, Justice and Strong Institutions |
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