



BLUE FOREST FINANCE

Financing the protection
and restoration of blue
forests and meadows

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FOREWORD

The Indian Ocean region is rich in natural resources. We are well acquainted with the economic benefits of our region's mineral, agricultural and fisheries wealth. But the wealth of our 'blue' forests and meadows- our mangroves, salt marshes and seagrass meadows- is equally extensive and important to livelihoods. Regrettably, these forests are being cleared and degraded at unsustainable rates.

While protecting and restoring our blue forests and meadows contributes towards climate change mitigation, conceptualising them as a resource is a paradigm shift that will yield benefits to Indian Ocean economies and livelihoods. Blue forests are vital to the marine biodiversity that supports economic activity and provides protein to millions; they also reduce the height of damaging waves, reduce flood risk and prevent erosion.

In IORA, the Blue Carbon Hub focuses on building awareness and capacity, and addresses knowledge gaps related to Blue Carbon in the Indian Ocean. The Hub seeks to support IORA Member States to lead the world in harnessing the benefits that these blue carbon ecosystems provide through evidence-based actions. For example, the Hub engages in and facilitates research that seeks to improve knowledge and provide the evidence base for development of robust policy and finance mechanisms as well as develop partnerships with organisations that can assist with implementation of activities.

Government and philanthropic support for protecting this natural wealth will not be enough. Our efforts will require additional assistance. Many in the private sector see the value in investing in activities to support this wealth, and are actively seeking opportunities to support protection and restoration efforts.

Nature-based solutions to climate change, such as blue carbon, can provide opportunities for the private sector to invest in actions which protect biodiversity and deliver climate positive outcomes - as well as facilitating meaningful participation of local communities, women and socially marginalised groups in the economy.

But we need to prepare ourselves and develop a framework within which that support can be delivered to harness this energy and enthusiasm.

This report is an initiative of the Hub that explains some of the key concepts and language associated with blue forest finance, to help practitioners to develop partnerships with the private sector. It also includes some recommendations on actions that IORA Member States (and indeed states in other regions) can implement to begin paving the way for private sector investment.

This paper will form the foundation of a discussion in the Indian Ocean region that will result in greater communication and cooperation between Member States on blue forest finance development.

Let us work together to invest in and grow our abundant natural wealth of blue forests and meadows.

Dr Salman Al Farisi
Secretary General
Indian Ocean Rim Association





GLOSSARY

Abatement: in climate policy, the act of reducing net emissions (it is also used to refer to the quantity of net emissions reduction).

Angel investor: an investor who provides financial capital to support the early stages of developing a business, when investment risk is high.

Asset: a resource that can be sold to generate cash, for example buildings, *bonds*, patents, and so on.

Blended finance: a type of financial mechanism in which donor funds from governments, multilateral development banks or philanthropic elements within civil society are combined with private sector finance in a way that removes uncertainty or risk to the private sector.

Bond: a type of financial instrument in which debt is issued as tradeable *assets*, which are purchased by investors who receive interest and principal repayment.

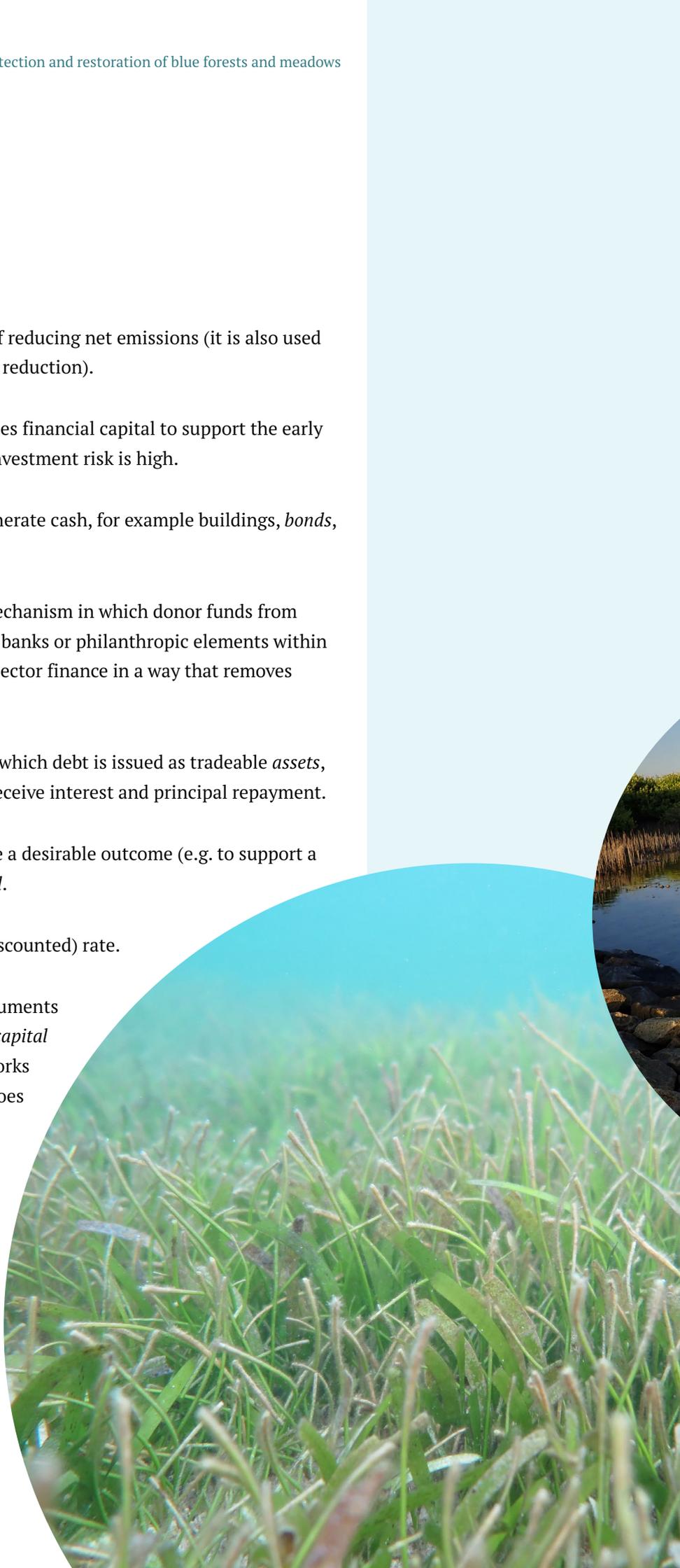
Capital: *assets* that are used to generate a desirable outcome (e.g. to support a restoration project). See *financial capital*.

Concessional: in finance, a lower (or discounted) rate.

Enabler: a broad class of financial instruments which can help to provide the *financial capital* even when existing commercial frameworks are inadequate (for example, a market does not yet exist).

Finance: a broad term usually intended to comprise the full set of activities involved in generating or managing money.

Financial capital: money used to generate an outcome.



First-loss: an arrangement in which an investor agrees to absorb initial financial losses.

Grant: money given to support an activity that does not need to be returned.

Impact investment: investment which seeks to combine financial returns with a set of social and/or environmental benefits.

Investment: in finance, allocation of *financial capital* with the explicit expectation of a return.

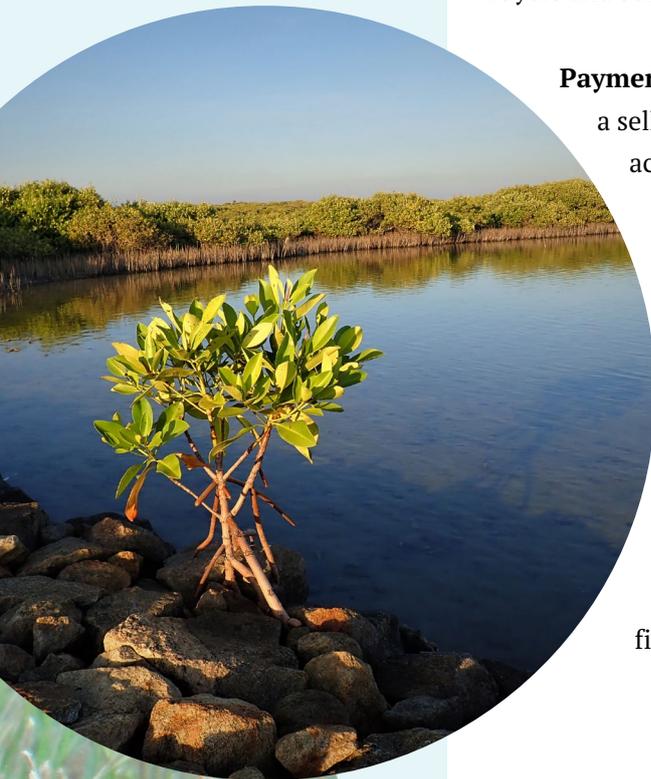
Market: a mechanism to facilitate exchange of goods and services between buyers and sellers.

Payment for ecosystem services: an arrangement in which a buyer pays a seller to manage a resource that they own (or for which they have access rights) in a way that improves environmental outcomes.

Private equity: private financial capital that is invested directly into companies

Trust fund: a type of financial instrument in which a third party manages and disburses funds to one or more beneficiaries.

Venture capital: a high-risk type of investment made early in development of a business in the anticipation it will yield a high financial return.



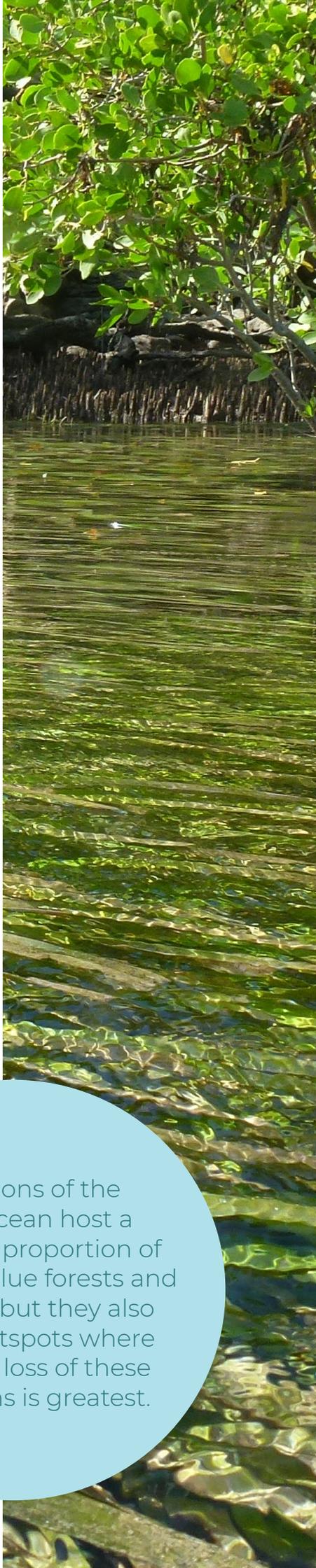
EXECUTIVE SUMMARY

Protection and restoration of ‘blue forests’ and ‘blue meadows’ — mangrove forests, seagrass meadows and tidal marshes — offer nature-based solutions to absorb and sequester atmospheric carbon dioxide (CO₂), support fisheries and reduce risks associated with floods and storms. In doing so, they provide an opportunity to address multiple challenges in a single portfolio of actions. Despite the benefits they provide, blue forests and meadows have been extensively cleared, fragmented and degraded. Protecting and restoring them is therefore key to maintaining (or restoring) their capacity to offer nature-based solutions to some of our most profound societal challenges.

