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## Coastline Erosion

### Why in news?

Recently, Union Minister cited that over one-third of India's coastline is vulnerable to erosion as per the study of National Centre for Coastal Research.

### What are the key highlights of the study about India's coastline?

*As much as 32% of India's coastline underwent sea erosion and 27% of it expanded between 1990 and 2018*

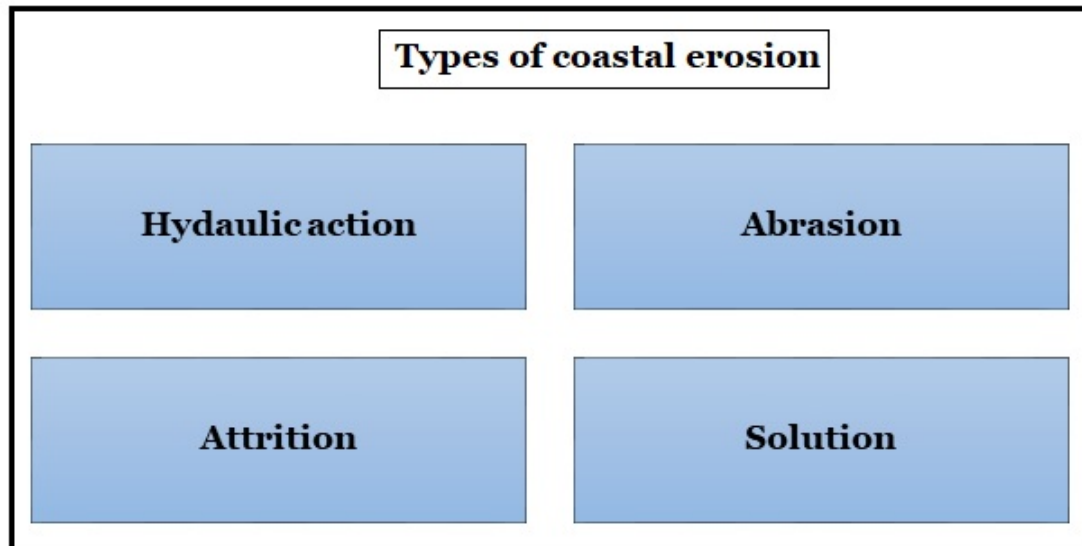
- **Coastal erosion**- It has been noticed in 9 States and 2 Union Territories.
- - The report states that the **west coast has relatively been stable** with erosion in minor pockets like Kerala. In the west, 48% of the coastline is stable, whereas only 28% of the eastern coast has been deemed stable.

*Goa and Maharashtra have the most stable coastlines in the country.*

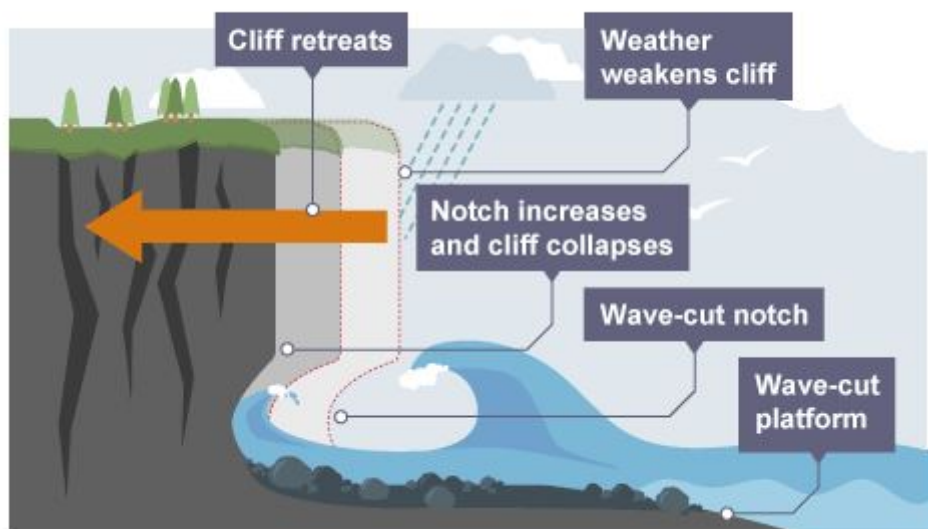
- **Accretion**- States such as Odisha (51%) and Andhra Pradesh (42%) recorded the maximum gain (The coast is growing) owing to coastline changes.

