Supplement

Blue Carbon Ecosystems

Climate Investment Planning and Mobilization Framework

May 2025

NDC PARTNERSHIP | Pew

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About the Supplements

Supplements provide a thematic perspective on the investment planning process outlined in the Climate Investment Planning and Mobilization Framework, offering additional guidance, best practices, success stories, and support resources. The Blue Carbon Ecosystems Supplement is designed for decision-makers and practitioners, particularly national governments working to implement NDC targets for blue carbon ecosystem conservation and restoration. It also supports those updating their NDCs to strengthen or incorporate financeable commitments for these ecosystems.

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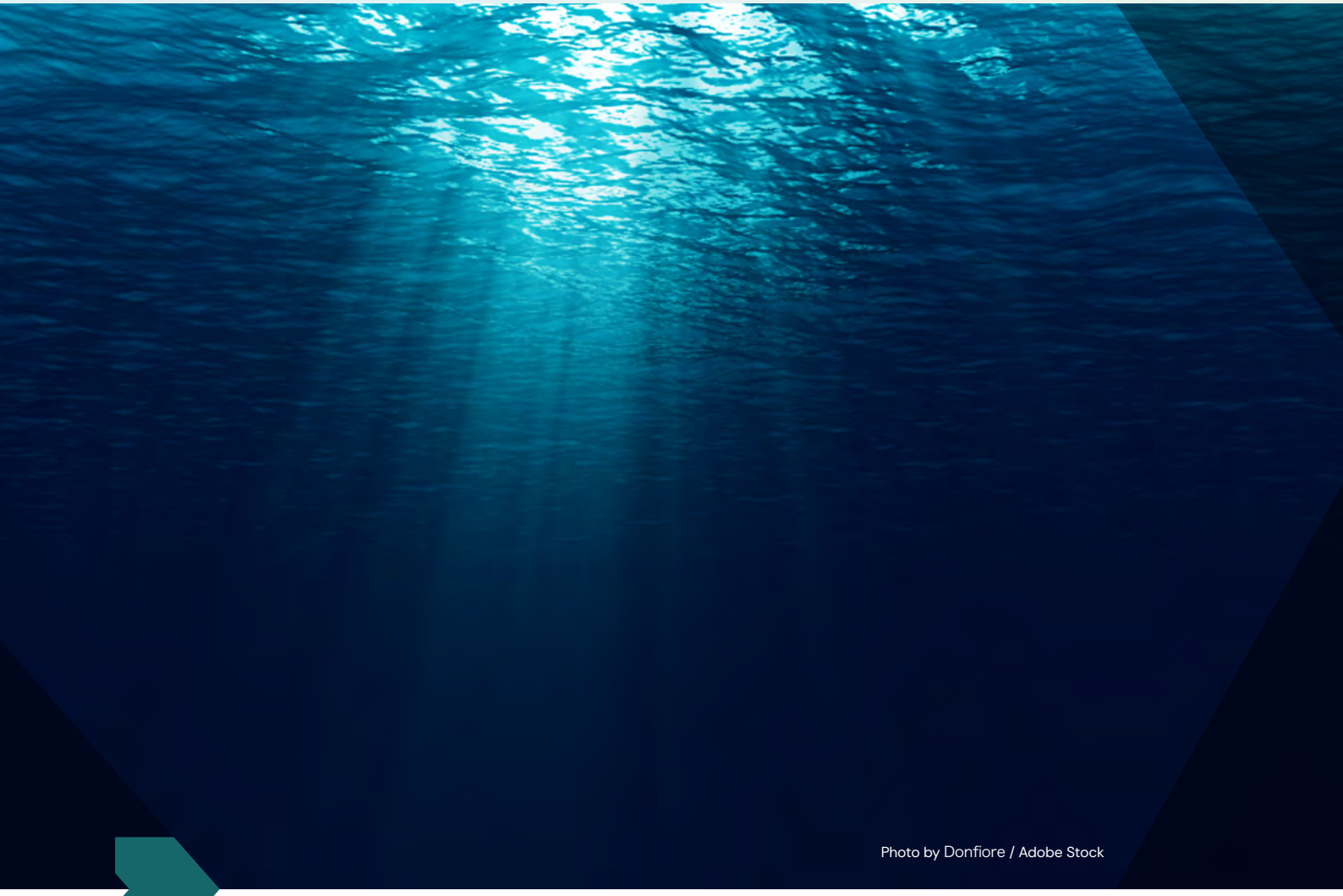

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Introduction

The Importance of Blue Carbon Ecosystem Conservation for Climate Action

Blue carbon ecosystems (BCEs), also known as coastal wetland ecosystems, include mangrove forests, seagrass meadows, and tidal salt marshes. They are described as "blue" carbon ecosystems because they are located where land meets sea, and they sequester and store large amounts of carbon in their biomass and in the sediment. In fact, these BCEs store three to five times more carbon per unit than tropical forests (McLeod et al., 2011) and are recognized by the Intergovernmental Panel on Climate Change (IPCC) for the measurable contribution that they can make to countries' emission reductions strategies. If these ecosystems are degraded or lost, they release the carbon they have stored back into the atmosphere. Conversely, if conserved and left undisturbed, BCEs can store carbon for millennia, serving as an important carbon sink.

Beyond their climate mitigation benefits, BCEs also play a critical role for people, nature, and climate by providing habitats for coastal biodiversity, helping communities adapt to floods, storms, and other impacts of climate change and supporting coastal fisheries and recreation economies. Despite this array of benefits, BCEs are some of the most threatened ecosystems on the planet.

The protection, sustainable management, and restoration of BCEs therefore constitute nature-based solutions to climate change, meaning these activities address societal challenges effectively and adaptively, simultaneously benefiting people and nature (IUCN, 2024). As governments contend with the severe impacts of climate change, an increasing number are conserving and restoring their BCEs to help them mitigate and adapt to climate change.

The climate mitigation value and adaptation benefits of BCEs can be recognized in countries' Nationally Determined Contributions (NDCs) to the UNFCCC Paris Agreement through commitments to conserve, restore, and effectively manage coastal wetlands. Countries may include targets for BCEs within either or both the adaptation and mitigation sections of their NDC.

- **In the adaptation section of an NDC,** targets may include actions that recognize benefits relating to resilience, biodiversity, the economy, fisheries, community, and other relevant ecosystem services. They may be measured qualitatively or quantitatively, and they may also include quantitative calculations of likely mitigation benefits based on site-specific or IPCC default values.
- **In the mitigation section of an NDC,** targets that are expressed as quantitative emissions reduction metrics should include assessments of the necessary area-based conservation or restoration goals and follow the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands.

While BCEs are critically important for coastal climate adaptation and resilience, biodiversity, and local economies, their conservation and restoration are not a mitigation panacea at the global level. For some countries, the rates of loss or scope for restoration might contribute to a significant component of their NDC. However, globally, BCEs mitigate less than 1% of global emissions (Friedlingstein et al., 2022). If the entire estimated restorable area of BCEs (18–32 million hectares) were restored, they would sequester between 229 and 841 teragrams (Tg) of carbon per year, amounting to only 3% of annual global emissions (Macreadie et al., 2022). The benefits of conservation and restoration of these coastal wetlands should not therefore be seen solely through the lens of carbon: they are critically important for people, nature, and climate, and their conservation and restoration must be paired with economy-wide decarbonization to achieve the goals of the Paris Agreement.

