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ALIGNING NATURE, FINANCE, AND DEVELOPMENT: INNOVATIONS FOR THE TRIPLE CRISIS

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Nature at the center of the triple crisis

Low- and middle-income countries (LMICs) are confronting a convergence of crises that are no longer separable in policy or finance: accelerating nature loss, intensifying climate shocks, and rising sovereign debt burdens.

Nature now sits at the center of the “triple crisis” because the same economic choices that deepen debt vulnerabilities are also accelerating climate shocks and ecosystem breakdown—and in LMICs these pressures collide directly in fiscal space and sovereign risk. As of 2026, there is at least a 70% probability that the five-year global mean temperature for 2025-2029 will exceed 1.5°C above pre-industrial levels, underscoring how close the world is to sustained climate overshoot.¹ At the same time, global financial flows continue to drive environmental decline: The “State of Finance for Nature” report by the United Nations Environment Programme (UNEP) estimates \$7.3 trillion per year in nature-negative finance flows in 2023, roughly 30 times larger than finance directed toward nature-based solutions.²

¹ World Meteorological Organization (2025).

² UNEP (2026).

While debt burdens have risen, development finance has retreated. The World Bank reports that developing countries paid out \$741 billion more in debt service than they received in new financing over 2022-2024—the largest gap in 50 years—and net public flows turned negative in 2023-2024.³ Once estimated illicit financial flows, conservatively in the hundreds of billions a year, are added to debt service, outflows of public and illicit capital exceed what arrives through aid and new lending, even as development needs escalate.⁴

The 2024 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) “Nexus Assessment” shows it is critical to recognize that the current debt, biodiversity, water, food, health, climate, and overall inequality crises are deeply interconnected and that siloed policy responses risk undermining each other.⁵ Climate change and ecosystem degradation undermine growth, fiscal stability, and export performance. Higher risk perceptions raise borrowing costs, compress fiscal space, and discourage investment in resilience, particularly for LMICs. Debt distress, in turn, limits governments’ ability to invest in the natural capital that underpins long-term development.

This “triple crisis” is increasingly recognized in global policy discourse, from the Bridgetown Initiative to the Expert Review on Debt, Nature and Climate.⁶ Nonetheless, the global financial architecture has been slow to adapt. Sovereign risk assessments, debt sustainability analyses, and capital market instruments continue to treat nature largely as an externality or downside risk, rather than as a productive asset capable of strengthening macro-fiscal resilience.

And yet, ecological degradation is no longer a peripheral or future risk. It is already embedded in the system and now actively manifesting as:

- fiscal stress at national and subnational levels
- rising insurance losses and market withdrawal
- rising credit losses and de-banking
- macroeconomic volatility and repricing of assets
- supply chain disruptions and revenue at risk
- constraints on and disruption of development and growth pathways

Treating nature as niche is simply no longer credible economics—rather, nature is increasingly recognized as core economic and financial infrastructure. This chapter explores how innovative finance for nature offers a practical pathway to realign incentives across the environment, the financial system, and the real economy to reflect this reality.

This chapter argues that the core challenge is not a shortage of capital but a failure of translation: The gains from investing in natural capital cannot yet travel through the decision systems that govern sovereign creditworthiness, debt sustainability, and market access. Until they can, nature-positive investments will remain fiscally invisible—competing for scarce budget resources rather than strengthening the fiscal position of the countries that make them. This failure is directly relevant to the post-2030 development agenda: a successor framework that does not resolve it will reproduce the same structural gap as the Sustainable Development Goals (SDGs)—goals without the

3 World Bank (2025c), xi; see also World Bank (2025b); ONE Campaign (2026); and Harcourt et al. (2025).

4 Tax Justice Network (2024). The report estimates global losses to cross-border tax abuse at approximately \$492 billion annually, with lower-income countries bearing the heaviest losses relative to their tax revenues.

5 IPBES (2024).

6 See more on the Bridgetown Initiative at <https://www.bridgetown-initiative.org/>; Expert Review on Debt, Nature and Climate (2025).

financial architecture to reach them. Innovative finance for nature is beginning to show how this translation can be built: through instruments that link performance to credibility, mechanisms that embed resilience into debt and risk frameworks, and country platforms that connect landscape-level outcomes to sovereign balance sheets. The innovations examined here are not peripheral to the next development framework—they are a precondition for it.

The chapter proceeds as follows: The first two establish why nature is macro-critical for LMICs and how the debt-nature feedback loop operates, illustrated through Uganda’s work on resilience-adjusted sovereign finance. Then, the chapter examines the main instruments now in use: sustainability-linked bonds and debt swaps, climate-resilient debt clauses, sustainability-linked insurance, and the role of central banks in treating nature as a systemic risk. Next, the chapter moves to landscape and market-level mechanisms—payments for ecosystem services, biodiversity credits, nature as infrastructure, and the bioeconomy as a structural development strategy. The remaining sections take up the challenge of embedding nature into credit risk frameworks, and address the risks of poor design, fragmentation, and niche confinement—and the guardrails needed to avoid them. The conclusion draws out what it would take to move from pilot innovation to the institutional change required for nature to function as a foundation of resilient development in a post-2030 agenda.

Why nature matters for development finance

NATURE AS A MACRO-CRITICAL ASSET

For many LMICs, natural capital is not peripheral to the economy—it is foundational. Agriculture, forestry, fisheries, tourism, hydropower, and bio-based industries account for a large share of employment, exports, and fiscal revenues. Degradation of ecosystems therefore transmits directly into macro-fiscal stress through multiple channels: lower growth, higher volatility, balance-of-payments pressures, and increased contingent liabilities from disasters. Making nature “macro-critical” is not merely a rhetorical device: It would mean, concretely, that nature-related risk and resilience factors enter debt sustainability and sovereign credit analyses, that sovereign credit ratings methodologies factor in the vital role of ecosystem services as foundations of economic dynamism, resilience, and export competitiveness, and that natural capital appears in public investment programming and national fiscal frameworks alongside conventional infrastructure. The chapter’s instruments should be evaluated against this standard.

