SUMMARY

THE BLUE CARBON HANDBOOK

Blue carbon as a nature-based solution for climate action and sustainable development

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HIGH LEVEL PANEL *for*
A SUSTAINABLE
OCEAN ECONOMY

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About the Ocean Panel

Established in 2018, the High Level Panel for a Sustainable Ocean Economy (Ocean Panel) is a unique initiative made up of serving world leaders who are building momentum for a sustainable ocean economy in which effective protection, sustainable production and equitable prosperity go hand in hand. By working collaboratively with a wide array of stakeholders, the Ocean Panel aims to identify bold solutions that bridge ocean health, wealth and equity and accelerate and scale responsive action worldwide.

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Blue carbon ecosystems are valuable natural assets contributing to climate change mitigation and adaptation, improved resilience and sustainable development

Nature plays a fundamental role in supporting all life on Earth. Intact natural ecosystems provide critical ecosystem services that contribute to healthy air and water, a prosperous economy and well-being (Dasgupta 2021). Still, it is threatened by the combined effects of overexploitation, climate change, habitat loss and fragmentation, pollution and bio-invasions (Bellard et al. 2022; Díaz 2023).

Marine and coastal ecosystems are not an exception. They provide essential services that sustain and enhance marine and terrestrial life (Halpern et al. 2012). For example, coastal wetlands, like mangroves, seagrass meadows and tidal marshes, play an essential role in climate change mitigation because of their vegetation capacity for absorbing and storing significant amounts of carbon dioxide (CO_2) from the atmosphere in their biomass and soils, helping to alleviate the impacts of greenhouse gas (GHG) emissions (Howard et al. 2017; Duarte de Paula Costa and Macreadie 2022). They also provide climate adaptation and resilience benefits by protecting coastlines against flooding and erosion resulting from storm surge events (Van Dolah et al. 2020; Moore and Schindler 2022). Additionally, marine and coastal areas support biodiversity and provide habitats for multiple species, including commercially valuable ones (Sowman and Cardoso 2010; Blasiak et al. 2017), and are popular destinations for tourism, providing recreational opportunities, generating revenue and supporting local economies (Leposa 2020).

Sustainably managing marine and coastal ecosystems is essential for maintaining biodiversity, the resilience of coastal communities, and the sustainable use of marine assets, ensuring the long-term well-being and prosperity of humans and the planet (Costanza 1999; Winther et al. 2020).

To ensure the long-term viability of natural assets and the provision of ecosystem services, natural capital management is an approach that recognises and values nature as a form of capital, incorporating its values into decision-making processes and optimising the benefits derived from ecosystems while ensuring their conservation and sustainable use (Dasgupta 2021; Carrasco de la Cruz 2021; Sangha et al. 2022).

Another ecosystem-based approach linked to managing natural resources and services is the development of nature-based solutions (NbS). This term, initially established by the International Union for Conservation of Nature and its international membership, has now been adopted by the UN Environment Assembly and refers to actions that are designed to sustainably manage, conserve or restore ecosystems to provide cost-effective, resilient and sustainable solutions to address societal challenges, such as climate change, biodiversity loss, water scarcity and natural resource management (Seddon et al. 2021). Examples include restoring degraded forests or wetlands to improve water quality, creating green infrastructure in urban areas to reduce the risk of flooding, and using natural systems such as mangroves or coral reefs to protect coastal communities from storms and sea level rise.

Within NbS, *blue carbon* refers to the capacity of coastal and marine ecosystems that are amenable to management to sequester and store CO_2 for long periods, sometimes thousands of years (IPCC 2019; Macreadie et al. 2021)—pathways are often called natural climate solutions. *Blue carbon* also refers to the capacity for healthy ecosystems to enhance climate adaptation and resilience efforts like preventing coastal erosion—called ecosystem-based adaptation. Such abilities highlight the power of NbS like sustainably managing blue carbon ecosystems for climate mitigation, adaptation and sustainable development.

