
Abstract

The regulatory ecosystem services in terms of carbon sequestration and storage by Indian seagrass ecosystems were coupled with their monetary values in the context of climate change mitigation in the seagrass meadows of Palk Bay and Chilika Lagoon, two major seagrass ecosystems of India. The results showed that the meadows acted as a net sink of atmospheric CO$_2$; however, they may also act as a minor source of CO$_2$ to the atmosphere depending on the degree of anthropogenic influence. The mean ecosystem productivity ranged between 6.31 and 11.9 kg C ha$^{-1}$d$^{-1}$, which is equivalent to the capture of 8.44 and 15.9 Mg CO$_2$ ha$^{-1}$ year$^{-1}$. This captured carbon was apportioned primarily in sediments (129 Mg C$_{org}$ ha$^{-1}$ in top 1 m soil), which was much higher than the carbon stored as above and below ground biomass (0.20–0.96 Mg C$_{org}$ ha$^{-1}$ and 0.30–2.90 Mg C$_{org}$ ha$^{-1}$, respectively). The economic valuation of regulatory ecosystem services in the form of C sequestration by an estimated 51,700 ha of total seagrass cover in India was largely dependent on the sequestration rates and the average social cost of carbon. The estimated values ranged between $ 1.02 million and $ 3.65 million per year. In addition, monetary values of the stored carbon in live biomass of Indian seagrass systems ranged between $ 0.45 million and $ 3.89 million, whereas, in the top 1 m soil it ranged between $ 109 million and $ 146 million. Detailed evaluations of various ecosystem functions considering the importance of the local variables may provide a better monetary estimate of these regulatory services.