

Sea Erosion in India

The National Centre for Coastal Research (NCCR) an attached office of Ministry of Earth Sciences monitors shoreline changes along Indian Coast. NCCR has carried out a national shoreline change assessment mapping for Indian coast using 28 years of satellite data from 1990 to 2018 along nine coastal States and two Union Territories (UTs) to provide information for coastal management strategy. Based on the report of NCCR, about 32% of the coastline is under varying degree of erosion (low, moderate or high), 27% is of accreting nature and the remaining 41% is in a stable state.

India's Coastline:

- The country's coastline is 6,631.53 kilometres long which is surrounded by the Arabian Sea in the west, Bay of Bengal in the east, and the Indian Ocean in the south.
- 2,135.65 kilometres was subject to varying degrees of erosion and 1,760.06 km expanded during this period.
- Nearly 2,700 km of the coastline is stable.
- The long coastline of India is dotted with several major ports such as Kandla, Mumbai, Nhava Sheva, Mangalore, Cochin, Chennai, Tuticorin, Visakhapatnam, and Paradip.

Coastal Erosion:

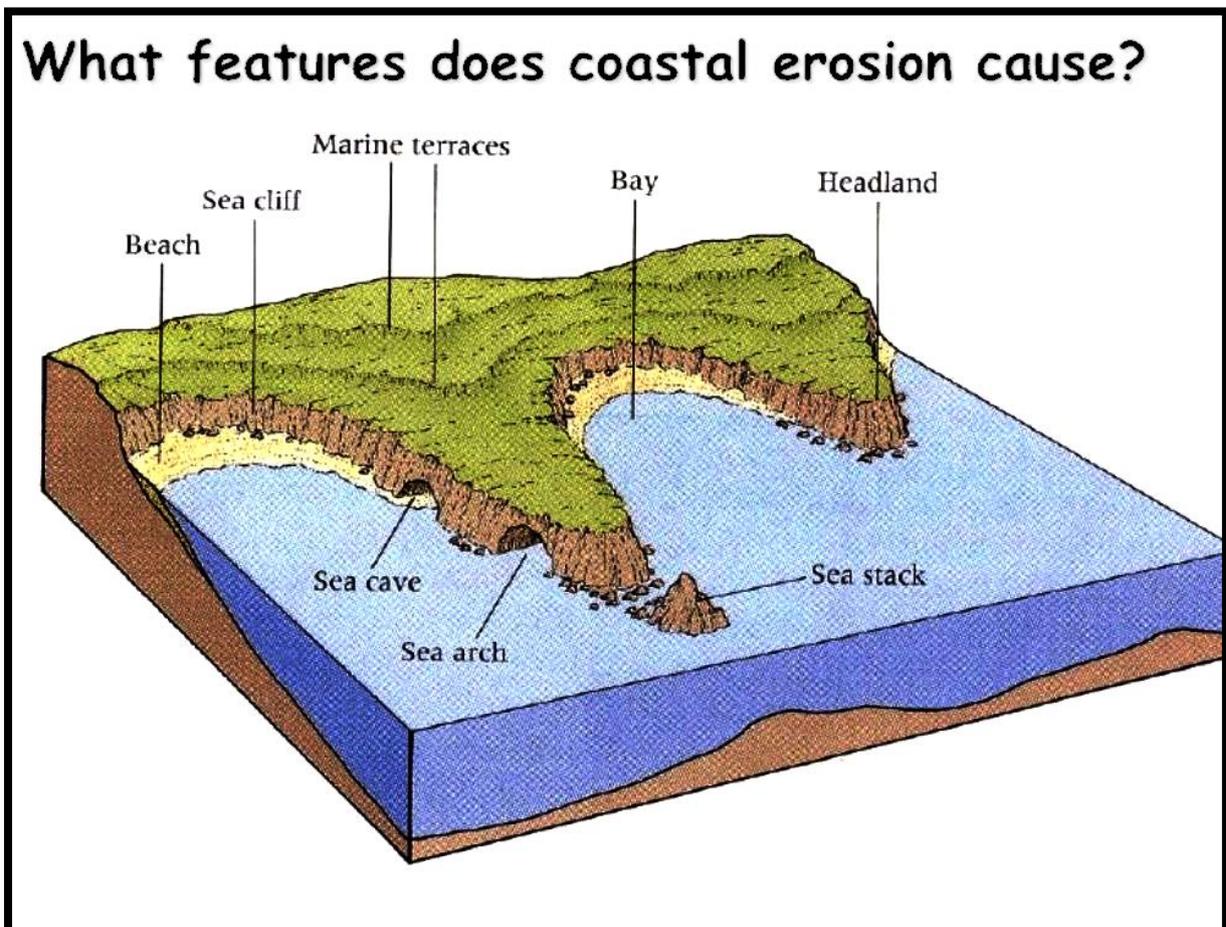
- Coastal erosion is the process by which local sea level rise, strong wave action, and coastal flooding wear down or carry away rocks, soils, and/or sands along the coast.
- Erosion and Accretion: Erosion and accretion are complementary to each other. If the sand and sediments have drifted from one side, it must accumulate somewhere else.
 - Soil erosion is the loss of land and human habitation as sea water washes off regions of soil along the coastline.
 - Soil accretion, on the other hand, results in an increase in the land area.
- 60% of the coastline of West Bengal underwent erosion during the period followed by Puducherry (56%), Kerala and Tamil Nadu at 41% and 41%, respectively.
- More erosion in Eastern Coast than the Western coast:
- The eastern coast sees a lot of rain which keeps the seas rough through most of the year. Besides the Southwest Monsoon (June to September), the eastern coast also witnesses the Northeast Monsoon from October to December and brings rain to coastal Andhra Pradesh and Tamil Nadu.
- The eastern coast underwent more erosion due to frequent Cyclonic Activities from Bay of Bengal in the past three decades, compared to the western coast, which remained largely stable.

