

CMLRE study to help development of preservation strategy for Andaman and Nicobar Island ecosystems

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The blue water pristine sea beaches with coral reefs are the traveler's delight which catch our attention for the sheer joy we derive from their serene beauty; but for a marine scientist, oceans are a treasure house of research. The oceans covering two third of the surface area of Earth play a vital role in sustaining life on Earth. Three billion people depend on marine and coastal resources for their livelihoods. Therefore it is of paramount importance for a marine scientist to understand the ocean and information on the distribution of living and non-living sea resources. In spite of their ecological and economic importance and the existence of policy and regulatory frameworks, The Andaman and Nicobar Island are under serious threat to its coral reefs, associated habitat and beauty. In this context, the present CMLRE study provides the first detailed information on distribution of living and non-living sea resources, which would help to develop a healthy ecosystem management strategy.

The functioning of the marine ecosystem is dependent on a wide range of organisms living at different depths of the ocean. Muddy and sandy sediments cover 70% of the world's seafloor. These sediments provide a conducive environment for the bottom-dwelling organisms. The benthic zone is the ecological region at the lowest level of ocean water where marine soft sediments allow the benthic assemblages to sustain their life as these sediments falling to the seabed from above are rich in organic matter. However the depths of the benthic zone vary depending on the bottom contour of the ocean. The organisms living in this zone are called benthos which include microorganisms (e.g., bacteria and fungi) as well as larger invertebrates, such as crustaceans and polychaetes. Macrozoobenthos are benthic animals that are big enough to be seen with the naked eye.

Centre for Marine Living Resources and Ecology (CMLRE), Kochi conducted a study on the distribution of macrofauna in areas surrounding the Andaman and Nicobar archipelago in the tropical Indian Ocean. The study was conducted at different depths of the ocean water to find out the distribution of marine invertebrates known as benthic assemblage and include macrozoobenthos (benthic fauna $\geq 300 \mu\text{m}$) such as polychaetes, molluscs and crustaceans. Among them polychaetes constitute the most dominant group constituting about 80% of the total macro benthic community and their diet include microbial, meiobial, and organic substances.

Macrofauna perform essential functions in the ocean carbon cycle that influences the productivity of the habitat, and thereby helps in recycling of nutrients and in turn promotes primary productivity. Macrozoobenthos help in nutrient cycling, which is the process of cycling of biologically important chemicals like carbon, nitrogen and phosphorous, i.e. breaking the organic molecules derived from biological sources to simplest inorganic forms which are reused as nutrients by other marine organisms and thereby maintaining a biogeochemical dynamics for a healthy ocean ecosystem.

CMLRE scientists found that the water around Andaman and Nicobar Islands are an important biodiversity hotspot. The result showed the highest polychaete species ever recorded in the northern Indian Ocean, with several new taxonomic discoveries. The polychaetes are also used as most veritable marine organisms for the detection of pollution. This study provided a unique opportunity to examine the community shift of macrozoobenthos in well-oxygenated mesophotic reef areas as well as oxygen minimum zone (OMZ) conditions which occur in close proximity. The result revealed that the polychaete diversity in oxygen minimum condition in Andaman Island (200m) is higher than other OMZ-influenced margins around the world. CMLRE scientists also found that the population of macrozoobenthos decreased from the mesophotic reef areas (200m), particularly in the case of the dominant groups, the polychaetes and crustaceans. Smaller-sized, interstitial polychaetes and crustaceans were abundant in the coarser sandy sediments at the shallower sites. The polychaetes were represented by 606 species (279 genera) in the study, of which 50% were rare species. Based on

polychaete species composition, three regions were delineated in the study area-the Nicobar margin, the western margin of the Andaman and Bay of Bengal sector.

A mesophotic (meso meaning middle and photic meaning light) coral reef is characterised by the presence of both light dependent coral and algae, and also organisms that can be found in water with low light penetration. The scientists noted that the goals of sustainable development is to create a framework to manage and protect Andaman and Nicobar ecosystems from pollution, as well as to address the impacts of ocean acidification. CMLRE suggested that preservation of sea-based resources can be achieved through sustainable use of these resources by acceding to international laws and thus mitigate some of the challenges.

Led by Aiswarya Gopal, the research team comprised of Usha V. Parameswaran, V. N. Sanjeevan, Anilkumar Vijayan, N. Saravanane, G. V. M. Gupta and M. Sudhakar of CMLRE, Kochi, Ministry of Earth Sciences, K. U. Abdul Jaleel of National Institute of Oceanography Regional Centre, Kochi, and A. V. Saramma of Department of Marine Biology, Microbiology and Biochemistry, School of Marine Sciences, Cochin University of Science and Technology, Kochi. The research paper is published in the Journal of Frontiers in Marine Science (available online from 25 August 2020).

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