The nations of the Indian Ocean host a substantial proportion of the world’s blue forests and meadows (for example, together they contain almost half of the world’s mangrove forests), but they also include hotspots where the rate of loss of these ecosystems is greatest. They have more to gain than many other regions: millions of people live along coasts which are at extreme risk from natural disasters like storms and tsunamis and rely heavily on the seafood they produce as their primary source of protein. However, generating the money to fund protection and restoration efforts can be difficult.

Partnerships with the private sector can help attract the money needed. Indeed, many actors in the private sector want to support these efforts, with motivations that range from broad corporate social responsibility to generating income from new revenue streams. With considerable blue forest resources and expanding blue economies, the nations of the Indian Ocean could lead the world in blue forest finance.

An impediment to attracting private sector finance is uncertainty about what the returns are: for example, restoring a mangrove forest can enhance carbon storage, and protect people and infrastructure from damaging storms, but the economic advantages that these confer are often not fully assessed. Another impediment is that the benefits tend to be spread widely (they are public goods) rather than to the investor, and it can be difficult to identify clear cash returns in the near term.



The nations of the Indian Ocean host a substantial proportion of the world’s blue forests and meadows, but they also include hotspots where the rate of loss of these ecosystems is greatest.



Addressing these impediments is important. The opportunities that the private sector provide also need to be harnessed thoughtfully, keeping focus on what we are trying to achieve. This will involve consideration of what the appropriate role and limits of different sectors are in financing public goods – there is no single answer to this, and each jurisdiction should make its own decisions.

This report has two key aims. First, it outlines the fundamentals of finance relevant to blue forests, providing an explainer of different types of finance instruments. We attempt to demystify some of the confusing jargon that can be a barrier to stakeholders who want to attract (or even just support) private sector investment. We intend this to improve financial literacy among individuals in governments and civil society who are working on nature-based solutions to climate change mitigation and adaptation challenges.

The second aim is to provide a simple guide to some of the options that might be most useful to explore in different circumstances. This is not intended to be comprehensive and should not replace due diligence for those wanting to pursue specific avenues. Indeed, there is much innovation occurring in blue forest finance, and new instruments are emerging. However, we intend for it to be a guide to assist in the initial steps of exploring blue forest finance. The information is also intended to help inform policy makers to consider the role that governments could play.

Finance can be confusing and confronting for those who do not have a background in business or economics. There are many types of financial instruments, many of which are unfamiliar to most people. Finance experts sometimes use language that can be difficult to understand, and this can be a barrier to understanding and effectively harnessing the opportunities they offer. Some simple types of financial transactions involve exchanges of the kind most people are familiar with, such as *payments* and *loans*. These generally require a clearly identified return, sometimes in cash (such as in a loan) but sometimes in goods or services (such as payments for a net reduction in greenhouse gas emissions). Sometimes, these might be sufficient to support protection or restoration efforts. However, in many instances they are not, perhaps because the risks involved for one or both parties are too high, or the investor requires a higher rate of return than is possible, or because the framework to support them is inadequate (for example, if a market does not yet exist).

In these instances, transactions might require *enablers* to lower the risks. *Bonds* are a promissory form of enabler, in which a bond issuer (which could be a company, a bank, or even a government) and a bond buyer (called a holder) have an agreement in which the buyer provides funds, and in return the issuer commits to repay those funds with interest over a defined period. Unlike a standard loan however, the buyer can be an investor from a broad suite of public or private institutions (who can elect to trade the bond at any time).

Trust funds are a legal structure in which a neutral third party manages and disburses funds to one or more beneficiaries (often these funds are provided by grants, but they can also be funds generated by various market-based payments). An *impact investment* can also be an enabler because it can provide financial capital to support development of new types of products or services for which the long-term market viability is unknown (and so which might be considered risky for typical investment pathways). An impact investment seeks to combine viable and competitive financial returns with a set of societal and/or environmental benefits.

Some types of finance, leverage *insurance* frameworks. These mechanisms are still relatively undeveloped, but essentially involve making payments in return for a reduction in risk. Payments could be made by those who have insurance policies or by insurers themselves, in exchange for the maintenance or restoration of blue forests; the resulting reduction in risk (for example, by attenuating damaging storm waves) results in lower insurance premiums and/or reductions in the financial liabilities of insurers.

Small restoration activities (say, tens to hundreds of hectares) might be well-suited to market-based mechanisms, such as carbon markets or other Payments for Ecosystem Services (PES) (perhaps with impact investment to help with initial finance), or some type of risk transfer. Larger endeavours (hundreds to thousands of hectares) might require a more complex arrangement, perhaps including elements from one or more blue bond, carbon market or risk transfer mechanisms like parametric insurance or catastrophe bonds. Efforts that encompass a national or even transboundary



scale will require significant investment of a kind few instruments can accommodate, although blue bonds are one candidate. In each case, there are some challenges to overcome, and nations might need to develop policies — or even legislation — to help overcome these.

Demonstration projects are needed to establish the proof that concepts work and show the financial and non-financial returns that can be generated. Project-scale demonstrations that provide the evidence of their potential will help give investors confidence, as well as provide opportunities to learn and improve. Such demonstration projects seem very well suited to blended finance approaches in which public or philanthropic funds are used to underwrite or support key early phases (perhaps through concessional finance, or even grants); this would allow initial financial returns to go to private investors, providing the evidence needed.

Another way of reducing risks to individual investors is the use of pooling schemes, in which funds from multiple investors are aggregated, so that each is exposed to less risk (conversely, the returns are then also shared). Pooling funds in this way can also address the issue of scalability and longevity (i.e. how to

make sure that blue forest protection and restoration covers a large enough area, and has enough resources to last for long periods). Trust funds can provide the financial structure and governance framework to combine various sources of funding — including grants and investments — into financial capital that can be sustained over a long period.

Knowledge transfer hubs to exchange information will also be critical. Part of this knowledge exchange should include the situations and context in which different mechanisms are appropriate — for example, carbon markets, bonds and insurance will each be appropriate in different situations. Such hubs could also be incubators of innovation as different ideas get mixed and new problems arise which lend themselves to different financial solutions. These hubs could also be important fora to engage with communities that participate in or are impacted by blue forest projects, as well as build capacity of project proponents to carry out successful interventions.

Investment enablers, such as bonds, will likely be important mechanisms to support and strengthen blue forest finance. Individual governments might want to explore the option of their own bond scheme, but multilateral development institutions also offer a mechanism to raise bond finance at a regional level, enabling transboundary financing solutions and providing the necessary expertise.



Demonstration projects are needed to establish the proof that concepts work and show the financial and non-financial returns that can be generated.

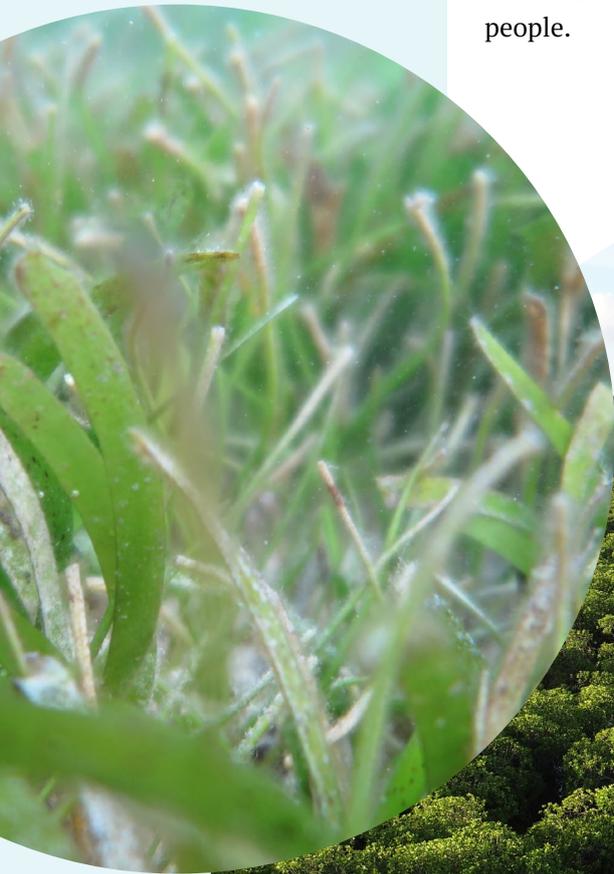
The fundamental finance architecture needed to support blue forest finance exists, but its potential has not yet been harnessed. To accelerate this, we need dedicated frameworks and strong policy environments. Governments can help by building this policy architecture, including clear tenure and property rights, institutions with well-defined responsibilities, and effective and transparent governance. Governments with good credit ratings are also well-placed to participate in blue bond schemes that might enable actions that encompass larger areas. Each jurisdiction should make its own decisions but some actions that governments could take to facilitate action include the following:

- Establish clearly articulated property right frameworks for blue forests (both the land — or sea floor — and the carbon credits generated from conservation and restoration activities).
- Support a high integrity voluntary carbon market, whether it is part of a regulated market or not, as well as clear frameworks for using such markets as a blue forest finance mechanism. This would include frameworks for regulators to effectively govern the operation of the market (if a regulated approach is taken) and policies for appropriate benefit sharing schemes and arrangements for communities and key stakeholders to participate.
- Develop demonstration projects needed to provide the proof-of-concept that investment in blue carbon assets can generate attractive returns, to facilitate investor confidence and provide opportunities to learn. This could include supporting opportunities for blended finance approaches which combine public funds with private sector investment, and demonstrate the range of outcomes that can be financed e.g. carbon sequestration, biodiversity, coastal resilience.
- Introduce mechanisms that encourage the use of pooling schemes, in which funds from multiple investors are aggregated, so that each is exposed to less risk. Similarly, smaller projects that wouldn't individually attract investment can be aggregated together to achieve economy of scale and spread risk across multiple projects.
- Establish knowledge transfer hubs to facilitate information exchange and capacity building. Such hubs could also be used as incubators of innovation as different ideas get mixed and new problems arise which lend themselves to financial solutions.



- Establish a governments bond scheme, and/or launch this with multilateral development institutions to attract investors at a regional level, enabling transboundary financing solutions.

With many thousands of hectares of remaining blue forests and meadows to be protected and repaired the challenge is large, but this in turn creates significant opportunity for the private sector. Moving forward, each of the actors, from governments to investors to restoration practitioners, have key roles to play. If we effectively and wisely harness the economic architecture available, adhering to a set of principles to help guide the development and implementation of existing and new instruments, we can take the opportunity and meet the challenge, creating enduring impacts for our climate, our ecosystems, and our people.



WHY DO WE NEED BLUE FOREST FINANCE?

Nature-based solutions harness the ecological processes that occur in ecosystems to address societal challenges such as climate change, disaster risk and food security (Cohen-Shacham et al., 2016¹). Protection and restoration of ‘blue forests’ and ‘blue meadows’ – mangrove forests, seagrass meadows and tidal marshes – offer particular promise, because these ecosystems combine an immense capacity to absorb and sequester organic CO₂ (McLeod et al., 2011) with an ability to support fisheries (Hutchison et al., 2014) and reduce risks associated with floods and storms (Losada et al., 2018). They therefore provide an opportunity to address multiple challenges in a single portfolio of actions. They also offer a way to support human communities, especially those that are vulnerable, because although these challenges are global, the actions supporting nature-based solutions tend to be local.