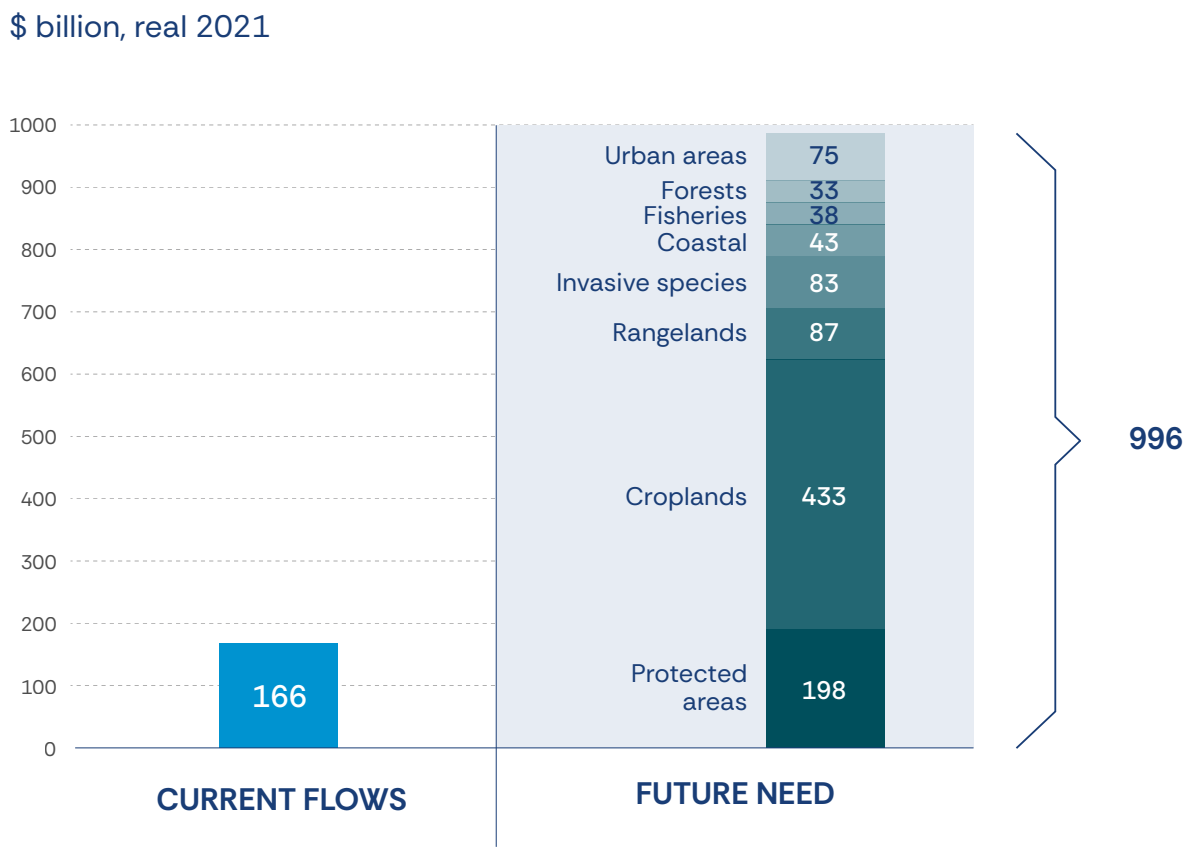
BCEs play a critical role for people, nature, and climate by providing habitats for coastal biodiversity.

Advancing BCE Investments for Climate Action and Sustainable Development

Biodiversity and ecosystem services, including those in BCEs, are crucial for human well-being and economic activity. However, human activities have led to a rapid decline in biodiversity, prompting the need for sustainable financing to fund conservation efforts. And so, in 2022, the UN Convention on Biological Diversity adopted a new global framework, the Kunming-Montreal Global Biodiversity Framework, to halt and reverse the loss of nature while also closing the biodiversity finance gap. Recent studies suggest that the current gap to fully funding biodiversity is estimated to be US$722-996 billion annually, over the next decade (Paulson Institute 2020; Cuming & Bromley, 2023). Financing for coastal areas, including for BCEs, represents about US$83 billion of this total need for biodiversity finance (Figure 1).

Governments can effectively integrate BCEs into their NDC 3.0 through cost estimates for implementing these targets and through the development of investment planning and mobilization strategies (Box 1).

FIGURE 1 **Current Annual Biodiversity Finance Flows Compared to the Funding Needs for Biodiversity Conservation by 2030**



Source: Adapted from the Paulson Institute 2022 and Bloomberg NEF 2023.

BOX 1. Examples of BCE Costing in NDCs

- **Costa Rica:** In 2024, Costa Rica hosted a workshop to measure progress towards achieving their coastal wetland NDC 2.0 targets and identify existing and potential financing sources. There were presentations on the latest financing developments and workshops on actionable next steps to improve regulations, support coastal communities, and operationalize financing. Participants noted the importance of developing NDC targets with indicators to measure progress; these targets with indicators can then inform the types and amount of financing to fill gaps best. Participants emphasized the importance of securing long-term sources to fund potential mechanisms.

- **Papua New Guinea:** Papua New Guinea's 2020 NDC is one of the few NDCs with costed estimates for its NDC targets. For each target, Papua New Guinea estimated the costs by consulting the implementing agencies, which conducted desk-based studies to estimate implementation costs. Where possible, existing data on implementation costs from other frameworks, such as Papua New Guinea's REDD+ strategy and implementation plan, was integrated into the NDC cost estimates. To improve the accuracy of NDC costing, NDC facilitators from Papua New Guinea recommend conducting feasibility studies to refine cost estimates; they note that doing so takes financial expertise and would require financial support.

- **Vanuatu:** In 2021, Vanuatu submitted an NDC that is consistent with Article 9 of the Paris Agreement, which calls for Parties to account for their financial needs in implementing adaptation and mitigation commitments. The approximate conditional cost of achieving Vanuatu's 2021 NDC is US$1,214,350,000. Vanuatu's 2021 NDC includes the following adaptation commitments to coastal wetlands and their associated costs:

  > To conserve, protect, and sustainably manage mangrove forests and mangrove ecosystems, wetlands, and shoreline trees especially as a measure to enhance resilience against the impacts of climate change (US$1,170,000).

  > To conserve at least 17% of important biodiversity areas, at least 30% of natural forest, at least 10% of wetland areas, and 10% of marine areas through effective community and government management measures by 2030 (US$460,000).

  > To protect naturally resistant or resilient areas including coral reefs that still have high coral cover and mangroves and coastal wetlands that can migrate inland (US$ 2,000,000).

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Rationale for a BCE Supplement

In a context in which the critical role of conserving BCEs for climate mitigation, biodiversity protection, economic growth, and social well-being is increasingly acknowledged, effective planning for related investments becomes essential. Such planning not only helps unlock the financial resources needed to protect and restore these ecosystems but also ensures that BCEs are fully integrated into national climate strategies, sustainable development frameworks, and financial decision-making processes. Doing so can enable countries to enhance their climate resilience, reduce emissions, support local livelihoods, and create new economic opportunities, while safeguarding vital natural capital for future generations.

This document provides governments, financial institutions, and other stakeholders with resources, including guidance materials and case studies, to support the advancement of blue carbon ecosystem investment planning. It is presented as a supplement to the NDC Partnership and GCF's Climate Investment Planning and Mobilization Framework ("the Framework") and offers a deeper exploration of key financial and policy aspects necessary for effectively mobilizing resources to protect and restore BCEs in alignment with climate and development objectives (Figure 2).

This supplement includes real-world case studies that highlight successful approaches to blue carbon investment planning and implementation. These case studies showcase lessons learned from countries that have effectively incorporated BCEs into their NDCs and national investment strategies, presenting best practices in finance mobilization, policy development, and stakeholder engagement. The supplement supports governments, financial institutions, and other stakeholders in navigating the complexities of BCE financing and also aims to address country efforts to scale up investment in nature-based solutions, ensuring that BCEs continue to provide critical climate, biodiversity, and socio-economic benefits.