Land Accretion:

- Odisha on the eastern coast is the only state where the coast witnessed an expansion of more than 50%.
- This was followed by the coast of Andhra Pradesh, which expanded 48%; Karnataka (26%) etc.

Impact: Recreational activities (sun bathing, picnicking, swimming, surfing, fishing, boating, diving, etc.) may be affected if existing beaches are reduced in width or disappear altogether. Also, there can be an impact on livelihoods of coastal communities.

Measures: Coastal habitats such as Mangroves, Coral Reefs and lagoons are recognized as the best defence against sea storms and erosion, deflecting and absorbing much of the energy of sea storms. Therefore, it is important to maintain these natural habitats for shore protection as well as for environmental conservation.



Factors causing Coastal Erosion:

1. Natural Phenomena:
 - Wave energy is considered to be the primary reason for coastal erosion.
 - Natural hazards like cyclones, thermal expansion of seawater, storm surges, tsunamis etc due to the melting of continental glaciers and ice sheets as a result of climate change hamper the natural rhythm and precipitate erosion.
2. Littoral Drift:
 - Strong littoral drift resulting in sand movement can also be considered as one of the major reasons for coastal erosion.
 - Littoral drift means the natural movement of sediment along marine or lake shorelines by wave action in response to prevailing winds.

3. Anthropogenic Activities:

- Dredging, sand mining and coral mining have contributed to coastal erosion causing sediment deficit, modification of water depth leading to longshore drift and altered wave refraction.
- Coastal erosion has been sparked by fishing harbours and dams constructed in the catchment area of rivers and ports reducing the flow of sediments from river estuaries.

4. Heavy Rainfall:

- Heavy rainfall can enhance the saturation of soils, with high saturation leading to a reduction in the soil's shear strength, and a corresponding increase in the chance of Slope Failure (landslides).

References:

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