BEYOND CARBON CREDITS:
DEMYSTIFYING NON-CARBON MARKET APPROACHES FOR BLUE CARBON ECOSYSTEMS

Deep-Dive Report for
Practitioners and Policymakers

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Executive Summary

The conservation, restoration, and sustainable management of blue carbon ecosystems are critical to addressing the intertwined crises of climate change and biodiversity loss. Actionable blue carbon ecosystems (BCEs) are considered mangrove forests, seagrass meadows, and tidal salt marshes, all of which have exceptionally high carbon sequestration potential per unit area and offer a range of benefits for communities, biodiversity, and climate adaptation and resilience.[1]

However, efforts to fully capture BCEs' value and secure the ongoing delivery of their ecosystem services remain limited, due to a complex set of barriers. Among these is a real or perceived lack of financing options to bring BCE projects to life and sustain the benefits they bring in the long term.

In fact, the suite of financing approaches available for BCE projects is broad and diverse. Carbon market approaches are often the most recognized financing solution for BCEs yet are not applicable or optimal everywhere. Only 1% of carbon credit transactions on the voluntary market to date are from blue carbon.[2] Thus, it is opportune to consider locally relevant opportunities (and barriers) for other financing options, which is why **other innovative financing approaches, referred to as non-carbon market approaches (NCMAs), are the focus of this report**.

A policy primer from the same lead authors of this report provides a succinct introduction to NCMAs for BCE projects and their utility. It is also recommended that all projects should aim to meet the High-Quality Blue Carbon Principles and Guidance and utilize the Practitioner's Guide as a tool to help achieve it.

This deep-dive report intends to help **decision-makers and implementers at national, subnational, and local levels** gain an understanding of the wide variety of NCMA types and financing instruments that could support BCE projects at the local level, including the critical enabling conditions that are necessary for a successful project. The report emphasizes the following key messages:

- Effective conservation, restoration, and sustainable management of blue carbon ecosystems are powerful nature-based solutions (NbS) that can support action towards global challenges like climate change, biodiversity loss, and sustainable development.
- Simultaneously, such projects can bring strong benefits for local communities when projects are appropriately designed for the local context and environmental conditions.
- This report outlines a range of non-carbon market financial instruments, each offering distinct opportunities to catalyze investment in blue carbon ecosystems.
- Financing instruments for BCE NCMAs depend highly on the local context, community engagement and buy-in, and the foundational enabling conditions that underpin whether a project or financial instrument will be successful.
- The consideration of enabling conditions provides an approachable and helpful lens when assessing which financing approach/es to pursue. Their consideration further reiterates the necessary early-stage steps to ensure a high-quality BCE project.
- While enabling conditions are essential, the report emphasizes that many NCMA instruments are already being piloted or applied in coastal contexts, offering real-world examples that can inform replication, scaling, and adaptation to local needs.
- BCE projects are often conflated with carbon market approaches, and thus many BCE NCMAs are not yet well-understood or optimally used. This report aims to demystify NCMAs and provide a broader understanding of various alternative financing approaches that fall under a BCE project umbrella.

Introduction

Blue carbon ecosystems (BCEs) refer to mangrove forests, seagrass meadows, and tidal saltmarshes. These coastal ecosystems are not only highly effective carbon stores[3] but also provide a wide range of other ecosystem services,[4,5] including protection against sea level rise and tidal surges, support of fisheries, a source of harvestable resources, income through tourism, and cultural, spiritual, and aesthetic value – to name a few.

Projects that conserve, restore, and/or sustainably manage BCEs can help recognize and protect these important services. There is growing global attention on such projects as effective means of mitigation of and adaptation to climate change – related actions are also known as coastal nature-based solutions (NbS).

Increasingly countries are including blue carbon targets within their Nationally Determined Contributions (NDC)s[6] for climate mitigation and adaptation action as well as in their National Biodiversity Strategy and Action Plan (NBSAP). However, national policy commitments are not universally translated into impactful action globally at a sufficient pace[7]

Financing is a very common limiting factor for conservation and restoration.[8] BCE projects have traditionally relied upon grant-based financing, but grants are rarely reliable in perpetuity and, in isolation, can foster a dependence on external inputs, rather than creating a self-sustaining economic system. Carbon markets may be the most widely known and utilized approach to monetize the protection of BCEs over the long term but are not always the most optimal or feasible for many areas. It is estimated, at today's market prices, that only about 20 percent of the world's mangrove forests (2.6 million hectares) could be protected through carbon finance projects.[9]

Non-carbon market approaches (NCMAs) provide alternative and sometimes complementary means that may better fit local and regional contexts and draw on aspects of the wider services provided by ecosystems beyond carbon. The purpose of this report is to introduce readers—in particular, national and regional policymakers and practitioners—to the range of funding approaches available and help inform the decision-making behind the financing and implementation of BCE projects.

The first sections of this report define NCMAs in the context of the report, explore the principal conditions that can help a decision-maker choose between carbon market, non-carbon market, or combined approaches, and provide an overview of necessary enabling conditions for NCMAs. The report also provides a deeper look into the range of NCMAs, many accompanied by case studies and an outline of their specific enabling conditions. While many of the NCMAs in this report can apply to all ecosystem types, the case studies are specific to coastal and marine environments. The intent is to provide decision-makers and implementers with an overview of options to determine which financing approach/es are optimal for their project.

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What are non-carbon market approaches?

Non-carbon market approaches (NCMAs) refer to any financing strategy for blue carbon ecosystems that does not involve the trade or transfer of carbon credits. Instead of relying on unitized carbon assets, these approaches mobilize capital through other mechanisms—such as ecosystem service payments, commercial activity, public funding, or philanthropic investment.

For example, a mangrove restoration project may generate value through sustainable harvesting of honey, mollusks, or fish, or attract funding through emerging mechanisms linked to biodiversity, resilience, or water services. Many NCMAs use blended finance structures that combine philanthropic, public, or commercial capital, often tied to specific financial returns or conservation outcomes.

NCMAs and carbon market approaches are not mutually exclusive; in fact, they form a complementary suite of solutions for financing BCE projects.[1] The decision to pursue one or the other—or a combination of both—depends on local context, project goals, enabling conditions, and financing types. This report aims to help decision-makers understand when and how different approaches apply, and how they can be used to drive effective, equitable conservation at scale.

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1 Opportunities for integrating carbon market and non-carbon market finance approaches vary by financing type and may not always be feasible. For example, under the Paris Agreement, combining Article 6 market-based approaches (Article 6.2 or Article 6.4) with non-market approaches under Article 6.8 for a single project is not feasible, as a country needs to determine if an activity falls under a market- or non-carbon market approach. Additionally, integration of NCMAs may be more feasible within Voluntary Carbon Market projects than in compliance markets, or between multiple NCMA approaches.

CARBON MARKET OR NON-CARBON MARKET APPROACH?

While carbon market approaches may typically come to mind first when considering blue carbon ecosystem project types, the generation of a carbon credit or carbon asset may not always be a viable project pathway. Additionally, there are instances in which non-carbon market approaches may be needed to support project readiness in the path to carbon market financing. A range of factors may render carbon market approaches unsuitable in some BCEs, yet this should not discourage BCE project implementers or investors, as NCMAs offer a broad suite of alternative and equally robust and valid potential project pathways, that may prioritize other ecosystem services and environmental and social benefits.

To decide whether a carbon market, non-carbon market, or combined approach[2] is feasible and optimal when establishing a project, there are several factors to consider. Given that carbon market approaches have a narrower scope than NCMAs, a good place to start is through examining the factors that may make a project unsuitable for a carbon market approach.

This section explores **enabling conditions for carbon market approaches**, specifically those that draw on the ability of BCEs to sequester carbon. If a potential project does not fulfill all these enabling conditions, then a non-carbon market approach could be preferable. Some NCMAs may also be unsuitable for similar reasons, but exploring these pathways remains worthwhile given the breadth and variety of NCMAs. The specific enabling conditions for NCMAs will be outlined later in this report. Additionally, approaches that combine carbon market approaches and NCMAs are increasingly common and can bring unique benefits.

The most significant conditions that need to be considered for a carbon market project, which may not be necessary or relevant for some or all NCMAs, are explored on the following two pages:

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2 See Footnote 1 for additional considerations for activities under Article 6 of the Paris Agreement.

CARBON MARKET ENABLING CONDITIONS

Additionality, leakage and permanence. Carbon market projects depend on robust risk assessments to qualify the following:

- **Additionality**: the extent to which project activities reduce or remove greenhouse gas emissions directly due to revenue from the sale of carbon credits. This includes demonstrating that project activities are not mandated by existing laws, regulations, or policies, among other criteria. Verifying additionality can be challenging, especially for conservation-focused projects, because it requires providing strong evidence for likely counterfactuals (what would have happened in the absence of the intervention).[10] Areas under strong environmental stewardship where healthy carbon-rich ecosystems are already maintained may not be eligible for carbon market approaches, given that the absence of the proposed project would not necessarily lead to carbon release;[11] though thankfully, crediting approaches are evolving to solve this paradox.[12]
- **Leakage**: the extent to which project activities cause greenhouse gas emissions elsewhere, outside the project area, typically through the displacement of anthropogenic activities.
- **Permanence**: The duration of time over which the greenhouse gas emission reductions or removals will remain, and the existence of measures to address any potential reversals (i.e. becoming a carbon source rather than carbon sink in the future).

These factors all need to be modelled to determine appropriate measures to mitigate potential risks (e.g. the use of buffer pools of unsold credits, among others). These may be particularly challenging to demonstrate in dynamic coastal environments.[13]

Fulfillment of further eligibility criteria. Carbon market projects follow selected methodologies, all of which have their own specific requirements. This means that though projects may not be feasible or eligible when using one methodology, they may be under others. Some of these methodologies are applicable worldwide, while some are only used by specific nations. Also, depending on the intended use of the credits, there could be specific requirements for additional enabling conditions to be in place for given carbon markets. That will be the case, most notably, for credits to be transferred under Article 6 of the Paris Agreement. It is also important to note that combining Article 6 market-based approaches (Article 6.2 or Article 6.4) with non-market approaches under Article 6.8 for a single project is not feasible, as a country needs to determine if an activity falls under a market- or non-carbon market approach.

Environmental and social safeguards. From the outset, projects should intend to establish frameworks to minimize negative impacts and maximize positive outcomes ensuring no net harm. Social safeguards typically require that projects protect human rights, avoid discrimination and any illegal practices, respect local customs and institutions, ensure consultations are inclusive, and follow a Free, Prior and Informed Consent (FPIC) process. Environmental safeguards require that projects protect intact and high conservation value ecosystems and follow all relevant environmental regulations.[14] Components of these frameworks may include benefit sharing mechanisms, grievance and legal redress mechanisms.

Institutional Arrangements. Before trading can occur, countries need transparent registry systems to account for the trade and retirement of credits, and measurement, reporting and verification (MRV) systems.[15] Long-term management plans are required by all high-quality standards.

Credit generation benefits outweigh project costs. Project scenarios must indicate that after permanence, leakage, and additionality are considered, the project will secure sufficient carbon emission reductions and/or removals to be deemed financially viable. Uncertainty in these projections typically leads to deductions to projected credit quantities, even if co-benefits (e.g. adaptation and resilience services) are strong.[16] Combined carbon market-NCMAs that incorporate further ecosystem services into valuation methodologies can help make projects viable under carbon market constraints.

Enabling policy conditions.

- **National policies and legal frameworks:** A compatible policy basis is needed to enable the generation and trade of high-quality carbon credits. Depending on which carbon markets are concerned, countries may also need to meet requirements for emission reductions and removals from domestic carbon market projects to be transferred internationally for use towards another country's NDC targets, for CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation), or "other purposes" including the voluntary carbon market,[17] to avoid the reductions being double counted (while only generated once).[18]
- **Carbon rights and land tenure:** A clear understanding of land ownership and carbon rights is essential to carbon market projects. For BCE projects, land tenure is often more complicated because coastal ecosystems typically involve multiple stakeholders, and statutory land titles may overlap or conflict with the customary tenure holders or users.[19] Titles may not even exist at all given that coastal ecosystems are dynamic environments; some subtidal environments (e.g. seagrasses) may be classified as seabed. These ecosystems may be designated a public good and/or owned by the state and identifying the managing agency or agencies may be challenging. Carbon rights may not be explicitly defined under national laws, be implemented in practice, or allocate benefits to local communities.[20]
- **Clarity over the nature of carbon:** There may be a need for clarity, typically at the domestic policy level, over definitions of carbon fluxes, sinks and sources, and how these are included within national databases or registries. This determines how carbon credits can be generated within specific contexts.
- **REDD+ Nesting:** Given that REDD+ efforts often provide effective pathways for carbon market projects, there is a need to ensure policy coherence, effective governance structures, and complementary goals and methodologies across these approaches. This is especially relevant for carbon market projects that aim to contribute to Article 6 or CORSIA requirements.

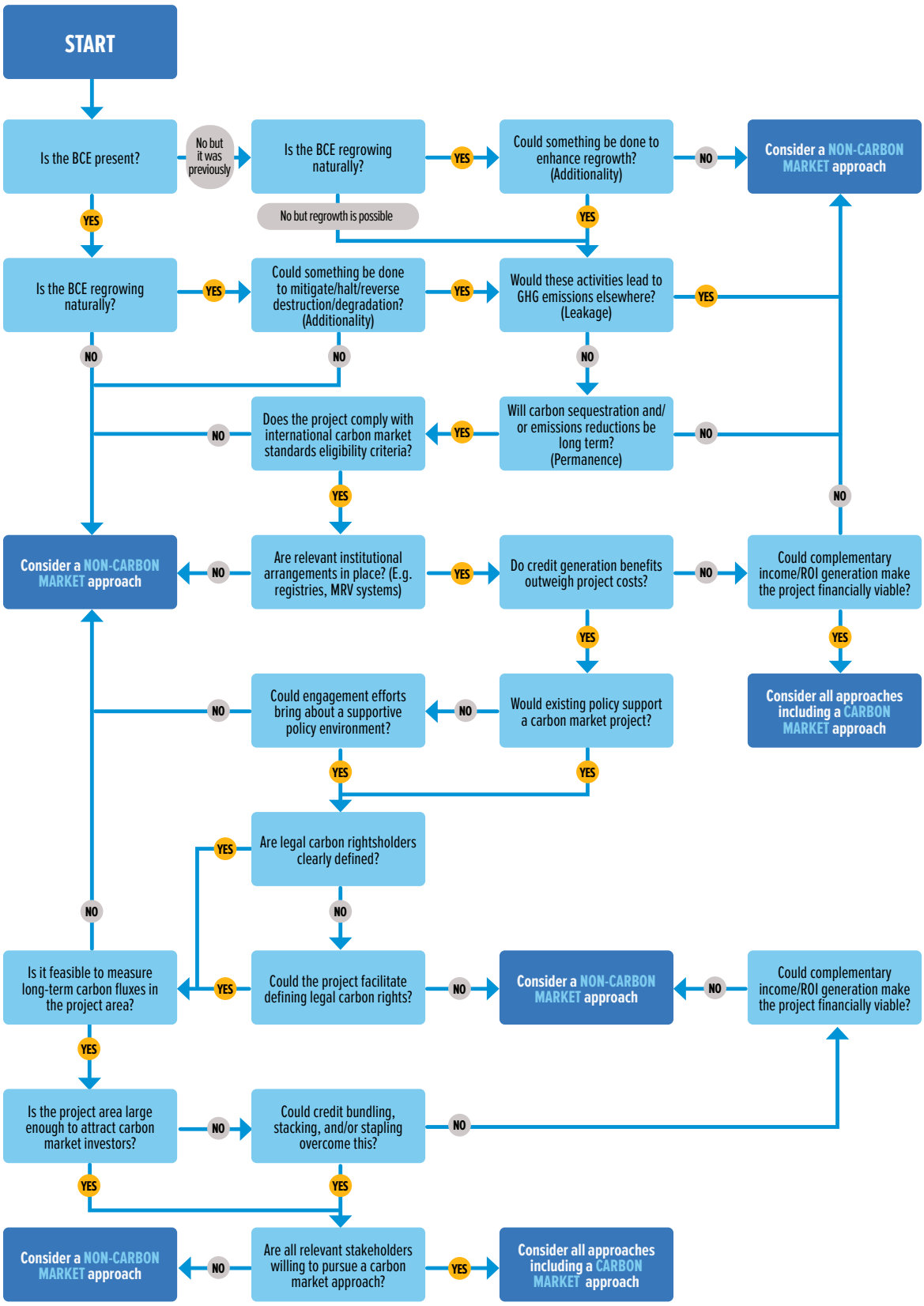
Carbon accounting protocols. BCEs are highly dynamic, both over short timeframes (e.g. tidal variation) and long timeframes (e.g. sea level rise, salinization, coastal development etc.).[21] This makes certain aspects of carbon sequestration challenging to accurately measure and model, in particular belowground carbon sequestration and carbon fluxes in and out of the ecosystem.[22] It is important to measure and model these aspects accurately to avoid overestimation of credit potential and to limit uncertainty deductions that reduce the number of credits available. When in-depth modeling and measurement is not possible, methodologies provide conversion factors to avoid overestimation, but these do carry a degree of uncertainty.

Project scale. As previously discussed, projects must be able to demonstrate sufficient carbon emission reductions and/or removals to be deemed financially viable. Smaller-scale projects may not produce the necessary volume of credits to warrant the costs of accreditation and ongoing MRV as a carbon market project. To address these constraints, some market methodologies allow for aggregation or grouping of multiple smaller-scale projects under a single methodology or the bundling of projects using different methods under a common carbon abatement contact. In both instances, aggregation may help to improve the financial viability of projects by distributing transaction costs across a portfolio of projects—for example, by allowing a single validation for multiple projects in the same geographic area or combining of monitoring and verification procedures.

Buy-in. Establishing a successful carbon market project involves buy-in from all stakeholders, including governments, landowners, and local communities. This buy-in may not be readily achievable given specific circumstances and views of the stakeholders involved.[23] Stakeholders may be more willing to pursue certain NCMAs over a carbon market approach.

FLOWCHART: CARBON MARKET OR NON-CARBON MARKET APPROACH

The following flowchart uses the enabling conditions on the previous two pages to help practitioners decide whether a carbon market approach, a non-carbon market approach, or a combined approach that employs both, may be preferable for a specific BCE project. It is important to note that many blue carbon projects may not fall directly within a "yes" or "no" category in the chart below, and that in many instances, steps can be taken to shift a project's condition from one category to the other (e.g., a project may be able to take measures to mitigate leakage, and policies and institutional arrangements to enable a carbon market approach may be strengthened over time).



METRICS AND INDICATORS FOR QUANTIFYING NON-CARBON ECOSYSTEM SERVICE BENEFITS IN BLUE CARBON ECOSYSTEMS

Robust and comparable metrics and indicators are critical for any NbS or BCE project. Metrics and indicators provide means of measuring the baseline, monitoring progress, and outcomes of the project, supporting quantification of risks, and demonstrating meaningful results. Reporting using common or consistent metrics and indicators is essential to demonstrate meaningful results and progress in a project, providing confidence through necessary due diligence for investments, and to provide a compelling story to attract donors and partners.

Metrics refer to measurable aspects that are tracked over the course of a project lifetime against a baseline and show changes as a result of project interventions.

Indicators – often in the form of Key Performance Indicators (KPIs) – bring together sets of metrics to demonstrate how project interventions have led to measurable benefits that ecosystem services provide. Ultimately, indicators are what one tries to measure, and metrics are how one can measure and track them.

For example:

- Ecosystem service to track toward a goal: Regulating (coastal protection)
- Indicator: Reduced coastal flooding for X households
- Metric: # of hectares of mangroves within X miles of community housing infrastructure

Clear indicators for evaluating success provide clarity and build shared understanding and expectations, which are important when many different stakeholders are involved.[24]

Carbon market approaches (for BCEs or others) have a common indicator and metric:

- Indicator: climate mitigation potential
- Metric: CO2e (carbon dioxide equivalent) sequestered or stored.