Mainstream financial analysis has to date largely treated nature in asymmetric terms: Climate and environmental hazards are increasingly modeled as risks, but interventions that reduce those risks are not recognized in a proportionate or systematic way. This creates a structural bias and disincentive: Governments and companies are penalized for vulnerability but not rewarded for active steps to improve resilience.

Recent analytical work highlights how this asymmetry influences cost of capital calculations, both quantitatively as well as qualitatively.⁷ Quantitative stress tests can now simulate how nature loss scenarios impact risk metrics at the country, portfolio, and counterparty levels.⁸ Qualitative factors such as governance and institutional strength play a decisive role in credit ratings, yet these factors are often assessed through evaluation criteria and indicators

⁷ NatureFinance (2026).

⁸ Lewsey (2022); ECB (2026).

that generally fail to capture the resilience-enhancing effects of environmental policies. As a result, countries that invest in nature-based solutions may see no benefit in terms of creditworthiness and borrowing costs, even when those investments are materially reducing long-term financial and fiscal risk in practice.

THE DEBT–NATURE FEEDBACK LOOP

The interaction between sovereign debt distress and nature loss is not incidental. Fiscal constraints delay investment in land restoration, watershed protection, and climate-resilient agriculture. Environmental degradation then increases exposure to floods, droughts, and commodity shocks, raising future fiscal costs and the prospect of major economic shocks. This feedback loop is particularly visible in countries where soft commodities—particularly vulnerable sectors in a rapidly warming world—dominate foreign exchange earnings.

Uganda provides a clear illustration of this dynamic (see more in box 6.1). Climate variability and land degradation threaten agricultural productivity and export performance, while high debt burdens and rising debt service costs limit the fiscal space for investment in adaptation and resilience. Recent work shows that targeted investments in climate- and nature-resilient agro-industrialization could increase medium-term growth while reducing macroeconomic volatility—yet these benefits are largely invisible in conventional risk pricing and credit assessment frameworks.⁹ Breaking this loop requires mechanisms that can translate proactive resilience into improved creditworthiness.

9 Uganda, Ministry of Finance (2026).

BOX 6.1

Uganda as a proof point: Making nature and resilience macro-critical

Uganda illustrates how investments in nature and climate resilience can be reframed from unmitigated fiscal costs into macro-critical credit strengths—if they are made visible within debt and credit frameworks.

Like many low-income countries, Uganda faces tightening fiscal space from rising global interest rates and elevated debt burdens. At the same time, its economy remains highly exposed to climate variability and ecosystem degradation, particularly in agriculture, which underpins growth, exports, and livelihoods. Sovereign risk assessments by credit ratings agencies and international financial institutions capture these vulnerabilities on top of the budgetary outlays on climate-proofing infrastructure and regenerative agriculture, but they understate the stabilizing effects of these measures.

To address this asymmetry, Uganda is pioneering a key performance indicator (KPI)-tagging approach to macro-fiscal planning and public financial management that explicitly connects sector-level projects and programs to improved macro-fiscal outcomes. The approach operates across three levels. National-level KPIs embed resilience priorities—such as climate-smart agriculture and ecosystem restoration—into fiscal and development strategies. Program and project KPIs verify delivery on the ground, shifting assessments from policy intent to demonstrated performance. Macro-fiscal KPIs then translate these outcomes into impacts on growth, volatility, external balances, and debt dynamics, making resilience financially material for IMF debt sustainability analysis and sovereign credit rating assessments.

Initial modeling has estimated the reduction in expected losses for 100-year flood and drought events under future climate conditions in terms of GDP impacts and knock-on effects on debt sustainability and credit metrics. Preliminary analysis indicates that combined adaptation and resilience measures across both hazards preserve 0.76 percentage points of GDP during severe climate years and keep public debt's present value about 1.1-1.2 percentage points of GDP lower than it would be without mitigation throughout the projection period. These initial findings capture only the quantitative impacts of the modeled shocks; hence, the uplift is likely to be much greater once other sectors, transmission channels, and qualitative factors are taken into account.

By converting resilience performance into measurable, verifiable evidence, Uganda demonstrates how nature-positive investments can improve credit narratives rather than compete with them for scarce fiscal space—offering a practical blueprint for aligning nature, development, and sovereign finance in debt-constrained settings.

SOURCE: Uganda, Ministry of Finance (2026), vi. Results are preliminary; full analysis incorporating chronic climate effects is forthcoming.

From risk to resilience: Innovations in sovereign and public finance

SUSTAINABILITY-LINKED SOVEREIGN FINANCING

Sustainability-linked financing (SLF) aims to reorient sovereign debt markets toward measurable climate, nature, and development outcomes. At its core are sustainability-linked bonds (SLBs) and sustainability-linked loans (SLLs), where sovereign issuers commit to defined sustainability targets—with financial terms such as interest margins or pricing linked to achieving those KPIs.¹⁰ SLBs and SLLs complement “use-of-proceeds” instruments by introducing performance-based financial incentives: Rather than earmarking funds for specific projects, they link financing terms to the achievement of agreed sustainability targets or KPIs.

