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Review Article

Blue carbon sequestration in seagrass ecosystems: A global synthesis with an emphasis on India's situation, difficulties and possibilities

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Supplementary Data

Appendix S1 — Selected articles included in the review					
Sr. No.	Authors	Year	Title	Journal/ Publisher	Study focus
1.	Ramesh <i>et al.</i>	2018	Legislation and policy options for conservation and management of seagrass ecosystems in India	Ocean & Coastal Management	Seagrass conservation
2.	Chanda <i>et al.</i>	2022	Blue carbon dynamics of the Indian Ocean: the present state of the art	Springer Cham	Blue carbon assessment
3.	Mishra	2023	Seagrass ecosystem adjacent to mangroves store higher amount of organic carbon of Andaman and Nicobar Islands, Andaman Sea	Marine Pollution Bulletin	Blue carbon assessment
4.	Stankovic <i>et al.</i>	2023	Blue carbon assessments of seagrass and mangrove ecosystems in South and Southeast Asia: Current progress and knowledge gaps	Science of The Total Environment	Blue carbon assessment
5.	Patro <i>et al.</i>	2017	Seagrass and salt marsh ecosystems in South Asia: an overview of diversity, distribution, threats and conservation status	Wetland science	Seagrass diversity and habitat
6.	Chanda	2022	Blue Carbon Dynamics in the Indian Ocean Seagrass Ecosystems	Springer Cham	Blue carbon assessment
7.	Stankovic <i>et al.</i>	2021	Quantification of blue carbon in seagrass ecosystems of Southeast Asia and their potential for climate change mitigation	Science of The Total Environment	Blue carbon assessment
8.	Chou <i>et al.</i>	2023	Dynamics of O ₂ and pCO ₂ in a Southeast Asia seagrass meadow: Metabolic rates and carbon sink capacity	Frontiers in Marine Science	Blue carbon assessment
9.	Sudo <i>et al.</i>	2021	Distribution, temporal change, and conservation status of tropical seagrass beds in Southeast Asia: 2000–2020	Frontiers in Marine Science	Seagrass conservation
10.	Ramesh <i>et al.</i>	2019	Importance of seagrass management for effective mitigation of climate change	Coastal Management	Seagrass conservation
11.	Ramamurthy <i>et al.</i>	1992	Seagrasses of Coromandel coast, India. Flora of India	Botanical Survey of India	Seagrass diversity and habitat
12.	Thangaradjou <i>et al.</i>	2008	Seagrass resource assessment in the Mandapam coast of the Gulf of Mannar Biosphere Reserve, India	Applied ecology and environmental research	Seagrass diversity and habitat
13.	Kaviarasan <i>et al.</i>	2019	Seasonal species variation of sediment organic carbon stocks in salt marshes of Tuticorin area, Southern India	Wetlands	Seagrass diversity and habitat
14.	Kamboj	2014	Biology and status of seagrasses in gulf of Kachchh marine National Park and sanctuary, India	Indian Ocean Turtle	Seagrass diversity and habitat
15.	Savurirajan	2018	Distribution and morphometric variability of seagrasses in the intertidal region of South Andaman Islands, India	Ph.D. thesis-Pondicherry University	Seagrass diversity and habitat
16.	Acharyya <i>et al.</i>	2023	Status and conservation challenges of the second-largest seagrass bed in India: Chilika lagoon	Environmental Science and Pollution Research	Seagrass conservation
17.	Kaladharan <i>et al.</i>	2021	Blue carbon stock of seagrass meadows of Chilika and Pulicat Lakes along the Eastern coast of India	Fish Technol	Blue carbon assessment
18.	Adhavan <i>et al.</i>	2022	Diversity of seagrasses and site-specific strategy for their restoration in Gulf of Kachchh Marine National Park—Gujarat, India	Journal of Coastal Conservation	Seagrass diversity and habitat