The CO2e metric is the same across all carbon market projects, even where prices or the greenhouse gases involved differ. BCE NCMAs, however, involve a broader range of indicators, given the range of benefits from ecosystem services that the projects prioritize. For example, adaptation and resilience indicators include benefits from multiple ecosystem services that do not have a common set of indicators used by projects for monitoring.[25] This report does not elaborate on an exhaustive list of potential common indicators for NCMAs but rather highlights the need for a common or core set of BCE NCMA indicators. These could ultimately support better clarification and understanding of BCE NCMAs or potentially be used to help set a 'market price' for different services with more standardized values.

Without common or core indicators for all BCE NCMAs, it is important for both metrics and indicators to be guided by a set of core principles -- for instance, they should be:

- Measurable, replicable, and comparable
- Related to pre-defined outcome goals
- Practical, safe, and cost-effective to measure
- Aligned with scientifically grounded methodologies
- Inclusive of local ecological and traditional knowledge
- Agreed upon by project implementers and relevant funders/investors
- Able to be independently verified by a third party

Efforts are being made internationally to streamline and harmonize metrics and indicators to reduce the burden on individual projects to develop, test, and validate their own. The Monitoring Framework for the Kunming-Montreal Global Biodiversity Framework, for instance, recommends national- and subnational-level indicators to measure biodiversity trends,[26] and there is ongoing work to establish indicators for the Global Goal on Adaptation under the UNFCCC's Paris Agreement.[27]

A selection of metrics and indicators related to the benefits that ecosystem services provide in BCE projects are provided below.[28] Appropriate and relevant metrics and indicators to employ per project will depend on the financial instrument/s and project design. The list below is a non-exhaustive list to offer examples of how the blue carbon community could eventually determine a core set of indicators for NCMAs in the future.

Ecosystem Service	Benefit	Indicators	Metric
Regulating	Coastal protection	• Homes and infrastructure protected or with reduced damage from erosion and flooding • Reduced or avoided property loss ($) • Avoided cost: flood risk models to assess avoided flood damages due to BCEs[29]	• # hectares within x miles of valuable infrastructure • $ of replacement costs of infrastructure • # of homes and infrastructure protected or provided with increased protection
Regulating	Carbon storage/ sequestration	• % emission reduction (avoided loss) and/or removals supporting climate mitigation efforts	• Measurement of greenhouse gas fluxes related to activity
Provisioning	Fisheries	• Increased food security with % increase in fish stock • Increased economic livelihood with % increase in commercial species	• % biomass of commercial species caught (or in nurseries) in BCEs • Recruitment of fisheries species affiliated with BCEs • Catch per unit effort
Provisioning	Alternative and sustainable livelihoods	• Strengthened economic/ employment status of local people and/or coastal communities through engaging in sustainable management practices and alternative livelihoods • Strengthened engagement of Indigenous Peoples and Local Communities (IP and LC) in X coastal NbS interventions or management practices • Increased recreational opportunities through ecotourism due to healthy biodiversity	• # of people trained/ capacity building • $ per unit of alternative commodity • # of IP and LC groups/ households with increased annual income from fisheries

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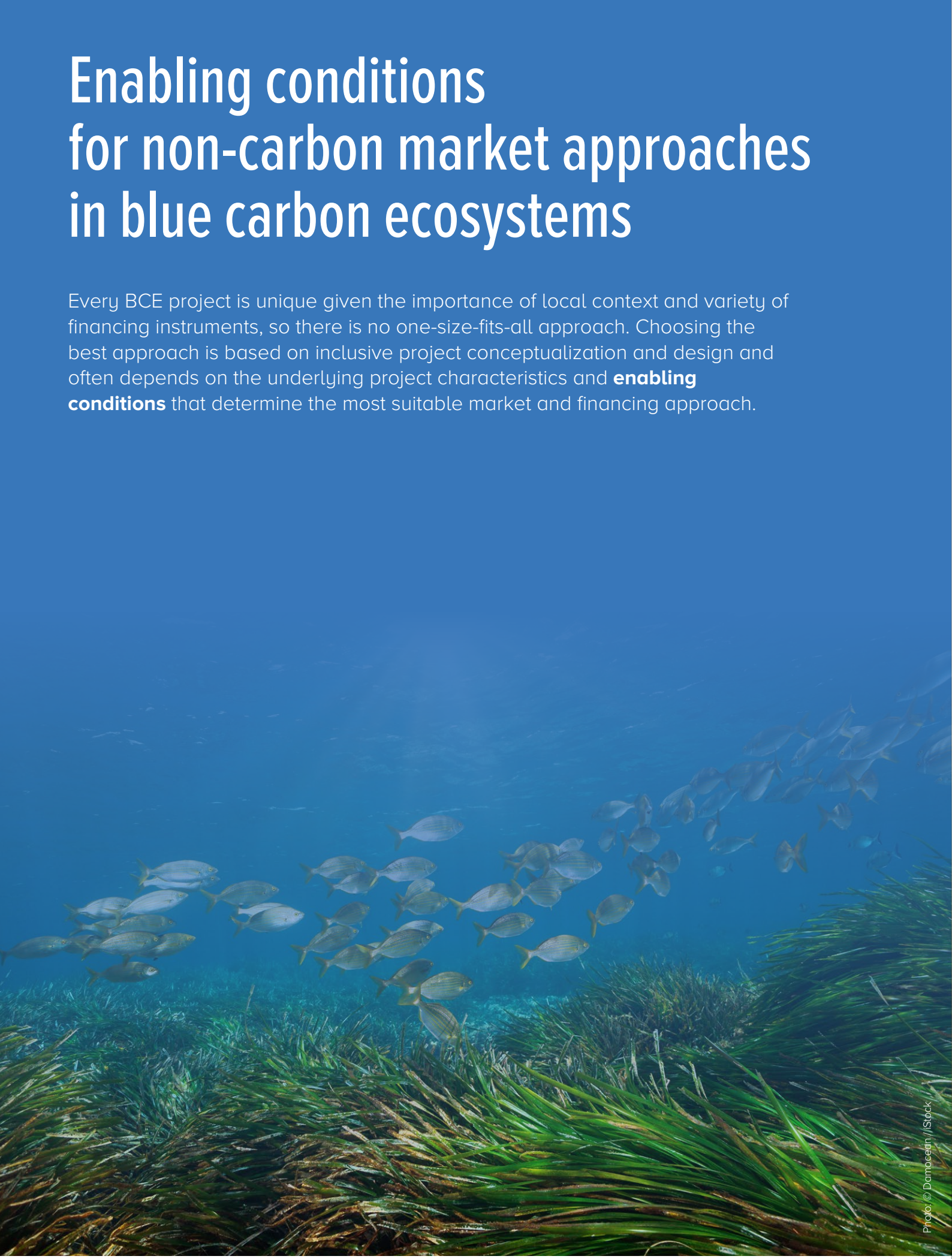
Enabling conditions for non-carbon market approaches in blue carbon ecosystems

Every BCE project is unique given the importance of local context and variety of financing instruments, so there is no one-size-fits-all approach. Choosing the best approach is based on inclusive project conceptualization and design and often depends on the underlying project characteristics and **enabling conditions** that determine the most suitable market and financing approach.



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Enabling conditions are essential foundational elements that facilitate successful project design, implementation, and financing flows. Without the right enabling conditions in place, the probability of the intended BCE project and chosen financial instrument being successfully implemented is reduced – or even made impossible. When practitioners or investors are considering potential projects, these early stages (e.g. pre-feasibility or feasibility) are crucial to assess the status of essential enabling conditions. A solid understanding at the outset can help to understand which financing approaches and related financial instruments might be most suitable for the BCE project under consideration.

Like all nature-based projects, BCE NCMA projects have certain necessary enabling conditions in place to facilitate project success. This section explores enabling conditions necessary for all NCMAs, as well as enabling conditions needed for some or many NCMAs but not necessarily applicable to all. **These enabling conditions needed for some NCMAs will be used as a framework to understand the applicability of different NCMAs in different contexts throughout the remainder of the report.**

Quick overview table (find details of all these enabling conditions on the following pages):

Enabling conditions needed for all NCMAs *A non-exhaustive selection of enabling conditions required across all BCE NCMAs.*	**Enabling conditions needed for some NCMAs** *Enabling conditions that are common to many BCE NCMAs, but not all.*
Institutional arrangements	Accessible formal financial services
Environmental and social safeguards	Generation of financial returns
Community engagement and trust	International market demand
Tenure and resource use rights	Domestic market demand
Clear understanding of local socio-economic contexts	Access to early-stage capital
Risk quantification and reduction	Large scale
Strong financial infrastructure	
Robust MRV, monitoring and enforcement mechanisms	
Data architecture	

ENABLING CONDITIONS NEEDED FOR ALL NCMAS

This section highlights a non-exhaustive selection of enabling conditions common across all BCE NCMAs.

Institutional arrangements. BCE projects depend on well-functioning institutional and regulatory frameworks for long-term success. This relies upon good governmental and managerial coordination, avoiding duplication of effort, and clear and tenable policy and legislation.[30] In absence of clear institutional frameworks and responsibilities, decision makers may need to strengthen and harmonize governance structures, encourage alignment of policy and planning with sustainable development, and capacity-build with local government, communities, and civil society organizations.[31]

Environmental and social safeguards. It is essential to ensure that participants' human rights are respected and that any negative, unforeseen social or environmental consequences are comprehensively managed and addressed.[32] Project frameworks should minimize negative impacts and maximize positive outcomes to ensure no net harm. Strong social safeguards include equitable benefit sharing, grievance, and legal redress mechanisms. Environmental safeguards require that projects protect intact and high conservation value ecosystems and follow all relevant environmental regulations.

Community engagement and trust. Community buy-in is essential to ensure long-term meaningful success. Projects based on existing, trusted relationships are more likely to be successful. Early engagement via capacity- and awareness-building exercises, such as workshops and outreach activities, are important steps for obtaining free, prior, and informed consent (FPIC) and for learning context-specific best practice through incorporating Indigenous and Traditional Owners' knowledge. Local ownership and leadership are necessary for equitable arrangements, including across gender and socially vulnerable groups. Visible and immediate incentives are often desirable.

Tenure and resource use rights. It is essential to understand the governance and ownership arrangements around land tenure, resource ownership, and use rights in the project area. Depending on national context, landowners, local communities or businesses, subsistence users, local or regional governments, or extractive industries may have different resource ownership or use rights,[33] which can affect project roles and responsibilities, and mechanisms for equitable benefit sharing. It is important to support local ownership, where appropriate to the local legal arrangements.

Clear understanding of local socio-economic contexts. Local context strongly influences project parameters, including stakeholders involved, inter-stakeholder relations, and equitable division of benefits. Project practitioners need to have a strong understanding and appreciation of this context, which can be built through inclusion/leadership of local people/professionals from pre-project stages, prior activities or experience in the area, and well-structured scoping activities.[34]

Risk quantification and mitigation. BCE projects are exposed to a range of socioeconomic and climate change risks that can threaten ecosystem integrity and carbon storage capacity. Proper quantification of project risks and potential impacts to the permanence of interventions over a project's lifespan are essential steps in assessing the suitability and viability of both carbon market and non-carbon market financing strategies.[35] While not all project risks can be fully mitigated, there are a number of tools that may enable the reduction of financial risks associated with BCE project investments:

Blended finance schemes which incorporate the use of public or philanthropic capital to absorb certain project risks can be highly effective in mobilizing private financing by improving the risk-return profile of BCE projects. Blended finance solutions can be structured using a variety of instruments including debt, equity, risk-sharing, or guarantee products.[36]

Portfolio approaches and other risk pooling and diversification schemes can distribute risks over a range of projects. Aggregated financing efforts can also assist with scale, bringing together smaller projects to reduce transaction and capacity costs and support longevity.[37,38]

Insurance products that address risks to natural assets can support ecosystem resilience by providing payouts for recovery and restoration efforts. Additionally, a range of products have emerged to insure investors against carbon credit delivery, reversal, and other risks associated with carbon market investments.[39]

Development of demonstration or pilot projects to show proof of concept and demonstrate reliable returns on investment and outcome-based results.[40]Some financiers and investors such as development banks and climate funds may provide early-stage financing, often inclusive of risk-mitigating measures.

Strong financial infrastructure and regulation. The financial mechanisms of a project need to be legally robust, secure, and transparent. The financial regulations in relevant jurisdictions are also a critical element of ensuring enabling environment for investment. Designing a financial mechanism that serves the needs of the project developers and beneficiaries may require new or expanded financial infrastructure to be established to channel funds, for example, this may involve establishing SPVs (Special Purpose Vehicles) or other entities.

Robust MRV, monitoring and enforcement mechanisms. All nature-based projects need to ensure delivery on expectations via consistent and comparable tracking. Progress should be measured against agreed metrics that are most appropriate for BCEs' unique environmental conditions.[41] Monitoring may also require regular management check-ins related to status of deliverables and responsibilities across stakeholders. All BCE projects should strive to use the best available science with existing transparent, science-based, well-regarded methodologies.

Data architecture. Tracking project progress, and boosting replicability and scalability, depend on high quality, reliable, and comparable data.[42] This may involve ensuring compatibility with existing data frameworks, developing harmonized KPIs, and streamlining data analysis.

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ENABLING CONDITIONS NEEDED FOR SOME NCMAS

This section highlights enabling conditions that are common to many BCE NCMAs, but not all. Assessing which enabling conditions are feasible in the project context can be instructive when choosing a financing approach/es. The table on the next double page spread gives an at-a-glance resource to indicate which of these frequent enabling conditions are necessary per financial instrument.

Accessible formal financial services. BCEs are often found in remote or marginal areas, where local communities and Micro-, Small, and Medium-sized Enterprises (MSMEs) may not have access to formal financial services such as banking, insurance, and loans.[43] Some financing approaches require formal financial infrastructure to operate effectively and equitably. In many cases, the establishment of such services can be pursued within the scope of a project.

Generation of financial returns. Some financing approaches are funded with the expectation of future returns on investment (ROI). This applies to both equity-based (shares) and debt-based (loans/bonds) investment models. Other funders, such as philanthropic or public funders, may not expect financial returns, though they will expect proof of positive results through meeting pre-defined KPIs.

International market demand. International market demand refers to global demand or demand from a different nation for a product produced in the scope of the project. Some BCE projects may rely on income from the sale of products (e.g. shrimp, fish), services (e.g. ecotourism), or ecosystem service-linked assets such as biodiversity or resilience credits produced as part of the project. The ability to generate income from these products and services are dependent on market demand. Public or market-based incentives that promote certified sustainable products and services from blue carbon ecosystems can be effective in supporting demand.

Domestic market demand. Domestic market demand refers to demand for project products from within the nation in which the project takes place. This typically involves shorter and less complex supply chains than international market demand and is subject to different, localized variables that dictate levels of demand.

Access to early-stage capital. The extent of initial financial investment in the early-stage design and preparatory phases varies between NCMAs. Upfront needs could include funding for building or strengthening local stakeholder relations, capacity- and knowledge-building, understanding the regulatory environment, establishing baseline data and agreed methodologies, project design (e.g. identifying risks and assumptions), and building necessary infrastructure (e.g. data management, financial flows).

Large scale. Understanding options based on the size of a potential project is important as some financing approaches may only be viable on a large scale. Further, some interventions may require sufficient scale to generate measurable and attributable benefits (e.g. resilience credits). Measures to aggregate projects can provide an alternative solution, if requisite strong institutional arrangements exist or can be created.

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HOW TO USE THE TABLE

The table on the opposite page provides a snapshot of different types of financial instruments for BCE NCMAs and selected enabling conditions needed for some of them. The table is intended to be used as a tool to inform practitioners or policymakers of the variety of BCE project financing approaches using NCMA within a specific, local context. The table on the opposite page does not include the enabling conditions needed for all NCMAs, found on the previous pages, as they are applicable to all types.

By cross-referencing the financing approaches on the left-hand side with the enabling conditions along the top, viewers can find the degree to which each of these conditions is relevant and necessary for different financing approaches. The table could be used to identify which financial instruments might be more suitable to the local context if fulfillment of some enabling conditions acts as a barrier. It is important to note that a high-quality project should never aim to 'sidestep' inconvenient enabling conditions but rather work optimally within the constraints of the local context. Further, it is important to note some enabling conditions may be strengthened, clarified, or fulfilled within the scope of the project itself – particularly with sufficient early-stage or upfront investment. A combination or sequence of approaches may also help fulfill enabling conditions that make other approaches possible in the future.

The categories in the columns should be interpreted as follows:

Always. Projects taking this financing approach will always need to fulfill this enabling condition. *If this enabling condition cannot be fulfilled, the financing instrument under consideration should not be pursued.*

Often. Many projects taking this financing approach will need to fulfill this enabling condition, but for some it may not be relevant or necessary. *If this enabling condition cannot be fulfilled, further investigation is necessary to determine whether the financing instrument under consideration can be pursued.*

Sometimes. Some projects taking this financing approach will need to fulfill this enabling condition, but for many it may not be relevant or necessary. *If this enabling condition cannot be fulfilled, further investigation is necessary to determine whether the financing instrument under consideration can be pursued.*

All financing instruments with **green text** are explored further later in the report, including detailing the rationale for the categorization of the associated enabling conditions. Financing instruments with **grey text** are touched on briefly later in the report.

Financing Approach	Financing Instrument	Is this enabling condition needed for the NCMA in question? (Either already present, or able to be fulfilled through project activities) *Note that further unique enabling conditions may apply for each instrument.*					
		Accessible formal financial services	Generation of financial returns	International market demand	Domestic market demand	Access to early-stage capital	Large scale
Ecosystem Value Based	Payment for Ecosystem Services (PES)	Always	Always	Often	Often	Always	Sometimes
	Insurance products	Always	Always	Often	Always	Sometimes	Often
	Biodiversity/ resilience credits	Often	Always	Often	Often	Always	Sometimes
Capital Market Based	Blue/green bonds	Often	Always	Always	Sometimes	Always	Often
	Catastrophe/ resilience bonds	Always	Always	Often	Always	Always	Often
	Debt-for-nature swaps	Often	Often	Sometimes	Sometimes	Often	Always
Outcome Based	Results-based Finance under REDD+	Often	Often	Often	Sometimes	Always	Often
	Impact bonds	Often	Sometimes	Sometimes	Sometimes	Always	Sometimes
	Project Finance for Permanence (PFP)	Often	Sometimes	Sometimes	Sometimes	Always	Always
Enterprise Based	Supporting MSMEs	Always	Always	Sometimes	Always	Sometimes	Sometimes
	Supply chain interventions	Always	Always	Sometimes	Always	Sometimes	Sometimes
Public Finance Based	Eco taxes	Often	Always	Often	Always	Sometimes	Sometimes
	Domestic government funding	Often	Sometimes	Sometimes	Often	Always	Often
	Official Development Assistance (ODA)	Often	Sometimes	Sometimes	Sometimes	Always	Sometimes
Grant Based	Private philanthropy	Often	Sometimes	Sometimes	Sometimes	Always	Often
	Conservation Trust Funds	Often	Often	Sometimes	Sometimes	Always	Often
Compensation Based	Corporate offsets	Always	Always	Always	Sometimes	Always	Often
	Extractive fees/ royalties	Often	Always	Often	Always	Sometimes	Sometimes

A deeper look at non-carbon market approaches for blue carbon ecosystems

Within the remainder of the report, many of the financing approaches included on the table are explored in more detail.

Here we explore a variety of BCE NCMAs, some more established and others nascent, as well as opportunities for combined approaches. Each subsection gives an overview of the financing instrument, the rationale and description of the necessary enabling conditions (enabling conditions necessary for some NCMAs separated from often more unique enabling conditions by a horizontal line), and the differing requirements of other enabling conditions for project success. Carbon market approaches are also examined through the same lens in an annex to this report.

