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DEBT-FOR-CARBON: USING CARBON CREDITS FOR DEBT RELIEF

Igor Shishlov, Holly Pearen, Luisa Weber, Axel Michaelowa, Pedro Martins Barata, Sandra Dalfiume, Ziqun Jia

DISCUSSION PAPER

Executive Summary

The convergence of climate vulnerability and sovereign debt distress has emerged as one of the defining macroeconomic challenges of this decade. Across developing economies, rising climate change impacts are constraining fiscal space and raising borrowing costs, while limited access to concessional finance hampers investment in resilience and low-carbon growth. To bridge this gap, governments and creditors are increasingly exploring **debt-for-climate swaps**—transactions that reduce or restructure debt in exchange for commitments to fund adaptation and mitigation. Yet despite renewed interest, most debt swaps remain small, complex, and opaque, offering limited macroeconomic impact.

This discussion paper proposes an evolution of the instrument: integrating **carbon credits**—particularly those generated under **Article 6 of the Paris Agreement** or high-integrity voluntary carbon market programs—into sovereign debt operations. Carbon credits offer measurable, verifiable, and tradable metrics of mitigation performance that can strengthen the financial attractiveness and environmental integrity of debt-for-climate swaps. Embedding them in debt transactions can help streamline negotiations, improve transparency, and align fiscal relief directly with mitigation targets of nationally determined contributions (NDCs) under the Paris Agreement. Two potential models of such debt-for-carbon swaps are explored in this discussion paper:

- **Option 1: "Debt forgiveness in exchange for carbon credits"** involves the transfer of accumulated credits or credits to be issued in the future from existing projects to satisfy part of a debt obligation. This approach is relatively simple, fast to execute, and particularly suited to bilateral debt restructurings using cooperative approaches under Article 6.2 of the Paris Agreement.
- **Option 2: "Debt-swap savings for carbon-crediting"** channels fiscal savings from debt restructuring into a national climate change mitigation funding facility that finances new mitigation activities (and possibly adaptation activities with mitigation co-benefits) capable of generating new carbon credits over time. Although more complex, this model offers greater scalability, clarifies and streamlines performance measurement through Monitoring, Reporting, and Verification (MRV) systems, and fosters long-term investment aligned with national mitigation (and adaptation) strategies.

Both structures link debt relief to verifiable emission reductions and removals but differ in timing and institutional requirements. Option 1 provides immediate fiscal space by monetizing existing and future carbon credits; Option 2 creates a sustainable, programmatic framework for future credit generation and private co-financing for climate projects.

Implementation, however, depends on several enabling conditions: credible MRV and registry systems, legal recognition of carbon credits as a valid mode of debt satisfaction and settlement, and coordination between ministries of finance and environment, as well as creditors. The discussion

paper also identifies key constraints that have limited deployment—including the heterogeneity of debt negotiations, siloed expertise between debt and carbon market professionals, and limited Article 6 readiness in many debtor countries.

To address these barriers, the discussion paper recommends:

- **Building institutional capacity** in debtor nations to manage carbon credits as financial assets;
- **Adopting quality standards** for eligible credits, especially for Article 6.2 and voluntary carbon market transactions;
- **Raising awareness** among creditors about carbon-market integrity, valuation, and risk management;
- **Clarifying legal frameworks** to treat verified carbon credits as a legitimate form of (in kind) payment rather than default; and
- **Quantifying climate investment benefits** for sovereign credit ratings and debt sustainability assessments.

As carbon markets mature and institutional capacity expands, debt-for-carbon transactions could become a cornerstone of a more resilient and equitable global financial architecture—one that rewards countries for delivering measurable mitigation results.

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Authors

This research report was led by Igor Shishlov, Holly Pearen and Luisa Weber with input from Axel Michaelowa, Pedro Martins Barata, Sandra Dalfiume, and Ziqun Jia.

Design and layout

Rosaria Caddeo

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Abbreviations

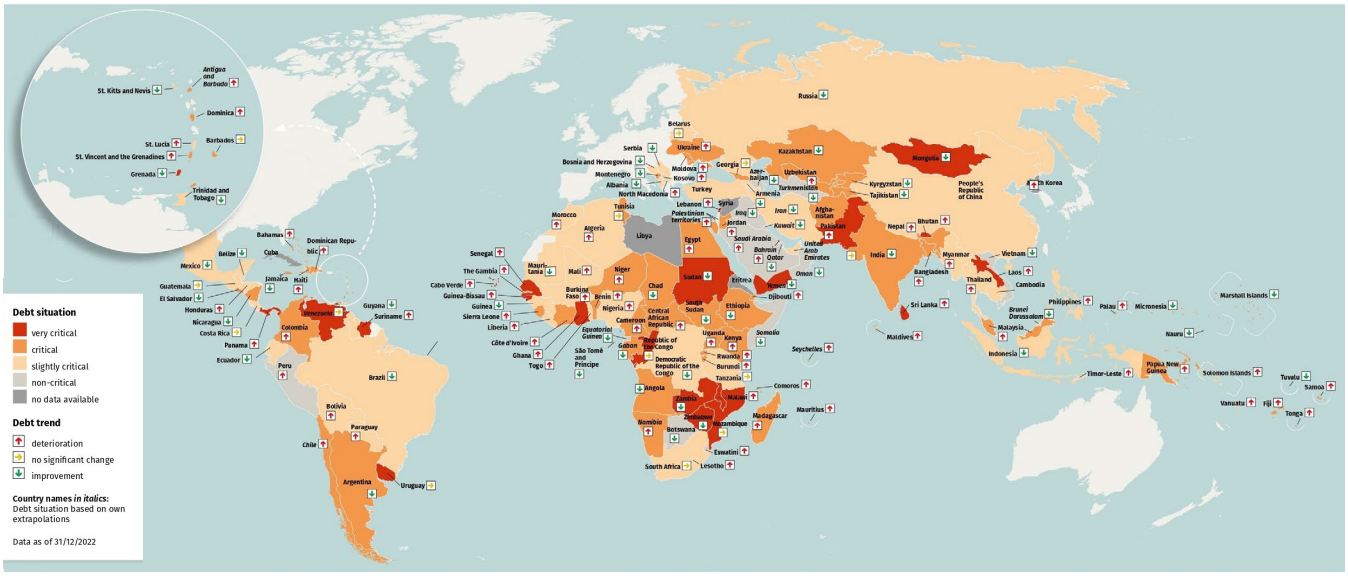
ABM	Adaptation Benefits Mechanism
AfDB	African Development Bank
A6	Article 6 (of the Paris Agreement)
CCP	Core Carbon Principles
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CPI	Climate Policy Initiative
DFC	Debt-for-Climate
DOE	Designated Operational Entity
ERPA	Emission Reduction Purchase Agreement
ESG	Environmental, Social and Governance
FAD	Fondo de Ayuda al Desarrollo (Spain's concessional loan facility)
FiCS	Finance in Common Summit
FPIC	Free, Prior and Informed Consent
GCF	Green Climate Fund
GDP	Gross Domestic Product
ICVCM	Integrity Council for the Voluntary Carbon Market
IMF	International Monetary Fund
ITMO	Internationally Transferred Mitigation Outcome
KPI	Key Performance Indicator
MDB	Multilateral Development Bank
MRV	Measurement, Reporting and Verification
NDC	Nationally Determined Contribution
ODA	Official Development Assistance
SDG	Sustainable Development Goal
UNFCCC	United Nations Framework Convention on Climate Change
UTE	Administración Nacional de Usinas y Trasmisiones Eléctricas (Uruguay)
VCM	Voluntary Carbon Market
VCMI	Voluntary Carbon Market Integrity Initiative
V20	Vulnerable Twenty Group of Finance Ministers

