

Carbon stocks in mangrove ecosystems of Sri Lanka: Average contributions and determinants of sequestration potential

K.A. Roshan S. Perera (Department of Botany, Faculty of Science, The Open University of Sri Lanka, Nawala, Nugegoda, 11222, Sri Lanka)

Wasana de silva (Department of Plant and Molecular Biology, Faculty of Science, University of Kelaniya, 11600, Sri Lanka)

Mala D. Amarasinghe (Department of Plant and Molecular Biology, Faculty of Science, University of Kelaniya, 11600, Sri Lanka)

Journal – Ocean & Coastal Management

Online ISSN: 1873-524X

Print ISSN: 0964-5691

Article publication date: 1 September 2024

Abstract

Mangroves are crucial in carbon sequestration despite covering only a small percentage of the Earth's surface. Latitudinal gradient primarily determines the distribution of climatic zones of distinct sunlight, temperature, and precipitation patterns, which influence the community structure of the mangrove ecosystem. The tropical climate of Sri Lanka contributes to the island's lush mangrove forests. The present study estimated that the average island's carbon sequestration capacity of Sri Lankan mangrove ecosystems is 524.25 t/ha representing a substantial volume of carbon storage that contributes to offset greenhouse effect due to increasing atmospheric CO₂. Our results substantiated that rainfall positively influences total carbon sequestration capacity of mangrove ecosystems.

It was also revealed that a positive relationship exists between vegetation structural complexity and sediment organic carbon, highlighting the influence of vegetation structure, that is primarily dependent on climatic conditions, on production of organic matter and sediment carbon sequestration. Globally, the carbon sink function of mangrove ecosystems is reported to be highest in the tropical areas and it declines towards sub-tropical higher latitudes while those in the southern hemisphere perform better carbon sinks than those in the northern hemisphere.

The vertical distribution of total organic matter content in mangrove sediments was revealed to be in a descending order, manifesting the weak tidal removal of surface organic matter under the microtidal conditions in Sri Lankan marine waters, thus qualifying mangrove ecosystems in microtidal coasts as effective carbon sinks.

Citation

Perera, KA Roshan S., and Mala D. Amarasinghe. "Carbon stocks in mangrove ecosystems of Sri Lanka: Average contributions and determinants of sequestration potential." *Ocean & Coastal Management* 257 (2024): 107357.

Publisher

Elsevier