The report provides an in-depth look at the building blocks and foundations necessary to implement a successful, equitable, and high-quality BCE NCMA project. The focus is primarily on enabling conditions as a demonstration of the importance of early-stage investment and project design. The report does not detail the mechanics of and finance flows or systems per financing instrument but does include case studies to illustrate how different financing approaches work in practice, and additional resource links in each section for more information. The five main categories of NCMAs explored here are:

ECOSYSTEM VALUE-BASED APPROACHES

CAPITAL MARKET-BASED APPROACHES

OUTCOME-BASED APPROACHES

ENTERPRISE-BASED APPROACHES

PUBLIC FINANCE-BASED APPROACHES

Photo: © NEED AUTHOR

ECOSYSTEM VALUE-BASED APPROACHES

Healthy and well-managed BCEs provide a wealth of benefits from ecosystem services that have real economic value. The monetary value of the benefits from ecosystem services can be considered through ecosystem accounting or valuation processes when project or management decisions are made. Ecosystem value-based approaches directly account for these services through financially supporting those stakeholders and projects that conserve, restore, or sustainably manage these ecosystems. This section provides three examples of this financing approach for BCE projects.

Payments for Ecosystem Services (PES)

Blue carbon ecosystems deliver a wide range of ecosystem services - from supporting fisheries and sustaining livelihoods to buffering coastlines and regulating flooding. However, the value of these services is still not fully captured in traditional economic assessments or resource management plans. Payments for Ecosystem Services (PES) help address this gap by compensating ecosystem stewards for actions that conserve or restore the natural systems underpinning these benefits. While definitions of PES can vary, this section focuses on approaches that do not involve the creation or trade of standardized, unitized commodities like carbon or biodiversity credits.

Effective PES typically depends on robust economic valuation of ecosystem services, which drives willingness to pay from service buyers.[44] Different benefits of ecosystem services have variable levels of measurability. Potentially measurable benefits for BCEs – depending on site characteristics – include coastal protection, water purification, carbon sequestration, reduction of erosion, fisheries support, and production of harvestable resources (e.g. mollusks).[45] Others, in particular cultural services, are less readily measurable.[46]

When measuring benefits directly is not practical or recommended, an alternative (or supplementary) approach is to pay service providers – those responsible for safeguarding or facilitating the service – proportional to the opportunity costs associated with not taking, or ceasing, actions that financially benefit the providers but harm the service/s in question (such as conversion to other land uses).[47]

PES relies on identifying service providers and service buyers. Service providers need to be legally recognized. In-depth stakeholder engagement and analysis is often necessary to ensure the right beneficiaries are identified. Local communities who depend directly on BCEs for sustenance and income are often the most effective stewards.[48]

The benefits bestowed by BCEs, such as flood mitigation, fisheries support, and cultural services, tend to be public goods. While this is good for society, it is more challenging to attract financiers who wish a direct financial return on their investment.[49] Governments are often important financiers/buyers, facilitators, and technical partners, especially when the ecosystem services in question are public goods. Governments can oversee the coordination and marketing of such projects, e.g. registration, buying and selling, and central financing.

PES is highly flexible and can be adapted for a wide range of contexts and scales. More than anything, it depends on robust ecosystem valuation alongside equitable and transparent means of payment transfers.

Enabling conditions: Payment for Ecosystem Services

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Accessible formal financial services. PES systems require sophisticated financial transfers for the coordination and delivery of funds from service buyers to service providers by fair, equitable, and transparent means. This often involves intermediaries such as NGOs.

Generation of financial returns. The PES philosophy hinges on the economic valuation of ecosystem services. The economic value associated with stewarding or restoring these services must outweigh any opportunity costs; these can be offset through the development of alternative sustainable opportunities. When ecosystem services are public goods, they may be measured based on criteria like Social Return on Investment.[50] To magnify financial returns, different ecosystem services may be able to be bundled together and sold as a package.

Access to early-stage capital. PES projects typically take a long time to deliver returns, so initial investments will likely take the form of grants, loans with long terms to maturity, or investments where financial ROI is not anticipated for a substantial amount of time.

Defined ecosystem values. The ecosystem services included within the PES project, and the methodologies for calculating their values, should be clear, robust, and agreed upon by all stakeholders.

Conditionality of payments. Monitoring and MRV efforts should ensure that the actions of service providers are indeed supporting the ecosystem service/s for which they receive payment. For practicality purposes, payments may be made based on implementation of certain agreed-upon management practices rather than proof of increased/enriched service delivery.[51]

Local capacity. Relevant local managers (public or private) and local communities need to have a good understanding of the value of the BCEs they oversee, the legal conditions involved, and training for alternative livelihood activities. FPIC can only be secured if sufficient capacity and knowledge is first assured.

Often necessary

International market demand. Depending on the project model, service buyers may include international stakeholders: corporations, foreign governments, or citizens of other areas that benefit (usually indirectly) from these ecosystem services. In such cases, a willingness or obligation to pay for these services is required.

Domestic market demand. Depending on the project model, service buyers may include local businesses and governments. This is especially true for smaller-scale PES projects.

Sometimes necessary

Large scale. If the underlying PES framework is established for a country or region, then costs at the individual project level become lower. This can pave the way for small projects, if there is an existing framework with which to integrate.

Case study: Payments for Ecosystem Services in action

Socio Manglar Incentives
Location: Ecuador's five main estuaries
Project area: 454.51 km^2

Leads, partners, governance
Ministry of Environment, Water and Ecological Transition, Undersecretary of Natural Heritage, Socio Bosque Program.
REDD for Early Movers (REM) Program
Conservation International (CI) Ecuador

Project financing

Socio Manglar, the Socio Bosque program's mangrove chapter, began in 2014 with full financing from the Government of Ecuador, later gaining support from the REM program in 2020 and from CI in 2023, with the support from a private donor. Now, 67% is financed by the government and 33% through international cooperation.

CI has also supported the creation of the Manglares Subaccount in the Socio Bosque Fund with a seed fund from the Aquaculture Stewardship Council and other resources from CI. In 2025 additional resources from a Green Climate Fund (GCF) project, Mangroves for Climate, will be invested in this financial mechanism.

Narrative

Socio Bosque is an Ecuadorian national program that provides financial incentives for communities and landowners that are conserving forests, páramos (highlands), and mangroves. Ecuador's mangroves are owned by the government, so the program is applied in areas that have previously signed a Mangrove Use and Stewardship Agreement between local associations and the government, which grants resource usage rights to these associations.

Incentives can be invested in any activity decided by the association. This includes conservation and monitoring of the area, bioeconomy, social and cultural development and organizational strengthening.

Enabling conditions

- **Accessible formal financial services:** Services are developed during the application phase and have been an aspect that each association must strengthen as they learn how to handle and manage financial resources.
- **Generation of financial returns:** The investment from GCF requires a positive financial return to support the program in the long term. For the investments in the local associations, non-financial return is required.
- **International market demand**: Not a condition of this program.
- **Domestic market demand:** This condition should be developed as the program grows, particularly to add resources in the endowment for the Socio Bosque Subaccount.
- **Access to early-stage capital**: The program was initially fully financed by the government. Now the program is transitioning to a blended mechanism expecting to secure 50% of financial resources from the government and the remainder from other sources.
- **Large scale:** Socio Manglar is a chapter of the large-scale national Socio Bosque PES system, so it does not itself need to be large scale.

Additional resources:

Protecting Seagrass Through Payments for Ecosystem Services: A Community Guide | UN Environment Programme (UNEP) | 2020

Payments for Ecosystem Services (PES): A practical guide to assessing the feasibility of PES projects | Center for International Forestry Research (CIFOR) | 2014

Diagram: Payments for ecosystem services scheme | Food and Agriculture Organization of the United Nations (FAO) | 2021

Insurance products

Insurance provides a guarantee of compensation for a specified loss or damage. Insurance helps support financial stability to ensure that certain activities – which can include livelihoods or ecosystem services – are able to persist even when faced with uncertainty. Insurance can facilitate the long-term, sustainable management or longevity of healthy and productive BCEs by financing restoration following natural disasters or supporting good management practices by local communities. Insurance products are best suited to protecting BCEs or related communities that are vulnerable to shock events (e.g. natural disasters), rather than gradual degradation or destruction.

- Insurance products related to BCE projects typically fall into two broad categories:
- Indemnity insurance: payouts based on the extent of losses and damages suffered by the policy holder

Parametric insurance: payouts based on set parameters, namely whether the characteristics and scale of an incident that causes loss and damage meet a pre-defined index.[52]

Given the increasing incidence of climatic threats, parametric insurance is rising in popularity as a more rapid, flexible, and feasible means of calculating and distributing payouts following natural disasters, as there is no loss adjustment processing and modelling needed, meaning time between the incident and payout can be dramatically reduced – essential for those who face significant loss and damage of resources or sources of income.[53] Parametric and indemnity insurance can function complementarily in BCE projects. Parametric insurance can provide immediate funding for initial post-disaster response, while indemnity insurance follows with longer-term financing based on comprehensive damage assessment.

While insurance products typically insure people or organizations, they can also be used to insure natural infrastructure such as BCEs and the ecosystem services they provide. For instance, investment into mangrove or coral restoration and protection can be achieved through parametric insurance products that pay for post-disaster restoration, to increase coastal resilience and reduce future disaster-related costs via these ecosystems.[54] In these cases, local governance is necessary to oversee the restoration and management of involved ecosystems.

The role of BCEs as risk mitigators could also be integrated into insurance products. The Mangrove Breakthrough Financial Roadmap advises the integration of mangroves as an adaptation solution within insurance pricing, which creates a strong incentive for corporate policy holders to safeguard mangroves within their influence to encourage cheaper insurance policies in the future.[55] Even without explicit integration, recognition of the benefits of BCEs for mitigating or avoiding damage builds the business case for their restoration and protection, by both insurers and policy holders.

There may also be a need to buffer uncertain risks for the insurance industry given the emergent nature of such insurance policies. Reinsurers, who provide insurance for insurers at a grander/international scale, can help disperse risk. Reinsurers look to longer-term investments and often set the KPIs that insurers need to abide by; it is recommended that reinsurers increasingly look to integrate NbS within their KPIs. Public-private collaborations can also help mitigate risks, for instance through governments providing first payouts to mitigate the risks of insurers suffering net losses through higher-than-expected claims.

Enabling conditions: Insurance products

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Accessible formal financial services. For local stakeholders to be able to access insurance products, they need to have the means to buy them, hold them, pay premiums and make claims following losses. In low-income areas, this may require the establishment of additional financial services, such as savings clubs and low-interest borrowing facilities. Insurance products do not necessarily need to rely on individual purchasing power; through structuring within government social protection or livelihood support programs, ideally tied to sustainable practices, they can reach collectives of joint policy holders.

Generation of financial returns. Insurance providers will only be interested in providing insurance products if they stand to receive a net financial gain through premiums, noting that these gains may not be realized short-term. If within a broader risk pool of products, insurers may be open to piloting newer approaches without prospects of short-term gain for emerging or underserved sectors, to build proof of concept and refine models.

Domestic market demand. The success of insurance products is contingent on sufficient buyers. Primary demand is typically from stakeholders within the project area, such as local governments, cooperatives, community groups, and tourism enterprises.

Measurable adaptation/resilience benefits. To include ecosystem services within insurance products, they need to be evaluated in socioeconomic terms, such as flood risk reduction and avoided losses, similar to PES approaches. This requires integration into risk frameworks acceptable to insurers.

Clear group of insurance beneficiaries with control over mitigative measures. Key stakeholder engagement is needed to understand the benefits of natural infrastructure such as BCEs. Understanding who can legally purchase insurance is also required. Often, anyone with an insurable interest in the covered asset is eligible to purchase insurance.

Appropriate index and event data. Parametric products, in particular, rely on being able to calculate and model the nature, scale, and probability of the events that they insure against, such as storms or floods, to understand risks and price their products accordingly. Access to reliable historical data is typically necessary.

Legal and regulatory framework. Many jurisdictions have yet to formally recognize or regulate index-based insurance products, which presents barriers for the establishment of parametric insurance. Regulatory readiness is essential to insurer participation and long-term scalability.

Often necessary

International market demand. Often, international reinsurers provide the capital and risk capacity needed to underwrite newer insurance products, especially in countries where local insurance markets are underdeveloped.

Large scale. Products that integrate ecosystem-based adaptation need sites of sufficient scale to generate measurable impact and justify development costs. Larger project areas also tend to help distribute and mitigate overall risk through spatial diversification.

Sometimes necessary

Access to early-stage capital. Insurance companies are well-versed in the administrative and analytical resourcing needed to run operations for established products. Building the business case for new products, however, may require significant capital investment: for instance, to quantify the adaptation/resilience benefits of BCEs, or model risk for novel and evolving scenarios. Parametric insurance products are less well-established than indemnity insurance products, but payouts are based on large-scale events meeting pre-defined conditions rather than calculating post-hoc losses of each individual policy holder, so in theory they are simpler to operate.

Case study: Insurance products in action

The Restoration Insurance and Financial Services Company (RISCO)

Revenue-based finance, blue carbon credits, and parametric insurance for pilot projects in the Philippines and Sundarbans, India

Leads, partners, governance

Conservation International, RISCO Holding, municipalities and associations

Project financing

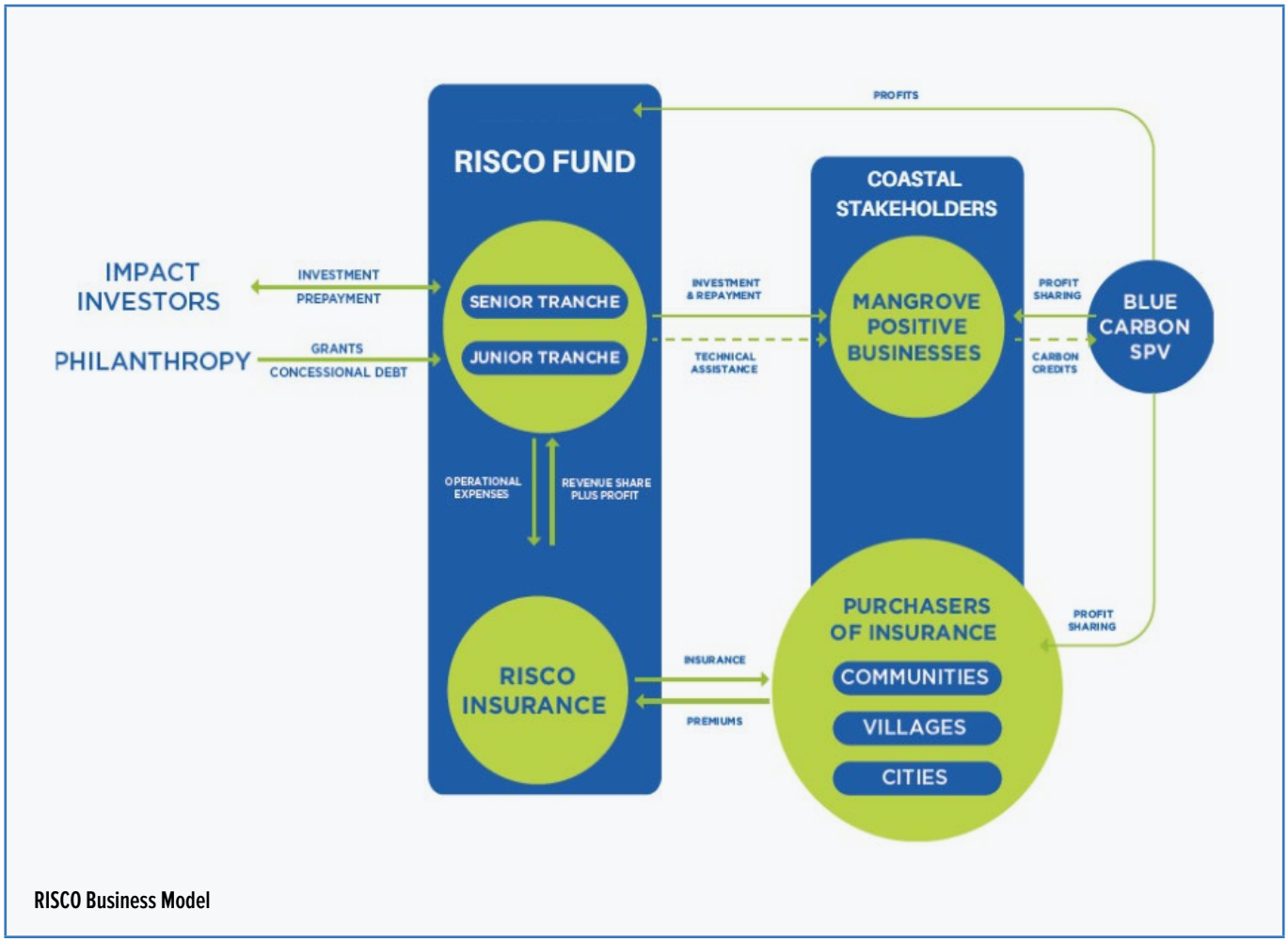
- Feasibility and small-scale trial for the Philippines funded by Swiss Re Foundation and Convergence Blended Finance
- Feasibility and small-scale trial for the Sundarbans, India funded by anonymous donor

Narrative

Launched in 2024, RISCO seeks to address the underinsurance of coastal communities facing increasing climate risks by both averting and minimizing loss and damage through conserving and restoring mangroves. RISCO provides access to risk transfer and concessional financing. RISCO operates through a split structure: RISCO Insurance is an agent that distributes parametric insurance to coastal stakeholders (i.e., municipal governments and SMEs) and provides loans to mangrove-positive business; revenue from these sources in addition to blue carbon credits is shared with the RISCO Fund, which invests in coastal NbS. RISCO's pilot project supports a seaweed business in the Philippines and Integrated Mangrove Aquaculture Systems (IMAS) in India with plans for further efforts in the region.

Enabling conditions

- **Accessible formal financial services:** Established financial services are necessary to facilitate the parametric insurance premiums and payouts set by RISCO that help communities recover from climate disasters, and a portion of the revenue is reinvested into mangrove restoration to further strengthen coastal resilience.
- **Generation of financial returns:** All three of RISCO's mechanisms (parametric insurance, loans, and blue carbon credits) aim to generate financial returns.
- **International market demand:** Reinsurers and local underwriters are supporting RISCO policy development. Blue carbon credits present a future revenue stream that can be reinvested in conservation and resilience-building initiatives.
- **Domestic market demand:** RISCO provides revenue-based financing for businesses that integrate mangrove restoration into their operations, such as IMAS or seaweed farming. These businesses expand mangrove cover while generating sustainable livelihoods, ensuring economic and ecological benefits. Municipalities are seeking parametric covers to expand disaster response activities.
- **Access to early-stage capital:** Capital was necessary to complete insurance, financing and blue carbon feasibility, risk modelling and mangrove restoration plans.
- **Large scale:** The pilot targeted the City of Puerto Princesa and Zamboanga City in the Philippines, and the Sundarbans in India.



RISCO Business Model

Case study: Insurance products in action

Weather index-based parametric insurance for small-scale fishers in the Philippines

Pilot covering 20 coastal municipalities in the Philippines

Leads, partners, governance

Leads: Rare (NGO), WTW (global advisory, broking, and risk solutions company)
Policyholder: Department of Agriculture Bureau of Fisheries and Aquatic Resources (DA-BFAR)
Payout manager: Philippine Crop Insurance Corporation (PCIC) (state insurer)

Project financing

- Funding for methodology development: Government of Canada via the Ocean Risk and Resilience Action Alliance (ORRAA)
- Funding for pilot project: DA-BFAR (PHP 10 million, aprx USD 180,000)

Narrative

The first-of-its-kind parametric insurance product is designed to help fishers adapt to climate change by providing income protection for lost fishing days due to adverse weather, through rapid pay-outs based on pre-defined weather triggers instead of indemnifying actual losses. The 2025 pilot targets 15,000 registered fishers, offered as part of the standard benefits package to drive fisher registration, an action linked to strengthened commitment to sustainable fishing practices.

Enabling conditions

- **Accessible formal financial services:** The project integrates the insurance product within the standard benefits given to registered fishers.
- **Generation of financial returns:** The pilot project does not anticipate financial returns for insurance providers, but this may be integrated when scaled.
- **International market demand:** Currently, further insurance or reinsurance companies are not involved.
- **Domestic market demand:** The demand for the insurance product originates from small-scale fishers, given they face increasingly unpredictable sources of income.
- **Access to early-stage capital:** Capital was sought to develop the methodology and risk modelling apparatus needed prior to the pilot project.
- **Large scale:** The pilot targets 15,000 fishers, with plans to scale up if the project meets its goals.

