A Brief on the Contribution of the Central Marine Fisheries Research Institute to Research and Knowledge of Coral Reefs of India by M.Devaraj[1]

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The coral reefs found in different parts of the coasts of the Indian mainland and Lakshadweep and Andaman Islands have always been a subject of scientific interest and fascination. They include the sensitive fringing reef ecosystems in the Gulf of Mannar, Palk Bay, Gulf of Kutch and the atolls of the Lakshadweep Islands and the continental island reefs of Andaman and Nicobar, all covering an estimated area of about 1217 sq. km.

These coral reefs support myriads of beautiful organisms and present a pristine seascape, which thrilled nature loving tourists, biologists and students. Their rich and varied biological diversity, parallel to the tropical rain forests, is being degraded by man for various extractive and nonextractive uses. The coral reefs which constitutes an important coastal life supporting system, contribute significantly to the sustained production of commercially exploited sea weeds, lobsters, crabs, bivalves, gastropods, cephalopods, holothourians, table fishes and ornamental finfishes belonging to many taxa. The Indian coral reef ecosystems are estimated to be capable of a fish production potential of 1.8 to 2.7 lakh tonnes per year. The social, economic and biological value of these ecosystems has therefore been recognised by the CMFRI in the early 1960 s itself as one of the priority areas for fundamental as well as applied research.

The taxonomic and ecological studies on the coral reef fauna, initiated in the sixties, have revealed the occurrence of 199 species of scleractinian corals under 37 genera from the reefs of India. Their diversity is high in Andaman and Nicobar (135 species and Lakshadweep (105 species). The reef biocomposition also includes 180 species of benthic algae, 14 species of seaweeds, 12 species of seagrass, 4 species of lobsters, many species of sponges' (108 'species), crabs, bivalves, gastropods, cephalopods, echinoderms (103 species) and 600 species of finfishes each in Lakshadweep and Andaman & Nicobar Islands. The productivity of the reefs is estimated at 9.1 g C/m^2/day in the Minicoy island, 7.3 g c/m^2/day in the Gulf of Mannar and 3.9 g c/m^2/day in the Andamans.

The institutes studies have facilitated a better understanding of the natural and anthropogenic factors responsible for the regression of coral growth and the degradation of species diversity. Besides natural deleterious processes like cyclones, erosion, siltation, diseases, pests (boring sponges & bivalves), algal blooms (Noctiluca, Trichodesmimum, Alexandrium etc.) the indiscriminate exploitation of corals and the associated flora and fauna, dredging, reclamation, and pollution have further threatened the reef ecosystem (Marine Biodiversity Conservation and Management, 1996). The Institute has conducted special

indicative surveys in the coral reefs of the Lakshadweep, and the Andaman & Nicobar Islands during 1978 and 1987 respectively to assess their mariculture potential and to estimate the impact of fishing and other allied activities in the reefs on their biodiversity, habitat alterations, degradations etc. The survey findings helped to identify and assess the threats and to formulate appropriate strategies for the conservation and sustainable management of the reefs around the mainland and the Islands.

Gulf of Kutch

The nearshore areas of the Gulf, with a catalogued list of 37 species (24 genera) of coral fauna, is heavily silted with terregenous deposits brought in by the tides and the winds. Dredging of sand f or the cement industry and the mining of massive corals also caused severe damages to the reefs. The effect is further compounded by oil pollution and overcollection of reef fauna. A total area of 400 sq.km in Okha to Jodia along the Gujarat coast has been brought under the Gulf of Kutch National Marine Park, administered by the state Forest Department with the objective of protecting and conserving the reef ecosystem and the fauna living therein, based on the proposal of the CMFRI, NIO and other scientific institutions.

Gulf of Mannar and Palk Bay

The indiscriminate use of reefs began in the sixties for various industrial purposes at an estimated rate of 250 m 3/day. Indiscriminate quarrying has led to the destruction or even disappearance of some of the islands in the Gulf of Mannar off Tuticorin. The once pristine coral reefs and the small islands in the Gulf of Mannar are all severely trampled, while exploiting the seaweeds, crabs, ornamental shells and ornamental fishes from the reef flats.

The reefs along the southeast coast of India support 94 species (under 37 genera) of scleractinian corals. In view of the importance of this ecosystem to humanity and the ever growing dangers to the reef biodiversity, the region embracing 21 islands in the Gulf of Mannar from Rameswaram to Tuticorin has been declared as the National Marine Park and administered by the Park Authority of the Wildlife wing of the Tamilnadu Forest Department. As the park region is biologically rich (primary productivity of 7.3 g c/m^2/day) and veritable, clandestine exploitation of seaweeds, corals, shells, fishes, turtles and dugongs, is still going on inspite of legal controls.

Andaman & Nicobar Islands

The indicative survey conducted by the Institute during 1978 was chiefly intended to identify the areas/groups suitable for mariculture and to assess the environmental qualities and infrastructure facilities available (CMFRI Bull. 34, 1983). SCUBA diving conducted in the nearshore reefs has revealed many details of the community structure and the ecology of the reefs. A total of 135 species under 59 genera of scleractinian corals have been are recorded from the Island. The reef suffered many threats from natural causes like siltation, sea erosion, predation by starfish (***Acanthaster planci)***,parasite causing White Band Disease (WBD) and from coral

boring sponges and bivalves. Large scale removal of corals and other curious molluscs, dredging, quarrying, effluents from the timber factories and dynamiting for fishing are the major human imposed threats to the reefs. Today only some sites in the Andaman & Nicobar re-main in pristine condition and the live corals show patchy growth in the reef area. As per an action plan for the conservation of the reefs, drawn up by the Andaman and Nicobar Administration, the Wandoor National Marine Park covering an area of 281.5 sq. km within the Labrythine Islands of S. Andaman has been declared as a protected area and wing of the Andaman Forest is managed by the Wildlife Department.

Lakashadweep Islands: The 1987 indicative survey conducted in the reef ecosystem of 12 Islands of Lakashadweep points to the need for urgent conservation and management of the atolls. A total of 105 species of scleractinian under 27 genera have been identified and catalogued from the reefs. The major threats to the reefs and their biodiversity are natural processes like sea erosion, siltation, predation (by ***Acanthaster* planci**) and diseases (WBD); whereas the human activities like construction, cattle grazing, removal of natural vegetation, mechanised fishing, dredging for cargo transport and exploitation of livebaits aggravate further reef destruction and faunastic devastation. The results of the study and the possible management measures are discussed in t he Institute's publication (CMFRI BUII No. 43, 1989)

All the research findings of the CMFRI stress the need for new research inputs, regular monitoring and specific guidelines for the effective management of the three National Marine Parks such as the Gulf of Kutch Marine Park, the Wandoor National Marine Park and the Gulf of Mannar Marine Park. Although many threatened and vulnerable reef organisms are brought under the CITES, which might control exploitation, it is essential to conduct further research on the biological, chemical and pharmacological values of all such species and other reef biota and their products or derivatives for evolving development and management options. The tropical coral reef ecosystem is a tropic network, that carries many food chains, some of them end up in economically important sedentary edible groups, with qualities of bioaccumulation. Therefore knowledge on the toxicological qualities of the reef biota, their taxonomy, distribution and abundance in space and time and their areawise catalogueing is very vital for any disaster management in the ecosystem relating to human poisonings, either direct or through food chain. The Institute's researchers feel that an integrated reef ecosystem conservation and management concept is imperative for evolving a National Reef Conservation Policy.

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