



## Land Reclamation

**For Prelims:** Land reclamation, [Coastal zones](#), [Rising sea levels](#), [Coastal flooding](#), [Global warming](#), [Mangroves](#).

**For Mains:** Current Extent of Land Reclamation, Issues Associated with Land Reclamation

### Why in News?

The **increasing economic importance of [coastal zones](#)**, particularly in **East Asia, the Middle East, and West Africa**, has led to significant **land reclamation projects** worldwide. Despite the economic benefits, these projects face **environmental challenges** and potential risks from **[rising sea levels](#)** and **[storm surges](#)**.

### What is Land Reclamation?

#### ▪ About:

- Land reclamation refers to the **process of creating new land by altering the topography of existing bodies of water**, such as seas, rivers, lakes, or marshes.
  - It is **typically done along coastlines** but can also **occur inland, involving the conversion of [wetlands](#) or other water bodies**.
- Land reclamation has a long history of being used to **expand coastal areas for [agriculture](#) and industrial purposes**.

#### ▪ Traditional Land Reclamation:

- Traditionally, land reclamation meant building a **series of dikes to enclose [tidal marshes](#) or shallow offshore waters** and draining these enclosures to create dry land.
  - In some cases, **streams were diverted to carry additional sediment into these areas**, building up the land to a higher level.
  - **Soil and stone could also be excavated from the mainland and dumped along the shore** or on the coast of existing islands, **gradually expanding the land into the sea**.

#### ▪ Modern Land Reclamation:

- Today, **major engineering projects** involve the **construction of kilometres of offshore concrete barrier walls**, which are filled with substantial amounts of sand, earth, clay or rock, often shipped in from far afield.
- The reclamation site can also be **filled with dredged soil from the nearby seafloor mixed with water**, in a process known as **hydraulic reclamation**.

#### ▪ Current Extent of Land Reclamation:

- The study, which examined satellite imagery of **coastal cities with a population of at least 1 million**, found that reclamation projects in **106 cities around the world had altogether created around 2,530 square kilometres (more than 900 square miles) of coastal land**.
- Nearly **90% of new coastal land was created in East Asia** over the last two decades, most often to make way for industry and port facilities catering to the globalised economy.
  - From 2000 to 2020, **China alone added around 350 square kilometres**, with

Singapore and Incheon, in South Korea, also raising vast new areas.

## What are the Issues Associated with Land Reclamation?

- **Coastal Flooding:** Most coastal land expansion in the past couple of decades happened in **low-lying areas**, with more than **70% of that land “at high risk from [coastal flooding](#) between 2046 and 2100,”** due in part to storm surges linked to [global warming](#) and the risk of land subsidence.
  - **Stronger storms and increasingly destructive flooding** are already taking coastal communities by surprise.
- **Distortion of Seabed Ecosystem:** Using materials like [sand](#) which are obtained from the [marine](#) and river environment can mean the **destruction of habitats** and spawning grounds of organisms.
  - Several countries have already banned the export of sand for land reclamation. The **resulting sand shortage has forced some construction companies to extract sand and clay from the ocean floor, destroying the seabed ecosystem in the process.**
- **Loss of Wetlands:** Coastal wetlands, such as [mangroves](#), salt marshes, and [estuaries](#), are highly productive ecosystems that provide numerous ecological benefits.
  - Land reclamation often involves **draining or filling these wetlands, resulting in their destruction or alteration.**
  - This loss of wetlands can disrupt the natural balance of coastal ecosystems, affecting **water quality, fish nurseries, and the overall resilience of the coastal zone.**

## Way Forward

- **Strategic Coastal Planning:** There is a need to develop **comprehensive coastal zone management plans** that consider the long-term effects of land reclamation and **balance economic development with environmental sustainability.**
- **Green Engineering Solutions:** There is a need to employ innovative engineering techniques that minimise the impact of land reclamation on coastal ecosystems.
  - For example, **adopting "soft" engineering solutions like permeable structures, floating islands, and sand-filled geotextile containers that allow water flow and minimise disruption to coastal processes.**
- **AI for Coastal Monitoring:** There is a need for using [artificial intelligence](#) and [remote sensing techniques](#) to monitor **coastal changes, predict erosion hotspots, and assess the effectiveness of coastal management interventions.**

## UPSC Civil Services Examination, Previous Year Question (PYQ)

**Q.** What are the environmental implications of the reclamation of the water bodies into urban land use? Explain with examples. (2021)

**Source:** [IE](#)

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