

From Links to Linkages

**Integrating renewable natural capital
into sovereign debt instruments**

November 2023





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Our use of Fibonacci sequence imagery is inspired by the association of this unique ratio with the maintenance of balance, and its appearance everywhere in nature- from the arrangement of leaves on a stem to atoms, uncurling ferns, hurricanes and celestial bodies.

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About this paper

Many of the biodiversity-rich countries in possession of the crucial renewable natural resources required to halt and reverse the vicious circle of global warming and nature depletion are gripped by debt distress, locked out of international debt markets, and are struggling to provide very basic services to their citizens. This paper explores options that these countries might have at their disposal to unlock their renewable natural capital's potential while improving their creditworthiness. In addition, the conditions needed for this to occur are explored. The main purpose of the paper is to ignite a wider ecosystem discussion on the pathways that would enable countries to capitalise on their renewable natural capital to enhance their creditworthiness and support their socio-economic development.



The Sustainability-linked Sovereign Debt Hub brings together actors from the entire spectrum of the sovereign sustainability-linked debt ecosystem. Founded to facilitate the growth of the performance-based sovereign debt market, the Hub supports initiatives that build nature and climate performance into models of sovereign financing. A high-level Advisory Board provides the Hub with strategic guidance and assistance.

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The views expressed in this paper are those of the authors alone and any potential errors/inaccuracies are their sole responsibility. Comments and queries about this report and the Sustainability-linked Sovereign Debt Hub can be addressed to:

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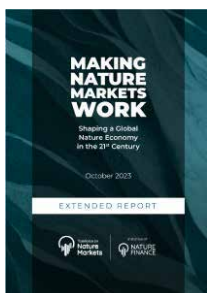
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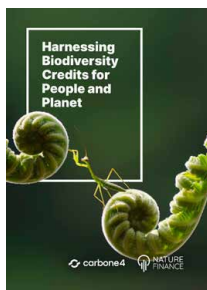
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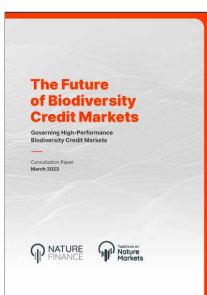
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Executive Summary

In the recent decades, the world has witnessed an accelerating growth of negative impacts on the natural environment and global society's economic health caused by intertwined climate and biodiversity crises. Both these crises, which are triggered and amplified by human activities and the inherent design flaws of the global financial markets, have gradually transitioned from a niche topic to one of the key focal points in international politics, diplomacy and the global economy.

Notwithstanding the attention the environmental crises are currently attracting globally, it seems that the Paris Agreement's targets¹ have now become virtually unattainable. Simultaneously, biodiversity loss is gathering pace and feeding into - and exacerbating - the climate crisis. Together, these are forming a downward spiral with potentially disastrous consequences for life on our planet.

Many of the biodiversity-rich countries in possession of the crucial renewable natural resources required to halt and reverse the vicious circle of global warming and nature depletion are gripped by debt distress, locked out of international debt markets. Consequently, these countries are struggling to provide basic services to their citizens. Ironically, these debt-distressed Low- and Middle-Income Countries (LMICs) are providing the world with invaluable positive externalities in the form of critical free ecosystem services. This comes at a time when creditors lack the willingness for timely and thorough debt relief measures and while concessional financing is becoming significantly constrained.

This paper explores some options that these countries might have at their disposal to unlock their renewable natural capital's potential while improving their creditworthiness, as well as the conditions that would need to be met for this to occur. The paper identifies new revenue streams from natural assets, which could be developed and integrated into countries' debt management frameworks and/or specific sovereign debt instruments in order to enhance their credit ratings and thereby development potential.

For renewable natural capital to play a decisive role in sovereign debt markets, it will be necessary to:

- Scale the jurisdictional carbon credit markets.
- Put a verifiable economic value on biodiversity, both through the scaling of the nascent biodiversity credit market and by enacting additional monetisable biodiversity claims on top of carbon credits.
- Provide a transparent and harmonised way of quantifying the state of nature and biodiversity over time.
- Scale the issuance of debt instruments that directly or indirectly incorporate proceeds of renewable natural capital. For example, by being used to collateralise debt or providing a financial flow to the creditors.
- Address the obstacles that hinder investors' readiness to invest in the complex debt instruments that integrate the proceeds of the nature assets.
- Address all stakeholders, including Indigenous Peoples and Local Communities (IPLCs) - (80% of the planet's remaining biodiversity is in IPLC's land).²

Only by developing debt instruments and an overarching international financial architecture that can successfully incorporate natural capital's ecosystem services can an inclusive and sustainable future be possible. Sovereign debt has an important role to play in this game-changing endeavour. Integration of the services and products originating from renewable natural capital would also provide a wide recognition across the markets of the vital role that nature plays in nations' economies and welfare.

The central purpose of this paper is not to prescribe solutions but to ignite a wider discussion on the pathways that would allow LMICs to capitalise on their renewable natural capital in a sustainable manner.³ The goal of this being to enhance these countries' creditworthiness, support their public finances and therefore also provide better public services and prosperity to citizens.

Introduction

The Problem

The precarious state of nature, climate and public finances in Low- and Middle-Income Countries

The last few decades have borne witness to a rising public awareness of two intertwined crises jeopardizing the very existence of humankind. Climate and biodiversity emergencies, both triggered and amplified by human activities and the inherent design flaws of global markets, have gradually taken the centre stage in the international political arena.

The climate crisis has been a focal point of the international diplomatic, environmental and policy efforts since the early 1990s. By contrast, biodiversity loss and its feedback loops to climate and socio-economic impacts on the most vulnerable countries, has only recently started to receive due attention. Some of the biodiversity-rich countries are being disproportionately affected by nature-loss and the underlying sixth mass extinction.⁴ These countries – with the great majority qualifying as Low- and Middle-Income Countries (LMICs) – harbour a significant portion of the world's biodiversity and are home to unique and endemic species.

They are facing unprecedented fiscal stress and diminished access to finance. According to the IMF, about 15 percent of low-income countries are already in debt distress and an additional 45 percent are at high risk of debt distress. Among emerging markets, about 25 percent are at high risk and facing default-like borrowing spreads.⁵

The precarious combination of high levels of public debt, restricted access to the international debt markets and the adverse effects of the twin climate and biodiversity crises on their economies pose both immediate and long-term risks to these countries, their citizens and investors.

This situation has the potential to further negatively affect biodiversity as communities turn to practices that deplete nature to support their livelihoods.⁶ This can turn into a perpetual vicious cycle of poverty: increasing natural capital depletion in turn further increases poverty and socio-economic and political instability.

The Solution

From the vicious cycle to the virtuous circle

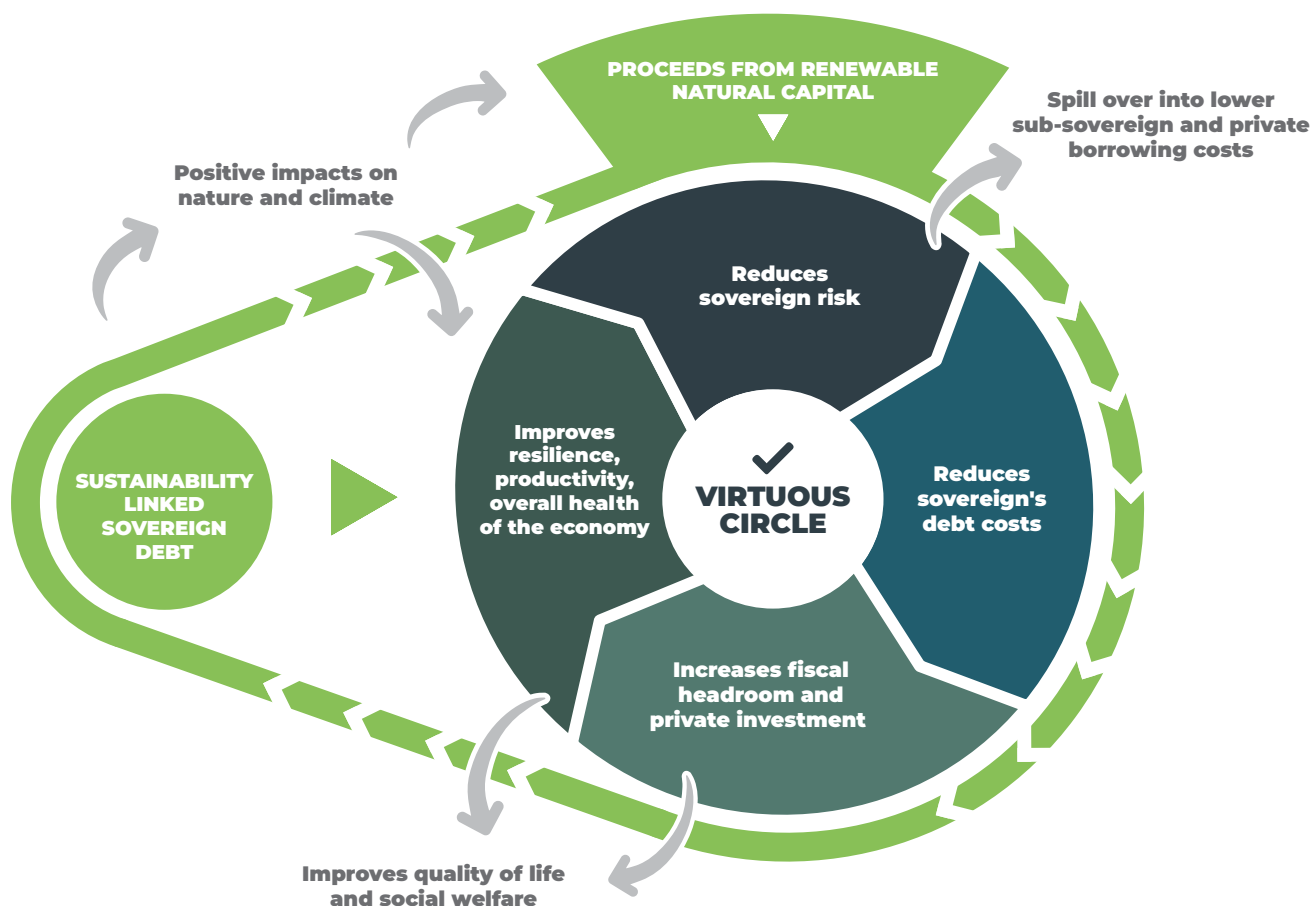
A new approach and innovative mechanism to integrate the value of ecosystem services into sovereign debt markets is urgently required to halt the destruction of global biodiversity and reverse the LMICs' downward debt spiral.