FIGURE 2 The Climate Investment Planning and Mobilization Framework

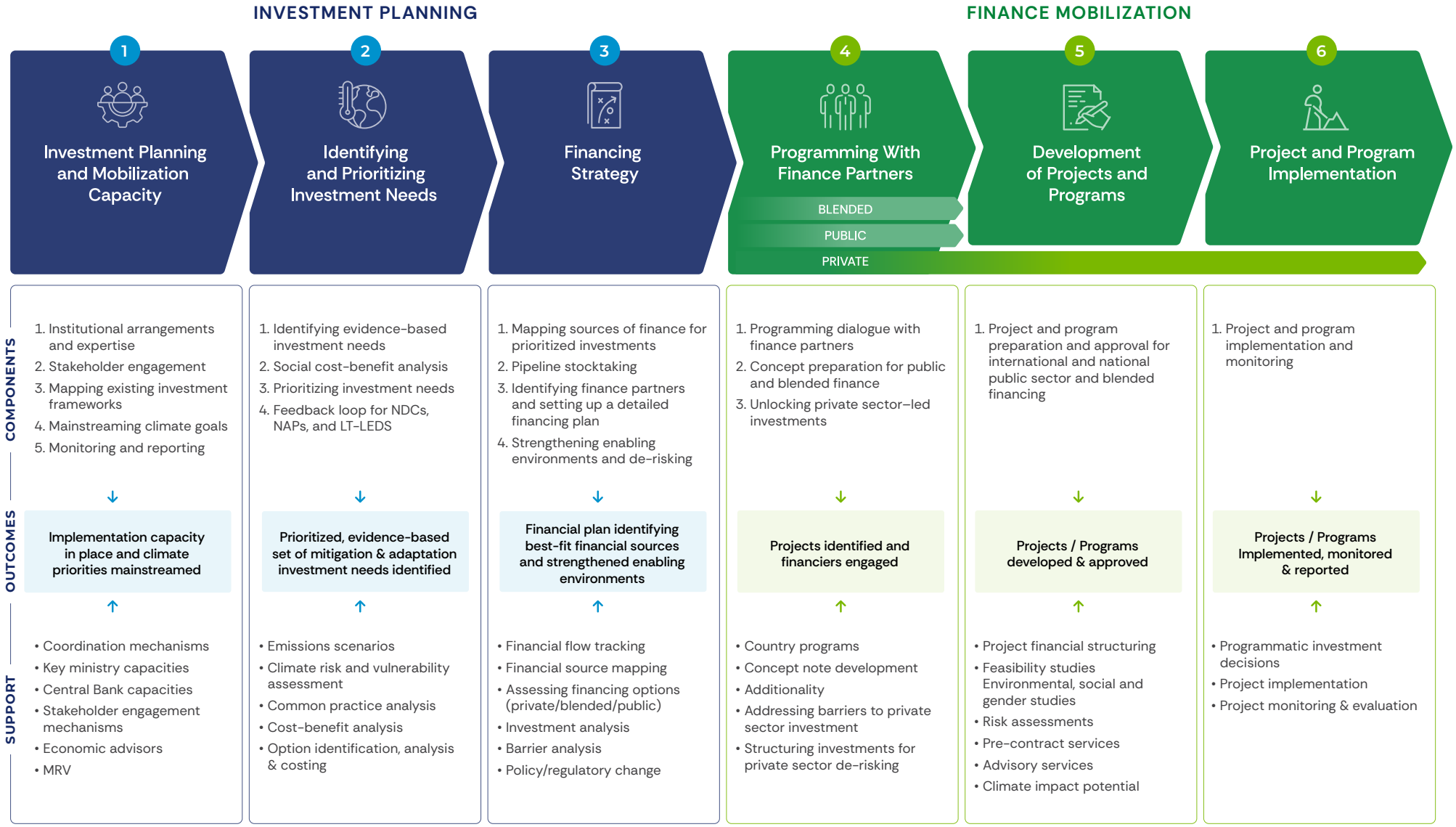

Photo by Richard Carey / Adobe Stock

FIGURE 3 The Climate Investment Planning and Mobilization Framework

This supplement builds on various stages and components of the Framework, with a deeper focus on two core elements. First, Stage 3, Component 1: Mapping sources of finance for prioritized investments, which provides insights into the public and private financial mechanisms available to support blue carbon investments, including carbon markets, blended finance approaches, and innovative financing instruments. Second, Stage 3, Component 4: Strengthening enabling environments and de-risking, which focuses on improving baseline data and clarifying policy conditions to catalyze investments in blue carbon ecosystems. Further links to the Framework are also referenced, with hyperlinks provided throughout.

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Enabling Conditions for Financing and Implementing Blue Carbon Ecosystem NDCs

Sustainable financing of BCEs requires that enabling conditions for governance, policy, and community buy-in are in place. Common challenges to delivering finance include having an insecure or unclear land tenure; lacking management or policy frameworks; lacking effective monitoring, reporting, and verification; and lacking community engagement (see CIPMF, Stage 1).

Opportunities for Governments

- **Collect baseline data:** Gather data on coastal ecosystems (e.g., extent, drivers of loss, etc.) to design financial instruments tailored to country-specific conditions (see CIPMF, Stage 2).
- **Clarify policy conditions:** Implement policies and management plans that define rights and jurisdictions from the local to national levels (see CIPMF, Stage 1).
- **Identify implementation costs:** Based on baseline data, existing policy, and management plans, develop an implementation budget including current funding and existing gaps (see CIPMF, Stage 2, Component 2).
- **Build internal capacity:** Use grants, loans, or public finance to ensure government agencies have the capacity to take on funds, implement activities, uphold the law, and disperse funds to communities (see CIPMF, Stage 1).
- **Implement stable policies:** Implement policies that are consistent, clear, and subject to minimal change to demonstrate to investors or financing bodies that the country does not pose a financial risk (see CIPMF, Stage 1, Component 1).

Baseline Data

Clarifying these enabling policy conditions form the foundational pillars for facilitating, mobilizing, and implementing funding. Conditions are unique to each country but encompass a broad range of legal, socio-economic, institutional, and environmental variables for investments. Investments often rely on baseline ecosystem data, stable policies, adequate management, and enforcement. Unlocking the potential for financing BCEs hinges on addressing inadequate policy conditions, and including such goals in a country's NDC is an opportunity to do so (see CIPMF, Stage 2, Component 1).

Data on BCEs is critical to developing effective management plans and accessing financing. Information such as ecosystem extent and historic loss can help identify priority actions and needs, including the types and amount of financing required. Some financing options such as carbon markets or biodiversity credits require historical data and information to demonstrate that restoration or conservation is truly additional. Additionality indicates that the carbon would not be sequestered and stored without the support of carbon credit finance and is a requirement for carbon market projects. In this context, collecting baseline data can help define and prioritize needs, next steps, and potential financing solutions to attract investors (Box 2).

BOX 2. Belize Baseline Data Case Study

To ensure that Belize's 2021 mangrove and other coastal wetland NDC commitments were backed by robust science, the country undertook its first ever comprehensive above- and below-ground carbon assessment in September 2022. Led by the Smithsonian Institution in partnership with the University of Belize and World Wildlife Fund and supported by The Pew Charitable Trusts, the project brought together government departments, local non-governmental organizations (NGOs), and international researchers to take soil cores and tree measurements to estimate the amount of carbon stored in Belize's mangroves.

Key findings from the Smithsonian-led study, Belize Blue Carbon: Establishing a national carbon stock estimate for mangrove ecosystems, which was published in the journal *Science of the Total Environment* in April 2023, include:

- The almost 58,000 hectares of mangroves of Belize currently store an estimated 25.7 million metric tons of carbon.
- Higher total carbon stock is found in tall, healthy, riverine mangrove ecosystems.
- Collaboration, knowledge sharing, and local buy-in are key for mangrove conservation.

To inform future management decisions for Belize's mangroves and to enable the protection, restoration, and carbon sink goals in Belize's NDC, a land tenure analysis of Belize's mangroves is underway. The land tenure analysis will aim to produce an updated land tenure inventory for Belize's mangrove areas, which will facilitate the engagement of coastal-marine land stakeholders (public and private) in fostering sustainable and climate-smart approaches around and within mangroves. This study will provide the baseline data and enabling conditions for which Belize may implement their ambitious, inclusive, and science-based mangrove-related NDC goals.

Photo by Mindaugas Dulinskas / WWF

Clarifying Policy Conditions

Investors in the conservation of BCEs (including carbon credits and other mechanisms) are averse to risk, particularly from fluctuating policy conditions. To attract external financing, governments should enact effective and stable policies that provide clear entry points for investment and demonstrate commitment to sustainability. For example, correcting market distortions by redirecting harmful subsidies towards beneficial coastal activities exhibits a commitment to protect coastal ecosystems. Signaling government buy-in indicates to investors that their investments will not be undermined by harmful practices. Removing barriers to progress must also coincide with opportunities for the private sector, investors, and philanthropy to provide support. An absence of regulation signals a lack of opportunity, as in the case of carbon market projects. Blue carbon ecosystem policy frameworks can fill this gap and lay the foundation for project development and investment while setting project quality standards (see CIPMF, Stage 3, Component 4 and Stage 4, Components 2 and 3).

