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SOUTH EAST INDIAN MARINE ECOSYSTEM – A REVIEW

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ABSTRACT

The first living organism has appeared in the sea more than 3500 million years. The marine environment is filled with a variety of organism ranging from the unicellular organism to warm blooded creatures. India is one of the biggest peninsular in the world. The coastline is about 7,516 km of which the mainland part measures 5,422 km and that around the two major island groups measure 2,094 km. These organisms live in complex communities and in close association with other macro and micro-organisms. The functioning of an ecosystem may not be high by conserving or giving importance to any single species, but protection of habitats will certainly preserve the ecosystem along with the species to be conserved. Tamil Nadu is enriched with various habitats and endowed with a rich biodiversity from marine coastal systems in the Gulf of Mannar to the Western Ghats landed with terrestrial evergreen forests. There are nearly 527 species of fish dominant taxa in the nekton of Tamil Nadu, other species belonging to various families like crustaceans are 419 species, 336 species of molluscs, 15 species of reptiles and 29 species of mammals. The Gulf of Mannar Biosphere Reserve is enriched with a huge variety of species exhibiting various habitats. The current review describes about the marine ecosystem in the south east India and also provides a picture of the biodiversity in the Gulf of Mannar.

Keywords: Seaweeds, Marine biota, Pelagic, Gulf of Mannar, Marine ecosystem, marine Diversity.

Introduction

Marine environment fills in as a home for various animal varieties extending from huge marine warm blooded creatures to unicellular planktonic life forms that go about as the base of the marine nourishment web. Kuitert and Debelius (2007) Marine biological system gives nourishment and safe house to numerous species. It includes a wide scope of complex natural surroundings characterized by the physical, compound and topographical varieties found in the ocean. van Dam, Finlayson, and Humphrey (1999) Living spaces are exceptionally gainful close shore areas, and the remote ocean floor occupied uniquely by profoundly concentrated life forms. Butler *et al.* (2010)

Marine Biota

Marine habitats can be broadly classified into coastal and open ocean habitats. Hutomo and Moosa (2005) Coastal environments repress the territory that reaches out from the shoreline out to the mainland rack. Untamed sea environments are found in the sea profound past the edge of the continental shelf. Marine living spaces can be arranged into pelagic and demersal natural surroundings. Griffiths *et al.* (2010)

Pelagic creatures are found in the shore or in the waterfront districts or in the untamed water sections and, tiny fishes and nektons are unmistakable living beings living in the pelagic condition or the benthic condition. Mazlan *et al.* (2005) Demersal living beings are found at the base of the

sea. The living beings living in a pelagic territory are called as pelagic creatures, yet a few living beings are pelagic in one phase of life and benthic in another. Nair (1977) Makers which incorporate natural particles are available in the two conditions. In the pelagic condition, both unicellular and multicellular tiny fish with photosynthetic shade in the photic zone go about as makers. Pagiola and Platais (2002) Commonly, the makers in the benthic are microalgae, large scale green growth and ocean grass. Oza and Zaidi (2001) Marine living spaces can be arranged by their occupants. Some marine living beings, similar to corals, mangroves and ocean grasses, are the architects in the biological system which revamp the marine condition to the point and make new natural surroundings for different life forms. Newell and Pizer (2004)

Indian Marine Ecosystem

India is one of the greatest peninsular on the planet. The coastline is around 7,516 km of which the terrain part estimates 5,422 km and that around the two noteworthy island gatherings measure 2,094 km (132 km around the Lakshadweep and 1962 km around the Andaman and Nicobar Islands. United (2005) The territory coast is separated into the West Coast and the East Coast. These two coasts are essentially extraordinary in their geomorphology with variation beach front and marine biological systems, which supports the huge biodiversity broadly and all around. Belyanina (1974) The waterfront district of the Bay of Bengal and Arabian Sea serves to be a rich angling ground in

the South Asian locale, and India remains in the principal position over the globe in sending out the marine items to various countries. Devassy and Bhattathiri (1974) The marine condition in India comprises of an assortment of biological systems happening along the coastline which outskirts the Indian promontory and circles the two noteworthy Island gatherings. The West Coast is typically uncovered with rough shores, overwhelming surf and headlands, while the East Coast is for the most part racking with shorelines, bogs tidal ponds and delta. Costello *et al.* (2010)

