ABSTRACT

Coastal environment is very dynamic and change in nature, which makes the coastal stretches highly significant with respect to social and economical aspects. The coastal processes persists at any location may continuously cause changes in geomorphology, shoreline morphology, landuse and landcover pattern of nearshore region. Therefore it is very essential to study the behaviour of coastal processes and its impacts over the shoreline for planning and formulation of effective coastal management system. In this context, present study provides an overview investigation of behaviour of Cauvery delta shoreline extending from Kollidam rivermouth to Nagapattinam port situated in the central part of East coast of Tamilnadu in India.

The study area is often subjected to frequent cyclones especially during Northeast monsoon period and distributaries of river Cauvery emerging into the sea in this region, makes the shoreline stretch highly vulnerable. Further, the shoreline stretch from Kollidam rivermouth to Nagapattinam Port is an open and medium energy coast having no natural harbour. The wave heights during calm period and cyclones are less than 1.0 m and about 2.0 m respectively. The tidal range is between 0.5 m to 1.0 m. The length of shoreline is 71 km. For this length, physical observation by field survey has become cumbersome process and hence widely adopted remote sensing technique was adopted in the present research work to fulfill

its objectives. The study was carried out with the main objectives as to study the changes of confluence widths and geomorphology of four relatively moderate rivermouths from 1975 to 2006; to assess the shoreline oscillation trends; to model the shoreline oscillations using statistical methods in order to predict the future trends and to assess the shoreline vulnerability to oscillations by Coastal Vulnerability Index (CVI). The Indian remote sensing satellite imageries form National remote Sensing Agency, Hyderabad, India such as IRS-1A (1990), IRS-1C (2000) and IRS-P6 (2005 and 2006) were used for the present study.

The geomorphology study of rivermouths reveals that the Kollidam rivermouth gradually tilted towards Northeast direction due to the formation of sand pit and the confluence width found to be increased at a rate of 8.5 m/year. Three geomorphologic features such as Swamp, Mud flat and sand spit were identified. For the other three rivermouth namely, Arasalar, Thirumalairajanar and Vettar, the sand spit was the only geomorphologic feature identified.

Study of long-term shoreline oscillations from the year 1975 to 2006 has indicated that the accretion was prevalent in stretches from South of Kollidam rivermouth to Toduvaipatanacheri and from Thiruvattangudi to Thirumalairajanpattinam. The maximum rate of accretion was recorded as 7.51 m/year in South of Kollidam rivermouth. Erosion was recorded for the remaining shoreline stretches with the maximum rate of erosion of 14.79 m/year just below the Kollidam rivermouth due to the convergence of wave energy. In order to validate remote sensing data, shoreline oscillations were

measured at three selected places and physically observed data uphold the remote sensing data. The accuracy of remote sensing for the present study was observed as 80%.

Further, measurement of mean sediment size indicates that the major long-shore sediment transport takes place from South to North. The range of sediment mean size varies between 2.050Φ to 1.423Φ. Near shore beach survey indicated the beach slope varies from 0.22% to 1.11%. Based on near shore beach slope and sediment mean size, a multiple regression model was suggested for the prediction of shoreline oscillation.

Based on the coastal parameters and geomorphology of the study area, Coastal Vulnerability Index (CVI) was determined for the entire shoreline stretch at 0^0 0' 1.0" intervals (one nautical mile). CVI reveals that out of 72 km 27% of shoreline was under very high vulnerability and another 27% was under high vulnerability. 7% of shoreline was under moderate vulnerability whereas 39% of shoreline ensured low vulnerability. Rubble mound sea wall has been recommended as coastal protection measures for the shoreline stretches falls under very high and high vulnerability against coastal oscillation.