Sustainability KPI-linked sovereign financing solutions (e.g. sustainability-linked bonds and loans, debt-for-nature swaps, sustainability performance funds,⁷ adaptation bonds, etc.) aim to deliver a virtuous circle of increased sustainability-aligned investment, lowered debt service burdens, a reduced degree of climate and nature-loss risks and a reduced incidence of debt-related crises.

Sustainability-linked sovereign debt can:

- 1** Directly reward positive sustainability outcomes through reduced costs of capital.
- 2** Incentivise investments that reduce sovereign risks through improved resilience and economic productivity, lowering the cost of capital to sovereigns.
- 3** Support sustainable development outcomes, directly through growth and productivity effects and indirectly by creating fiscal space to support increased public spending.
- 4** Reduce the need for ex-post debt structuring by advancing smarter risk sharing between debtors and creditors.
- 5** Provide a tangible monetary incentive for the implementation of policies that address climate change and protect the environment.

Figure 1
Virtuous Circle of Sustainability KPI-Linked Sovereign Debt



Source: Sustainability-linked Sovereign Debt Hub⁸

However, despite firm indices that governments, investors, multilateral and bilateral development finance institutions are gradually warming up to the idea of using KPI-linked debt issuance as a climate and nature-loss risk mitigation tool (e.g., sustainability-linked bonds issuance from Chile and Uruguay, debt-for-nature swaps in Belize, Barbados and recently Ecuador and Gabon),⁹ more will need to be done on the revenue side of public finances. While successful climate and nature-loss risk mitigation undoubtedly contributes to a country's economic resilience, the sovereigns should also seek to generate tangible benefits of safeguarding natural assets in the form of new revenue streams.

With many LMICs incapable of accessing international debt markets due to their low creditworthiness and obstacles in the provision of sufficient credit enhancement capacities from third parties,¹⁰ these sovereign issuers could consider how to integrate the proceeds of their renewable natural capital, traded in hard currency in the international markets, into their debt management strategies. Countries could explore new public revenue streams from payments for ecosystem services (PES) and other renewable nature markets.

New revenue streams can be directly or indirectly embedded in the debt instruments to increase credit ratings, reduce debt servicing costs, substitute coupon interest payments, or as part of an outstanding debt refinancing and restructuring operation. This has the potential to create extra fiscal space and investment opportunities for sustainable growth. Different possible pathways of linking these revenue streams to sovereign debt are explored in Chapter 4.

The potential to monetise renewable natural capital

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The potential to monetise renewable natural capital

Nature provides diverse benefits to society in the form of ecosystem services and related goods. Examples include:

provisioning services

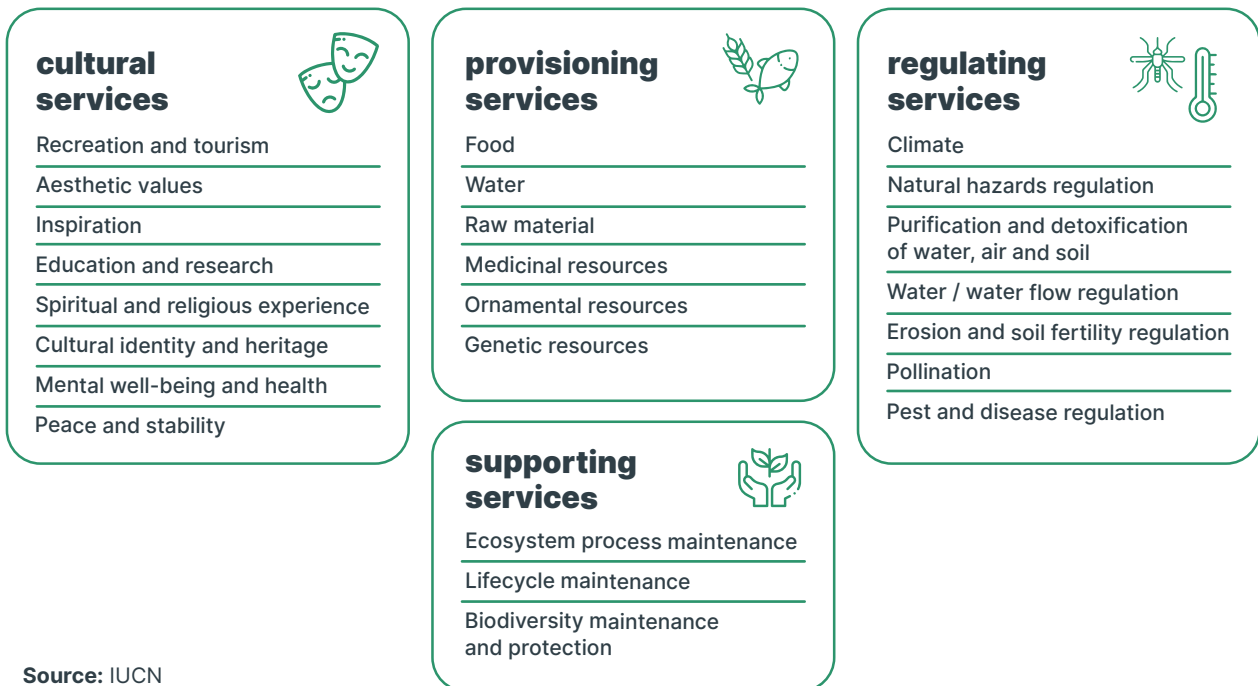
regulating services

cultural services

supporting services

Figure 2

Ecosystem services and related goods



This report focuses on the possibilities of generating public revenues directly through the monetisation of ecosystem services rather than indirectly through the collection of taxes from such activities. The emphasis is on the unit-based renewable nature markets, carbon and biodiversity credits respectively. This is due to their securitisation and scaling potentials and to the ways in which they could be linked to the sovereign debt instruments.

Nevertheless, the report also briefly addresses other potential revenue streams from natural assets. The intention is to initiate a broader debate on linking diverse ecosystem services to the sovereign debt markets and specific debt instruments.

Scaling carbon credit markets

Carbon credits are one of the essential tools to mobilise capital towards mitigating climate change. Two main types of carbon credit markets exist: compliance and voluntary. There are now thirty compliance carbon markets operating around the world, in which entities must purchase or trade allowances for the emissions they produce. Together, in 2021, these markets – which cover close to a fifth of global greenhouse gas (GHG) emissions¹¹ – have surpassed a value of US\$ 850 billion.¹²

Voluntary carbon credits, on the other hand, present only a minor share of overall carbon markets: in 2021, the market value for voluntary carbon market (VCM) transactions reached approximately US\$ 2 billion.¹³ The size of the market would need to be drastically scaled if it were to play a meaningful role in sovereign debt issuance, refinancing and restructuring. Instead, the market has been facing strong headwinds due to growing criticism over its credibility (see Box 1).

Box 1 | Recent controversies over VCM

Lately, voluntary REDD+ carbon credits¹⁴ have come under criticism over their lack of transparency and quality. Specifically, the investigation undertaken by a consortium of the international press¹⁵ made serious accusations against one of the leading certifiers of voluntary carbon credits. The authors claimed that 90% of Verra certified rainforest offset credits were “likely to be phantom credits and do not represent genuine carbon reductions”.¹⁶

Verra¹⁷ and a number of other organizations (e.g., Sylvera,¹⁸ Everland¹⁹) pointed out the inadequacies in the scientific research supporting the above claims and presented their own research showing significantly smaller percentages of low quality carbon credits (e.g., Sylvera rated only 25% of the REDD+ projects to be of very low quality and over 30% being of high quality).²⁰ Despite this, the VCM’s reputation – which had already seen prior growing skepticism (less than 20% of 137 companies surveyed by the World Economic Forum and Bain&Co. planned to buy carbon credits stating concerns over their quality, complexity of standards and reputational risk)²¹ – got tarnished.

Notwithstanding the current deficiencies of the VCM, there might be a couple of catalytic factors which could unlock its potential in the LMICs in the forthcoming years:

Article 6

The Glasgow COP26 meeting in 2021 reached an agreement on Article 6, which would facilitate the creation of a rule book for global trading of sovereign credits (i.e., those coordinated at a national level, rather than being exclusively project based).

Jurisdictional REDD+ framework

With a growing awareness that nature-based solutions (NbS) can be used by countries to meet their Nationally Determined Contributions (NDCs) under the Paris Agreement, developing countries are driving the market towards a jurisdictional REDD+ approach. This approach expands the scope of REDD+ beyond individual projects or specific areas. By emphasizing a broader, jurisdiction-wide approach (either sovereign or sub-sovereign) an improved layer of transparency is introduced.

