

## SUSTAINABLE DEVELOPMENT OF COASTAL ECOSYSTEM , BAY OF BENGAL , SOUTH INDIA

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### Introduction

The coastal interface between the continents and the ocean is comprised of a continuum of aquatic systems including networks of rivers and estuaries , the coastal fringe of a sea , the continental shelf and its slope. These interdependent systems are characterized by very significant biogeochemical processes - primary productivity generation , organic matter and nutrient sinks for example . Significant inputs of nutrients to the coastal zone arrive via rivers and drainage basins network . The network contains various filters (e.g. wetlands ) retaining or eliminating nutrients during their downstream passage to the sea. The effectiveness and selectivity of these filters depend on the strong biogeochemical coupling that exists between carbon, nitrogen and phosphorous and silica circulation and they are also affected by hydrology and land use / cover (Howarth et al., 1996). Nutrient fluxes have been increased by human activity ; in addition , the Nitrogen : Phosphorus : Silica ratios of these inputs have been perturbed and many coastal management practices exacerbate these perturbations .India's 7,500 km coastline is inhabited by 49 per cent of the country's population spread over nine coastal states. The coastal states have a population density ranging from more than 2,000 people per sq km in Kerala to more than 600 people per sq km, which is much higher than the national average of 300 people per sq km (Times of India, 30.1.1999). According to the Handbook on Fisheries Statistics (1996), the estimates of production potential are 3.9 million tones and 4.5 million tones per annum for inland and marine sectors respectively. The seasonal fluctuations in inshore catches are increasing over years, perhaps as a result of overexploitation. About 7 per cent of the world's mangroves are along the northeast coast of India and in the Andaman and Nicobar group of islands and the mangrove cover is estimated to be around 420,000 ha. (Brown, 1997). The Ministry of Environment and Forests conducted a preliminary survey of wetlands and found that there are four million hectares of wetlands in the country excluding paddy fields and mangroves.

### Coastal Zone: Point of concentration of externalities

Vatten (1994) says that the problems facing coastal communities in the Bay of Bengal are side effects of rather successful developments in agriculture, fisheries, industry and tourism. Many swamp forests and mangroves( 26% areal reduction during 1975 – 1991,Brown 1997) in Sunderbans areas have been cleared for agriculture and shrimp farming . The agriculture sector negatively influences the other sectors by pollution of fisheries through use of agro-chemicals and silting of coral reefs and ports resulting from land erosion. Estuarine fisheries like the mud-crab fishery, which provided considerable income for the traditional fishers in the Godavari delta area almost completely disappeared as a result of release of aquaculture effluents into the creeks. The impact of tourism on coastal fishers in Puri and Konark is disturbing as the fishers are continuously evacuated from the beaches by the government authorities, which want to develop the beaches into tourist attractions (Salagrama, 1999). Brown (1997) gives estimates of industrial discharges from chemical factories, agricultural wastes and domestic effluents and reports that they are well above the permitted levels and had a direct impact on the poorer sections of the coastal society. Studies have revealed the presence of pesticide residues in shrimps, bivalves, gastropods, molluscs and

commercially valuable fish species . Many studies have indicated that, dependence on coastal resources is likely to increase in the near future (Gadgil & Guha, 1995 etc.) and hence conflicts over natural resources and the environment will tend to increase .

#### Sustainable Coastal Development

There are evidences that the access of the coastal poor to the natural resources is increasingly circumscribed. Most regulatory mechanisms adopted by the government to rejuvenate threatened coastal ecosystems exclude people, hurting the coastal poor the most. To sum up: Traditionally the communities have developed a multitude of dependencies on the natural assets in the area. The range of different services available to them was quite large so long as the access to resources was equitable and productive. There is a decline in the asset base (and / or property rights) , but the needs continue to remain the same, if not increased. The consequence of these declines on the coastal poor can only be negative and worsening. In this paper an attempt is made to suggest sustainable strategies to coastal zone problems of South India (Tamilnadu State and Pondicherry Union Territory ) from the stand point view of natural sciences and social sciences . As per the definition of this paper , Sustainable coastal development can be described as the proper use and care of the coastal environment borrowed from the future generations . In order to achieve sustainable development objectives , it is important to have strategies such as : conserving and enhancing the coastal environment , managing risk & coastal vulnerability , and merging environmental considerations with economics in decision making .