19.	Anand <i>et al.</i>	2024	The Distribution of Dugongs and the Status of Seagrass in the Gulf of Kachchh, Gujarat, India	Thalassas: An International Journal of Marine Sciences	Seagrass diversity and habitat
20.	Thangaradjou & Bhatt	2018	Status of seagrass ecosystems in India	Ocean Coastal Manage	Seagrass diversity and habitat
21.	Ganguly <i>et al.</i>	2017	Seagrass metabolism and carbon dynamics in a tropical coastal embayment	Ambio	Blue carbon assessment
22.	Govindasamy <i>et al.</i>	2013	Seasonal variations in seagrass biomass and productivity in Palk Bay, Bay of Bengal, India	International Journal of Biodiversity and Conservation	Seagrass diversity and habitat
23.	Ganguly <i>et al.</i>	2018	Valuing the carbon sequestration regulation service by seagrass ecosystems of Palk Bay and Chilika, India	Ocean Coast Manage	Blue carbon assessment
24.	Manikandan <i>et al.</i>	2011	Seagrass diversity and associated flora and fauna in the coral reef ecosystem of the Gulf of Mannar, Southeast Coast of India	Journal of Earth and Environmental Science Research	Seagrass diversity and habitat
25.	Mathews <i>et al.</i>	2010	Status of seagrass diversity, distribution and abundance in Gulf of Mannar marine national park and Palk Bay (Pamban to Thondi), southeastern India	South Indian Coastal and Marine Bull	Seagrass diversity and habitat
26.	Geevarghese <i>et al.</i>	2018	A comprehensive geospatial assessment of seagrass distribution in India	Ocean Coastal Management	Seagrass diversity and habitat
27.	Umamaheswari <i>et al.</i>	2009	Mapping the extent of seagrass meadows of Gulf of Mannar Biosphere Reserve, India using IRS ID satellite imagery	International Journal of. Biodiversity and Conservation	Seagrass diversity and habitat
28.	Edward <i>et al.</i>	2019	Seagrass restoration in Gulf of Mannar, Tamil Nadu, Southeast India: a viable management tool	Environmental Monitoring and Assessment	Seagrass conservation
29.	Koshy <i>et al.</i>	2018	Synthesis of the conference on management and conservation of seagrass ecosystems in India	Ocean & Coastal Management	Seagrass conservation
30.	Mishra & Apte	2020	Ecological connectivity with mangroves influences tropical seagrass population longevity and meadow traits within an island ecosystem	Marine Ecology Progress Series	Seagrass diversity and habitat
31.	Mishra <i>et al.</i>	2020	Loss of Dugong grass [<i>Halophila ovalis</i> (R. Brown)] population structure due to habitat disturbance in an island ecosystem	Indian Journal of Geo-Marine Sciences	Seagrass diversity and habitat
32.	Kaladharan <i>et al.</i>	2020	Blue carbon stock of the seagrass meadows of Gulf of Mannar and Palk Bay off Coromandel Coast, south India	Indian Journal of Fisheries	Blue carbon assessment
33.	Seal <i>et al.</i>	2023	Seagrass and Seaweed habitats in Gulf of Mannar and south Palk Bay region	Final Technical Report, Wildlife Institute of India, Dehradun	Seagrass diversity and habitat
34.	Sridhar <i>et al.</i>	2008	Comparative investigation on physico-chemical properties of the coral reef and seagrass ecosystems of the Palk Bay	Indian Journal of Geo-Marine Sciences (IJMS)	Seagrass diversity and habitat
35.	Murugan <i>et al.</i>	2024	Assessment of blue carbon in seagrass meadows in Pulicat Lake, Andhra Pradesh, India	Marine Pollution Bulletin	Blue carbon assessment
36.	Thangaradjou <i>et al.</i>	2015	Biogeochemical processes in tropical seagrass beds and their role in determining the productivity of the meadows	Geochemistry International	Blue carbon assessment
37.	Jagtap	1998	Structure of major seagrass beds from three coral reef atolls of Lakshadweep, Arabian Sea, India	Aquatic Botany	Seagrass diversity and habitat

