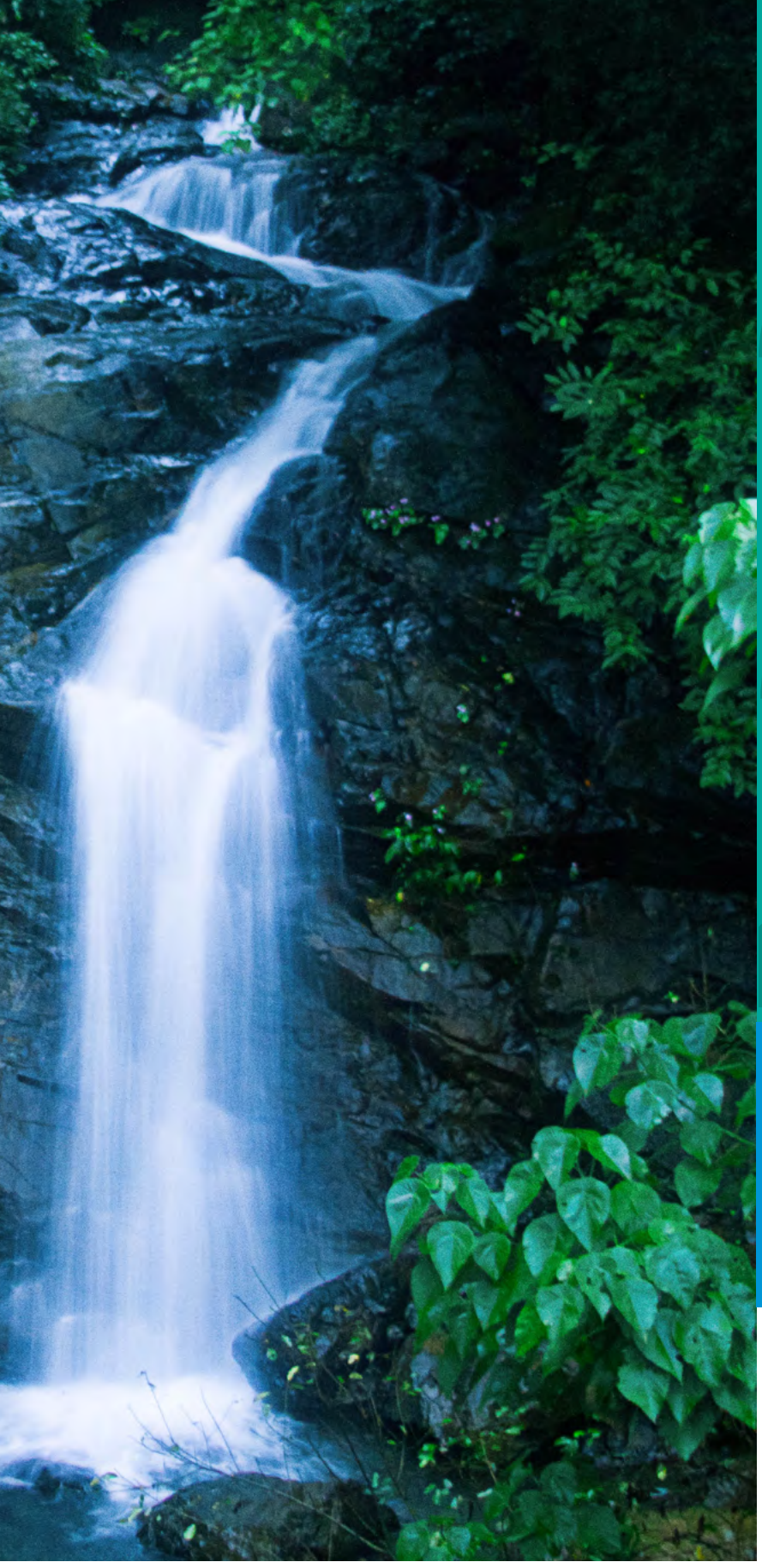


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FINANCING NATURE

A Mid-Decade Update

From Isolated Progress to Implementation at Scale

PAULSON INSTITUTE | The Nature Conservancy | WWF

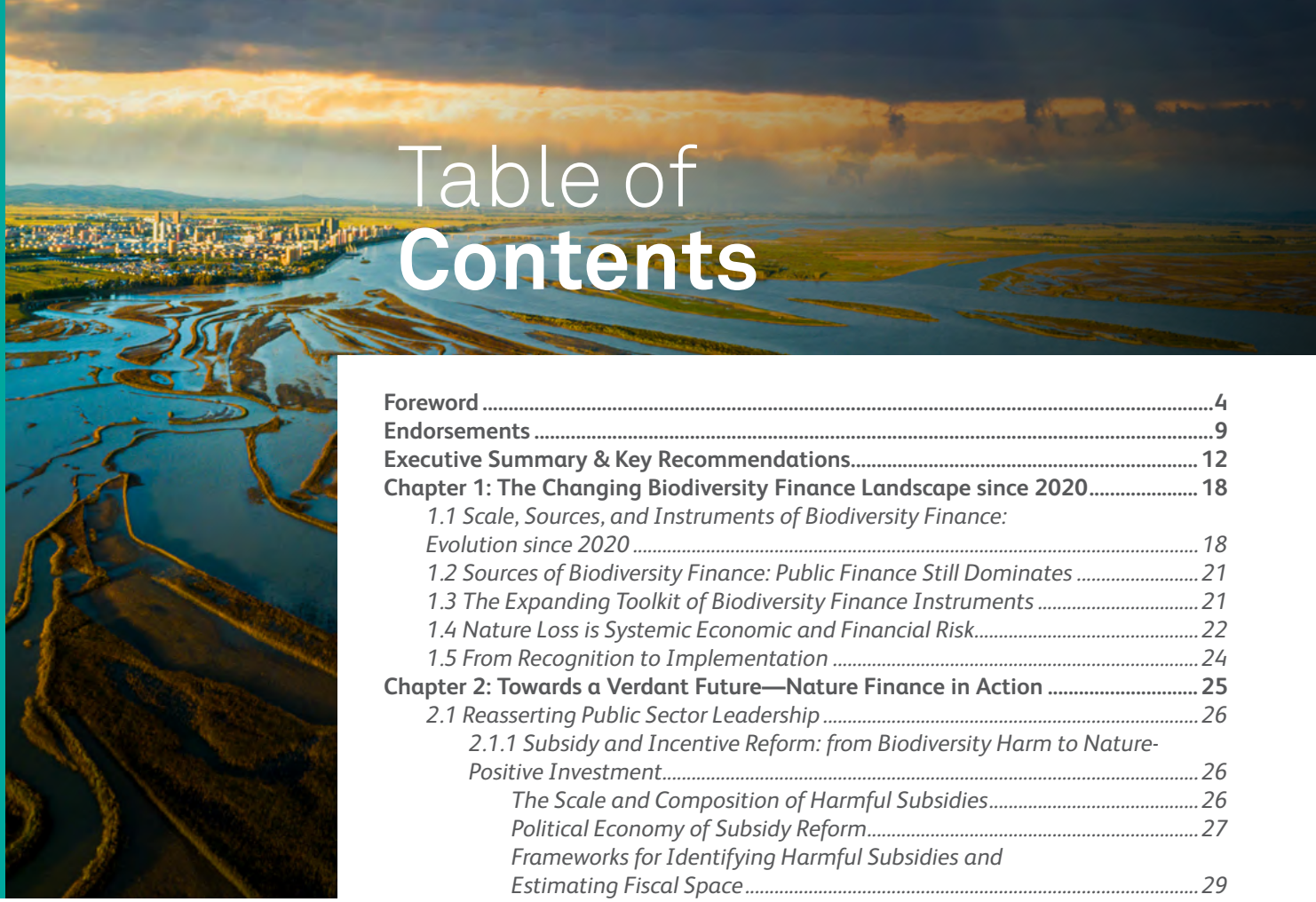


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Disclaimer

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FOREWORD



HENRY M. PAULSON, JR.
Chairman, Paulson Institute

Protecting nature is not only a moral responsibility. It is increasingly an economic and strategic imperative as well.

When my family first visited a small barrier island off the coast of Georgia forty-five years ago, the island was largely undeveloped. Today it remains so and, with an ecolodge dedicated to conservation, is one of the places we cherish most. Our grandchildren now, along with hundreds of nature-loving tourists, walk the same beaches, explore the same marshes, and experience the same sense of wonder and enchantment that first drew us there.

One of the great privileges of helping steward this remarkable place has been watching its wildlife thrive. Loggerhead turtles still return to nest on its shores. Dolphins move through the surf. Egrets, wood storks, and countless migratory birds fill the marshes and skies. The landscape has changed little over the decades because generations of people made a conscious decision to protect it.

What gives me the greatest satisfaction, however, is not simply the preservation of the land. It is seeing succeeding generations develop the same connection to nature that Wendy and I found there so many years ago. On an island where phones and televisions quickly lose their appeal, they discover something increasingly rare in modern life: the opportunity to slow down, pay attention, and appreciate the natural world.

Experiences like these remind me that nature is more than a resource to be managed or an asset to be valued. It is a source of beauty, inspiration, innovation, indeed, of much that is good about life. That alone is reason enough to protect it.

But as the pages that follow make clear, protecting nature is not only a moral responsibility. It is increasingly an economic and strategic imperative as well.

Taking Stock, Six Years On

When the Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability published the first *Financing Nature* report six years ago, our aim was twofold: to make the economic case for protecting nature, and to show that the world could actually pay for it. The shortfall in nature finance,

estimated at around US$ 711 billion a year in our 2020 report, is now around US$ 1.317 trillion, according to BloombergNEF, under a newer, broader framework. I am not a big fan of these figures, although I understand their necessity as a guide for policymakers. Such numbers are estimates and can obscure as much as they reveal.

