



Feasibility of Carbon Removal by Restoring Coastal Vegetation

For Prelims: Carbon Sequestration, Climate Change, Coastal Ecosystem, Carbon Dating, Blue Carbon

For Mains: Feasibility of Carbon Removal by Restoring Coastal vegetation

Why in News?

Recently, a study has been published, which has raised scepticism about the efficiency of restoring coastal habitats to offset carbon emissions.

What are the Findings?

- Restoring Coastal habitats is far from certain and unreliable. and there's a real risk that the scale at which they can mitigate emissions has been massively oversold.
- It is extremely **difficult to work out a reliable figure for carbon accumulation by coastal ecosystems** under current conditions.
- There is a very weak **basis for calculating the future carbon offsets** that restoration projects might provide over the next 50 to 100 years.

What are the Causes of Uncertainty?

- **Wide Variation in Estimates:**
 - Estimates of the rate at which **blue carbon** habitats remove CO₂ from the atmosphere vary widely.
 - **Blue Carbon refers to carbon sinks** held by coastal, aquatic, and marine vegetation, marine organisms, and sediments.
 - Across several hundred scientific studies, there was a **600-fold difference between the highest and lowest estimates for carbon burial** in salt marshes, a 76-fold difference for seagrasses and a 19-fold difference for mangroves.
- **Errors in Dating Process:**
 - Burrowing organisms disturb and mix younger and older layers, **causing errors in the dating process of fossil fuels by making sediments seem younger**, and carbon burial rates greater, than they really are.
 - **Carbon dating** is a **radiometric dating method**. It uses the naturally occurring radioisotope carbon-14 (14C) to estimate the **age of carbon-bearing materials up to about 58,000 to 62,000 years old**.
- **Imported Carbon More Resistant to Decay:**
 - Much of the carbon buried in coastal sediments comes from elsewhere, such as soil swept from the land and carried by rivers. This is called **Imported Carbon**.
 - In a study on one saltmarsh, the proportion of 50% imported carbon near the sediment **surface increased to 80% in deeper layers**.
 - Since the deeper value represents the habitat's long-term **carbon burial** rate, the

direct contribution of a restored habitat to removing carbon **may be much less important than thought.**

▪ **Release of Marsh Gas:**

- Turning an [oil palm plantation](#) back into a [mangrove](#) forest or [flooding a coastal area](#) to make a saltmarsh should help the land accumulate carbon.
- But that same **land could also release more [methane](#) (otherwise known as marsh gas) and nitrous oxide** – both powerful greenhouse gases – leaving **no net climate benefit.**

▪ **Calcifying Animals Contribute Emissions:**

- There are calcifying animals and plants which grow in these habitats, particularly [seagrass meadows](#).
- The strap-like leaves of seagrass are often covered by a white crust of shelled worms and coralline algae.
- When these organisms **make their calcium carbonate covering, CO₂ is produced.**

What are the Recommendations?

- Blue **carbon habitats should still be protected** and, where possible, restored, as they have benefits for climate adaptation, coastal protection, food provision and biodiversity conservation.
- Every effort should still be made to halt, and wherever possible reverse, the worldwide loss of coastal vegetation. Blue carbon habitats are, **after all, more than carbon sinks - they also protect communities from [storms](#), nurture biodiversity** and species targeted for [fisheries](#), and improve water quality.
- The priority must be to **double down on emission reductions**, only using carbon removal methods to help achieve [net zero](#) where their **success is certain.**

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. What is blue carbon?

- (a) Carbon captured by oceans and coastal ecosystems
- (b) Carbon sequestered in forest biomass and agricultural soils
- (c) Carbon contained in petroleum and natural gas
- (d) Carbon present in atmosphere

Ans: (a)

[Source: DTE](#)

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