International Union for Conservation of Nature
ISSUES BRIEF
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OCEANS AND CLIMATE CHANGE (II)

Blue carbon – coastal and marine ecosystems and their role in climate change mitigation

- Blue carbon is the **carbon stored in coastal and marine ecosystems**.
- These ecosystems **sequester and store more carbon per unit area than terrestrial forests** and are now being recognised for their role in **mitigating climate change**.
- Coastal ecosystems of mangroves, tidal marshes and seagrass meadows also provide **essential benefits for climate change adaptation**, including **coastal protection and food security** for many coastal communities.
- However, if the ecosystems are **degraded or damaged**, their **carbon sink capacity is lost or adversely affected**, and the **carbon stored is released**, resulting in **emissions of CO_2 that contribute to climate change**.
- **Dedicated conservation efforts** can ensure that coastal ecosystems continue to play their role as long-term carbon sinks.

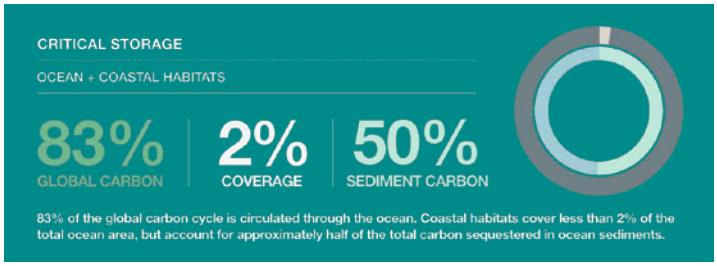
What is the issue?

The **coastal ecosystems** of mangroves, tidal marshes and seagrass meadows provide numerous benefits and services that are essential for **climate change adaptation** along coasts globally, including coastal protection and food security for many coastal communities. Additionally, these ecosystems sequester and store more carbon – often referred to as '**blue carbon'** – per unit area than terrestrial forests and are now being recognised for their role in **mitigating climate change**.

Many natural environments contain large stores of carbon deposited by vegetation and various natural processes over centuries. The ability of these vegetated ecosystems to remove carbon dioxide (CO_2) from the atmosphere makes them significant **net carbon sinks**. However, **if the ecosystems are degraded or damaged directly or indirectly by human activities, their carbon sink capacity is lost or adversely affected**, and the carbon stored in the soil is released, resulting in emissions of CO_2 that contribute to climate change.

Why is this important?

Coastal ecosystems need to be conserved and restored as globally significant carbon sinks. Despite their small extent relative to other ecosystems, **they sequester and store globally significant amounts of carbon in their soil**. The ongoing destruction and loss of these systems contributes to additional human-induced greenhouse gases. Alongside tropical forests and peatlands, coastal ecosystems demonstrate how **nature can be used to enhance climate change mitigation strategies** and therefore offer opportunities for countries to achieve their Intended Nationally Determined Contributions (INDCs).



What can be done?

Conserving and restoring terrestrial forests, and more recently peatlands, **has been recognised as an important component of climate change mitigation**. Several countries are developing policies and programmes in support of sustainable development through initiatives that reduce the carbon footprint associated with the growth of their economies. These include **actions to conserve and sustainably manage natural systems** relevant to the United Nations Framework Convention on Climate Change (UNFCCC), including through the Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism.

These approaches are expanding to cover other natural systems – including marine and coastal ones – that contain rich carbon reservoirs. **Dedicated conservation efforts can ensure that coastal ecosystems continue to play their role as long-term carbon sinks**, by helping to ensure that no new emissions arise from their loss and degradation, whilst stimulating new carbon sequestration through the restoration of previously carbon-rich coastal habitats.

