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 erosion2.
- **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	• It is due to the powerful waves generated by wind and tides erode the coastline over time. • The intensity of wave action depends on factors such as coastal geomorphology, wind patterns, and sea currents.
Sea level rise	• Rising sea levels due to global warming and climate change contribute to coastal erosion. • As sea levels rise, waves reach farther inland, leading to erosion of coastal land.
Sediment loss	• Natural processes like coastal currents and longshore drift can cause the loss of sediment along the coastline. • This reduces the availability of sediment to replenish eroded areas.
Human interference	• Improper coastal infrastructure development, sand mining, construction of harbours, and coastal pollution, can accelerate coastal erosion. • These activities disrupt natural sediment movement and alter coastal processes.

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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