1. Introduction

1.1. The climate-debt nexus

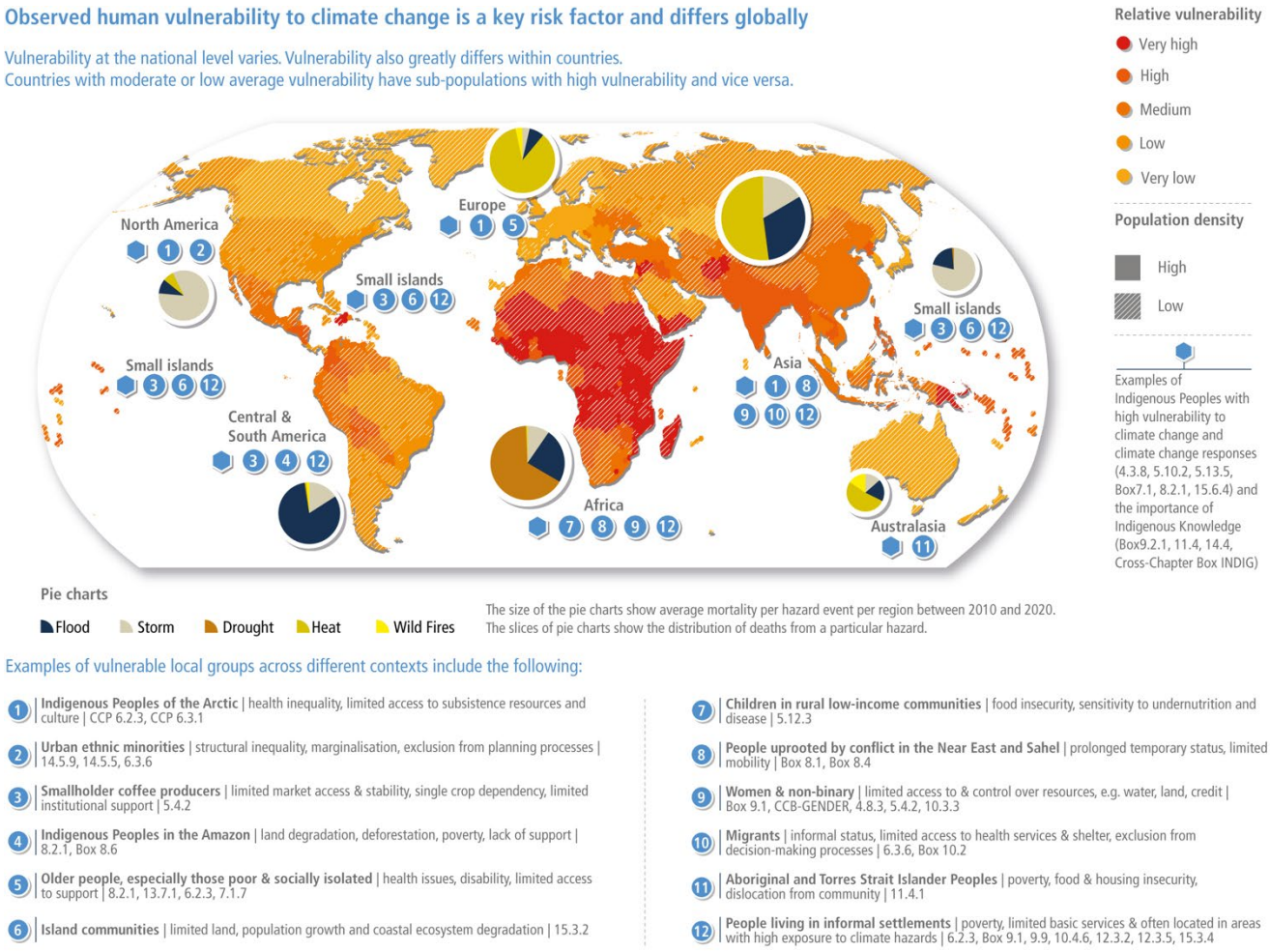
The convergence of **sovereign-debt distress** (Figure 1) and **climate change vulnerability** (Figure 2) is emerging as one of the most pressing macroeconomic challenges of the decade. Across developing and emerging economies, the costs of climate change—manifesting through extreme weather events, agricultural losses, and infrastructure destruction—are compounding fiscal pressures that were already aggravated by the COVID-19 pandemic and tighter global credit conditions. The result is a **climate change–debt vicious cycle**, in which limited fiscal space prevents adequate investment in adaptation and decarbonization, while unmitigated climate shocks further weaken public finances (Volz *et al.*, 2020; ActionAid, 2023; Darouich *et al.*, 2023; World Bank, 2024). Moreover, international public climate-finance flows also remain far below the scale required to meet the Paris Agreement objectives despite the commitments made at COP29, with developing countries shouldering the highest adaptation and mitigation costs while facing some of the highest borrowing rates.

Figure 1: Debt situation in the Global South countries



Source: Misereor and Erlassjahr.de (2024, p. 3)

Figure 2: Vulnerability to climate change



Source: IPCC (2022)

This dynamic has both national and systemic implications. For debtor countries, climate change-driven fiscal stress erodes growth potential and creditworthiness. For creditors, it increases the risk of disorderly defaults and diminishes the long-term value of sovereign assets. Sovereign debt distress linked to climate shocks also poses systemic risks, threatening portfolio sustainability for both public and private creditors and undermining confidence in emerging-market debt markets. As the International Monetary Fund (IMF) and Green Climate Fund (GCF) emphasize, without targeted mechanisms that address debt sustainability and accurately reflect climate risks and mitigation opportunities, most climate change-vulnerable countries will remain unable to meet their mitigation and adaptation targets enshrined in their Nationally Determined Contributions (NDCs) under the Paris Agreement (Chamon *et al.*, 2022; GCF, 2024).

In this context, innovative instruments that link debt management with climate change mitigation and adaptation are gaining renewed traction as part of a more resilient global financial architecture.

1.2. The promise and limits of debt-for-climate swaps

Debt-for-climate (DFC) swaps—whereby a portion of a country's external debt is cancelled, converted, or refinanced in exchange for commitments to fund domestic climate change mitigation and adaptation programs—represent one such innovation. Properly structured, these transactions can create fiscal breathing space, reduce debt-service obligations, and mobilize resources for mitigation and adaptation investments aligned with national priorities (Chamon *et al.*, 2022; Darouich *et al.*, 2023; Weber *et al.*, 2024). For creditors, they offer a vehicle to support the climate and sustainability goals while maintaining repayment discipline and gaining political goodwill.

The recent wave of high-profile transactions, including Belize's Blue Bond (2021) and Ecuador's USD 3 billion debt conversion for conservation (2023), demonstrates that DFC swaps can reach a meaningful scale. Characterized by innovative structures, layered products and newer stakeholders, transactions were supported by guarantees or insurance from multilateral development banks (MDBs) or philanthropic institutions (Desai, 2023; Winters, 2024) to mobilize private finance and reduce borrowing costs for developing nations. These examples have re-energized political interest and illustrated the potential to align debt restructuring with climate finance objectives.

Yet, in most cases, DFC swaps remain too small, too complex, and too opaque to deliver systemic impact. To date, most operations have involved debt volumes representing tiny fractions of the debtor's total public debt, limiting their macroeconomic impact despite their political visibility (Chamon *et al.*, 2022). Negotiations involving multiple creditor classes are lengthy and resource-intensive; transaction costs can absorb a significant share of savings; and defining unique rigorous monitoring and reporting systems that demonstrate mitigation and adaptation benefits is problematic (Weber *et al.*, 2024). Negotiations are further complicated by the diversity of creditor types—from Paris Club members and multilateral institutions to emerging bilateral and commercial lenders—each with different mandates, accounting rules, and tolerance for concessional restructuring.

As concluded in the report by Perspectives Climate Research (Darouich et al., 2023), the next generation of DFC swaps must therefore:

- **Increase their scale** through programmatic and multilateral approaches;
- **Streamline negotiation and implementation** to improve efficiency;
- **Adapt to national and sectoral contexts** while aligning with the SDGs; and
- **Ensure measurable results** through transparent, regularly verified impact assessments.

1.3. Purpose and approach of this paper

This discussion paper explores how integrating carbon-credit mechanisms into DFC swaps can make the instrument more attractive to both debtors and creditors. Carbon credits—particularly

those generated under the international carbon markets Article 6 of the Paris Agreement or high-integrity voluntary carbon market programs —can serve as quantifiable, verifiable, and tradable metrics of mitigation performance (Chamon *et al.*, 2022; GCF, 2024; Sharma, 2025). Embedding carbon credits in debt transactions can strengthen DFC swaps in four ways:

- **Boosting financial impact** by increasing the pool of total assets eligible for debt satisfaction/settlement and/or sweetening the terms of debt restructuring;
- **Streamlining negotiation and implementation** by using carbon credits as a standardized metric of mitigation performance;
- **Enhancing transparency and accountability** through well tested measurement, reporting, and verification (MRV) systems of international carbon markets; and
- **Ensuring policy coherence** by directly linking debt conversions to NDC mitigation and adaptation targets, thereby aligning fiscal relief with national climate strategies.

For creditors, the use of high-integrity credits introduces a measurable and tradable asset class that can offset costs or contribute to corporate and sovereign decarbonization targets.

This analysis builds directly on the recommendations of the report by Perspectives Climate Research (Darouich *et al.*, 2023), extending them by assessing how carbon-market instruments could enhance both the financial efficiency and mitigation integrity of DFC swaps (Chamon *et al.*, 2022; GCF, 2024; Lee and Choi, 2024; Sharma, 2025).

Accordingly, the discussion paper proceeds as follows. Section 2 reviews recent literature and policy proposals linking carbon credits with debt transactions, including experiences from the IMF, GCF, and the CPI/FiCS Lab. Section 3 proposes two potential transaction structures—(1) debt forgiveness in exchange for carbon credits and (2) using savings from debt restructuring to establish carbon-crediting projects or programs—and evaluates their respective benefits and drawbacks. Section 4 concludes with a discussion of potential risks and recommendations for capacity-building, policy harmonization, and areas for further development, including potential pilots in Africa and other climate-vulnerable regions.