Yet what's beyond dispute is the trend: We're investing far too little in the natural systems on which everything else depends. The imbalance in global priorities is telling in how the world—even those interested in climate change—sees nature. In 2024, global climate finance surpassed US$ 2 trillion for the first time, while finance for biodiversity reached only a small fraction, roughly US$ 300 billion. Nature protection remains a second thought in the green transition.



The discrepancy is sobering. It shows the lack of political will in devoting much-needed attention to the decline in our natural capital. There are some glimmers of hope. In the past six years, we've moved from asking whether biodiversity can be financed at scale to demonstrating how to do so—albeit on a small scale. Governments, financial institutions, companies, and conservation groups have tested an array of mechanisms and are finding solutions.

We've partnered again with The Nature Conservancy and added the World Wildlife Fund to assemble the most practical guide yet to financing nature, anchored in concrete case studies from key regions and across sectors.

The Scale of What We're Losing

In the few years since our first report, the natural world has continued to decline at a pace that is difficult to fathom. Although extinction is a natural phenomenon, scientists estimate that our planet is now losing species at 1,000 times the natural rate. Roughly, 48% of species are in decline, and vertebrate populations have fallen by an average of 73% since 1970.

If we stay on this trajectory, the world will lose up to half of all species by the middle of this century. In North America, the richest continent on earth, we have already lost more than half of our grasslands—the most imperiled ecosystem we have. In the Amazon, deforestation is pushing us toward a tipping point at which hydrological changes could permanently dry out millions of acres of rainforest and alter the region's entire climate, if not the world's.

Wild mammals account for barely 5% of all mammalian life by weight—the remainder are humans and their livestock. Freshwater

Although extinction is a natural phenomenon, scientists estimate that our planet is now losing species at 1,000 times the natural rate.



wildlife populations have collapsed by 85% since 1970, and in Latin America, monitored wildlife has fallen by a staggering 95% .

More than 85% of the world's wetlands are gone, and between early 2023 and mid-2025, bleaching-level heat stress struck 84% of the planet's coral reefs. This year, Earth Overshoot Day fell on July 30: By midsummer, humanity will have spent the entire budget of natural resources the planet can renew in a year and will live out the rest of 2026 drawing down natural capital we cannot replace. This replenishment of nature just can't keep up.

The economic stakes are equally stark. An analysis by PwC found that more than half of global GDP, an estimated US$ 58 trillion, is moderately or highly dependent on nature. The World Bank estimates that the collapse of just a few of these critical ecosystem services—pollination, fisheries, and timber—could cost the global economy US $2.7 trillion a year by 2030. But more fundamentally, all economic activity ultimately depends on nature and the life-support systems it provides.

The deeper question is: What do we risk by throwing the global ecosystem, or Mother Nature, out of balance? We cannot fully calculate these costs, nor should we learn the hard way by lack of action.

In short, although we will never be able to calculate the full value of nature, we know enough to understand that its destruction presents profound risks to human society.

Getting the Incentives Right

Faced with losses on this scale, we must be clear about our priorities. First and foremost, we must protect what we still have. An intact ecosystem, whether an old-growth forest, a healthy reef, or an undisturbed grassland, is not easy to rebuild once it is lost, and never cheaply, so safeguarding what remains is the most effective and least expensive thing we can do. Next, we should turn to restoring what has already been degraded, giving nature the chance to recover the ground it has lost. And finally, we must put in place the laws and policies that make protection and restoration possible.

To address the risk of biodiversity loss, we must initiate a comprehensive, worldwide effort to appropriately value and protect nature. This needs to start with leadership from governments setting the right regulatory and legal framework. Public budgets, tax policy, subsidy reform, and regulation help determine whether private capital flows into protecting nature or toward harming it. No financial innovation, however clever, will substitute for getting the policy environment right.

The single largest opportunity, by far, remains the redirection of hundreds of billions of dollars in subsidies that actively harm biodiversity. Today, governments spend more in a single month on subsidies that harm nature than they spend protecting it in an entire year. Countries that have begun to experiment with restructuring harmful agricultural, fishery, and forestry subsidies—without sacrificing farmers' livelihoods—have shown that this can be successful, and that policy reform can shift capital toward nature. Our analysis finds that redirecting even a tenth of the most harmful agricultural subsidies towards practices that restore nature rather than deplete it could generate as much as US $2.4 trillion in economic gains by 2040.

Another opportunity lies in how and where we build. Over the coming decade, trillions of dollars' worth of infrastructure will be built to support people and create jobs around the world. Much of it is vitally needed, particularly in developing countries: the roads, ports,

dams, transmission lines, and energy projects required to grow economies and raise living standards. We should be realists about this. That infrastructure is going to be built. But where it is sited and how well it is planned will determine how much of the natural world it takes with it. Routing a road or a power line around a critical habitat rather than through it costs little at the drawing board and avoids damage that is expensive, and often impossible, to undo. Governments and the development banks that finance these projects should be doing much more to mitigate needless harm to biodiversity.

The private sector will follow when the economics work. CEOs increasingly understand that nature loss is a material business risk, from supply chain disruption to insurance costs to stranded assets. But understanding isn't the same as investing.

I've always believed that a healthy planet is good for business; it's far cheaper to prevent environmental damage than to clean it up afterward. But companies won't deploy capital into conservation unless there's a clear financial return. Philanthropy distributes profits; investing generates them. That's why de-risking guarantees, blended finance, tax incentives, and clear regulatory signals matter so much. Where governments have provided them, capital has begun to follow.

Climate and Nature Are Inseparable

For too long, biodiversity has been treated as a minor afterthought on the global environmental agenda. Climate and nature crises must be tackled together. They are deeply intertwined: A warming planet puts ecosystems under enormous stress, and the loss of those ecosystems exacerbates climate change.

In addition, many climate change solutions are needlessly harming biodiversity. We can't solve the climate crisis at nature's expense, yet too often we're doing exactly that. Deploying renewable energy is essential, and the dramatic fall in the cost of solar is a game-changer. Still, we must deploy clean energy wisely. Poorly sited solar and wind installations can require many times more land than the fossil fuels they replace, carving transmission corridors through habitat and destroying native prairie and forest.

Wind turbines placed in migratory corridors threaten the birds and bats that pollinate our crops and hold our ecosystems together, causing unnecessary harm that simple, inexpensive measures could largely prevent. A newer concern is the land, water, and power being claimed by the data centers now multiplying to power artificial intelligence. As we build the economy of the future, we must build it with nature in mind, so that progress on one front is not made at the expense of the living systems we all depend on.

Well-designed natural climate solutions, with appropriate safeguards, are among the most cost-effective tools we have, and they deliver biodiversity and community benefits simultaneously. The instruments to finance them—from carbon markets that include high-integrity forest credits to vehicles such as the Tropical Forest Forever Facility that Brazil and its partners are advancing—are maturing rapidly.

What Already Works

This report is, above all, a record of what already works. Performance-based payments for ecosystem services are rewarding English farmers for healthy soil, clean water, and wildlife rather than acreage, funding the watershed restoration that has returned billions of liters of water to Cape Town, and giving South African livestock producers a reason to rebuild grassland soils. Green, blue, and sustainability-linked bonds, once a curiosity, are now beginning to enter the mainstream, with biodiversity criteria increasingly built in.

Debt-for-nature conversions, executed in countries such as Belize, Barbados, Gabon, the Bahamas, and Ecuador, are unlocking well over a billion dollars for marine and terrestrial conservation while easing sovereign debt burdens, showing how finance can reward protection while easing fiscal pressure.

Having local communities, often Indigenous people, participate and benefit economically in the protection and preservation is critical. Remote sensing, artificial intelligence, and open data have transformed our ability to monitor ecosystems cheaply, transparently, and at scale.

In supply chains, the picture is shifting as well. Leading companies in food, agriculture, fisheries, and mining are recognizing that biodiversity loss is not an externality but a core business risk. The most forward-looking firms are moving beyond compliance and actively investing in landscape-level restoration, responsible sourcing, and partnerships with the local communities and Indigenous peoples who steward most of the biodiversity on Earth.

None of this means the job is done, far from it. Nature is still being lost faster than our solutions can keep pace. Many of the most promising mechanisms remain pilots rather than programs being implemented. Standards, taxonomies, and disclosure frameworks for nature-related financial risk are still being built, and they need to be developed quickly and consistently across jurisdictions so that capital can move with confidence. The Taskforce on Nature-related Financial Disclosures (TNFD) has laid important groundwork, but voluntary frameworks are not enough. We need regulation.

The Politics We Cannot Ignore

We also need to be honest about the politics. Governments today are spread thin. They are contending with war, hunger and mass displacement, fragile economies, and politics that too often seem incapable of solving anything. Against these currents, protecting nature can look like an unnecessary distraction. But that is precisely the trap.

Nature is not a competitor with these priorities; it underpins them. It is the foundation of the food we grow, the water we drink, the air we breathe, and the stability that keeps societies from coming apart. Let it unravel, and every other crisis—famine, migration, conflict, disease—grows harder and more expensive to solve.

Protecting nature is not a luxury to be deferred until the world is finally at peace. It is part of how we build that peace, and it cannot wait. This year's UN Biodiversity Conference, COP17, will test that resolve and serve as a weathervane for the road ahead.

As an immediate first step, every government should commit to an urgent, comprehensive review of all subsidies in agriculture, forestry, and fisheries within the next twelve months, identify those most harmful to biodiversity and climate, and publish a clear timetable for reforming or redirecting them. No other single action would unlock more capital for nature, and none is more overdue.

