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A View on Coastal Management An Encourage

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Abstract:
In this study, it has conducted an overview to understand the Gulf of Mannar environment in brief. This study, strongly finds the needs to meet the continuing comments. It is better that the Implementation of Coastal Regulation Zone to1000m from the existing 500m limits. It should be ordered, to use the renewable-energy boats to make the pollution-free marine environment, especially, to protect the Coral region. Contrivance natural disaster warning systems in the Coral islands, this helps in increased uninterrupted monitoring of Coral reef from threats.

Keywords:
Coral Reef; Gulf of Mannar; Coastal Management

In Modern days the coastal studies are implemented for forecasting the networks and process. Coastal environments are dynamic in nature, still, interesting to understand and to feel. In it, importantly, Coral reefs are acting major role for the bio-diversity of oceans, also natural barrier for wind activity. In the study area, Coral reefs are important food source. The recent government project were resulted that, the Coral reefs are increased around five percentage in its quantity. This causes a major impact for the use of up gradational level of reef studies.

CORAL REEF:

Coral reefs are uncommon in marine nature, but they are the main key for the marine nature as well as give some bio resources. Corals are invertebrate animals and live in colonies in association with certain algae called zooxanthellae. Corals essentially make massive deposits of calcium carbonate with minor additions of calcareous algae and other organisms which secrete calcium carbonate. As they are sedentary, they can't run away if attacked. As a result, to evade predators, they produce fouling agents or poisonous chemicals to keep their predators at bay. To avoid overcrowding on the reef, Corals produce chemicals that inhibit even reproduction of their competing neighbours. Coral reefs are made of Coral colonies which thrive in shallow and warm tropical marine waters. Corals are known for their color, and sheer beauty of form and design. They are highly productive. In fact, among the biological organisms, man's ability to alter the surface of the earth is rivalled only be colonies of tinyCoral polyps. They also have the potential of yielding a variety of bioactive substances including drugs for curing diseases (Kumaraguruet.al. 2006).

REEF DIVERSITY AND RESOURCES:

Gulf of Mannar and Palk Bay:The Reefs in the Gulf of Mannar are fairly accessible to researchers from Tamilnadu and so have been well studied. The CMFRI has regional offices at Mandapam and Tuticorin and have carried out pioneering work related to surveys of the islands and the reefs. An effect of environment and human interference on the Coral reefs of Palk bay and Gulf of Mannar has been carried out by Pillai in 1975. A study of the different species and genera of Corals found in the Gulf of Mannar has been carried out by Pillai in 1986.The Centre for Advanced study in Marine Biology, Annamalai University has also carried out several studies on the ecology and status of the reefs in the Gulf of Manner.The Madurai-Kamraj University is involved in an underwater survey using scuba equipment, of the islands of Gulf

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of Mannar in relation to studying the ecology of ornamental fishes of export value in the Gulf of Mannar. They have established Scuba diving facilities with all the necessary equipment to carry out underwater ecological studies in the Gulf of Mannar. These facilities will be utilized for man-power development in this field of practical significance.

BIO-RESOURCES:

Coral reefs are homes of shallow organism. The Gulf of Mannar has more than 225 fishing villages, 118 fish landing centers, 3961 mechanized vessels, 12681 country crafts, 8586 catamarans and the annual fish production is 87,113 tonnes, out of thetotal 350,790 tons of Tamilnadu.(A.K. Kumaraguru, V. Edwin Joseph, N. Marimuthu, J. Jerald Wilson) Gulf of Mannar islands have mangrove vegetation which includes the species of Rhizopora, Avicennia,Bruguiera, Ceriops and Lumnitzera.

The sea grass beds of Gulf of Mannar are unique since they provide food source for theendangered marine mammal Dugong. Some of the important species of sea grasses in the Gulf of MannarareEnhalus sp., Thalassia sp., Halophila sp., and Cymadocea sp., of the total 13 species recorded in theGulf.The Coral reef resources of the Gulf of Mannar are unique. They grow surrounding all the 21islands. They offer shelter to a variety of organisms and protect the mainland from storms, currents andshore erosion. Coral reef ecosystem is a complex one.