Despite the benefits they provide, blue forests and meadows have been extensively cleared, fragmented, or degraded, because they mostly occur on the coast, where many people live and where the demand for space is high. Protecting and restoring them is therefore key to maintaining (or restoring) their capacity to offer nature-based solutions (Hoegh-Guldberg et al., 2019). In some cases, restoration is no longer an option (for example, if the ecosystems have been replaced by buildings). However, there are hundreds of thousands of hectares where restoration is possible (such as abandoned aquaculture ponds).

The nations of the Indian Ocean have an opportunity to be global leaders in harnessing the potential that blue carbon forests and meadows offer. They host a substantial proportion of the world’s blue carbon ecosystems (for example, together they contain almost half of the world’s mangrove forests: Vanderklift et al., 2019a), but they also include hotspots where the rate of loss of these ecosystems is greatest. They have more to gain than many other regions: millions of people live along coasts which are at extreme risk from natural disasters like storms and tsunamis, and rely heavily on the seafood they produce as their primary source of protein.



Despite the benefits they provide, blue forests and meadows have been extensively cleared, fragmented, or degraded.

¹ See also the formal IUCN definition at: https://www.iucn.org/sites/dev/files/content/documents/wcc_2016_res_069_en.pdf



Some efforts towards protection and restoration of blue forests in the Indian Ocean exist — for example, the Blue Forests Project². However, these efforts need to be replicated and expanded rapidly to reverse the accumulated loss. This will require money. So far, much of the money for protection and restoration has come from public funds (from governments or multilateral development banks) or philanthropic donations, but these sources are insufficient to generate the quantity of funds needed.

Partnerships with the private sector can help generate the money needed to expand protection and restoration efforts (Deutz et al., 2020). The private sector is adept at raising and managing financial capital (money) for specific purposes, and many actors in the private sector want to support nature-based solutions. Their motivations are diverse, ranging from broad corporate social responsibility to a desire to generate income from new revenue streams. Increasingly, the private sector is seeking to manage their exposure to climate risks and nature loss and align investment with activities that support global initiatives, such as the Sustainable Development Goals or the Paris Agreement. Blue economy approaches are taking advantage of existing and emerging financial architectures to achieve sustainable outcomes (Steven et al., 2020), and there is considerable opportunity for those who can most quickly implement existing mechanisms and innovate new ones. With abundant blue forest resources and expanding blue economies, the nations of the Indian Ocean have an opportunity to lead the world.

2 <https://gefblueforests.org/about/>

CHALLENGES TO ATTRACTING PRIVATE SECTOR INVESTMENT

Although the opportunity is large, there are barriers that need to be overcome. One impediment to private sector participation is uncertainty about the returns on investment (Sumaila et al., 2020): for example, restoring a coastal mangrove habitat can provide significant benefits such as carbon storage, or protection from damaging storms, but the economic advantages that these confer might not be fully assessed. Another impediment is that the benefits tend to be spread widely (they are public goods) rather than to the investor, and it might be difficult to identify clear immediate cash returns.

Addressing these impediments is important, and the opportunities that the private sector provide need to be harnessed thoughtfully, keeping focus on what we are trying to achieve. This will involve consideration of what the appropriate role and limits of different actors are in financing public goods — there is no single answer to this, and each jurisdiction should make its own decisions. It will involve construction of an economic architecture designed to ensure that investment supports desirable activities without perverse effects, as well as development of the right incentives to encourage this investment.

Finance is a broad term usually intended to comprise the full set of activities involved in generating or managing money. It can provide such economic architecture. Within this architecture, there are multiple tools that we can draw upon (they are reviewed in the following sections). However, without constraints those same tools can also be deployed to uses that are contrary to the goals that we want to achieve. To harness the advantages of finance, and avoid the potential pitfalls, collectively we need a set of principles.





The need for principles is not a new idea. Indeed, multiple sets of principles exist that may be applicable to blue forests, such as the Blue Carbon Code of Conduct³, the Sustainable Blue Economy Finance Principles⁴ and the Green Bond Principles⁵. They share common themes, focussed on aspects such as transparency and equity (in the sense of being fair, not in the financial sense). We do not repeat those principles here but encourage individuals seeking to understand how private sector investment can be used to familiarise themselves with them.

This report has two central aims. First, we outline the major options for encouraging private sector investment, and in so doing we attempt to demystify some of the confusing jargon that can be a barrier to stakeholders who want to attract (or even just support) private sector investment. In so doing we hope to help improve financial literacy among individuals in governments and civil society who are working on nature-based solutions. Second, we highlight some options that might be most useful to explore. This is not intended to be comprehensive and should not replace due diligence for those wanting to pursue specific avenues. Indeed, there is considerable innovation occurring in finance to support nature-based solutions generally, and in blue forest finance in particular, and new instruments are continually emerging. Some mechanisms might not be appropriate in some cultural circumstances, and alternatives might be preferred – for example the use of sukuk instead of bonds (which are explained later). Other guides exist (see for example *The Ocean Finance Handbook*⁶). We intend for this report to be a useful guide to complement these and to assist in the initial steps of exploring finance that can be used to support actions to protect, manage and restore our blue forests and meadows.

3 <https://news.gefbeforests.org/blue-carbon-code-of-conduct>

4 <https://www.unepfi.org/blue-finance/the-principles/>

5 <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf>

6 <http://blue-finance.org/?p=3085>

A BRIEF GUIDE TO BLUE FOREST FINANCE INSTRUMENTS

Finance can be confusing and confronting for those who do not have a background in business or economics. There are many types of financial instruments, some of which are unfamiliar to most people. Finance experts sometimes use language that can be difficult to understand, and this can be a barrier to understanding and effectively harnessing the opportunities they offer. In the following sections, we describe the most relevant and commonly used instruments to raise financial *capital*, offering a simplified classification and a synopsis of the main types of instruments (Figure 1).

Very broadly, financial capital for protection and restoration of blue forests can be divided into two categories: *grants* and *investments*. Grants do not require repayment (lower panel in Figure 1), and can be from public donors, such as the Official Development Assistance (ODA) programs that many countries have, or multilateral development banks. They can also be provided by private donors, such as philanthropy by high-net-worth individuals or companies that have programs designed to enhance social or environmental responsibility. This report does not cover these types of arrangements, but instead focuses on *investment*, which we define as transactions in which there is an explicit expectation of a financial return. In blue forest finance these typically also have additional expectations of a set of societal and/or environmental outcomes.

Investments in turn can be broadly subdivided into a few different types (see Figure 1, and also the system provided by *The Ocean Finance Handbook*⁷). Some simple types of financial transactions involve exchanges of the kind most people are familiar with, such as *payments* and *loans*. These generally require a clearly identified return, sometimes in cash (as in a loan) but sometimes in goods or services (such as payments for a net reduction in greenhouse gas emissions). Sometimes, these might be sufficient to support protection or restoration efforts. However, in many instances they are not, perhaps because the risks involved for one or both parties are too high, or the investor requires a higher rate of return than is possible, or because the framework to support them is inadequate (for example, if a market does not yet exist: Sumaila et al., 2020). In these instances,

7 <http://blue-finance.org/?p=3085>

transactions might require *enablers* to lower the risks. *Bonds* are a promissory form of enabler in which a bond issuer (which could be a company, a bank, or even a government) and a bond buyer (called a holder) have an agreement in which the buyer provides funds, and in return the issuer commits to repay those funds with interest over a defined period. Unlike a standard loan however, the buyer can be an investor from a broad suite of public or private institutions (who can elect to trade the bond at any time). *Trust funds* are a legal structure in which a neutral third party manages and disburses funds to one or more beneficiaries (often these funds are provided by grants, but they can also be funds generated by various market-based payments). *Impact investment* can also be an enabler because it can provide financial capital to support development of new types of products or services for which the long-term market viability is unknown (which might be considered risky for typical investment pathways). Impact investment seeks to combine viable and competitive financial returns with a set of societal and/or environmental benefits.

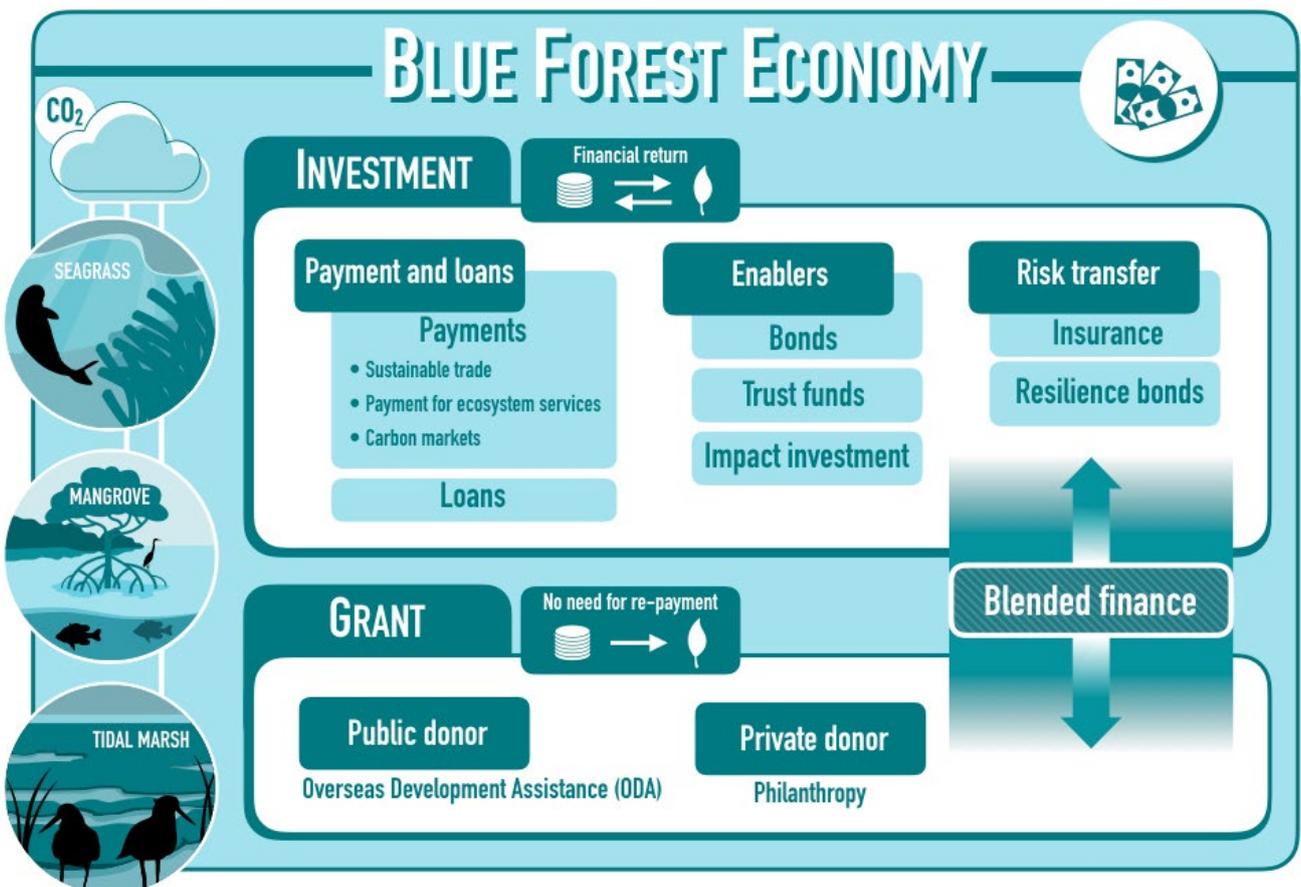


Figure 1: A classification of the financial instruments and structures which are most relevant for financing the sustainable use, protection and restoration of blue carbon ecosystems.