My wife Wendy and I have spent much of our lives working on nature conservation, in the United States and around the world. We know education, beginning with school children, is critical because the public wants to protect what they value and understand. We've seen what happens when the right education, communication, and policies meet the right financing and the right partners on the ground. Ecosystems recover. Species return. Nature, given even a modest



chance, is remarkably resilient. Hopelessness is the enemy of progress.

We make the economic case in these pages because it's powerful and because it's what ultimately moves capital. But let's not lose sight of why this work matters most. Nature is not a luxury. It is not free. It is the support system beneath every economy, every supply chain, and every life on this planet.

And it is, above all, the source of the wonder and beauty that make life worth living—the birdsong in the morning, the forests that humble us, the rivers and reefs and the grasslands teeming with life. A world that loses these is poorer in every way that matters. The cost of protecting nature is real, but it's a fraction of the cost of losing it—and what we stand to lose is, frankly, priceless.



ENDORSEMENTS



INGER ANDERSON

Executive Director

United Nations Environment Programme

"The finance that destroys nature still vastly outweighs the finance that protects it, and redirecting those flows is the single greatest opportunity we have. Progress is possible, and it is already underway. This report reinforces the shared evidence and the urgency of acting on it."



AJAY BANGA

President

The World Bank Group

"Nature is infrastructure too. It creates the conditions for more and better jobs. Forests collect, store, and distribute water that businesses depend on; farmers diversify their income by starting nature-based businesses; and wildlife tourism employs tens of millions of young people globally. That's why we echo the call for advancing regulatory reform, pairing nature financing with policy engagement, and linking public investment with private-sector participation."



KRISTALINA GEORGIEVA

Managing Director

International Monetary Fund

"Nature loss can pose significant risks to economic resilience. This report serves as an invaluable guide for economic policymakers on how to incorporate nature-related considerations into decision-making."



ILAN GOLDFAJN

President

Inter-American Development Bank

"Meeting global biodiversity goals will require moving nature finance from individual successes to a higher scale of ambition—from landmark debt-for-nature swaps in Ecuador and The Bahamas to platforms such as EcoInvest and ReInvest+, and the Financing Nature Metrics Guide. Building on the Paulson Institute's pioneering work, the IDB Group and ECLAC are developing the first regional biodiversity study to assess the finance gap in Latin America and the Caribbean. To be launched at CBD COP17, the study will help countries identify investment opportunities, mobilize capital, and turn biodiversity commitments into measurable development results. I congratulate the Paulson Institute, The Nature Conservancy, and World Wildlife Fund on this new report that will certainly help expand our collective work and replicate it at scale."



ZOU JIAYI

President and
Chair of the Board of Directors

Asian Infrastructure Investment Bank

"Healthy ecosystems—from mangroves and wetlands to forests—are infrastructure in their own right, and their benefits cross borders. Financing that reconciles development with conservation is not only possible, it is sound economics. This report makes a timely contribution to advancing that effort."



BRIAN MOYNIHAN

Chair and CEO

Bank of America

"We continue to see solid client activity around building resilience for the long term. We are providing capital, expertise, and strategic advice to help drive innovation and economic growth."



DILHAN PILLAY SANDRASEGARA

CEO

Temasek

"There is a deep nexus between natural capital and financial capital. Nature underpins resilient economies and sustainable growth, and achieving nature-positive outcomes will require concerted multi-stakeholder collaboration, systems-level change, and scalable financing solutions, including high-integrity carbon markets. This report offers a practical roadmap for investors and businesses seeking to translate ambition into action."



DAVID SOLOMON

CEO

Goldman Sachs

"Capital markets can be a powerful force for protecting nature when the incentives are structured correctly, and the returns can be real. The task now is to scale these solutions across the financial system. This report shows policymakers how creating the right incentives can unlock more private capital."



DR. SIMON ZADEK

Managing Partner

Morphosis

"Nature finance is at the end of the beginning, with the building blocks needed to drive nature's value into finance and economy, from data and accounting to financial innovation, and a generation of rules and norms that can embed nature into tomorrow's markets. Now is the time to implement these innovations at scale, and this report offers a clear-eyed guide to making that happen."



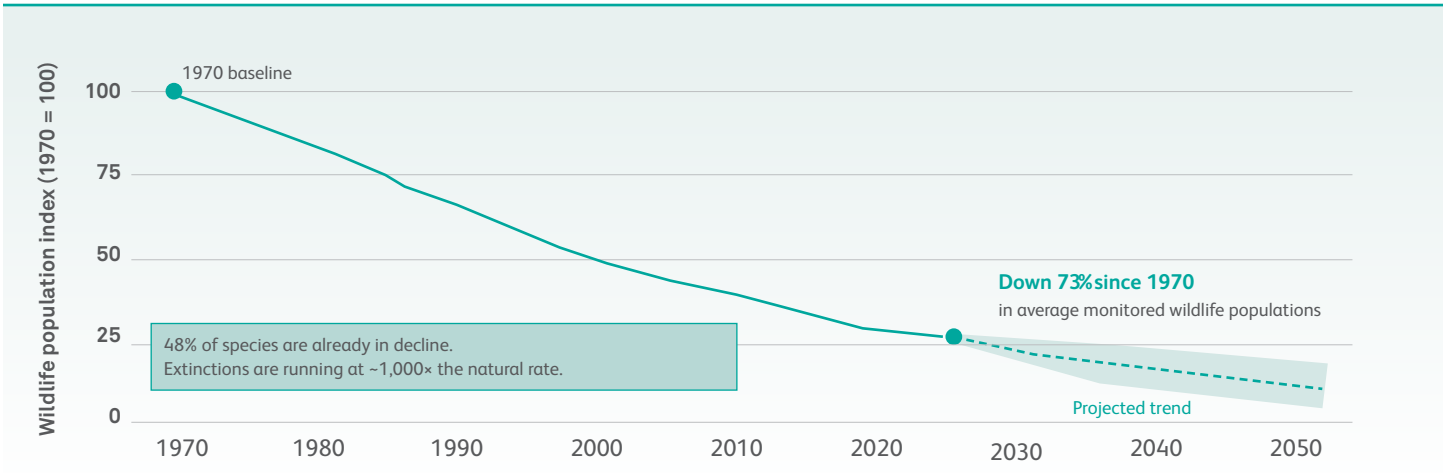
Executive Summary & Key Recommendations

The world does not lack the money or the mechanisms to protect nature. It lacks the right incentives, political will, and speed necessary. Since the 2020 *Financing Nature: Closing the Global Biodiversity Financing Gap* first measured the shortfall, the toolkit has grown, and more capital than ever is going towards nature protection. Yet, at the same time, the biodiversity funding gap has widened, simply because the financial flows that destroy nature are growing faster than the ones that protect it.

The stakes are measured in economies as well as ecosystems. The natural world is declining at a pace that is hard to fathom, and if we do not change our trajectory, scientists warn we are on course to lose up to half of all species by the middle of this century. More than half of global GDP, roughly US$ 58 trillion, is moderately or highly dependent on nature, and the World Bank warns that the collapse of just a few ecosystems, among them pollination, fisheries, and timber, could cost the world US$ 2.7 trillion a year by 2030. These are not just abstract numbers. They are felt as fisheries stop yielding catches, as pollinators fail, and as the wetlands and coastlines that once buffered communities from floods disappear. The highest cost falls on the hundreds of millions of people, often the poorest and most rural, whose incomes directly depend on healthy land and water. Nature loss is a direct threat to jobs, food security, and economic growth. While assigning nature a precise dollar value will always be imperfect, the greater danger lies in not valuing it at all. Left unpriced, nature is treated as worth zero in the decisions of policymakers and markets, even as the economy depends on it entirely.

FIGURE 1. NATURE IS COLLAPSING ON OUR WATCH[1, 2]

On the current trajectory, scientists warn the world could lose up to half of all species by 2050.



Source: Living Planet Index (WWF/ZSL); IPBES. Dashed line and shaded band show the projected continuation of the observed trend.

The task at hand is to move from scattered wins to implementation at scale.

The biodiversity financing gap now stands at around US$ 1.317 trillion per year under BloombergNEF's broader framework estimation, which highlights the drastic changes needed from 2024 financial flows to meet the Kunming-Montreal Global Biodiversity Framework (GBF) 2030 finance and harmful-subsidy reform targets.[3] Financing gap estimates are also affected by inflation. Money alone, however, will not stop nature loss. Even fully funded, biodiversity will continue to vanish without the policies, incentives, and regulation to change how economies treat it.

Much has changed since 2020. Governments adopted the Global Biodiversity Framework, the range of financing instruments has grown, and companies and financial institutions have made real progress in measuring and disclosing their exposure to nature-related risk. This resulted in unprecedented levels of investment and activity globally. Unfortunately, these efforts are not sufficient to reach the goals the global community has set in the GBF. Action falls far short of the necessary pace and scale. Promising approaches are stuck in pilots, disclosure has not translated into different decisions, and the flows that harm nature still dwarf those that help it. The task at hand is to move from scattered wins to implementation at scale.

Getting there rests on two moves that must happen together. The first is to stop financing the problem. Governments should reform the subsidies and public spending that pay to destroy nature. They should use credible land-use planning to steer roads, mines, and other development away from the places that matter most, as preventing damage is almost always cheaper than restoring or offsetting it later. The second is to make protecting nature the easier economic choice. This means treating it as the productive capital the whole economy runs on, pricing its loss into planning and risk, and building the rules and revenue streams that let proven models attract private capital. Public money remains essential for the parts of nature that will never turn a profit, and private capital follows when the economics work. Chapter 2 sets out the specific actions across policy, finance, business, technology, and communities. They point to five priorities.