The shallow water Corals fix the energy from thesunlight using the dissolved nutrients brought by the water currents. A number of reef animals come to feedon plants and plankton. Finfishes like Acanthurids, Nemipterids, Balistids, Labrids and ChaetodontidsspawninCoral reefs. Since the fishing communities are dependent on the Coral reef ecosystem, it is necessary toconserve and protect this ecosystem. Towards this, the Government of Tamil Nadu by its order Number 116dated 20.5.1982 prohibited the removal of Corals, dead or alive, from the water. The interlocked andenmeshed calcareous skeletons of dead Corals form the islands. There are around 137 species of Coralsbelonging to 37 genera. The species of Acropora, Montipora and Porites are commonly available in theGulf.

Pearl Oyster beds are common in Tuticorin region. Although 6 species of pearl oysters have been reported in Indian waters, natural pearls are obtained from Pinctadafucata in the Gulf of Mannar. Gulf of Mannar has about 80 pearl banks and thefishing season is November to May. The fishing seasons for chunks are from September to March. A large number of pearl banks in Tuticorin region are available at a depth of 10-20 meters. The cephalopod fishery of Gulf of Mannar includes squids and cuttlefishes. Among the squids Loligoduvancelli and among the cuttlefishes Sepia pharaonis, S. aculata and Sepia inermis form the major fishery of cephalopods. Seacucumberswhich belong to holothurians are available in the Gulf of Mannar. They are collected by skin diving, at depths ranging from 2-10 meters. The seacucumbersHolothuriascabra and Holothuria-spinifera have been over-exploited.scabra is a valuable species for the preparation of seacucumber Beech-de-Mer.A large number of finfish species are available in the Gulf of Mannar. This includes nearly 125species of reef fishes. The common finfishes of Gulf of Mannar belong to Leiognathids, Sardines, Lethrinids,Perches, Carangids, Anchovies, Seer fishes, Red mullets, Half beaks, Needle fishes and Elasmo-branchssuch as sharks and rays.

RS & GIS:

The changes observed at Tuticorin using temporal satellite imageries show that the shoreline dynamics is natural and this is not due to human interference. Coastal processes play a major role in shaping the coastal configuration of this area. (Visalatchi and Raj Chandar, 2012)

FLOOD PLAIN ECOSYSTEM:

They are seen along the banks of the rivers of the study area. These plains are formed due to

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depositionof sedimentsduring the flood seasons. The periodic floods for several thousand years resulted in the piling of huge volume of sediments, spreading laterally for long distances. These flood plain areas have ideal conditions for carrying out agricultural activities. It covers an area of 2931ha or 2.3per cent of the total study area.

COASTAL DISASTER AFFECTED AREA IN DHANUSHKODI:

Coastal areas are the arrangements of complex diverse and fragile ecosystems like Mangroves, tidal salt marsh, tidal mudflats, sand dunes, backwater area, lagoon, Coral reef ecosystem affected by cyclone. They need special attention for their resources function and provide opportunity for economic development of the local people in Dhanushkodi.

The delineation of saltwater intrusion and beach sand dunes are done on the basis of the contour pattern of apparent resistivity values that is reflected in the 2D ERI. The Distribution pattern of saltwater and sand dunes in the area profiles are estimated through the ERI up to the depth of 11.9 m. The distribution pattern of saltwater intrusion, sandstone clearly reveals that the increase of the percentage of beach rock decreases the influence of the seawater intrusion. The beach rock and rocky coast acts as dyke rock and disallows the infiltration of the seawater into the coastal aquifer. The lower percentages of sandstone/rocky coast, in the areas of clearly depict the above conclusion as seawater intrusion into the coastal aquifer is evident from the field experiment.

The impact of the tidal and wave energy along the coastal zone is clearly articulated with the advent of the 2D ERI study in the study area. Through this 2D ERI study the variation of hydraulic conductivity from the high waterline of the beach to a distance of 120m perpendicular to the coastline in the study area clearly exhibits the saltwater intrusion zone low resistivity values of various profiles. At Dhanushkodi tip seawater occurrences are observed from 3m to a maximum depth of 8m. Saltwater zones are encountered from a depth of 7.5 m onwards. The consolidated beach ridge or beach rock in the subsurface zone of the high water line of the beach prevents further intrusion of seawater. The detached patches of thesandstone/beach rock in these areas allow intrusion of seawater The low resistance is occurs between 1-5 ohm.m along the three profiles represent saltwater intrusion with high salinity .The moderate resistive layer were identified between 10 to 20 Ohm.m indicates sand dunes in the study area. The high resistive value (100 Ohm.m) shell limestone with Neotectonic implications at the surface between layers between horizontal distances indicates sand stone in the study area.