Marine environments can be sorted as coral reefs, sandy and rough shorelines, estuaries. They fill in as significant assets for nourishment and furthermore give different biological administrations to people. Halpern *et al.* (2008) Aside from this, an unnatural weather change brought about by atmosphere changes additionally challenge the marine biodiversity of India. Soondron, Ragoonaden, and Mukhopadhyay (2003) Biodiversity must be saved by counteracting misfortune and reclamation of different environments. Longhurst and Pauly (1987) Our essential concern is to support these delicate biological systems and to save and keep up the marine condition by assurance, protection and feasible utilization of marine living assets. Menzies, George, and Rowe (1973)

Estuary Ecosystem

Estuaries make the transitional zone between the marine condition and the lower tidal locale of a waterway. They are additionally significant in perspectives on business, mechanical and diversion. Assessment (2005) There are around 14 noteworthy estuaries in the East Coast and 16 in the West Coast. These biological systems experience high anthropogenic weights primarily because of industrialization and urbanization. Nesis (1986) These environments experience broad harm because of Inflow of city waste water, dumping of sewage and modern effluents into to the water bodies. Overwhelming aggregation of substantial natural and inorganic poisons by aquaculture exercises around estuaries has likewise brought about pollution of this environment. Newell and Pizer (2004)

Lagoon Ecosystem

Tidal ponds are low-lying shallow water body isolated from the sea by a hindrance however associated through specific deltas to the sea. Berghe (2005) There are around 8 noteworthy tidal ponds in the East Coast and 9 in the West Coast. These biological systems experience high anthropogenic weights predominantly because of industrialization, urbanization and collection of substantial natural and inorganic toxins by aquaculture exercises like the estuarine environment. Das *et al.* (2009)

Sea Grass Ecosystem

Ocean grasses are discovered submerged in protected and shallow regions of bay, ocean, straights, tidal ponds and backwaters. They help in the protection of imperilled species like marine turtles, dugong, and so forth. Geynrikh (1992) In the Indian coast, there are around 14 species detailed and 9 species are found widely in Andaman and Nicobar Islands. Ingole (2005)

Seaweed Ecosystem

Kelp are found for the most part on level and rough beach front wetlands which are therefore uncovered amid

low tides and submerged amid elevated tides. Moiseyev (1986) Kelp is found in plenitude on the West Coast, Andaman and Nicobar Islands and Lakshadweep, yet recurrence in the East Coast is minimal less. Around 1200 types of ocean growth have been accounted for in the Indian beach front district. Naskar and Mandal (1999)

Mangrove Ecosystem

Mangroves are backwoods that can endure the salt substance in the water. These environments are found predominantly in tropical, subtropical and between tidal locales. It comprises of trees or bushes that develop in shallow and sloppy salt water or bitter water. M D Richmond, Francis, and Association (2001) Around 69 types of mangroves having a place with 27 families and 42 genera are accounted for. In India, mangroves spread a zone of 24,461 km which speak to 2.6% of the all-out mangrove zone on the planet according to the most recent satellite information by the Forest Survey of India in the year 2003. Matthew D Richmond (2002) Mangrove environments experience high anthropogenic weights fundamentally because of industrialization, urbanization and Heavy collection of overwhelming natural and inorganic poisons by aquaculture exercises. Sengupta and Qasim (2001)

Coral Ecosystem

Minor living beings having a place with gathering Anthozoa of Phylum Cnidaria are known to be Corals. They emit an enormous calcareous skeleton which by and large store calcium carbonate to manufacture huge settlements and resplendent. Assortment of corals in a confined living space because of a cemented development offers ascend to coral reef. It is a mind boggling framework which comprises of a wide scope of creatures including plants and corals. Sengupta and Qasim (2001) Coral reefs are comprehensively arranged into 3 types in particular

- Fringing reefs
- Barrier reefs and
- Atolls.

Every one of the three sorts of corals are found in the Indian waters. Bordering reefs are accounted for in Gulf of Mannar, Andaman and Nicobar Islands and Gulf of Kutch. There are around 199 types of corals having a place with 71 genera, which are accounted for in the Indian Ocean. Spalding, Blasco, and Field (1997) Coral reefs are the most elite, beneficial and the dynamic biological system of the Marine world. It additionally gives asylum and reproducing grounds to different marine living beings and furthermore go about as financial source and give work to individuals. Wafar *et al.* (2011)

Marine diversity – Tamil Nadu

Tamil Nadu is advanced with different natural surroundings and enriched with a rich biodiversity from marine beach front frameworks in the Gulf of Mannar toward the Western Ghats arrived with earthbound evergreen woods. Tamil Nadu is found between 76° 14' and 80° 21 East longitudes and 8° 05' and 13° 34' North scopes. Southon *et al.* (2002) It has a land territory of 1, 30,058 km², which just comprises around 4 % zone of the complete nation. Veron (2002) Tamil Nadu has a rich and shifted marine fauna around 313 types of sponges, 131 types of echinoderms are accounted for. There are almost 527 types of fish prevailing

taxa in the nekton of Tamil Nadu, different species having a place with different families like shellfish are 419 species, 336 types of molluscs, 15 types of reptiles and 29 types of warm-blooded animals. Nektonic species are for the most part found in the beach front waters. Southon *et al.* (2002), Veron (2002)