For sovereigns, this shift is particularly important. It allows governments to integrate sustainability goals directly into core fiscal planning and debt management strategies, rather than treating them as isolated projects or ancillary objectives. Côte d’Ivoire’s “Sustainability-Linked Financing Framework” demonstrates how nature-relevant KPIs—such as improved forest cover and increased renewable energy capacity—can be embedded in sovereign financing with transparent reporting structures and third-party verification (see box 6.2). There have been several examples of SLBs to date such as Chile and Uruguay.¹¹

Beyond these, debt-for-nature swaps—in which a portion of a country’s external obligations is restructured or repurchased at a discount in exchange for locally funded environmental investment commitments—are re-emerging as mechanisms that link debt relief with conservation and climate action.¹² Examples include transactions in Belize and Barbados that redirect savings toward marine protection and resilience, and multilateral efforts such as the Global Hub on Debt for Development Swaps launched with support from Spain and the World Bank to scale such approaches.¹³ Recent analysis suggests that pairing SLBs, SLLs, and debt swaps with credit enhancement tools like guarantees or credit risk insurance could reduce perceived risk, attract private capital, and make sustainability-linked sovereign financing more scalable and impactful.¹⁴

Crucially, sustainability-linked instruments can create a credible signaling mechanism. When KPIs are well designed and independently verified—through a debt restructuring or a new SLB issuance—they provide forward-looking information to investors and rating agencies about policy commitment, institutional capacity, and delivery performance, both on nature and climate specifically, and on broader fiscal governance. However, while issuance of such instruments remains relatively small-scale and sporadic, the signals are not yet strong enough to shift risk perceptions and pricing. Realizing that potential also hinges on complementary changes in sovereign risk measurement and

10 NatureFinance (2023).

11 OECD (2024).

12 Whiting (2024).

13 Nature Conservancy (2022); Inter-American Development Bank (n.d.); World Bank (n.d.).

14 Task Force on Credit Enhancement for Sustainability-linked Sovereign Financing (2025).

pricing methodologies, including updates to the World Bank-IMF debt sustainability analysis frameworks for LMICs and market access countries.¹⁵ Credit ratings agencies will need to accord greater weight to resilience and adaptation policies in their rating criteria, and look past their short time horizon to see the positive medium-term impacts that such interventions have on credit profiles.¹⁶ Hence, the signaling potential is real, but it remains largely unrealized in operational terms.

BOX 6.2

Côte d'Ivoire's 'Sustainability-Linked Financing Framework': Nature performance meets sovereign finance

Côte d'Ivoire provides one of the most advanced examples of how nature-related performance can be embedded directly into sovereign financing terms.

Building on earlier green and social bond issuances, the government introduced a Sustainability-Linked Financing Framework that links borrowing costs to performance on clearly defined climate and nature indicators. The framework focuses on two macro-critical sectors. In energy, a KPI tracks the share of non-hydro power renewable energy in installed electricity capacity, supporting energy security and climate resilience. In forestry, KPIs track gross forest cover loss and gain, addressing deforestation risks that threaten exports, rural livelihoods, and long-term growth.

What distinguishes Côte d'Ivoire's approach is not only KPI selection but the supporting credibility infrastructure. Targets are aligned with national strategies and Nationally Determined Contributions, assessed for ambition and feasibility, and underpinned by robust monitoring, reporting, and verification systems using geospatial data. The financing structure incorporates both interest rate step-ups and step-downs, penalizing underperformance while explicitly rewarding overachievement.

By explicitly linking forest and energy outcomes to the cost of capital, Côte d'Ivoire's SLF Framework operationalizes the principle that natural capital stewardship strengthens sovereign creditworthiness. It demonstrates how sustainability-linked instruments can move beyond signaling to become incentive-compatible tools, aligning investor returns with nature-positive development outcomes and offering a scalable model for other nature-rich LMICs.

SOURCE: World Bank (2025a).

¹⁵ World Bank (2026a; 2026b).

¹⁶ NatureFinance (2026).

CLIMATE- AND NATURE-RESILIENT DEBT CLAUSES

Climate-resilient debt clauses (CRDCs)—sometimes called debt pause clauses—address a different dimension of the triple crisis: liquidity shocks that tend to follow natural disasters.¹⁷ These clauses allow temporary suspension of debt service after predefined climate events, providing fiscal breathing space without triggering default. They are not a solution in and of themselves, but they are an important enabler for more structural reforms—preserving the fiscal capacity and policy credibility that sustainability-linked instruments require to function.

Recent experience shows that, when included ex ante into debt contracts and under certain strict conditions, CRDCs can avoid being treated as credit negative by rating agencies and can even enhance resilience by reducing the likelihood of destabilizing ratings downgrades and disorderly defaults. While CRDCs do not directly finance nature investments, they complement sustainability-linked instruments by protecting fiscal space during shocks that can derail progress on achieving their performance targets. Efforts like the London Coalition on Sustainable Sovereign Debt, launched by the U.K. government around the 2025 U.N. Financing for Development Conference, are seeking to advance innovations in new debt contracts, including expanded CRDCs as well as new Majority Voting Provisions, to promote transparency, more orderly restructurings, and more resilient borrowing frameworks.¹⁸

CREDIT ENHANCEMENT AND BLENDED STRUCTURES

For many LMICs, the challenge is not willingness to adopt performance-linked instruments, but rather, accessing markets on affordable terms. Credit enhancement—through the provision of guarantees, insurance, or concessional capital by development finance institutions—is another important enabler that can play a catalytic role for structural solutions.

Recent analysis suggests that credit-enhanced sustainability-linked sovereign transactions could refinance tens of billions of dollars in existing debt while embedding climate and nature performance into financing terms (see box 6.3 for more information).¹⁹ By reducing risk for private investors, these structures can crowd in capital at scale, provided governance and monitoring systems are robust.