In other words, the existing bifurcation of the compliance and voluntary markets could now be set on a path to convergence. Through enabling the voluntary purchase of what is in effect a compliance grade asset tackling climate change, sovereign carbon will encourage a wider range of market participants to empower and finance progress towards the Paris Agreement net-zero targets.²² The Paris Agreement expects all participating countries to track their national greenhouse gas emissions and commit to targets. Countries set mitigation and adaptation national goals (NDCs) and establish plans to achieve them. Under this scenario, developing countries have become much more interested in using all available options to meet their NDCs. This includes emissions reductions from existing and future individual REDD+ carbon projects. For this reason, some host countries are designing ways to integrate these into a broader jurisdictional program.²³

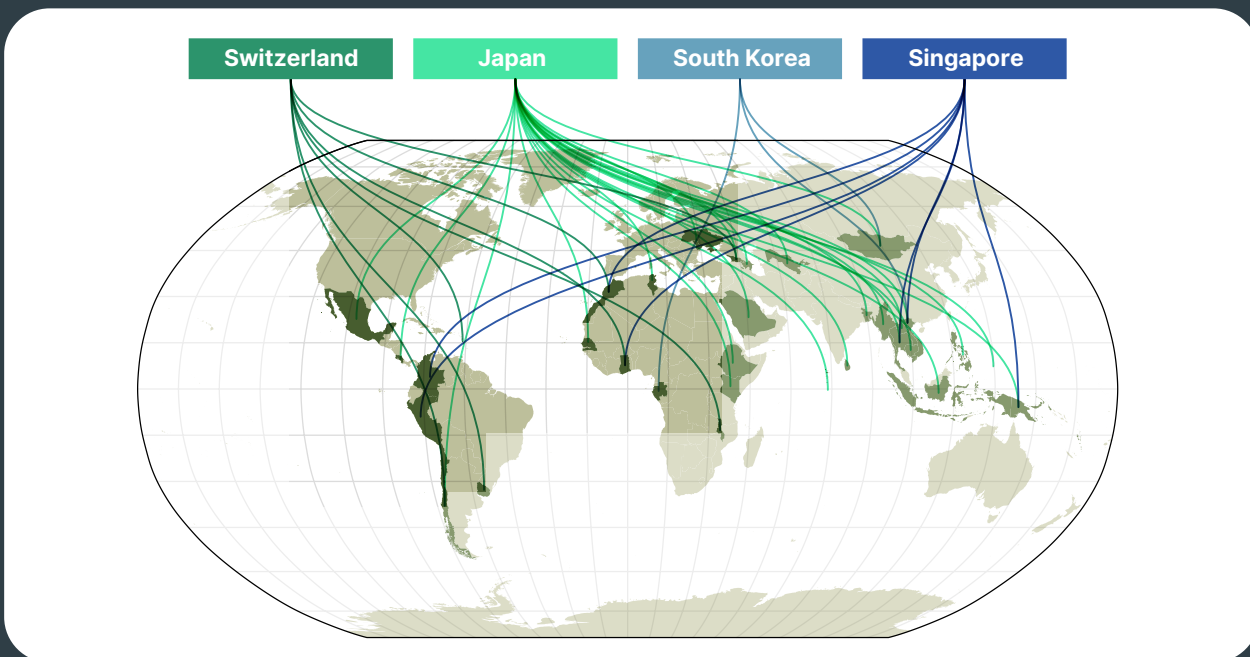
Box 2 | Article 6 of the Paris Agreement²⁴

The Paris Agreement established Article 6, which enables countries to collaborate in achieving their Nationally Determined Contributions (NDCs) by trading mitigation outcomes while avoiding double counting of emission reductions through the application of corresponding adjustments. Article 6 offers countries a way to invest in actions outside their borders and raise global ambition to limit temperature rise to 1.5 degree C. They can trade Article 6 units bilaterally or multilaterally.

Article 6.2

Article 6.2 enables a host country that is on track to exceed its NDC target to trade units to obtain investments, support for capacity building and access to technologies not available through domestic resources. The buyer country purchases these units (Article 6.2 units), known as Internationally Transferred Mitigation Outcomes (ITMOs), to address any gaps in meeting its own climate goals. While several Article 6.2 pilots have been signed, no bilateral trades have been completed yet.

Figure 3
Examples of Article 6.2 pilots



Buyer country	Host country
Switzerland	Chile, Ghana, Dominica, Georgia, Malawi, Morocco, Peru, Senegal, Thailand, Ukraine, Uruguay, Vanuatu
Japan	Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Vietnam, Laos, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, Thailand, Philippines, Senegal, Tunisia, Azerbaijan, Moldova, Georgia, Sri Lanka, Uzbekistan, Papua New Guinea
South Korea	Mongolia, Vietnam, Gabon
Singapore	Colombia, Ghana, Morocco, Peru, Papua New Guinea, Thailand, Vietnam

Source: TNC

Cooperation between countries is expected to take different forms: project-based units generated by private developers, jurisdictional units generated by governments, and international linking of emissions trading systems (ETS).

Article 6.4

Countries will also be able to trade units approved by a centralized mechanism. Article 6.4 trades are supervised by a United Nations (UN) body, which is similar to UN's Clean Development Mechanism (CDM) of the Kyoto Protocol.

Article 6.4 remains a work in progress with a remaining lack of clarity around the methodologies that will be approved by its Supervisory Board.

Article 6.8

Countries may decide to support, either financially or technically, other countries without any expectation of trading carbon units. This is the so-called "non-market approach."

Article 6.8 is less defined and there is currently not much clarity on how the mechanism will work.

Jurisdictional REDD+ also offers new opportunities for countries that have not previously been able to access climate finance through REDD+. High forest coverage, low deforestation (HFLD) countries (e.g., Gabon and Guyana) have very high forest cover due to historically low rates of deforestation. With low deforestation baselines, these countries have been facing serious difficulties in achieving notable additionality to justify the issuance of REDD+ credits. For this reason, some jurisdictional REDD+ standards (see Figure 4) include separate methodologies for issuing HFLD credits that do not rely on deforestation baselines to calculate the permitted issuance.²⁵

Figure 4
Comparison of carbon credit certification schemes

					
Project Type	Project REDD+	✓	✗	✗	✗
	Nested REDD+	✓	✓	✓	✗
	JREDD+	✓	✓	✓	✓
	HFLD	✗	✓	✓	✓
Market figures	Number of projects/ programs	> 1,800 projects	15 programs	15 programs	5 programs
	Total credits to date (MtCO ₂ e)	> 900	33	2.6	9
	JREDD+ credits to date	0	33	2.6	9
Acceptance	ICROA endorsed	✓	✓ conditional	✗	✗
	CORSIA eligible	✓ only some methodologies	✓	✓ Partially approved	✗ Rejected twice

Source: Sylvera

In addition to terrestrial nature-based solutions, REDD+ also covers nature-based solutions in marine and coastal activities (e.g., mangroves, sea grasses, salt marshes). It therefore also offers a platform for the development of blue carbon. Nevertheless, its relatively small size calls for an agreement on standards and guidelines to provide high-quality REDD+ blue carbon and sufficient scaling of supply and demand.²⁶

Sovereign carbon credits offer an opportunity for countries to establish better control over the proceeds of their natural capital. This can allow for a positive impact on their public finances, either directly as budget revenues or through the enabling of cheaper borrowing, if used for collateralisation. Because the programmes are region- or nation-wide, and overseen by the government, jurisdictional approaches directly incentivize using tools of politics, policy and regulation to tackle forest emissions. This goes above and beyond what is feasible for project-based REDD+.²⁷ For example, Guyana mapped its path to sustainable development and growth in its Low Carbon Development Strategy framework launched in 2009. This eventually led to the first issuance of jurisdictional REDD+ carbon credits in 2022.

As this policy-based approach befits the nature of the ICMA Sustainability-linked Bond Principles (SLBPs), jurisdictional REDD+ credits and the structures of sovereign and sub-sovereign SLBs appear to be essentially complementary. This is due to sovereign sustainability-linked bonds' KPIs being required to be tied to the underlying governments' policies.

The ongoing discussions on the Forest and Land Use Investment Packages (FLIPs)²⁸ and Positive Conservation Partnerships (PCPs)²⁹ will probably also shed additional light on the role that REDD+ sovereign carbon credits can have in monetizing the natural capital of the sovereigns in question.

If jurisdictional REDD+ credit carbons become eligible for the major compliance markets, that could present a significant boon to the countries with abundance of high-carbon, biodiversity-rich ecosystems. These countries might also want to explore the possibilities of creating their own domestic or wider regional compliance markets, which incorporate nature-based solutions carbon credits.

Box 3 | The cases of Gabon, Guyana and Suriname

The case of Gabon

In 2022, Gabon announced its intention to issue 90 million credits through the REDD+ framework approach. This would represent 20 percent of all credits ever issued in the voluntary credit markets.³⁰ Contrary to many other tropical biodiversity-rich countries, Gabon had managed to avoid major deforestation in the last decades. An issuance of voluntary carbon credits would reward the efforts of a sovereign government's past good practices in safeguarding its natural assets. If successful, it would demonstrate that countries' previous efforts to avoid nature destruction could in turn eventually be monetized. However, after the initial attention, questions were raised about the appropriateness of the REDD+ result units (RRU) for the offsetting purposes.

This is because the UNFCCC REDD+ framework had been primarily designed for countries to access result-based payments through the Forest Carbon Partnership Facility (FCPF) Carbon Fund, Green Climate Fund, Central African Forest Initiatives (CAFI) or bilateral government agreements. Consequently, Gabon has to date struggled to sell its RRU on the voluntary carbon markets.

The Government of Gabon is planning to distribute the proceeds from their carbon sale as follows:³¹

- Reinvesting back into the forests (10%)
- Investing in health, education, and climate infrastructure (25%)
- Investing in future generations (25%)
- Debt service (25%)
- Rural development (15%)

The case of Guyana

Guyana has taken a different approach compared to Gabon. In December 2022, it became the first country to receive TREES jurisdictional REDD+ carbon credits for the voluntary and compliance markets accredited by the Architecture for REDD+ Transactions (ART).³² Guyana's 33.47 million TREES credits were eligible for use by airlines for compliance with the International Civil Aviation Organization's global emission reduction program CORSIA, as well as for use towards voluntary corporate climate commitments. Guyana's TREES credits were also the first market-ready credits issued to a jurisdiction classified as "High Forest, Low Deforestation" (HFLD). The HFLD crediting approach in TREES recognizes that HFLD jurisdictions must continue to aggressively protect forests to avoid deforestation and degradation, and that carbon market finance can be a powerful incentive to help achieve this. All HFLD credits are tagged as such on ART's public registry.³³

US Hess Corporation entered a deal with Guyana to purchase 37.5 million of current and future issuances of REDD+ jurisdictional credits in the value of US\$ 750 million.³⁴ Indigenous communities will receive 15 percent of the proceeds of the transaction.³⁵ 85 percent of revenues is planned to be allocated to multi-community and national programs. This includes transformative investment in renewable energy, protection against climate change and biodiversity loss as well as investment in health and education, biodiversity research and expansion of protected areas. In addition, this supports job creation in agriculture and fisheries, tourism, manufacturing and services, as well as the improvement of the economic value of sustainable forestry and low-income mining.³⁶

The case of Surinam

In September 2023, Surinam announced it planned to become the first country to sell carbon credits under the Article 6 system. The first credits would be backed by Suriname's 2021 emissions reductions registered with REDD+, and would amount to 4.8 million metric tons of carbon dioxide equivalent.³⁷

Box 4 | Nested REDD+ credits: from REDD+ projects to jurisdictional programmes

It is reasonable to expect that diverse 'nested' REDD+ structures will develop across different countries embedding the features of project-based and jurisdictional approaches, for different reasons, from land ownership and the legacy of existing projects to optimization of public and private resources. Recognizing this, voluntary carbon standards (e.g., Verra), REDD+ financing initiatives (e.g., FCPF), and a number of country governments have developed plans to "nest" projects together with government REDD+ strategies or action plans.³⁸ Behind these will need to be specific benefit and costs sharing arrangements between the private entities and sovereigns. These range from encouraging project developers to operate within the program to offering non-monetary benefits directly for community participation.³⁹

The transition from the project-based to jurisdictional and nested REDD+ credits could - together with the implementation of Article 6 of the Paris agreement - present the catalyst to scale the VCM to a sufficient size. This would enable them to play a crucial role in countries' public finances. Hence, the revenues from natural capital could directly or indirectly benefit sovereigns' creditworthiness and support their economic development targets.