2. Literature review

2.1. Evolving landscape of debt-for-climate swaps

Early experiments with debt-for-nature swaps and the issuance of thematic bonds in the 1990s and 2000s illustrated initial efforts to securitize environmental value within sovereign-debt markets, though these initiatives remained fragmented and small in scale. More recently, the concept of DFC swaps has gained renewed prominence as policymakers search for instruments that can jointly tackle fiscal stress and climate-finance shortages. Building on the legacy of debt-for-development and debt-for-nature operations of the 1990s and 2000s, current DFC swap arrangements aim to convert portions of a country's external debt into investments that advance climate mitigation and adaptation goals (Warland and Michaelowa, 2015; Chamon *et al.*, 2022).

The rationale is straightforward. For debtor countries, swaps can provide fiscal breathing space by reducing debt-service obligations and earmarking resources for priority climate change mitigation and adaptation programs. For creditors, they offer a politically visible way to support global climate change goals while maintaining repayment discipline and credit-risk management (Georgieva, Chamon and Thakoor, 2022).

The IMF's 2022 analysis formalized this dual perspective, noting that DFC swaps can lower financing costs for debtors and generate "greenium" benefits for participating creditors. However, it also emphasized that such operations remain ad hoc, small in scale, and administratively demanding. In most cases, the financial relief achieved has represented less than 1 per cent of Gross Domestic Product (GDP), limiting macroeconomic impact (Chamon *et al.*, 2022).

In parallel, the Green Climate Fund's 2024 working paper described DFC swaps as a potentially powerful response to the "climate crisis–sovereign debt doom loop," whereby climate shocks increase debt distress and debt service crowds out adaptation spending (GCF, 2024). The GCF called for programmatic, multi-creditor approaches supported by standardized frameworks for MRV of climate outcomes.

Policy discussions have increasingly framed DFC swaps as part of a broader reform of the global financial architecture, linking debt sustainability to the Paris Agreement and Sustainable Development Goals (SDGs). The T20 policy brief by the Policy Center for the New South, Morocco (Canuto et al., 2023) proposed a "Debt Relief for Climate Initiative" for Africa, combining debt reduction with targeted investment in climate change resilience and renewable energy. Similarly, regional actors such as the African Union and the African Development Bank (AfDB) have highlighted the need for debt-relief mechanisms that expand fiscal space for climate change-related spending. Initiatives such as the G20 Common Framework for Debt Treatments, the Bridgetown Initiative, and the V20 Climate Prosperity Plans have all called for innovative

instruments that integrate debt relief with climate resilience, underscoring growing political momentum for such blended fiscal–climate policy approaches.

Despite this renewed interest, the literature recognizes that most existing swaps remain fragmented and opaque, with limited transparency regarding the actual mitigation or adaptation impacts achieved (Darouich *et al.*, 2023; Weber *et al.*, 2024). Monitoring practices vary widely across deals, and few incorporate robust MRV systems. These limitations underscore the need for more standardized, performance-based approaches—a gap that some subsequent studies have suggested could be filled through integration with carbon-market instruments.

2.2. Integrating carbon credits into debt instruments

The search for more transparent and scalable approaches to debt-for-climate swaps has prompted growing interest in linking them with carbon-market mechanisms—both voluntary and compliance-based. Carbon credits, whether issued under the Paris Agreement's cooperative approaches (Article 6.2) or the Paris Agreement Crediting Mechanism (Article 6.4), provide a quantifiable and verifiable measure of climate performance that can be embedded within financial transactions. International voluntary carbon market programs have suffered from a loss of trust in the last years due to a series of scandals but carbon credits from such programs may also play a role once integrity has been established.

The IMF observed that partial repayment of loans in the form of carbon credits could reduce the cost of new debt and increase fiscal space for climate investment (Chamon *et al.*, 2022). By enabling creditors to receive measurable environmental value—either as tradable assets or as contributions toward their own net-zero targets—carbon credits can align financial and climate incentives. Similarly, the GCF (2024) highlighted that integrating environmental markets into DFC swaps can generate additional revenue streams, strengthen MRV systems, and reduce reliance on unverified indicators. This would transform debt swaps from symbolic policy gestures into performance-based finance instruments governed by transparent accounting.

The Climate Policy Initiative / FiCS Lab proposed several practical modalities for such integration (Sharma, 2025). One option is to allow repayment with carbon credits, thereby reducing debt-service obligations over time; another is to reissue existing debt under DFC conditions to investors willing to accept credits as part of repayment. These arrangements could streamline restructuring processes by introducing a common, tradable metric—a feature lacking in conventional swaps.

A complementary line of analysis, advanced by the T20 policy brief (Canuto et al., 2023), calls for a "Debt Relief for Climate Initiative" in which debt reduction is tied to investments that generate verifiable mitigation and adaptation outcomes, particularly in Africa. The brief emphasizes that transparent quantification of results through carbon-credit methodologies could attract new

classes of creditors—including institutional investors seeking Environmental, Social and Governance (ESG)-aligned sovereign exposure.

Academic work further elaborates this potential, although existing literature remains limited. Lee and Choi (2024) describe an Article 6-linked debt-for-climate swap (A6-DFCS) model that embeds dual MRV systems—one for debt management and one for carbon-credit generation—to enhance integrity and accountability. Ahmad et al. (2024) similarly argue that bilateral debt-swap financing can be indispensable for sustainable growth when combined with clear performance metrics and high-quality governance frameworks.

Collectively, these contributions suggest that carbon markets could address some of the core weaknesses of existing DFC swaps: lack of standardization, slow negotiations, and uncertain outcomes. By providing a measurable unit of climate change mitigation value, carbon credits enable both debtor and creditor to assess progress against agreed benchmarks. Yet, the literature also cautions that practical deployment remains limited and heterogeneous, reflecting differences in institutional capacity, Article 6 readiness, and creditor risk appetite.

2.3. Empirical precedent: Spain–Uruguay "Los Caracoles" wind farm project

While most studies agree that integrating carbon credits into debt-for-climate transactions could enhance scale and transparency, practical implementation remains limited. One of the earliest and most illustrative examples of connecting debt relief with carbon-market mechanisms is the Spain–Uruguay "debt-for-efficiency" swap, which financed the 10 MW Los Caracoles wind-farm project under the Clean Development Mechanism (CDM). Spain had adopted a favorable policy toward debt conversions with Latin American and African partners in the early 2000s (Cassimon, Prowse and Essers, 2014). Law No. 38/2006 formally linked debt relief to development policy, prioritizing infrastructure, health, education, and environmental conservation.

Under the Debt Conversion Program for Public Investment, signed in 2003 and renewed in 2005, Spain agreed to forgive debt owed to its *Fondo de Ayuda al Desarrollo (FAD)*—its concessional loan facility for export promotion. The forgiveness totaled roughly USD 9 million in 2003 and USD 10.8 million in 2005. In return, Uruguay committed to deposit an equivalent amount into a counterpart fund in a domestic bank account to finance agreed public-investment projects (Cassimon et al., 2014; United Nations Framework Convention on Climate Change [UNFCCC], 2020).

A bi-national Spanish–Uruguayan committee, with representatives from both ministries of economy, managed the fund and had final authority over project selection. Bidding was limited to Spanish companies or ventures using Spanish goods and services. The 2005 renewal added a specific focus on CDM projects and required that any Certified Emission Reductions (CERs) be offered first to Spain (Cassimon, Prowse and Essers, 2014; UNFCCC, 2020).

The first approved project—the *Los Caracoles* wind farm in southern Uruguay—was developed jointly by the Uruguayan state-owned utility UTE, the Governments of Spain and Uruguay, and the World Bank, which managed the Spanish Carbon Fund. The total investment amounted to USD 29.7 million: roughly one-third financed through the debt-swap fund, USD 18.9 million contributed by UTE, and about EUR 0.73 million from the Spanish Carbon Fund via advance CER purchases (Cassimon, Prowse and Essers, 2014; UNFCCC, 2020).

Without the combined support of the debt-swap and expected carbon-credit revenues, UTE's board indicated it would not have approved the project, as the arrangement substantially reduced overall costs (UNFCCC, 2020). Construction began in 2007; by January 2009 all turbines were operational, feeding power into the national grid. In 2009 UTE and the World Bank signed a letter of intent for the purchase of CERs, and the project was formally registered as a CDM activity in May 2012 for an initial seven-year crediting period, later renewed until 2026, using methodology AMS-I.D.

Spain signed a non-ODA-diversion declaration at the World Bank's request, ensuring that the debt-swap funds would not be classified as official development assistance (UNFCCC, 2020). The first issuance of credits occurred in October 2014; by July 2025 the project had produced 145,308 CERs (UNFCCC, n.d.). The activity has also requested transition to the Article 6.4 mechanism (UNFCCC, 2025). UTE considers *Los Caracoles* a landmark renewable-energy project that has operated successfully for more than fifteen years (UTE, 2024).