Some types of investments leverage *insurance* frameworks. These mechanisms are still relatively undeveloped, but essentially involve making payments in return for a reduction in risk. Payments could be made by those who have insurance policies or by insurers themselves, in exchange for the maintenance or restoration of blue forests; the resulting reduction in risk (for example, by attenuating damaging storm waves) results in lower insurance premiums and/or reductions in the financial liabilities of insurers.

The following sections describe these mechanisms in more detail, with examples of how they can be applied to protection and restoration of blue forests and meadows.



AN EXPLAINER ON CURRENT AND POTENTIAL BLUE FOREST FINANCE INSTRUMENTS

Market-based transactions: payments and loans

Markets — the economic structure in which a buyer gives money to a seller in exchange for a good or a service — are a ubiquitous and intuitive part of contemporary life. One of the fundamental characteristics of markets is that the price a buyer is willing to pay is an indication of the relative importance of the good or service they are buying. Often, a willingness to pay a higher price enables buyers to influence the way that it is produced. This in turn provides an opportunity for markets to be used to provide incentives (in the form of higher prices) for those who provide the goods to behave in certain ways. In the context of loans, this can also be extended to lenders, because they can provide credit with similar incentives (such as lower interest rates, or longer repayment periods).

Sustainable and fair-trade initiatives are examples of this type of approach. In essence, they offer buyers the opportunity to purchase products knowing that the producers adhere to a set of social and/or environmental principles, and in return they pay a higher price. Typically, this is assured through third-party certification, of which there are multiple (examples include the Aquaculture Stewardship Council, Forest Stewardship Council, and Fairtrade). Among blue carbon ecosystems, these are most well-developed for mangroves. There are multiple projects throughout the world in which products ranging from wood to seafood are produced in ways that better protect mangroves, often through local management which encourages sustainable harvest in otherwise protected mangroves.

An extension of this type of approach is *Payments for Ecosystem Services* (PES). These are somewhat loosely defined but are characterised by a formal agreement between a buyer and a seller, in which the seller typically agrees to manage a resource that they own (or for which they have a right to use) to meet a set of defined conditions. The conditions are typically focussed on improving environmental outcomes. A common condition in application of PES to ecosystems on land is management to maintain or increase carbon sequestration,



contributing to efforts to mitigate climate change. Other types of conditions can include modifying land use practices to provide habitat for native species, to reduce soil erosion or flood risk, or to enhance water quality. Sometimes, multiple conditions can be invoked — such as by combining carbon sequestration with habitat provision — these can each elicit a discrete payment (this approach is called ‘stacking’), but more typically they are combined (an approach called ‘bundling’) into a single payment from the same buyer.

The most mature framework for PES in blue carbon ecosystems is through carbon markets (Figure 2). In a carbon market, the ‘service’ that is purchased is a net reduction in greenhouse gas emissions (this net reduction is called ‘abatement’); this can be generated through activities that reduce or avoid actual emissions (for example by using renewable energy instead of combusting fossil fuels), or activities that enhance sequestration of CO₂ (for example by restoring forests). Although there are multiple greenhouse gases (GHG), the commodity that is bought and sold in carbon markets is a tonne of carbon dioxide equivalent (tCO₂-e). In this unit, all GHG are converted into the equivalent global warming potential of CO₂, which is the most abundant GHG in earth’s atmosphere. Methane (CH₄) and nitrous oxide (N₂O) are two naturally-occurring GHG that can be released in substantial quantities when blue forests are cleared or degraded; they also have much higher global warming potentials (in other words, for an equivalent amount — say, a tonne — they tend to absorb more energy and so contribute relatively more to warming). They are therefore important to account for, and the role of protecting and restoring blue forests in reducing their emissions can be quite important.

Carbon markets can be broadly divided into markets that exist to service a legislative or regulatory requirement (typically called compliance or mandatory markets), and those that are voluntary (Vanderklift et al., 2019b). In the former, buyers will typically seek the abatement which costs the least. For these buyers, blue carbon activities will be competitive only if the price of each tCO₂-e of abatement is equal to or lower than other methods. In contrast, buyers in a voluntary market typically do so because they are motivated by reasons other than the need to meet regulatory requirements, such as broad corporate social responsibility. This in turn can arise from various sources, but an increasingly important one is the expectations of investors, which are pressuring companies to implement plans and targets to reduce net GHG emissions from their activities to zero. Voluntary markets can be part of a broader regulated market (as in South Africa), or they might be separate — in the latter case, although the markets are unregulated, there are still some important rules that need to be followed (these are outlined below). The existence of different market mechanisms opens the

possibility that some emission reductions could be counted by more than one user, which would inflate estimates of net emissions reduction globally (called ‘double counting’, for example if a project in one country is funded through ODA from another and both want to count the emission reductions achieved from the project to offset their emissions). Internationally agreed rules now stipulate that to avoid double counting, if a country in which the project occurs wishes to sell their emissions reductions using international carbon market trading mechanisms they cannot count those reductions towards their own emission reduction target (established in their Nationally Determined Contribution) but the buyer of the emissions reductions (the donor country) can count them.

Multiple markets exist worldwide. The details of how these work vary, but they tend to have a set of common characteristics. First, a ‘credit’ (that is, one tonne of CO₂-e) associated with a particular abatement activity is certified by an independent third-party standard and issued into a public registry (more on these standards below). This credit can then be purchased from the seller (which could be the project proponent or a third party such as a broker or other intermediary). Once purchased, the credit becomes the property of the buyer, and so it can be retained or resold. Each credit has a unique serial number, which is listed on a variety of public registries. Once the owner is ready to take it off the market so that they can claim the emissions reductions of that credit, the credit is ‘retired’ and this is noted in the registry against the serial number. It can then no longer be sold or given away, and no other party may make claims regarding the emissions reductions associated with that credit.

There are three critical features that a credit must demonstrate. First, they must represent an abatement that would not have occurred without the incentive provided by carbon finance. This is called *additionality*. Second, the net CO₂ reduction that the credit represents must not be reversed, at least not for a very long period, like 100 years. This is called *permanence*. This criterion is relatively easy for some projects to achieve — for example, replacing fossil fuel with renewable energy. It is more challenging for activities that involve protecting or restoring blue carbon ecosystems — for example, what happens if a mangrove forest dies because of a heatwave? Because of this, a portion of the credits generated by a project are usually not sold and are instead kept aside as a ‘buffer’ in case they are needed to compensate for reversal.

Finally, the activity that the credit represents should not have caused an increase in net emissions somewhere else, or at least must account for any such increase. This is called *leakage*.

To verify that the abatement is genuine, and these criteria have been met, the projects that generate the credits are assessed according to international standards by accredited organisations. Most voluntary standards are based on principles developed by the International Organisation for Standardisation (namely ISO 14064 and ISO 14065). Multiple organisations provide these standards, but in voluntary markets most credits are issued according to requirements established by two programs: the Verified Carbon Standard and Gold Standard (Hamrick and Gallant, 2018). Each of these, and other standards, have a set of methods that outline how an activity should be implemented, including how net emissions reductions should be quantified. The activities through which net GHG emissions reductions are achieved must be verified, and the reductions must be validated by independent third-party auditors. These auditors evaluate activities and their associated net GHG emission reductions to ensure that they meet the requirements of the relevant program and method, and that the activity has correctly calculated the net emission reductions.

Prescriptive guidance about the types of methods which are eligible, and how to quantify emissions reductions, are also included in the compliance frameworks established in several jurisdictions (such as the Emissions Reduction Fund in Australia and the Compliance Offsets Program in California, USA). Few of these frameworks accept credits generated through voluntary standards. They have tended to be somewhat slower at incorporating blue carbon methods than voluntary standards. This has been a constraint on generating market-based finance for blue forest restoration in those jurisdictions.

So far, application to restoration and protection of blue forests in both unregulated voluntary markets and regulated markets has primarily been through mangrove reforestation (or afforestation), primarily by adapting methods developed for terrestrial forests — see examples from Madagascar and Indonesia in Case Study 1 and Case Study 2. A recent innovation is the development of voluntary market methods that include activities such as protecting coastal wetlands that would otherwise be degraded (and thus avoiding the emissions that would be produced), and restoration of tidal marshes and seagrasses. All are now achieving verified abatement, so that credits are being registered (and payments are therefore made), although none yet exist in the Indian Ocean.

Other environmental or social benefits that accrue from such projects can also be recognised (another form of PES). In this approach, the benefits are similarly verified and validated according to a standard that sets requirements for how a baseline (or without-project) scenario compares to the actual outcomes of the project on local communities and/or the environment. This requires a similar verification and validation process involving third party audits. Once this is complete, the carbon





credits can then be labelled with the additional standard — for example, in the case of a carbon credit issued under the VCS standard, labels can include the Climate, Community and Biodiversity Standard (denoting that the project has also delivered social and environmental benefits), or the Sustainable Development Verified Impact Standard (denoting that the project has provided benefits to help meet one or more of the Sustainable Development Goals). Carbon credits labelled with these additional benefits might attain a higher price. Compliance markets do not exist for these non-carbon outcomes, however there is increasing appetite from the private sector to invest in projects that achieve these certified outcomes (see for example the Taskforce on Nature-related Financial Disclosures⁸).

One innovation being explored is the addition of a resilience credit to carbon credits generated by blue forest protection and restoration.⁹ In this approach, the reduction in flood risk generated by the activity is estimated (and subjected to a similar process to that for carbon credits), and payments for this made in addition to the payments made for the carbon sequestered.