Biodiversity credits: development of a market

Biodiversity refers to the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems. This includes diversity within species, between species, and ecosystems.⁴⁰

The complexity of biodiversity elements and their interactions, as well as the biodiversity's location-related specifics, make it difficult to measure it. However, the quantification of biodiversity in some form or another is necessary not only to put a fair price on it - and monetise the ecosystem services it can provide - but also to create an overarching socio-economic system that can safeguard nature.

To unlock new investment in biodiversity, there is a need for unitisation of biodiversity outcomes. This needs to encompass the complexity of biodiversity in a way that is also pragmatic, verifiable and understandable for both investors and non-experts.⁴¹

The units, or biodiversity credits, are an emerging mechanism to quantify and track biodiversity conservation and preservation efforts and outcomes. A biodiversity credit represents a unit of biodiversity that is being restored or preserved.⁴² Biodiversity credit markets are increasingly recognized as one mechanism that can drive financing toward the protection, regeneration and stewardship of biodiversity, and close the biodiversity financing gap.⁴³

Target 19 of the Kunming-Montreal Global Biodiversity Framework (GBF), agreed upon in December 2022, explicitly refers to biodiversity credits as a potential mechanism for financial resource mobilisation.

A distinction needs to be emphasized between biodiversity credits and biodiversity offsets. The latter are driven by negative impacts on biodiversity in one location that can be compensated for by purchasing biodiversity units, which are intended to represent an equivalent or an augmented positive impact on biodiversity in another location. By contrast, biodiversity credit projects are intended to finance 'real' gains for biodiversity without these being linked to negative impacts in a different location. Such credits are also called certificates or claims, and referred to, in the corporate context, to efforts "beyond value chain".

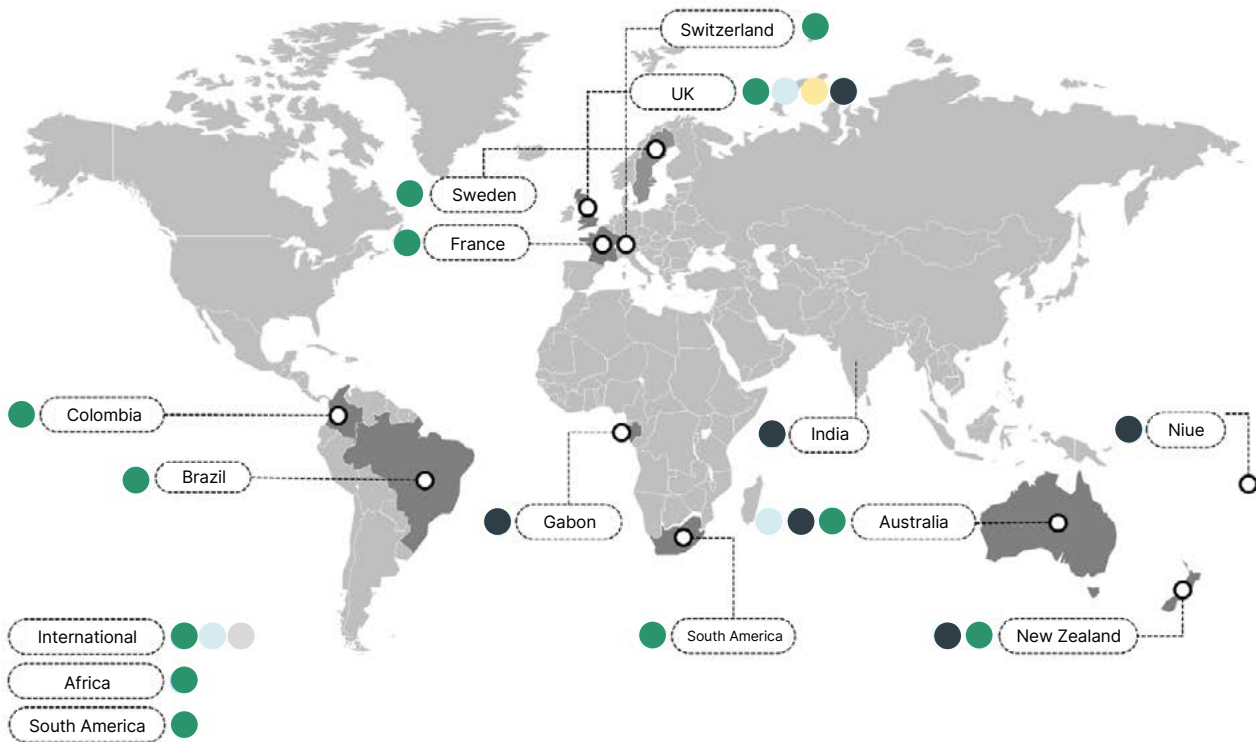
There are two likely directions for the biodiversity credit markets to develop:

- 1 private sector-led schemes under voluntary standards;
- 2 government-led schemes under specific policy or legislation, or a potential combination thereof.⁴⁴

To date, several biodiversity credit projects as well as national (draft) legislations have emerged worldwide.

Figure 5

Overview of voluntary biodiversity credit schemes and initiatives⁴⁵



Private sector-led programs

- GreenCollar, NaturePlus™ Credits (*Australia*)
- Terrain NRM, Cassowary Credits (*Australia*)
- South Pole, EcoAustralia™ (*Australia*)
- Wilderlands, Biological Diversity Units (*Australia*)
- Ekos, Sustainable Development Units (*New Zealand*)
- Plan Vivo, PV Nature Biodiversity Certificates (*International*)
- Wallacea Trust, Biodiversity Credits (*International*)
- VERRA, Verified Impact Standard (SD VISta) (*International*)
- Climate Trade/Terrasos, Biodiversity Credits (*Colombia*)
- Ecosulis CreditNature (*United Kingdom*)
- ValueNature Biodiversity Credits (*South Africa*)
- OpenEarth, Marine Ecosystem Credits (*International*)
- Organisation for Biodiversity Certificates (*France*)
- Recelio, Dynamic Biodiversity Tokens (Switzerland)
- Orsa Besparingskrog (*Sweden*)
- BioCarbon Registry (*Colombia*)
- CarbonZ (*New Zealand*)
- Credit Nature (*Scotland*)
- InvestConservation (*International*)
- Single Earth (*International*)
- South Pole (*Colombia*)
- Botanic Gardens Conservation (*International*)
- ERA Brazil (*Brazil*)
- New Atlantis Labs (*International*)
- Rebalance Earth (*Africa*)
- Savimbo (*Colombia*)

Government-led programs

- Proposed Nature Repair Market (*Australia*)
- Ocean Conservation Credits (*Niue*)
- Biodiversity credit system (*Gabon*)
- Green Credit Programme (draft rules introduced) (*India*)
- Biodiversity Credit System (under consultation) (*New Zealand*)

Governance/integrity initiatives

- World Economic Forum Biodiversity Credits Working Group (*International*)
- Biodiversity Credits Alliance (*International*)
- Taskforce for Nature Markets (*International*)
- IUCN Global Standard for Nature Based Solutions (*International*)

University-led programs

- Queen Mary University (*United Kingdom*)

Independent standards

- VERRA (*International*)
- Plan Vivo Foundation (*United Kingdom*)

Source: Pollination

Similarly to carbon credits markets, the biodiversity credits could eventually contribute to countries' public revenues, enhance their creditworthiness, and more generally, support socio-economic development through the monetisation of natural assets and their ecosystem services beyond carbon sequestration.

Some other types of payments for ecosystem services (PES)

Other ecosystem services from natural capital benefit different industries. For example, more than half of the 979 hydropower dams operating in tropical developing countries depend on water from cloud forests. This water is a critical service to downstream economic activity, including cities, hydroelectric dams, and agricultural and industrial water users, creating a buffer for dry seasons and periods of drought.⁴⁶ In addition to selling sovereign REDD+ carbon credits originating from newly protected cloud forests, governments could monetise the extra water supply and the sediment reduction. This could be achieved:

- 1** Through the sale of biodiversity or water credits to the hydropower companies
- 2** Through other types of specific payments for ecosystem services made by the hydropower companies to governments for the safeguarding of cloud forests.

Sustainable forestry is another obvious example of how countries can generate income from their state-owned natural capital, either through a special state managed forestry fund or by granting concessions to private operators (see next Section). Given the significant differences in forested land ownership structures and management regimes between different countries, the exploitation potential of forests for the purpose of public finances varies across different jurisdictions. The value of sustainable timber and other commodities linked to forest and agroforestry could be amplified - and the multiplication of economic and social impacts could be achieved - if countries supported the development of the capacities in the value chain to process timber towards intermediate and finished wood products. However, in order to ensure market integrity, it will be critical for legislation to be rigorously enforced and aligned to the best sustainable forestry policies and practices to secure environmental, economic and social sustainability.

Government concessions for the exploitation of renewable natural capital

A common source of public funding is the fees and royalties earned from different types of concessions and licenses that authorities grant for economic use of renewable nature resources. The revenues governments earn could also include the carbon and biodiversity credits generated by the projects within a specific concession agreement.