Additional resources:

Relevance and Feasibility of Mangrove Insurance in Mexico, Florida, and The Bahamas | The Nature Conservancy (TNC) and partners | 2022

Report on Ecosystem-based Adaptation (EbA) and Nature-based Insurance Solutions (NbIS) in the Philippines and Asia | GIZ and partners | 2024

[Diagram]: How Parametric Products Benefit Catastrophe-Driven Risk Transfer | Amwins | 2020

Alternative credits: biodiversity, resilience

Carbon is not the only ecosystem service benefit with the potential to be monetized through a credit-based approach. Other benefits, such as biodiversity or resilience, can also be quantified and are gaining momentum. Exploratory efforts are examining whether ecosystem services benefits besides carbon, including biodiversity and climate resilience, can be reliably valued and traded on markets of different scales.

Overarching governance architectures for these approaches are emerging, such as through the International Advisory Panel on Biodiversity Credit Framework.[56,57] Other regulatory approaches such as the Nature Repair Market in Australia[58] and the UK's Biodiversity Net Gain market[59] are also being approved and implemented. These markets are expected to evolve at national and subnational levels. As a result, given the diversity of context and applications, there is not necessarily the same expectation for standardization as for carbon market approaches. Nevertheless, emerging efforts are seeking to learn from carbon markets to build upon existing structures and address gaps to support the transition to a nature-based economy.[60] Over 50 crediting approaches have emerged, including from key carbon market players such as the Verra Nature Framework.[61,62]

Biodiversity credits could contribute towards achieving the Kunming-Montreal Global Biodiversity Framework targets, particularly Targets 2 (ecosystem restoration), 3 (area conservation), and 19 (financial resource mobilization).[63] Biodiversity credits could also provide reporting pathways for companies implementing recommendations from the Taskforce on Nature-related Financial Disclosures.[64]

Like carbon credits, the generation of alternative credits depends upon a clear shared understanding of tenure and stewardship, as well as an agreed understanding of resource usage rights to ensure that the profits gained from sale of credits are equitably distributed.

Enabling conditions: Alternative credits

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Generation of financial returns. Alternative credits should bring worthwhile financial benefits to those stewarding the services in question. The sale of credits may also bring returns for investors, depending on the funding model employed.

Access to early-stage capital. High-quality credit-generating projects need to follow a rigorous set-up process. Many lessons have been taken from carbon market projects, with the intention of ensuring high quality even in early projects.[65] There may be opportunities to build up more capital-intensive activities, such as monitoring further biodiversity metrics, once credit revenue begins flowing.

Additionality, leakage and durability: Depending on the methodology employed, alternative credit approaches may rely on: proving counterfactuals, i.e. that project revenues enable the benefits that the credits are issued for; demonstrating low leakage, that the project doesn't divert damaging activities elsewhere; and that benefits are durable over time. These requirements may be more flexible than for carbon markets given the more diverse array of metrics used to measure biodiversity or resilience.

Often necessary

Accessible formal financial services. Depending on the scale and methodology used within the project, local BCE stewards may require means of receiving and managing payments for the alternative credits they generate.

International market demand. Depending on the project, credits may target international or domestic buyers, or both. Ongoing demand for such credits is currently less proven than for carbon credits.

Domestic market demand. See above.

Sometimes necessary

Large scale. Efforts are being made to aid even small projects to access these emerging markets and employ the necessary methodologies. Like carbon credits, they may be bundled, stacked, or stapled with other credits (including carbon credits) and/or other credit-producing projects to reduce investment risk and increase project revenue.

Case study: Alternative credits in action

Developing a methodology for coastal resilience credits

Partners: The Nature Conservancy (TNC), University of California-Santa Cruz, East Carolina University, TerraCarbon

Funders: AXA XL (insurance and reinsurance provider)

Narrative

The coastal resilience methodology was developed to quantify and monetize the flood protection benefits provided by restored or conserved coastal wetlands. The methodology generates resilience credits based on the number of people and properties at reduced risk of flooding due to restored and protected mangrove and tidal marsh habitat. These credits can be traded in voluntary markets, attracting investment and generating returns. This approach incentivizes the conservation and restoration of BCEs while enhancing community resilience and contributing to climate adaptation goals.

Developing the coastal resilience methodology required access to high-resolution data on bathymetry, topography, population, and economic exposure values. Projects should be located where restored or conserved habitats lie directly between the source of storm surges and exposed populations. The methodology also benefits from existing modeling studies or reports that provide total water level data, including wave heights, for various return periods.

Effective implementation requires collaboration among stakeholders, including local communities, governments, and private sector partners, and access to early-stage capital from public, private, and philanthropic investments. Clear tenure and resource use rights are essential for long-term success and community support.

Identifying corporations/buyers early on, whose priorities align with improving coastal resilience for communities, will demonstrate market demand for generated credits. The methodology for coastal resilience credits is currently in the final stages of approval under Verra's SDVISta program.

Additional resources:

Definition of a Biodiversity Credit | Biodiversity Credit Alliance | 2024

Monetizing Resilience Benefits as a New Financial Tool to Unlock Private Sector Financing | International Fund for Agricultural Development (IFAD) | 2022

CAPITAL MARKET-BASED APPROACHES

Capital markets are markets that trade in debt and related financial assets, such as bonds and shares, typically to make substantial long-term investments that carry an expectation of financial returns in the future. In the context of BCEs, we focus on three financing approaches that engage with capital markets through the trade and restructuring of debt.

Blue/green bonds

Bonds are a form of transferable debt: they represent a loan, but differ in that they are issued by the borrower to the lender, and the lender can trade the bond on markets. They can be issued for general purposes, or can limit bond proceeds to fund specific purposes. These thematic bonds include sustainable green and blue bonds, which are issued to enable investment in the sustainable green (terrestrial) and blue (marine) economy.[66,67] They can be issued by both private and public entities, including corporates, financial institutions, national governments, municipalities, and development banks.[68]

The main difference between blue/green bonds and conventional bonds is that it is necessary to track how their proceeds are used, to ascertain that they are enabling investment in the pre-agreed areas. Blue/green bonds also tend to have favorable terms for the issuer (e.g. lower interest rate), as an incentive to choosing a blue/green bond approach over a typical bond approach. Given that they essentially function the same as conventional bonds, they are already well-understood by investors, which helps build financier confidence in projects that utilize them.

Here we focus on blue bonds as a potential financing instrument for coastal BCE projects, in particular, projects that invest in mechanisms/businesses that later generate financial returns to pay the bond's interest and ultimately return the principal.

Blue bonds can be connected with debt-for-nature swaps,[69,70] as well as other instruments that alleviate risk. Blue bonds alone can risk increasing debt burdens, whereas structuring them within debt-for-nature swaps (or other instruments) unlocks conservation outcomes and reduces sovereign debt risks.[71]

Enabling conditions: Blue/green bonds

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Generation of financial returns. Blue bonds require projects to deliver financial returns in excess of what is required to service and repay the bond.

International market demand. Bonds are liquid, transferable instruments and form an important component of the international debt market. International demand for blue bonds is necessary to maintain prices and the willingness of funders.

Access to early-stage capital. The nature of bonds and the transaction costs of issuance suggest a significant minimum issuance size. While green bonds have seen issuances as low as USD 2 million,[72] blue bonds are considered most effective when at USD 50-500 million in scale due to the costs involved in their issuance.[73]

Solid credit rating and/or guarantees. Bonds require credible issuers with a robust track record and often require additional guarantors (e.g. government) to achieve an adequate credit rating and mitigate risk of defaulting on the loan.

Often necessary

Accessible formal financial services. The capital released through blue bonds can be utilized by a range of stakeholders at a range of levels. Depending on project design, this may include payments to local communities or organizations, or funds may be managed at a higher level with a focus on indirect financial or non-financial benefits for local stakeholders.

Domestic market demand. While bonds are more typically bought and sold on international rather than domestic markets, it is also feasible for bonds to only be transferred within domestic markets, or both international and domestic markets (usually within separate tranches).

Large scale. Blue bonds are often issued only for large quantities of capital (USD 50-500 million minimum)[74] and typically finance an agreed portfolio or pipeline of projects, making them suitable for aggregated collections of projects rather than smaller individual projects.

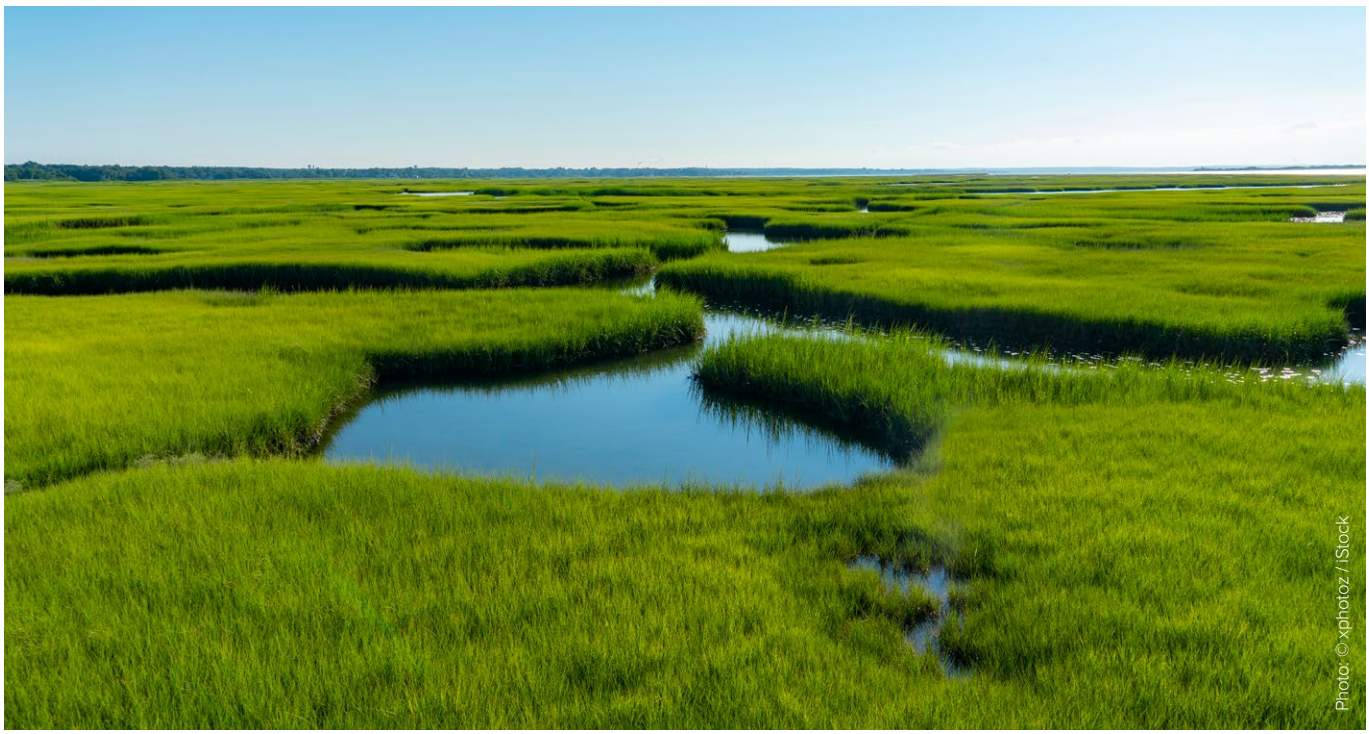


Photo: ©xphotoz / iStock

Case study: Blue bonds in action

The Seychelles Sovereign Blue Bond[75,76]

The Seychelles
Project area involves roughly 410,000 km^2 (30% of the Seychelles' Exclusive Economic Zone)

Leads, partners, governance

Seychelles Government
Grant disburser / Conservation Trust Fund: Seychelles Conservation & Climate Adaptation Trust (SeyCCAT)
Loan disburser: Development Bank of Seychelles (DBS): loan disburser
Partial guarantor: World Bank (USD 5 million)
Lender: Global Environment Facility (GEF) (USD 5 million soft financing)
Bond structuring counsel/support: HRH Prince of Wales' Charities International Sustainability Unit, Standard Chartered, Latham & Watkins LLP, Clifford Chance LLP:

Project financing

- USD 15 million raised from international investors for sustainable marine investments in the blue economy.
- Provides USD 350,000 annually to SeyCCAT trust funding (about 40% of total trust funding)
- Proceeds are used by SeyCCAT to issue grants to projects via the Blue Grants Fund; and by DBS to issue loans via the Blue Investment Fund.

Narrative

Three years after the conclusion of the Seychelles debt-for-nature swap in 2015, the first of its kind for ocean conservation and climate adaptation, it was necessary to implement further financial mechanisms to effectively manage the newly created protected areas and other climate commitments. The introduction of the Seychelles Sovereign Blue Bond, another world first, provides proceeds that support the expansion of marine protected areas, improved governance of priority fisheries and the development of the Seychelles' blue economy.

Enabling conditions

- **Accessible formal financial services:** Local-level formal financial services are not very relevant; SeyCCAT and DBS co-manage bond proceeds and provide access to grants and loans, respectively, to projects.
- **Generation of financial returns:** The bond has an effective interest rate of 6.5%, though this is reduced to 2.8% due to the GEF's concessional loan subsidizing the coupons (interest payments).
- **International market demand:** The blue bond's attractive relative valuation and the support of the World Bank made it a significant opportunity for investors.
- **Domestic market demand:** The blue bond aids investment into sustainable economic growth, improved livelihoods and jobs.
- **Access to early-stage capital:** The blue bond project builds off the success of the debt-for-nature swap; both involve large quantities of capital.
- **Large scale:** Projects funded by bond proceeds collectively cover a large area.

Additional resources:

Funding ocean conservation and protection through blue bonds | Our Shared Seas | 2025

Bonds to Finance the Sustainable Blue Economy: A Practitioner's Guide |Asian Development Bank (ADB) and partners | 2023

Practical Guidance to Issue a Blue Bond | United Nations Global Compact | 2020

Catastrophe/resilience bonds

Bonds can also be designed to focus on climate adaptation and resilience, and to leverage the power of capital as an 'insurance' mechanism against catastrophic losses.

Catastrophe bonds have existed since the 1990s and are used principally to transfer risks from insurers to investors, tapping into the larger resources of the capital market.[77] Natural disasters can lead to insurance payouts to policyholders at a scale that is financially disastrous for insurance companies. Catastrophe bonds involve insurers taking out loans from investors and paying interest on the loans as they advance towards maturity. The bond principal (the money borrowed) is usually held by a Special Purpose Vehicle (SPV) rather than the insurers themselves. If a natural disaster that fulfills certain pre-established conditions happens before the bond reaches maturity, the principal is used to pay policyholders and so the investors face a loss (rather than the insurer). If such a disaster does not happen before the bond matures, repayment of the bond principal plus interest means that the investors make a worthwhile profit.

Resilience bonds are a variation on catastrophe bonds, with an added element that promotes investment in resilience projects. Interest repayments can be reduced if debtors (often insurance companies) complete specific risk-reducing projects during the bond term, which could include nature-based solutions that build climate resilience. This brings benefits to policyholders who face fewer losses following natural disasters, the debtors who pay less interest, and the investors who are at lower risk of losing their investment. In this way, benefits reach not just the financial service providers, but local communities, through adaptation and resilience activities funded by the capital market.

In the context of BCEs, resilience bonds can be used to fund BCE conservation, restoration, and sustainable management given the resilience and risk-reduction benefits that these ecosystems provide. They also support more reliable insurance services in the event of natural disasters, which benefits disaster recovery.

The exploration of enabling conditions below refers specifically to resilience bonds, given they play a role in risk reduction in addition to risk transfer, so representing a more powerful instrument for BCEs.

Photo: © Matt Curnock / Ocean Image Bank

Enabling conditions: Catastrophe/resilience bonds

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Accessible formal financial services. Resilience bonds rely on formal insurance services with many policyholders. This requires local communities and organizations to be able to access insurance policies.

Generation of financial returns. Investors will only be willing to hold resilience bonds if the prospects of financial returns are good and the risk profile is acceptable.

Domestic market demand. The structure of resilience bonds relies upon individuals or organizations taking out insurance policies and insurers issuing resilience bonds to investors. Demand for these services is therefore required from all these stakeholders.

Access to early-stage capital. Resilience bonds have to date been issued at larger scales with substantial sums of capital involved. Minimum issuance size starts at around USD 100 million, which can prove a barrier to many projects; aggregation with other projects can help overcome this hurdle.[78]

Pipeline of resilience projects. Resilience bond rebates are conditional on funding resilience projects that demonstrably reduce risk. This requires a well-structured pipeline of feasible and effective projects.

Accurate risk reduction models. Setting the conditions of resilience bonds requires a sophisticated understanding of risk, including to what degree funded projects can mitigate this risk.[79]

Often necessary

International market demand. Like other bonds, there is capacity for resilience bonds to be traded on international markets. This liquidity may not be strictly necessary but does help allay investors' concerns about risk.

Large scale. For resilience bonds to be worthwhile for investors and insurers alike, typically they will involve insurance products that will overall deliver substantial net profits. Pilot studies or concessional products may be applicable on smaller scales.

Case Study: Catastrophe bonds in action

Catastrophe Bond for enhancing financial protection of Jamaica[80,81]

Jamaica (10,991 km^2)

Leads, partners, governance

Sponsor: Government of Jamaica
Grant support: UK and Germany funded Global Risk Financing Facility (GRiF), United States Agency for International Development (USAID)
Intermediary, technical support: World Bank
Compensation calculator: AIR Worldwide

Project financing

The Government of Jamaica (with financial support from grantees) paid the World Bank a fixed premium for insurance coverage, to provide a principal (coverage amount) of USD 185 million for 2021-2023. The World Bank transferred the premium to global capital investors as bond coupons. When a qualifying natural disaster occurs that triggers payouts, an independent calculation agent determines payout amount and transfers them to the Government of Jamaica.

Narrative

Jamaica is highly vulnerable to natural disasters and climate-induced changes along its coasts. The catastrophe bond provided an insurance cover for tropical cyclone events. Compensation is calculated parametrically, based on central pressure and course of the cyclone, and paid out within weeks of the disaster. Jamaica is the first Small Island Developing State to independently sponsor a catastrophe bond and the first to incorporate a cat-in-a-grid parametric trigger design.

Enabling conditions

- **Accessible formal financial services:** The World Bank supported the building of prerequisite governance, policy, and an institutional framework.
- **Generation of financial returns:** Capital market investors receive bond coupons. Payouts to claimants are financed by bond principal reductions in the event of an eligible natural disaster occurring.
- **International market demand:** Accessing international debt capital markets was critical for Jamaica given limited capacity of local debt capital markets.
- **Domestic market demand:** The project did not involve local debt capital markets.
- **Access to early-stage capital:** The principal of USD 85 million covered a risk period of 2.4 years (three hurricane seasons).
- **Large project area:** The catastrophe bond covers the entirety of Jamaica.

Additional resources:

Conservation Investment Blueprint: Resilience Bonds | re:focus partners | 2019
Catastrophe Bonds | Wharton Risk Center | 2021
[Diagrams]: Resilience Bonds: a business-model for resilient infrastructure | Field Actions Science Reports | 2018

Debt-for-nature swaps

Debt-for-nature swaps provide benefits for nations via two pathways:

- Reducing national debt
- Freeing up funding for conservation

Portions of national debts are either forgiven or restructured to offer longer maturity, lower interest rates, and/or reduction of the overall debt stock.[82] Such restructuring efforts are conditional on using freed-up financing for specific conservation purposes with clear KPIs. Debt-for-nature swaps fall into two broad categories:

- Public (bilateral) debt-for-nature swaps: a creditor government agreeing to forgive a portion of the debt of a debtor country
- Private (commercial) debt-for-nature swaps: a third party, such as an NGO, purchasing the commercial debt of a debtor country in the secondary market at a discount.

Both approaches are contingent on the debtor country agreeing to spend proportionate funds on nature-related goals.

