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The southwest coast of India, particularly the Kollam-Trivandrum-Kanyakumari coasts, over the years, have undergone significant changes in the shoreline (mostly negative) and this is attributed to the changes induced in coastal hydrodynamics due to both natural and anthropogenic factors. Of the various factors, the human-driven stresses on the coast which have been progressively increasing due to various reasons such as the introduction of hard structures for purposes such as coastal protection without proper scientific study, development of port and harbours, inlet stabilization and also other activities such as beach sand and river sand mining have adversely affected the coast thereby altering the coastal processes of the region as well as the sediment availability. A review of the performance of the hard protective measures adopted such as groynes, seawalls, jetties etc present along the Kollam-Thiruvananthapuram-Kanyakumari stretch clearly indicates that the structures like groins/breakwaters which are provided at a particular location or coastal stretch has triggered erosion on the adjacent coasts mainly because of the changes in coastal geomorphodynamics and this, in turn, has often resulted in the adoption of similar hard measures to protect the adjacent coast with the trend continuing. The present study highlights the changes in coastal morphodynamics (including the sediment transport pattern) that the coastal stretch selected for the study has witnessed particularly during the last decade and the factors responsible have been delineated. Changes in shoreline position (both short and long-term) are studied by comparing multi-dated satellite images whereas for the changes in the coastal morphodynamics the available site-specific data which includes wave measurements, beach profile measurements, bathymetry data, sediment characteristics, etc. have been used. In addition, numerical model studies also have been carried out to understand the changes and also to substantiate the findings.

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Coastal Restoration- A Comparative Analysis of Bakkhali and Mousuni, Indian Sunderbans

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Coastal erosion is the process by which coastal landmasses are eroded by the action of destructive waves at a rate of 4 feet/year. Cyclonic disturbances in the coastal islands of Indian Sunderbans like Bulbul (2019), Amphan (2020) and Yaas (2021) has affected in rupturing of embankment hampering livelihoods. A comparative study was done between Mousuni and Bakkhali, part of Indian Sunderbans facing Bay of Bengal in the Southern part of Ganges delta. The objective of the study was to assess the suitability of embankments in combatting the vulnerability of coastal erosion in Mousuni and Bakkhali. To observe the beach morphology both quantitative and qualitative approaches were undertaken. Quantitative methods such as measuring the design of various embankments (mainly permanent concrete embankment and temporary geojute), dumpy level was used to observe the effects of coastal erosion on both the beaches. Qualitative methods such as questionnaire survey was done to understand the people's perception regarding the sustenance of embankment. Mousuni island faced a land reduction of about 3.82km² along western bank (1979 - 2011; Das,2022) whereas coastal stretch of about 2km from Bakkhali in the east to Fraserganj in the west was eroded (Das,2022). A comparison of Mousuni and Bakkhali shows that the south of Mousuni experiences striking effects of coastal erosion at Baliara demolishing the geojute embankments and resorts. Unlike Mousuni, Bakkhali shows an aerial change in erosion as well as accretion scenario along the coasts. Well- structured concrete embankments are demanded by the local residents in case of both the islands. Mousuni, being more vulnerable due to its location gets eroded faster than Bakkhali losing more land. Site specific mechanisms with proper embankment design covered plant species (mangrove) is required to cope up with the coastal retreat of these two islands. Keywords- Coastal retreat, coastal erosion, vulnerability of cyclones, embankments