While UTE has consistently maintained that the debt-swap facility and expected CDM revenues were decisive enabling factors, the project's additionality has been debated. On the CDM side, the Designated Operational Entity (DOE) validated additionality via a barrier analysis (rather than investment analysis), in line with small-scale rules under AMS-I.D (UNFCCC, n.d.). Because the activity was registered as small-scale, common-practice and investment analyses were not mandatory, which narrowed the scope of the additionality test compared with large-scale projects.

It was also highlighted that procurement restrictions confined participation to Spanish firms, potentially limiting local economic spillovers (Cassimon, Prowse and Essers, 2014). The case nevertheless remains the clearest operational precedent for combining debt conversion, concessional finance, and carbon-credit generation—offering lessons for future Article 6-linked transactions on governance, transparency, and more equitable benefit-sharing.

2.4. Remaining gaps and analytical framing

The reviewed literature underscores a broad consensus that debt-for-climate swaps can contribute to both fiscal sustainability and climate change related action when supported by credible governance and transparent monitoring systems. Empirical experiences—from the Spain–Uruguay *Los Caracoles* wind-farm project to the Seychelles and Ecuador conservation swaps—demonstrate that debt conversion can mobilize investment for mitigation and adaptation. Likewise, recent

analyses by the IMF, GCF and CPI/FiCS Lab (Chamon *et al.*, 2022; GCF, 2024; Sharma, 2025), and academic work such as Lee and Choi (2024) converge on the view that linking swaps with carbon-credit mechanisms could transform them from symbolic debt-relief tools into scalable, performance-based instruments.

Yet despite this conceptual progress, the practical deployment of debt-for-carbon swap models remains highly limited. Three interrelated gaps stand out:

- **Institutional and capacity barriers** — Many debtor countries lack coordinated frameworks that bring together ministries of finance, environment, and planning to manage both debt restructuring and carbon-market operations. The state of Article 6 readiness, experience with carbon markets such as the CDM and voluntary market, and availability of domestic MRV systems remain uneven across the Global South.
- **Creditor-side constraints** — Few lenders have developed internal guidance or legal provisions allowing debt satisfaction / settlement through carbon credits. Transactions may surface and require resolution of novel questions about accounting treatment, default triggers, and valuation of non-cash instruments.
- **Transaction-design heterogeneity** — Existing cases of DCF swaps differ widely in structure, participants, and performance indicators. Without common templates or reference models, negotiation and verification remain slow and costly, discouraging replication.

As a result, there are neither sufficient examples nor a standardized framework defining how carbon credits could be generated, transferred, and accounted for within sovereign-debt operations. The literature highlights potential pathways but stops short of detailed design proposals.

This discussion paper seeks to fill that gap by developing **two conceptual transaction structures**—one in which accumulated carbon credits and carbon credit streams accruing in the future are used to satisfy part of a debt obligation, and another where savings from debt restructuring finance new carbon crediting projects or programs. These models draw directly on lessons from prior DFC experiences and current carbon-market practices under Article 6. Each structure is examined in Section 3 with attention to its potential benefits, risks, and policy implications for both debtor and creditor countries.

3. Possible debt-for-carbon transaction structures

Building on the literature reviewed above, this section outlines how carbon-credit mechanisms could be practically incorporated into sovereign debt-restructuring operations. Translating the conceptual promise of debt-for-climate swaps into actionable models requires an understanding of the underlying asset—the carbon credit—and how its generation, verification, and transfer can be aligned with debt-management processes. The discussion therefore begins with a brief explanation of the carbon-credit lifecycle (Section 3.1), which provides the technical foundation for linking verified emission reductions and removals to debt-relief milestones. It then presents two possible transaction structures: debt forgiveness in exchange for existing carbon credits and streams of future credits (Section 3.2) and the use of savings from debt restructuring to establish new crediting programs (Section 3.3). Each model is assessed in terms of feasibility, potential benefits, and practical challenges, followed by a comparative analysis (Section 3.4) and key policy considerations (Section 3.5).

3.1. Carbon-credit lifecycle

Under the Paris Agreement, two complementary approaches govern international generation and use of carbon credits. Article 6.2 enables countries to engage in bilateral cooperative approaches with the purpose of achieving their NDCs, authorizing transfers of *Internationally Transferred Mitigation Outcomes (ITMOs)* between governments or their authorized entities in accordance with UNFCCC guidance (UNFCCC, 2024a). The rules require minimum criteria for credits to be real, additional, and verified emission reductions or removals, but allow considerable flexibility in defining eligible activities and contractual terms, provided that each party applies corresponding adjustments to its NDC accounting to prevent double counting (Marr *et al.*, 2024). This flexibility makes Article 6.2 particularly suitable for bespoke sovereign arrangements, such as debt conversions or government-to-government swaps.

By contrast, Article 6.4, the Paris Agreement Crediting Mechanism (PACM), establishes a centralized UN mechanism governed by a Supervisory Body under the UNFCCC (UNFCCC, 2024b). Projects registered under Article 6.4 follow UN-approved methodologies (methodologies that must comply with Article 6.4 standards, e.g. baseline, additionality, permanence standards), undergo stringent validation and verification, and issue units recorded in the international registry (Michaelowa *et al.*, 2025). While the PACM has stricter requirements, this framework offers a high degree of standardization and environmental integrity, making it appropriate for multilateral or private-creditor transactions requiring internationally recognized certification.

Beyond the UN framework, private carbon crediting programs such as Verra or Gold Standard remain relevant, especially for countries not yet fully operational under Article 6 and for activity types that do not yet have methodologies under PACM. However, these programs often lack a consistent framework for ensuring integrity, requiring project-level vetting to verify the quality of the carbon

projects. Voluntary efforts, such as the Integrity Council for the Voluntary Carbon Market (ICVCM), are underway to establish consistent ratings criteria and global benchmarks for high-integrity credits generated under these programs, and insurance products to address reversal risks.

Against this background of these different carbon market approaches, integrating carbon credits into debt operations requires a clear understanding of how such credits are generated, verified, and authorized for transfer (in case of Article 6.2 transactions). For ministries of finance and creditors accustomed to conventional financial instruments, carbon credits represent a distinct asset class whose value is based on independently certified climate-mitigation outcomes rather than cash flows or collateral. Their credibility, and therefore their suitability for sovereign-debt transactions, depends on the integrity of the governance of the international carbon market lifecycle through which they are created.

The process begins with the design of a mitigation activity—for example a waste management project, energy-efficiency program, or land-use initiative—capable of delivering measurable emission reductions or removals. Activity developers select a methodology approved by the program defining the baseline scenario, additionality tests, monitoring procedures, design of appropriate environmental and social safeguards, and identification of sustainable development impacts. If no such methodology exists, they can propose a new one to the program administrators. In case of Article 6 transactions, operators need to take extra steps to engage with the government to determine if the activity could be authorized for international transfer (e.g., the host government will need to ensure that the authorized activity does not undermine NDC achievement).

Following independent validation, the activity is registered with one of the programs described above. Once implementation begins, the operator monitors performance over a defined period (ranging from 10-45 years from the start of the project depending on the program). Verified results are reviewed by an accredited independent auditor who confirms that the program has been carried out to the specifications detailed in the applicable methodology. Upon confirmation, the relevant program registry issues carbon credits as a unique, serialized units each representing one metric tonne of CO_2 equivalent reduced or removed. The registry allows account holders to accumulate, sell, transfer or retire issued credits and ensures that credits are issued only once.

A carbon credit's integrity rests on robust MRV, strong rules for additionality, baseline setting, permanence, and social and environmental safeguards, including benefit-sharing and respect for local rights. Carbon credits issued by well-governed programs can serve as performance-based instruments in debt transactions: verified emission reductions and removals can be linked to fiscal milestones, such as scheduled tranches of debt forgiveness or concessional refinancing.