The high-profile successes of a few swaps are raising interest and ambition worldwide.[83] Means to replicate and standardize these approaches are essential to reach the full potential of debt-for-nature swaps, through driving down costs, de-risking, and building streamlined protocols.[84]

Debt-for-nature swaps are typically national-level. The process is usually long and involved, beginning with negotiation of terms and establishment of the project parameters. Then, multiple stakeholders – which can include national governments, financial departments, international and local conservation organizations and public interest bodies, and private financial institutions – negotiate the terms. The terms include the establishment of an exchange rate, redemption rate, and local instruments for investment.[85] If successful and well executed, debt-for-nature swaps can offer long-term and cost-effective financing.

Debt-for-nature swaps can also contribute to approaches that combine financing instruments. For instance, combining with blue bonds provides an instrument for the re-issuing of debt with more favorable terms, conditional on the loans being used for specific conservation purposes.[86]


Photo: © Fish Forever Indonesia

Enabling conditions: Debt-for-nature swaps

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Large scale. Debt-for-nature swaps require intense and often-protracted negotiations to reach an agreement, meaning there is a significant investment of resources, time, and capacity. This makes them suitable only for large-scale endeavors, though the portfolio of on-the-ground projects they fund may be of diverse sizes and involve actors at a range of scales.

National characteristics. For debt-for-nature swaps to be feasible, there are several conditions that must be met. The indebted country must hold existing debt that the creditor or debt purchaser would be willing to restructure; this normally means that it is unlikely that the debt will be repaid under existing terms.[87] The indebted country also typically needs to have high 'natural capital' in the form of globally important ecosystem services.

Clear repayment and risk management strategy. Debt-for-nature swaps require sophisticated strategies for the conditional transfer of funds/debt and the assessment and response to risk.

Local capacity. Given that creditors and debt purchasers are most likely to consider debt-for-nature swaps when there is a significant chance of the debtor defaulting, they tend to be most relevant for countries with high debt, typically related to lower rates of development. These countries often face implementation challenges as they may have fewer local conservation and development organizations with the resources or capacity necessary to execute the projects agreed upon. A critical component of any debt-for-nature swap is capacity-building at the local level.

Often necessary

Accessible formal financial services. Each debt-for-nature swap is unique in the activities it finances. They may necessitate the creation of financial intermediaries, such as Special Purpose Vehicles or trust funds.[88] In many cases this may include the transfer of capital to local communities or institutions to carry out specific activities, but others may not involve local stakeholders to such a degree (e.g. establishment/enforcement of protected areas by governments).

Generation of financial returns. Private financial institutions are usually involved to restructure/reissue the debt and to mediate or mainstream funding flows. These institutions can earn fees or receive preferable rates.[89]

Access to early-stage capital. Debt-for-nature swaps involve restructuring or reissuing significant volumes of debt, and the debtor country investing debt savings into nature conservation as a result. These payouts to conservation can be made iteratively and/or incrementally over time, depending on the terms of the agreement; but significant early-stage costs are still typically involved for negotiating, establishing, and administrating the agreement itself.

Sometimes necessary

International market demand. Commercial debt-for-nature swaps involve purchasing national debt from international markets, but do not rely on 'demand' for these markets per se. Markets are principally involved in terms of determining the discount price, based on the market's predicted possibility of repayment. Bilateral debt-for-nature swaps do not involve international markets.

Domestic market demand. Domestic markets are typically not involved in debt-for-nature swaps, though agreed terms may incorporate the support/creation of tradeable commodities within their criteria for success.

Case study: Debt-for-nature swaps in action

Belize Debt Conversion for Marine Conservation[90]

Belize
Commitments to increase Belize's Biodiversity Protection Zones from 16.5% up to 30% of its ocean area (over 4,000km^2 in new ocean protection) by 2026.

Leads, partners, governance

Arranged by: The Nature Conservancy (TNC)'s NatureVest
Government of Belize
Arranged/financed by: Credit Suisse
Credit enhanced by: United States International Development Finance Corporation (DFC)

Project financing

- A USD 364 million debt conversion for marine conservation enabled Belize to repurchase its USD 553 million 'superbond', a quarter of the country's total public debt, from bondholders at a 45% discount through a "Blue Loan" arranged by TNC. The "debt conversion" resulted in a USD 189 million reduction in principal outstanding.
- The savings achieved in the refinancing allowed Belize to create an estimated USD 180 million in conservation funding for over 20 years, composed of annual cashflows from the government and an endowment capitalized through the Blue Loan.

Narrative

In the light of concerns over Belize's ability to pay superbond bondholders given an economic slowdown and high debt burden, TNC arranged a Blue Loan between the Belize Blue Investment Company (BBIC, a TNC subsidiary) and Belize, to allow Belize to repurchase the superbond. The structure raised funding from Credit Suisse through the issuance of highly rated blue bonds. Belize committed to using resultant savings to finance marine conservation efforts over the next 20 years, through transferal of payments to an independent Conservation Fund. Commitments included securing 30% of Belize's ocean under protection by 2026, with half the area in high biodiversity protection zones, as well as enhanced Marine Spatial Planning efforts.

Enabling conditions

- **Accessible formal financial services:** The swap involved sophisticated financial instruments and entities, such as BBIC and the Conservation Fund, which organized dissemination of funds.
- **Generation of financial returns:** The blue loan has an internal rate of return of 6.1%. Blue bond investors also receive returns over time.
- **International market demand:** The blue bonds involved can be traded on international markets.
- **Domestic market demand:** The swap does not involve domestic markets at the macro level.
- **Access to early-stage capital:** The debt-for-nature swap involved debt conversion of USD 364 million, a very substantial sum.
- **Large scale:** The swap involves dramatic developments in Belize's national conservation commitments, including new/improved protected areas and enhanced management of marine and coastal resources.

Additional resources:

Debt-to-Sustainability Swaps (D2S): A Practical Framework | Finance for Development Lab | 2024
Debt-for-nature Swaps: A New Generation | Clifford Chance | 2023
[Diagrams]: Explainer: What are debt-for-nature swaps? | Dialogue Earth | 2021

OUTCOME-BASED APPROACHES

Outcome-based approaches focus on the achievement of pre-defined goals. While all financial approaches should include an expectation of strong positive outcomes, this section focuses on pathways that explicitly integrate outcomes into their funding structure. Such approaches are wide-ranging, involving multiple funders and stakeholders at various levels. This section explores three outcome-based approaches with high application potential in BCEs.

Results-based Finance under REDD+

A results-based finance (RBF) instrument aimed to support climate mitigation action through reducing deforestation is REDD+: Reducing Emissions from Deforestation and forest Degradation to foster conservation, sustainable management of forests, and enhancement of forest carbon stocks. Under REDD+, developing countries can receive results-based payments for emission reductions via reductions in deforestation, serving as a strong financial incentive to implement and sustain lasting change.

These results-based payments do not involve the issuance or transfer of carbon credits. While REDD+ can also be structured to generate carbon credits for voluntary or compliance markets, this report focuses on the NCMA components of REDD+.

Although REDD+ has primarily targeted terrestrial tropical forests, mangrove forests can be integrated into REDD+ programs if considered forests in the respective country's National Forest Definition under its Forest Reference Emission Level (FREL). This report examines REDD+ as a results-based finance instrument within jurisdictional programs that include mangroves, recognizing that it intersects with multiple instruments and ecosystem types. Seagrasses and salt marshes are not considered forests, so are not included in REDD+, but could be part of a broader landscape-scale approach.[91,92]REDD+ activities rely upon accurate and robust benefit sharing with stakeholders, which depends upon in-depth knowledge of resource stewards and users.[93] This includes clear carbon rights and land tenure arrangements. REDD+ payments are disbursed to implementers after results (i.e. emissions reductions) have been verified, meaning that it is implementers that carry risk.[94]

Some REDD+ programs, like jurisdictional programs under the World Bank's Forest Carbon Partnership Facility (FCPF) Carbon Fund,[95] can support both carbon credit generation and non-carbon market RBF. However, the same emission reduction (ER) unit cannot be used for both purposes. Each ER is contractually assigned to a single, exclusive use: either transferred for potential use in carbon markets or retained by the host country to count toward its nationally determined contribution (NDC), without transfer. This approach ensures compliance with UNFCCC rules and safeguards against double counting to preserve environmental integrity.

Enabling conditions: Results-based Finance under REDD+

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Access to early-stage capital. REDD+ entails stringent methodologies that require significant capacity-building to meet, which in turn requires the injection of substantial capital to build a country or project's readiness even before developing the project document. Results-based payments are made once results are demonstrated, so the project will require financing from other sources for building project readiness and project design, or arrange advanced payments.

Benefit sharing systems. Jurisdictional REDD+ programs require equitable and transparent frameworks for disbursement of project benefits among stakeholders.

Meet conditions of the UNFCCC Warsaw Framework for REDD+: To access results-based finance under REDD+, countries must meet the four elements outlined in the Warsaw Framework:[96]

- National REDD+ strategy or action plan
- Forest Reference Emission Level (FREL/FRL)
- National Forest Monitoring System (NFMS)
- Safeguards Information System (SIS)

While mangrove forests have smaller global coverage than terrestrial tropical forests, it is important they are adequately included in these elements. It may necessitate additional considerations; for example, updates to the national forest definition, clear references in the national REDD+ strategy, or including soil organic carbon in the FREL with corresponding emission factors to support accurate quantification and reporting.

Environmental and social safeguards: To access RBF payments, the REDD+ program must adhere to REDD+ Cancun safeguards, or other agreed and robust safeguard standards. Cancun safeguards are internationally adopted guidance from the UNFCCC for environmental and social safeguards that ensure that projects complement existing efforts, are transparent, equitable, inclusive, incentivize conservation, and address risks of reversal and leakage.[97]

Often necessary

Accessible formal financial services. For the monetary benefits in REDD+ programs, local stakeholders who may be responsible for project operations need to be able to receive and manage these benefits, allowing equitable distribution as defined in the benefit sharing plan.

Generation of financial returns. REDD+ may integrate other financing approaches that do entail financial returns; so, while this potential is not an explicit requirement, it can often help make projects more sustainable and bring further benefits to local communities.

International market demand. The results of REDD+ projects often yield products (e.g. climate-friendly cocoa for a premium) that enter international commodity markets, but they can also be set up independent of global markets.

Large scale. Significant set-up costs make establishing REDD+ projects challenging for smaller project areas; however, taking a 'nested' approach, which integrates project-scale activities into national programs, can facilitate the participation of projects of varying scales, contributing to a more inclusive and flexible REDD+ architecture. A nested approach supports results-based finance, reduces set-up costs, and improves the assessment of local deforestation drivers, enabling mitigation actions to be more effectively tailored to specific social, ecological, and geographic contexts.[98,99]

Establish a dedicated fund: The establishment of a specific fund can help support forest and BCE conservation by channeling funding for carbon and non-carbon benefits. Such a fund helps coordinate actions across government levels and sectors, and can use co-benefit indicators such as biodiversity or conservation indices in its funding criteria to incentivize activities such as the expansion of protected areas.

Sometimes necessary

Domestic market demand. REDD+ projects do not typically depend on domestic markets but are likely to incorporate a domestic market for non-timber forest products or other alternative livelihoods within the project parameters.

Leveraging public and private finance through blended finance mechanisms. This mechanism mobilizes resources for REDD+ by matching public and private funds, whereby a government or international institution commits to contribute an amount equal to that invested by a private entity or national government in a REDD+ initiative. It reduces financial risk, enhances project bankability, and incentivizes private sector participation. Blended finance also helps governments scale up REDD+ implementation by supplementing limited public budgets and promoting long-term financial sustainability.[100,101]

Insight: Indonesia – Results-Based Finance for Mangroves

Indonesia's 'FOLU net sink 2030 target'[102] represents the nation's climate goal for their forestry and other land use (FOLU) sector to absorb more carbon than it emits by 2030, through activities like reforestation and reducing deforestation. Indonesia includes mangroves within their FRL, which accounts for aboveground biomass, below ground biomass, and carbon soil in mangroves and peatlands.[103]

This means that mangroves are included within the FOLU net sink 2030 target, which is being funded by the Indonesian state and a relatively small component through RBF from Norway.[104] After independent verification of 11.2 million tons of reduced emissions from forests, Norway made the first payment of USD 6 million in 2022.[105]

Additional resources:

National Funding Mechanisms For REDD+: Lessons Learned and Success Factors | UN-REDD Programme | 2022

Unlocking Blue Carbon Development: Investment Readiness Framework for Governments | World Bank Group | 2023

The inclusion of Amazon mangroves in Brazil's REDD+ program | Bernadino et al | 2024

Nesting REDD+ Pathways to Bridge Project and Jurisdictional Programs | TNC | 2021

Impact bonds

Conservation and environmental impact bonds involve the investment of private capital in a conservation initiative against specific project outcomes. The investor is repaid by a designated outcome payer (e.g. a philanthropic or government funder) only if these outcomes are achieved and verified by a third party. This means that investors provide upfront capital to service providers with no guarantees they'll get it back. Impact bonds are not considered 'true' bonds because they are not traded on markets.[106]

Such an approach carries higher risk for the investor (often a private funder), but with potential financial reward, given interest accrued on the loan. This makes impact bonds accessible to service providers who do not have high creditworthiness or financial resilience.[107]

Enabling conditions: Impact bonds

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Access to early-stage capital. The loans from the investors provide the upfront capital needed, and require considerable time to identify and negotiate terms with investors. Other costly components include legal costs and overcoming regulatory hurdles.[108]

Partnership of investors, service providers, and outcome funders. Establishing impact bonds requires setting up and negotiating the terms of unique partnerships of stakeholders. Given risk is primarily taken on by the investors, very strong project design and risk mitigation measures will need to be demonstrated from the outset.

Often necessary

Accessible formal financial services. Project design for impact bond-funded projects can vary. Accessible capital at the local level may be necessary, or capacity-building and sustainable development may take place through other means.

Sometimes necessary

Generation of financial returns. Investors become interested in impact bonds given their potential to deliver financial returns via interest accrued on the loan. However, these returns are paid for by the outcome funder, meaning the project itself does not need to generate funds, only to meet pre-agreed outcomes.

International market demand. Given that impact bonds cannot be traded, the initial investor/s will remain involved for the project duration.[109]

Domestic market demand. The establishment of an impact bond does not require the creation of tradeable commodities at any level, though they may be included within the remit of some projects.

Large scale. Impact bonds are scalable from local- to regional-level conservation efforts. Often, they may be launched as part of a program funding multiple impact bonds.[110]

Case study: Impact bonds in action

Small-Scale Fisheries (SSF) Impact Bond

Southeast Sulawesi, Indonesia
Project area: 144.71 km^2

Leads, partners, governance

Lead: Rare Innovative Finance, Rare Fish Forever Indonesia (implementer)
Performance manager: Levoca
Global counsel: Reed Smith
Local counsel: Arifin, Purba & Firmansyah "APF"
Results verifier: The Center for Coastal and Marine Studies (PKSPL) at the Bogor Institute of Agriculture (IBP University)
Governance: A Project Steering Committee will coordinate operational decisions throughout the implementation of the project.

Project financing

Total project outcome funding is anticipated to reach USD 6 million. Investors (private and, where applicable, philanthropic sources) provide upfront capital to cover initial implementation costs of community-driven NbS. Outcome funders (philanthropic organizations and governments) repay investors only for each when socio-environmental outcome metric once it has been achieved and independently verified.

Narrative

The SSF Impact Bond in SE Sulawesi aims to establish three new Managed Access with Reserves (MA+R) and fisheries rights within them, as well as formalize and strengthen the community-led SSF sector. This includes establishing legally recognized Fishery Management Bodies (FMBs) and supporting legal registration and strengthening of fishers and microbusinesses along the domestic SSF value chain. This formalization strengthens governance, creates financial identities, improves resource management, and unlocks access to formal financial services. By tying investments to pre-agreed, verified socio-environmental outcomes, the Bond aligns financial returns with measurable impacts.

Former successes of Rare's Fish Forever program provided the foundation for defining outcome metrics. A blue bond approach was considered, but ultimately not chosen, given that blue bond proceeds often do not reach SSF communities due to their informal financial status.

Enabling conditions

- **Accessible formal financial services:** The formalization of the FMB as a registered, legal entity is one outcome metric. The project will also undertake financial literacy training and Savings Clubs development.
- **Generation of financial returns:** To return principal investment, five primary outcome metrics must be met. Three additional premium metrics, if met, generate a return for investors.
- **International market demand:** Existing demand for the impact bond product forms the backbone of a scaling strategy to grow from pilot to regional to global reach.
- **Domestic market demand:** Governmental support provides domestic demand, through agreeing to pay for outcomes that align with their political commitments to the worldwide 30x30 initiative for governments to designate 30% of Earth's land and ocean area as protected areas by 2030.
- **Access to early-stage capital:** Significant investment and outcome funding commitments at the start of the project were necessary.
- **Large scale:** The SSF Impact Bond will establish three MA+Rs in SE Sulawesi with a collective area of 144.71 km^2. This large area is necessary for achieving outcome goals and sufficiently contributing to governmental targets.

Additional resources:
Environmental Impact Bonds: a common framework and looking ahead | M W Brand et al | 2021
Rare's small-scale fisheries impact bond | Rare | 2025
[Diagram]: Innovative Financing: Environmental Impact Bonds | American Flood Coalition | 2019

Project Finance for Permanence (PFP)

Project Finance for Permanence (PFP) is a funding approach designed to secure the policies, capacity, and long-term financing needed to achieve conservation goals.[111] It draws on practices from the mainstream financial sector that have proven to maintain sustainable financing.[112] This approach involves large and varied groups of stakeholders, including investors, government, civil society, and communities, creating a detailed conservation plan, estimating long-term costs, securing upfront commitments for financing, and setting clear goals and milestones for fund disbursement.[113] Once the plan is secured, the program seeks donors willing to commit initial funds: often a mixture of public and private financiers. Over time, the government will adopt policy changes needed to meet the pre-defined conservation goals and progressively increase its share of project funding, disbursed as milestones are reached, until it fully assumes ongoing costs.[114]

PFP can draw on a variety of funding approaches, including results-based finance, carbon markets, and classic philanthropic funding.[115] It adapts practices from the mainstream financial sector to overcome challenges associated with long-term sustainable financing for large-scale conservation.[116] PFP can also be combined with other financing approaches, such as debt-for-nature swaps and blue bonds.[117]

Enabling conditions: PFP

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Access to early-stage capital. PFP programs need to seek donors willing to commit the significant initial funds required to meet agreed-upon conservation goals, as well as map out how future funding will ensure that these goals will be maintained or expanded upon. Ongoing funding is disbursed when pre-agreed milestones are reached.

Large scale. Generally speaking, long-term conservation goals rely on conserving a large area, as this builds resilience to slow- or rapid-onset environmental variation such as climatic changes.

Often necessary

Accessible formal financial services. PFP designs can vary widely, so the importance of local accessibility to capital will depend strongly on project design. Given that PFP normally takes a comprehensive approach, it is likely that many project designs will incorporate or necessitate formal financial services.

Sometimes necessary

Generation of financial returns. PFP approaches typically do not seek to monetize project activities or ecosystem services, though they may be combined with other financing approaches that do.

International market demand. PFP approaches do not typically depend on external markets but may be established within combined approaches that do.

Domestic market demand. PFP approaches do not typically depend on domestic markets but may be established within combined approaches that do.

Insight: The Forever Costa Rica Association[118]

Created in 2010, Forever Costa Rica was the second PFP model applied to conservation to be established in the world. They manage, invest, and mobilize resources from a range of international and private funding sources, through a very wide range of projects that aim to conserve biodiversity and promote sustainable livelihoods.

Several of their projects focus on mangroves. For example, one project focused on integrating mangroves into a regional climate adaptation plan, to support future decision-making around restoration of mangrove ecosystems as a means of building adaptation and mitigation. Proposed measures also include integrated seagrass management.