CENTRAL BANKS AND NATURE AS A SYSTEMIC RISK

There is growing acknowledgment among central banks and financial supervisors that nature degradation carries macro-critical financial risks that cannot be separated from climate risks. Research such as Nicola Ranger’s 2023 “The Green Scorpion” study for the Network for Greening the Financial System (NGFS) demonstrated that nature and climate risks interact strongly with complex feedback, creating nonlinearities and tipping points that significantly underestimate actual risks when assessed in isolation.²⁰ The NGFS subsequently published a conceptual framework in 2024 establishing a three-phase risk assessment framework to help central banks identify sources of physical and transition risks, assess economic impacts, and evaluate risks to the financial system, while acknowledging that existing models persistently underestimate nature loss consequences.²¹ Subsequent work on nature-re-

17 Sustainable Sovereign Debt Hub (2025).

18 Singla (2025).

19 Task Force on Credit Enhancement for Sustainability-linked Sovereign Financing (2025).

20 Ranger (2023).

21 Network for Greening the Financial System (2024).

lated stress tests for the U.K. found that there could be a 12% loss to U.K. GDP as a result of nature degradation, and when nature-related risk amplifications are incorporated into climate scenarios, the overall impact of climate change on the U.K. economy is estimated to double beyond present NGFS forecasts.²²

Pioneering integrated scenario work is now being directly undertaken by leading central banks such as the European Central Bank (ECB), further reinforcing the material consequences of treating climate and nature risks separately. A collaborative project between the ECB, Potsdam Institute for Climate Impact Research, NatureFinance, and the University of Minnesota published results in late 2024 showing that climate-only policy scenarios fail to safeguard biodiversity while presenting significant economic risks to the agricultural sector.²³ The direction of travel is clear: Nature risk is shifting from peripheral concern to core prudential requirement, with central banks increasingly exploring integrated climate-nature scenarios, standardized disclosure frameworks, and stress testing protocols that recognize financial stability depends on ecological stability.

BOX 6.3

MDB Task Force on Credit Enhancement for Sustainability-Linked Sovereign Financing for Nature and Climate report

The Task Force on Credit Enhancement for Sustainability-Linked Sovereign Financing for Nature and Climate report examines how credit enhancement mechanisms can support sovereign sustainability-linked financing, particularly in emerging markets and developing economies. The report identifies barriers—such as high cost of capital, limited track records for nature-related instruments, and uneven investor understanding—and outlines specific ways credit enhancement can address them. These include expanding partial credit guarantees to reduce lender risk; using risk insurance and first-loss facilities to improve credit profiles for bonds linked to climate and nature targets; standardizing performance measurement and reporting frameworks to increase investor confidence; and integrating credit enhancement more systematically into debt structuring and refinancing operations to lower borrowing costs. The Task Force also suggests enhancing coordination among multilateral development banks, regional financiers, and bilateral partners to make these tools more accessible and strengthening sovereign capacity for designing and monitoring sustainability-linked instruments. Taken together, these recommendations aim to make financing for nature and climate outcomes more feasible within constrained sovereign debt environments.

SOURCE: Task Force on Credit Enhancement for Sustainability-linked Sovereign Financing (2025).

²² Green Finance Institute (2024).

²³ NatureFinance (2024a).

Beyond sovereigns: Nature finance at multiple scales

PAYMENTS FOR ECOSYSTEM SERVICES AND NATURE CREDITS

At subnational and landscape levels, payments for ecosystem services (PES) and emerging nature credit markets offer mechanisms to reward stewardship directly. These instruments create revenue streams linked to measurable ecological outcomes—such as carbon sequestration, watershed protection, wildlife protection and/or biodiversity conservation.

Costa Rica’s decades-old PES program through its national forest financing fund, FONAFIFO, has become the gold standard, having reversed deforestation with forest cover now at nearly 60% (up from 40% in 1987).²⁴ The U.K.’s Environmental Land Management scheme has become one of the most significant PES expansions in Europe, with U.K. agri-environment payments reaching approximately £1.121 billion in 2024—a 51% increase from 2023—as England transitioned away from EU-era farm subsidies toward rewarding farmers for delivering biodiversity, carbon, and water-quality outcomes.²⁵ Alongside this, the mandatory Biodiversity Net Gain was introduced in England in February 2024, requiring developers to produce at least a 10% net gain in biodiversity.²⁶

Globally, the number of forest carbon PES schemes has grown substantially, with over 710 active forest carbon programs recorded by 2024, up from roughly 550 such schemes in 2018, reflecting continued momentum especially tied to voluntary carbon markets and biodiversity commitments made after the Conference of the Parties.²⁷ The Organisation for Economic Co-operation and Development (OECD) reported in 2025 that biodiversity-positive subsidies and PES are gaining traction across member countries, though a striking funding gap remains: From 2021 to 2023, less than 0.6% of \$295 billion in annual agricultural support across 54 countries was directed toward environmental public goods like biodiversity, underscoring the scale of reform needed.²⁸ In the Global South, climate finance has helped drive community-based PES expansions, particularly in African rangelands and forest zones, with new projects in Uganda, Tanzania, and elsewhere aiming to bundle carbon storage with livelihood benefits, though insecure land tenure remains a persistent barrier to scale.²⁹

Biodiversity credit markets are another possible mechanism to address the estimated \$700 billion annual financing gap for nature conservation, though they remain nascent with global sales totaling only \$8 million to date.³⁰ The International Advisory Panel on Biodiversity Credits, launched by the U.K. and France in June 2023, released its first framework at COP16 in October 2024, establishing principles for “high-integrity” credits that prioritize Indigenous Peoples and local communities as co-owners and participants, with 31 pilot projects now underway across 21 countries.³¹ On the ground, Colombia’s Terrasos has emerged as a pioneer, having sold \$7 million in biodiversity credits through its Habitat Banks model, which now spans almost 6,000 hectares of preserved or restored ecosys-