The sustainable management of blue carbon ecosystems can deliver broader environmental, social and economic benefits

The carbon captured from the atmosphere is stored as organic matter in plants' trunks, branches, stems, leaves and roots, as well as in the sediment of coastal ecosystems (Lovelock and Duarte 2019). This process can support climate change mitigation (reducing GHG emissions or removing them from the atmosphere), adaptation (adjusting and responding to the changing climate and its impacts to reduce vulnerability and build resilience), and resilience (ability of natural and human systems to absorb, adapt to and recover from climate change impacts) (McLeod et al. 2011).

However, the carbon stored in blue carbon ecosystems' biomass and sediment can be emitted to the atmosphere when degraded or destroyed (Lovelock et al. 2017; Macreadie et al. 2021). Globally, soil carbon loss from mangrove forest cover change was calculated to be between 30 million and 122 million metric tonnes of CO_2 equivalent between 2000 and 2015, with 75 percent of that amount coming from changes in land use dynamics in Indonesia, Malaysia and Myanmar alone (Sanderman et al. 2018). Consequently, restoring these ecosystems or protecting them intact helps to mitigate climate change, while degrading them emits greenhouse gases, contributing to climate change.

Supporting nature-based solutions, like blue carbon, does not obviate the need for rapid phase-out of fossil fuels and severe reduction in carbon emissions (Seddon et al. 2021). Still, their capacity to store carbon in their underlying soils at concentrations up to five times higher than terrestrial forests on a per hectare basis (Macreadie et al. 2021), reaching approximately 6-12 gigatonnes (billion metric tonnes) of carbon stored worldwide (Kauffman et al. 2020), makes the conservation and restoration of blue carbon ecosystems an important NbS tool to address climate change while improving adaptation and resilience (Macreadie et al. 2017).

The Blue Carbon Handbook uses the term *blue carbon ecosystems* to refer to mangroves, seagrass meadows and tidal marshes since they have internationally adopted methodologies for carbon accounting as defined through the 2013 Supplement to the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands. As scientific knowledge evolves, other coastal and marine ecosystems might become actionable blue carbon approaches. Emergent blue carbon ecosystems include kelp forests, other forms of macroalgae, and unvegetated marine sediments (Krause-Jensen et al. 2018; Raven 2018; Filbee-Dexter and Wernberg 2020). Other relevant areas require research, such as the role of fish or mammal biomass on carbon cycling, which might also shape the future of ocean health.

Notably, blue carbon coastal ecosystems provide critical ecosystem services and benefits in addition to climate mitigation:

- Coastal protection, by acting as natural buffers against coastal erosion, storm surges and wave impacts (Barbier 2016). The dense root systems of blue carbon ecosystem plants help stabilise coastlines, serving as a natural defence that protects human infrastructure and settlements from erosion and storm damage, reducing the vulnerability of coastal communities (Narayan et al. 2016; Morris et al. 2020).
- Biodiversity and habitat support, by providing vital habitats for a diversity of species (Barbier 2017).
- Mangroves, seagrass meadows and tidal marshes serve as nursery areas and breeding grounds for numerous commercially important fish, shellfish and crustaceans, supporting fisheries and providing livelihoods for coastal communities (Liquete et al. 2016; zu Ermgassen et al. 2021).
- Water quality improvement, through water filtration by the dense vegetation and root systems, trapping sediment, nutrients and pollutants from land runoff and adjacent waters (Hussain and Badola 2008). This helps to reduce nutrient loading, improve water clarity and enhance overall water quality in coastal areas.