Additional resources:

Securing Sustainable Financing for Conservation Areas: A Guide to Project Finance for Permanence | Amazon Sustainable Landscapes Program and WWF | 2021

Annual Report 2023 | Forever Costa Rica Association | 2024

Great Bear Sea PFP | 2024

Photo: © Fish Forever Indonesia

ENTERPRISE-BASED APPROACHES

Building and strengthening sustainable local economies is key to the longevity of BCE conservation, restoration, and sustainable management efforts. Interventions at the local level to support sustainable business practices create financial incentives that persist long-term. Similarly, enterprise-based approaches build financial freedom and autonomy, reducing reliance on external funding for BCE projects and instead empowering local communities and organizations to manage BCEs themselves indefinitely. This section explores two financing approaches that focus on supporting local enterprises that in turn support BCEs.

Supporting Micro-, Small, and Medium-sized Enterprises (MSMEs)

Local businesses within coastal communities are well-positioned to support BCEs, with the right tools. Micro-, Small, and Medium-Sized Enterprises (MSMEs), defined through metrics related to having fewer employees, fewer assets, and/or lower revenue than larger enterprises,[119] account for 90% of businesses, 60 to 70% of employment, and 50% of GDP globally. MSMEs often sustain or provide the livelihoods of marginalized and vulnerable groups.[120]

In the context of BCEs, projects often focus on bioeconomy businesses: those that rely on biological resources. Projects can help build sustainable value chains that use BCE products (e.g. fish, mangrove honey, etc.) through promoting the growth of MSMEs that follow sustainable management practices

Efforts to support MSMEs can foster local champions for protecting BCEs and support BCE projects through economic means. Efforts may include:

- Financial education and business mentorship
- Ensuring compliance with market standards
- Promoting formalization of MSMEs
- Improving access to formal financial services.

In the long term, building the financial resilience for MSMEs fosters sustainable natural resource management practices by reducing pressure on businesses to over-extract or degrade resources.

Enabling conditions: MSMEs

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Accessible formal financial services. Often fostered within the purview of the project itself, formal financial services are essential for building MSME resilience and capacity.

Generation of financial returns. Support for MSMEs is predicated on them benefiting financially through expanded and/or improved practices.

Domestic market demand. Demand at the domestic level for the products or services that the MSMEs provide is essential for fueling their business model. Businesses that fulfill certain environmental criteria can cater to demand for sustainably sourced products.

Sometimes necessary

International market demand. It is not typically necessary for MSMEs' products and services to enter the international market, though they may in some cases.

Access to early-stage capital. Projects that support MSMEs can be established for relatively low cost, depending on the scale involved. Cost also depends on the scope of the project; for instance, projects that actively monitor impacts of project activities on associated BCEs will have higher costs.

Large scale. Projects that support MSMEs can feasibly function at smaller scales. Aggregating similar MSMEs to streamline support services can help build economies of scale.

Photo: © Fish Forever Indonesia

Case study: Supporting MSMEs in action:

Fish Forever: Financial & Market Inclusion (FMI) with Gender Integration

Southeast Sulawesi, Indonesia

Leads, partners, governance

Lead: Rare, Indonesia's Ministry of Marine Affairs and Fisheries
Partners: provincial marine and fisheries agencies, district government fisheries agencies, Bank Rakyat Indonesia (BRI), Bank Negara Indonesia (BNI), Haluoleo University, Kendari Muhammadiyah University, SE Sulawesi's provincial agency for cooperative and microbusinesses
Social security provider: BPJS Ketenagakerjaan
Target beneficiaries: SSF actors (fishers, fish processors, fish traders, and first-level fish buyers/ collectors).

Project financing

- Grants totaling approximately USD 20,000 – 30,000 provided by MAC Foundation, Walton Foundation, and ORRAA mostly for training programs
- Contribution of around USD 5,000 by SE Sulawesi's provincial agency for cooperatives and microbusinesses and around USD 1,000 by BPJS Ketenagakerjaan for training programs

Narrative

Rare's Fish Forever program has a longstanding history of working with small-scale fisheries in Indonesia. The FMI project aims to:

1. Increase the financial literacy of SSF actors (including women) and linking them with formal financial institutions, such as social security providers.
2. Facilitating SSF actors to form Savings and Loans Clubs to build their social and economic resilience.
3. Strengthening fisheries microenterprises to increase added value through sustainable business strategy development and improving management skills, business formalization and business digitalization.

Enabling conditions

- **Accessible formal financial services:** Project activities enable SSF actors to hold and pool savings, and self-funding mechanisms contribute to conservation activities (e.g. Fishery Management Body surveillance).
- **Generation of financial returns:** Supporting improvements to business strategies helps improve profits, while integrating sustainability.
- **International market demand:** The project does not involve international markets given the fisheries products involved are not suitable for international sale.
- **Domestic market demand:** The SSF supply chain involved reaches domestic markets in local communities and cities.
- **Access to early-stage capital:** Initial capital was relatively modest, used mostly for training activities that enhance community skills, providing business management tools for fish buyers, and small grants to FMB businesses.
- **Large scale:** The project has seen thousands of financial literacy training attendees, and the establishment of dozens of savings clubs and formalized microbusinesses.

Additional resources:

Improved practices for forest management and fish smoking in Cameroon's mangroves | CIFOR-ICRAF | 2023

Financial Inclusion to support Ecosystem-based Adaptation for Small-Scaling Fishers in the Philippines | Anindita Chakraborty and Swati Mehta Dhawan | 2025

Development of Java Coastal MSMEs Based on Blue Economy | E P Putri | 2024

Building micro, small and medium enterprises' capacity and access to green finance through the Land Finance Hub: A case study of Indonesian MSMEs | CIFOR-ICRAF | 2023

Supply chain interventions

Many products and industries rely on healthy and intact BCEs, including fisheries, timber, and tourism. The supply chains for these products and services need to be sustainable and resilient to change. There are many ways that projects can support this. Among the most useful is the establishment of, and/or adherence to, standards and certifications that mark products and services that follow sustainable practices.

Stakeholders at all stages of a supply chain have roles to play in sustainable practice, including producers, value adders, intermediary buyers and traders, retailers, and end consumers. The activities of producers have the most direct impact on BCEs, though their modes of practice are influenced by the characteristics and demands of, and contractual relations with, the rest of the supply chain.

Projects that work with supply chains for the benefit of BCEs may:

- Create and/or facilitate standards and certifications that incentivize sustainable practices within the supply chain (for instance, greater product value or access to lucrative markets for producers).
- Facilitate capacity-building to grow and support sustainable practices (e.g. providing tools or education in sustainable harvesting practices for producers).
- Undertake efforts to build consumer demand for sustainable products.
- Improve corporate policies to prioritize sustainable sourcing – for example through carbon insetting, where companies work to reduce carbon emissions within their own supply chain.
- Take jurisdictional approaches that mandate sustainable supply chain practices.

Enabling conditions: Supply chain interventions

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Accessible formal financial services. Robust supply chains rely on actors at all stages, including producers, being able to access formal financial services. A lack of such services can leave producers (and others) vulnerable to unjust and inequitable working conditions and trade.

Generation of financial returns. The businesses involved in supply chains will typically be most interested in projects that can improve their profit margins.

Domestic market demand. Demand is typically necessary at the domestic level for the products involved in the supply chains. In some cases, demand may need to be stimulated, such as for certified sustainable products. This can be achieved through government intervention or awareness campaigns targeting consumers.

Sometimes necessary

International market demand. Many supply chains do not reach the international market and can be robust and resilient without international trade.

Access to early-stage capital. Depending on the project scope, substantial upfront capital may not be necessary. For instance, supporting businesses to integrate with existing certification does not typically require significant set-up costs. Other supply chain projects, however, such as the establishment of new certification schemes, may require significant upfront resourcing.

Large scale. Even the integration of small producers (or other supply chain actors) can benefit overall supply chain sustainability.

Case study: Supply chain interventions in action

Climate Smart Shrimp (CSS)

Indonesia
Project area: 0.1km^2

Leads, partners, governance

Conservation International (CI)
Conservation International - Ventures
Konservasi Indonesia
JALA (aquaculture technology company and shrimp farm owner)

Project financing

- Philanthropic funding: USD 450,000
- Impact investment: USD 300,000
- Private investment: USD 700,000

This approach is being scaled through the development of the Climate Smart Shrimp Fund (CSSF), a revolving loan fund that combines concessional and commercial capital to provide repayable conditional loans to shrimp farmers.

Narrative

Climate Smart Shrimp (CSS), which employs conditional financing for mangrove restoration and responsible modernization of shrimp aquaculture. Restoring mangroves is critical to biodiversity and climate resilience. Shrimp aquaculture has historically been a driver of mangrove destruction and an economic barrier to restoration. CI's CSS approach couples (i) restoration of mangroves to provide biodiversity, water quality, and community climate adaptation benefits with (ii) responsible intensification of shrimp farming for sustained income and food security. The long-term sustainability and scalability of CSS is secured through partnerships across the aquaculture value chain and with financial institutions to provide access to investment capital.

Enabling conditions

- **Accessible formal financial services:** CSS delivers reliable, cost-effective access to finance and technical assistance.
- **Generation of financial returns:** Not applicable for the pilot projects, but the CSSF may ultimately involve return-seeking investors.
- **International market demand:** Being established as part of the project.
- **Domestic market demand:** Being explored in Indonesia with national retail outlets.
- **Access to early-stage capital:** Established as part of the project.
- **Large scale:** Not necessarily key as shrimp farm improvement and restoration can take place across a range of spatial scales; however, large project areas offer advantageous opportunities for expansive, contiguous restored mangrove habitats.

Also supporting supply chain interventions, **Blue Carbon Plus (BC+)** is a global initiative that promotes sustainable, economically viable business models that benefit coastal ecosystems, the communities that depend on them, and the climate. Launched in 2024 as a partnership between Conservation International (CI) and The Nature Conservancy (TNC), BC+ seeks to unlock the potential of blue carbon ecosystems—such as mangroves, salt marshes, and seagrasses—to tackle climate change while delivering tangible social and economic benefits.

BC+ addresses key barriers to carbon finance—such as complex regulations, uncertain land and resource rights, and limited local capacity—by supporting innovative business models that link conservation with sustainable production. Rather than relying solely on carbon credits, BC+ champions regenerative enterprises in which coastal habitat restoration and protection become core drivers of local economies.

By integrating blue carbon conservation with economic opportunity, BC+ attracts both local and global investment, helping to build a future where nature and people thrive together.

One example of a BC+ model is the sustainable cultivation of **Salicornia** in salt marshes. Seawater Solutions, a regenerative agriculture business and BC+ partner, is piloting Salicornia-based restoration efforts in Portugal and Ghana. Salicornia sequesters significant soil carbon and supports emerging markets in food, cosmetics, and alternative livestock feed. Developing this supply chain offers both climate benefits and local livelihood opportunities, as community members can participate as producers or processors. The feasibility of integrating this model into a corporate insetting program is currently being explored, with the goal of attracting private finance, building local capacity, and scaling a replicable business model.

Additional resources:

Investing in Mangroves: The Corporate Playbook | World Economic Forum | 2025

Options for mangrove-friendly alternative livelihoods in the mangrove ecosystem | Wageningen Marine Research | 2022

Photo: © Fish Forever Indonesia

PUBLIC FINANCE-BASED APPROACHES

Public finance –finance allocated by national or local governments – continues to fund most conservation efforts: around 80% by recent estimates.[121] Public finance revenues for conservation originate from various mechanisms, including taxes, fees, royalties, compensation payments, and fines. Tax revenue, for instance, is gathered, pooled, and allocated as part of the governmental budget, but some governments or administrative bodies have means of directly garnering funds for environmental activities through eco-taxes. These mechanisms specifically tax environmentally harmful activities internalizing the environmental, social, and economic costs that would otherwise not be captured. Carbon taxes are a prime example of this mechanism in action.

Aside from domestic public finance, funding can also originate from another nations. Official development assistance (ODA) is governmental aid from developed countries that targets the economic welfare and development of developing countries, usually within specific geographic and sectoral parameters defined by the donor countries.[122] Climate and biodiversity goals are closely tied to sustainable development, and contemporary ODA often targets the conservation, restoration, and sustainable development of ecosystems, including BCEs.[123] ODA can take the form of concessional finance, grants, and technical assistance. Increasingly, ODA is disbursed conditional on outcomes, known as results-based ODA. This promotes transparent impact evaluation via MRV and the fostering of benefits that directly reach local communities.[124]

Public funding falls outside of the scope of this report, thus readers can review other resources that cover it in detail below.

Additional resources:

The Ocean Finance Handbook | Friends of Ocean Action | 2020

Financing Nature: Closing the Global Biodiversity Financing Gap | The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability | 2020

Blue Forest Finance:Financing the protection and restoration of blue forests and meadows | CSIRO | 2022

GRANT-BASED APPROACHES

Grant-based approaches do not seek financial returns. While some grant-based approaches are very well-developed and understood, others are newer and more innovative. Many innovative approaches are learning from other sectors to ensure that conservation goals and associated financing are reliable and sustainable in the long term – something that has historically been difficult to secure in these types of approaches.

Many grant-based approaches represent a high impact potential, given that very large amounts of money and resources can be involved. Often, they are conditional, based on funders' priorities. Grants can be issued by private philanthropic organizations, or by governments for domestic projects, typically through a competitive application process and conditional on pre-defined outcomes. However, grants are often one-time or short-term opportunities that often serve as a financial bridge for structural changes to policy or sustainable management, but do not alone represent a self-sustaining financial pathway for projects.

Conservation Trust Funds (CTFs) are an especially powerful long-term funding mechanism that typically follows a grant-based approach, though other funding approaches may be incorporated. For instance, some CTFs may be replenished through repayments on concessional loans rather than offering grants.

CTFs specifically support projects like protected area management, sustainable development, and nature-based solutions to climate change.[125] Trust funds are private institutions that can be used to unlock and implement long-term financing for environmental or social projects through pooling funds from various public and private sources and distributing them gradually over time via NGOs, community-based organizations (CBOs), or government agencies. Examples include:

- Endowment funds, which invest the capital and use the returns on investment for project financing
- Sinking funds, which finance projects until the finite fund is exhausted
- Revolving funds, which are frequently replenished to help enable longer-term financing. Revolving funds can be paired with PES projects, by using generated PES capital to re-invest in environmental projects.[126]

The enabling conditions surrounding grant-based approaches may typically be simpler to meet for many potential projects, though they vary widely on a case-by-case basis.

Additional resources:
The Ocean Finance Handbook | Friends of Ocean Action | 2020
The Little Book of Investing in Nature | Global Canopy | 2020
Practice Standards for Conservation Trust Funds | Conservation Finance Alliance | 2020

COMPENSATION-BASED APPROACHES

Compensation-based approaches work on the principle that those causing environmental damage should offset the damage through directly or indirectly funding conservation, restoration, and sustainable management efforts. While such 'offset' approaches are controversial, they remain a critical element of BCE funding. Some approaches may also go beyond just compensation, aiming to ensure an overall 'net gain' to biodiversity, carbon sequestration, or other metrics. Offsets are found on the lowest rung of the mitigation hierarchy, a widely used conceptual framework that recommends that developers first seek ways to avoid impact, minimize unavoidable impact, rehabilitate or restore ecosystems following impact, and finally offsetting remaining impacts as a last resort.[127]

Corporate offset approaches are relatively well-known, with corporations making either bilateral payment to projects that benefit the climate and/or environment, or purchasing carbon (or other) credits as a means of offsetting their carbon-emitting and/or environmentally damaging activities.

Other compensation-based approaches include charging fees, royalties, or permits for the extraction of natural resources, and using revenue for conservation purposes, overlapping with public finance-based approaches.

Additional resources:

Biodiversity Offsets: A User Guide | World Bank | 2016

Developing ecosystem accounts for the marine and coastal environment: Limitations, opportunities and lessons learned from the United Kingdom experience. Grilli et al | 2021

Conclusion

This report offers a diverse landscape of non-carbon market approaches, each representing a promising pathway for financing blue carbon conservation where carbon market approaches may be unviable or insufficient. These tools are most powerful when applied strategically, with deep attention to local enabling conditions. As blue carbon projects advance globally, leveraging this broad financial toolbox alongside robust safeguards and strong local partnerships will be essential to achieve durable, equitable, and high-integrity outcomes.

Implementers or decision makers can use the information in the report to refine and expand options for project design and development. The range of contexts and conditions is what makes blue carbon ecosystem projects unique and challenging, and also emphasizes why it is important to use all tools available to optimize financial flows to the communities who need them and encourage positive environmental and social impacts.

The report introduces the fundamental information needed to determine which approach (or approaches) to pursue and which enabling conditions will be essential to understand and support. This information should be used to understand which financing approaches remain feasible when certain enabling conditions are not possible in a given circumstance. In addition, this report outlines enabling conditions that may not exist at the project outset but can be cultivated or advocated for throughout the project design and early implementation. However, such information should never be used to justify perverse incentives by promoting lower-quality projects. All projects should strive to meet the High-Quality Blue Carbon Principles and Guidance and utilize the Practitioner's Guide as a tool to help achieve them.

No financing approach needs to exist in isolation. Very often, the optimal approach involves combining several approaches to leverage the different mechanisms they offer. Considering which approaches are compatible with one another within a specific local context is highly recommended.

The key messages from the report include the following:

- Effective conservation, restoration, and sustainable management of blue carbon ecosystems are powerful nature-based solutions with local to global impacts, and associated sustainable financing needs that equitably support local stakeholders and their families.
- Non-carbon market approaches offer a practical and scalable pathway to mobilize sustainable finance for blue carbon ecosystems, especially where carbon markets are not viable or appropriate. Early consideration of enabling conditions is essential to match financing instruments to context-specific needs.
- A diverse suite of financing tools can be tailored to local contexts to support conservation, restoration, and community resilience.
- Combined approaches that use both carbon and non-carbon mechanisms are emerging as a powerful way to overcome individual limitations and deliver more holistic, inclusive finance strategies.

Comprehension and continued learning around these financing instruments – inclusive of and beyond carbon markets – is essential for an equitable and resilient future. This report is intended to begin to facilitate this process, making BCE financing solutions more accessible and approachable across all project stages.

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Acronyms

ADB	Asian Development Bank	**IMAS**	Integrated Mangrove Aquaculture Systems
AFD	French Development Agency	**IPBES**	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
BBIC	Belize Blue Investment Company	**IP and LC**	Indigenous Peoples and Local Communities
BCE	Blue Carbon Ecosystem	**KPI**	Key Performance Indicator
BC+	Blue Carbon Plus	**MA+R**	Managed Access + Reserve
CBD	Convention on Biological Diversity	**MRV**	Measurement, Reporting, and Verification
CBO	Community-Based Organization	**MSMEs**	Micro-, Small, and Medium-sized Enterprises
CCB	Climate, Community and Biodiversity	**NbIS**	Nature-based Insurance Solutions
CI	Conservation International	**NbS**	Nature-based Solutions
CIFOR	Center for International Forestry Research	**NCMA**	Non-Carbon Market Approach
CO2e	Carbon dioxide equivalent	**NFMS**	National Forest Monitoring System
COP	Conference of the Parties	**NGO**	Non-Governmental Organization
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation	**ODA**	Official Development Assistance
CSIRO	Commonwealth Scientific and Industrial Research Organisation	**ORRAA**	Ocean Risk and Resilience Action Alliance
CSS	Climate Smart Shrimp	**PCIC**	Philippine Crop Insurance Corporation
CTF	Conservation Trust Fund	**PES**	Payments for Ecosystem Services
DA-BFAR	Philippines Department of Agriculture Bureau of Fisheries and Aquatic Resources	**PFP**	Project Finance for Permanence
DAC	Development Assistance Commitee	**RBF**	Results-based Finance
DBS	Development Bank of Seychelles	**REDD+**	Reducing Emissions from Deforestation and forest Degradation in developing countries
DFC	United States International Development Finance Corporation	**REM**	REDD for Early Movers
EbA	Ecosystem-based Adaptation	**RISCO**	The Restoration Insurance and Financial Services Company
FAO	Food and Agriculture Organization of the United Nations	**ROI**	Return on Investment
FMB	Fishery Management Body	**SeyCCAT**	Seychelles Conservation & Climate Adaptation Trust
FMI	Financial and Market Inclusion	**SSF**	Small-Scale Fisheries
FOLU	Forestry and Other Land Use	**SIS**	Safeguards Information System
FPIC	Free, Prior and Informed Consent	**SMEs**	Small and Medium-Sized Enterprises
FREL/FRL	Forest Reference Emission Level	**SPV**	Special Purpose Vehicle
GCF	Green Climate Fund	**SSF**	Small-Scale Fishery
GEF	Global Environment Facility	**TNC**	The Nature Conservancy
GIZ	German Agency for International Cooperation	**UNEP**	United Nations Environment Program
GRiF	Global Risk Financing Facility	**USAID**	United States Agency for International Development

Annex 1: Carbon market approaches

Carbon market approaches involve the quantification of carbon fluxes and sequestration within a BCE and generating a proportionate amount of carbon credits, that can then be sold and traded internationally. The generation of carbon credits depends on sequestration increasing (and/or emissions reducing) over time due to specific project activities.