⁸ <https://tnfd.global>

⁹ <https://www.climatefinancelab.org/project/blue-carbon-resilience-credit/>

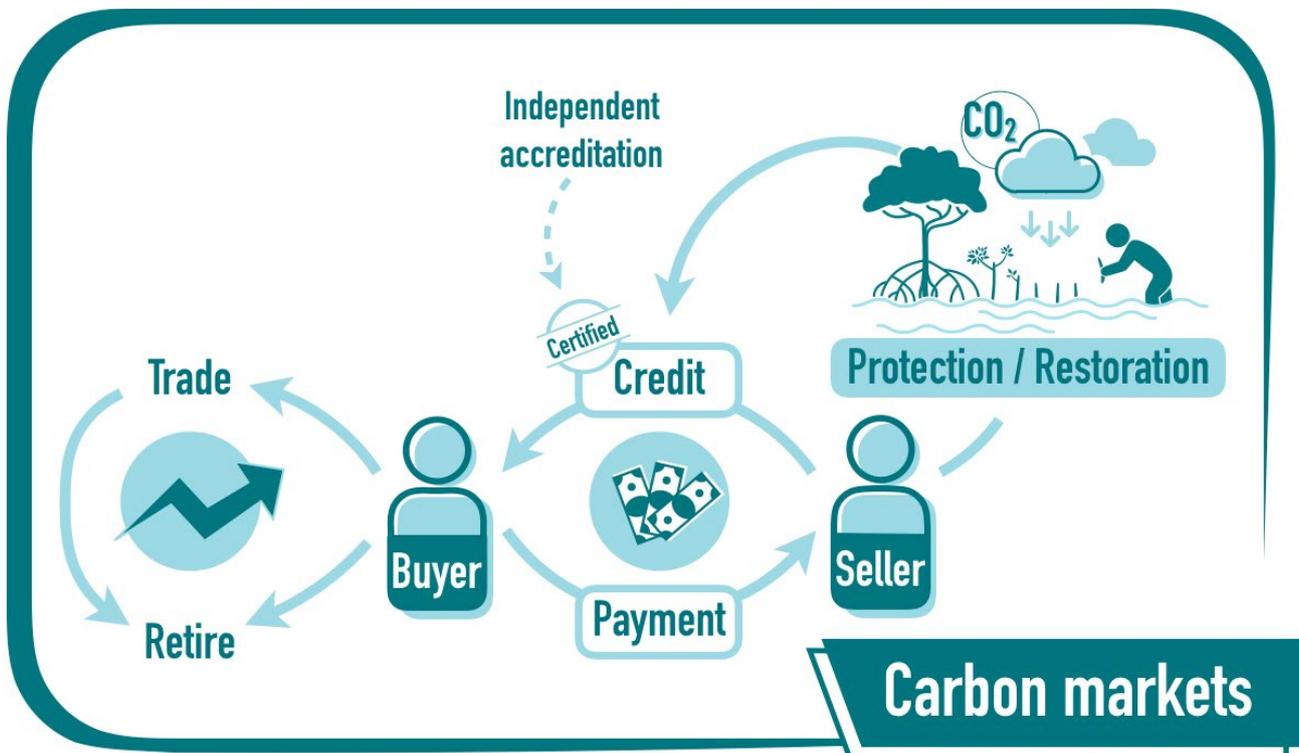


Figure 2: In a carbon market, buyers purchase carbon credits from sellers who use them to support activities that reduce emissions, or activities that enhance sequestration of CO₂. The buyers can then use them to offset emissions they produce from their activities.



CASE STUDY 1

Voluntary carbon markets: *Tahiry Honko*, community-led mangrove conservation and restoration

Madagascar has experienced some of the highest rates of mangrove deforestation in recent decades, largely to supply food, building materials and cooking fuel for poor rural communities. The not-for-profit Blue Ventures has been deeply involved in efforts to restore mangroves, through a suite of activities that include not just reforestation, but also development of alternative sources of fuel and livelihoods to allow communities to transition to more sustainable use of their coastal ecosystems. In the south-west of Madagascar, the *Tahiry Honko* project (meaning ‘preserving mangroves’ in the language of the Vezo who live there), located in the Velondriake Locally Managed Marine Area (LMMA), involves conservation and reforestation of over 1,200 hectares of mangroves. Around 200 consultations and workshops have been held with the 10 villages since the first one in 2014, culminating in the certification of 1,371 tCO₂-e in June 2020. These credits are verified according to the Plan Vivo Standard.

To get to the milestone of certification, multiple steps needed to be completed. These steps included collection of the data needed to quantify carbon mitigation, and approval of several formal documents, including a Project Idea Note (in 2015) and Project Design Document (in 2019). All this effort takes money, and it can take time for the income received from selling the certificates to cover those expenses. Like many such projects, this has been possible in *Tahiry Honko* because of grants provided by other not-for-profit organisations and governments.



The local people are formally represented in this process by the Velondriake Association, which is comprised of individuals elected from 33 villages located within the LMMA (2 to 4 per village, depending on the size of the village). The association plays a variety of roles including helping local communities to demonstrate rights to the carbon, approving the benefit sharing arrangements and managing and disbursing the communities' share of financial benefits. Annual revenue from sale of the credits is primarily (80%) allocated to support continuation of activities on the ground that result in emissions reductions (such as forest patrols, mangrove reforestation, and establishment of alternative fuelwood plantations) and activities that aim to improve the lives of people in the communities (such as subsidised school fees for all village children within the project area or building schools where there are none). Of the remainder, 20% goes to the Government of Madagascar, to finance the activities related to the governance of the REDD+ which are ensured by the Ministry of Environment and Sustainable Development through the Bureau National des Changements Climatiques, et de la REDD+ (National Bureau of Climate Change, Carbon and REDD+).

CASE STUDY 2

Voluntary carbon markets : Mangrove restoration in Sumatra

Indonesia is home to almost a quarter of the world's mangroves but has also experienced high rates of mangrove deforestation and degradation. A mangrove restoration project on the island of Sumatra intends to reverse some of this loss, funded through use of impact investment in return for carbon credits. In this project, the Indonesian not-for-profit organisation Yagasu implements mangrove restoration with finance from the Livelihoods Carbon Fund, an impact investment fund backed by multiple companies who provide the initial finance to enable projects to start. The project aims to restore mangroves in an area where 70% of mangrove forest had been destroyed or degraded. In so doing, the project intends to sequester carbon in a way that also allows for local people to enhance their livelihoods, for example by combining mangrove restoration with aquaculture in a silvofishery.

Mangrove seedlings (mostly species from the genus *Rhizophora*, famed for its large roots which meet the trunk well above the soil surface) are grown in nurseries, and are then planted in the restoration areas, where they are monitored to ensure they are still alive. If not, they are replaced.

The project's achievements are accredited by Verra, and uses methods developed under the Verified Carbon Standard. By 2019, more than 5,000 hectares of mangroves had been restored, generating almost 300,000 tCO₂-e of tradable carbon credits (Verified Carbon Units) from carbon sequestered in the mangroves themselves, as well as in the soil underneath them. The local people, who have rights to most of the area being restored, have agreed that the carbon credits be allocated to the Livelihoods Carbon Fund, and in return receive grants and small loans to establish businesses that take advantage of the other opportunities that the mangroves provide, like fisheries and natural dyes made from various parts of the mangrove.



Investment enablers: bonds, trust funds and impact investment

Sometimes, traditional systems of payments and loans do not provide sufficient financial capital to support protection or restoration of ecosystems. In such situations, innovative use of other traditional types of finance instruments can help to pave the way for the necessary financial capital. We consider these to be *enablers*.

These enablers include bonds, trust funds and impact investment, which are distinct types of arrangements. *Bonds* are debt-based financial products commonly used to raise financial capital in the global capital markets, which are the largest source of finance (Figure 3). Bonds can be issued by a government, a multilateral organisation, a corporation, or a bank (the issuer) and are purchased by a wide variety of investors (the holders). The proceeds from the sale of a bond are used by the issuer to support a set of activities. Because the issuer incurs debt, they are akin to a borrower — bonds, like loans, must be repaid. Repayments have a fixed duration (called a term) and interest rate (called a coupon rate). Bonds can be freely bought and sold, which makes them attractive, especially if the issuer has a good credit rating. A bond can be a secured instrument, which means that the issuer provides some surety, such as guarantees or collateral in the form of assets. Such surety enhances the creditworthiness of the issuer, alongside performance measures such as a track record in generating cash returns.

Over the last two decades, different types of bonds (such as green bonds and climate bonds) have increasingly been used to raise financial capital to support activities from climate mitigation to environmental improvement. More recent formulations include sustainability bonds and social impact bonds, which are typically used to support activities that enhance specific environmental or social outcomes, respectively. These each target funding to a particular purpose and include clear verification processes to ensure that the bonds meet a defined set of criteria and minimum standards. The Green Bond Principles (GPB) and the Social Bond Principles (SBP), developed by the International Capital Market Association (ICMA) are the most internationally accepted and widely used guidelines.¹⁰ Most examples of bonds being used to finance nature-based solutions are sovereign-issued bonds to finance activities, that are ultimately

¹⁰ <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/June-2020/External-Review-GuidelinesJune-2020-090620.pdf>

are repaid with cash rather than making any repayments to investors in the form of carbon credits or other environmental outcomes. The International Finance Corporation (IFC) Forest Bond is an example of a bond for which returns can be paid in carbon credits. This bond was issued by the IFC (and listed on the London Stock Exchange), and investors had the option of receiving their bond interest payments in carbon credits rather than cash.

Blue bonds are a type of bond used to raise financial capital for the specific purpose of supporting actions that focus on improving the state of marine ecosystems or the way they are used (Case Study 3). Examples are improved fishery management, infrastructure to improve water quality and actions to reduce pollution. The design of blue bonds should be aligned with existing good practice, while also responding to the increasingly comprehensive policy framework that a blue economy approach provides. The Sustainable Blue Economy Finance Principles¹¹ mentioned earlier in this paper emphasise good environmental, social and governance practices to help ensure that the investment supports desirable activities without perverse effects. These principles can be applied to develop blue bonds that generate financial capital to support appropriate projects, but these will need identified returns on investment and robust assessments of their outcomes. Robust metrics exist for blue carbon, and these can be integrated into blue bonds. The Water Infrastructure Criteria¹² under the Climate Bonds Initiative provides an example on how blue bonds can be integrated into a framework designed to support efforts to combat climate change.

Catastrophe bonds are a type of bond that is designed to transfer risks associated with natural disasters (like cyclones) to the capital market. Like other types of bonds, catastrophe bonds are sold to investors by an issuer (in this case, typically a bank or a reinsurance company). They differ from other types of bonds in several ways; most significantly, they are financial instruments that provide insurance to the issuers and a return to investors.¹³ The proceeds from catastrophe bonds are held in a 'special purpose vehicle' (a subsidiary company used to separate risk from a parent company) and are only paid to the issuer if a pre-defined event (such as a tropical cyclone) occurs. If the event does not occur,

11 <https://www.unepfi.org/blue-finance/the-principles/>

12 <https://www.climatebonds.net/files/files/Climate%20Bonds%20Water%20Infrastructure%20Criteria%20Introductory%20Brochure%20April%202018.pdf>

13 <http://www.refocuspartners.com/wp-content/uploads/2017/02/RE.bound-Program-Report-December-2015.pdf>

repayments are made to investors. These types of bonds have not yet been used to support coastal protection or restoration activities but could be developed so that funds from the sale of bonds are directed to activities that help coastal ecosystems recover from damage caused by extreme events.¹⁴ For example, a mangrove restoration project could be insured so that the occurrence of an event (say, a cyclone) which damages newly planted mangroves triggers payments to finance their replanting. While funds from the sale of a catastrophe bond are held in a special purpose vehicle, the pay-out (if the pre-defined event occurs) could be directed to activities that help coastal ecosystems recover from damage caused by extreme events.