Governments must address the underlying policy conditions that prohibit the effective management and stewardship of coastal ecosystems; doing so will unlock financing potential. This may include designing policies to attract high-quality investment through stable regulatory environments and strengthened management and enforcement. Many communities in coastal ecosystems have insecure land tenures and are vulnerable to displacement, the loss of livelihood, the inability to access resources, and exploitation. these vulnerabilities result in a lack of incentive to conserve the environment, an inability to access financing, and an exclusion from decision making. In Kenya, the government unlocked carbon market access by passing legislation on community forestry management in mangroves, granting communities the ability to restore degraded mangroves through carbon finance (see CIPMF, Stage 3, Component 4).

Enabling conditions go beyond policy and include indicators of government buy-in and the presence of financing institutions. International funding bodies operating within the country, such as the World Bank or the Green Climate Fund, could incentivize governments to prioritize environmental conservation, including the protection of coastal wetlands. Additionally, development funding can provide a vital runway to create the necessary conditions for other financing bodies to participate. However, governments must have the internal capacity, knowledge, and skills to apply for funding opportunities and manage those funds once achieved (see CIPMF, Stage 1, Component 1).

To attract external financing, governments should enact effective and stable policies that provide clear entry points for investment and demonstrate commitment to sustainability.

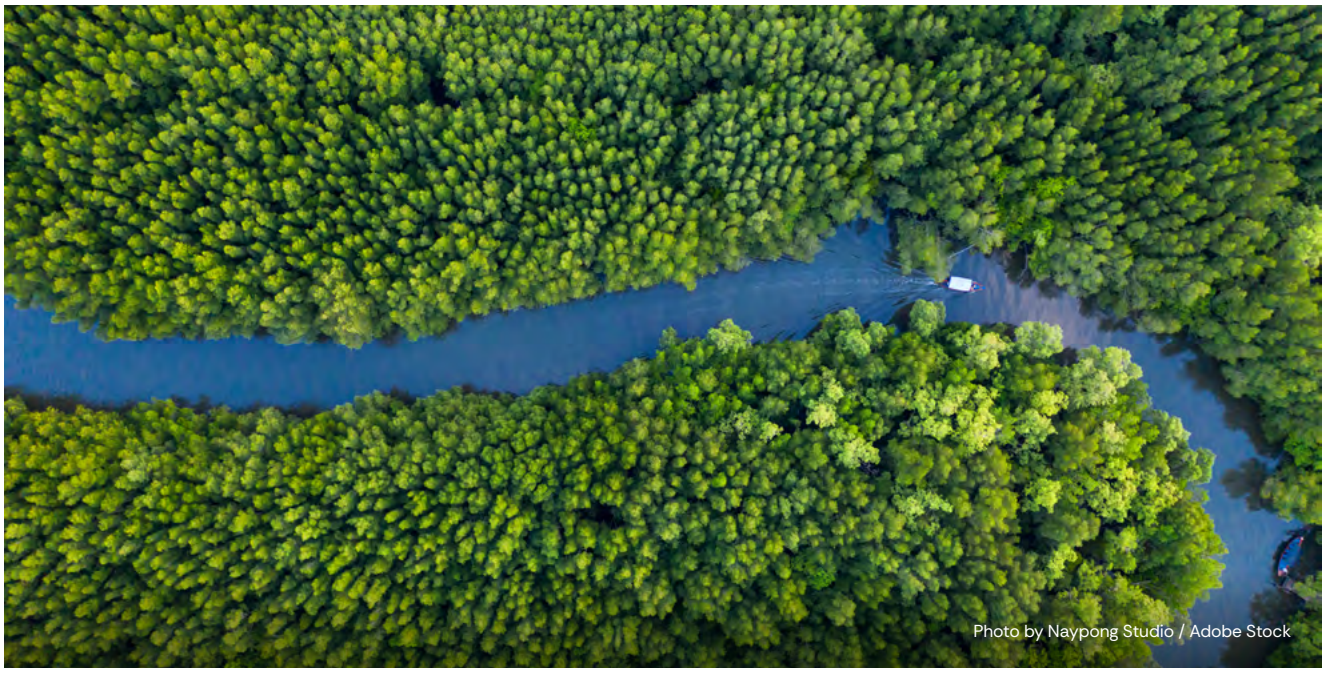
Photo by Naypong Studio / Adobe Stock

Given the barriers discussed above, countries need to assess blue carbon opportunities that are "financeable," or worth investing in. "Investible" mangrove blue carbon has been defined as areas that would be under imminent threat of decline or loss if left unprotected by a conservation intervention (Zeng et al., 2021). This definition is based on the "additionality" criterion for certifiable carbon credits under international carbon market trading requirements. Demonstrating investibility requires information gathering—for example, modeling the magnitude of certifiable carbon from mangrove blue carbon projects and their mitigation potential. A preliminary desktop study provided a global estimate of 13.76 million hectares (Mha) of mangrove forests worldwide, approximately 20% (2.6 Mha) of which is potentially investible for carbon finance projects, based on the probability of imminent threat. This corresponds to a mitigation rate of about 0.13% of annual global carbon dioxide emissions or a 1.02% emissions reduction from forestry and other land use (FOLU) between 2002 and 2011 (Zeng et al., 2021).

However, these are only preliminary estimates given the recent increase in carbon credit prices, exclusion of key enabling criteria such as land tenure from the analysis, and the assessment of exclusively conservation-based activities. Therefore, further research should explore the full extent of mangrove areas available for carbon crediting (see CIPMF, Stage 3, Component 4).

Creating the enabling conditions through policy and private stakeholder processes provides opportunities for unlocking BCE financing. In many cases funding will not "automatically flow" unless these conditions are present. Public and private partnership approaches including commercial decisions on blue carbon protection will require collaboration on data generation that informs climate mitigation benefits as well as financial returns on investments. This information should inform activities at various levels including site-specific, national, regional, and global scales (see CIPMF, Stage 1, Component 1).

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Existing Barriers to Blue Carbon Ecosystem Financing for NDC Implementation

Despite the growing interest in BCEs and their ability to contribute to adaptation and to mitigate climate change, countries face an array of barriers to accessing financing. The primary barrier is a lack of financial resources to allocate to domestic needs, including to coastal wetlands, due to competing interests. Where financial resources do exist, low institutional capacity and expertise limit access and implementation of climate and biodiversity finance (see CIPMF, Stage 1).

A general lack of data ready for the government and information on BCEs, rates of BCE loss, causes of degradation, and local uses compound challenges and can lead to poorly informed policies and decision-making. Standardized methodologies and approaches may facilitate consistent data collection and provide the necessary ecosystem-specific knowledge required to channel financing for lasting impact (see CIPMF, Stage 2).

International financing sources, such as Multilateral Development Banks (MBDs), can provide national and financial support but are often difficult to access due to strict requirements and eligibility criteria. Furthermore, funds often have compliance and reporting requirements that can make applying for opportunities difficult without in-country capacity, and implementing funds can be a lengthy process.

Fragmented policies and inadequate enabling conditions pose significant barriers to accessing and allocating public finance. Misaligned policy priorities across government agencies; overlapping or conflicting policies; or asymmetrical policies at the national, regional, and local levels result in incoherent frameworks. Disjointed policies often result in gaps or overlap in agency responsibilities, which cause bureaucratic delays and opaque divisions of power that complicate allocating or accessing finance. Similarly, finance requires the enabling policy conditions that complement the financing tools being utilized and accessed. Enabling conditions should include strong institutional frameworks, clear policies and guidance, and robust and clear governance structures. Improper enabling conditions may cause market failures and the misappropriation of funds and may limit access to international financing sources (see CIPMF, Stage 1, Component 3).