Given that this report focuses on NCMAs, carbon market approaches are briefly included here purely for comparison purposes. A variety of other resources provide comprehensive introductions to carbon market approaches in the context of BCEs.

Enabling conditions

Reminder: also see the "Enabling conditions needed for all NCMAs" section earlier in the report.

Always necessary

Accessible formal financial services. Local BCE stewards need a means of receiving and managing payments for carbon credits.

Generation of financial returns. Carbon market projects are established with the expectation that the carbon credits generated will yield financial benefits for stakeholders. The establishment of benefit-sharing agreements among stakeholders is important.

Access to early-stage capital. High-quality carbon market projects need to follow a rigorous set-up process. This involves employing high-quality methodologies that establish additionality and permanence, engaging with stakeholders including local communities to receive FPIC, establishing safeguards, grievance and legal redress mechanisms, and MRV, registry, and sometimes REDD+ nesting. This upfront funding may be secured via grants or via forward sales of credits (though the latter brings risks of selling credits below future market value).

High-integrity capital. The competition created by high demand for blue carbon credits, while potentially beneficial for communities and project developers, can also tempt bad actors. Investors and buyers need to be held accountable for credit quality factors within their control, which requires applying ethical and high-integrity guidelines to project developers. Communities and project developers should also seek only investors offering good prices and support.

Often necessary

International market demand. Many carbon market projects depend upon selling generated credits to international markets at a good price. Demand for carbon credits is growing on both mandatory and voluntary carbon markets but can fluctuate.

Domestic market demand. Some nations, such as Australia, Japan, and Thailand, have national markets for carbon credits, following specific frameworks.

Large scale. Carbon crediting models may rely on larger scales to justify the costs to implement a project and increase profit margins, but size is not necessarily a requirement. It is possible for individual landholders to generate and sell carbon credits on a smaller scale. Bundling, stapling, and stacking carbon market projects can overcome barriers related to scale.

Case study: Carbon market approaches in action

Vida Manglar – Blue carbon REDD+ project in the Gulf of Morrosquillo
Gulf of Morrosquilo, Colombia
Project area: 75.61km^2

Leads, partners, governance

Conservation International (CI) as project proponent, CVS Regional Environmental authority, INVEMAR National Research Institute, Omacha Foundation and 14 community-based associations.

Project financing

Feasibility assessment funding was provided by the Global Environmental Facility (GEF). Apple Inc. supported project design and verification under the Verra standard, and credits were sold internationally. Credit prices increase with each issuance, to ultimately eliminate the need for philanthropic support. 90% of 2015-2018 revenue was invested back into protected area management, including salaries of local experts, developing ecotourism and economic alternative programs, and trainings. To ensure financial sustainability, Vida Manglar currently uses blended finance: credits, fee payments, and an endowment fund for program maintenance.

Narrative

Vida Manglar is the first BCE conservation program in the world to be certified with the Verified Carbon Standard (VCS) using the wetland module (VM0007) and climate, community and biodiversity (CCB), and approved by Verra. The estimated project length is 30 years from 2015-2045, resulting in a projected emissions reduction of 939,296 tonnes of CO_2 equivalent. Vida Manglar has enabled long-term success by recognizing communities as key participants in decision making, and by supporting alternative livelihoods, including ecotourism, bee products and sustainable agriculture. Local trust and support, coupled with clear resource rights, has proven essential.

Enabling conditions

- **Accessible formal financial services:** several environmental institutes spent over three years conducting a feasibility assessment to gather data, information, and ensure the infrastructure of financial services in the area could support carbon crediting.
- **Generation of financial returns:** financial returns were expected, generated, and distributed through a transparent benefit-sharing pathway.
- **International market demand:** provided by well-established international carbon markets and a demand for nature-based credits.
- **Domestic market demand:** not highly relevant for this project.
- **Access to early-stage capital:** Some capital was invested into the project prior to pursuing carbon finance but was insufficient to mitigate illegal cutting or to restore lost areas. Approximately $500k in philanthropic funding was used to develop the Project Document, go through Validation and Verification, and secure CCB certification.
- **Large scale:** a large project area with high rates of loss and high potential to be managed was important to ensure the carbon potential was high enough for project feasibility and Verra approval.

Additional resources:

The Blue Carbon Handbook | Lisa Schindler Murray, Ben Milligan | 2023

Deep Blue: Opportunities for Blue Carbon Finance in Coastal Ecosystems | International Finance Corporation | 2023

State of the Blue Carbon Market 2024 | Ecosystem Marketplace | 2024

Overview of Carbon Markets under Article 6 of the Paris Agreement | Conservation International

Endnotes

1 Bertram, C., Quaas, M., Reusch, T. B. H., Vafeidis, A. T., Wolff, C., & Rickels, W. (2021). The blue carbon wealth of nations. *Nature Climate Change*, *11*(8), 704–709. https://doi.org/10.1038/s41558-021-01089-4

2 Forest Trends' Ecosystem Marketplace. (2024). *State of the Blue Carbon Market 2024*. https://www.ecosystemmarketplace.com/wp-content/uploads/2024/10/State_of_the_Blue_Carbon_Market_FINAL-with-box.pdf

3 Macreadie, P. I., Costa, M. D. P., Atwood, T. B., Friess, D. A., Kelleway, J. J., Kennedy, H., Lovelock, C. E., Serrano, O., & Duarte, C. M. (2021). Blue carbon as a natural climate solution. *Nature Reviews Earth & Environment*, *2*(12), 826–839. https://doi.org/10.1038/s43017-021-00224-1

4 Griscom, B. W., Adams, J., Ellis, P. W., Houghton, R. A., Lomax, G., Miteva, D. A., Schlesinger, W. H., Shoch, D., Siikamäki, J. V., Smith, P., Woodbury, P., Zganjar, C., Blackman, A., Campari, J., Conant, R. T., Delgado, C., Elias, P., Gopalakrishna, T., Hamsik, M. R., … Fargione, J. (2017). Natural climate solutions. *Proceedings of the National Academy of Sciences*, *114*(44), 11645–11650. https://doi.org/10.1073/pnas.1710465114

5 Rifai, H., Quevedo, J. M. D., Lukman, K. M., Sondak, C. F. A., Risandi, J., Hernawan, U. E., Uchiyama, Y., Ambo-Rappe, R., & Kohsaka, R. (2023). Potential of seagrass habitat restorations as nature-based solutions: Practical and scientific implications in Indonesia. *Ambio*, *52*(3), 546–555. https://doi.org/10.1007/s13280-022-01811-2

6 Lecerf, M., Herr, D., Elverum, C., Delrieu, E., & Picourt, L. (2023). *Coastal and marine ecosystems as Nature-based Solutions in new or updated Nationally Determined Contributions, Ocean & Climate Platform, Conservation International, IUCN, Rare, The Nature Conservancy, Wetlands International and WWF*. https://ocean-climate.org/wp-content/uploads/2023/10/NDC_Analysis_2023.pdf

7 Herr, D., Agardy, T., Benzaken, D., Hicks, F., Howard, J., Landis, E., Soles, A., & Vegh, T. (2016). *Coastal "blue" carbon: A revised guide to supporting coastal wetland programs and projects using climate finance and other financial mechanisms*. IUCN International Union for Conservation of Nature. https://doi.org/10.2305/IUCN.CH.2015.10.en

8 Conservation International, Environmental Defense Fund, & The Nature Conservancy. (2022). *Joint Inputs on the Work Programme on the Framework for Non-Market Approaches under Article 6.8*. https://www.edf.org/sites/default/files/documents/Article_6.8_Submission_FEB_2022.pdf

9 Zeng, Y., Friess, D. A., Sarira, T. V., Siman, K., & Koh, L. P. (2021). Global potential and limits of mangrove blue carbon for climate change mitigation. *Current Biology*, *31*(8), 1737-1743.e3. https://doi.org/10.1016/j.cub.2021.01.070

10 Houston, A., Kennedy, H., & Austin, W. E. N. (2024). Additionality in Blue Carbon Ecosystems: Recommendations for a Universally Applicable Accounting Methodology. *Global Change Biology*, *30*(11). https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.17559

11 Ullman, R., Bilbao-Bastida, V., & Grimsditch, G. (2013). Including Blue Carbon in climate market mechanisms. *Ocean & Coastal Management*, *83*, 15–18. https://doi.org/10.1016/j.ocecoaman.2012.02.009

12 Architecture for REDD+ Transactions. (2021). *ART HFLD Primer and Frequently Asked Questions*. https://www.artredd.org/wp-content/uploads/2021/12/ART-HFLD-Primer.pdf

13 Schindler Murray, L., Milligan, B., Ashford, O. S., Bonotto, E., Cifuentes-Jara, M., Glass, L., Howard, J., Landis, E., Northrop, N., & Thiele, T. (2023). The blue carbon handbook: Blue carbon as a nature-based solution for climate action and sustainable development. *Report. London: High Level Panel for a Sustainable Ocean Economy.* https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook_summary-1.pdf

14 Dyck, M., Streck, C., Trouwloon, D. (2023). *The Voluntary Carbon Market Explained.* https://vcmprimer.org/wp-content/uploads/2023/12/vcm-explained-full-report.pdf

15 & FOA. (2020). *The Ocean Finance Handbook*. HYPERLINK "https://www3.weforum.org/docs/WEF_FOA_The_Ocean_Finance_Handbook_April_2020.pdf" https://www3.weforum.org/docs/WEF_FOA_The_Ocean_Finance_Handbook_April_2020.pdf

16 Herr, D., Agardy, T., Benzaken, D., Hicks, F., Howard, J., Landis, E., Soles, A., & Vegh, T. (2016). *Coastal "blue" carbon: A revised guide to supporting coastal wetland programs and projects using climate finance and other financial mechanisms*. IUCN International Union for Conservation of Nature. https://doi.org/10.2305/IUCN.CH.2015.10.en

17 Conservation International. (2024). *OVERVIEW OF CARBON MARKETS UNDER ARTICLE 6 OF THE PARIS AGREEMENT*. https://d2iwpl8k086uu2.cloudfront.net/docs/default-source/s3-library/publication-pdfs/ci-article-6-explainer-for-cop29-nov5-2024.pdf?sfvrsn=ee37055e_3

18 Schneider, L., Duan, M., Stavins, R., Kizzier, K., Broekhoff, D., Jotzo, F., Winkler, H., Lazarus, M., Howard, A., & Hood, C. (2019). Double counting and the Paris Agreement rulebook. *Science*, *366*(6462), 180–183. https://doi.org/10.1126/science.aay8750

19 Merk, C., Grunau, J., Riekhof, M.-C., & Rickels, W. (2022). The need for local governance of global commons: The example of blue carbon ecosystems. *Ecological Economics*, *201*, 107581. https://doi.org/10.1016/j.ecolecon.2022.107581

20 Guido, V. (2023, January 10). From paper to people: Bringing equity to carbon markets. *Trellis*. https://trellis.net/article/paper-people-bringing-equity-carbon-markets/

21 Luijendijk, A., Madricardo, F., & Xiao, Y. (2023). *Coastal dynamics*. https://www.nature.com/collections/chdiacjbcb

22 Pham, T. D., Ha, N. T., Saintilan, N., Skidmore, A., Phan, D. C., Le, N. N., Viet, H. L., Takeuchi, W., & Friess, D. A. (2023). Advances in Earth observation and machine learning for quantifying blue carbon. *Earth-Science Reviews*, *243*, 104501. https://doi.org/10.1016/j.earscirev.2023.104501

23 Carton, W., Hougaard, I.-M., Markusson, N., & Lund, J. F. (2023). Is carbon removal delaying emission reductions? *WIREs Climate Change*, *14*(4), e826. https://doi.org/10.1002/wcc.826

24 Schindler Murray, L., Milligan, B., Ashford, O. S., Bonotto, E., Cifuentes-Jara, M., Glass, L., Howard, J., Landis, E., Northrop, N., & Thiele, T. (2023). The blue carbon handbook: Blue carbon as a nature-based solution for climate action and sustainable development. *Report. London: High Level Panel for a Sustainable Ocean Economy.*https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook_summary-1.pdf

25 Schindler Murray, L., Milligan, B., Ashford, O. S., Bonotto, E., Cifuentes-Jara, M., Glass, L., Howard, J., Landis, E., Northrop, N., & Thiele, T. (2023). The blue carbon handbook: Blue carbon as a nature-based solution for climate action and sustainable development. *Report. London: High Level Panel for a Sustainable Ocean Economy.*https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook_summary-1.pdf

26 COP to the CBD. (2022). *Decision 15/5. Monitoring framework for the Kunming-Montreal Global Biodiversity Framework*. https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-05-en.pdf

27 UNFCCC. (2015). *Global goal on adaptation | UNFCCC*. Global Goal on Adaptation. https://unfccc.int/topics/adaptation-and-resilience/workstreams/gga

28 Andradi-Brown, D., Howe, C., Mace, G. M., & Knight, A. (2013). Do mangrove forest restoration or rehabilitation activities return biodiversity to pre-impact levels? *ResearchGate*. https://doi.org/10.1186/2047-2382-2-20

29 Menéndez, P., Losada, I. J., Torres-Ortega, S., Narayan, S., & Beck, M. W. (2020). The Global Flood Protection Benefits of Mangroves. *Scientific Reports*, *10*(1), 4404. https://doi.org/10.1038/s41598-020-61136-6

30 Schindler Murray, L., Milligan, B., Ashford, O. S., Bonotto, E., Cifuentes-Jara, M., Glass, L., Howard, J., Landis, E., Northrop, N., & Thiele, T. (2023). The blue carbon handbook: Blue carbon as a nature-based solution for climate action and sustainable development. *Report. London: High Level Panel for a Sustainable Ocean Economy.* https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook_summary-1.pdf

31 Merk, C., Grunau, J., Riekhof, M.-C., & Rickels, W. (2022). The need for local governance of global commons: The example of blue carbon ecosystems. *Ecological Economics*, *201*, 107581. https://doi.org/10.1016/j.ecolecon.2022.107581

32 *Environmental and Social Risk Management*. (2023, February 2). Plan Vivo Foundation. https://www.planvivo.org/environmental-and-social-risk-management

33 Sommerville, M. (2016). *Mangrove payment for environmental services in Vietnam: Opportunities & challenges*. Washington, DC: USAID Tenure and Global Climate Change Program. https://tenuresecurity.org/wp-content/uploads/2018/02/USAID_LAND_TENURE_TGCC_MANGROVE_PAYMENT_VIETNAM.pdf

34 Merk, C., Grunau, J., Riekhof, M.-C., & Rickels, W. (2022). The need for local governance of global commons: The example of blue carbon ecosystems. *Ecological Economics*, *201*, 107581. https://doi.org/10.1016/j.ecolecon.2022.107581

35 Friess, J. P., Dan. (2015, March 25). How viable are payment schemes for 'blue carbon'? *CIFOR-ICRAF Forests News*. https://forestsnews.cifor.org/27533/paying-for-ecosystem-services-the-future-for-coastal-and-marine-landscapes?fnl=

36 WEF, & FOA. (2020). *The Ocean Finance Handbook*. https://www3.weforum.org/docs/WEF_FOA_The_Ocean_Finance_Handbook_April_2020.pdf

37 WEF, & FOA. (2020). *The Ocean Finance Handbook*. https://www3.weforum.org/docs/WEF_FOA_The_Ocean_Finance_Handbook_April_2020.pdf

38 Vanderklift, M., Steven, A., Benzaken, D., Thiele, T., Cunliffe, C., Ravaoarinorotsihoarana, L. A., Schmid, A., & Wharton, J. (2022). *Blue forest finance: Financing the protection and restoration of blue forests and meadows*. https://research.csiro.au/iora-blue-carbon-hub/wp-content/uploads/sites/321/2022/11/Blue-forest-finance-guide-FINAL.pdf

39 International Finance Corporation-WBG. (2023). *Deep blue: Opportunities for blue carbon finance in coastal ecosystems*. https://www.ifc.org/content/dam/ifc/doc/2023-delta/deep-blue-opportunities-for-blue-carbon-finance-in-coastal-ecosystems-optimized.pdf

40 Vanderklift, M., Steven, A., Benzaken, D., Thiele, T., Cunliffe, C., Ravaoarinorotsihoarana, L. A., Schmid, A., & Wharton, J. (2022). *Blue forest finance: Financing the protection and restoration of blue forests and meadows*. https://research.csiro.au/iora-blue-carbon-hub/wp-content/uploads/sites/321/2022/11/Blue-forest-finance-guide-FINAL.pdf

41 Sumaila, U. R., Walsh, M., Hoareau, K., Cox, A., Teh, L., Abdallah, P., Akpalu, W., Anna, Z., Benzaken, D., Crona, B., Fitzgerald, T., Heaps, L., Issifu, I., Karousakis, K., Lange, G. M., Leland, A., Miller, D., Sack, K., Shahnaz, D., … Zhang, J. (2021). Financing a sustainable ocean economy. *Nature Communications*, *12*(1), 3259. https://doi.org/10.1038/s41467-021-23168-y

42 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

43 Sumaila, U. R., Walsh, M., Hoareau, K., Cox, A., Teh, L., Abdallah, P., Akpalu, W., Anna, Z., Benzaken, D., Crona, B., Fitzgerald, T., Heaps, L., Issifu, I., Karousakis, K., Lange, G. M., Leland, A., Miller, D., Sack, K., Shahnaz, D., … Zhang, J. (2021). Financing a sustainable ocean economy. *Nature Communications*, *12*(1), 3259. https://doi.org/10.1038/s41467-021-23168-y

44 Sommerville, M. (2016). *Mangrove payment for environmental services in Vietnam: Opportunities & challenges*. Washington, DC: USAID Tenure and Global Climate Change Program. https://tenuresecurity.org/wp-content/uploads/2018/02/USAID_LAND_TENURE_TGCC_MANGROVE_PAYMENT_VIETNAM.pdf

45 Lau, W. W. Y. (2013). Beyond carbon: Conceptualizing payments for ecosystem services in blue forests on carbon and other marine and coastal ecosystem services. *Ocean & Coastal Management*, *83*, 5–14. https://doi.org/10.1016/j.ocecoaman.2012.03.011

46 Quevedo, J. M. D., & Kohsaka, R. (2024). A systematic review of cultural ecosystem services of blue carbon ecosystems: Trends, gaps, and challenges in Asia and beyond. *Marine Policy*, *159*, 105898. https://doi.org/10.1016/j.marpol.2023.105898

47 Moros-Cañon, L. (2019). *Payments fo Ecosystem Services in Colombia: Discourses, design, and motivation crowding* [Thesis submitted for the degree of Doctor of Philosophy, ICTA_ Universitat Autonoma de Barcelona-UBA]. https://ddd.uab.cat/pub/tesis/2019/hdl_10803_670175/lmc1de1.pdf

48 UNEP. (2020, February 2). *Protecting Seagrass Through Payments for Ecosystem Services: A Community Guide*. https://www.unep.org/resources/toolkits-manuals-and-guides/protecting-seagrass-through-payments-ecosystem-services

49 Vanderklift, M., Steven, A., Benzaken, D., Thiele, T., Cunliffe, C., Ravaoarinorotsihoarana, L. A., Schmid, A., & Wharton, J. (2022). *Blue forest finance: Financing the protection and restoration of blue forests and meadows*. https://research.csiro.au/iora-blue-carbon-hub/wp-content/uploads/sites/321/2022/11/Blue-forest-finance-guide-FINAL.pdf

