Land reclamation and its importance

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Why in News: People have been reclaiming land from the sea for centuries, to control flooding and make more space for agriculture and coastal industries.

Background

Traditionally, land reclamation means 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.

Often, when the new coastal land was below sea level, water had to be pumped out over the dikes or emptied through sluices and discharged into the sea.

That's now the case in much of the Netherlands, where around one-third of the country is below sea level and must be artificially drained to keep out the North Sea.

Land reclamation now 'a global-scale phenomenon'

Today, many reclamation projects in rapidly growing urban centers across the Global South have advanced far beyond a simple dike.

The increased economic importance of coastal zones, especially in East Asia, the Middle East and West Africa, has spurred a rush to stake a claim in this new land for luxury residential, upscale commercial and industrial space.

Major engineering projects now involve the construction of kilometers 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.

Despite the considerable cost and engineering challenges, coastal land reclamation has become "a global-scale phenomenon" over the last two decades, according to a study published in the journal Earth's Future early this year.

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 kilometers (more than 900 square miles) of coastal land, an area roughly the size of Luxembourg.

China leads the way in creating new land

Nearly 90% of that land was created in East Asia, most often to make way for industry and port facilities catering to the globalized economy.

From 2000 to 2020, Shanghai alone added around 350 square kilometers, with Singapore and Incheon, in South Korea, also raising vast new areas.

“Urban growth itself has become a pretty big source of profit for China, and in other countries as well,” said Young Rae Choi, an expert in marine and coastal governance and East Asian studies and one of the study’s co-authors.

Importance of Land Reclamation

Many of these massive reclamation projects — primarily in China but also across Asia and the Middle East — are being launched as eco-friendly developments.

The work is centered on projects in Hong Kong and mainland China, explained that cities are already spending the money to include “future-ready” reclamation techniques — including seawalls and breakwaters — in ongoing reclamation projects, as well as reinforcing and elevating existing coastal defences

Sloped seawalls could also add rock armor, also known as riprap — large rocks or concrete blocks used to prevent erosion by dispelling wave energy.

Reclamation projects today are getting intertwined with the emerging sustainability paradigm name-checking “eco-city” projects in cities like Tianjin and Tangshan near Beijing. Such projects include environmentally friendly features like rehabilitated wetlands, artificial reefs, energy-efficient infrastructure or restored mangrove forests that act as a buffer from ocean storms.

Concerns with Land Reclamation

Until fairly recently, reclamation projects didn’t really take into account the risk posed by rising seas levels linked to climate change. But It has become a really serious issue over the past few years

The Earth’s Future study showed that 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.

For instances, Marine City in Busan, South Korea, a residential community dominated by upscale skyscrapers, where successive typhoons over the last decade have tossed waves over seawalls and submerged nearby streets.

The Earth’s Future study said development projects have destroyed coastal land like marshes, swamps and mangrove forests, adding that “more than half of tidal flats [in the Yellow Sea] were lost mainly due to reclamation.

Using materials like sand which are obtained from the marine and river environment can mean the destruction of habitats and spawning grounds of organisms, leading to a serious impact on the food webs from an environmental, ecological and conservation points of view

Conclusion

Several countries have already banned the export of sand for land reclamation, including Cambodia, Indonesia, Malaysia and Vietnam. Land reclamation will continue to be a solution for many countries around the world to address its more pressing needs for increased development and urbanization, balancing economy and ecology