1. Stop paying to destroy nature.

Governments should recognize that some of their own policies and spending, including subsidies, tax breaks, loan guarantees, procurement, and infrastructure investment, actively drive nature loss, and should cut or redirect that money. For every dollar spent protecting nature, thirty go to destroying it. Reforming harmful subsidies is one of the biggest levers to close the gap. This should be done while continuing to strengthen environmental accountability for private investment and enforcement of environmental laws.

Subsidy reform remains one of the highest-leverage opportunities to stop financing nature loss, and the place to start is agriculture, fisheries, forestry, and energy. Government finance leaders should co-lead a government-wide review of subsidies, tax breaks, underpriced public resources, guarantees, procurement, and infrastructure spending, add up their real costs, and shift toward practices that help nature rather than harm it. Reforms should be transparent, phased in over time, and designed with the industries, workers, communities, and Indigenous Peoples and Local Communities (IPLCs) affected, while protecting livelihoods and improving value for public money.



2. Treat nature as critical infrastructure, not a free input.

Governments should treat nature as productive capital, an asset the whole economy runs on, and line up economic policy, public investment, and risk management behind protecting it.

Economic stability and growth depend on healthy ecosystems for food, water, fertile soil, energy, and a livable climate. Governments should consider nature loss as a macro-level economic risk and build it into economic planning, public investment, infrastructure decisions, and fiscal risk analysis by accounting for the future costs of nature loss, from restoring ecosystems, to defending against floods to treating water, responding to disasters, and replacing infrastructure. Government finance leaders should work with environment, planning, and sector departments to align policies, settle conflicts, and turn nature and climate related plans into costed project pipelines of real projects and workable financing. Development banks can help with technical support and project preparation.

3. Fight climate change and nature loss as one battle, not two.

Governments, businesses, and investors should get their climate, nature, development, and investment plans in line with one another before the money is committed, not after.

National climate, nature, and development plans should align so that investment in farming, cities, energy, mining, and digital infrastructure serves both climate and nature. Planning guided by good biodiversity data and by the simple rule of avoiding harm first, should steer development toward lower-conflict areas and keep it out of ecologically critical no-go zones. Climate and energy transition investments should be checked for their effect on nature, so that cutting carbon does not come at the cost of wildlife and habitat.



4. Make nature-positive investment the easy investment.

Governments and regulators should create the policy and market conditions that let nature finance grow at scale, and Multilateral Development Banks (MDBs) and Development Finance Institutions (DFIs) should use their balance sheets and tools to mobilize investment.

Clear rules, standards, and demand signals help make nature-positive projects worthwhile. Predictable revenue and repayment streams can be created through payments for ecosystem services, outcome-based contracts, biodiversity net gain, habitat banking, sustainable procurement, and utility payments for nature that provides infrastructure services. Development banks, development finance institutions, philanthropy, and fund managers should build and finance a pipeline of investable projects through preparation, technical support, common standards, pooling of small projects, and well-targeted guarantees or concessional finance. Every instrument should be tied to measurable results, credible baselines and Key Performance Indicators (KPIs), honest reporting, independent verification, strong safeguards, and a real share of benefits for IPLCs.



5. Scale what already works.

Businesses and financial institutions should build nature into their strategy, everyday operations, lending, and investment, and scale up the approaches that have already worked.

Companies should use the Taskforce on Nature-related Financial Disclosures (TNFD) framework not just to report but to guide strategy, operations, supply chains, and where they put their capital. Banks and other lenders can extend that reach across the economy by asking borrowers for TNFD-aligned disclosure and using it in due diligence, credit decisions, loan terms, and portfolio management. Businesses and investors should set measurable targets, strengthen traceability and responsible sourcing, and move more capital toward verified nature-positive outcomes. Philanthropy and technology providers should help proven models graduate from pilots by supporting project preparation, measurement, local capacity, and durable financing.

None of these priorities waits for perfect conditions. Each can begin now with the institutions and tools we already have, and each gets easier as the others advance. The common thread is leadership: governments willing to set the rules, reform harmful incentives, and businesses and financiers willing to act on the risks they have already disclosed. We have the tools, the instruments, and the proof of what works. What we no longer have is time. With every year that destruction outpaces protection, the window narrows and the bill grows. The moment to act on what we know is now.



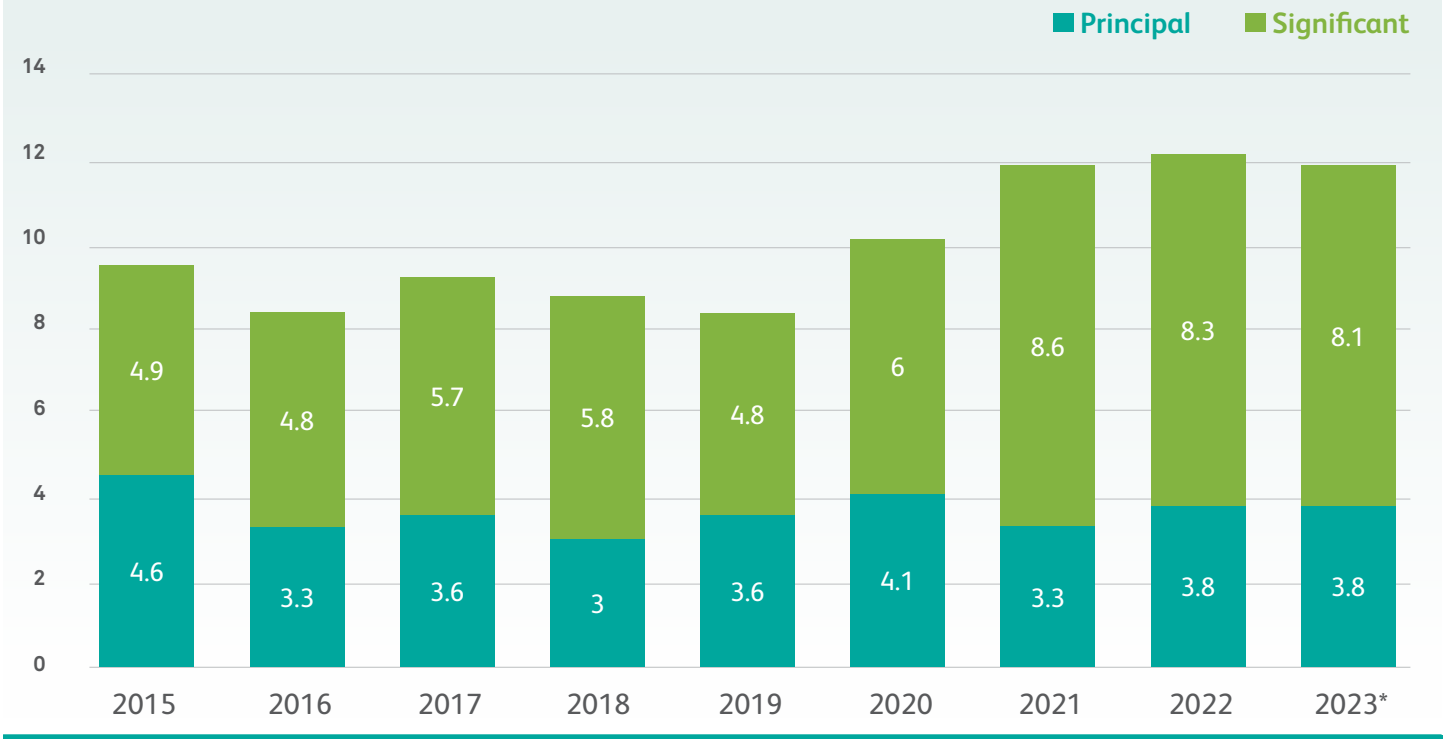
Chapter 1: The Changing Biodiversity Finance Landscape since 2020

1.1 Scale, Sources, and Instruments of Biodiversity Finance: Evolution since 2020

The scale of biodiversity finance and the strength of supportive policy have improved meaningfully since 2020. Yet the financing challenge remains daunting, with financial flows harmful to nature still overwhelming those directed toward its protection and restoration. Recognition of the challenge has spread widely, with governments, MDBs, companies, investors, and philanthropies acknowledging biodiversity's role in both growth and financial risk. The adoption of the GBF was a major step forward, as it provided globally agreed targets for increased financing and the reduction or redirection of harmful incentives and financing. Implementation at the required scale remains the key challenge. Nature-positive finance, funding flowing to nature projects, is increasing across the globe, but from too small a base and relying too heavily on public budgets. Nature-negative financial flows, finance that supports activities harmful to nature, continue to overwhelm the financial resources dedicated to conservation and restoration.