These concessions typically allow the recipients to use a specific natural asset, provide a service, or engage in a particular economic activity within a designated area and timeframe. Some examples of concessions for the use of renewable natural capital are:

- | Water Use Concessions, granted to operate hydroelectric power plants on rivers, for irrigation, aquaculture activities or industrial use of water
- | Forest Management Concessions to harvest timber, engage in agroforestry practices, and protect the forest's biodiversity
- | Solar Energy Project Licenses
- | Wind Energy Leases
- | Marine Energy Concessions
- | Geothermal Exploration Concessions
- | Eco-Tourism Licenses

Both PES and government concession fees and royalties could be directly used to finance a special sovereign fund used to collateralize sovereign debt issuance. They could prove a valuable source of public income to secure the sustainability of debt post-restructuring. The next chapter looks at different possible mechanisms for their integration into sovereign debt instruments.

Integrating renewable natural capital into sovereign debt

From Links to Linkages

Integrating renewable natural capital
into sovereign debt instruments



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Integrating renewable natural capital into sovereign debt

Nature-rich LMICs facing debt distress could explore the possibilities of capitalizing on their renewable natural capital in ways that do not breach the thresholds of sustainable exploitation. These new public revenue streams could improve the overall state of their public finances through an injection of fresh revenue into national budgets. This would consequently lead to their improved creditworthiness.

However, to facilitate their immediate access to debt markets, LMICs governments might want to consider inclusion of new revenue streams originating from their renewable natural capital directly into their debt issuance or refinancing strategies. Natural capital's proceeds could also provide an additional layer of credit enhancement to the sovereigns, complementing scarce and underutilized guarantees from multilateral development banks (MDBs) and other development financial institutions.

Collateralisation of debt

Collateralisation of debt can facilitate access to external financing when conventional unsecured financing is not available for a sovereign. As it would be politically undesirable for governments to relinquish the state ownership of their natural capital in case of their default, they could collateralize revenue streams from their natural capital to improve the credit rating of a specific debt instrument.

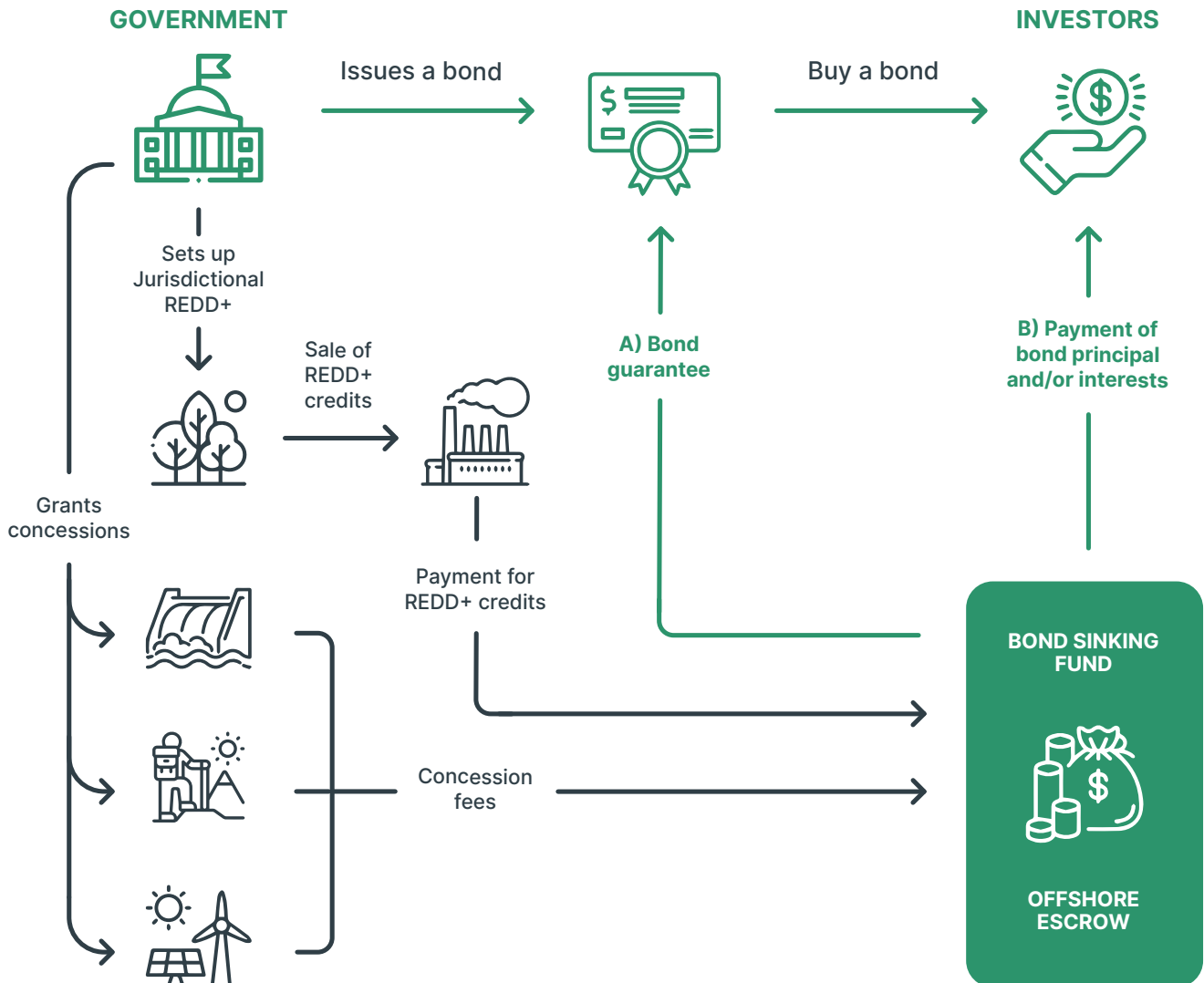
Collateral can provide access to funding during liquidity crisis as well as can be used as a bridge to more conventional financing, or to avoid borrowing very short term and/or at very high cost. Collateralized bonds and loans may be issued by the sovereigns directly or by public sector entities, including state owned enterprises (SOEs), with or without an explicit state guarantee.

Collateralisation is covered in a contract - in the event of a default, a creditor would obtain control over the said collateral.⁴⁷ The collateral can come in many forms. Historically, oil or future oil revenues have been used to accommodate the risks exposure of creditors (see Box 6). Countries rich in renewable natural capital could consider enhancing their debt issuance or refinancing by collateralizing the revenues from their nature assets. An example could be a sinking fund, which could be funded by the sales of jurisdictional REDD+ carbon credits, revenues from different concessions granted by the government and/or sales of state-owned sustainably sourced timber. This would guarantee the repayment of specific sovereign bonds or loans. To mitigate the political risk, the fund could be put in an offshore escrow account.

The sinking fund could provide an additional layer of credit enhancement on top of a partial guarantee obtained from a multilateral development bank or a bilateral development financial institution. Depending on the size of the assets under management, this could also be a stand-alone guarantee instrument. Based on their natural assets, countries could use any of the revenue streams identified above to finance their sinking funds or other types of collaterals.

Figure 6

Possible mechanism of a sinking fund



Source: NatureFinance

An alternative to a sinking fund could be securitisation of sovereign debt with the issuance of revenue-backed bonds. The repayment of revenue bonds is secured purely by the revenues from the project the bonds are funding, making them especially suitable for countries at the lowest end of the credit ratings' scale.

Box 5 | Revenue bonds and securitisation of debt

Revenue bonds, also known as revenue-backed debt, are a type of bond in which the repayment of the obligation is primarily guaranteed by the operating revenues of an entity. Revenue bonds are primarily utilized by government entities to subsidize infrastructure projects. The most common projects include the construction of airports, roads, bridges, and sewer facilities. Revenue bonds are different from other types of municipal bonds, such as the “general obligation” (GO) bonds. Contrary to general obligation bonds, where the repayment is secured by all the revenues - including tax revenues generated by an entity - the repayment of revenue bonds is guaranteed only by revenues obtained by the projects that were subsidized using the bonds. In the case of revenue bonds, tax revenues are not used at all.⁴⁸

Since the mid-1980s, the securitisation of future flow receivables has grown in importance as a financing alternative for the public sector. By providing future revenue flows as collateral, securitisation arrangements aim to mitigate the risks commonly associated with public sector borrowing - most notably transfer and convertibility risks - in order to obtain a credit rating superior to that of unsecured sovereign borrowing.⁴⁹

Revenue-backed debt has a much longer history, though. The concept dates back to the 18th and 19th centuries when governments and municipalities in Europe and the United States issued bonds to finance infrastructure projects such as bridges, canals and railways. These bonds were secured by the revenue generated from tolls or fees charged to users of these facilities. The 19th century witnessed a significant expansion of municipal borrowing in the United States. Cities and local governments issued municipal bonds to finance various projects, including water supply systems, sewer systems, public schools and hospitals. Revenue bonds became increasingly popular for projects that could generate a stable stream of income, such as toll roads, water treatment plants and electric utilities.

In the 20th century many public utilities issued revenue bonds to finance the construction and expansion of their infrastructure. The development of revenue-backed debt helped attract private capital to these infrastructure sectors, as investors saw the bonds as relatively secure investments backed by predictable revenue streams. It became a preferred financing method for airports, seaports, toll roads, public transportation systems, and other essential infrastructure. To this day, revenue bonds remain an essential financial tool for governments and entities seeking to fund projects that can generate predictable and stable income streams. This includes the above-mentioned infrastructure, but also renewable energy projects, water treatment plants and wastewater treatment facilities.

Box 6 | The case of Angola: collateralizing debt with non-renewable natural capital

Securitized borrowing in Angola dates back to the early 2000s, when post-civil war reconstruction could not be funded by concessional financial sources. Oil-backed loans in Angola were at first arranged by international banks and later, bilateral creditors - including China. Oil-backed debt has remained an important source of financing despite access to more conventional sources of financing, including Eurobonds (since 2015) and unsecured bilateral credits.⁵⁰

However, due to the oil price volatility and a heavy reliance of Angola's public finances on its oil revenues, the country has faced several debt crises in the recent decade. In 2020, oil-backed loans presented roughly 40 percent of Angola's external debt and most of its obligations to China.⁵¹ It has become obvious that collateralisation of country's debt with a commodity that represents the bulk of its public revenue streams can become a two-edged sword in the case of increased commodity price volatility, specifically if the price is not predetermined or hedged.