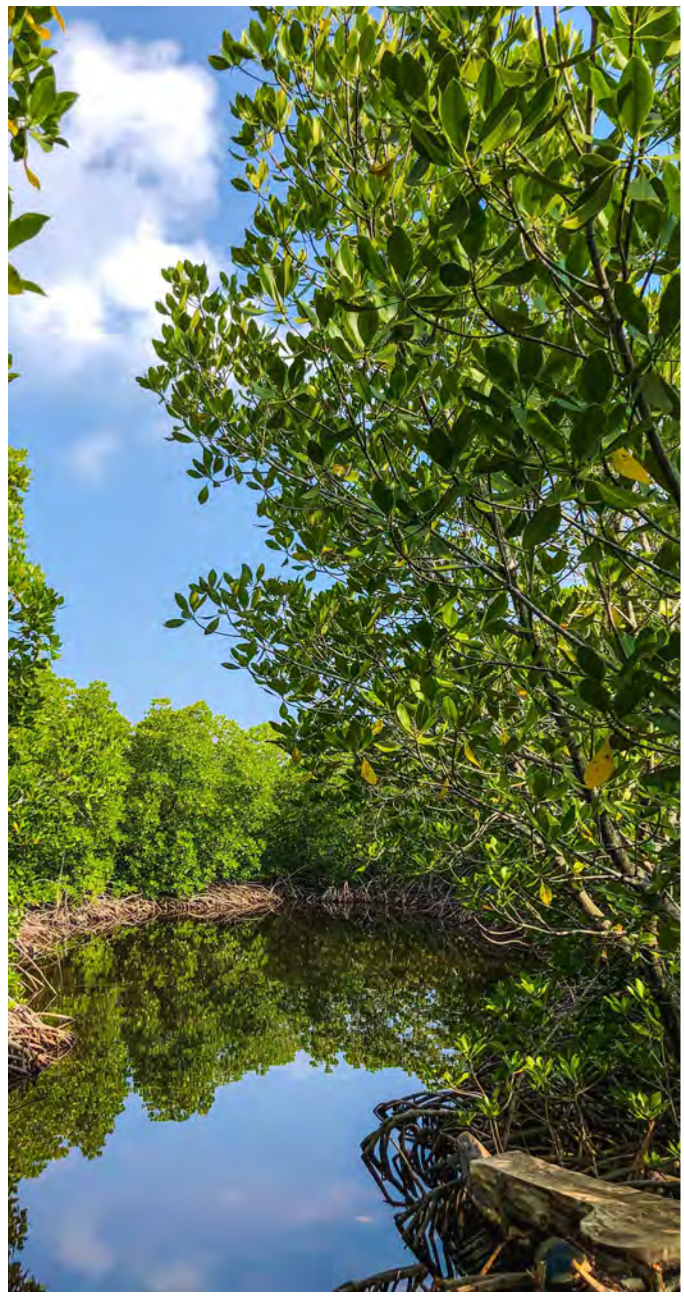
- Recreation and tourism, by offering opportunities for nature-based activities such as birdwatching, boating, fishing, snorkelling and kayaking. Nature-based tourism associated with blue carbon ecosystems can stimulate local economies and provide employment opportunities, contributing to sustainable livelihoods (Barbier 2017).
- Cultural well-being, by supporting not only leisure and recreational activities but also aesthetics, religious or spiritual activities, cultural identity and sense of place (Chan et al. 2012; Cooper et al. 2016).

Estimates of the economic value of these ecosystems can vary widely depending on the type and number of ecosystem services and benefits included in the analysis, geographic location, and methodology (Bertram et al. 2021).

Despite the value and importance of coastal blue carbon ecosystems, it is estimated that globally, 50 percent of salt marshes, 35 percent of mangroves, and 29 percent of seagrasses have been degraded or lost since the mid-twentieth century as a result of climate-derived negative impacts such as sea level rise, the increased frequency and intensity of hurricanes (Hanley et al. 2020; Swapna et al. 2022), and other human activities such as coastal development (Barbier 2017).

The transformative potential of sustainably managing blue carbon ecosystems is reflected by the continuously increasing international policy, initiatives and partnerships around this theme. Blue carbon is already a viable and actionable solution, and blue carbon ecosystems have established methodologies recognised internationally by the IPCC, to enable their inclusion in national GHG inventories to account for their mitigation potential (Eggleston et al. 2006; Lovelock and Duarte 2019). For example, the "*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*" provides detailed guidance and methodologies in tiers, allowing for a stepwise approach to account for coastal wetlands as part of its land sector, including mangroves, seagrass meadows and tidal marshes, in a national GHG inventory based on technical capacity and type of data available (IPCC 2013).