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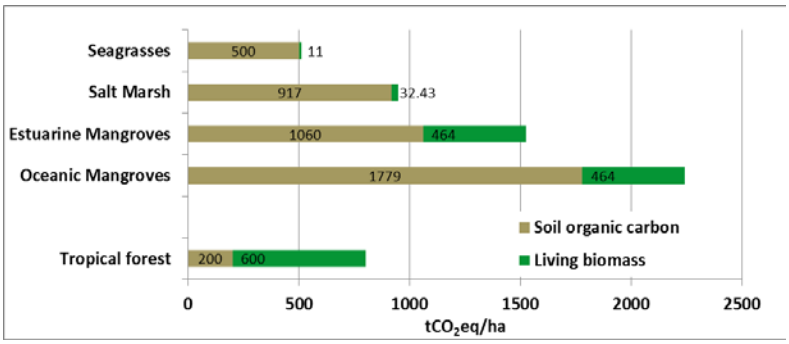
Global averages for carbon pools (soil organic carbon and living biomass) of focal coastal habitats. Tropical forests are included for comparison.



Note: Only the top metre of soil is included in the soil carbon estimates

On an implementation level, mangroves, salt marshes and seagrasses can be included in **national accounting**, now that the new *IPCC 2013 Supplement to the 2006 Guidelines for National Greenhouse Gas Inventories: Wetlands* has been issued. Mangroves can also be included in REDD+, and all three ecosystems can be incorporated into Nationally Appropriate Mitigation Actions (NAMAs) and INDCs.

Some technical elements need to be fully integrated into these mechanisms to value the full coastal carbon potential, e.g. accounting for soil carbon. An expansion of the implementation of programmes and projects around the world is also needed to **stop the ongoing loss of these ecosystems and curb resulting emissions**.

Currently, the management of marine ecosystems is not fully recognised as a climate mitigation option under the UNFCCC. Further debate and dialogue are now needed to analyse the opportunities to develop an incentive mechanism for the open ocean under the Climate Convention.

An ecologically degraded ocean loses its capacity to support the carbon cycle and act broadly as a carbon sink. There may be opportunities for a UNFCCC oceans emissions work programme to complement activities under other processes (e.g. United Nations Convention on the Law of the Sea, Convention on Biological Diversity, Regional Fisheries Management Organizations) which are concerned about the **sustainable management of our diverse marine resources and their services**.

Marine Protected Areas and other area-based management efforts offer opportunities for no-regret climate change tools and are now needed more than ever for sustaining a functioning ocean which continues to serve as a carbon sink.

Many countries have started to include coastal ecosystem management in their national climate change mitigation activities, including under REDD+, Nationally Appropriate Mitigation Actions and other mechanisms. These experiences show opportunities for further enhancement (e.g. on a technical level the accounting for soil carbon as part of REDD+ needs to be further advanced) as well as replication and expansion in other countries. More and more efforts now also try to link the mitigation and adaptation benefits of these systems, and to direct the appropriate management and policy responses through national development goals as well as coastal planning efforts.

Coastal ecosystem management for mitigation and adaptation may also be advanced under the Poznan Strategic Program on Technology Transfer and through the work and services of the Technology Mechanism.

The importance of healthy marine flora and fauna (open ocean, deep sea, corals, kelp or plankton) for a functioning ocean carbon cycle is well understood. However, their potential and possible inclusion in UNFCCC incentive mechanisms and national carbon balances is currently limited. These systems either do not demonstrate globally relevant, long-term climate mitigation potential or have jurisdictional challenges related to management and clear national carbon emissions or removals allocation.

The management of marine ecosystems for a functioning ocean carbon cycle ought to be, at this stage, better incorporated into **sectoral regulation and management regimes** (e.g. fisheries, deep-sea mining), including on a regional basis such as through the Convention on the Conservation of Antarctic Marine Living Resources.

Where can I get more information?

- **iucn.org/marine**
- Blue Carbon Initiative (2015) *Guidance for national blue carbon activities*: *fast-tracking national implementation in developing countries*
- The Blue Carbon Initiative
- The UNEP/GEF Blue Forest project
- Laffoley, D. et al. (eds.) (2014) *The Significance and Management of Natural Carbon Stores in the Open Ocean*. Full report**.** Gland, Switzerland: IUCN

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