24 UNFCCC (n.d.).

25 Nemar (2025).

26 United Kingdom, Department for Environment, Food & Rural Affairs (2023).

27 UN Forum on Forests Secretariat (2025).

28 OECD (2025), 21.

29 Wunder et al. (2012).

30 Deutz et al. (2020), 13; World Economic Forum (2023), 5.

31 Terrasos (n.d.); International Advisory Panel on Biodiversity Credits (2024), 8.

tem managed for at least 20 years with technical, financial, and legal guarantees, using blockchain technology for transparency.³² NatureFinance’s Africa biocredit scoping study identified over 30 biodiversity credit projects across the continent representing an “unmatched range of investment opportunities” across diverse ecosystems beyond what carbon markets offer, though the report warns that without proper regulation, the market risks repeating carbon credit problems around measurable impacts and community benefits.³³

Overall, significant challenges remain for these instruments: Most developers are currently stacking biodiversity credits with carbon credits until demand materializes, debates around offsetting versus contribution remain unsettled, there is no active trading market yet, and critics warn against “putting a price on nature” across vastly different landscapes without proper equivalence standards—though optimistic projections suggest the market could reach \$7 billion by 2030 and \$180 billion by 2050 if integrity concerns are adequately addressed.³⁴

NATURE AS INFRASTRUCTURE

Treating ecosystems as infrastructure reframes conservation and ecosystem services as productive investment rather than static conservation. Mangroves, wetlands, and forests can deliver flood protection, water regulation, and erosion control at lower cost than gray infrastructure.³⁵ Yet public investment frameworks often struggle to appraise these benefits, let alone integrate them into project development and execution.

Innovative finance approaches—blending public budgets, insurance mechanisms, and private capital—are beginning to address the gap between the scale of ecosystem service value and what gets financed from an infrastructure lens. The Asian Infrastructure Investment Bank (AIIB) has become a significant driver of this shift, arguing in its flagship “Investing in Nature as Infrastructure” report and subsequent work that ecosystems should be treated as governable, investable assets on par with roads or energy grids—accessible through national infrastructure plans, blended finance, and public-private partnership structures.³⁶ For example, AIIB’s 2025 \$1 billion Climate-Focused Policy-Based Loan to Brazil explicitly ties sovereign lending to mangrove protection, carbon market development, and biome regeneration under Brazil’s Ecological Transformation Plan, illustrating how ecosystem service commitments can be embedded directly in sovereign finance instruments.³⁷ Box 6.4 further details Cape Town’s water bond as an example of a nature-based investment. A joint 2025 report by AIIB, the European Bank for Reconstruction and Development (EBRD), and the Paulson Institute goes further, proposing public-private partnerships for nature as a standardized delivery model, with guarantees, insurance products, and biodiversity credits identified as the three most underused tools for de-risking nature finance at scale.³⁸

Despite growing rhetorical consensus around nature as infrastructure, mainstreaming it through multilateral development bank (MDB) lending and capital markets faces deep structural barriers. MDB efforts remain largely siloed or project-based rather than embedded across operations. As the World Resources Institute noted following COP30, where MDBs launched harmonized tracking principles and a common nature finance taxonomy, genuine mainstreaming requires integrating nature-positive principles across entire institutional portfolios, a

32 Cavano (2024).

33 NatureFinance (2024b).

34 Cole and Eis (2024).

35 Nature4Climate (n.d.).

36 Douglas and Zou (2024).

37 Asian Infrastructure Investment Bank (2025).

38 AIIB, EBRD, and Paulson Institute (2025).

task most banks are still far from.³⁹ A compounding problem is the persistent skills gap within project origination and technical teams: MDB staff are predominantly trained in gray infrastructure disciplines—civil engineering, transport, energy—and lack the ecological and natural capital expertise needed to identify, design, and appraise nature-based projects at the project preparation stage, producing a systematic bias toward concrete solutions long before financing decisions are made.⁴⁰

This is exacerbated in capital markets by a lack of standardized metrics: unlike carbon, biodiversity is inherently location-specific with over 570 competing measurement approaches and no agreed international standard, meaning

BOX 6.4

Cape Town's water bond: Nature as infrastructure in practice

Cape Town's water crisis from 2017 to 2018 forced the city to confront a fundamental infrastructure question: how to secure water supply at the lowest long-term cost while reducing climate risk. The response offers a clear example of “nature as infrastructure” in practice.

Following the crisis, the City of Cape Town issued a municipal water bond to finance investments that would improve water security. While conventional gray infrastructure options—such as desalination plants and new dams—were considered, analysis showed they were among the most expensive options, with high energy use, long construction timelines, and ongoing operating costs.

Instead, a significant portion of the city's water strategy focused on nature-based solutions, particularly the removal of invasive alien plant species from key catchment areas. These species consume far more water than native vegetation, reducing runoff into dams and aquifers. Clearing invasive plants allows natural ecosystems to recover and significantly increases water yield—often within a few years.

Studies conducted for the city showed that invasive species eradication delivers water at a lower cost per cubic meter than many gray alternatives, while also providing co-benefits such as reduced fire risk, improved biodiversity, and job creation. Importantly, these interventions function like traditional infrastructure: They deliver a measurable, reliable service—water supply—at scale.

The Cape Town water bond demonstrates how nature-based solutions can be treated, financed, and governed as infrastructure, rather than as ancillary environmental projects. For investors and policymakers, the lesson is clear: When ecosystems are correctly valued and managed, investing in nature can be the cheapest and most effective option for building climate-resilient public infrastructure.

SOURCE: RMB (2026).

39 Neunuebel, Laxton, and Bulbena Janer (2025).

40 Lund Larsen (2019).

ecosystem service benefits cannot yet be priced or traded in ways legible to bond markets or sovereign balance sheets.⁴¹ The AIIB-EBRD-Paulson Institute joint report is candid about the consequence: Many nature-based solutions that deliver core infrastructure services are still classified as environmental interventions and excluded from sovereign infrastructure pipelines entirely, locked out of the capital planning frameworks through which finance actually flows.⁴² Until nature is embedded in national accounts and MDB project classification in a standardized and legitimate infrastructure solution—and until origination teams have the expertise to propose it—the private sector signals needed to catalyze large-scale capital allocation will remain absent.