Biodiversity finance has increased through 2023, particularly through public sources, but recent cuts to official development assistance (ODA) threaten to reverse this progress. Total official development finance (ODF) for biodiversity, which includes other non-concessional financial flows, has been on an upward trend, rising 42% to US$ 11.9 billion in the five years to 2023, the last year for which biodiversity-specific data are available. However, not all biodiversity finance is equal. Finance targeting

FIGURE 2. Total Biodiversity Official Development Finance in US$ billion[4]



Source: UN

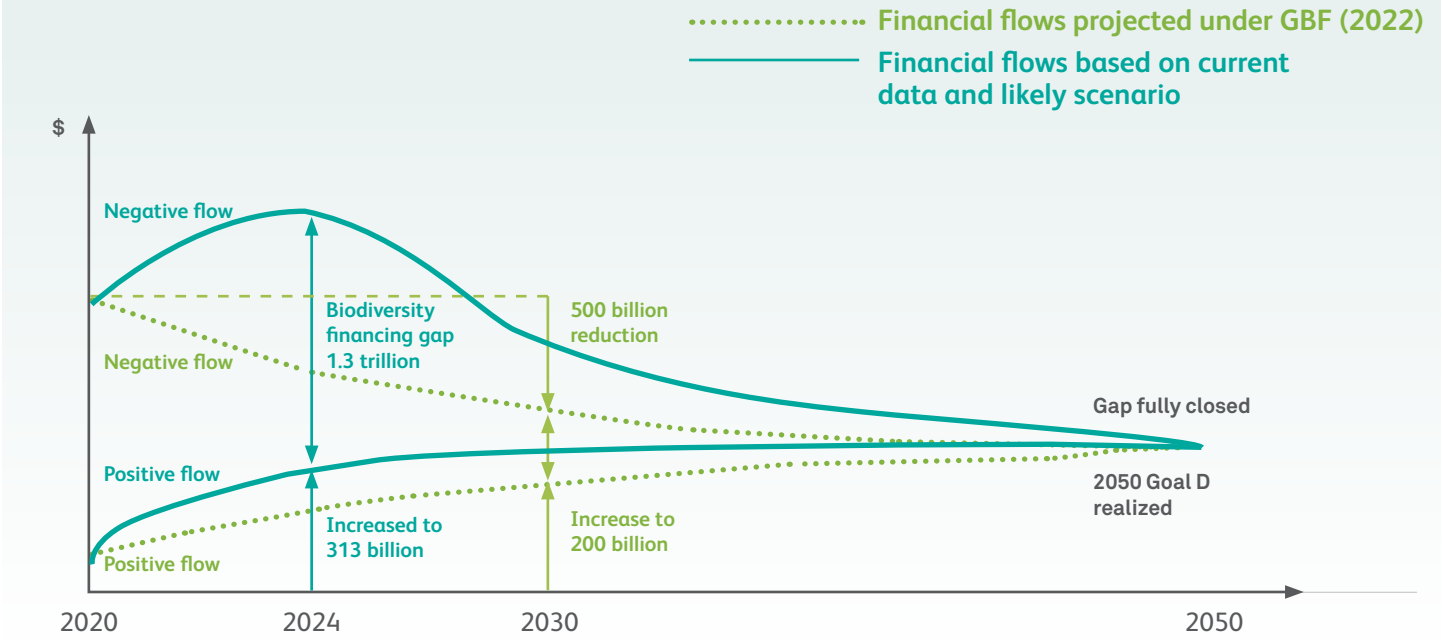
The financing gap has widened mainly because harmful financial flows have grown faster than nature-positive finance.

biodiversity as its principal objective declined by 17% , to US$ 3.8 billion over the eight-year period to 2023, and biodiversity finance represented only 7% of all development finance.[4]

The financing gap has widened mainly because harmful financial flows have grown faster than nature-positive finance. Bloomberg NEF estimates that total biodiversity financing surpassed US$ 300 billion in 2024. Yet despite this growth, the gap widened to US$1.317 trillion, requiring greater action, particularly on harmful-subsidy reform, to meet the GBF's 2030 targets (see Figure 3).[3] UNEP estimates that nature-negative finance reached US$ 7.3 trillion in 2023—roughly 30 times the investment in nature-based solutions (NbS). US$ 2.4 trillion of this negative finance was in environmentally harmful public subsidies, with the remainder coming from private capital concentrated in sectors such as utilities, industrials, and energy.[5] There has been limited progress in meeting GBF Target 18 of identifying harmful subsidies, mostly in the EU, but little evidence of repurposing the financial flows.[3]

Figure 3 brings the scale of the challenge into sharper relief by comparing current financial flows with the GBF's 2030 targets and projections. Closing the biodiversity financing gap cannot be achieved by increasing nature-positive finance alone. Under the GBF's 2030 targets, reducing harmful subsidies by US$ 500 billion and increasing biodiversity financing to US$ 200 billion would substantially narrow the gap. Recent growth in biodiversity financing is

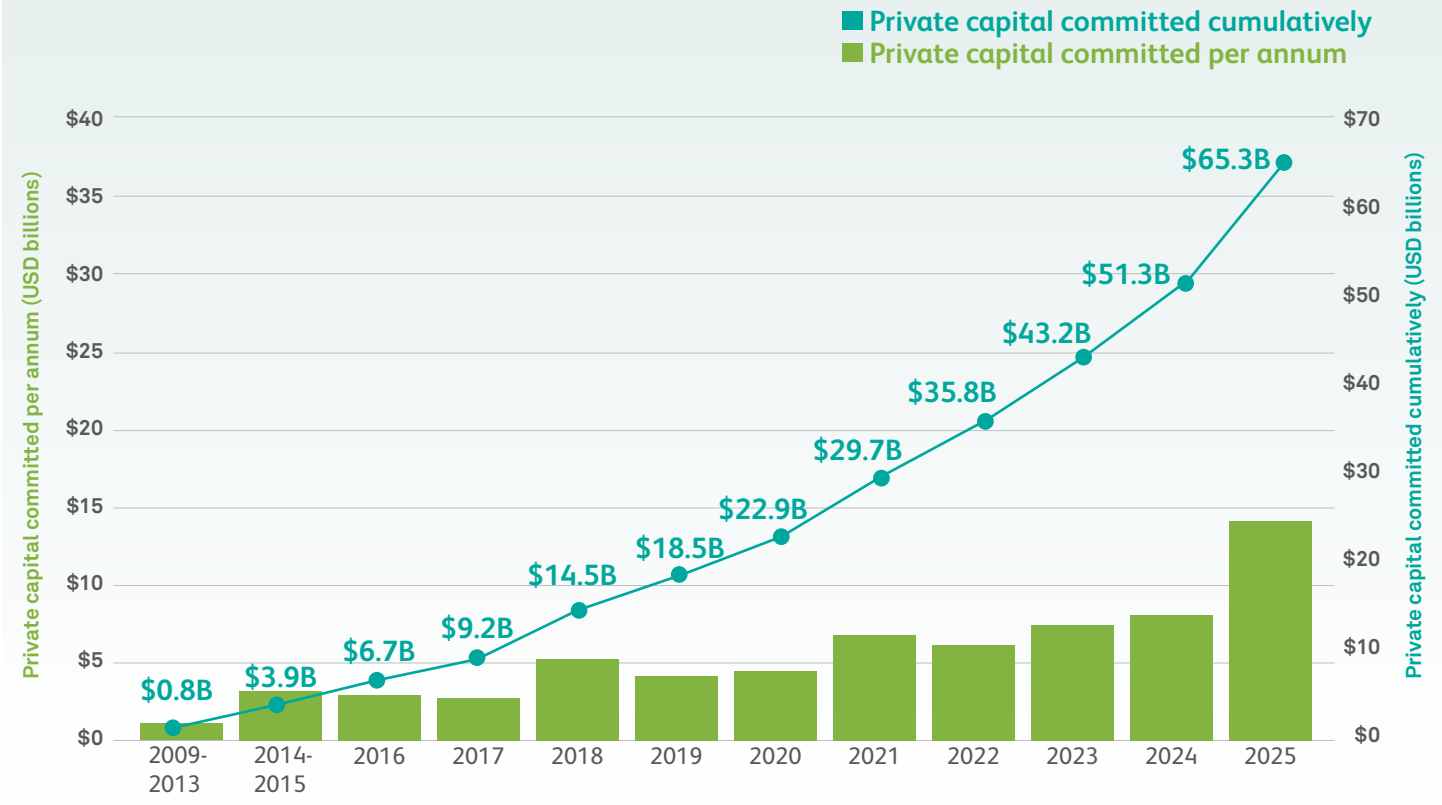
FIGURE 3. Biodiversity-related financial flows: 2024 levels, GBF 2030 targets & 2050 Goals



Source: Graphic developed by Basile Van Harve and adapted by the authors. BloombergNEF data for 2024 biodiversity financing (US$ 313 billion) and the biodiversity financing gap (US$1.317 trillion).[3]

Note: Figure is illustrative and not to scale.

FIGURE 4. Private Capital Committed to Nature Investments 2009-2025[7]



Source: The Nature Conservancy

encouraging, but it has been accompanied by a significant increase in harmful subsidies—effectively pushing both positive and negative financial flows upward. Achieving the GBF's 2050 Goals will therefore require much more aggressive action to reduce and redirect harmful financial flows.

While public finance still covers the bulk of nature financing, private finance for biodiversity has grown rapidly, albeit from a notably smaller base. Private finance for biodiversity in circulation grew more than eleven-fold in the four years leading up to 2024.[6] Recent research shows a steady upward trend of private capital committed to nature, with a significant jump in 2025, with more than half of private flows going to working landscapes such as agriculture and forestry. While this growth is promising, private finance still represents a relatively small share of total finance directed toward nature.[3]

The headline challenge remains stark, but the policy and financial architecture for biodiversity finance is more developed than it was in 2020. Global targets, dedicated funds, MDB frameworks, capital market instruments, disclosure standards, and enhanced data collection and processing capabilities all provide a promising foundation for scaling nature finance; however, substantial policy and institutional support are still needed to reduce the nature financing gap.

1.2 Sources of Biodiversity Finance: Public Finance Still Dominates

Public finance remains at the heart of nature finance. Domestic public budgets provide the largest share of nature finance globally, partly because nature is perceived as a public good and because governments play key roles in environmental enforcement and planning in nature-related sectors such as agriculture, energy, and water. This current state of financing sources implies that budget allocation, fiscal policy, and government investment decisions will remain central to closing the biodiversity financing gap.