The Gulf of Mannar locale is the world's most extravagant area of marine bio-decent variety lying in the Indian coast between Rameswaram to Kanyakumari. It exists in 08° 47' to 09° 15' North; and 78° 12' to 79° 14' east. The Government of Tamil Nadu considering the environmental and natural lavishness announced the Gulf of Mannar area as the primary marine National Park of the nation which incorporates 21 un-possessed islands and their shallow waters around and the waterfront locales of Ramanathapuram and Thoothukudi areas. Diaz and Rosenberg (2008) This biosphere (GOMBR) covers a center territory of around 560 km² and reaches out up to 10,500 km² which incorporates the 21 islands of the national park. The Gulf of Mannar Biosphere Reserve (GOMBR) is advanced with an immense assortment of animal varieties displaying different natural surroundings.

Seabeds are overwhelmed via sea grass having a place with families like Potamogetonaceae and Hydrocharitaceae and species, for example, *Cymodocea rotundata*, *Halodule*, *Cymodocea serrulata* mangroves including *Muctonata*, *Avicennia alba*, *Rhizophora*, *Bruguiera gymnorhiza*, *Lumnitzera racemosa* *Ceriops tagal* are likewise normal in the stretch. There are about 147 types of kelp and all the 11 types of ocean grass and all the mangrove species accessible in India are available in this biosphere. There are around 82 types of Scleractinian corals found in the Gulf of Mannar Marine National Park (Keesing and Irvine 2005).

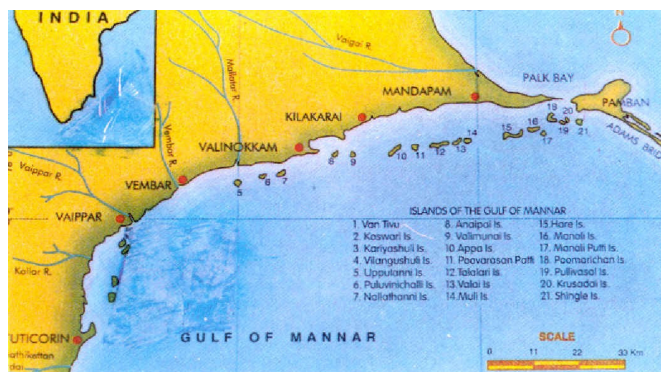


Fig. 1: Topography of Gulf of Mannar (www.fisheries.tn.gov.in)

The most bounteous types of this reef are *Gracilaria lichenoides*, *Sargassum*, *Halimeda opuntia*, *Caulerpa* and *Amphiroa fragilissima*. The Gulf of Mannar is copious with ocean grasses. The species having a place with the family Hydrocharitaceae and Potamogetonaceae have been watched. It gives nourishment sources to the ocean warm blooded creatures, especially dugong which feeds upon these grasses on the Krusadai islands and the shoreline of this inlet. It likewise has special mangrove vegetation. It is interesting to see that such vegetation comprises of species having a place with *Avicennia*, *Rhizophora*, *Lumnitzera*, *Ceriops*, *Bruguiera*, and so forth. During the long stretches of December and January, the mangroves sprout with blossoms. Saxena (2012)

The coral reefs are exceptionally subject to the course of water ebb and flow. It gives safe house to green growth, wipes, angles and different living spaces. Floating and detained phytoplankton are experienced separated from the sedimentary and fixed green growth. Tomczak and Godfrey (2013) Calcification is the most basic and significant for the coral reefs development. Essentially, there is no connection among calcification and photosynthesis, however the phytoplankton and algal populaces acquire more prominent importance upon coral reefs. Kathiresan (2000)

Conclusion

The benefits that people derive from nature are ecosystem resources. Human survival and wellbeing depend on these resources and thus on the protection and best management. Many sophisticated, modern tools for generating chemical compounds are available for the research, but there are still many natural biologically active compounds in the womb of nature which are a mystery. The marine environment has an enormous source of biologically active natural products, which have not been found in many terrestrial sources. These biological active compounds derived from those marine-based organisms show various applications. The bioactive properties derived from marine compounds with potential uses serve as functional food ingredients for the maintenance of health and to prevent chronic diseases. Hence the primary goal of mankind is to protect these sources which provide the resources for the well-being of mankind.

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