The aim of this Ocean Panel–commissioned special report is to aid in the acceleration of action and understanding of the variety of blue carbon benefits and activities necessary to finance and scale action, supporting the implementation of high-quality, high-impact, blue carbon projects. It aims to be a key resource for governments and other stakeholders working on blue carbon across sectors—from government officials to natural resource managers, small-scale fisheries and their local communities, non-governmental organisations (NGOs), academics, business leaders and others.



Advancing blue carbon projects for sustainable management

Given the potential for blue carbon ecosystems to contribute to climate change mitigation, adaptation and resilience, and the other benefits these assets provide, advancing sustainable blue carbon projects at local, national and regional scales is valuable and timely.

A blue carbon project can be defined as a nature-based solution approach focused on the conservation, restoration or other form of sustainable management of mangroves, seagrass meadows or tidal marshes that also accounts for its climate, livelihoods and/or biodiversity benefit. Examples of measures to restore degraded areas and protect intact ones may include replanting mangrove trees, protecting or restoring seagrass meadows, or promoting activities, actions or regulations to reduce coastal erosion and pollution.

High-quality, high-impact blue carbon projects

Given the increased international attention to blue carbon and broader nature-based solutions, experts and stakeholders have collaborated to consider guidance that supports best practices and ensures high-quality projects, promoting positive outcomes for people, nature and the climate. One example is the High-Quality Blue Carbon Principles and Guidance framework (Conservation International et al. 2022), which was developed through a thorough consultative process and builds on existing NbS guidance and standards. It highlights five core principles, described in Table S-1, to ensure that projects have real emission reductions, environmental and social integrity, and equitable benefit-sharing practices and decision-making approaches with local communities.

Table S-1. The five High-Quality Blue Carbon Principles and additional good practice approaches underlying resilient and impactful blue carbon projects and their justifications

HIGH-QUALITY BLUE CARBON PRINCIPLES	JUSTIFICATION
Safeguard nature	Blue carbon projects provide opportunities to preserve and enhance ecosystem resilience.
Empower people	Blue carbon practitioners must ensure inclusive participation and leadership of Indigenous Peoples, local communities, women and other marginalised groups in project design, governance and management. Additionally, it is essential to implement social safeguards to protect and enhance community member rights, knowledge use, and leadership and foster equitable access to the global carbon market.
Employ the best information, interventions and carbon accounting practices	Designing projects in accordance with science-based ecological protocols and information is key (Wylie et al. 2016). The integrity of the voluntary carbon market hinges, in part, on the quality of information used to design projects and communicate the resulting carbon value of the credits generated. Therefore, it is critical to ensure transparent and accurate greenhouse gas accounting and monitoring by using a scientifically sound methodology or protocol and to establish accurate carbon baselines through evidence-based assessments.
Operate locally and contextually	The role of blue carbon ecosystems in local customs, gender and power dynamics is variable. Their resource uses, management and ownership regimes depend on local contexts. Additionally, the social, policy and governance structures are heterogeneous. Such variability requires that projects be designed based on local social and ecological contexts, accounting for the local implications of international policies and advancing local policies to promote successful projects.
Mobilise high-integrity capital	High-integrity financial flows are essential and depend on setting science-based reasonable targets. Where those are not met, remaining emissions should be compensated with high-quality carbon credits based on agreements and contracts designed to promote fair and transparent pricing and compensation.

Table S-1. The five High-Quality Blue Carbon Principles and additional good practice approaches underlying resilient and impactful blue carbon projects and their justifications (Cont.)