High fiscal demands already constrain domestic public finance, along with reduced ODA support and limited nature-based revenues. Environment-related taxes make up less than five percent of total tax revenues, and biodiversity-specific taxes are considerably smaller.[8] While biodiversity-positive taxes and other fees have increased over time, they are too small to finance the scale of conservation and restoration needed. Recently, global annual biodiversity-related tax revenues were just under US$ 11 billion.[9]

International public finance is critical to closing the financing gap, especially in Low- and Middle-Income Countries (LMIC). ODA, MDB lending, and Global Environment Facility (GEF) funding provide critical financial resources for countries with intense conservation needs and constrained fiscal space. Multilateral-provided biodiversity financing has increased sharply[10] and is becoming more standardized but remains small relative to climate finance and as a percentage of MDB balance sheets. A notable headwind is the recent pullback in bilateral financing, as ODA witnessed a 23% decrease in 2025, its largest drop on record, with further reductions forecast for 2026.[11]

Private sector engagement, despite considerable progress and increased institutional commitment, has not yet deployed capital at anywhere near the scale required. Investors, corporations, banks, and asset managers are increasing disclosure of nature-related risk exposure, managing supply chain exposure, buying offsets and investing in NbS and nature-linked financial instruments. Private finance remains a small share of total nature finance and often depends heavily on public policy, risk sharing, and oversight.

Philanthropic finance is small compared to the gap but can be highly catalytic. Philanthropic funding is often crucial for upstream projects and making projects bankable through supporting innovation, standardization, preparation, and IPLC inclusion. Funding levels have been volatile in recent years.

Government budgets, MDB concessional finance, private capital, and philanthropy play different but complementary roles in financing nature. Closing the financing gap requires deploying each source of finance where it is most effective, in structures designed to maximize mobilization of additional finance.

1.3 The Expanding Toolkit of Biodiversity Finance Instruments

Since 2020, the toolkit of available financial instruments has expanded considerably. The toolkit now includes a broader set of nature-focused funds, more sophisticated capital market instruments, and innovative MDB and DFI instruments that also come with technical assistance,



disclosure frameworks, better biodiversity offset options, and natural infrastructure models. There has been significant progress. The remaining challenge is to move from innovation to implementation, standardization, and replication at scale.

Multilateral and public mechanisms continue to evolve, though with mixed results so far. The Global Biodiversity Framework Fund (GBFF) is approving projects to support the goals of the GBF but remains thinly capitalized relative to the scale of need. The China-initiated Kunming Biodiversity Fund is beginning to support developing countries in implementing the GBF, but remains modest relative to the global needs. The Cali Fund is intended to use commercial profits from nature to finance the protection of nature, though it has yet to mobilize meaningful resources. More encouragingly, MDBs have approved common principles on nature, and several have increased their financial and operational commitment to biodiversity protection and are supporting various blended finance structures that leverage private investment with credit enhancement and technical assistance. A dedicated task force has been established to expand the use of credit enhancement for sustainability-linked sovereign debt for nature and climate outcomes.[12]

Debt capital market instruments for sovereign and corporate issuance have gained momentum. Commercial debt-for-nature conversions, while still a nascent market, are available for LMIC governments with the right debt profile. Green Bonds have become a well-established market, often issued with nature-linked outputs, and sovereigns, banks, and companies are issuing Blue Bonds. A few bonds have been issued under the dedicated Nature Bonds label. While there is a long way to go, the global debt capital markets have started the journey.

NbS and natural infrastructure financing are growing into recognized asset classes that can link biodiversity outcomes to infrastructure and attract blended finance flows to forest, wetland, and ocean conservation, with co-benefits for climate and communities. These often receive public support through long-term offtake arrangements, risk sharing, and project preparation and capacity building to become investable.

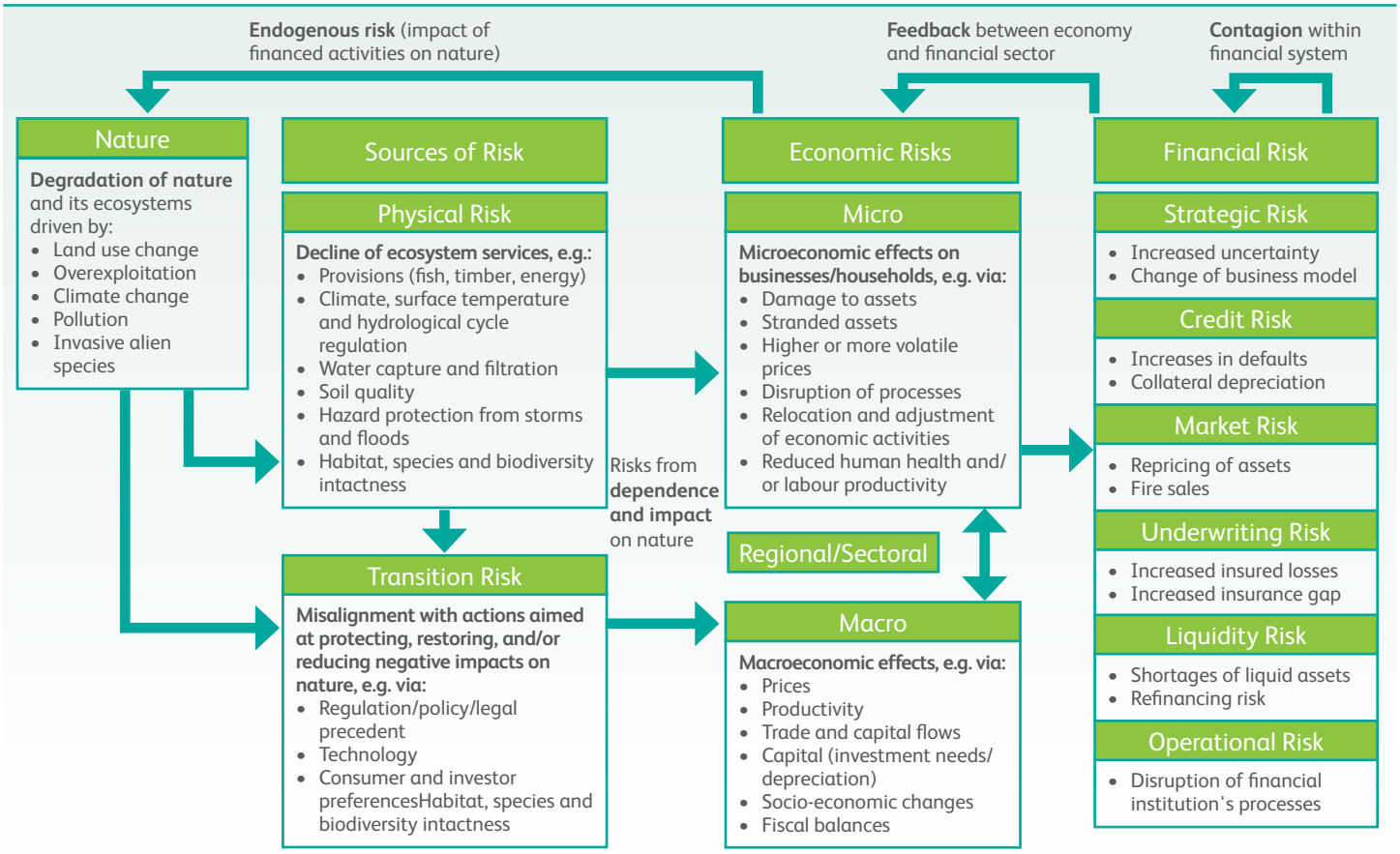
Offset trading mechanisms, such as voluntary carbon with biodiversity co-benefits and biodiversity offset credits, are a potential source of private finance. These markets remain promising but still lack common standards and governance. The nascent biodiversity credit markets have suffered from continued scrutiny over environmental integrity, reliable and affordable measurement and verification, uncertain demand, and risks to IPLCs.

Disclosure and risk frameworks have advanced considerably. The success of nature risk frameworks, in particular the TNFD, has helped companies and financial institutions identify dependencies, impacts, risks, and opportunities linked to nature exposure. There are early signs of financial institutions and investors using these disclosure frameworks as conditions for financing.[13] The next step is for these frameworks to become a part of corporate strategy decisions, credit rating agency risk analysis and lending requirements, and for them to be backed up by regulatory requirements for transparency and disclosure.

1.4 Nature Loss is Systemic Economic and Financial Risk

Nature loss is increasingly recognized not simply as an environmental concern but as systemic economic and financial risk. Economic stability and growth depend on healthy ecosystem services that nature provides, such as food, water, soil fertility, energy and climate regulation. Nature degradation, which is happening at

FIGURE 5. Risk Transmission Channels[16]



Source: NGFS | Adapted from Svartzman, R. et al. (2021) A "Silent Spring" for the Financial System? Exploring Biodiversity-Related Financial Risks in France.

unprecedented rates, is a systemic risk that undermines nature's ability to continue providing ecosystem services and threatens economic growth, financial stability, and human wellbeing.[2]

WEF research revealed that more than half of the world's GDP is moderately or highly dependent on nature and its services.[14] These dependencies extend beyond primary sectors like agriculture, forestry, and fisheries with direct reliance on ecosystem services (like pollinators or soil quality) through industry supply chains into manufacturing, chemicals, metals, real estate, tourism, and financial services. Business models and investment theses that don't recognize these dependencies place financial institution portfolios at risk of client defaults and stranded assets. Ultimately, as a recent IMF paper recognizes, the economy is embedded in nature and ultimately depends on functioning natural systems.[15]

Nature-related financial risks can be physical and transition risks that affect economies through various transmission channels. Physical risk, stemming from nature loss, reduces the ecosystem services that businesses and households depend on, decreasing productivity, asset value, and price stability. Water scarcity, invasive species, pollinator collapse, deforestation leading to landslides, loss of wetlands, and mangroves leading to increased vulnerability to floods and storms can have direct fiscal impacts by disrupting production, raising prices, reducing tax revenue and increasing budget expenditures for disaster relief and infrastructure repair. Transition risks arise when business activities are misaligned with actions aimed at protecting, restoring, and reducing negative impacts on nature, such as new policy, technology, or market shifts that emerge to restore or conserve nature.[16] Nature-related risks, both physical and transition, are transmitted from businesses and households through the wider economy and into the financial system manifesting in various forms of financial risk.