GEOCHEMISTRY:

The relative abundance in Sand, Silt and clay content with sediment types inferred for the sub samples of core are presented in Fig. 2. The sand percentage ranges from 4.33% to 19.08% except for the surface samples in which the sand percentage is high(30.60) Apart From the surface samples maximum percentage of Sand is present at 30cm to 40cm depth and low percentage of sand is present at the depth interval 90cm to 100cm. In general all the samples inthe core are depleted in sand fraction. The increase in the sand fraction is seen in the top (surface to 50cm depth) and bottom (215cm to 255cm dept) of the core.

The core is characterized by thin sandy silt clay overlying fine clayey silt. The grain size distribution, which does not show much variation, indicates homogenous nature. The muddy nature of thesediments also indicates calm sedimentation without any turbulence. The higher water content of the muddominatedsamples indicates that they were deposited relatively recently. The mud accumulation indicates that these muddysediments are deposited seasonally.

The silt and clay fractionhave been flushed out and transported from the Indian coast and continentalshelfregionespeciallyfromTuticorint oCapecoumerincoastandweredepositedinthedee

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pseaoftheGulfofManner.TheNorthEquatorialCounterCurrentandIndianCounterCurrent,whichacirculatingsouthofCapecoumerininclockwiseandanticlockwiseDirectionsandhavingtheirinfluenceinthestudyarea.
TheNorthEquatorialCounterCurrent,whichisalsopassing throughthestudyareahastransportedthefinesedimentsfromthecontinentalregionanddepositedinthecontinentalsloperegion.Outof the52samplesanalyzed,sevensamplesaresandyclayeysiltandallothersamplesareclayeysilt.Eventhesandyclayeysiltispresentbetweensurfacesto65cmonly.

SEDIMENT CHARACTERISTICS:

In the present study the sedimentation rate ranged from 1.97 mg/cm^2/day to 12.31 mg/cm/day. Thepercentage of sand in the sediment was higher than silt and clay. The organic carbon level in all thestudy stations ranged from 0.03 to 2.54. The sediment pH of the six studied stations was highly acidicin nature at all the study sites in the Gulf of Mannar.

RATE OF SEDIMENTATION:

The highest value of sedimentation occurred in the month of October in Van Island and Pulivinichalli, January in Koswari, Kariyachalli and Nallathanni islands, November and December in Upputhanni Island. The lowest value of sedimentation occurred in the month of April in Van Island, May in Koswari, September in Kariyachalli, March in Upputhanni and January and February in Pulivinichalli and Nallathanni Islands. In all the study sites, highest rate of sedimentation was noticed during the monsoon season and lowest concentration was during the summer and post-monsoon season. It was noticed that greater variation in rate of sedimentation was recorded during the post-monsoon seasons.

ORGANIC CARBON:

The percentages of organic carbon for the studied sediments are given in Fig. 6. The percentage of organic carbon ranged from 0.03 % (January) to 0.93 % (March) in Van island, 0.07 % (September) to 2.33 % (April) in Koswary, 0.04 % (August) to 2.23 % (April) in Kariyachalli, 0.03 % (October) to 2.33 % (July) in Upputhanni, 0.18 % (August) to 2.24 %(July) in Pulivinichalli and 0.13 % (August) to 1.43 % (April and May). The result showed greater variation in the concentration of organic carbon during monsoon season and post monsoon season when compared with other seasons. It was observed that the percentage of organic carbon was increased from the late monsoon to post-monsoon and it decreased during the pre-monsoon. The maximum percentage of organic carbon varied for different stations in different months, however minimum percentage of organic carbon was recorded during the months of July, August and September in all the stations studied.

FUNCTION OF THE OFFSHORE BREAKWATERS:

The impact of the harbour on the downstream side, i.e. on the southern part of Van Island and its reef area, and the subsequent impact of Van Island and its reef area on the mainland at Salaipatorri Point, Tuticorin, are interrelated. The offshore breakwaters of the harbour have enhanced the hydro-mechanical properties: wave height and angle of incidence in the area between the harbour and Van Island. As a result, other phenomena, such as bed liquefaction and consequent displacement of a 300-m width of the southern part of Van Island, have taken place. Displacement of 300 to 400 m of the northern tip of the reef area of Van Island has been noticed and the scouring of bottom sediments has also taken place. Considering the functions of Van Island and its reef area, the average depths of about 0.5 to 1.5 m are equated as emerged and submerged breakwaters, respectively, producing a significant attenuation of waves that generally break on them. The following mechanism around offshore breakers can be listed as Modification of wave energy, Diffraction and refraction of waves behind the island(natural

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breakwaters), Generation of local and near-shore currents, Modification of along-shore and onshore sediment movement patterns in the area between SalaipatorriPoint and Van Island.