BOX 3. Trends in Requests for Support to the NDC Partnership for Blue Carbon Ecosystem Finance

Trends in requests for support to the NDC Partnership can help partners tailor projects, programs, and funding to better respond to developing countries' blue carbon financing and investment needs. Seven countries have submitted 23 "blue carbon financing and investment" requests for support, comprising less than %1 of all requests received by the NDC Partnership. Of these requests, 35% are supported, compared to a 60% support rate across all requests received by the Partnership. Governments are still seeking support for 65% of these requests, all from countries' NDC Implementation/Partnership Plans. The three most common activity types in these requests also encounter the largest gaps in support: developing bankable projects and pipelines (15 requests, 80% unsupported); project and program financing and resources mobilization (9 requests, 78% unsupported); developing studies and analysis (9 requests, 56% unsupported).

The following are some requests for blue carbon ecosystem investment support received by the NDC Partnership:

- The **Dominican Republic** requested support to develop a **fund for the recovery of mangroves, estuaries, coral reefs, and other coastal-marine ecosystems and species.** No support has been committed.
- **Indonesia** requested support to **enhance resource mobilization** for NDC implementation by **stocktaking innovative finance frameworks, including for a blue economy.** This was supported by ICLEI, UNDP, and UNICEF.
- **Senegal** requested support to develop an **NDC investment strategy and financing scheme** across various sectors, including **identifying and prioritizing investment needs in the coastal sector.** This effort, which was led by the Ministry of Environment, was supported by GIZ.

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Types of BCE Financing

There is a suite of government and private sector financing opportunities for integrating climate and nature into NDCs and for financing BCEs. Financing opportunities for BCEs are not limited to carbon offsets or credits; a wider range of finance frameworks such as "Greening finance," in which financial flows are directed away from harmful projects towards positive environmental investments, and "Financing green," in which investments are directed to climate action and nature-based solutions (Wright et al., 2024).

Solutions within these frameworks include bonds, blended finance and parametric insurance, and similar mechanisms are available.

Marine environments pose special challenges to implementation due to their fluid and transboundary nature (Bladon et al., 2016). An enabling environment must be created by addressing policy gaps and government subsidies that negatively impact climate and conservation outcomes.

Successful financing schemes require clear property rights, robust science and baseline data, effective governance, and financial sustainability (Bladon et al., 2016) (see CIPMF, Stage 3, Component 3). A range of public and private financing options is available (see Appendix 1 for more detail on these options):

1. **Public financing options** include grants from donors and philanthropic organizations; concessional financing from development banks and bilateral lenders; sovereign green/blue bonds and sovereign sustainability-linked bonds (SLBs); debt for results refinancing, including debt-for-nature/climate swaps and subnational green/blue investments (Wright et al., 2024).
2. **Private and market-based financing options**, which are dependent on regulatory conditions, include private equity/nature investment funds; carbon markets; outcome bonds (e.g., Wildlife Conservation Bond); payment for ecosystem services (PES), insurance, biodiversity credits, and other ecosystem crediting approaches.

To appropriately prioritize blue carbon ecosystem investments, there must be a clear understanding of the baseline data, including the ecosystem status and level of threat, the existing policy implications, and the relevant financial mechanisms. This information should also allow for an assessment of the enabling conditions and feasibility of financing opportunities. These elements are discussed in Appendix 1.

Domestic Public Sources of Finance for Implementing BCE NDC Commitments

Globally, coastal green infrastructure (including wetlands) receives only about 3% of global coastal investment compared to gray infrastructure (e.g., roads and buildings); more balanced public financing is needed (McCreless et al., 2016). Because BCEs are public goods, they are often exploited or undervalued. It is, therefore, public institutions that are responsible for providing the policy and financial framework for BCEs. However, because of competing priorities, national or public financing of BCEs is often insufficient.

Domestic public finance is one important way to finance BCEs by directly allocating funds from national budgets or implementing environmental taxes and subsidies to reward or discourage behaviors that impact the environment (see CIPMF, Stage 1, Component 4).

Each of these mechanisms plays a different role in conserving, restoring, and managing coastal wetlands. Historically, government budgets have subsidized sectors, including development, agriculture, and extractive industries, that damage coastal ecosystems. Instead, development subsidies that destroy mangroves could be redirected towards restoration, conservation, and the development of new sustainable industries such as ecotourism. Shifting public funds provides a financial incentive for sustainable development while reducing ecosystem pressures without needing to identify new funding streams.

Photo by Tanes / Adobe Stock

Taxes, charges, and subsidies regulate the prices of resources that produce environmental or social harm. Taxes and charges target the prices consumers and producers pay in order to discourage harmful practices. Governments can channel revenue from taxes into conservation or restoration programs. In general, countries may also direct taxes towards funding environmental programs or into conservation trust funds that finance capacity building efforts or conservation and restoration (see CIPMF, Stage 3, Component 4).

Domestic public financing requires balancing environmental taxes with subsidies while redistributing harmful subsidies. Taxes discourage environmentally harmful behavior, while subsidies incentivize positive behavior. Governments can provide subsidies for activities that would not otherwise be financially viable, such as adopting environmentally friendly fishing gear or protecting tidal salt marshes. Governments should carefully consider how much money to provide and how to counteract harmful practices and ensure that any support does not promote activities that negatively impact coastal ecosystems.

For example, countries spend $35.4 billion on fishing subsidies that can negatively impact coastal communities by decreasing catch, increasing fishing effort, and inflicting economic hardships that can drive local habitat degradation (Sumaila et al., 2019). National budgets, taxes, and subsidies are important financial mechanisms governments can leverage to reduce harmful activities and promote conservation and restoration. Balancing taxes and subsidies can create sustainable financial streams and support coastal wetlands without negatively impacting the economy (see CIPMF, Stage 3, Component 4).

Domestic public financing requires balancing environmental taxes with subsidies while redistributing harmful subsidies.

International Public Sources of Finance for Implementing BCE NDC Commitments

Restoring coastal seagrass, tidal salt marshes, and mangrove habitats to their historic extent by 2050 is estimated to cost between US$27 billion and US$37 billion per year (Edwards, 2021). Domestic public funding will not be able to cover all these costs. Additional funding especially from international public sources in the form of loans, grants, and technical assistance can address additional financing needs. Multilateral Development Banks (MDBs) and Official Development Assistance (ODA) provide loans, grants, and technical support for countries to scale environment and climate-related initiatives (see CIPMF, Stage 4, Components 4 and Component 5).

MDBs can offer long-term financing for national coastal wetland conservation and restoration projects. They offer loans, grants, and technical support that can provide critical upfront financing for long-term projects that require reliable funding. Projects that require financing beyond the initial loan or grant can leverage MDB funds to attract private investors or other additional financing, which can help de-risk projects or implement activities that have high costs, such as restoring abandoned aquaculture ponds to mangrove forests. Whereas MDBs operate in a large swath of countries, ODAs target developing economies and sustainable development activities such as reducing poverty and increasing local capacity. Funding counts as development assistance if it comes from an official government or agency, promotes national welfare, and is concessional (below-market rates). The United Kingdom's Blue Planet Fund—a £500 million program to support marine conservation around the world—serves as a primary example of development assistance at work (UK Blue Planet Fund, 2024).

Debt financing mechanisms, such as debt for nature swaps and blue bonds are innovative ways to raise funds by capitalizing on a country's financial requirement to repay outstanding debt. In the case of debt for nature swaps, a country's debt holders forgive or restructure a portion of the debt in exchange for investments into coastal conservation or restoration projects (Box 3). This financing mechanism alleviates national debt and allows money that would normally go towards loan repayment to be directed towards the blue economy. Alternatively, blue bonds allow governments to raise money for specific BCE projects. The bond purchasers provide an investment that the government (the issuer) repays over time. Blue bonds are similar to traditional bonds but are designated for blue economy projects and are based on performance. They are best suited for projects that require high levels of capital over a long period and can provide a return on investment, such as mangrove restoration for ecotourism. Blue bonds correct for an overreliance on traditional philanthropy, provide cheaper financing than bank loans, and transfer potential risk to investors (see CIPMF, Stage 3, Component 4).