SUSTAINABILITY-LINKED INSURANCE

Sustainability-linked insurance—which extends the KPI-linking logic of sustainability-linked debt to risk-transfer markets, adjusting premiums or coverage in response to measurable resilience or nature-protection actions by policyholders—is an important emerging area worth flagging.⁴³ On its own, insurance smooths expenditures over time rather than channeling new resources into nature, and with the LMIC protection gap exceeding 90%, the immediate challenge is closing the coverage gap itself.⁴⁴ That gap is also an opportunity: Narrowing it can be written directly into sustainability-linked sovereign debt as a KPI, so that measurable gains in disaster coverage—and the resilience investments that make risks insurable—are rewarded through financing terms. A nearer-term entry point lies in instruments governments already fund: Many states subsidize agricultural insurance premiums—Brazil’s rural premium subsidy program among them—and such support can be tied more explicitly to resilience-enhancing measures, conditioning it on practices like agroecology or watershed protection that lower underlying risk.⁴⁵ Linked this way, public insurance spending can become a much stronger lever for adaptation rather than only a means of loss compensation as this field matures.

NATURAL CAPITAL ACCOUNTING: NATURE ON THE BALANCE SHEET

Natural capital accounting is the practice of measuring and valuing stocks of natural assets—forests, wetlands, soils, water, biodiversity—and the ecosystem services they provide and integrating that information into economic and financial decision-making at both national and corporate levels.

On the public sector side, natural capital accounting has been advancing in recent years through the U.N. System of Environmental-Economic Accounting, with over 90 countries compiling accounts by mid-2024 and the 2025 update to the System of National Accounts now formally integrating natural capital—a significant step toward making ecosystem assets visible in systems of national accounts.⁴⁶ The Coalition of Finance Ministers for Climate Action has called on finance ministries to embed natural capital valuation into policy and budget decisions, yet as the Nature on the Balance Sheet Initiative’s May 2025 roadmap—produced by the Capitals Coalition, The Landbanking Group, Systemiq, and the Center for Global Commons—candidly noted, there remain very few examples of natural capital satellite accounts actually driving public policymaking, and nature-negative subsidies continue at scale.⁴⁷ Systemiq’s contribution to the Independent High-Level Expert Group on Climate Finance COP30 report similarly

41 Bruegel (2023).

42 AIIB, EBRD, and Paulson Institute (2025).

43 WWF (2026).

44 Ibid., 4.

45 Souza, Pereira, and Stussi (2022).

46 SEEA (n.d.); European Commission et al. (2025).

47 Capitals Coalition et al. (2025).

drew on this initiative's analysis to frame natural capital recognition as a prerequisite for the integrated climate finance agenda, positioning the shift from optional disclosure to sovereign balance sheet recognition as central to mobilizing the \$1.3 trillion in annual flows needed for climate and nature by 2035.⁴⁸

In the private sector, the pace of institutional adoption of natural capital accounting has accelerated considerably, though translation into binding financial recognition remains nascent. The Task Force on Nature-related Financial Disclosures' (TNFD) final recommendations, published in September 2023, had attracted over 733 organizational adopters across 56 countries by COP30 in November 2025—including asset managers overseeing \$22.4 trillion.⁴⁹ The Landbanking Group has gone a step further, developing a remote-sensing and contracting infrastructure that unitizes measured improvements in soil, water, climate, and biodiversity into nature assets capable of being booked as intangible assets under the International Financial Reporting Standards.⁵⁰ Together these efforts represent meaningful convergence, but the critical enablers—accounting standards, assurance frameworks, regulatory safe harbors, and nature risk ratings—are still relatively immature and must align before natural capital valuation becomes a mainstream input to investment decisions at scale.⁵¹

THE BIOECONOMY AND STRUCTURAL TRANSFORMATION

Nature-based sectors can also underpin long-term growth, not only conservation. For finance ministries in particular, a sustainable bioeconomy—economic activity that uses renewable biological resources while regenerating rather than depleting them—functions as a growth, diversification, and risk-management strategy that channels commercial resources into nature and can strengthen fiscal resilience. For nature-rich low- and middle-income countries it offers a route to expand exports, move up value chains, and reduce dependence on volatile commodity cycles, and where bioeconomy resilience outcomes are measurable, they can be linked to performance-based and sustainability-linked finance. See chapter 9 by Monique Atouguia and Dorothy Maseke on the bioeconomy for a fuller account.

Making nature count in financial risk frameworks

RESOLVING THE NATURE RISK DILEMMA

The rollout of nature risk management and reporting frameworks such as TNFD poses a dilemma for financial institutions (FIs). Integrating nature risks into their credit risk management frameworks can help to elucidate critical nature risks and dependencies, but it also implies extra costs and adjustments to risk pricing and portfolio exposures that may clash with commercial objectives. If such changes are not adopted industry-wide—e.g., because TNFD is not integrated in financial regulation—then an FI that unilaterally prices in nature risks may put itself at a

48 Bhattacharya et al. (2025), 6.

49 Task Force on Nature-Related Financial Disclosures (n.d.).

50 Thomas (2025).

51 Capitals Coalition (n.d.).

disadvantage relative to competitors that do not. If nature risks are reported but not acted on, then the FI can be accused of greenhushing. If the FIs do integrate nature risks across the industry, then the adverse impacts on credit affordability and access can lead to de-banking, mirroring developments in the insurance sector.