The coastal environment at Salaipatorri Point prior to harbour construction was in a perpetual state of long-term indirect morphological change. Therefore, the impact assessment of the offshore breakers on the shoreline prior to and after the construction of the harbour would reveal the existence of stabilized coastal forms, depending on the presence or absence of the offshore structure. Hence, bathymetric charts published in 1978 were used for data on the protruding shoreline at Salaipatorri Point, the distance between the island and the protruding shoreline, the width of Van Island and its reef area and the depth details around Van Island. The overall dimensions of the salient formation at Salaipatorri Point can be utilized to determine the influence of Van Island and its reef area (emerged and submerged breakwaters). It have recorded the morphological variation of the salient formation at Salaipatorri Point. These recorded events of morphological changes are correlated with the subsequent morphological variations of Van Island and its reef area after construction of the harbour. It has been estimated that a 300-m width of emerged shoreline in the southern part has been eroded. Scouring of the reef bottom by wave induced shear forces, with a combination of hydraulic gradient force and mining for Coral rubble, have widened the gap between the emerged and submerged breakers and increased the average water depth from 1.5 to 2.0 m for about a 400-m width in the northern tip of the reef area. For computation, an average of 15-m width of the emerged part of island and 15-m width of the submerged part of the reef zone per year are taken as the widening gap between the reef and the island. The widening of the gap between the emerged and submerged breakers of Van Island and the reef area is slowly converting the single breaker into segmented breakwaters. The layout of offshore breakwaters has been characterized by a dimensionless parameter, I/GB, where I is the width of Van Island – the total width of emerged and submerged breakwaters – and GB is the gap width between the emerged breaker (Van Island) and the submerged breaker (reef area). I/GB is the ratio of breakwater length to the gap width, which is assumed to reflect the capacity of the system to absorb wave energy. If I/GB is high, a small amount of energy is transmitted towards the shoreline and if the I/GB ratio is very low, a high amount of wave energy is transmitted towards the shoreline.

COASTAL GEOMORPHOLOGY:

Landforms observed in the Rameswaram Island are Beaches, Beach ridges and swales, Dunes and Sandy plains, Lagoons and Mudflats, Creeks, Spits.

Beaches: The landform that occurs through the total length of 72Kms of the study area without any break is sandy beach. The dominant wave actions with large amount of input of sediments derived through the longshore littoral currents from Southern Tamilnadu make the beaches as a most dynamic landform of the area. Wide beaches are observed in the Southern coast extending to a maximum of 1 Km around Natarajapuram and in further south areas. In the Northern coast, beaches are generally narrow and extend only to 5 to 10 Mts. Beaches in the study area composed of fine and medium sand. In the crenulated portions of the Northern coast, the beaches are terminated by cliffedCoral reefs and Cuddalore Sandstone. Over the cliff Corals and Sandstone form a terraced landform. A beach profile of Rameswaram island in general exhibit the characteristics. The tail like portion of Rameswaram Island under water during high tide. Observed in the South Eastern portion is entirely made up of sandy barrier beaches. Large portion of this land is submerged under water during high tide.

CONCLUSION

This study, strongly finds the needs to meet the continuing comments. Implementing, Coastal Regulation Zone to1000m from the existing 500m limits. It should be ordered to use the renewable-energy boats to make the

pollution-free marine environment, especially, to protect the Coral region. The existing rule that to use of particular sized fishing nets, in particular, limited zones must me regularized. It controls the environmental effects. Incessantly, the Coral reef shoreline changes should be monitored and must be recorded properly for the track of historical events. Encouraging the Participatory rural appraisal in a vast level can reduce the Coral reef degradation. Along the Coral area has to implement the Coral reef boundaries. Contrivance natural disaster warning systems in the Coral islands, this helps in increased uninterrupted monitoring of Coral reef from threats.

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