BOX 3. Belize's Blue Bonds and Debt for Nature Swaps

Debt for nature swaps and blue bonds can be used separately or, as in the case of Belize, together. To alleviate national debt, the Belize government restructured nearly $550 million of external debt by issuing a blue bond worth $364 million, which was underwritten by Credit Suisse. The funding allowed Belize to buy back—at a 45% discount—its external debt, which the government must pay over a 20-year period.

As part of the deal, Belize committed to investing US $180 million in marine conservation, marine protected areas, and economic development for the blue economy such as fishing and ecotourism. Since Belize implemented the bond, the government expanded biodiversity protection to 20.5% of their ocean, designated mangrove reserves, and started a Marine Spatial Plan (MSP).

Photo by James / Adobe Stock

Opportunities for Governments

- **Implement taxes:** Use taxes to discourage behavior that negatively impacts the environment and to fund blue carbon ecosystem conservation and restoration.
- **Implement subsidies:** Use subsidies to promote behavior that positively impacts BCEs.
- **Remove harmful subsidies:** Remove subsidies that negatively impact the environment and redirect them towards funding blue carbon conservation and restoration.

Market-based Sources of Finance for Implementing BCE NDC Commitments

There is an explosion of interest in carbon finance opportunities for nature-based solutions from a variety of entities in both the nonprofit and private sectors. Investor and corporate interest in carbon credits is real and has the potential to deliver substantial flows of funding to support the conservation and restoration of BCEs. A study by Griscom et al. (2017) showed that Natural Climate Solutions (NCS), defined as deliberate human actions to protect, restore, and improve the management of forests, wetlands, grasslands, oceans, and agricultural lands to mitigate climate change, deliver over one-third of the cost-effective climate mitigation needed by 2030 to limit global warming to below 2°C. Among these solutions, reforestation offers the greatest potential for carbon sequestration, although it is not the most cost-effective option.

McKinsey estimates that "demand for carbon credits could increase by a factor of 15 or more by 2030 and by a factor of up to 100 by 2050 (Cindy Levy & Pinter, 2021). Overall, the market for carbon credits could be worth upward of $50 billion in 2030." However, a more recent report by Refinitiv suggests that the value of traded global markets for carbon dioxide (CO2) permits grew by 164 percent to a record 760 billion euros ($851 billion) in 2021 (Chestney et al., 2022). Improving the estimates of global demand will be essential as carbon market opportunities mature. Regardless, the potential of these markets has not yet been realized. Several challenges could limit the supply of high-quality credits reaching the market, including meeting monitoring, reporting, and verification criteria for quality; political and governance challenges; high project costs; and scarce seed funding. Carbon markets come with risks. Poorly designed projects become counterproductive and can have a negative impact on climate mitigation or on other conservation objectives. High-quality solutions must be designed for each situation based on the best available science and robust engagement with all relevant stakeholders, including local communities.

Article 6 of the UNFCCC is an international framework that facilitates carbon trading or other approaches to meeting NDC targets. Article 6 is now fully operational, and governments are signing bilateral agreements and implementing policies for Article 6.2, which allows the exchange of emissions reductions between countries through national trading rules. By developing these frameworks early and with private sector and community input, governments are signaling their interest in participating in carbon market mechanisms that can attract potential investors. Currently, there has only been one Article 6.2 transaction, although this number is expected to increase as more policies and frameworks operationalize.

Demand for carbon credits could increase by a factor of 15 or more by 2030 and by a factor of up to 100 by 2050. The market for carbon credits could be worth upward of $50 billion in 2030.

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Several market-related challenges currently limit the implementation of blue carbon projects and the sale of resulting credits, including the comparative cost and burden of verifying blue carbon and verifying carbon credits in other ecosystems (Friess et al., 2022). These challenges may include the small scale of blue carbon projects currently and the double counting of credits by commercial and national institutions. This is why a portfolio of private and public financial instruments will be needed to generate funding streams that are substantial and reliable enough to realize the potential of BCEs as a natural climate solution. Public finance mechanisms are established and accessible to governments now but are also only one piece of a larger puzzle of financial solutions for protecting and restoring BCEs.

Engaging external sources is critical to protecting and enhancing nature and to meeting national targets set out within NDCs.

The United Nations Framework Convention on Climate Change provides the framework for countries to voluntarily cooperate to reduce emissions, adapt to climate change, and meet climate targets. Established under Article 6 of the Paris Agreement, countries can transfer carbon credits earned in one country to another. There are two pathways to trade credits: under the Paris Agreement Crediting Mechanism (PACM) and through bilateral/multilateral trade under Article 6.2. Currently, BCEs are eligible for trade under the Article 6.2 rules, meaning that countries must institute national frameworks, guidance, and policies to begin trading. However, the PACM system has not developed methodologies for forestry and blue carbon ecosystems, although it is likely to at some time in the future. Once the methodologies are operational, only projects based on the reduction or removal of GHGs will be permitted; projects based on conserving ecosystems will not qualify.

Countries are now taking steps to enter into bilateral trading agreements, such as Australia's Indo-Pacific Carbon Offsets Scheme with Papua New Guinea and Fiji. For example, under the Article 6.2 framework, a mangrove restoration project can produce carbon credits that the country will trade to count towards another country's NDC targets. The money from the credit purchase will fund mangrove conservation, restoration, and management activities.

No single finance mechanism can provide the solution to protect and restore BCEs. In practice, finance often combines multiple mechanisms and approaches to achieve environmental goals. Blended finance refers to the mobilization of different finance sources across the public and private sectors, which de-risks an investment by demonstrating the government's commitment to the project and by diversifying revenue sources. Philanthropic donations or public finance provide the scaffolding to engage the private sector and expand the project. For example, many blue carbon market projects employ grants, public finance, and philanthropic donations to initiate a project and attract the attention of investors for pre-purchase agreements or to purchase credits. These funds support project startup costs and restoration until the project can earn carbon credits. At the national level, Costa Rica's Payment for Ecosystem Services (PES) scheme started by implementing a 3.5% fossil fuel tax, whose revenue goes directly into financing and running the program (Pagiola, 2008). The program received additional support from a World Bank Loan and a grant from the Global Environment Facility.

Opportunities for Governments

- **Create conditions for markets:** Develop high-quality carbon market policies to attract investors and create a stable operating environment (see CIPMF, Stage 3, Component 4).
- **Develop compliance markets:** Implement compliance-based carbon market legislation to incentivize decarbonization of the economy and include BCEs as a potential offsetting mechanism. It should be noted that compliance markets legally require specific companies or sectors to purchase carbon credits to offset their GHG emissions if they do not meet their mandatory emissions cap (see CIPMF, Stage 1, Component 1).
- **De-risking through blended finance:** Engage multiple financing sources, such as philanthropy, loans, or grants, to de-risk investment opportunities (see CIPMF, Stage 3, Component 4).
- **Create a strategy:** Strategically identify grants or loan opportunities that will cover upfront costs of implementing long-term financing mechanisms (see CIPMF, Stage 3, Component 3).
- **Enabling conditions:** Use grants or loans to fund activities that create or improve enabling conditions (see CIPMF, Stage 3, Component 4).

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Cross-Cutting Recommendations

Policy Alignment and Institutional Coordination

To maximize the potential of different financing options for BCEs, it is essential to strengthen policy signals to investors, identify capacity and national needs, and promote solutions that integrate multiple solutions (see CIPMF, Stage 1, Components 1 and 4). Understanding localized needs and landscape-level concerns can help identify strategies for securing the financing".

For example, a mangrove area degraded by local timber harvesting combined with few economic and livelihood options for communities will require long-term financing, such as carbon market financing combined with development assistance to create policies and implement community protections. Conversely, degraded areas on private lands may require instruments such as conservation easements to incentivize protection.

Developing a financing strategy for implementing blue carbon ecosystem NDC targets relies on enhanced cooperation and coordination across government agencies and the internal capacity to engage with the private sector, international development banks, and other institutions. Agencies should work together to identify data gaps and the necessary enabling conditions to incentivize public and private sector participation. National blue carbon roadmaps or policies developed across institutions help to identify priorities, gaps, and next steps, as well as de-risk potential investments (see CIPMF, Stage 3).