Substitution of coupon payments with the proceeds of natural capital

A sovereign issuer could consider using specific proceeds from its renewable natural assets to reduce or substitute in its entirety the coupon interests of a debt instrument. For example, jurisdictional carbon credits, or eventually sovereign biodiversity credits, could be used to substitute the coupon payments of a bond or provide an upside on a lower coupon rate.

However, while some (impact) investors could be willing to enter in such a structure directly, the majority would need to be shielded from the pricing uncertainties and operational complexities. To make the bond eligible for the mainstream emerging markets fixed-income investors, the structure would probably require an intermediary off-taker of carbon credits who could guarantee a pre-determined price. The intermediary would also relieve the investors of the operational and interdepartmental difficulties of dealing with carbon credits.

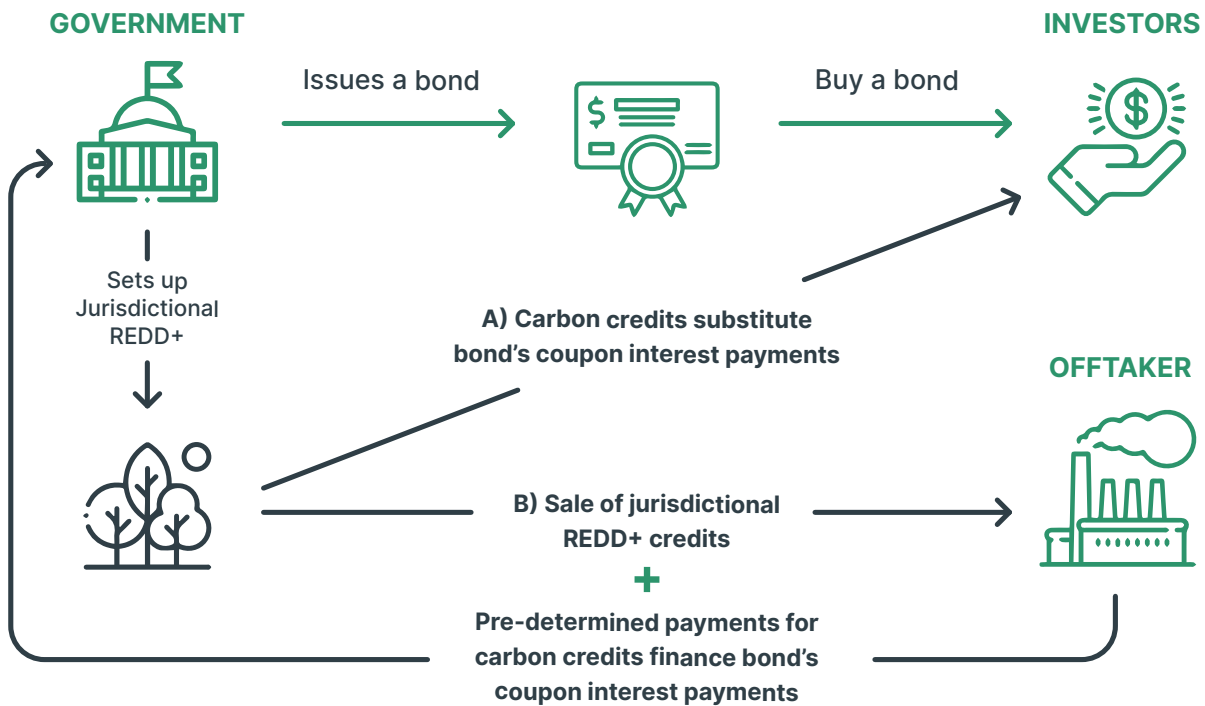
In theory, any proceeds from the natural assets could be used to service interest payments either directly or indirectly. For example, in addition to the concession fees the hydropower electricity companies pay for the use of water to generate electric power, they could reach an agreement with the government to fund the sovereign bond coupons through the payments for the ecosystem services of the state-owned cloud forests. Examples of this could include payment for the provision of extra water and the prevention of soil accumulation behind the dams.

Servicing sovereign sustainability-linked or green bonds issued to fund climate adaptation projects based on nature solutions (e.g., planting and restoring mangrove forests) could be partially funded by the jurisdictional carbon credits, and eventually, sovereign biodiversity credits generated by these same projects.

It is essential to match the size and timing of the revenues with the liabilities originating from sovereign bonds. Sovereigns might consider setting up one central sovereign fund for the proceeds of their renewable natural capital to accumulate, thus indirectly providing the means of servicing their debt.

Figure 7

Possible mechanism to substitute interest payments with jurisdictional REDD+ credits



Source: NatureFinance

Securing post-restructuring debt sustainability

The global debt markets has been witnessing a new wave of Debt-for-Nature (DfN) swaps⁵² in the recent years. A debt-for-nature swap is a financial arrangement between a debtor country and its creditors that aims to address both environmental conservation and debt reduction. In a debt-for-nature swap, a portion of a developing country's external debt is forgiven or restructured by the creditors in exchange for the debtor country's commitment to allocate funds toward conservation efforts or sustainable development projects. Seychelles, Belize, Barbados, and, most recently, Ecuador and Gabon, have paved the way for these types of sovereign debt transactions that may gradually grow from a niche market into a more widely utilised and recognized mechanism of sovereign debt refinancing and restructuring. Cape Verde and Portugal reached an agreement to swap Cape Verde's debt to the Portuguese state for investments in the environmental and climate fund.⁵²

A major dilemma in debt restructuring is often how to assure that the restructured debt remains sustainable in the long-term. Creditors could condition debt-for-nature restructuring / refinancing by channeling a part of newly issued cheaper debt into projects generating carbon and biodiversity credits and other monetisable ecosystem services that would create new permanent direct budget income streams for the sovereign in question.

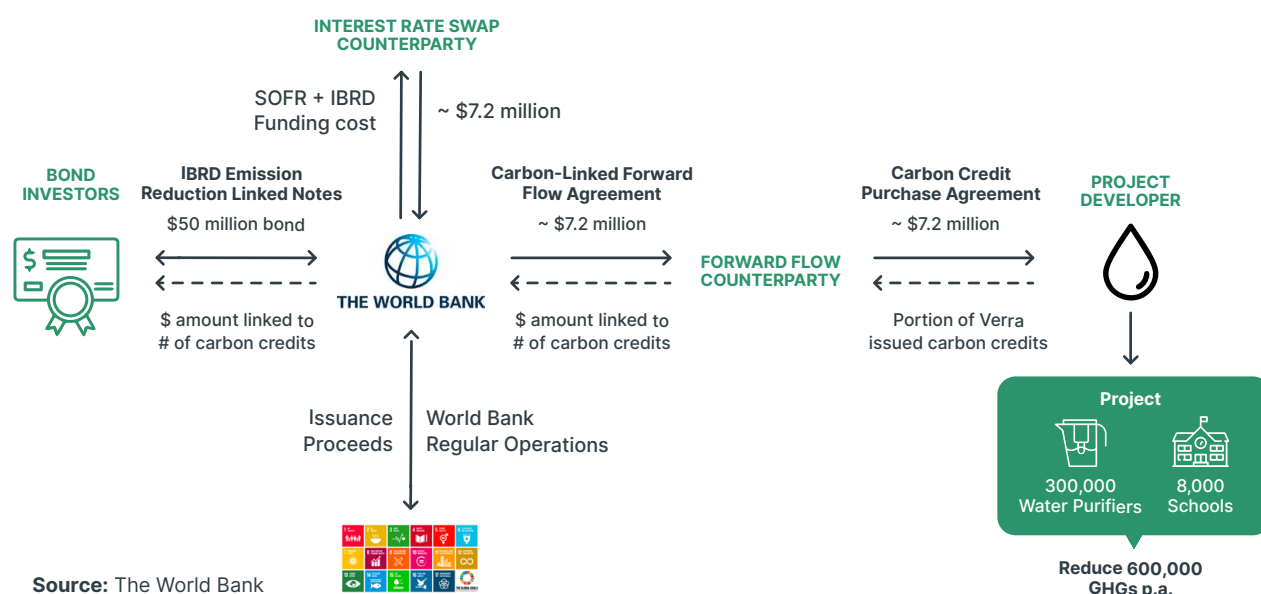
The future proceeds of the renewable natural capital could also be used directly in a DfN swap, as either a sweetener for debt forgiveness or a collateral to attract better refinancing conditions. The former solution would most likely be more feasible in bilateral deals than in multilateral arrangements.

Box 7 | The Case of IBRD's Emission Reduction-Linked Bond

In February 2023, the World Bank issued a five-year US\$ 50 million, principal protected Emission Reduction-Linked Bond that provides investors with a return linked to the issuance of Verified Carbon Units (VCUs) expected to be produced through a project in Vietnam. The project is expected to make clean water available to around two million children and to reduce greenhouse gas emissions by almost 3 million tons of carbon dioxide over 5 years.

The bond is an outcome-based financial instrument that mobilised private capital to support the financing of a project with positive climate and development impacts – with outcomes measured by the generation of VCUs. Investors in the bond will forego ordinary coupon payments, with the equivalent amounts being provided - through a hedge transaction with Citi - to support the financing of the water purifier project managed by a private project developer. Instead of ordinary coupons, the investors will receive semi-annual coupon payments linked to the issuance of VCUs by the water purifier project on the Verra Registry.⁵³

Figure 8
Financial structure and flow of funds



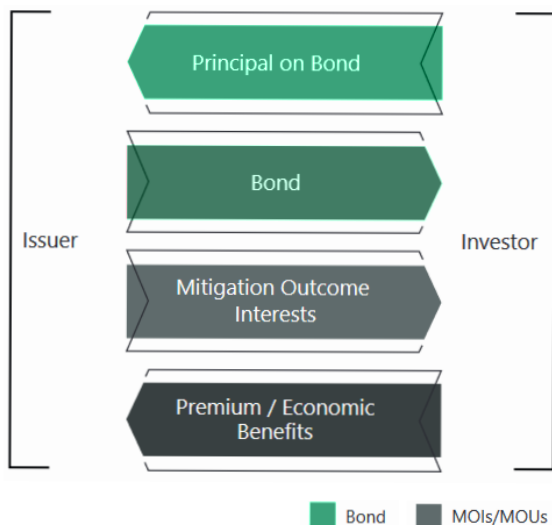
Box 8 | The Case of Smart Contract-based Carbon Credits attached to Green Bonds⁵⁴

Project Genesis 2.0, a cooperation of the BIS Innovation Hub, the Hong Kong Monetary Authority and the UN Climate Change Global Innovation Hub, proposed a green bond structure that is appended with mitigation outcome interests (MOIs). This will be repaid in carbon credits recognised under international or national verification mechanisms compliant with the Paris Agreement. The MOIs can be sold and traded immediately, separate from the bond issuance. Carbon credits used to repay the MOI obligations will need to be mainly generated by the asset or activities financed by the proceeds of the bond, and not simply bought from the carbon market.