OTHER GOOD PRACTICE APPROACHES	JUSTIFICATION
Transparency and good metrics	Using common and robust standards and methodologies based on the best available definition of what 'counts' as high quality is critical. Clear metrics for assessing a project's capacity to meet goals should be defined in accordance with the fundamental principles to ensure clear expectations when engaging in blue carbon projects.
Mobilise relevant policy instruments	Enabling coherent policy conditions and developing governance instruments are key to achieving successful conservation or restoration projects focusing on resilient, equitable, inclusive and sustainable solutions for not only climate change but also broader sustainable development.
Enable multiple financial flows	Small-scale market-based projects, large-scale conservation efforts and combined large-scale conservation with market-based approaches (e.g. LEAF Coalition) can contribute to leveraging the development of blue carbon projects.
Integrate with other management interventions and frameworks for sustainable development	Integrating projects for protecting and restoring blue carbon ecosystems into global frameworks, agreements and incentives (such as nationally determined contributions, national adaptation plans, or national biodiversity strategies and action plans, ends a strong signal of national policy and investment priorities to the international community, thus driving resources and global, national, and local action. Additionally, linking blue carbon projects to broader blueprints (such as sustainable ocean plans) for conserving marine and coastal areas, biodiversity, and other targets is essential to leverage the project's outcomes and attract additional financial investment towards protection and restoration.
Ensure the flow of benefits for local communities	Projects must be able to measure and track the outcomes for Indigenous and local communities, ensuring that they are part of the project design, and can maximise benefits for livelihoods, supporting income generation and endorsing peoples' rights (Vierros 2017).

Other good practice approaches can complement the High-Quality Blue Carbon Principles. These aspects should be taken into consideration during project development and implementation. Following such recommendations leads to resilient and impactful projects and builds trust within local communities and among other relevant stakeholders, including municipal governments or small-scale fishing communities who live and work in the area.

Many blue carbon projects require an initial scoping assessment that can occur through a staged approach to allow for flexibility in project planning and prioritisation. Some examples of critical steps include:

1. Evaluate the availability and quality of existing data on mangroves, seagrass meadows, and tidal marshes within the national jurisdiction. This includes assessing the spatial distribution, historical changes, ecosystem services provided, social and cultural aspects, as well as the pressures and threats impacting these ecosystems. Collaboration with government departments and NGOs can provide valuable insights and access to relevant data sources.
2. Identify any critical information gaps that may require further scientific research. Addressing these gaps will enhance the understanding of blue carbon ecosystems and support informed decision-making throughout the project's development.
3. Conduct a comprehensive cost-benefit analysis, considering the financial implications of project objectives and commitments. This analysis should consider the tangible benefits these ecosystems provide to local communities, such as coastal protection and support for economic sectors like fisheries and tourism. Balancing these benefits with potential trade-offs, such as restrictions on other activities like aquaculture or logging, is essential for making informed decisions.

4. Explore opportunities to integrate blue carbon projects with broader management interventions and frameworks at the global level, across sectors or departments (climate change, biodiversity, natural infrastructure, etc.). This positioning can enhance the project's impact and contribute to international efforts to address climate change and sustainable development.
5. Evaluate potential policy requirements and assess relevant regulations. This ensures alignment with existing legal frameworks and identifies any additional policy considerations or adjustments required to implement the project successfully.

The scoping phase of a blue carbon project involves a comprehensive assessment of feasibility, risks, and policy considerations. Considering these factors, decision-makers can lay a strong foundation for the project's development, align it with national priorities, and contribute to global efforts towards a more sustainable and resilient future.

Options and actions for governments

The protection and restoration of blue carbon ecosystems requires action at global, national, and local levels. While existing international policy agreements and frameworks recognise the value of healthy blue carbon ecosystems and can enable collective action at scale, national and local policies and actions are essential and thus need to be successfully implemented and resourced (Macreadie et al. 2021).

Governments—national, subnational and local—are important custodians of their blue carbon ecosystems. While they define international targets and are the key drivers of change on the ground, together with local communities, they must balance and reconcile a multitude of public interests (Wylie et al. 2016). Still, core blue carbon milestones, such as advancing restoration (under Sustainable Development Goals), and increasing protection of coastal and marine ecosystems (under the UN Convention on Biological Diversity) have become priorities, and governments need to provide suitable technical, regulatory, and incentive frameworks for action (Blok et al. 2020).

