



Mains Practice Question

Q. "The process of coastal erosion and deposition creates a distinctive suite of landforms." Discuss. (150 words)

25 Nov, 2024 GS Paper 1 Geography

Approach

- Introduce by defining coastal erosion and deposition
- Give factors influencing Coastal Erosion and Deposition
- Delve into Landforms Created by Coastal Erosion
- Highlight Landforms Created by Coastal Deposition
- Conclude suitably.

Introduction

Coastal processes, including **erosion and deposition**, are dynamic forces that shape the coastline by sculpting a variety of landforms.

- **Erosion**, driven by waves, tides, and currents, removes material, while deposition occurs when sediment carried by water is laid down.
- Together, these processes create distinct coastal landscapes that are influenced by **geology, climate, and human activity**.

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Factors Influencing Coastal Erosion and Deposition

Geology

Influences erosion rates based on the hardness or softness of rock types.

Tidal Range

Affects the extent of erosion and deposition through tidal movements.

Wave Energy

Determines the balance between erosion and deposition based on wave intensity.



Human Activity

Modifies natural processes through interventions like coastal defenses.

Landforms Created by Coastal Erosion:

Erosion predominantly forms rugged and dramatic landforms as follows:

- **Cliffs and Wave-Cut Platforms:** Waves erode the base of coastal rock, forming steep cliffs.
 - Repeated erosion creates a **flat platform at the base of cliffs**, known as a **wave-cut platform**. (Example: Cliffs of Dover, England)
- **Sea Arches and Sea Stacks:** Continuous wave action forms caves in **headlands, which later develop into arches**.
 - When the arch collapses, it leaves isolated columns of rock called sea stacks. (Example: The Twelve Apostles, Australia)
- **Coves and Bays:** Softer rock erodes faster than harder rock, leading to the formation of coves and bays. (Example: Lulworth Cove, UK)
- **Blowholes:** Waves force water into cracks, creating **upward pressure that forms vertical shafts or blowholes**. (Example: Kiama Blowhole, Australia)

Landforms Created by Coastal Deposition:

Deposition forms gentler, more stable landforms:

- **Beaches:** Formed by the **accumulation of sand, pebbles, and other sediments** along the shore.
- **Sandbars and Barrier Islands:** Sandbars form offshore due to wave action, while **barrier islands are larger**, elongated features that protect coasts from wave energy.
- **Spits and Tombolos:** Spits are narrow ridges of sand or shingle projecting into the sea, formed by **longshore drift**. When a spit connects the mainland to an island, **it forms a tombolo**.
- **Deltas:** Depositional features formed **at river mouths where sediment carried by rivers is deposited** as they meet slower-moving water bodies. (Example: Sunderbans Delta, India)

Conclusion

The **interplay of coastal erosion and deposition results in a distinctive suite of landforms**, ranging from cliffs and arches to beaches and deltas. These processes are vital to understanding the **dynamic nature of coastlines** and the need for sustainable coastal management in the face of challenges like climate change and sea-level rise.