

# SOME ASPECTS OF INTEGRATED COASTAL ZONE MANAGEMENT IN INDIA

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## INTRODUCTION

The coastal zone which lies roughly between the seaward margin of the continental shelves (to a depth of about 200 m) and the inland limits of the coastal plains (to a similar height of 100 m in altitude) encompasses the areas of highest biological productivity and diversity on earth (Pernetta & Elder, 1993).

Coastal areas normally support the wide diversity of highly productive habitats like sand dune vegetation, mudflats, mangroves, corals, marine algae and seagrasses. In addition to this the planktonic population of phyto- and zooplankton also contribute its might to the total productivity of the coastal zone. All these biological systems contribute directly or indirectly to the world's production of fish, crustaceans as well as molluscs. Moreover most of the agriculture production is concentrated in the coastal plains and estuarine deltas. (Davis, 1994).

It is very interesting to note that maximum human population resides along the coastline and the estuaries in India. Indus civilization in Mohenjodaro and Harrappa is well known.

Recently, the coastal zone has also experienced a rapid growth of industries and also the related problems (Cutter, 1999). All these activities are not properly planned and regulated inspite of various laws available (Vanguri, 1994). This trend has created tremendous pressures and the ecological balance is disturbing. There are various factors which are degrading the coastal waters (Mesarovic and Pestel, 1974).

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## GEOMORPHOLOGY OF THE INDIAN COAST

India has about 7500 km coastline with several large and small estuaries joining the Arabian Sea and Bay of Bengal. There are two major island groups of Andaman & Nicobar and Lakshadwip. The coastline is intersected by rocky promontaries and shores with stretches of sandy beaches. The profile of the western coast is different due to the presence of western ghats than the eastern coast which has mostly the even plains.

### COASTAL CLIMATE

Both the east and west coasts are experienced by different rainy seasons during different periods of the year. There are coastal areas covered by heavy rainfall and also some areas like Kachchh which are semi arid to arid. The coastal atmospheric temperatures also vary resulting in complex problems. All the climatological factors show the direct and indirect influence on the oceanography, coastal life and the environment.

### OCEANOGRAPHY

Both the Arabian Sea and the Bay of Bengal of the Indian Ocean are influenced by two different monsoon regimes. Bay of Bengal experiences more cyclones every year as compared to the west coast. The coastal currents in both these water bodies change the course according to the seasons. Indian ocean is also called the 'closed ocean'.

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The tidal amplitudes towards north (in Gulf of Kachchh and Hooghly estuary) are, extremely high and are known as 'Tidal Bore' while towards south this variation is minimum. The marine waters also change their chemical composition i.e. nutrients, salinity, pH, etc. by the precipitation and also the river runoff alongwith the sediment load.

#### **NATURAL RESOURCES**

Indian Ocean region is identified as 'little known' as compared to the Pacific and Atlantic Oceans. However, this ocean is rich in the natural resources both living and nonliving. There are mineral deposits, polymetallic nodules and other interesting formations.

Biologically, both the arms of Indian Ocean-Arabian Sea and Bay of Bengal, alongwith two major island groups have rich 'marine biodiversity'. Some of the ecologically important ecosystems are the mangroves, corals, seaweeds, seagrasses, and the sand dunes. Coastal zones are biologically known as the most productive component of the marine biosphere. This produces maximum fish population. The food chain is of different nature, the grazing type and the detritus based. This is of tremendous economic value (Parikh and Parikh, 1997)

#### **THREATS**

Due to the increasing demands and the human population, there are continuous pressures on the marine areas like estuaries, coastal areas and also the open ocean. Most of the population lives along the coast and particularly in the estuarine region for various reasons like trade, navigation, agriculture, fishing, etc. Most of the megacities i.e. Mumbai, Chennai, Kalikutta, etc. are situated along the coast.

The major threats are of two types, abiotic and biotic. The abiotic threats are like cyclones, earthquakes, sea level rise, floods, etc. While the biotic threats are overexploitation, pollution, deforestation and reclamation. In recent years maximum small and large

scale industries producing toxic and non-toxic wastes have come up in the coastal areas. More and more are in pipeline. For this purpose the coastal areas are being reclaimed disturbing the natural ecological balance. The human greed for more economic profits has no end.

Internationally and nationally efforts are being made to minimise the pressures on the seas. Different State and Central Govt. agencies have made several legislations for the protection of the marine water, minerals and also the marine biodiversity. Control of water pollution, Coastal Zone Regulation Notification, Wild Life Protection Act, Disposal of Hazardous Chemicals in the Ocean and Mesh Size Regulation for fisheries are some of the rules already available. In spite of these rules, the general health of our seas along the Indian coast is going from bad to worse. Department of Ocean Development has also taken up a COMAP Project all along the coastline to monitor the pollution levels. Ministry of Environment & Forests has made it compulsory for EIA studies by every industry. But still there are problems which need solutions.

### **ICZM STRATEGY**

To avoid all these problems in the coastal areas, it is urgently necessary to develop Integrated Coastal Zone Management strategies for the entire coastline. This ICZM plan should encompass all the aspects of seas around India like geomorphology, climatology, oceanography, marine biodiversity, ecology, pollution, tourism, coastal land use plan, over exploitation and sustainable development as well as utilization of all the living and non-living resources of our seas. Planning and strict execution of the ICZM plan is necessary to save our seas.

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