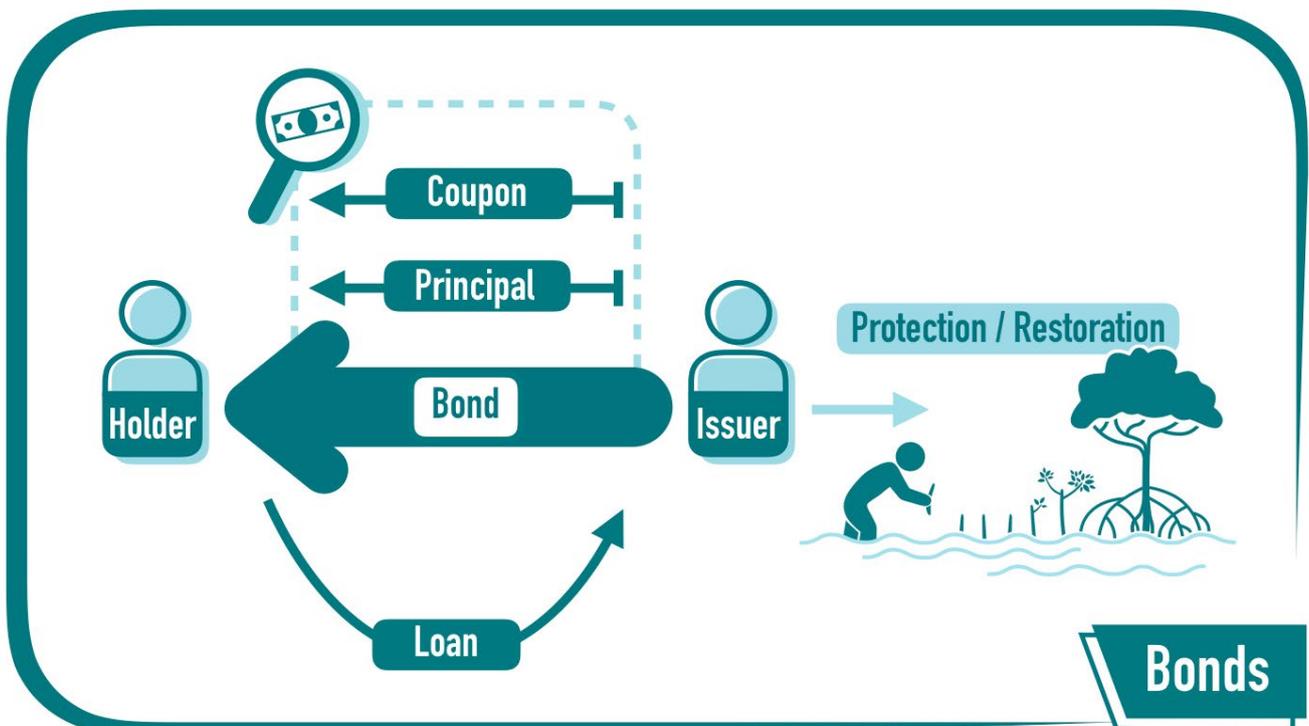


Figure 3: Bonds are debt-based financial products used to raise financial capital in the global capital markets, which are the largest source of finance. Bonds are purchased by a wide variety of investors and the proceeds from the sale are used by the issuer to support a set of activities. Bonds must be repaid, with interest (called a coupon rate).

14 <https://www.unepfi.org/publications/insurance-publications/protecting-our-world-heritage-insuring-a-sustainable-future/>

CASE STUDY 3

Bonds and trust funds : The Seychelles Blue Bond and SeyCCAT

The Indian Ocean island nation of Seychelles has been globally prominent in promoting sustainable use of the ocean, in particular through a Blue Economy framework. In 2015, the Government of Seychelles completed a US\$21.6 million debt restructure with the Paris Club of creditors which committed the Government of Seychelles to designate 30% (~400,000 km²) of its Exclusive Economic Zone (EEZ) as marine protected areas (MPAs) and to develop a marine spatial plan for its entire EEZ by 2020. The independent Seychelles Conservation and Climate Adaptation Trust (SeyCCAT) was established to administer the funds made available by the debt swap, and the repayments to creditors who provided a concessional loan to facilitate the debt swap. SeyCCAT also manages the financial capital, which include savings from repayments and grant funds, which include a revolving Blue Grants Fund and a Blue Endowment Fund, which are used to support the long-term management of the MPAs, as well as actions that improve the sustainability of fisheries, or that contribute substantially to marine protection and adaptation to climate change.

SeyCCAT is independent from the government (the governing board includes representatives from government, the private sector and civil society), and has a strong focus on transparency and accountability procedures. It is also able to generate financial capital from a variety of sources, enhancing its ability to support activities consistent with its mandate. This capability was critical in the decision to use SeyCCAT to manage the proceeds of the Seychelles Blue Bond grants.

In 2018, The Government of Seychelles announced the issuance of a sovereign blue bond worth US\$15 million over 10 years. The Blue Bond transaction included a partial guarantee of US\$5 million from the World Bank, and a concessional loan of US\$5 million from the Global Environment Facility to make repayments affordable to the government. Blue Bonds were bought by three impact investors. The proceeds of the Blue Bond are disbursed through the Blue Grants Fund (BGF: US\$3 million disbursed through SeyCCAT) and the Blue Investment Fund (BIF: US\$12 million disbursed through the Development Bank of Seychelles). The BGF provides grants to support fisheries governance reform and development of more sustainable fisheries management. The BIF provides loans for the private sector, especially fishers and local small and medium enterprises, to support activities such as stock rebuilding, development of sustainable practices, improved value chains and small-scale aquaculture.

Since 2015 SeyCCAT has successfully issued three calls for proposals for conservation and climate adaptation and mitigation projects. The marine spatial plan for Seychelles' EEZ and the designation and management of 30% of the EEZ as MPAs were completed and gazetted in 2020. Implementation has not been without challenges, including maintaining momentum, capacity to develop and adopt new technologies, establishing effective knowledge management systems for monitoring and reporting, education and training of local workforce and small and medium enterprises to take advantage of opportunities, building a culture of transparency and accountability which is essential to maintain investment flows, as well as addressing policy coherence across government sectors.



Trust funds provide a direct mechanism to manage funds from a variety of sources, such as grants or levies (Figure 4). These are then disbursed to support actions that enhance environmental or social outcomes. They can be designed to last by investing the financial capital and using only the return on this investment (endowment fund), or to regularly disburse the financial capital until it reaches zero (sinking fund). Another approach is the revolving fund, in which the financial capital is regularly replenished or increased, for example through fees, taxes or levies collected by a government, and either disbursed or used as an endowment. Trust funds can be a suitable way to structure disbursement of payments received under PES arrangements. They have also been used to secure long-term funding by acting as a dedicated funding source for specific purposes, with the capital invested and only dividends spent (Bladon et al., 2014). Case Study 3 provides an example of how the potential of this approach has been harnessed in Seychelles, and Case Study 4 an example of a trust from Vanuatu.

The private sector can also invest through *impact investing*. This is a general term that encompasses various types of investment that share the characteristics of seeking both financial return alongside a social and/or environmental benefit.¹⁵ Impact investment might be direct (such as by providing financial capital directly to a business) or indirect, such as through an investment fund. Often, impact investment can provide initial, or *first-loss*, capital needed to get a business started. Impact investors vary widely and can include institutional investors and individuals. Some impact investment is *venture capital*, in which high-risk investments are made in the hope they will yield a high financial return, but there is a strong possibility that they might fail. Some might be so-called *angel* investors, who provide early-stage financial capital, but might want some ownership stake in return.

¹⁵ <https://thegiin.org>

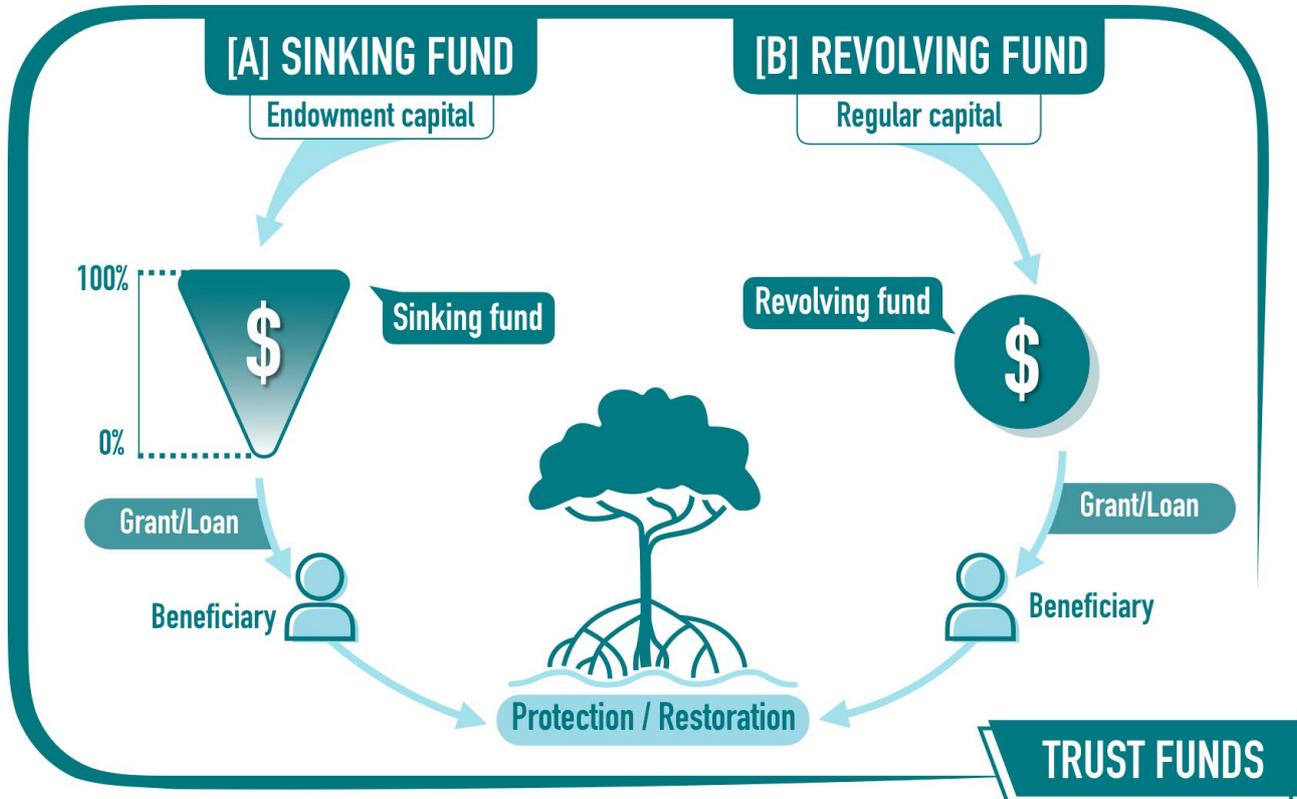


Figure 4: Trust funds are a mechanism to manage funds from a variety of sources, such as grants or levies. These are then disbursed to support actions that enhance environmental or social outcomes. They vary in design; some common types involve those designed to regularly disburse the financial capital until it reaches zero (sinking fund), or regularly top up financial capital (revolving fund).