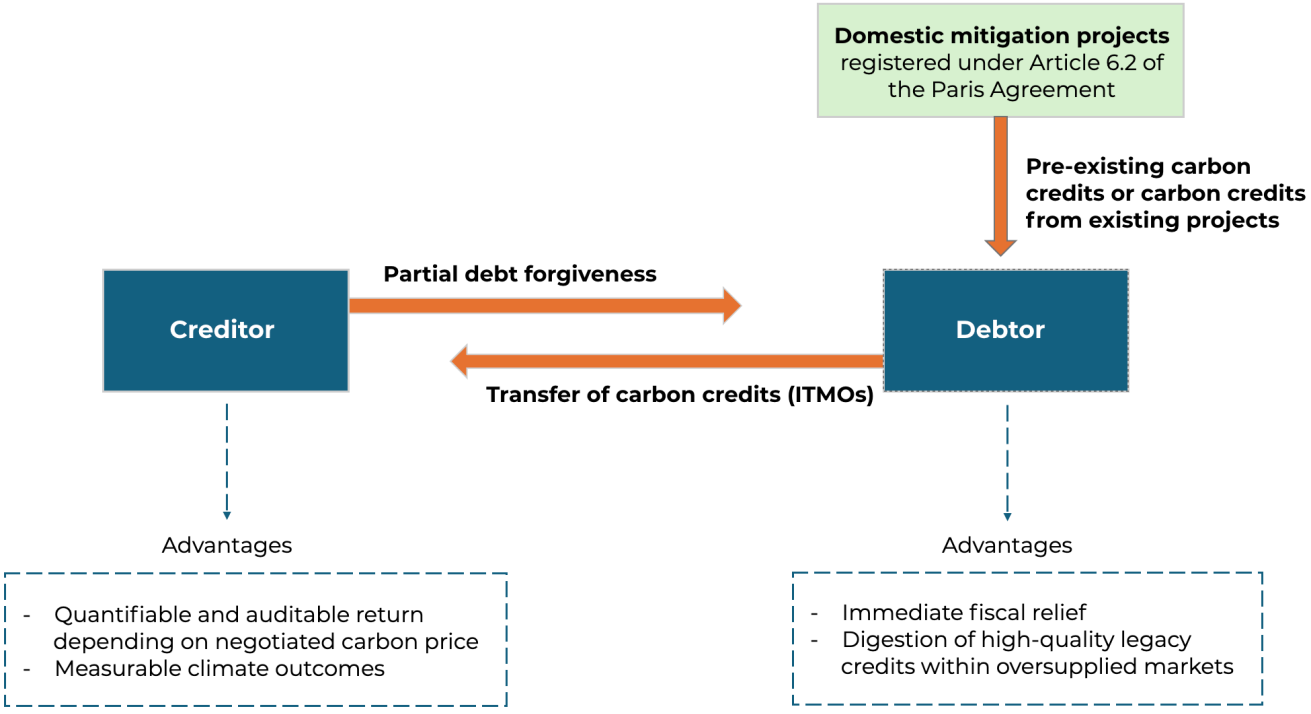
Synchronizing the carbon credit-generation process with the timeline of a sovereign-debt operation is therefore essential. During negotiations, parties can define eligible carbon crediting programs and activity types, further integrity checks if deemed necessary, and expected verification

schedules. Issuance milestones can correspond to debt-relief tranches, with contingency provisions in case of under-delivery or methodological changes. In this way, verified climate change mitigation outcomes become quantifiable benchmarks for financial performance, transforming debt conversions into transparent, results-based climate-finance instruments.

3.2. Option 1: Debt forgiveness in exchange for existing and future carbon credits

One of the most direct ways to integrate carbon markets into sovereign-debt operations is to use **carbon credits as an asset to satisfy part of a debt obligation** (Figure 3). In this model, a creditor agrees to cancel or refinance a portion of a sovereign's external debt in exchange for the transfer of accumulated carbon credits or a stream of such credits to be issued in the future. The transaction thus replaces a cash or bond payment with a verified emission-reduction outcome, aligning fiscal relief with measurable climate outcomes.

Figure 3: Debt forgiveness in exchange for existing or a stream of future carbon credits



Source: Authors

Under this approach, the debtor country would identify a portfolio of high-integrity carbon credits—either credits already issued and held in national or project registries but not sold yet, or credits to be delivered in the future over an agreed schedule following independent verification, to be authorized for international transfer. These credits could stem, for example, from domestic mitigation projects registered under the Article 6.2 cooperative approaches framework or issued under the PACM, allowing the creditor and debtor to bilaterally determine the quality standards,

price benchmarks, and terms of transfer (UNFCCC, 2024a). The transfer of *Internationally Transferred Mitigation Outcomes (ITMOs)*, once authorized and adjusted against the host country's NDC, would enable both sides to account transparently for the climate benefit while satisfying part of the debt instrument.

Should credits be transferred as part of compensation for debt relief, the question arises whether such debt relief could be treated officially as development assistance. Under OECD rules negotiated under the Development Aid Committee, during the implementation of the Kyoto Protocol, the procurement of carbon credits for use by countries for compliance with targets under the Protocol were not to be counted for the purposes of development aid. Project developers under the CDM were to provide letters attesting that no ODA funds had been provided for the purpose of generating credits.

In practice, such transactions could be formalized through Emission Reduction Purchase Agreement (ERPA) between the debtor and the creditor, or through an intermediary such as a development bank acting as trustee. The ERPA would define the quantity, type, and integrity requirements of the eligible credits; the delivery and verification schedule; and the valuation method for converting verified units into debt satisfaction. Using an ERPA framework provides legal clarity on ownership transfer and performance obligations, drawing on well-established precedents from World Bank and UNFCCC carbon-finance operations.

The model's main advantage lies in its simplicity and speed of implementation. Because it relies on credits that already exist or are highly likely to be issued due to the project being already operational, the mechanism can be executed more rapidly than the establishment of a new crediting program. For creditors, the arrangement provides a quantifiable and auditable return: each tonne of verified emission reduction / removal corresponds to the amount of debt cancelled depending on the negotiated carbon credit price. The credits could be used towards the creditors own climate commitments or sold onward into voluntary or compliance markets as eligible. Credits from existing programs have likely already undergone FPIC processes and stakeholder engagement. For debtor countries, it unlocks immediate fiscal space while creating a direct incentive to maintain participation in credible carbon-market mechanisms. Moreover, this model would create a new demand channel for carbon credits and thus lead to an increase of credit prices.

Article 6.2's flexibility makes it particularly suitable for this structure for sovereign creditors. Parties can define eligibility, quality controls, and the relative valuation of carbon credits in financial terms, while still adhering to the UNFCCC's transparency and reporting requirements. The bilateral nature of such transactions also allows customization—so that, for instance, carbon credits from priority sectors such as energy efficiency, coal power-plant retirement, or nature-based mitigation satisfying high integrity requirements can be matched with creditors whose sustainability goals align with those outcomes.

However, the model also faces notable challenges. Institutional readiness remains uneven: ministries of finance or central banks responsible for debt negotiations often have limited familiarity with carbon-market mechanisms, while ministries of environment may not be directly involved in sovereign-debt processes. Existing crediting programs will likely include benefit sharing requirements that direct a specific percentage of proceeds to stakeholders and impacted communities. Ownership and rights to transact credits generated from jurisdictional programs may require additional clarification in debtor country legal systems. Creditor institutions likewise may lack legal or accounting frameworks for recognizing carbon credits as financial assets. In many countries, Article 6 implementation infrastructure—including national registries and procedures for corresponding adjustments—remains incomplete, which could delay transfers or limit the volume of eligible credits. The UNFCCC-operated registry for Article 6 credits will resolve some of these issues but is not yet fully operational. Finally, both debtor and creditor must ensure that the transfer of carbon credits does not create ambiguity regarding default or repayment obligations, requiring careful contractual design.

Despite these hurdles, debt forgiveness in exchange for carbon credits represents a feasible near-term model for linking fiscal and mitigation objectives. It provides a concrete pathway for creditors to demonstrate measurable climate contributions while enabling debtor countries to monetize verified mitigation outcomes. The model's flexibility under Article 6.2 makes it a promising foundation for bilateral pilot transactions, particularly in sectors where robust methodologies already exist and where there is an existing stock or highly likely future stream of carbon credits.

In the illustrative example of Option 1, the debtor government commits to transfer a specified volume of already-issued, registry-recorded emission reduction units to the creditor in exchange for partial debt forgiveness. The operation provides immediate fiscal relief while ensuring that the mitigation value transferred is measurable, verified, and transparently reported. Only credits meeting robust integrity criteria—including, for instance, sound baseline setting, additionality requirements, independent third-party verification, and safeguards such as Free, Prior and Informed Consent (FPIC) for affected communities—should qualify for such a transaction. This condition protects both parties from reputational risk and ensures that the debt-for-carbon swap contributes demonstrably to national mitigation targets and global environmental goals.