In exchange for an MOI, the bond investor pays a premium or provides to the issuer another type of economic benefit compared with its baseline source of financing. The proposed green bond structure endeavours to take into account the greenness of the issuer's entire investment plan. Credits generated by the assets or activities financed by the proceeds of the bond will first be used to offset any climate performance gaps from other activities of the issuer financed post bond issuance. Only the remaining credits can be used to repay for the MOIs to the bond investor.

Diagrammatic illustration of the proposed structure of green bond

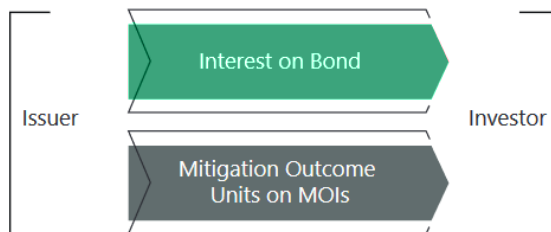
AT ISSUANCE



DURING THE BOND LIFECYCLE

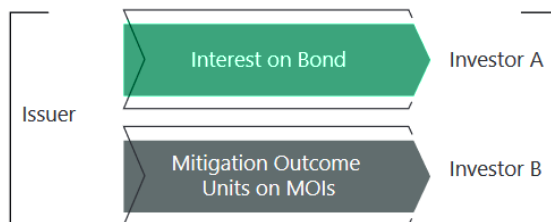
Scenario 1

Investor keeps both Bond and MOIs



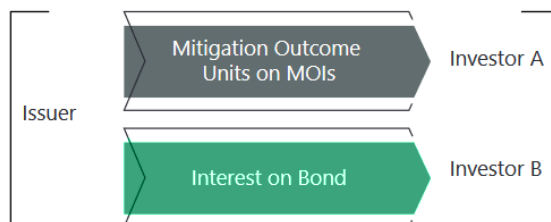
Scenario 2

Investor A sells MOIs in the secondary market to Investor B and keeps only the bond

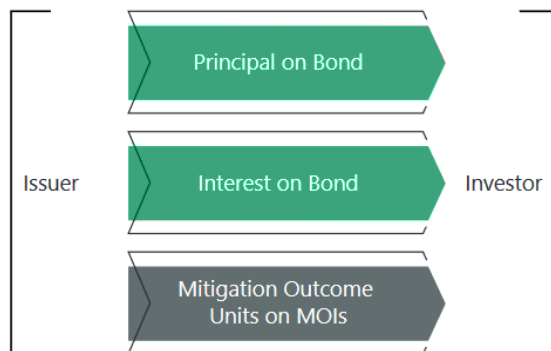


Scenario 3

Investor A sells Bond in the secondary market to Investor B and keeps only the MOIs



AT MATURITY



Project Genesis 2.0 explores blockchain, smart contracts, and IoT solutions that digitally track and record real-time mitigation outcome data associated with a digital MOI linked to a bond lifecycle in an immutable form, which in turn are used to settle delivery obligations under the MOI. The two prototypes developed in this project demonstrate the ability for investors to monitor, and trace back the environmental impact of the funded asset or activity on a granular level, in a timely and cost-efficient manner. This increases the visibility for investors on the likelihood of full carbon credit delivery thereby allowing them to better manage the risk of any potential shortfall of MOUs.⁵⁵

Source: BIS Innovation Hub

Box 8 | The Case of Smart Contract-based Carbon Credits attached to Green Bonds (cont.)

Summary table of benefits demonstrated in Project Genesis 2.0

	Benefits
Green Bond Issuers	<ul style="list-style-type: none"> • Access to cheaper funding provided by the premium on MOIs • Transforming the carbon market from an ex post to ex ante enables filling the financial viability gaps of green projects, especially in countries that have limited access to traditional finance
Investors	<ul style="list-style-type: none"> • MOUs provide an objective definition of green, protecting investors from potential reputational risk of greenwashing • Gain exposure to the carbon market as an alternative investment class • Offset own GHG emissions to meet emission targets with MOUs • Delivery of MOUs offer the transparency of the environmental impact of the green bond
Sustainable Finance Ecosystem	<ul style="list-style-type: none"> • MOIs pledged as part of the green bond ensure additionality of green bonds, channelling much needed finance towards climate solutions that would otherwise not be implemented • Delivery of MOUs reduces the risk of greenwashing of green bonds, thereby shifting mainstream finance towards effective climate solutions that contribute to climate goals • Provide liquidity and price discovery for the carbon market by deepening participation of financial investors in carbon credits

Source: BIS Innovation Hub

Box 9 | The Case of IFC's Forest Bond

In 2016, IFC issued the so called 'Forest Bond'. This five-year bond raised US\$ 152 million to support private sector development aimed at reducing deforestation in Kenya. The Forests Bond was developed with mining group BHP Billiton and Conservation International. BHP Billiton provided a price-support mechanism for the Forests Bond. If investors had elected the cash coupon instead of the carbon coupon, BHP Billiton would have off-taken the carbon credits generated and delivered by the Kasigau Corridor REDD project.⁵⁶

The bonds were sold to major global institutional investors including CalSTRS, Treehouse Investments LLC, TIAA-CREF, and QBE. This was also listed on the London Stock Exchange.⁵⁷ Although in the end none of the investors opted for carbon credits, choosing instead to receive the bond's coupon in cash, the bond - as the first of its kind, integrating carbon credits into a debt instrument - provided critical experience and lessons-learned on how to structure such transactions in the future.⁵⁸

Overcoming the obstacles to connecting renewable natural capital to sovereign debt

From Links to Linkages

Integrating renewable natural capital
into sovereign debt instruments



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Overcoming the obstacles to connecting renewable natural capital to sovereign debt

Scaling carbon credit markets

The pre-condition for the integration of renewable natural capital's proceeds into sovereign debt is a stable and liquid market of a sufficient size for these ecosystem-generated products and services. At their current capitalisation, the voluntary carbon credit markets cannot provide sufficient means for collateralisation or coupon substitution of the sovereign debt instruments beyond pilot projects. The lack of transparency and the resulting controversy around the credibility of project-based voluntary carbon credits has severely affected the credits' prices and VCM development overall. Strong and transparent governance needs to be established for the voluntary carbon credits markets if LMICs governments are to capitalize on nature-based solutions for climate mitigation and adaptation.

Recent efforts to develop jurisdictional REDD+ carbon credits frameworks are a step in the right direction in empowering the interested LMICs. However, the market would benefit from a clear endorsement of the advantages of adopting jurisdictional REDD+ frameworks combined with the HFLD approach which rewards the developing countries that have managed to avoid high rates of deforestation. A few potential pathways to endorse the jurisdictional REDD+ approach are listed below:

- 1** A substantive tailwind for jurisdictional REDD+ credits would be their inclusion in compliance offsetting schemes, such as cap-and-trade emission trading systems, or specific sector markets, such as CORSIA.⁵⁹ Improved transparency and strong governance are a prerequisite for the potential fusion of the compliance and voluntary markets.
- 2** Recognizing jurisdictional REDD+ credits as an instrument to settle the carbon tariffs within the EU Carbon Border Adjustment Mechanism⁶⁰ could present an additional boon for the carbon credit market and set a precedent at the global level.
- 3** One of the major bottlenecks in the securitisation of carbon credits is the uncertainty around price and volume. Moreover, credit rating agencies will also need to see forward price and purchase agreement on carbon/biodiversity credits to be able to provide any rating on instruments that include these credits as a source of revenue. The establishment of a global mechanism that guarantees a minimum price (at least for the next few years) should be explored. Such a mechanism could be managed by multilateral institutions, with the price being backed by a set of governments.
- 4** As nature-based solutions to mitigate carbon emissions can also deliver biodiversity, soil and water related ecosystem services (e.g., water purification, flood and soil erosion prevention), these additional benefits need to be rewarded and reflected in higher prices of the underlying carbon credits. It would be highly desirable to amplify the discussion on the role and the development of carbon credits that include these additional ecosystem service layers.

Development of biodiversity credit markets

The Kunming-Montreal Global Biodiversity Framework makes a specific reference to encouraging biodiversity credits and offsets (Action-oriented Target 19). However, some key design dilemmas will need to be overcome to develop an efficient global credits market.

The emerging biodiversity credit markets should capitalise on the lessons learnt in the carbon credits space.⁶¹ To gain acceptance and traction the biodiversity credits will need to avoid the deficiencies of the early voluntary carbon credit markets.

The crucial piece of the puzzle remains the demand. Biodiversity credits, unlike biodiversity offsets, are intended to facilitate private sector investments in the protection, regeneration and stewardship of nature. It is important to note that they are not associated with offsetting or compensating for negative impacts elsewhere.⁶² They will need to prove the existence of demand beyond the private sector's reputational initiatives and claims.

There are several potential ways to create an enabling environment to scale private sector investment in biodiversity credit markets:⁶³

- Mandatory preparation and disclosure of natural capital accounts,
- Mandatory disclosure of nature / biodiversity-related financial risks,
- Imposition of nature / biodiversity tax and trading system.