Nationally determined contributions (NDCs), according to the Paris Agreement adopted under the UN Framework Convention on Climate Change, represent the efforts of each country to reduce national emissions and adapt to the impacts of climate change. Countries can include blue carbon ecosystems' management as part of their NDCs' commitments (Morrissette et al. 2023). NDCs, or other national reports, can be an important policy lever that captures the multiple benefits of coastal ecosystems and the governance complexities by taking a 'bottom-up' approach towards achieving the climate goals of the Paris Agreement, allowing adequate robustness and flexibility (Northrop et al. 2020; Dencer-Brown et al. 2022).

Blue carbon ecosystems sit between land and sea. This spatial position results in the involvement of multiple government agencies in decision-making processes, each with different—and sometimes competing—mandates and targets (Burdon et al. 2019). That can conflict with economic development and coastal infrastructure goals or plans. As a result, it is crucial to establish policy coherence and develop community awareness of the importance of these ecosystems (Burdon et al. 2019). For this reason, it is also critical to develop clear national and local strategies and frameworks that consider blue carbon ecosystem conservation and restoration, alongside other interests, to support a balanced assessment of trade-offs and priorities. Policy coherence can, for example, be achieved by creating ecosystem management incentives while also avoiding subsidising activities that undermine ecosystem health (Voyer et al. 2021). A critical role for national governments is to provide clear and permanent policy signals, align funding streams and get the incentive structure right.

Scaling investment for implementing blue carbon projects through markets and alternative innovative opportunities

NbS actions, while focused on restoration, conservation and sustainable management, can also be linked with financial mechanisms that can account for ecosystem services provided, such as GHG emission reductions, as part of market-based (carbon trading) or non-market-based (enabling conditions, coastal and community resilience, and/or conservation) projects (Cohen-Shacham et al. 2019).

Financial and capacity building support for adequate and sustainable implementation are critical to support healthy blue carbon ecosystems. Financial flow options could include engaging through the voluntary carbon markets, or the new carbon market approaches and mechanisms under the Paris Agreement (Article 6) including payments for mitigation and adaptation outcomes, to fund blue carbon ecosystem restoration and conservation through private and public financial flows or public-private partnerships (Sumaila et al. 2021). The supply potential of blue carbon credits is favourable, and the increase in prices that buyers or investors are willing to pay make it increasingly attractive to cover the costs of the restoration and conservation initiatives of blue carbon ecosystems (Friess et al. 2022) (Table S-2).

Carbon credits and mitigation outcomes can be used to claim engagement in climate action or to offset carbon emissions from other activities. This involves quantifying the amount of carbon dioxide emissions captured and stored, including by the biomass and underlying soils in coastal and marine ecosystems compared to a scientifically robust baseline (Vanderklift et al. 2019). These claims need to represent real, additional and verifiable emission reduction.

The implementation of nature-based market or offsetting approaches, including for blue carbon, have several common steps including, but not limited to:

1. Baseline setting, against which emission reductions can be measured in a particular area.
2. Carbon accounting, to quantify the amount of carbon that can be sequestered through various management interventions (e.g. conservation and restoration).
3. Certification and verification by an independent third party to ensure the integrity of blue carbon offsetting projects, including the methodology used to calculate the carbon sequestration potential and the accuracy of the data.
4. Sale of carbon credits, where verified credits are purchased by companies, governments or individuals to offset their carbon emissions or to meet their carbon reduction targets.
5. Steps 2–4 are repeated throughout the life of the project to ensure transparency and credibility in the amounts of carbon being sequestered and, thus, in the credits being sold.