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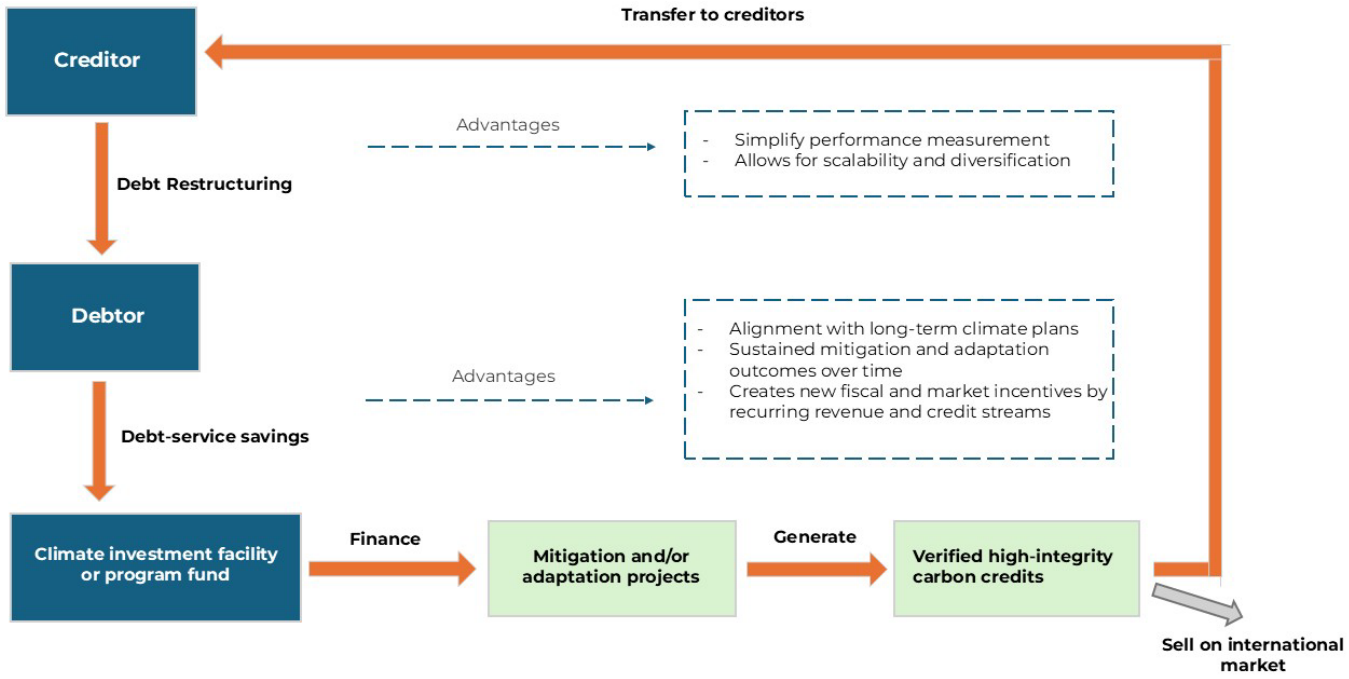
To illustrate, a structure similar to the Ghana–Switzerland cooperative approach under Article 6.2 of the Paris Agreement could be envisaged. Ghana's national crediting framework, established under its Climate Change Act and supported by the Environmental Protection Agency, enables selected projects—such as clean-cooking, waste-to-energy, and distributed renewable-energy initiatives—to issue verified emission reductions (Government of Ghana and Government of Switzerland, 2020; Ghana Carbon Market Office, 2023). Once authorized as Internationally Transferred Mitigation Outcomes (ITMOs) and recorded in Ghana's national registry, a portion of these credits could be transferred to a creditor country as part of a sovereign debt-restructuring package. The debtor thereby obtains immediate fiscal space and reduced debt-service obligations, while the creditor accesses high-integrity ITMOs toward its international climate commitments without incurring new budgetary expenditures (UNDP, 2022; ICAP, 2025). Such transactions would be formalized through a bilateral implementation agreement and an ERPA detailing credit-transfer terms and debt-servicing conditions. This option thus operationalizes the link between sovereign finance and Article 6 mechanisms, creating a replicable pathway for fiscally constrained but climate-ambitious countries.

3.3. Option 2: Using debt-swap savings to fund carbon-crediting activities

A second and more strategic approach to integrating carbon markets into sovereign-debt operations involves using **fiscal savings generated through debt restructuring** to establish new carbon-crediting projects (Figure 4). Instead of transferring accumulated or future credits from existing projects, this model channels a portion of the fiscal space created by debt relief into new activities that generate verified emission reductions or removals in the future. In doing so, it directly addresses one of the main limitations of debt-for-climate swaps—the lack of standardized, performance-based metrics—by embedding established carbon-credit methodologies and monitoring systems into the structure of the deal itself.

Figure 4: Using debt-swap savings to fund carbon-crediting programs



Source: Authors

Under this model, the debtor and creditor governments agree that a share of the debt-service savings resulting from a restructuring will capitalize a dedicated climate change mitigation funding facility or program fund. The fund then finances new mitigation projects capable of generating high-integrity carbon credits in sectors aligned with national climate and development policy priorities. Projects are designed and validated under recognized carbon market methodologies, following the same sequence described in Section 3.2. Once verified, the emission reductions / removals are issued as carbon credits, which can either be sold on the international market to generate additional revenues or transferred to creditors as performance indicators demonstrating progress under the agreement.

This structure offers several advantages. First, it can simplify performance measurement by replacing bespoke key performance indicators (KPIs) with the transparent and well-established procedures used in carbon-crediting frameworks. The carbon-credit lifecycle—from methodology approval to third-party verification and issuance—naturally aligns with the multi-year timeline of debt restructurings, allowing periodic verification to correspond with scheduled debt-service tranches. Second, the program-based design allows for scalability and diversification, enabling multiple projects or sectors to be aggregated under one national framework. Third, it enhances policy coherence by aligning investments with the host country's NDC and established safeguards, such as FPIC and benefit-sharing rules, thereby strengthening both environmental integrity and social legitimacy. Finally, by generating a pipeline of carbon credits over time, the model can create

new fiscal and market incentives, as verified units can be sold or used to attract private co-financing, thus amplifying the initial impact of the swap.

However, the approach also poses challenges. The most critical relates to additionality—ensuring that the financed projects deliver emissions reductions or removals beyond what would have occurred in the absence of the transaction. Credible baseline setting and transparent governance—ideally through PACM or high-quality Article 6.2 approaches—are therefore essential. Institutional capacity is another constraint: effective coordination between ministries of finance, environment, and planning is required to manage both debt and carbon-market processes, while Article 6 readiness must be sufficiently advanced and access to registries available to enable credit issuance and transfer. The design of such programs also involves transaction costs and lead times, as project pipelines must be developed and implemented before carbon credits are issued, delaying tangible returns for creditors.

This model embodies the kind of programmatic and scalable approach recommended in the 2024 Perspectives Climate Research study and subsequent analyses by the IMF and GCF. Anchoring debt conversions in carbon crediting projects can yield stronger long-term development impacts while maintaining transparency and accountability through established MRV systems. Yet success will depend on strengthening institutional capacity, ensuring clear additionality, and harmonizing sovereign-debt and carbon-market regulations to enable smooth implementation across ministries and counterparties.

One illustrative case could involve the early retirement of coal-fired power plants paired with renewable-energy deployment, following methodologies such as Verra's VM0052 "Accelerated Retirement of Coal-Fired Power Plants Using a Just Transition." In this model, the debt swap provides immediate fiscal relief by reducing annual debt-service obligations—ideally on debt service of the decommissioned coal plant. A portion of these savings capitalizes a dedicated facility that finances the decommissioning of a coal plant ahead of schedule and supports construction of replacement solar and wind capacity. The emission reductions achieved are verified through robust MRV procedures.

Credits are issued progressively as emission reductions are verified, with a transparent revenue-sharing framework that allocates proceeds to debt-service savings, community-transition support, and further adaptation and mitigation investments. The program includes a just-transition plan—covering worker retraining, social protection, and community development—consistent with internationally recognized safeguards and national energy-transition policies.

This approach strengthens policy coherence by linking fiscal relief directly to measurable mitigation outcomes and social benefits. It also ensures that only high-integrity transition credits (see Box 1 below), meeting strict additionality, permanence, and social-safeguard requirements, are generated and used. In doing so, it transforms the debt-for-climate swap into a performance-based

investment mechanism that simultaneously supports debt sustainability, energy transition, and equitable development.

Box 1. Transition Credits

Transition credits are a new category of carbon units created from the verified avoided emissions resulting from the early retirement of carbon-intensive assets, primarily coal-fired power plants.

- Issuance: only after closure and verification of replacement renewable capacity.
- Methodologies: emerging under Verra (2025) and Gold Standard (draft 2025) as well as approaches by ADB, the government of Singapore and other players.
- Use: sale on voluntary or Article 6 markets; transfer to creditors in debt-for-carbon swaps.
- Typical valuation: USD 11–52 per tCO_2e, reflecting high-integrity, scarcity, and transformational impact (IEEFA, 2025).
- Co-benefits: funds for worker transition and grid modernization.

Properly designed, transition-credit swaps convert stranded fossil-fuel liabilities into verifiable low-carbon assets while reducing sovereign debt burdens.

3.4. Comparative assessment of the two structures

Both approaches outlined above share the objective of linking debt relief with measurable mitigation performance, yet they differ markedly in their operational logic, timing, and institutional requirements. The first model—**debt forgiveness in exchange for existing carbon credits**—is transaction-driven and relies on accumulated or units to be generated by existing projects to satisfy part of a sovereign obligation. The second—**using debt-restructuring savings to establish carbon-crediting programs**—is program-driven, reinvesting fiscal space into new mitigation activities that generate credits over time. The following table compares the main features, advantages, and challenges of each structure.

Table 1: Comparison of the two debt-for-carbon transaction models

Dimension	Option 1: Debt forgiveness for carbon credits	Option 2: Using debt-swap savings to fund carbon-crediting programs
Core mechanism	Transfer of accumulated or to be issued carbon credits from existing mitigation projects (ITMOs or high-integrity voluntary-market units) in exchange for partial debt cancellation.	Allocate a portion of debt-service savings to a mitigation funding facility that finances new mitigation or adaptation projects generating verified carbon credits.