Nature-related risks also affect sovereign risk. The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) model demonstrates how nature loss creates material risks for countries whose economies depend heavily on natural capital, leaving them more exposed to weaker growth as ecosystems deteriorate. Lower tax revenue and increased fiscal costs weaken fiscal strength and raise borrowing costs.[17] This is particularly concerning for LMICs, where dependence on natural resources and natural capital is often high and fiscal space is limited. Recent research also links biodiversity loss to sovereign creditworthiness and increased borrowing costs.[18]

Climate change and nature loss risks are intertwined. Degrading ecosystems can reduce carbon storage ability and weaken resilience to floods, droughts, and storms. At the same time, climate change can accelerate biodiversity loss through ocean acidification, extreme weather, and ecological tipping points. Climate mitigation, on the other hand, can damage biodiversity when extraction of transition minerals, biofuel production, or solar installation are poorly planned and sited. Therefore, economic and financial risk assessment must consider both climate and nature together.

Nature loss can also threaten development goals. Economic development is at greater risk in rural, low-income societies, where livelihoods often depend more directly on nature, threatening poverty eradication, worsening health outcomes, and disproportionately affecting women and children.[14] Declining ecosystem services further undermine progress on 80% of SDG targets related to poverty, hunger, health, water, cities, climate, oceans, and land.[2]

Humanity's demands already far exceed nature's capacity to meet them. Economic activity underlies the main drivers of nature loss, namely changes in land and sea use, overexploitation, climate change, pollution, and invasive species.[2] Nature loss results in the direct reduction of an economy's natural capital assets, although many are public goods and not valued economically. *The Dasgupta Review* on the economics of biodiversity stresses that GDP, as a measure of economic wealth, must give way to inclusive accounting that recognizes the contribution of natural capital assets to societal well-being, alongside valuing human and produced capital.[19]

The policy implications of systemic and financial risks are critical. Ministries of Finance, central banks, regulators, investors, companies and financial institutions need to incorporate nature-related risks and dependencies into economic and financial planning, public investment, debt sustainability frameworks, and portfolio management.

1.5 From Recognition to Implementation

Since 2020, biodiversity finance has gained a stronger policy architecture and an expanding toolkit of financial instruments; however, implementation has not kept up. Nature-positive finance remains insufficient, private capital still accounts for a small share of public financing, instruments can be difficult to replicate, and nature-negative financial flows continue to overwhelm positive investment by a wide margin.

Closing the gap will require governments to align public budgets and investment decisions with biodiversity goals, MDBs and DFIs to use their balance sheets strategically, and public and philanthropic capital to reduce risk that private investment cannot take. Chapter 2 examines the policies, institutions, financing instruments, and enabling conditions needed to put these approaches into practice.



Chapter 2: Towards a Verdant Future—Nature Finance in Action

The global biodiversity financing gap continues to widen. At the same time, heightened geopolitical tensions, slowing economic growth, tightening public finances, and shifting corporate priorities risk pushing biodiversity further down the global agenda. Yet allowing nature to fall by the wayside would only increase long-term economic, social, and environmental costs. Closing the gap requires both increasing finance for conservation and restoration and reducing or redirecting public and private financial flows that are harmful to nature.

While many of the structural reforms needed to transform the relationship between the economy and nature will require political foresight and courage, progress need not wait for ideal conditions. Around the world, governments, businesses, financial institutions, philanthropic organizations, and local communities are already demonstrating practical ways to reduce pressures on biodiversity while mobilizing greater investment in nature. Government policy creates the foundation for development finance, philanthropic capital, and private investment to flow toward nature-positive activities. For finance ministers, these actions can protect economic productivity, reduce future public costs, and make better use of scarce public resources.

This chapter demonstrates how governments can realign economic incentives through subsidy reform, use forward-looking spatial planning to reconcile development with conservation, and deploy regulatory and market mechanisms to encourage more sustainable production and investment. It also shows companies and financial institutions embedding nature into business strategy and capital allocation; blended finance and philanthropic capital reducing investment risks and unlocking larger pools of private investment; technology leaders building the knowledge and digital infrastructure that enables conservation to be delivered more efficiently and at greater scale; and community-led stewardship translating conservation investments into durable biodiversity outcomes.

None of these approaches alone close the biodiversity financing gap. Together, however, they demonstrate that practical solutions, both proven approaches and emerging models, are available across policy, finance, business, technology, and community action. Even before broader systemic reforms take hold, governments and institutions can build on these approaches to reduce pressures on biodiversity, mobilize greater investment in nature, and gradually narrow the biodiversity financing gap.

2.1 Reasserting Public Sector Leadership

2.1.1 Subsidy and Incentive Reform: from Biodiversity Harm to Nature-Positive Investment

Reforming subsidies harmful to nature does not necessarily mean removing support, but rather redesigning or repurposing existing incentives to serve legitimate economic and social objectives while reducing harm to biodiversity–often without the need for new public spending. Harmful incentives are often inefficient public expenditure that delivers poor value for money. By distorting markets, misallocating capital, undermining sector productivity, and generating downstream costs that ultimately fall on public budgets, they can weaken outcomes for people, nature, and climate. Governments worldwide spend significantly more on activities that inadvertently undermine biodiversity than on those that protect it. As highlighted in Chapter 1, nature receives roughly one dollar of support for every 30 dollars funding its destruction.[5] Subsidy reform is the single largest fiscal lever in the GBF and is essential to closing the biodiversity funding gap. Redirecting just 10% of the most distortive agricultural incentives toward nature-positive practices could generate up to US$ 2.4 trillion in global economic gains by 2040[20] and help to reduce the harmful-subsidy component of the financing gap.

Recognizing this problem, GBF Target 18 requires governments to identify all harmful subsidies by 2025 and repurpose or reduce them by at least US$ 500 billion per year by 2030. However, Target 18 is among the least implemented targets in the framework. The parties have already missed the 2025 interim deadline to identify harmful subsidies. Fewer than 15% of parties referenced plans to identify harmful incentives.[21] The recent draft Global Report on GBF implementation found that of the 129 parties who reported by the deadline, few mentioned progress on Target 18.[22]

The main challenge for subsidy reform is not technical but political and institutional. Subsidies that drive nature destruction receive political support because the sectors they benefit are key components of the economy. The sectors and interests that benefit are well organized, while nature is often underrepresented. Policies that repurpose harmful subsidies toward nature-protecting practices can reduce biodiversity harm, strengthen natural capital, and stimulate sustainable economic growth and sector productivity.

This section describes the scale and composition of subsidies harmful to nature, examines the political economic conditions needed to make reform possible, outlines practical tools for identifying, prioritizing, and redesigning harmful incentives, and draws lessons from reform experiences.

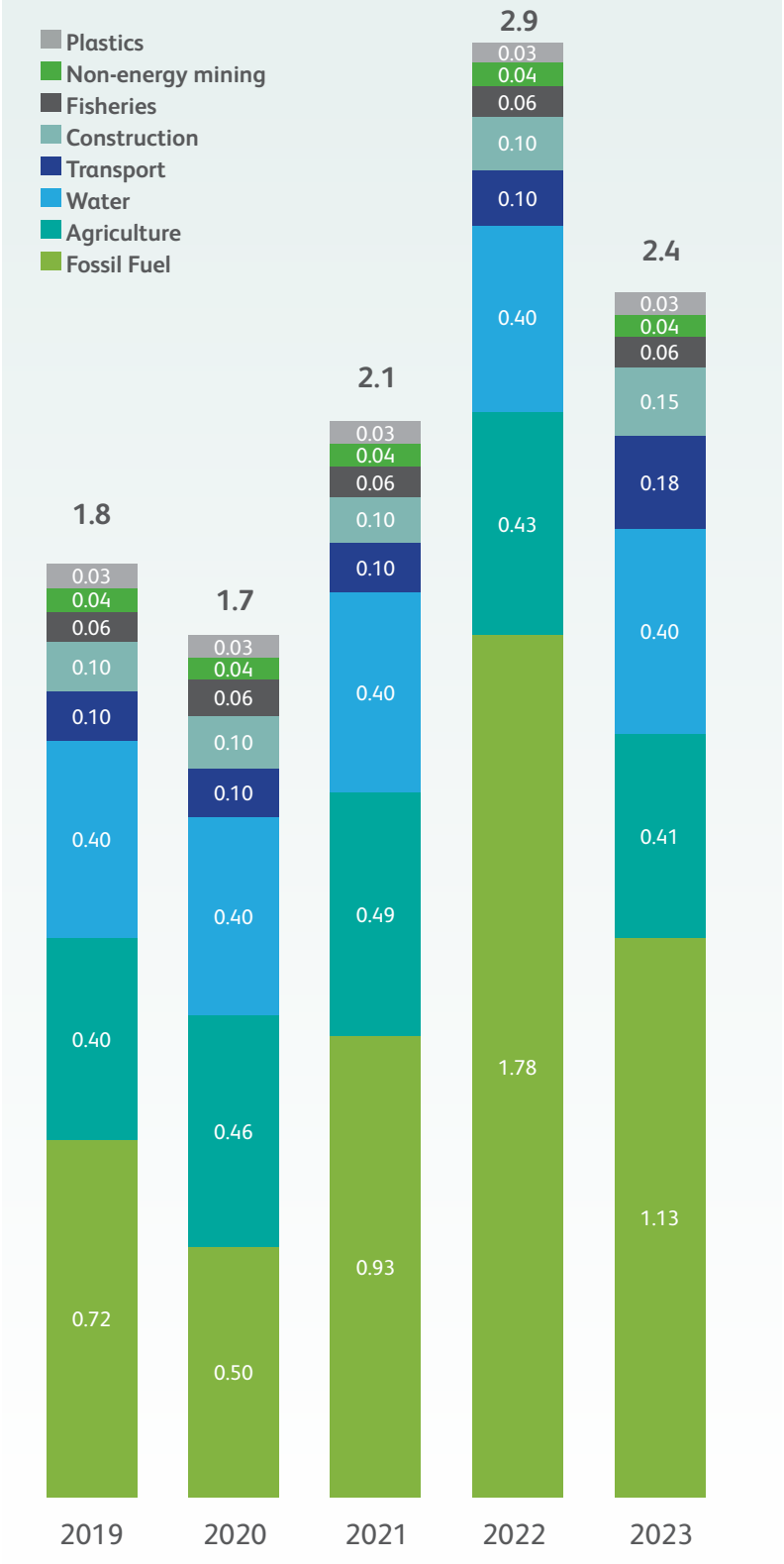
The Scale and Composition of Harmful Subsidies