CASE STUDY 4

Trust funds : North Efate Conservation Trust, Vanuatu

The North Efate Conservation Trust (NECT) in Vanuatu was established as a pilot project of RESCCUE (Restoration of ecosystem services and adaptation to climate change) a project which aimed to assist Pacific Island countries and territories to adapt to and withstand climate change through Integrated Coastal Zone Management (ICZM). The project was funded from 2014-2019 by the Agence Française de Développement (AFD) and the Fonds Français pour l'Environnement Mondial (FFEM).

NECT is a partnership between local community associations, the provincial tourism authority, and the not-for-profit charity Live and Learn Vanuatu to fund activities such as coral restoration, waste management or enhancement of local protected areas. The source of funding was a voluntary 10% conservation levy on accommodation facilities and tourism activities, generating an estimated €9,000 annually. RESCCUE provided €90,000 in seed funding to be used over five years to start collecting the tourism levy and to support the management of the fund while conducting demonstration activities to show tourists how their contribution was spent.

Some of the challenges and lessons learnt from the establishment and operations of NECT include the need to reflect the local context of a subsistence economy with low population density, limited funding sources, and land tenure issues. Transaction costs can be high if the aim is to build and up technical expertise and partnerships to achieve local ownership.



Insurance and risk transfer

In some situations, ecosystems can be repaired or restored with effective post-disaster responses, backed by financing through risk transfer mechanisms (Kousky and Light, 2019). These mechanisms include various types of insurance, several of which are being explored as ways to finance protection and restoration of coastal ecosystems, although applications to blue forests are limited so far. This type of financing (effectively arranging finance in advance of a disruption) is not only a more cost-effective way to manage risk, but it also builds resilience to disruptions, providing greater certainty to investors. When it is arranged to provide rapid payments following damage or loss, it can also reduce long-term impacts.

At its most basic, insurance is a way to provide financial protection in the event of damage or loss to an asset (such as property). It transfers risk from the insured to the insurer. The insurer assesses the extent of risk by quantifying the probability of an insurance claim; this in turn determines the price of the premium (the money paid for the insurance). The probability of a claim is quantified through analysis of historical and modelling probabilities to estimate the likelihood and severity of events that would cause damage or loss. Insurers are able to accommodate the financial risk of receiving expensive claims through 'risk pools', which is a way of aggregating insurance policies and the premiums they generate. It is an effective financial mechanism to protect assets in the case of low-frequency and high-severity events that might otherwise be prohibitively expensive for individuals to absorb.

Insurance as a mechanism to fund protection and restoration of blue forests and meadows, and coastal ecosystems more generally, is a recent innovation. Potential mechanisms involve either insuring ecosystems directly (considering them as assets) or indirectly by providing incentives for their protection and restoration (for example through insuring the incomes of people who have the responsibility for protecting or restoring the ecosystem). Insurance could also reduce the risk of investments in protection and restoration by insuring against loss of the ecosystems that those investments support, and provide funds to restore or repair ecosystems in the event of damage. Insurance can also provide a way to finance such restoration rapidly (Niehörster and Murnane, 2018).

There are two broad types of insurance: indemnity and parametric insurance (Figure 5). Indemnity insurance is the most common, and probably familiar to most people: it follows a form in which the insurer agrees to pay an amount to cover the loss of (or damage to) an asset. In return the insurer receives a regular payment (called a premium). In the event of loss or damage, the insurer





reimburses the insured party for the actual losses (or part of those losses) incurred. The size of the insurance payment is determined by the size of the actual loss. Examples of indemnity insurance relevant to ecosystem protection and restoration might include insurance of some property of the ecosystem (for example, carbon in the case of projects established to provide carbon sequestration), or third-party liability insurance (for example, to restore a wetland following an oil spill). Restoration projects themselves might be able to use these mechanisms to manage risks; for example, a mangrove restoration project could be insured so that an extreme event (say, a cyclone) damages the restored mangroves and an insurance payment is triggered that can then finance replanting. These insurance mechanisms remain little explored in applications to blue forests.

The structure of parametric insurance is similar, but instead of paying an amount to cover the actual damage, the payment is made if a specific measurement for an agreed parameter (such as windspeed or rainfall) is reached, irrespective of the actual damage or losses. In parametric insurance the basis risk (the risk that the actual losses will exceed the amount insured, or that a payment is made when there is little or no damage) tends to be greater. However, parametric insurance allows for payments to be made rapidly following a damaging event, because there is no need to wait for the damages to be assessed — the payment is made according to a predefined schedule, based on the agreed parameter (called a ‘trigger’).

Parametric insurance has been used in an innovative way to provide insurance for coral reefs in Quintana Roo, Mexico. Here, money from multiple sources including fees from property owners that receive benefit from the reef (such as hotels) are placed in a trust fund, which then purchases the insurance. If wind speed in a defined area exceeds 100 knots, the insurance claim is triggered, and a payout is disbursed to the trust fund to help finance repair of the coral reef; the amount paid is determined by the windspeed. This innovative application of insurance was based on extensive research and engagement with multiple stakeholders over a long period. This type of arrangement could also be applied successfully to mangroves, which provide flood protection benefits that significantly outweigh the cost of mangrove rehabilitation (Beck et al., 2020), provided there are assets already being protected by the mangroves that could justify the cost of the insurance. A trust fund approach might be relevant if there are multiple small participants, but insurance might be attractive to large institutions (such as governments) in situations where they are responsible for large-scale mangrove restoration. Parametric and indemnity insurance can also be used together: for example, parametric insurance might be suitable for initial (and rapid) finance, followed by indemnity insurance to assess losses and provide the funds over a longer term (Beck et al., 2020).

Resilience bonds are another type of risk transfer instrument that might facilitate investment in protecting and restoring coastal ecosystems. These are an innovation still in development: although a bond, they work in a way that is more similar to parametric insurance than to traditional types of bonds (see the earlier section on enablers) and extend on the concept of catastrophe bonds. Essentially, they operate by allowing a bond issuer to raise capital to finance activities designed to enhance resilience. They also have a risk transfer component – if a ‘trigger’ event (like that used in parametric insurance) occurs, the bond repayments are suspended or forgiven. In this event, the bond purchaser receives a lower coupon payment than they would if the event had not occurred. If an action is implemented that reduces the probability of that event occurring, then insurance premiums might also decrease. Resilience bonds are based on estimating the likely reduction in risk, and then using the money saved (i.e. the rebate) to fund the activity. They have not yet been used to fund protection or restoration of coastal ecosystems but seem an appropriate instrument to explore for this purpose. They appear well-suited to natural capital investments, for example by providing capital for restoration efforts that simultaneously protect the investment from extreme events.

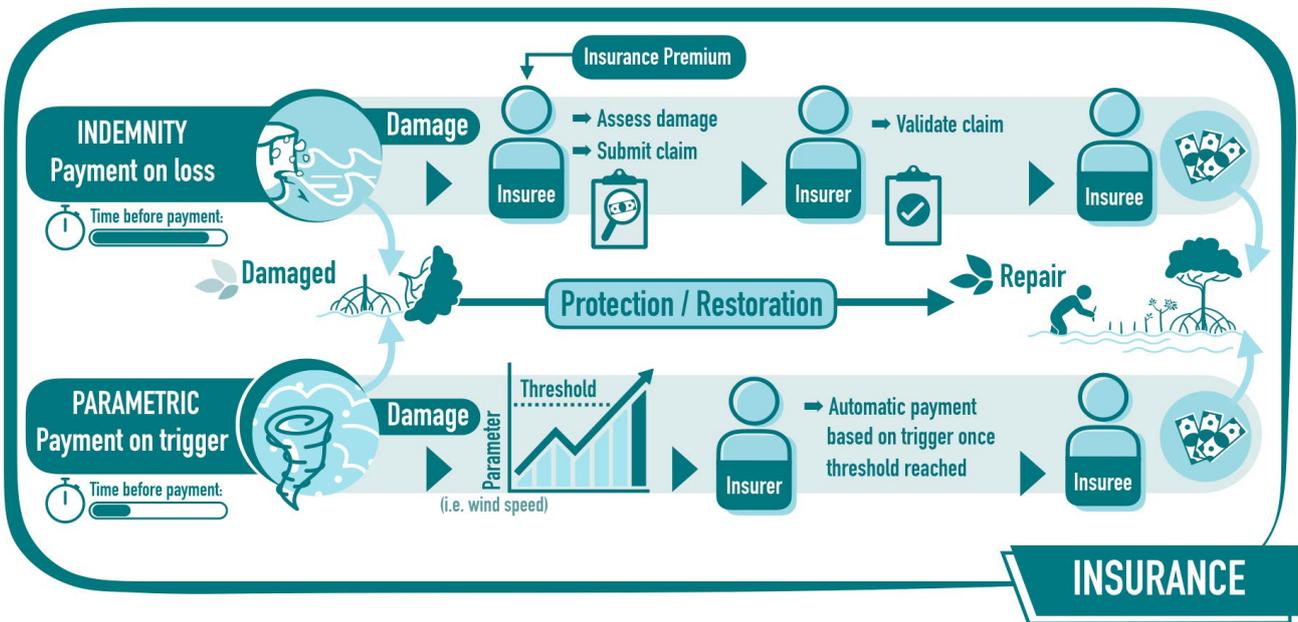


Figure 5: Insurance is a way to provide financial protection in the event of damage or loss to an asset (such as property). There are two broad types of insurance: indemnity and parametric insurance. In indemnity insurance the insurer agrees to pay an amount to cover the loss of (or damage to) an asset. In return the insurer receives a regular payment (called a premium). In parametric insurance, a payment is made if a specific measurement for an agreed parameter (such as windspeed or rainfall) is reached, irrespective of the actual damage or losses.

Mixing it up: blended finance and public-private partnerships

As several examples in this report have shown, traditional finance is sometimes not sufficient to attract investment from the private sector for ideas that are new or still developing, perhaps because they do not yet provide an adequate return on investment, or perhaps because there is too much uncertainty or risk. In these situations, *blended finance* can be very helpful. Blended finance is a model in which funds from governments, multilateral development banks or philanthropic elements within civil society (such as not-for-profit organisations or high net worth individuals) are used in a way that removes uncertainty or risk so that investment by the private sector is made easier.¹⁶ It is an approach that allows these different types of capital to invest alongside each other, so that each achieves its own objectives. This can be done in a variety of ways, such as through grants, concessional finance like low-interest loans, or a price guarantee. Other approaches can involve using public or philanthropic funds to cover the costs of designing and planning projects, or doing readiness studies. Blended finance solutions can help reduce the risk to private investors and so make investment more attractive. Blended finance often involves substantial financial innovation, as new methods are developed to solve difficult problems.

Some blended finance arrangements might also be characterised as *public-private partnerships* (PPP) – typically, an approach in which the private sector finance is used to deliver public services.¹⁷ However, not all PPP arrangements are blended finance, which can lead to confusion. For example, a contract between a government for a company to provide a service in return for fees might be a PPP but is not blended finance.

Several examples in this report have shown the value of blended finance. For example, the Seychelles blue bonds were enabled by concessional loans and guarantees. At a smaller scale, mangrove protection and restoration programs in Kenya and Madagascar have been enabled by philanthropic grants.