Dimension	Option 1: Debt forgiveness for carbon credits	Option 2: Using debt-swap savings to fund carbon-crediting programs
Speed and complexity	Rapid execution; fewer institutions involved; depends on credit supply and host Article 6 readiness.	Slower start-up; requires program governance, project pipelines, and sustained MRV capacity.
Scalability	Limited by available carbon credit stock and expected issuance volumes of existing projects. Sovereign to sovereign transactions necessarily involve larger volume programs.	Higher potential for scale through aggregation of multiple projects and long-term investment cycles.
Integrity and MRV	High by design if limited to credible carbon market programs but subject to negotiation.	High by design if limited to credible carbon market programs.
Policy alignment	Strong when credits come from NDC-priority sectors and are formally authorized by the host country.	Strong structural alignment: the program can be designed around NDC implementation and national climate-finance strategies.
Financial effects	Provides immediate fiscal relief and can absorb high-quality legacy carbon credits. Debt transactions may be more accessible than new capital for purchase transactions.	Creates recurring revenue or carbon credit streams that can attract private co-investment and reduce long-term financing costs.
Key risks	Additionality and baseline integrity; delivery risk if credits are to be issued; uneven Article 6 readiness; benefit sharing distribution; ownership and transfer rights may need clarification.	Additionality and baseline integrity; coordination across ministries; long lead time before credits are generated.
Best suited contexts	Bilateral restructurings, countries with existing credit inventories and operational Article 6 frameworks.	Multi-creditor restructurings or countries seeking to build carbon crediting pipelines.

While Option 1 offers **speed and simplicity**, its scope is limited by the availability and integrity of existing credits and projects. Option 2, though more complex, provides a **strategic and scalable pathway** that embeds performance-based financing into long-term national climate change mitigation plans. In practice, the two models are complementary: a country might use a quick bilateral credit transfer (Option 1) to unlock immediate relief while investing part of the fiscal savings into a broader crediting program (Option 2) that delivers sustained mitigation (and possibly adaptation) outcomes over time.

3.5. Policy and legal considerations for implementation

Translating these conceptual models into practice requires careful attention to the legal, institutional, and accounting dimensions of sovereign-debt operations. Although both options rely on the same principle—linking debt relief to verified climate outcomes—their execution depends on clear definitions of eligibility, transparent governance of carbon-credit transfers, and mutually recognized accounting and reporting rules.

A first consideration concerns **the eligibility and integrity of carbon credits**. Parties must agree on the types of units that can be delivered or generated within a debt transaction, as well as on the standards that define their environmental quality. In most cases, this will involve debtor countries specifying whether credits originate under *Article 6.2 cooperative approaches*—where authorized *Internationally Transferred Mitigation Outcomes (ITMOs)* are adjusted against the host country's NDC—or under *Article 6.4* or credits from high-integrity voluntary programs, and creditors establishing or adopting high-integrity credit eligibility criteria. Variation in credit quality, anticipated reversal risk, and market demand will vary, in many ways mirroring variations in sovereign debt. These variations can be reflected in deal terms such as pricing, volume, and using guarantees and insurance as with other financial transactions.

A second aspect involves **ownership, transfer, and authorization procedures**. Under Article 6.2, the term sheet must set out how and when the host government will authorize the transfer, how the registry will record it, and at what point legal title to the credits passes—whether at issuance, escrow release, or registry confirmation. These elements are critical to defining when the sovereign's performance obligation is fulfilled and how the creditor can account for the received asset. For transactions relying on voluntary-market registries, similar provisions are needed to ensure delivery certainty and traceability, often through *delivery-versus-payment* or *escrow* arrangements. Credits derived from jurisdictional programs may require additional ownership and right to transfer clarification in debtor country legal systems.

Equally important is the **accounting and financial treatment of credits** within debt instruments. Using carbon credits to satisfy part of a sovereign obligation should be framed not as a substitute for repayment, but as an agreed mode of performance under the contract. Legal documentation should therefore specify that credit delivery—up to an agreed limit—constitutes valid satisfaction of the payment obligation and does not trigger default. The valuation methodology, price reference, and currency treatment should be clearly stated, along with provisions for verification and auditor confirmation. Model documentation from existing carbon-finance ERPAs could also inform the drafting of future debt-for-carbon agreements, particularly clauses on delivery, valuation, and force-majeure risk. This clarity reduces uncertainty for both debt-management offices and credit-risk assessments.

Another set of issues arises around **institutional coordination and capacity**. In most countries, ministries of finance lead debt management, while ministries of environment oversee carbon-market participation. Effective implementation requires close cooperation between these entities, as well as with central banks and statistical offices responsible for fiscal reporting. Without shared protocols and interoperable registries, the administrative burden of integrating climate and debt data can outweigh the benefits of the transaction.

Finally, both options must comply with **social and environmental safeguards**. Projects financed or credited under a debt-for-carbon arrangement must uphold recognized principles such as FPIC of

affected communities, transparent benefit-sharing mechanisms, and grievance procedures aligned with national legislation. Incorporating these standards not only reduces implementation risk but also strengthens the legitimacy of the swap, ensuring that the pursuit of fiscal relief does not come at the expense of local rights or environmental integrity. Debt transactions leveraging credits from existing programs must honor pre-existing benefit sharing agreements.

From a policy perspective, the success of debt-for-carbon instruments will depend on whether these legal and institutional foundations can be established at scale. Pilot transactions should therefore include clear contractual templates, model clauses on credit delivery and valuation, and explicit references to national Article 6 frameworks. In parallel, coordination among finance, environment, and planning institutions will be essential to mainstream such mechanisms into broader fiscal and climate strategies.

The two models outlined above demonstrate that carbon credits can transform debt-for-climate swaps from ad hoc financial relief instruments into transparent, performance-based mechanisms for aligning fiscal policy with mitigation action. Whether through the transfer of accumulated and new credits from existing projects or the creation of new crediting programs, both approaches make it possible to quantify the mitigation value of debt operations and to link repayment or relief directly to verified emission reductions and removals.

Their feasibility, however, hinges on several enabling conditions. Clear legal recognition of carbon credits as a valid mode of debt performance, credible measurement and verification systems under Article 6, and coordinated governance between finance and environment ministries are all prerequisites for implementation. Equally important is the readiness of both debtors and creditors to treat carbon markets not merely as environmental tools but as integral components of sovereign financing.

In practice, currently only a few countries and institutions have the technical capacity, policy frameworks, and market awareness needed to operationalize such transactions. The next section therefore discusses why debt-for-carbon instruments remain rare and what reforms could help overcome them.

4. Discussion and recommendations

Despite growing political interest and the increasing alignment of climate policy and debt agendas, the practical deployment of debt-for-carbon transactions remains extremely limited. Understanding why these innovations have not yet scaled is essential to identifying the policy and institutional reforms needed to enable the next generation of debt-for-climate swap mechanisms.

4.1. Understanding limited deployment

The first constraint lies in the **heterogeneous nature of sovereign-debt restructuring itself**. Each negotiation reflects a unique combination of creditor composition, fiscal pressures, and political economy factors. Bilateral, multilateral, and commercial creditors have different mandates, accounting standards, and tolerance for concessionality, making it difficult to replicate transaction models across cases. For many official creditors, internal guidelines still provide no reference for accepting non-cash settlement instruments such as carbon credits, while commercial lenders remain primarily focused on credit-risk mitigation rather than environmental co-benefits.

On the debtor side, **institutional and technical capacity** often limits readiness to integrate carbon markets into fiscal or debt-management strategies. Ministries of finance typically oversee restructuring and macroeconomic planning, whereas ministries of environment or climate change manage Article 6 participation, related infrastructure, and NDC implementation. The absence of coordination mechanisms between these entities means that opportunities to link debt operations with mitigation investment are rarely identified or operationalized in practice.

A further barrier is the **siloed expertise** between the sovereign-debt and carbon-market communities. Debt specialists tend to view carbon credits as uncertain, non-fungible assets, while carbon-market professionals often lack familiarity with the legal, accounting, and policy constraints of sovereign restructuring. This gap has prevented the development of shared templates, valuation methods, and standard documentation—factors that could otherwise streamline negotiation and build confidence among parties.

Finally, **market and policy uncertainty** has also played a role. The international carbon market under Article 6 remains in its early implementation phase, and voluntary carbon markets have been affected by numerous scandals about their environmental integrity and resulting pressure on credit prices. These factors have suppressed demand for credits, even when they are high quality and transparently verified. As the Article 6.2 and 6.4 carbon markets mature and integrity standards become more harmonized, these concerns are likely to diminish, creating a more predictable environment for such hybrid transactions.

4.2. Strategic recommendations

Addressing these barriers requires targeted actions by debtor governments, creditor institutions, and international organizations. The following recommendations outline a pathway to unlock the potential of debt-for-carbon swaps and ensure that future transactions are credible, transparent, and developmentally beneficial.