Authorities should seek to incentivise private companies through regulation and taxation to go beyond nature-related risk disclosures and to engage in the active funding of nature-positive outcomes, thus scaling a transparent and regulated market for biodiversity credits along the way. Companies might choose to invest in biodiversity credits to fulfil a voluntary corporate commitment to contribute to a nature-positive future by 2030.⁶⁴ They could demonstrate positive action towards the mitigation of nature-related risks associated with biodiversity loss to which they are exposed, and which they will increasingly be expected to disclose under the 2023 TNFD framework.⁶⁵

As nature-related risks and dependencies tend to be sector-specific, industry associations could coordinate companies' joint actions to mitigate these risks through investments in specific biodiversity credit schemes. Habitat banks, such as is the case of Terrasos in Colombia,⁶⁶ could become the facilitators that channel private funds into material biodiversity projects to mitigate companies' nature dependencies.

Biodiversity offsetting schemes, either compliance driven or voluntary, will most likely struggle to achieve the prominence of carbon offsetting due to the idiosyncratic nature of biodiversity. Contrary to GHG emissions, where one tonne of CO₂ equivalent is a straightforward measurement unit and the location of emissions does not matter, biodiversity is a more complex, location-specific and heterogenic category.

Additional scientific research into solutions to set the biodiversity baselines (such as the SEED Biocomplexity Index – see Box 8) must be encouraged as well as financially and technically supported by various stakeholders. Determining scientifically robust and widely recognized baselines and measurement units for monitoring biodiversity could - together with adequate technological solutions to collect and process data - prepare the terrain for impactful and geographically scalable compliance biodiversity credit markets.

Box 10 | SEED Biocomplexity Index⁶⁷

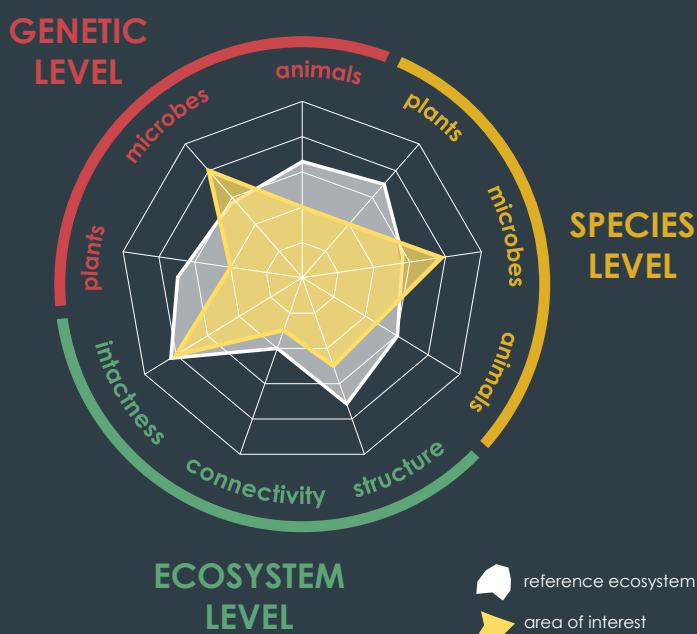
The Crowther Lab at ETH Zurich is developing SEED to overcome the challenge of measuring complex biodiversity. SEED is the world's first biodiversity index that accounts for all scales of life's complexity at a genetic, species and ecosystem level, for every location on the planet and its change over time. Rather than measuring a few reductionist aspects of nature, SEED integrates multiple datasets across all levels of diversity and taxonomic groups into a single comprehensive and standardised measure designed to convey the underlying state of biodiversity.⁶⁸

By correlating this with remote-sensing and ground-truth site data, assessments can show how biological complexity ("biocomplexity") is changing in any site over time, and benchmark with other sites in the same ecoregion. SEED rates the state of that ecosystem relative to its natural state. Therefore, a rating of 1 means that ecosystem is in a natural state, and zero would be the equivalent of a completely degraded ecosystem. The closer a site is to 1, the more regenerative and resilient it is likely to be. In addition to supporting corporations in assessing the state of an ecosystem they are investing in, SEED will also be used to support the measurement of an organisation's impact on the ecosystem over time.

It is intended to:

- Create a standardised and comprehensible biodiversity index that measures the complexity of nature at a global scale,
- Shape standards and underpin the governance of nature markets and regulatory disclosures,
- Create a market-facing platform that catalyses capital to flow to equitable nature-based solutions.

Biocomplexity Index



Source: SEED

Overcoming the operational obstacles

There are also major operational obstacles hindering the integration of natural capital in the sovereign debt markets. Structuring such instruments involves costly and lengthy processes. The issuers might lack time, the necessary capacities, as well as incentives to venture out of more familiar mainstream alternatives.

Even though sovereign debt instruments with carbon or biodiversity credits embedded in their cashflows could be eligible investments for specific impact investors, many major fixed-income investors might avoid them because of the operational complexities they would create within their internal processes. For example, the emerging markets fixed-income desk might not be mandated for carbon credit related transactions. Furthermore, being exposed to the volatility of the carbon credits pricing would introduce an additional layer of risk for the investors that they might not be willing to take on.

A viable solution could be the introduction of an intermediary who offtakes the jurisdictional credits at a predetermined price and enables the sovereign issuer to finance the coupon interests with the proceeds.

Addressing the complexity of such transactions would most likely call for a gradual approach where multilateral development banks and national development finance institutions could lead the way with pilot projects. This was the case with the IBRD's Emission reductions-linked bonds in Vietnam. They could also assume the role of anchor investors. At this stage, the private demand side will most likely depend on specific impact investors.

The collateralisation and securitisation approaches to integrating revenues from the ecosystem services would probably encounter fewer operational hurdles. The sovereigns could also use the non-unit-based proceeds from the renewable natural capital - such as fees from concessions - to finance a sinking fund used for collateralisation of their debt.⁶⁹

It is important to note that revenue-backed debt is usually considered less risky than general debt. This is because it is tied to a specific revenue stream. However, the success and stability of the project or income stream are critical factors in ensuring that the debt can be repaid as expected. The exposure of renewable natural capital to the physical risks aggravated by the climate crisis needs to be factored in. Different insurance and guarantee solutions, both from the public development finance institutions and private insurances, should be explored to support the resilience of revenue streams originating from natural assets. This could help overcome hesitation from the sovereign debt investors and kick-start a self-perpetuating cycle of decreasing debt costs and rising carbon and biodiversity credits prices on the primary market.

The legal and contractual frameworks for revenue-backed debt must be clear, enforceable, and provide adequate protection to investors. Engaging in dialogue with investors, improving governance, and strengthening legal frameworks can also help build confidence and facilitate the scaling of renewable natural capital originating revenue-backed debt. Additionally, multilateral financial institutions could provide technical assistance to interested governments.

Conclusion

Many of the LMICs on the brink - or in the midst - of debt distress possess abundant renewable natural resources. These provide invaluable positive externalities to the rest of the world in the form of various ecosystem services, currently provided for free. A sustainable future for humankind can only be possible if we set in place global socio-economic and financial systems that minimise the incompleteness of the global markets by internalising these 'externalities'. Sovereign debt can - due to its sheer size and the inherent developmental component - become an important driver of this game-changing endeavour.

For renewable natural capital to become a viable sovereign credit enhancement solution and, more generally, a fully utilised indefinite source of public financing, the renewable nature markets will need to be drastically scaled up from their current levels. Carbon and, eventually, biodiversity credits, as tradable units of ecosystem services derived from natural capital, can play an instrumental role in unlocking countries' nature assets and linking them to the sovereign debt markets. Furthermore, collateralisation and securitisation of sovereign debt can also capitalise on other, non-unit-based revenues originating from the renewable natural capital. It is reasonable to expect that the integration of carbon and biodiversity credits into the sovereign debt instruments would act as an additional catalyst to accelerate their growth.

This would, simultaneously, also provide a wide recognition of the vital role that nature plays in nations' economies and their welfare. Consequently, additional attention should be given to sovereign balance sheets and accounting for natural capital.

Going forward, we recommend that interested stakeholders set up communication channels and informal collaboration platforms for further exploration of this area. **The Sustainability-linked Sovereign Debt Hub (SSDH), hosted by NatureFinance, could, due to its non-profit, collaborative and inclusive nature, provide a platform for different stakeholders to coordinate their activities.**

We also propose that those who are interested in developing the linkages between debt and nature markets - specifically in the context of shaping a global nature economy in the 21st century - consider the recommendations of the Taskforce on Nature Markets.⁷⁰

Finally, interested parties could develop pilot projects to identify and address additional challenges, as well as introduce good practices that can be used for scaling the integration of natural capital into the sovereign debt markets and wider socio-economic development strategies.

Endnotes

¹ The primary goal of the UNFCCC Paris Agreement is to limit global warming to well below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degrees Celsius.

² <https://www.ifad.org/en/web/latest/-/indigenous-peoples-are-protecting-biodiversity-one-harvest-at-a-time>

³ In 1987, the United Nations Brundtland Commission defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

⁴ The sixth mass extinction, also referred to as the Anthropocene extinction, is the ongoing extinction event characterized by the loss of numerous plant and animal species on a global scale.

⁵ Kristalina, G., (2023). Confronting Fragmentation Where It Matters Most: Trade, Debt, and Climate Action. IMF Blogs, Washington, D.C., US.

⁶ Johnson, J.A. et al., (2021). The Economic Case for Nature: A Global Earth-Economy Model to Assess Development Policy Pathways. World Bank, Washington, DC, US.

⁷ <https://blogs.worldbank.org/psd/pitch-perfect-tuning-financial-instruments-harmony-sustainable-development-goals>

⁸ Sustainability-linked Sovereign Debt Hub, (2022). Reshaping Sovereign Debt Markets to Deliver a Sustainability Dividend. <https://www.ssdh.net/>

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- ²⁸ Forest and Land Use Investment Packages (FLIPs) are integrated packages of technical, financial, and diplomatic support; investment; and business partnerships. They engage a range of public, private, multilateral and philanthropic institutions in an actively coordinated arrangement to support the implementation of a country's ambitious climate target, with a particular focus on forests and other land uses.
- ²⁹ Positive Conservation Partnerships (PCPs) focus specifically on conservation of major high-carbon biodiversity-rich ecosystems. Where conservation of high-carbon, high-biodiversity areas is a priority for a given country, Positive Conservation Partnerships (PCPs) may form a core component of the FLIPs approach.
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From Links to Linkages

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