38.	Jagtap <i>et al.</i>	2003	Status of a seagrass ecosystem: an ecologically sensitive wetland habitat from India	Wetlands	Seagrass diversity and habitat
39.	Nobi <i>et al.</i>	2011	Distribution and biology of seagrass resources of Lakshadweep group of Islands, India	Indian Journal of Geo-Marine Sciences	Seagrass diversity and habitat
40.	Kaladharan <i>et al.</i>	2013	Turtle herbivory of seagrass ecosystems in the Lakshadweep atolls: concerns and need for conservation measures	Journal of the Marine Biological Association of India	Seagrass diversity and habitat
41.	Mishra <i>et al.</i>	2021	Seagrass ecosystems of India as bioindicators of trace elements. In Coastal Ecosystems: Environmental importance, current challenges and conservation measures	Cham: Springer International Publishing	Seagrass conservation
42.	Newmaster <i>et al.</i>	2011	Local knowledge and conservation of seagrasses in the Tamil Nadu State of India	Journal of Ethnobiology and Ethnomedicine	Seagrass conservation
43.	Singh <i>et al.</i>	2015	Seagrass ecosystem and climate change: an Indian perspective	Journal of Climate Change	Blue carbon assessment
44.	Gole <i>et al.</i>	2024	Latitudinal variation in seagrass communities with special emphasis on post-tsunami status in the Andaman and Nicobar archipelago, India	PLoS One	Seagrass diversity and habitat
45.	Mishra <i>et al.</i>	2025	Seagrass population dynamics and biodiversity assemblages indicate negative effects of short-term nutrient enrichment in tropical island ecosystem	Journal of Environmental Management	Seagrass diversity and habitat
46.	Gopi <i>et al.</i>	2020	Heavy metals accumulation in seagrasses collected from Palk Bay, South-eastern India	Marine Pollution Bulletin	Seagrass conservation
47.	Thangaradjou <i>et al.</i>	2014	Evidences for heavy metal contamination in surface sediments of seagrass ecosystem of Lakshadweep archipelago, India.	Environmental Earth Sciences	Seagrass conservation
48.	Asha <i>et al.</i>	2020	Physicochemical characteristics and benthic faunal constituents of a few seagrass and mangrove habitats of Tuticorin coast, Gulf of Mannar	Journal of the Marine Biological Association of India	Seagrass diversity and habitat
49.	Thangaradjou & Kannan	2007	Nutrient characteristics and sediment texture of the seagrass beds of the Gulf of Mannar	Journal of Environmental Biology	Seagrass conservation
50.	Nair <i>et al.</i> ,	1983	Ecology of Indian estuaries: Part II. Ecology of seagrass bed of <i>Halophila ovalis</i> (Hook) in the Ashtamudi estuary, SW coast of India	Indian Journal of Geo-Marine Sciences	Seagrass diversity and habitat
51.	Vedharajan <i>et al.</i>	2023	Seagrasses in the Indian Ocean region with special reference to urbanisation. In Climate Change and Urban Environment Sustainability	Springer Nature Singapor	Seagrass conservation
52.	Mishra & Farooqa	2023	Sediment organic matter content drives bivalve density in tropical oligotrophic seagrass ecosystem	Indian Journal of Geo Marine Sciences	Blue carbon assessment
53.	Vinithkumar <i>et al.</i>	1999	Organic matter, nutrients and major ions in the sediments of coral reefs and seagrass beds of Gulf of Mannar biosphere reserve, southeast coast of India	Indian Journal of Geo Marine Sciences	Blue carbon assessment
54.	Ranith <i>et al.</i>	2024	Assessment of coral reef connectivity in improved organic carbon storage of seagrass ecosystems in Palk Bay, India	Marine Pollution Bulletin	Blue carbon assessment
55.	Kaviarasan <i>et al.</i>	2025 (a)	Blue Carbon Potential of Indian Mangroves, Seagrasses, and Salt Marshes: A Review of Current Knowledge and Future Directions for Climate Change Mitigation	Sustainable Development and Biodiversity, Springer	Blue carbon assessment
56.	Kaviarasan <i>et al.</i>	2025 (b)	Salinity Influence on Sediment Organic Carbon (SOC) Stock in Different Coastal Ecosystems of Southern Andaman Island: An Overlooked Aspect of Blue Carbon Research	Sustainable Development and Biodiversity, Springer	Blue carbon assessment

57. Ranith	2025	Decadal-scale urban footprints on seagrass blue carbon dynamics in Palk Bay, India: a remote sensing based framework	Frontiers in Marine Science	Blue carbon assessment
58. Rastogi <i>et al.</i>	2026	Diversity and distribution of seagrasses in Chilika Lagoon: Regional threats and management recommendations	Indian Journal of Geo-Marine Sciences	Seagrass conservation
59. Rangesh <i>et al.</i>	2026	Spatial dynamics of aragonite saturation state and blue carbon stocks in seagrass meadows of the Palk Bay, Southeast Coast of India	Environmental Monitoring and Assessment	Blue carbon assessment