These dynamics can be illustrated by way of the basic credit risk formula:

$$\text{Expected Loss (EL)} = \text{Probability of Default (PD)} \times \text{Loss Given Default (LGD)} \times \text{Exposure at Default (EAD)}^{52}$$

All else being equal, integrating nature risks into credit modeling weakens repayment capacity ($\uparrow$ PD) and impairs collateral quality ($\uparrow$ LGD), with higher expected losses forcing lenders to raise interest rates on and/or cut exposure ($\downarrow$ EAD) to counterparties vulnerable to nature risks and dependencies. The dilemma is that efforts to account for nature in lending decisions result in costlier and scarcer credit.

To avoid this outcome, FIs have two basic options: (a) encourage interventions to mitigate the impact of nature-related risks ($\downarrow$ ELs, $\downarrow$ LGD); or (b) use nature as an asset to collateralize loans ($\downarrow$ LGDs). An example of the former is regenerative agriculture, such as planting shade trees or no-till farming, which has been shown to lessen nature risks and strengthen resilience against climate shocks. The incentives embedded within nature-based solutions, such as interest-rate reductions linked to biodiversity KPIs, are designed to incentivize borrowers to undertake such actions.

However, financial incentives may not be sufficient to compensate for the extra transaction costs and time required to implement risk-reductive measures. For instance, transitioning to regenerative agriculture can entail significant investments, forgone production, and long lead times before the interventions bear fruit. The incentives must also be strong enough to overcome ingrained habits, vested interests, and biased systems favoring conventional farming practices, which may be reinforced by the increased uncertainty of weather patterns and commodity prices in a climate-stressed environment. It may be difficult to disentangle the idiosyncratic from the systemic nature risks; in other words, those over which the borrower has some control versus those that require collective action or government intervention.

Furthermore, financial incentives also do not address the fundamental problem that most agricultural producers are underbanked or unbanked. Households and small and medium-sized enterprises (SMEs) form the backbone of the bioeconomy, yet only 24% of adults in LMICs borrow through formal credit, according to the latest Findex Survey—a figure that is substantially lower in the rural and agricultural sectors.⁵³ Lack of collateral is a primary barrier to financial inclusion (see chapter 8 by Felipe Faria, Morgan Gillespy, and Guido Schmidt-Traub on the role of supply chain financing). In LMICs, real property is a requirement in approximately 80% of secured lending, yet households and SMEs own only movable assets and lack formal title to their land.⁵⁴ Recent fintech innovations have emerged to streamline collateralization, for instance through movable asset registries on the blockchain, yet they do not meaningfully make up for the paucity of fixed assets. Nature assets may offer an alternative to plug the collateral gap in a way that also addresses the nature risk dilemma.

Nature acts as a store of carbon that can be monetized via credits in the regulatory and voluntary carbon markets. The carbon is stored in soil, trees, and biochar (a charcoal-like substance created by heating organic biomass via pyrolysis in a way that sequesters carbon). The resulting credits can be sold via forward sale agreements to offtakers who want to offset or inset their carbon emissions. These forward contracts represent receivables that can be collateralized for

52 EL = The main variable in pricing loans. PD = The likelihood that the borrower will not pay. LGD = The portion of the total exposure expected to be lost if a default occurs (= 1 – recovery rate). EAD = Total value an institution is exposed to at the time of default.

53 World Bank (2025d), 129.

54 World Bank (2019); World Bank (2022), 6.

loans or “discounted” in working capital credit. For example, an agroforestry cocoa producer can secure a loan against an off-take agreement of biochar credits that will be generated from the detritus of future harvests. The farmers can unlock capital from physical nature assets that otherwise have limited or no productive value under conventional farming systems, while using the lower cost of borrowing to finance the regenerative transition.

BRINGING NATURE INTO QUALITATIVE ANALYSIS

Many of the nature finance solutions outlined above rely on robust monitoring, reporting, and verification (MRV) systems to verify outcomes and track performance to which financial incentives are linked. However, whereas climate risks have widely recognized quantitative measures for mitigation and adaptation (e.g., CO₂-equivalent emissions; economic losses from catastrophic events), measures of biodiversity or the state of nature more broadly lack common metrics across all countries and biomes. Whereas climate and nature risks from floods and drought can be quantified with reasonable accuracy and increasingly at the sovereign level, the risk-reductive benefits of natural capital or resilient infrastructure remain difficult to capture (at least so far). Furthermore, many aspects of nature risk and resilience are inherently qualitative, such as the quality of environmental regulation and enforcement.

Qualitative analysis is generally not treated with the same degree of rigor as quantitative analysis, especially in sovereign risk assessments, which often omit key aspects of nature risk and resilience. The metrics used to measure governance and institutional quality generally omit or understate the importance of the environment and resilience. For instance, the World Bank’s Worldwide Governance Indicators (WGIs), which carry significant weight in Fitch’s and Moody’s institutional assessments, do not meaningfully capture the quality of a country’s environmental policies and regulations—so the steps a government takes to strengthen ecological resilience leave little or no trace in its institutional score, even when they materially reduce long-term fiscal risk.⁵⁵ The gap is not in the economics, but in the decision systems.

Upgrades to the WGIs and other institutional assessment frameworks can help to correct the asymmetry. KPI-linked approaches offer another way forward. By defining clear, verifiable indicators that link nature-based solutions project-level outcomes to macro-fiscal performance, countries can convert “credibility” into measurable evidence. Uganda’s ongoing work on agro-industrialization and nature illustrates how resilience investments can be mapped to growth, volatility, and debt dynamics in a way that is legible to investors and rating agencies.

Challenges and guardrails

Innovative finance for nature is promising but not without real risks, and understanding them is essential to getting the approach right. Three stand out as particularly important.

The first is the risk of poor design undermining real-world outcomes. Many nature finance instruments—sustainability-linked bonds, biodiversity credits, results-based payments—rely on KPIs to trigger or validate financial rewards. But KPIs can be gamed. In carbon markets, investigative analysis has found that in some project categories, fewer than 16% of issued credits correspond to actual emissions reductions; biodiversity faces analogous risks, where loosely defined indicators or selective reporting can significantly overstate conservation impact.⁵⁶

⁵⁵ NatureFinance (2026).