### What is coastal erosion?

- **Shoreline retreat**- It is the loss of coastal lands due to the net removal of sediments or bedrock from the shoreline.
- **Types-**



- **Hydraulic action** - This type of erosion is more effective in areas where the rock has many cracks or joints, such as limestone or chalk.
- It can also create features such as blowholes, geysers, and sea caves.
- **Abrasion**- It is also known as corrosion or sandpapering. It can create smooth and polished surfaces on the rock, such as wave-cut platforms.
- It can also erode softer rocks faster than harder ones, creating differential erosion.
- **Attrition**- This type reduces the size and shape of the rock fragments carried by the waves.
- It can also increase the efficiency of abrasion, as smaller and rounder particles can act as more effective tools for erosion.
- **Solution**- It is also known as corrosion or dissolution. It depends on the chemical composition of the rock and the water.
- Some rocks, such as limestone and chalk, are more soluble than others, such as granite and basalt.
- It can create features such as karst landscapes, sinkholes, and stalactites.



## What are the factors causing coastal erosion?

Factors	About
Waves	<ul style="list-style-type: none"><li>• It is due to the powerful waves generated by wind and tides erode the coastline over time.</li><li>• The intensity of wave action depends on factors such as coastal geomorphology, wind patterns, and sea currents.</li></ul>
Sea level rise	<ul style="list-style-type: none"><li>• Rising sea levels due to global warming and climate change contribute to coastal erosion.</li><li>• As sea levels rise, waves reach farther inland, leading to erosion of coastal land.</li></ul>
Sediment loss	<ul style="list-style-type: none"><li>• Natural processes like coastal currents and longshore drift can cause the loss of sediment along the coastline.</li><li>• This reduces the availability of sediment to replenish eroded areas.</li></ul>
Human interference	<ul style="list-style-type: none"><li>• Improper coastal infrastructure development, sand mining, construction of harbours, and coastal pollution, can accelerate coastal erosion.</li><li>• These activities disrupt natural sediment movement and alter coastal processes.</li></ul>

## What are the effects of coastal erosion?

- **Land loss**- It can have severe implications for coastal communities, infrastructure, and ecosystems. Valuable agricultural land, residential areas, and tourist destinations can be negatively affected.
- **Climate refugees**- Erosion can force communities to relocate as their homes and livelihoods are threatened.
- **Coastal flooding**-As erosion removes natural barriers, such as sand dunes and vegetation, coastal areas become more vulnerable to flooding during storms and high tides.
- **Biodiversity loss**-Coastal erosion affects coastal ecosystems, including mangroves, coral reefs, and dune systems.
- **Economic Impact**- It can damage or destroy coastal infrastructure, including roads, buildings, and ports.
- **Loss of revenue**- It can impact beach tourism and reduced land productivity can also impact local economies.

## What are the India's initiatives for coastal management?

*Indian coast is about 7500 km long and characterized by varied landforms and ecosystems.*

- **Integrated Coastal Zone Management (ICZM)**- It is a study and a planning initiative under *World Bank*, with the first phase for Enhancing Coastal Ocean Resource Efficiency (ENCORE)
- **Society of Integrated Coastal Management**- It launches the ICZM under four components.
  - National Coastal Management Program

- ICZM- West Bengal
- ICZM- Orissa
- ICZM- Gujarat
- **National Centre for Sustainable Coastal Management**- It is set up in Chennai to undertake studies and research in the area of Coastal Zone Management including coastal resources and environment.
- **National Action Plan on Climate Change**- It outlines a strategy that aims to enable the country to adapt to climate change and enhance the ecological sustainability of our development path.
- **Coastal Regulation Zone**- It is notified by the Ministry of Environment under the ambit of Environment Protection Act 1986, sets guidelines to strike balance between economic growth and environmental conservation.

### Quick facts

#### National Centre for Coastal Research

- **Ministry** - Ministry of Earth Sciences
- **Origin** - In 1998, the Project Directorate 'Integrated Coastal and Marine Area Management (ICMAM-PD)' was developed in Chennai.
- In 2018, ICMAM-PD was designated as the NCCR.
- **Objective**-
  - To develop and improve the country's capabilities in addressing the challenging problems prevailing in the coastal zone.
  - To offer scientific and technical support to coastal communities for integrated and sustainable use of resources towards the socio-economic benefit of the society
- **Multi-disciplinary research**- Marine Pollutions, Coastal processes and Hazards, Coastal Habitats and Ecosystem and Capacity Building and Training.
- **Technical support**- It provides support to the coastal states and stakeholders for sustainable coastal management.

### References

1. [Indian Express- Coastline vulnerable to erosion](#)
2. [PIB- Coastal erosion](#)



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