50 Nicholls, J., & Cupitt, S. (2009). *A guide to social return on investment*. New Economics Foundation. https://neweconomics.org/uploads/files/aff3779953c5b88d53_cpm6v3v71.pdf

51 Fripp, E. (2014). *Payments for Ecosystem Services (PES): A practical guide to assessing the feasibility of PES projects*. https://www.cifor-icraf.org/publications/pdf_files/Books/BFripp1401.pdf

52 *Insurance for Catastrophes—Indemnity vs. Parametric Insurance with Imperfect Information | Working Paper | ifo | CESifo*. (2022). CESifo Working Paper No. 9631. https://www.ifo.de/en/cesifo/publications/2022/working-paper/insurance-catastrophes-indemnity-vs-parametric-insurance-imperfect

53 Sengupta, R., & Kousky, C. (2020). *Parametric Insurance for Disasters*. https://esg.wharton.upenn.edu/wp-content/uploads/2023/07/Parametric-Insurance-for-Disasters_Sep-2020.pdf

54 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

55 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

56 International Advisory Panel on Biodiversity Credits. (2024). *Framework for high integrity biodiversity credit markets.* https://www.iapbiocredits.org/framework

57 Biodiversity Credit Alliance (BCA), International Advisory Panel on Biodiversity Credits (IAPB), & World Economic Forum (WEF). (2025). *High Level Principles to Guide the Biodiversity Credit Market* [White Paper]. https://www.biodiversitycreditalliance.org/wp-content/uploads/2025/05/377455_High_Level_Principles_to_Guide_the_Biodiversity_Credit_Market_En_v7_May-2025.pdf

58 Australian Government, Department of Climate Change, Energy, the Environment and Water. (n.d.). *Nature Repair Market—DCCEEW*. Retrieved May 12, 2025, from https://www.dcceew.gov.au/environment/environmental-markets/nature-repair-market

59 Wentworth, J. (2025). *Biodiversity net gain*. https://doi.org/10.58248/PN728

60 Biodiversity Credit Alliance (BCA). (2025). *High-level Principles to Guide the Biodiversity Credit Market* [White paper]. https://www.biodiversitycreditalliance.org/wp-content/uploads/2025/05/377455_High_Level_Principles_to_Guide_the_Biodiversity_Credit_Market_En_v7_May-2025.pdf

61 Verra, & The Biodiversity Consultancy. (2024). Nature Framework [SDVM002-Version 1.0]. *Verra*. https://verra.org/methodologies/nature-framework/

62 Plan Vivo Foundation. (2023, January 17). *About PV Nature*. Plan Vivo Foundation. https://www.planvivo.org/pv-nature

63 CBD. (2022). *2030 Targets (with Guidance Notes)*. 2030 Targets; Secretariat of the Convention on Biological Diversity. https://www.cbd.int/gbf/targets

64 TNFD. (2023). *Recommendations of the Taskforce on Nature-related Financial Disclosures, September 2023*. https://tnfd.global/wp-content/uploads/2023/08/Recommendations_of_the_Taskforce_on_Nature-related_Financial_Disclosures_September_2023.pdf

65 International Advisory Panel on Biodiversity Credits. (2024). *Framework for high integrity biodiversity credit markets.* https://www.iapbiocredits.org/framework

66 Bank, A. D. (2023). *Bonds to Finance the Sustainable Blue Economy: A Practitioner's Guide*. Asian Development Bank. https://www.adb.org/publications/bonds-finance-sustainable-blue-economy-practitioners-guide

67 UN GLOBAL COMPACT. (2020). *Practical Guidance to Issue a Blue Bond*. https://ungc-communications-assets.s3.amazonaws.com/docs/publications/Practical-Guidance-to-Issue-a-Blue-Bond.pdf

68 EU Commission. (n.d.). *Blue Bond | Research and Innovation*. Retrieved May 12, 2025, from https://projects.research-and-innovation.ec.europa.eu/en/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/restore-our-ocean-and-waters/blue-bond

69 World Bank. (2024). *Belize: A Blue Carbon Readiness Assessment*. https://documents1.worldbank.org/curated/en/099092624201530564/pdf/P500975129447dd09b1b9f91319a258920fb.pdf

70 Saliman, A., & Hardt, M. (2025). *"Funding ocean conservation and protection through blue bonds.* https://oursharedseas.com/wp-content/uploads/2025/05/oss-bluebonds-20250502-1.pdf

71 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

72 S&P Dow Jones Indices LLC. (2019). *Frequently Asked Questions Green Bonds*. https://www.spglobal.com/spdji/en/documents/additional-material/faq-green-bonds.pdf

73 ASIAN DEVELOPMENT BANK. (2021). *Sovereign Blue Bonds: Quick Start Guide* [ARM210331-2]. https://www.adb.org/sites/default/files/publication/731026/adb-sovereign-blue-bonds-start-guide.pdf

74 ASIAN DEVELOPMENT BANK. (2021). *Sovereign Blue Bonds: Quick Start Guide* [ARM210331-2]. https://www.adb.org/sites/default/files/publication/731026/adb-sovereign-blue-bonds-start-guide.pdf

75 Dogley, D., & SeyCCAT. (2024). *The Seychelles Debt for Nature Swap: A Case Study_webversion*. https://seyccat.org/wp-content/uploads/2025/03/SeychellesDebtSwapCaseStudy_webversion.pdf

76 World Bank Group. (2019). *Seychelles launches World's First Sovereign Blue Bond* [Text/HTML]. World Bank. https://doi.org/10/29/seychelles-launches-worlds-first-sovereign-blue-bond

77 LSE. (2024). What role do catastrophe bonds play in managing the physical risks from climate change? *Grantham Research Institute on Climate Change and the Environment*. https://www.lse.ac.uk/granthaminstitute/explainers/what-role-do-catastrophe-bonds-play-in-managing-the-physical-risks-from-climate-change/

78 Qadir, U., & Pillay, K. (n.d.). *Green Bonds for Climate Resilience*. https://gca.org/wp-content/uploads/2021/10/Green-Bonds-for-Climate-Resilience_State-of-Play-and-Roadmap-to-Scale.pdf

79 Vaijhala, S., & Rhodes, J. (2018). Resilience Bonds: A business-model for resilient infrastructure. *Field Actions Science Reports. The Journal of Field Actions*, *Special Issue 18*, Article Special Issue 18. https://journals.openedition.org/factsreports/4910

80 South Pole Carbon Asset Management Limited. (2023). *Financing for Disaster and Climate Resilient Infrastructure for a Net-Zero Economic Transition* [Position Paper]. https://cdri.world/upload/biennial/CH4.3-SPC.pdf

81 World Bank. (2023). *World Bank Catastrophe Bond provides Jamaica with Financial Protection against Tropical Cyclones* [Case Study]. https://thedocs.worldbank.org/en/doc/43a111757d3b1ff1cabde80ee7eb0535-0340012021/original/Case-Study-Jamaica-Cat-Bond.pdf

82 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

83 UNDP. (2023). *A new wave of debt swaps for climate or nature*. UNDP. https://www.undp.org/future-development/signals-spotlight-2023/new-wave-debt-swaps-climate-or-nature

84 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

85 Resor, J. P. (1997). Debt-for-nature swaps: A decade of experience and new directions for the future. *Unasylva*, *No. 188*, 56. https://www.fao.org/4/w3247e/w3247e06.htm

86 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

87 Resor, J. P. (1997). Debt-for-nature swaps: A decade of experience and new directions for the future. *Unasylva*, *No. 188*, 56. https://www.fao.org/4/w3247e/w3247e06.htm

88 Fondo Acción. (2020). *Fondo Acción | Un compromiso de 100 años con la conservación y la niñez en Colombia*. https://fondoaccion.org/2021/05/25/un-compromiso-de-100-anos-con-la-conservacion-y-la-ninez-en-colombia/

89 Ring, J., Stefanova, M., Roebiono, R., & Stodulka, K. (n.d.). *The Mangrove Breakthrough: Financial Roadmap_ Unlocking investment at scale in critical coastal ecosystems*. Retrieved May 12, 2025, from https://www.mangrovealliance.org/wp-content/uploads/2023/11/Mangrove_Breakthrough_Financial_Roadmap_Finance_Coastal_Ecosystems_2023.pdf

90 The Nature Conservancy. (n.d.). *Belize blue bonds for ocean conservation* [Case Study]. https://www.nature.org/content/dam/tnc/nature/en/documents/TNC-Belize-Debt-Conversion-Case-Study.pdf

91 World Bank. (2023). *Unlocking Blue Carbon Development: Investment Readiness Framework for Governments*. https://documents1.worldbank.org/curated/en/099092223142013793/pdf/P1803270733769058099a406ce8a40b23e6.pdf

92 International Finance Corporation-WBG. (2023). *Deep blue: Opportunities for blue carbon finance in coastal ecosystems*. https://www.ifc.org/content/dam/ifc/doc/2023-delta/deep-blue-opportunities-for-blue-carbon-finance-in-coastal-ecosystems-optimized.pdf

93 Fauna & Flora International. (2014). *Tenure and Resource Use Rights Lessons Learned from Redd+ and Other Conservation Strategies*. https://www.fauna-flora.org/wp-content/uploads/2023/05/FFI_2014_Tenure-and-resource-use-rights.pdf

94 UNREDD Programme. (2016, September 29). *The innovative character of REDD+ payments and their potential for change: Trends from Latin America*. UNREDD Programme. https://www.un-redd.org/news/innovative-character-redd-payments-and-their-potential-change-trends-latin-america

95 Forest Carbon Partnership Facility. (2024). *2023 Annual Report* [Annual report]. https://www.forestcarbonpartnership.org/sites/default/files/documents/_web_world_bank_2023_fcpf_annual_report_r01.pdf

96 UNFCCC. (n.d.). *REDD+ resources | UNFCCC*. Retrieved May 12, 2025, from https://unfccc.int/topics/land-use/workstreams/redd/redd-resources#Warsaw-Framework-for-REDD

97 UNREDD Programme. (2021, July 15). *Cancun safeguards*. UNREDD Programme. https://www.un-redd.org/glossary/cancun-safeguards

98 World Bank. (2021). *Nesting of REDD+ Initiatives: Manual for Policy Makers*. https://documents1.worldbank.org/curated/en/411571631769095604/pdf/Nesting-of-REDD-Initiatives-Manual-for-Policymakers.pdf

99 Conservation International. (n.d.). *REDD+ Nesting Policy Recommendations Translations*. REDD+ Nesting Policy Recommendations Available in Multiple Languages. Retrieved May 13, 2025, from https://www.conservation.org/events/redd-nesting-policy-recommendations-translations

100 Green Climate Fund |, I. E. U. (2024, September 23). *REDD+ Results-Based Payment Pilot Projects: Enhancing Climate Action in Latin America and the Caribbean* [Text]. Independent Evaluation Unit | Green Climate Fund; Independent Evaluation Unit | Green Climate Fund. https://ieu.greenclimate.fund/news/redd-results-based-payment-pilot-projects-enhancing-climate-action-latin-america-and-caribbean

101 Comisión Nacional Forestal (CONAFOR). (2017). *Estrategia Nacional Para Redd+ 2017-2030 Mexico*. https://redd.unfccc.int/media/estrategia-nacional-redd_-2017-2030_mexico.pdf

102 The Ministry of Environment and Forestry of the Republic of Indonesia. (2023). *Folu Net Sink: Indonesia's Climate Actions Towards 2030*. https://www.menlhk.go.id/cadmin/uploads/PHOTO_BOOK_FOLU_NET_SINK_Indonesia_s_Climate_Actions_Towards_2030_a3d4f1fa43.pdf

103 Republic of Indonesia. (2022). *National Forest Reference Level for Deforestation, Forest Degradation, and Enhancement of Forest Carbon Stock_ In the Context of Decision 12/CP.17 para 12 UNFCCC*. https://redd.unfccc.int/media/modified_2nd_frl_indonesia_20220529_clean.pdf

104 Norway's International Climate and Forest Initiative. (2024, January 3). COP28/Dubai: Norway joins the Mangrove Alliance for Climate (MAC). *Norway's International Climate and Forest Initiative*. https://www.nicfi.no/2024/01/03/cop28-dubai-norway-joins-the-mangrove-alliance-for-climate-mac/

105 miljødepartementet, K. (2022, October 19). *Contribution Agreement Concluded: Norway Delivers US$ 56 Million In Results-Based Support For Indonesia's FOLU Net Sink 2030 Climate Goals* [Nyhet]. Regjeringen.No; regjeringen.no. https://www.regjeringen.no/en/aktuelt/norway-delivers-us$-56-million-in-results-based-support-for-indonesias-folu-net-sink-2030-climate-goals/id2936675/

106 Lüske, M., & Langenbucher, K. (n.d.). *Social Impact Bonds. Output 4 – Innovative policy design of active labour market policies (ALMPs)*. Retrieved May 13, 2025, from https://www.oecd.org/content/dam/oecd/en/topics/policy-issues/employment-services/social_impact_bonds.pdf

107 International Bank for Reconstruction and Development / The World Bank. (2022). *Using impact bonds in education in low- and middle-income countries: An evidence review*. https://documents1.worldbank.org/curated/en/099846504132230407/pdf/IDU02b848900027dd04d480a179090d86b2071a4.pdf

108 Deutz, A., Heal, G. M., Niu, R., Swanson, E., Townshend, T., Zhu, L., Delmar, A., Maghji, A., Sethi, S. A., & Tobin de la Puente, J. (2020). *Financing Nature: Closing the global biodiversity financing gap.* [Full report]. The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability. https://www.paulsoninstitute.org/wp-content/uploads/2020/09/FINANCING-NATURE_Full-Report_Final-Version_091520.pdf

109 Lüske, M., & Langenbucher, K. (n.d.). *Social Impact Bonds. Output 4 – Innovative policy design of active labour market policies (ALMPs).* Retrieved May 13, 2025, from https://www.oecd.org/content/dam/oecd/en/topics/policy-issues/employment-services/social_impact_bonds.pdf

110 International Bank for Reconstruction and Development / The World Bank. (2022). *Using impact bonds in education in low- and middle-income countries: An evidence review*. https://documents1.worldbank.org/curated/en/099846504132230407/pdf/IDU02b848900027dd04d480a179090d86b2071a4.pdf

111 Cabrera, H., Planitzer, C., Yudelman, T., & Tua, J. (2021). *Securing Sustainable Financing for Conservation Areas: A Guide to Project Finance for Permanence.* https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/1z0aqa0cl9_PFP_ASL_WWF_REPORT_2021_March_22_final_.pdf

112 Steele, P., Ducros, A., Patel, S., & Newman, E. (2023). *Innovative Finance for Nature and People: Opportunities and Challenges for Biodiversity-Positive Carbon Credits and Nature Certificates*. GEF, IIED. https://www.thegef.org/sites/default/files/documents/2023-03/GEF_IIED_Innovative_Finance_Nature_People_2023_03_1.pdf

113 Cabrera, H., Planitzer, C., Yudelman, T., & Tua, J. (2021). *Securing Sustainable Financing for Conservation Areas: A Guide to Project Finance for Permanence.* https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/1z0aqa0cl9_PFP_ASL_WWF_REPORT_2021_March_22_final_.pdf

114 World Bank. (2023). *Unlocking Blue Carbon Development: Investment Readiness Framework for Governments.* https://documents1.worldbank.org/curated/en/099092223142013793/pdf/P1803270733769058099a406ce8a40b23e6.pdf

115 World Bank. (2023). *Unlocking Blue Carbon Development: Investment Readiness Framework for Governments.* https://documents1.worldbank.org/curated/en/099092223142013793/pdf/P1803270733769058099a406ce8a40b23e6.pdf

116 Steele, P., Ducros, A., Patel, S., & Newman, E. (2023). *Innovative Finance for Nature and People: Opportunities and Challenges for Biodiversity-Positive Carbon Credits and Nature Certificates*. GEF, IIED. https://www.thegef.org/sites/default/files/documents/2023-03/GEF_IIED_Innovative_Finance_Nature_People_2023_03_1.pdf

117 TNC. (2023). *The Nature Conservancy Announces Debt Conversion for Ocean Conservation in Gabon, First Ever in Mainland Africa*. The Nature Conservancy. https://www.nature.org/en-us/newsroom/tnc-announces-debt-conversion-for-ocean-conservation-in-gabon/

118 Forever Costa Rica, & Association Team. (2024). *Annual Report 2023 HARMONY* [Annual report]. https://forevercostarica.org/wp-content/uploads/2024/05/Annual-Report-2023-1.pdf

119 IFC-World Bank Group. (n.d.). *IFC's Definitions of Targeted Sectors* [Text/HTML]. IFC. Retrieved May 13, 2025, from https://www.ifc.org/en/what-we-do/sector-expertise/financial-institutions/definitions-of-targeted-sectors

120 IFC-World Bank Group. (2024). *Financial Institutions Group (FIG) MSMEs*. https://www.ifc.org/content/dam/ifc/doc/2024/msme-s-factsheet-ifc-financial-institutions-group.pdf

121 Tobin-de la Puente, J., & Mitchell, A. W. (2021). *The Little Book of Investing in Nature*. https://globalcanopy.org/wp-content/uploads/2021/07/LBIN_2020_RGB_ENG.pdf

122 OECD. (2024). *Official development assistance (ODA).* OECD. https://www.oecd.org/en/topics/official-development-assistance-oda.html

123 Deutz, A., Heal, G. M., Niu, R., Swanson, E., Townshend, T., Zhu, L., Delmar, A., Maghji, A., Sethi, S. A., & Tobin de la Puente, J. (2020). *Financing Nature: Closing the global biodiversity financing gap.* [Full report]. The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability. https://www.paulsoninstitute.org/wp-content/uploads/2020/09/FINANCING-NATURE_Full-Report_Final-Version_091520.pdf

124 World Bank. (2023). *Unlocking Blue Carbon Development: Investment Readiness Framework for Governments.* https://documents1.worldbank.org/curated/en/099092223142013793/pdf/P1803270733769058099a406ce8a40b23e6.pdf

125 Bath, P., Luján-Gallegos, V., & Guzmán-Valladares, A. (2020). *Practice Standards For Conservation Trust Funds* [2020 edition]. https://static1.squarespace.com/static/57e1f17b37c58156a98f1ee4/t/620fc5df0c701728749585da/1645200880671/Practice+Standards+For+Conservation+Trust+Funds+2020+EN+links+-+211208+.pdf

126 Vanderklift, M., Steven, A., Benzaken, D., Thiele, T., Cunliffe, C., Ravaoarinorotsihoarana, L. A., Schmid, A., & Wharton, J. (2022). *Blue forest finance: Financing the protection and restoration of blue forests and meadows.* https://research.csiro.au/iora-blue-carbon-hub/wp-content/uploads/sites/321/2022/11/Blue-forest-finance-guide-FINAL.pdf

127 Moulherat, S., Boileau, J., Chapelier, G., & Favre, S. (2023). Chapter 3. The Mitigation Hierarchy. In: C. Rosell et al., (Eds.). *Biodiversity & Infrastructure Handbook*. https://www.biodiversityinfrastructure.org/handbook/3-mitigation-hierarchy/

128 Schindler Murray, L., Milligan, B., Ashford, O. S., Bonotto, E., Cifuentes-Jara, M., Glass, L., Howard, J., Landis, E., Northrop, N., & Thiele, T. (2023). The blue carbon handbook: Blue carbon as a nature-based solution for climate action and sustainable development. *Report. London: High Level Panel for a Sustainable Ocean Economy.*https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook_summary-1.pdf

129 Schindler Murray, L., Milligan, B., Ashford, O. S., Bonotto, E., Cifuentes-Jara, M., Glass, L., Howard, J., Landis, E., Northrop, N., & Thiele, T. (2023). The blue carbon handbook: Blue carbon as a nature-based solution for climate action and sustainable development. *Report. London: High Level Panel for a Sustainable Ocean Economy.*https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook_summary-1.pdf

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