⁵⁶ Senken (2026); zu Ermgassen et al. (2025).

The Campaign for Nature has been particularly pointed on a related systemic risk: that inflated expectations for voluntary private finance could allow governments to abdicate their public financing responsibilities, even though most biodiversity services function as public goods. MRV systems—the technical infrastructure used to verify that ecological outcomes have actually been delivered—remain expensive, fragmented, and in many contexts nascent. A 2025 review by the Nature Tech Collective noted that biodiversity MRV is particularly scattered, with multiple competing methodologies and no settled standard, making comparison across projects and landscapes difficult.⁵⁷ Public goods here means non-excludable, non-rival benefits that the market cannot adequately price or sustain on its own, and which therefore ultimately require public funding, regulation, and policy.

The second risk is fragmentation. The nature finance landscape currently comprises dozens of distinct instruments—PES schemes, biodiversity credits, blue bonds, debt-for-nature swaps, sustainability-linked bonds, blended finance vehicles—deployed by a dispersed set of donors, development banks, foundations, and private investors, often with different metrics, timelines, and governance structures. Setting up blended finance structures alone is described by the World Economic Forum as fundamentally complex, with lengthy negotiations and high transaction costs that impede stakeholder alignment.⁵⁸ One World Resources Institute study found that some companies are using more than 3,000 metrics to describe nature-related outcomes in sustainability disclosures, and that they currently spend 43% more on sustainability reporting than on sustainability innovation—a striking illustration of how compliance overhead can crowd out the action it is meant to incentivize.⁵⁹

The third and perhaps most structural risk is that nature finance remains confined to a niche—a specialist environmental, social, and governance corner of capital markets—rather than influencing the core fiscal and investment decisions that shape land use, infrastructure, and economic development. This is rapidly starting to change as the relationship between nature, climate, debt, and macro-fiscal risk and resilience becomes increasingly evident. Nonetheless, private finance for nature had only reached \$102 billion as of 2024, while UNEP’s “State of Finance for Nature” 2026 found that \$7.3 trillion still flows annually into nature-negative activities—meaning that for every dollar invested in protecting nature, around \$30 is simultaneously being spent to destroy it.⁶⁰

Addressing these challenges requires sustained investment in data infrastructure and institutional capacity, as well as international coordination on standards that make outcomes comparable and trustworthy. It also requires an honest reckoning with the limits of marketization. Not all ecological values can or should be translated into financial instruments—the intrinsic value of biodiversity, the cultural and spiritual relationships between Indigenous communities and their landscapes, and the long-term resilience services provided by intact ecosystems do not map neatly onto investable assets or tradable credits.

Crucially, the ultimate ambition of nature finance is not simply to channel more private capital into conservation projects at the margins of the economy: It is to shift the incentive structures, business models, and investment decisions of the real economy itself—agriculture, infrastructure, energy, manufacturing—so that nature-positive outcomes become the default rather than the exception. The objective is not to financialize nature indiscriminately, but to ensure that where finance does shape incentives, it does so through well-designed, verifiable instruments embedded in robust public policy frameworks—so that capital flows through the real economy in ways consistent with long-term development and environmental outcomes (a sustainable bioeconomy), rather than merely creating a parallel green niche while the core economy continues on a nature-negative and carbon-intensive trajectory.

57 Campaign for Nature (2024); Nature Tech Collective (2025).

58 Alvarado (2024).

59 Choi and Czebiniak (2025).

60 UNEP FI (2024); UNEP (2026), xiv.

From pilot innovation to systems change

The triple crisis of nature loss, climate change, and debt distress demands more than incremental adjustments. It requires rethinking how value, risk, and resilience are recognized in financial systems in a world beset by mounting environmental degradation and climate shocks.

The experience from landscapes like Southern Bahia and platforms such as the Bioeconomy Challenge underscores a central lesson of the triple crisis: Nature, finance, and development cannot be aligned instrument by instrument, project by project. Alignment emerges only when incentives are coherent across scales—from farmers and ecosystems at the ground level, all the way up to sovereign balance sheets and global capital markets.

Innovative finance for nature is beginning to show how this coherence can be built: by stacking capital, linking performance to credibility and results, and embedding inclusion into financial instrument design and outcomes. The task ahead is not more invention, but institutionalization—ensuring that nature-positive outcomes systematically translate into financial advantage for countries, financial institutions, companies, and communities that are actively taking steps to reduce vulnerability. The deeper obstacle is not economics. The economic case for investing in nature as infrastructure for development is increasingly established. The obstacle is institutional: the failure to integrate these insights into the practical models and decision systems used by the IMF, World Bank, ministries of finance, and ratings agencies. When the integration happens, investing in nature ceases to be a fiscal burden or a side project, and becomes what it has always been: a foundation of resilient development.

The negotiation of a post-2030 development framework presents the first real opportunity to build this institutionalization from the ground up rather than retrofit it. A successor to the SDGs that does not embed nature and resilience into its financial architecture will reproduce the same failure: goals without the fiscal mechanisms to reach them. What the next framework must include at its core is not a separate nature goal or a climate finance target alongside others, but the integration of natural capital into the economic logic through which development is financed and measured.

Concretely, this means debt sustainability frameworks that price resilience as well as vulnerability; sovereign credit methodologies that reward demonstrated adaptation and resilience investment; national accounts that make natural capital visible alongside produced capital; and public investment programming that treats ecosystems as core economic and financial infrastructure. The SDGs created a general blueprint for what needs to happen. The post-2030 agenda must establish how it gets financed—and nature has to be a central part of the answer—not as an add-on, but as a structural feature of the financial architecture that makes the rest possible.

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