¹⁶ http://s3.amazonaws.com/aws-bsdc/BFT_BetterFinance_final_01192018.pdf

¹⁷ <https://www.oecd.org/governance/budgeting/PPP-Recommendation.pdf>

Blended finance is becoming commonly used to finance activities that address climate change, but most have focussed on renewable energy, and relatively few have harnessed nature-based solutions.¹⁸

However, investment in nature-based solutions through blended finance is growing¹⁹, and it holds considerable promise for providing a way to generate finance for protection and restoration of blue carbon ecosystems.

Multilateral development banks (MDB: a type of financial institution which focuses on providing financial assistance to achieve a broad set of societal outcomes) play a key role in delivering these types of enabling finance. One of these, the Asian Development Bank (ADB) recently launched the Oceans Financing Initiative²⁰, which aims to combine ADB and donor funds with technical assistance to develop innovative financial instruments to create investment opportunities that are attractive to a range of sources, including the private sector. In situations where MDB and Development Finance Institutions (DFI: a type of financial institution, usually owned by national government, which focuses on investments in developing countries) manage trust funds (such as the World Bank's trust fund PROBLUE²¹), they can use the funds to support project preparation – they are therefore a promising mechanism to enable projects that aim to protect or restore blue carbon ecosystems. The Readiness and Preparatory Support Programme of the Green Climate Fund²² supports developing countries to strengthen the governance and capacity of their institutions and implement frameworks towards a transformational long-term climate action agenda.



18 https://assets.ctfassets.net/4cgqlwde6qy0/58T9bhxExlNh2RilxWxSNe/ba56fa36c81349640179779ddd68cc99/Convergence_-_The_State_of_Blended_Finance_2019.pdf

19 <https://earthsecurity.org/report/the-blended-finance-playbook-for-nature-based-solutions/>

20 <https://www.adb.org/sites/default/files/related/145041/Oceans%20Financing%20Initiative.pdf>

21 <https://www.worldbank.org/en/programs/problue/overview>

22 <https://www.greenclimate.fund/readiness>



Some other relevant technical assistance and donor support facilities include the Blue Action Fund²³ supported by Germany and Sweden, and the Blue Natural Capital Financing Facility (BNCFF)²⁴ launched by IUCN. The primary purpose of BNCFF is to support the development of sound, investable projects with clear ecosystem service benefits based on multiple income streams and appropriate risk-return profiles. BNCFF is providing finance for a variety of projects, including restorative aquaculture, mangrove and seagrass protection for carbon credits.²⁵

Opportunities arise and go often, and it can be difficult for individuals to keep track of them. An online database that tracks opportunities for the Indian Ocean as they arise, perhaps like that provided by the Commonwealth Blue Charter Ocean Funders Database²⁶, would undoubtedly be useful.



²³ <https://www.blueactionfund.org>

²⁴ <https://bluenaturalcapital.org>

²⁵ <https://bluenaturalcapital.org/supported-projects/>

²⁶ <https://oceanfund-bluecharter.thecommonwealth.org>



MOVING FORWARD

From challenge to opportunity

Private sector finance has great potential for generating the financial capital needed to support the protection and restoration of blue forests and meadows, but its use for this purpose has been limited so far. The focus of blue economy investments has been more typically on renewable energy infrastructure, waste management and shipping. Blue forest finance is distinct, paving the way for financial innovation, and potentially offering an attractive option for investors seeking something different (Steven et al., 2019).

As the preceding sections have outlined, there are multiple options, but not every option is applicable in every circumstance; decisions about which finance mechanisms are most appropriate need to be matched to the context (Table 1). Small restoration activities (say, tens to hundreds of hectares) might be well-suited to market-based mechanisms, such as carbon markets or other PES (perhaps with impact investment to help with initial finance to reduce risk). Larger endeavours (hundreds to thousands of hectares) might require a more complex arrangement, perhaps including elements from one or more of blue bonds, carbon markets and risk transfer mechanisms like parametric insurance or catastrophe bonds. These might also be applicable when coupled with mechanisms to facilitate aggregation of multiple small projects into a larger portfolio that is more attractive to investors. Efforts that encompass a national or even transboundary scale will require significant investment of a kind few instruments can accommodate, although blue bonds are one candidate. In each case, there are some challenges to overcome, and countries might need to develop policies — or even legislation — to help overcome these.



Table 1: Different financial instruments are appropriate for different situations. When considering how they might be used to support protection and restoration of blue forests, the size of a project is one consideration.

Spatial extent	Potential mechanisms	Notes
Local (10-100 ha)	PES, carbon markets, insurance (Case Study 1 and Case Study 2)	Impact investment and/or blended finance might help provide initial finance and reduce risk to investors
Regional (100-1,000 ha)	Blue bonds, insurance, carbon markets, catastrophe bonds	Pooling schemes and/or trust funds might help manage scalability; blended finance might help provide initial finance and reduce risk to investors
National to international (1000-10,000 ha)	Blue bonds (Case Study 3)	Multilateral development institutions can help with readiness funds to improve governance and capacity; PPP might help achieve the necessary scale

A fundamental challenge to attracting private sector investment for protection and restoration of blue forests is that it is not always easy to demonstrate returns to prospective investors. However, investors are increasingly keen to align their investments with activities that support — or that at least consistent with — sustainable development, nature positive and climate change goals. The growing interest in green and climate bonds highlights these trends, although they remain a minor proportion of global capital markets. This provides an opportunity, but investors might still need better evidence for the return they could receive on their investment. In some cases, investment might seek a return in a form other than money, for example in the form of carbon credits. Demonstration projects and innovative finance mechanisms are needed to establish the proof that concepts work and show the returns that can be generated. Evidence is gradually accumulating that mechanisms like blue bonds and blue carbon markets can work if the price of carbon is sufficient (as the examples in the case studies show), but application of insurance and PES remains very limited. Project-scale demonstrations that provide the evidence





of their potential will help give investors confidence, as well as provide opportunities to learn and improve. Such demonstration projects seem very well suited to blended finance approaches in which public or philanthropic funds are used to underwrite or support key phases (through grants, or perhaps concessional loans); this would allow initial financial returns to go to private investors, providing the evidence needed. Using public or donor funds to support readiness programs — such as building local capacity in blue forest protection and restoration — might also be suitable. In some situations, it will be desirable to move from blended finance to activities supported by private sector finance alone; this will involve clear plans that include a focus on providing the evidence that investors need, while adhering to principles of equity.

Another challenge is to minimise risks to investors. Here, there are several options. As discussed earlier, blended finance can help reduce risks. Another way of reducing risks to individual investors is use of pooling schemes, in which funds from multiple investors are aggregated, so that each is exposed to less risk (conversely, the returns are then also shared). Pooling funds in this way can also address the issue of scalability and longevity (i.e. how to make sure that blue forest protection and restoration covers a large enough area, and has enough resources to last for long periods), such as in the Quintana Roo coral reef insurance example. Trust funds can provide a complementary solution, able to combine various sources of funding — including grants and investments — into financial capital that can be sustained over a long period. This might also work in reverse: that is, when a single investor seeks to invest at a scale greater than that which a single project can encompass. In this situation, an analogous implementation would be to aggregate projects to manage the investment and direct the returns to the investor.

Investment enablers, such as bonds and trusts, will likely be important mechanisms to support and strengthen blue forest finance. For example, blue bonds are an effective way to harness a mechanism that investors understand and value into protection and restoration. Individual governments might want to explore the option of their own bond scheme, but multilateral development institutions also offer a mechanism to raise bond finance at a regional level, enabling transboundary financing solutions and providing the necessary expertise.

Protection and restoration of blue forests can occur in many forms, for example integrating restoration with aquaculture (such as in Case Study 2) or built infrastructure (Thiele et al., 2020). For large-scale ‘blue’ infrastructure projects,

such as the construction of port facilities that integrate restoration of ecosystems, various forms of financial capital could be envisaged, including PPP models that incorporate blended finance. These projects can generate income over long periods, be environmentally and financially sustainable, and even generate government income through taxes.

Taking the first step

It is clear that protection and restoration of blue forests can confer multiple benefits, which outweigh the costs of the protection and restoration activities.²⁷ Blue forest finance is developing, from new methods applied in blue carbon markets to development of innovative bond and insurance products, but it is not yet available at the scale needed. So, what will it take to generate the scale of private sector investment that can facilitate protection and restoration of blue forests and meadows?

Governments can help by implementing a strong policy environment, including clear tenure and property rights (particularly in the context of sea level rise) as well as the associated carbon and ecosystem services that underpin market mechanisms. They can also develop policies that support high-integrity blue carbon market mechanisms and development of methods to be applied within these. Governments can also establish institutions with clear responsibilities and effective governance over these environments. A review of policy frameworks might be useful, perhaps using the National Blue Carbon Policy Assessment Framework (Herr et al., 2016). The position of blue forests at the margin of land and sea often creates a situation in which responsibilities are unclear — removing this ambiguity will help pave the way for effective governance. For example, the innovative institutional mechanisms of SeyCCAT (Case Study 3) helped improve transparency and accountability, important elements considered by prospective investors. Governments with good credit ratings are also well-placed to participate in blue bond schemes that might enable actions that encompass larger areas.

Multilateral development institutions and not-for-profit organisations can help by providing technical advice, as well as grant or concessional funds to develop institutions and local capacity and implement pilot projects. The Seychelles example illustrates the importance of project development training to securing a successful pipeline of projects which will meet bond requirements.



It is clear that protection and restoration of blue forests can confer multiple benefits, which outweigh the costs of the protection and restoration activities.

27 <https://gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/>

Mutual understanding between those who practice restoration and those who can finance it is critical. This works both ways; financiers need to know how restoration practitioners operate and what they can do, and restoration practitioners need a basic understanding of finance. This report aims to help achieve the latter, but knowledge transfer hubs to exchange information will also be critical (Thiele et al., 2020). Part of this knowledge exchange should include information and experience about the situations and context in which different mechanisms are appropriate — for example, carbon markets, bonds and insurance will each be appropriate in different situations (Table 1). Such hubs could also be incubators of innovation as different ideas get mixed and new problems arise which lend themselves to financial solutions. An online database that tracks opportunities as they arise would also be a valuable resource.

An extension to knowledge transfer is a mechanism to enable financiers and practitioners to meet, in the same way that a marketplace provides a venue for buyers and sellers to meet. Such mechanisms are already present in carbon markets, but a ‘blue forest finance’ marketplace would provide a venue for a wider suite of participants to meet. This might be more relevant for some types of financial instruments, such as PES or perhaps insurance. The scale of investment for mechanisms such as bonds — which are more typically in the order of millions of dollars — might render such a marketplace unnecessary for their purposes. For those, targeted use of funds to develop readiness (including of the policy and financial architecture needed to enable investment) are probably more relevant.

Ultimately, selecting the most appropriate finance mechanism (or combination of mechanisms) to fit the situation will depend on the nature and scale of the desired outcome and the policy, social and economic circumstances of the host country. Currently, carbon markets are the main instrument, although even those are still developing. Protection and restoration of blue forests and meadows brings multiple benefits and can in the right circumstances generate financial return for investors. With many thousands of hectares of blue forests and meadows to be protected and repaired the challenge is large, but this in turn creates significant opportunity for the private sector. Moving forward each of the actors, from governments to investors to restoration practitioners, have key roles to play. If we effectively and wisely harness the economic architecture available, adhering to a set of principles to help guide the development and implementation of existing and new instruments, we can take the opportunity and meet the challenge.

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