



Blue Carbon Potential of Mirissanduwa and Kadolgasnelella Conservation Mangrove Forest, Negombo Estuary, Sri Lanka

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Mangroves are unique ecosystems thriving in harsh tropical and warm temperate conditions. These ecosystems are crucial for fighting climate change due to their ability to capture and store "blue carbon". The significant carbon stored in mangroves underscores their immense worth as a natural solution for climate change mitigation. Despite mangroves being a recognized source of climate change mitigation, there are limited studies on their role in the Negombo Estuary. The research intends to provide data supporting the protection, restoration, and sustainable management of these vital habitats to directly reduce atmospheric CO₂ and enhance climate resilience. Sri Lanka's coastlines host 21 true mangrove species, with significant patches in the Negombo Estuary. The study investigated blue carbon reserves and environmental conditions. Ten 5 m x 5 m plots were randomly sampled to analyse blue carbon. Aboveground biomass (AGB), Belowground biomass (BGB) and Carbon stocks of mangrove biomass were estimated using Diameter at Breast Height (DBH) measurements and allometric equations. A total number of 10 soil samples were randomly collected from each plot to a depth of 30 cm, each using a soil corer. Soil samples were collected to determine pH, salinity, and Total Organic Carbon (TOC). TOC was measured using Loss on Ignition (LOI) method. The total blue carbon was calculated by adding aboveground carbon, belowground carbon and TOC. The study revealed that *Rhizophora mucronata* was the dominant species. Calculated total aboveground, belowground, TOC and blue carbon stocks were 776.23, 318.71, 438.40 and 1533.34 Mg C ha⁻¹ respectively. Average soil pH was 7.62 ± 0.19 and salinity was 2.90 ± 0.66‰. This research enhances our understanding of blue carbon storage in mangroves, underscoring their role in climate change mitigation. Further studies on blue carbon storage and promoting mangrove-based eco-tourism are recommended for sustained conservation and economic development.

Keywords: *Negombo Estuary, Blue carbon, Climate resilience, Aboveground biomass, Belowground biomass*