Strategies should be tailored to national needs. Implementation of innovative finance activities should be firmly grounded in lessons learned from other case studies. Duplicating financial mechanisms that have proven to be successful and combining them with innovative approaches that address specific risks can help unlock sustainable finance streams and scale projects faster. Governments should combine these instruments sequentially, moving from short- to medium- to long-term mechanisms—each paving the way for the next instrument by creating enabling conditions or implementing or developing policies.

Developing a financing strategy for implementing blue carbon ecosystem NDC targets relies on enhanced cooperation and coordination across government agencies and the internal capacity to engage with the private sector.

Identifying and Prioritizing Finance

Governments will need to identify and prioritize blue carbon ecosystem investments appropriate for their national circumstances. Outlined below are suggested steps and actions for doing so (see CIPMF, Stage 2, in particular, Component 3).

- Assess the available baseline data along with relevant policy mechanisms; where feasible, conduct scenario modeling to simulate mitigation, adaptation, and financial outcomes.
- Share policy and baseline data information with relevant stakeholders at all governance levels to validate expected outcomes, including identifying beneficiaries and losers.
- Develop and recommend a suite of prioritized BCE investments that align with existing climate finance flows.
- Identify new and innovative mechanisms to address remaining investment gaps.
- Co-develop implementation plans that include the costs and likely benefits of BCE investment, including climate benefits.
- Offer recommendations on effectively guiding future policy formulation and data-generation processes as part of further NDC/National Adaptation Plans (NAP)/ Long-Term Low Emission Development Strategies (LT-LEDS) iterations.

Project Preparation, De-risking, and Partnerships

Increasing capacity and support for developing bankable projects in BCEs is critical to unlocking the full potential of these vital environmental assets. BCEs, such as mangroves, seagrasses, and salt marshes, provide essential services that include carbon sequestration, coastal protection, and biodiversity preservation. However, many countries face challenges in developing projects that attract investment due to limited technical expertise, regulatory barriers, and the perception of financial risk. To overcome these barriers, it is essential to build local capacity in key areas such as project design, governance, and climate finance mechanisms, ensuring that stakeholders at all levels understand the long-term benefits and investment opportunities of BCEs.

One key way to increase capacity is to provide targeted training and technical support to governments, project developers, and local communities. This involves equipping stakeholders with the knowledge and skills needed to design and implement effective blue carbon projects that meet both environmental and financial goals. Support can include guidance on monitoring, reporting, and verification (MRV) systems, which are essential for ensuring that projects achieve measurable outcomes in carbon sequestration and other environmental benefits. Furthermore, building stronger partnerships between governments, NGOs, financial institutions, and the private sector is vital to sharing expertise, leveraging resources, and fostering collaborative efforts that can accelerate the development of bankable blue carbon projects.

In addition to technical capacity, financial mechanisms that de-risk blue carbon investments are critical to attracting private sector participation. Innovative financing solutions, such as blended finance, carbon credits, and impact investing, can help reduce perceived risks and provide the necessary capital for project implementation. Governments and financial institutions must work together to create enabling environments that incentivize investment in BCEs—for example, by incorporating blue carbon into national climate strategies and carbon markets. As the global demand for nature-based solutions grows, increasing capacity for developing and financing blue carbon projects will play a crucial role in scaling up investments in these ecosystems, enhancing their potential to contribute to climate change mitigation and sustainable development.

Increasing capacity and support for developing bankable projects in BCEs is essential for realizing the full potential of these ecosystems as critical tools in climate change mitigation and adaptation. BCEs, including mangroves, seagrasses, and salt marshes, offer a range of environmental benefits; they sequester significant amounts of carbon dioxide, protect coastal communities from storm surges, and support biodiversity. Despite their immense value, the ability to develop effective, financially viable blue carbon projects has been hindered by challenges such as a lack of technical expertise, inadequate regulatory frameworks, and limited access to financing. To overcome these barriers, there must be an integrated effort to enhance local and regional capacity in designing, implementing, and financing blue carbon initiatives that are both environmentally effective and economically attractive to investors.

Building capacity begins with providing tailored training programs and technical assistance to stakeholders at all levels. Governments, local communities, and project developers need access to comprehensive support to better understand the environmental and economic value of BCEs—including about designing and managing projects that align with global climate goals, local development priorities, and the diverse needs of coastal communities. Robust monitoring, reporting, and verification (MRV) systems are crucial for tracking carbon sequestration outcomes and ensuring that projects are delivering on their promises. Effective MRV systems not only enhance transparency and accountability but also help attract investment by demonstrating the reliability of blue carbon credits or other financial returns. Furthermore, training should encompass the practical aspects of integrating blue carbon projects into national climate strategies, marine spatial planning, and development plans, which will help ensure that these initiatives are adequately supported and positioned for long-term sustainability.

Moreover, developing bankable blue carbon projects requires fostering stronger collaboration between governments, the private sector, financial institutions, and NGOs. These stakeholders must work together to overcome financial barriers and share risks associated with blue carbon investments. Governments can create favorable policy environments that incentivize investment in BCEs by, for example, integrating blue carbon projects into national and international carbon markets. At the same time, the private sector can help mobilize the necessary capital by investing in innovative financing mechanisms like blended finance, carbon credits, and impact investing, which help mitigate the perceived risks of blue carbon projects. De-risking these investments makes it easier for project developers to secure the funding needed to implement their projects at scale. Financial institutions must also step up their efforts to provide targeted financing options—for example by providing low-interest loans, grants, or guarantees for blue carbon initiatives—to enable these projects to compete with other investment opportunities.

Lastly, enhanced public-private partnerships and financial instruments tailored to the unique characteristics of BCEs are required. Blended finance mechanisms, which combine public and private sector funds, are particularly important for unlocking capital for blue carbon projects in developing countries where financial resources are limited. Additionally, carbon credit markets should be expanded to recognize and reward the carbon sequestration benefits of BCEs, offering a financial incentive for conservation and restoration efforts. Governments can support this process by adopting policy frameworks that recognize blue carbon in national climate action plans, carbon pricing systems, and international agreements. By building an environment more conducive to blue carbon projects, stakeholders can create a sustainable financial ecosystem that attracts investment and ensures the long-term viability of blue carbon initiatives. As the global demand for nature-based solutions continues to grow, enhancing capacity and support for BCEs will be critical to addressing climate change, preserving biodiversity, and achieving sustainable development goals.

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Conclusion

Integrating comprehensive and measurable blue carbon ecosystem (BCE) components into Nationally Determined Contributions is a critical strategy for advancing climate action and securing finance opportunities. Blue carbon ecosystems, including coastal wetlands, mangroves, seagrasses, and salt marshes, play a significant role in climate change mitigation because they sequester carbon at much higher rates than do terrestrial ecosystems.

These ecosystems also offer additional environmental benefits, such as enhancing biodiversity, protecting coastal communities from extreme weather events, and supporting sustainable fisheries.

By incorporating BCEs in NDCs, countries send clear policy signals to potential investors, demonstrating their commitment to leveraging natural solutions for climate change mitigation.

This helps to build investor confidence in the long-term viability and impact of conservation and restoration efforts. When NDCs include specific and quantifiable targets for BCEs, they become more attractive to external funding sources, as investors prefer projects with clear, measurable outcomes. Well-defined goals for BCE initiatives reduce risks, offer transparency, and ensure that funding is directed toward initiatives with tangible environmental benefits.

For NDCs to be robust and financeable, baseline conditions must be clearly established. Baseline data serves as the foundation for measuring progress and assessing the effectiveness of the climate actions outlined in the NDCs. This includes detailed information on the extent, health, and carbon storage capacity of BCEs. Governments must prioritize the collection of high-quality data—for example, through satellite mapping, field verification, and remote sensing techniques—to accurately assess the state of these ecosystems. Furthermore, governments should establish and enforce clear policies and management frameworks that address the conservation, restoration, and sustainable management of BCEs, ensuring that these ecosystems are adequately protected and maintained over time.

