

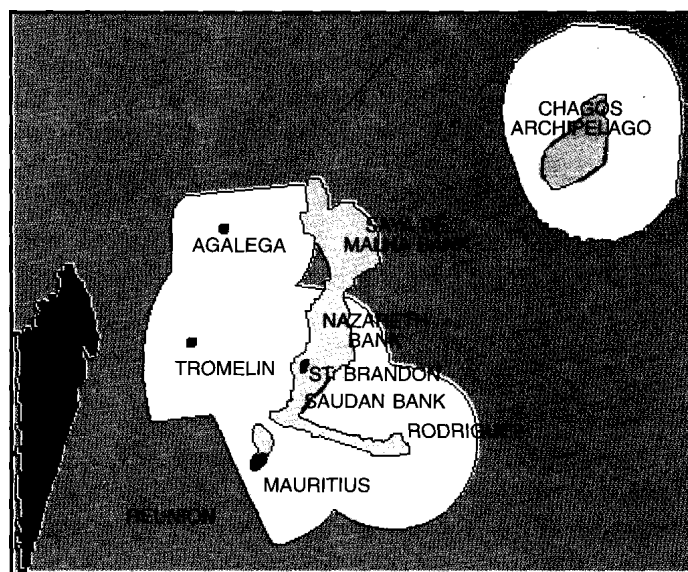
Mauritius: a journey from beach to laboratory

Few other nations should be more concerned about the ocean and oceanographic research than Mauritius. Being located in the midst of the Indian Ocean, the waters around this island greatly influences the climate, economy and health of the people of this Republic. The industrialization during late eighties brought in textiles and financial services to reinforce Mauritian economy wholly run till then by sugarcane cultivation and fun-filled sunny golden beach-centered tourism. However, despite having an Exclusive Economic Zone (EEZ) thousand times its landmass, the ocean based economic activities contributing to the Gross National Product of Mauritius have been unfortunately insignificant. Considering the facts that Mauritius is one of the most densely populated countries in the world and does not have any known land-based mineral resources, exploitation of oceanic resources will probably follow as the next phase of her industrial development. Hence, there is a greater need for an integrated approach in scientific planning, formulation, implementation and overall management of ocean related activities in Mauritius. This can ensure not only sustainable use of the ocean, but could also generate employment opportunities. In a bid to strengthen these noble intentions with feasible ideas, Mauritius is now working on a rational vision and operational schedule for the sustainable exploitation of her maritime resources.

The coastal zone is the prime frontier area to study, as it impacts the livelihood of a majority of the Mauritians- one-way or the other. Monitoring change in shoreline is an important task for the concerned ministry and research institutions. Expectedly, the shoreline was divided into homogeneous geomorphological cells. A GIS-based mapping of these cells using satellite, aerial photography and real-time ground truthing is taken up to estimate coastal vulnerability against geological, climatological, biological, chemical and physical extremes. There is a

proposal to set-up few time-series stations around Mauritius and outer islands. Such stations selected on strong scientific rationale, would collect data of all possible oceanographic parameters at regular intervals over a stipulated period. Modelling such data would help develop strategies to effectively mitigate the coastal problems.

The economy of a large majority of the Mauritian population depends on fishing and fisheries resources. Unfortunately complete biomass evaluation and detailed maps of coral reef and fish stock are still not available. To overcome this shortcoming, efforts are now on to identify new fishing banks through bathymetric survey and satellite information. Deployment of artificial reefs and mariculture are encouraged. Continuous monitoring of chlorophyll content, sea surface temperature, and current pattern are studied to maximize the resource products. Mauritius is in the process of making robust plan and necessary legislation for conservation and sustainable use of marine biodiversity and its



Exclusive Economic Zone (*in yellow*) of the Republic of Mauritius

components. Setting up of an integrated coastal zone management framework involving impact assessment certification mechanism and an efficient hazard and crisis mitigation group are being actively considered.

A substantial part of the protein needs of Mauritius comes from the sea through captured fisheries. A good demand for filleted and other value-added forms of fish should excite fishing industry. Biotechnology and sea ranching mechanism can ensure high food quality and add value to the product. Grounds for deep-water shrimps and possibilities to develop technology for better fish preservation are explored now. The seafood technology area, in particular, can create lot of job opportunities. Extracts from marine organisms can also contribute a substantial part of the country's drug needs. Inventory list of such marine organisms is being prepared. Mauritius is insisting for well-equipped laboratories and trained human resources to capture the intellectual property rights and other commercial possibilities in the field of bioprospecting. Some beginning has been made by setting up a fully equipped biotechnology laboratory in Mauritius with the Indian help.

As a fundamental measure, the vast Exclusive Economic Zone and the Continental Shelf need to be explored in detail to complete geological, chemical, biological and physical mapping. Understanding the submarine landslides, sea floor tectonics and its effect on stability of Mauritian coastline are of great significance. In consonance with Article 76 of the UNCLOS Convention, Mauritius has been one of those very few countries in the world to have collected necessary geological and geophysical data to demarcate extension of legal continental shelf. An intensive exploration to identify maritime resources within the EEZ for hydrocarbon potential, seamount cobalt rich crust and phosphorus, hydrothermal metal deposits of the mid - oceanic ridge and associated bioactive compounds is necessary. Another area in which Mauritius is interested is to harvest renewable energy from wind, waves, currents, tides, and from large temperature difference that exists in the water levels within a short distance from the shore.

Mauritius is lucky to have a considerable portion of the Central Indian Ridge (CIR) within her Exclusive Economic Zone and extended Continental shelf. Understanding the processes of generation of new oceanic crust at the CIR would be interesting to obtain fundamental information on mantle melt behaviour and high-grade sulphide metal deposits. A host of worms

and colourful tubes amazingly occur at this extremely hot (>200°C) deep-sea environment. The genetic adaptations of these organisms (see above photo) may prove commercially potential and academically significant. Studying the various dimensions and dynamics of CIR by taking advantage of technological advances in collaboration with other nations should prove rewarding.

Ocean regulates climate by absorbing much of the atmospheric carbon. Hence, understanding the biogeochemical environment that controls and relates oceanic productivity and atmospheric composition can help climate prediction. Increased research on air-sea interaction processes and simulation of ocean-atmosphere coupling would contribute substantially to enhance weather and climate prediction ability. To this end, Mauritius is now integrated with international campaign to understand the above delicate aspects. By deploying Argo floats, data-buoys, tide gauges and sediment traps, Mauritius is poised to generate wealth of information of her waters. It is proposed to study the Mascarene Plateau in detail as the oceanographic parameters of this area greatly influence the Mauritian climate and the resultant economy. From social points also, Mauritian waters are expected to have a wealth of history submerged. Scientific investigation to catalogue marine archaeological sites and trace maritime history through research may bring out unsung pages of culture and commerce in the past.

In order to make use of the ocean in a sustainable way, ministries and institutions in Mauritius are taking much interest. Simultaneously, capacity building should be a prime activity for the Mauritius marine community involving rewarding collaboration among the various institutions. A national coordination committee in ocean sciences is being set up for this purpose. Being a responsible contributor to global ocean research campaigns, Mauritius is on the edge to qualify to act as hub of marine research activities in the Indian Ocean. It is believed that only through visible, rational and responsible marine scientific activities, Mauritius can take advantage of her enormous geographical and strategic potential. If approached judiciously, oceanic activities could become a pillar of Mauritian economy in near future.

Ranadhir Mukhopadhyay

*The author is from National Institute of Oceanography and the former Director of the Mauritius Oceanography Institute, Mauritius.
E-mail: ranadhir@darya.nio.org*