(1) Build institutional capacity in debtor nations.

Governments—particularly ministries of finance—need technical support to understand and manage carbon credits as a financial asset class. This may include integrating credit revenues into balance-of-payments frameworks, developing domestic registry and MRV systems, and establishing cross-ministerial coordination between finance, environment, and planning agencies.

(2) Adopt minimum quality standards for carbon credits.

To maintain confidence among creditors and investors, debt-for-carbon transactions should focus on high-integrity credits that meet recognized quality benchmarks. A benchmark approach would be a limitation to PACM credits. For Article 6.2 approaches, transparent governance and high-quality methodologies would be a necessary condition in addition to the UNFCCC-prescribed, corresponding adjustments, transparent authorization procedures, and reporting. Use of voluntary carbon-market credits, including those authorized under Art. 6.2 cooperation, should be limited to those generated by methodologies approved as Core Carbon Principle (CCP) aligned by the ICVCM.

(3) Enhance awareness among creditors and financial institutions.

Official and private creditors should build literacy around the carbon-credit development process, integrity labels, and emerging market demand. Dedicated guidance notes—by multilateral banks and international financial institutions—could clarify how carbon credits may be integrated into restructuring frameworks, including valuation principles and risk management practices.

(4) Clarify the legal and accounting treatment of carbon-credit payments.

Debt-restructuring policies and legal documentation should explicitly recognize that the delivery of verified carbon credits of a pre-defined quality class constitutes an agreed mode of performance rather than default. Standard clauses could provide guidance on carbon credit eligibility, valuation, timing, and verification requirements, thereby reducing negotiation time and uncertainty across future transactions.

(5) Quantify the fiscal and macroeconomic benefits of mitigation investment.

Integrating mitigation investment into sovereign credit assessments can strengthen the case for debt relief or concessional financing. Empirical evidence linking an increased economic efficiency

through mitigation to improved sovereign creditworthiness would help mainstream such considerations in rating methodologies and debt-sustainability analyses.

(6) Promote regional pilots and peer learning—especially in Africa.

African countries face both high debt vulnerability and significant mitigation and adaptation finance needs. Establishing a series of pilot transactions under harmonized guidance could demonstrate feasibility and create a demonstration effect for other regions. Regional development banks, the African Union, and multilateral partners could play a catalytic role by providing de-risking instruments and technical assistance.

4.3. Towards the roadmap for implementation

The convergence of debt distress and climate crisis underlines the urgency to redesign sovereign financing tools in a way that delivers both fiscal stability and environmental integrity. Integrating carbon credits into debt operations is not a panacea, but it provides a measurable, performance-based bridge between two policy domains that have long evolved in isolation. As carbon markets mature and institutional readiness improves, such instruments could form an important part of a broader architecture for sustainable debt management—one that rewards credible climate action with tangible financial benefits.

This discussion paper is part of a broader effort to make DFC swaps more effective, scalable, and aligned with international climate policy objectives. The analysis has shown that integrating carbon-credits—whether through the transfer of accumulated and future high-integrity credits from existing projects or the creation of programs mobilizing new mitigation projects—can help transform DFC swaps into transparent, performance-based instruments that link fiscal relief directly to measurable mitigation outcomes. Yet realizing this potential requires moving from conceptual design to practical implementation.

The next step should therefore be the development of a Roadmap for improved DFC swaps, providing structured guidance for policymakers, development banks, and financial institutions. This roadmap will translate the conceptual models discussed here into operational steps. This would explore how international carbon-crediting frameworks can serve as delivery mechanisms, ensuring robust MRV of emission reductions and enhancing the financial terms of swaps through results-based finance.

By defining standard metrics, integrity thresholds, and governance models, the roadmap will help create a scalable template for next-generation DFC swaps, reducing transaction costs and improving financial credibility. In the future, this approach could be expanded into the adaptation policy space, building on innovative impact metrics—such as those piloted under the African Development Bank's Adaptation Benefits Mechanism (ABM)—that can quantify resilience outcomes within non-market approaches under Article 6.8 of the Paris Agreement. Such an

expanded approach would enable national and multilateral development banks to integrate measurable mitigation and adaptation outcomes into debt-relief operations. Ultimately, this second phase aims to lay the groundwork for a standardized, results-driven architecture that aligns debt sustainability with the global goals of the Paris Agreement.

Annex 1 — Indicative actors for debt-for-carbon deals

Stakeholder	Role
Ministry of Finance	Leads debt negotiation; allocates fiscal savings
Ministry of Environment / Climate Change	Ensures NDC alignment, Article 6 authorization, MRV oversight
Central Bank / Debt-Management Office	Integrates credits into sovereign-balance-sheet accounting
Multilateral Development Banks (MDBs)	Provide guarantees, concessional refinancing, and validation support
Private creditors / bondholders	Potential participants in voluntary exchange offers
Verification bodies	Conduct independent MRV under approved methodologies
Civil-society and local communities	Ensure FPIC and benefit-sharing implementation

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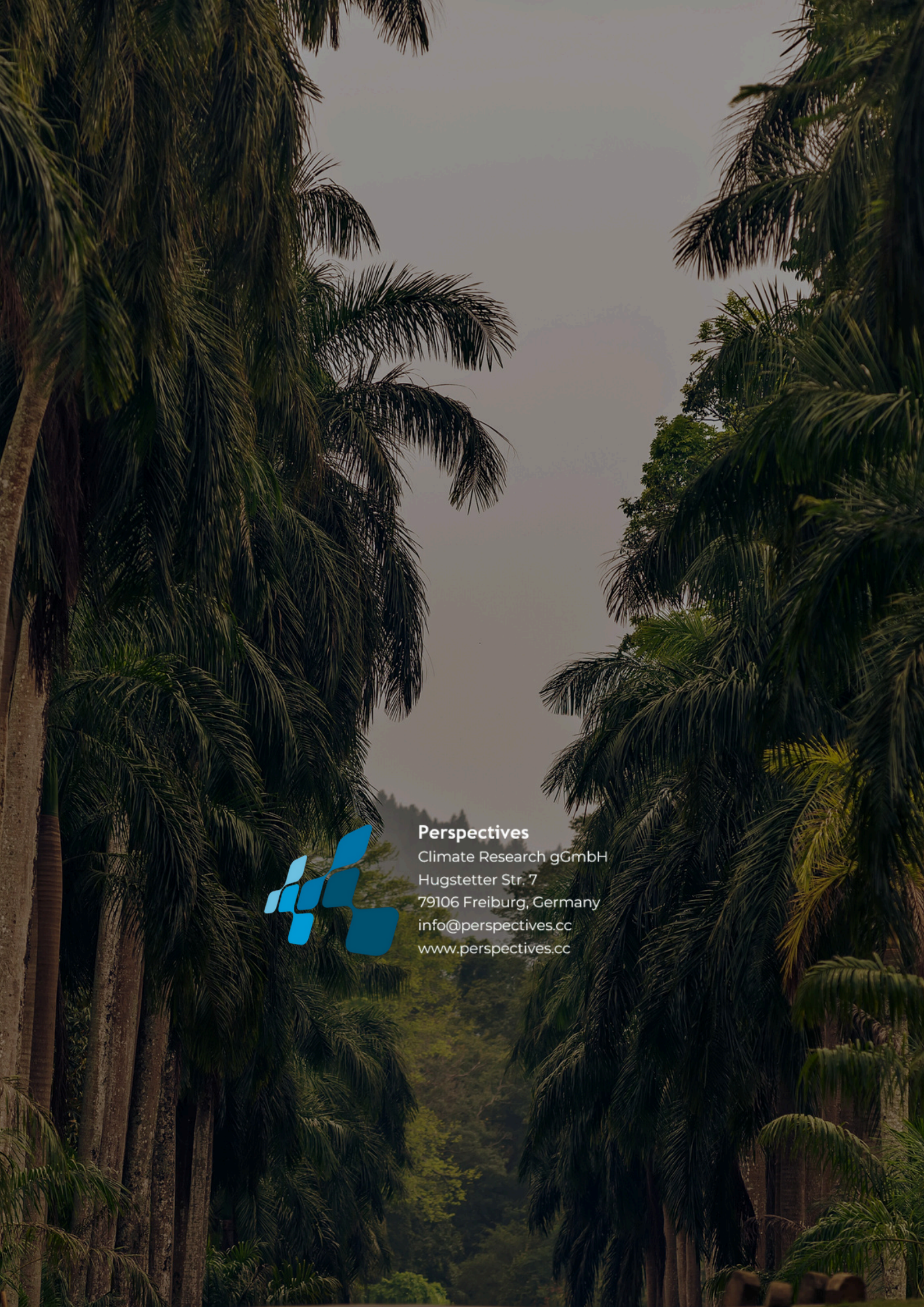

Perspectives
Climate Research gGmbH
Hugstetter Str. 7
79106 Freiburg, Germany
info@perspectives.cc
www.perspectives.cc