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MANDAPAM REGIONAL CENTRE OF CENTRAL MARINE FISHERIES RESEARCH INSTITUTE MARINE FISHERIES POST - 623 520, MANDAPAM CAMP RAMANATHAPURAM DISTRICT, TAMIL NADU, INDIA

Sethusamudram ship canal project in the Gulf of Mannar Marine Biosphere Reserve - Its impact on Environment.

A.C.C. Victor

Regional Centre of Central Marine Fisheries Research Institute,
Marine Fisheries - 623 520, Ramanathapuram Dist., Tamilnadu.

The Gulf of Mannar is located on the southeastern tip of India in the State of Tamil Nadu. It is in this region India's first and foremost Marine Biosphere Reserve is located. Popularly known as the Biologists paradise, this region harbours more than 3,600 species of plants and animals, making it one of the world's richest marine biosphere reserves. Owing to its shallowness, semienclosed nature, less fluctuating temperature regimen, biophysical and ecological uniqueness, nutrient enrichment etc., it has acquired special status in the bio-diversity map of the Indo-Pacific oceanic realm. In recent years, the Government of India has been taking steps to initiate the excavation of the Sethu Samudram ship canal in the Rameswaram Island to connect the Palk Bay with Gulf of Mannar to facilitate the passage of ships without touching Colombo and circumnavigating Sri Lanka. In the budget for the year 2000-2001, the Government of India has sanctioned funds of Rs.4.8 crores for a detailed feasibility study and environmental impact assessment of the project. While the Government of Tamilnadu has expressed its happiness over the undertaking of the project, some environmentalists have raised questions on the positive and negative impacts of the project. The primary objective of this article is to analyse the positive and adverse aspect of the project.

A total of 21 islands are located in the Gulf of Mannar Biosphere Reserve between Pamban in the north and Tuticorin in the south. These islands lie on the proposed Sethusamudram ship canal zone and are located at a distance of approximately 1 to 4 km off the shoreline along the 150-km long coastline. These islands give protection to the mainland from the effects of wind and wave action especially during the northeast monsoon period when the wind velocity in this region exceeds 50 km per hour.

There are about 1 lakh people living in the 127 fishing villages located along the Sethusamudram Ship Canal zone, of which 87 villages are in the Palk Bay zone and the remaining 40 in the Gulf of Mannar zone. The people from these villages make their livelihood solely through fishing, seaweed collection and marine based industries. The annual marine fish catch in the Gulf of Mannar - Palk Bay zone is around 78,500 tonnes per year.

This Biosphere Reserve has been chosen for inclusion into an action programme to save India's protected areas on the basis of its threatened status and richness of biological wealth.

This Reserve has also been selected as an International priority-site on the criteria of its bio-physical and ecological uniqueness, economic, social, cultural and scientific importance, national and global significance. The probable impact of the shipping canal during the construction and operational phases need examination mainly on habitat destruction.

It is very important to note that any type of methods employed to dredge/break the substratum would result in increased silt formation and turbidity. Too much of silt load present in seawater prevents sunlight reaching of the sea-bed, thereby harming primary productivity.

Primary productivity the only means of synthesis of organic matter is the basis to tropic web. Thus any damage to the lower level would reflect at the higher level where the fishery exists. If sunlight does not penetrate into the sea for days together, darkness would prevail on the bottom, which adversely affect the photosynthetic activity of the symbiotic algae in the molluscs and corals. Further when silt gets deposited on all living organisms especially on sedentary biota - viz. pearl oysters, corals, algae, gorgonids, other molluscs, annelids, prochordates, echinoderms, the egg mass of many free swimming animals etc, they get destroyed since these organisms have no/little locomotive power to move away from the dredging zone. Deposition of silt bury many small living organisms. Silt enters into the gills of the animals and impairs respiration. Silt also affects the planktonic life. Siltation affects the solubilization of oxygen and gas exchange due to mineralisation and pH changes and, thus, the amount of dissolved oxygen in the water is reduced. Owing to the destruction of seagrass and seaweed beds, larger animals such as dugongs, turtles and herbivorous fishes are also affected. It is true that the dissolved components of the silt would enrich the algal growth and trigger the planktonic bloom. But this blooming may not be of much use since the benthic and other fauna, which mainly feed on them, are either not available or destroyed owing to silt deposition. The actual method proposed for breaking/dredging the bottom is not known. However, if blasting is resorted to, the resultant shock waves would adversely affect the fauna and flora of the Gulf region. When underwater rocks are dynamited, depending on the size and type of explosives used, almost all the plants and animals living at and around the site will perish and those living on the vicinity of the site will also be affected by the shock waves emanating from the blast.

Whatever may be the method of breaking/dredging that is employed, the sediments removed from the sea bottom would get dumped or spread adjacent to the canal. This would form as a mat and bury all the fauna and flora into it. Adverse effects are also to be expected from pollution owing to the use of machinery for construction and functional units. Spillage of oil and grease, rust and metallic wastes due to wear and tear, marine litter, float, sam and Jetsam including plastic bags, discarded articles would be the major pollutants.

During the operational phase, the frequent ship movements in the canal and dredging of the canal enhances turbidity, oil spill, besides emptying of bilge water, marine litter may have many negative impacts. The Gulf of Mannar Biosphere Reserve supports a very fragile ecosystem and this will affect the fauna and flora of the region to a very great extent. Therefore, the negative impact mentioned supra can be avoided by carefully, judiciously containing turbidity and pollutants both during the constructional and operational phase.

Excavation of the canal in the Adams Bridge sector would provide a deeper passage in the sector, which is shallow at present, and serve only as a barrier. Underwater currents play a significant role, not only in the transportation of large marine organisms, planktonic biota, fish eggs and larvae but also on shore dynamics, especially of the islands, reef and paars. Strong current would erode the banks of the canal and carry the sediments from one sector to another, which ultimately results in accretion of sand in one sector and decretion in another sector. Once the canal is deepened, the passage would greatly increase the movement of fishes and other large animals from Bay of Bengal to Indian Ocean and vice-versa. Hence, the entry of oceanic and alien species into Palk Bay and Gulf of Mannar and also disposal of endemic species outside Palk Bay and Gulf of Mannar would be facilitated.

On completion of the canal, the fishing in the canal should be restricted and properly regulated under expert guidance. At the sametime, these fishermen, being seafarers, might find increased opportunities in sea/ mercantile marine-based jobs.

There is good possibility for cultural / archaeological artifacts being brought up while dredging for the canal. Therefore, organisations like the Tamil University, Thanjavur, the Department of Archaeology of the State of Tamilnadu, the Department of Ancient History and Culture, University of Madras, Chennai and the Archaeological Survey of India, New Delhi should be co-opted to observe the excavation so that the artifacts can be retrieved, identified, studied and kept under safe custody.

Agriculture is very poor in the districts adjoining the proposed canal. Droughts are frequent. There are no major agricultural or mineral based industries here The construction of the project would strengthen the security of the country and enhance its economic development through maritime trade and income from service industries connected to shipping. Once the excavation of the canal is completed and the project is implemented, this would facilitate the passage of ships without going around Sri Lanka and touching Colombo, while the distance traversed between the ports of the east coast and those of the west coast would be reduced considerably. The implementation of the project would encourage many industries to come in the Districts of Tuticorin and Ramanathapuram. The Tuticorin Harbour will become one of the world's leading harbours in the entire South East Asia because of the increased trade and commerce. The implementation of the project would also put an end to the travails of the fishermen off Rameswaram coast, as they would get more protection for their endeavours and will also get alternative means of employment.