

## Seagrass Biomass Distribution in Mangrove Fringed Creeks of Gazi Bay, Kenya

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**Abstract :** Seagrass meadows are important carbon sinks, thus understanding this role and their conservation provides opportunities for their applications in climate change mitigation and adaptation. This study aimed at understanding seagrass contribution to ecosystem carbon at Gazi Bay; by comparing carbon stocks in seagrass beds of two mangroves fringed creeks of the bay. Specifically, the objectives included assessing the distribution and abundance of seagrass in the fringed creeks, and estimating above and below-ground biomass. Results obtained would be added to the mangrove and open bay carbon in estimating total ecosystem carbon of Gazi bay. The stratified random sampling strategy was applied in this study. Transects were laid perpendicular to the waterline at intervals of 50 meters from the upper region near the mangroves to the deeper end of the creek across seagrass meadows. Along these transects, 0.25m<sup>2</sup> square quadrats were laid at 10 m to assess distribution and composition of seagrasses in the creeks. A total of 80 plots were sampled. Above-ground biomass was sampled by harvesting all the seagrass materials within the quadrat while four sediment cores were obtained from each quarter of the quadrat and then sorted into necromass, rhizomes and roots to determine below ground biomass. Samples were cleaned and dried in the oven for 72 hours at 60°C in the laboratory. Total biomass was determined by multiplying biomass with carbon conversion factor of 0.34. In all the statistical tests, a significant level was set at  $\alpha = 0.05$ . Eight species of seagrass were encountered in Western creek (WC) while seven in the Eastern creek (EC). Based on importance value, the dominant species in WC were *Cymodocea rotundata* and *Halodule uninervis* while *Thalassodendron ciliatum* and *Enhalus acoroides* dominated the eastern creek. The cover of seagrass in EC was 67.97% compared to 56.45% in WC. There was a significance difference in abundance of seagrass species between the two creeks ( $t = 1.97$ , D.F = 35,  $p < 0.05$ ). Similarly, there was significance differences between total seagrass biomass ( $t = -8.44$ , D.F. = 53,  $p < 0.05$ ) and species composition ( $F(7,79) = 14.6$ ,  $p < 0.05$ ) in the two creeks. Mean seagrass in the creeks was  $7.25 \pm 4.2$  Mg C ha<sup>-1</sup>, (range: 4.1 - 12.9 Mg C ha<sup>-1</sup>). The findings of the current study reveal variations in biomass stocks of the two creeks of Gazi bay that have varying biophysical features. It is established that habitat heterogeneity between the creeks contributes to the variation in seagrass abundance and biomass stocking. This enhances understanding of these ecosystems hence the establishment of carbon offset project in seagrass for livelihood improvement and increased conservation.

**Keywords :** seagrass, above-ground, below-ground, creeks, Gazi bay

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