In addition to robust baseline conditions, aligning blue carbon ecosystem targets with other national policies—such as the National Biodiversity Strategies and Action Plans (NBSAPs) and the Sustainable Development Goals (SDGs)—is crucial. This alignment enhances policy coherence, ensuring that climate action through BCEs supports broader environmental, social, and economic objectives. It also helps attract additional funding from international donors and financial institutions, which are increasingly focused on the interlinkages between climate action and sustainable development.

Aligning blue carbon ecosystem targets with other national policies—such as NBSAPs and SDGs enhances policy coherence, ensuring that climate action through BCEs supports broader environmental, social, and economic objectives.

As we continue to move forward, it is essential to integrate BCE targets into national development frameworks and climate strategies, ensuring they align with broader goals for reducing greenhouse gas emissions and achieving resilience against climate impacts. By doing so, countries can unlock the necessary financing to protect and restore these vital ecosystems, ultimately contributing to a more resilient and sustainable future. These ecosystems not only are a crucial part of the fight against climate change but also provide long-term socio-economic benefits, supporting livelihoods, enhancing food security, and protecting vulnerable coastal communities.

Ultimately, integrating BCEs into NDCs can mobilize the necessary resources to preserve these ecosystems and empower countries to achieve both their climate and sustainable development goals. This, in turn, will help ensure a more resilient, climate-smart, and economically viable future for all.

Appendix 1: Funding Instruments for BCEs

INSTRUMENT	DESCRIPTION	PAYER	BENEFICIARY	ADVANTAGES	DISADVANTAGES
Public Finance					
Blue Bonds	Impact bonds are issued by entities looking to borrow money to achieve outcomes that positively affect the environment. The investor purchases the bond expecting the project to achieve its predefined goals and to receive a return.	Investors	Governments to implement projects	• Increased demand for impact bonds. • Predictable income.	• High risk of failure if activities are not realistic or measured. • Misaligned expectations between issuers and investor • Additional financing may be required. • Must generate a return.
Grants	Grants are funds government agencies, foundations, or international development organizations provide for a specific purpose. Unlike loans, grants do not need to be repaid and can be used for a variety of projects and objectives.	Donors, philanthropy	Public or private sector projects	• Provides upfront financing. • No need for projects to return funds.	• Competitive application processes requiring detailed proposals. • Many reporting requirements.
Loans	Loans are used to support projects with the expectation of repayment with interest.	Banks	Public or private sector projects	• Provide necessary upfront capital. • Can help bridge funding gaps.	• Financial pressure of returning the loan plus interest. • Risk of default if the project does not perform.
Conservation Easement	Conservation easements are a voluntary and legally binding agreements between a private landowner and the government or other entity. The agreement stipulates that the landowner must conserve a certain portion of their land or conduct ecologically beneficial activities in exchange for tax benefits or credits.	Governments through reduced taxes/ increased benefits	Landowners	• Long-term financing. • Alters harmful behaviour and practices. • Engages the private sector.	• Requires funding and interest to purchase easements. • More difficult to adapt to changing environmental conditions. • Requires management and enforcement, which can be costly.
Taxes	Taxes consider the environmental damage or harms by certain products or sectors and incorporate those costs into the prices of goods and services.	Private sector, individuals	Public sector	• Engages private individuals in conservation and restoration.	• Impact may be small if the tax is not large enough. • Politically challenging in some cases. • Risk of funding reallocation or misuse.

INSTRUMENT	DESCRIPTION	PAYER	BENEFICIARY	ADVANTAGES	DISADVANTAGES
Subsidies	Subsidies are financial support from the government in exchange for environmentally friendly activities.	Public sector	Private sector or individual landowners, tourism operators, fishers, etc.	• Accelerates positive environmental behaviour. • Reduces the cost of environmentally friendly behaviour. • Effective immediately. • Supports early innovation.	• Can create perverse incentives. • Risk of misused or misallocated funds. • May face political challenges. • Can distort the market. • Potential overdependency over time.
Biodiversity Offsets	Biodiversity offsets address the unavoidable biodiversity loss from development activities by requiring developers to pay for or implement biodiversity restoration projects themselves or to pay third-party projects to meet their legal requirements.	Private sector	Public sector and individual projects	• Reduces biodiversity loss. • Creates co-benefits and enhances ecosystem services such as carbon sequestration. • Engages the private sector. • Creates measurable conservation outcomes.	• Minimal evidence of their effectiveness in conserving and restoring biodiversity. • Requires upfront capital to develop government policies and infrastructure. • Difficult to implement in marine environments. • Requires robust monitoring.
Private Finance					
Biodiversity Credits	The public sector purchases biodiversity credits from projects that deliver net positive biodiversity benefits. The money from purchasing the credits goes towards maintaining or increasing biodiversity.	Private Sector	Public sector	• Engages the private sector in conservation. • Support no-net-loss of biodiversity.	• Benefits are difficult to measure. • Unclear what the demand for credits will be. • Long timeframes to measure and achieve benefits. • Higher risk investment.
Payment for Ecosystem Services (PES)	Payment for ecosystem service (PES) schemes compensate individuals or communities for increasing specific services, such as water purification, flood mitigation, or carbon sequestration. PES schemes are voluntary and require a well-defined and studies ecosystem service (e.g., carbon sequestration) that an entity can provide and sell to a buyer.	Public or private sector	Private sector	• Incentivizes the private sector to conserve natural resources. • Can create additional economic opportunities for communities. • Accounts for economic externalities.	• Implementing projects can be complex. • Requires in-depth knowledge and understanding of the target ecosystem. • Requires willing buyers.
Debt for Nature Swaps	Debt-for-nature swaps (DFNS) service countries with high external debt and difficulties making recurring payments by forgiving the debt in exchange for the country's commitment to use the payments for domestic conservation.	Public sector (foreign governments) to forgive debt	Public and private sector	• Reduces external debt. • Facilitates international aid. • Facilitates domestic cashflow.	• Long-term ecological impact is unknown. • Requires large time and resources to implement.

INSTRUMENT	DESCRIPTION	PAYER	BENEFICIARY	ADVANTAGES	DISADVANTAGES
Conservation Trust Funds	Conservation Trust funds are legal entities that manage and allocate financing to specific purposes or objectives but require an initial allocation of funding from specific taxes, donations, or philanthropic bodies; they use the interest or entire capital to fund specific activities or projects.	Public and private sector	Public and private sector	• Provide long-term financing. • Attract a diversity of donor support. • Useful in countries with multiple donors and overlapping efforts. • Pool financing and risk to attract more investors.	• Trust funds often lack the capacity to distribute funding in a timely manner.
Mixed					
Carbon Markets	Carbon markets facilitate the creation and trade of carbon credits. Companies or individuals can purchase credits from projects that reduce or remove atmospheric emissions to compensate for their greenhouse gas emissions.	Private sector or individuals	Private sector and individuals/ communities	• Encourages the private sector to pay to reduce emissions and promote environmental stewardship. • Provides flexibility on ways to reduce emissions. • Can create additional economic opportunities. • Can promote sustainable development. • Accounts for economic externalities.	• Prices are often unstable. • Can have complex requirements that are difficult to implement. • Market distrust due to negative press and poor-quality projects.
Public-Private Partnerships (PPP)	Public-private partnerships (PPPs) are contracts between the public and private sectors to provide a project or service usually delivered by the state. PPPs help governments engage the private sector and investment to implement green projects. By working together, PPPs pool resources and capacity to increase the demand for certain projects or services.	Public and private sector	Public sector	• Transfers risk to the public sector. • Helps finance projects that the government cannot fund by itself. • Enhances the potential impact.	• High perceived risk. • Potential complex coordination and implementation.
Blended Finance	Blended finance is the use of development funding to catalyze additional long-term financing sources, such as new markets. It helps mitigate the risk for investors, which can facilitate further investments.	Public and private Sector	Public and private sector	• Reduces risks. • Enhances potential impact. • Promotes investments. • Support higher rates of success.	• Requires coordination and resources. • Potential complex coordination and implementation.

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Blue Carbon Ecosystems Supplement

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