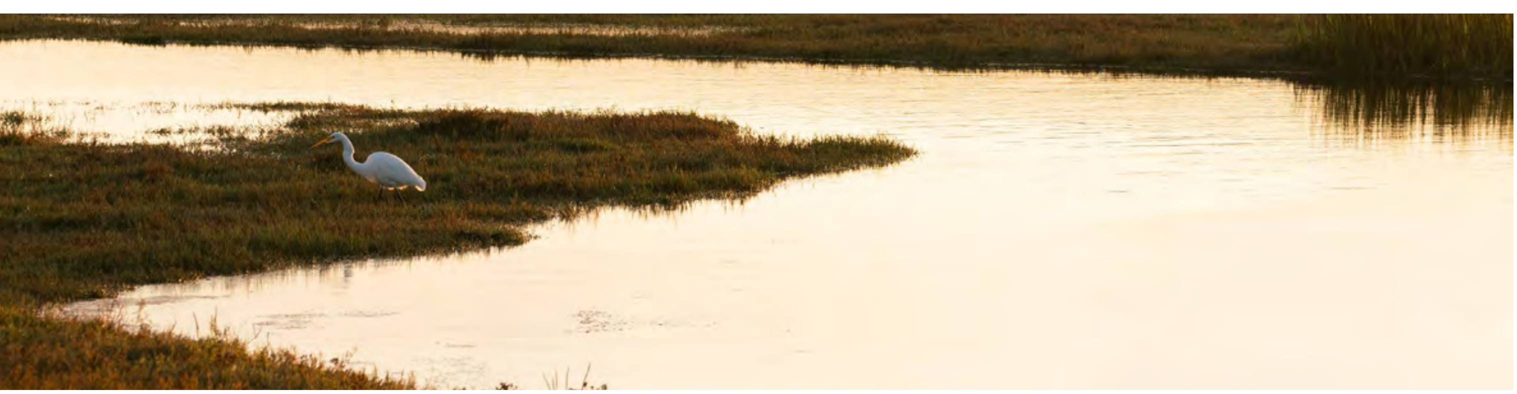


Table S-2. Advantages and disadvantages of using carbon markets as a financial mechanism to support blue carbon ecosystem restoration and conservation

ADVANTAGES	DISADVANTAGES
▪ Carbon markets provide price signals for emission reductions when government incentives are lacking, or in support of government policies. ▪ Established methodologies, standards and infrastructure enable funding. ▪ Helps to bridge financing gaps and supports, for example, debt-for-nature swaps. ▪ High demand for blue carbon credits can be sustained with strong socio-economic and environmental integrity and equity.	▪ High costs and capacity limitations hinder project development, and the measuring, reporting and verification processes need to be streamlined. ▪ Inefficient and costly monitoring and verification processes, particularly for belowground blue carbon estimation. ▪ Land tenure uncertainties and need for long-term management plans. ▪ Unclear blue carbon rights and regulatory changes. ▪ Perceived risks because of past failures and limited operational projects ▪ Inadequate systematic addressing of threats and risks. ▪ Slow scaling up of investments because of market uncertainties and the need for government clarifications. ▪ Potential implications for a country's national mitigation target goals, such as in the NDC.

The revenue generated from the sale of carbon credits can then be used to finance conservation and restoration projects, to the benefit of local stakeholders, often via an equitable benefit sharing plan.

Blue carbon credits can be traded in voluntary or compliance carbon markets, similar to other carbon credit types. Voluntary carbon markets are based on transactions between buyers and sellers who wish to offset their carbon footprint or engage in climate action. In contrast, compliance carbon markets are driven, in part, by government regulations that mandate companies to offset a certain percentage of their emissions to comply with environmental regulations.

Public sector investment

Governments can incentivise blue carbon ecosystem restoration and conservation through policies, government grants, subsidies or tax credits for businesses investing in restoration projects. However, while supporting and favouring avenues for ecosystem conservation and restoration, it is essential also to phase out incentives that encourage the degradation, deforestation, or removal of existing blue carbon ecosystems (Sapkota and White 2020).

Additionally, government initiatives should be careful to avoid attracting actors who may not develop or implement scientifically robust methodologies and equitable projects. This can be achieved by aligning stakeholders' vision through transparency and strategic planning (Wylie et al. 2016).

Another strategy for providing financial incentives for restoration or conservation projects while also providing benefits to local communities is the establishment of payment for ecosystem services programs. These programs reward landowners and communities for the ecosystem services provided by restored or protected blue carbon ecosystems (Hejnowicz et al. 2015).

Private sector investment

Private investors, including corporations and individuals, can participate in the voluntary carbon market as buyers of carbon credits generated by nature-based projects, like blue carbon, or other types of projects. The private sector can also participate in compliance markets by purchasing or trading carbon credits to meet compliance obligations. In both cases, after third-party verification of emission reductions, carbon credits may be sold and kept track of on a registry, ideally public for transparency purposes (Macreadie et al. 2022).

Furthermore, private investors may invest in carbon credits as part of their overall investment strategy. By diversifying their investment portfolio, they can mitigate risks associated with traditional financial markets and explore opportunities in the growing market for emission reductions (Macreadie et al. 2022).

Alternative funding and finance opportunities

Blue carbon projects provide a wide range of ecosystem services that could be monetised beyond carbon, like benefits from storm surge protection, improved fish stocks, or climate adaptation. However, such an approach is hampered by challenges associated with ecosystem service valuation (e.g. adaptation or resilience metrics) and the typically small-scale nature of the project areas (Sangha et al. 2022; Himes-Cornell et al. 2018).

Integrating blue carbon activities and blue natural capital asset companies into broader coastal infrastructure projects can help to access finance more efficiently and from a more comprehensive range of sources, including through blue bonds or development banks.

Public-private partnerships, including those focused on technology transfer and capacity building, can be funded through international support and help implement practical financing tools for blue ecosystem restoration (Sumaila et al. 2021).

What’s next for blue carbon projects?

The advancement of blue carbon projects is one of the many tools for climate action and sustainable development. However, it is essential to recognise and address various knowledge and methodological challenges, as well as finance and policy gaps, to optimise project design, implementation, financing and monitoring.

Investment in research and capacity building, and having good policies in place is needed to realise the implementation of blue carbon projects. This requires collaborative efforts between governments, international organisations, scientific institutions, private sector actors and local communities.

Healthy blue carbon ecosystems and the related projects that protect or restore them present an opportunity for policymakers to have local impact while addressing the pressing challenges of climate change, biodiversity loss and sustainable development. *The Blue Carbon Handbook* provides insights and recommendations for how to effectively implement blue carbon projects at the national and local levels, ensuring their environmental and social integrity.

Blue carbon projects extend beyond climate action, offering co-benefits in terms of resilience, biodiversity conservation, food security, and livelihoods. Financial resources are necessary to implement and sustain durable action to protect, restore and sustainably manage blue carbon ecosystems. Financial mechanisms and approaches could consider a range of options to support project design and implementation that include but are not limited to carbon markets or other non-market approaches, like payment for ecosystem service schemes, or bilateral or philanthropic funding. It is crucial to consider a holistic approach that incorporates climate change (mitigation and adaptation), coastal and community resilience, biodiversity conservation and community livelihood needs. The science, need and opportunity are clear: nature-based solutions, like blue carbon, are part of the solution set to address climate change and biodiversity loss, while also ensuring that the needs of both people and nature are met.

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The Blue Carbon Initiative was established in 2010 to accelerate the recognition of the importance of coastal and marine ecosystems for climate change mitigation and facilitate the integration of science and policy such that efforts to mitigate climate change are science-driven and include conservation, restoration, and sustainable use of coastal and marine ecosystems. It is coordinated by Conservation International (CI), the International Union for Conservation of Nature (IUCN), and the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific, and Cultural Organization (IOC– UNESCO). The BCI advances blue carbon science through syntheses and methodological guidance to facilitate development and implementation of climate-relevant policy, management and, more broadly, climate change actions at the local, national, and international levels.

The International Partnership for Blue Carbon (IPBC) is a global network of government agencies, non-governmental organizations, intergovernmental organizations and research institutions that share a vision that all global coastal blue carbon ecosystems (mangroves, tidal marshes and seagrasses) are protected, sustainably managed or restored – contributing to climate change mitigation, adaptation, biodiversity, ocean economies and livelihoods of coastal communities. The Partnership provides an open forum for Partners to connect, share and collaborate to build solutions, take actions, and benefit from the experience and expertise of the global community. The Partnership was launched at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties in Paris in 2015 (COP21) by nine founding Partners, and has since expanded to over fifty Partners in 2023. The Partnership is coordinated by Australia with the support of IOC-UNESCO.

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