Recent analysis, which includes off-budget instruments, underpriced resources, and indirect support across all sectors, estimates the size of subsidies harmful to nature at between US$ 800 billion and US$ 2.6 trillion per year, equivalent to 2.5% of global GDP.[23,24] The wide variation reflects methodological differences. The lower figure represents the most defensible floor, while the higher figures estimate the broader economic reality. Regardless, even the conservative estimate dwarfs the US$ 300 billion investment per year that global biodiversity conservation currently receives. Notably, global environmentally harmful subsidies dropped 17% in 2023, from an all-time high in 2022.[5]

Harmful subsidies can include direct transfers, tax expenditures, underpriced public resources, regulatory support, and other publicly supported risk-bearing tools that lower the economic cost of biodiversity-damaging activity. Distinguishing harmful from potentially harmful subsidies also matters: Some instruments can be damaging in certain contexts but not in others. Reform strategies must therefore be calibrated accordingly.

Agricultural subsidies are among the largest discretionary fiscal instruments, despite often being economically inefficient and detrimental to nature and therefore, to the long-term sustainability of this nature-reliant sector. World Bank analysis suggests that farmers capture around 35 cents in increased production for every public dollar spent.[20] A significant share of this underperformance is structural. When support systems are designed to underprice or degrade the natural assets

FIGURE 6. Public Finance: Environmentally Harmful Subsidies (trillion US$)[5]



Source: UNEP

that underpin agricultural productivity, such as soil, water, and biodiversity, they erode the productive base they are meant to sustain.

Governments often subsidize the same underlying risk repeatedly, first through incentives that increase exposure to climate and resource shocks, then through support that offsets declining yields as natural capital deteriorates, and ultimately through rising insurance payouts, disaster response costs, and emergency support. The United States federal crop insurance program paid over US$ 19 billion in 2022,[25] and land degradation has cost the Kenyan economy an estimated 3–5% of GDP annually.[26] These environmental costs are not external to public finance; they are downstream budget liabilities generated, in part, by subsidies and incentives that increase exposure to environmental risk.

Reforming subsidies can support many of the GBF targets. Fishery subsidies can directly counter the Target 5 goal on sustainable harvest. Misaligned subsidies can accelerate habitat conversion that the Target 3 30x30 commitments seek to protect against. For example, fossil fuel subsidies accelerate infrastructure buildout that can fragment nature connectivity. Meeting the 30x30 goal alone will not halt biodiversity loss if the current level of harmful subsidies remains intact. It will create isolated pockets of conservation within a broader system of subsidized nature destruction.

Political Economy of Subsidy Reform

Harmful subsidies persist mainly because they have political support. The industries that benefit from these subsidies are often concentrated, organized, and defended. At the same time, the natural systems that bear the cost are diffuse, underrepresented, and rarely appear on any balance sheet. As a result, the policy architecture, while largely designed for legitimate purposes, becomes the largest fiscal driver of biodiversity loss.

Repurposing subsidies is therefore both a fiscal efficiency and an environmental protection strategy. At the farm level, reducing dependence on external subsidized inputs,



while improving soil and water management, can cut production costs up to 40% , reduce exposure to input price volatility, and improve long-run competitiveness.[27] The choice, therefore, is not between supporting agriculture and protecting nature, but between agricultural spending that compounds future fiscal liabilities and spending that reduces them. Repurposing existing subsidy support toward instruments that reinforce natural capital can be among the highest-return fiscal reforms available, as the resulting biodiversity benefits can also strengthen productivity and resilience.

For Ministries of Finance, as managers of fiscal risk and overseers of the budget, leadership and involvement are essential in subsidy reform goals. However, subsidy reform requires a cross-government effort, including sector and planning ministries, regulators and elected officials, as well as industry and civil society. The fiscal case for repurposing is strong, but it does not necessarily translate into political traction. Finance and other ministries that enact subsidy reform often face powerful sectoral constituencies and, potentially, sector ministries without an equivalent constituency on the conservation side of the reform. This asymmetry explains why commitments to reform subsidies harmful to nature have appeared in international agreements since the 1992 Rio Declaration without generating reform at scale.

Subsidies are rarely designed with harmful intent. Most exist to serve an essential purpose, such as food security, rural employment, input price stabilization, or protection of smallholder producers from market volatility. The constituencies that benefit from existing subsidies must be included in the reform process, and any politically viable reform strategies must address their legitimate economic and social concerns.

Successful Reform Strategies and Lessons Learned

Coalition-building across ministries

Successful reforms consistently require collaboration among the ministries of finance, agriculture, and energy, rather than environment ministries working alone. Colombia's cross-ministerial climate action cabinet made significant progress towards achieving its protected and conserved areas targets while also advancing subsidy reform, showing how cross-government coordination can create the political conditions for reform that ministries struggle to achieve independently.[28]

Phased reform with transition support

Compensating affected industries and workers reduces political resistance and extends the coalition of supporters. The EU's gradual greening of the Common Agricultural Policy, despite significant implementation gaps, demonstrates both the potential and the limitations of incremental reform design.

Fiscal crisis as a reform window

The most substantial subsidy reforms frequently occur during fiscal consolidation periods, such as IMF program reviews, post-crisis adjustment, or sovereign debt restructuring. In these reviews, the fiscal cost of subsidies becomes more visible and politically salient. Indonesia's progressive reduction of fossil fuel subsidies followed the 2014 fiscal crisis. Several emerging economy energy subsidy reforms have occurred under IMF technical assistance programs.[29] These reforms demonstrate that a crisis may create reform opportunities that stable fiscal environments typically do not offer.

Transparency as a reform tool

Making subsidy costs visible to legislators and the public shifts the political cost-benefit calculus. Budget transparency reforms that require explicit disclosure of tax expenditures and off-budget support along with international reporting frameworks, such as the GBF Target 18 identification requirement, create domestic accountability that can help sustain reform momentum.

The financing that results from harmful subsidy reform is not limited to direct budget savings. Capital reallocation, redirecting support payments toward

environmentally positive instruments, can generate biodiversity benefits without incurring additional fiscal costs. In agriculture, for example, repurposing a portion of the existing nature-negative support toward agri-environment schemes, such as sustainable land management incentives or conservation payments, shifts the incentive without removing the fiscal transfer. In the energy sector, redirecting fossil fuel subsidies toward renewable energy or energy efficiency investment can transform the investment landscape while remaining cost-neutral. The fiscal question is not simply how much is saved, but also how much can be redirected to nature-positive purposes.

Frameworks for Identifying Harmful Subsidies and Estimating Fiscal Space

Subsidies can take on many forms and are scattered across budget lines, tax expenditure statements, regulatory frameworks, and off-budget instruments. They are often designed in isolation by ministries with little or no cross-government visibility, without consideration of biodiversity impacts, and rarely tracked. Many governments struggle to track, quantify, and report on biodiversity-related subsidies because of methodological challenges.[22] Building this analytical capacity within governments, particularly within ministries of finance, planning, and environment, is often the first step to subsidy reform.

Several methodological frameworks are available to help governments with systematic subsidy identification and assessment:

- OECD Producer Support Estimates (PSE)[30] program is best for agricultural sector subsidy reform. The PSE provides annual data on government support to agriculture across 54 economies, disaggregated by support type and environmental impact pathway. PSE is the most comprehensive and comparable cross-country dataset available.
- IMF fiscal subsidy methodology is best for energy sector subsidies and fiscal cost analysis. The IMF framework covers both explicit and implicit subsidies across the energy sectors, including estimated cost of unpriced environmental externalities.[31]
- Biodiversity Finance Initiative (BIOFIN) Public Expenditure Review[32] provides a biodiversity-specific framework for mapping both positive and negative public expenditures. It is applicable across sectors and adaptable to different national accounting systems.

This process need not be exhaustive to be useful. Targeting the highest-cost, highest-impact instruments in two or three sectors can generate the analytical foundation for meaningful reform without requiring a comprehensive whole-economy review.

BOX 1: BIOFIN, A Step-by-Step Subsidy Screening Tool for Finance Ministries

The BIOFIN initiative's "Nature of Subsidies" guide[33] provides a practical, step-by-step methodology for Ministries of Finance, in collaboration with other related ministries and institutions, to identify, assess, and prioritize the reform of biodiversity-harmful subsidies.

The guide covers identification of the inventory of subsidy instruments across budget categories, classifying them by biodiversity impact (harmful, potentially harmful, neutral, beneficial), estimating fiscal cost, and developing reform options, including elimination, redesign, and positive-incentive substitution.

BIOFIN presents a five-step subsidy reform process:

1. Identification and assessment of current subsidies harmful to biodiversity
2. Defining multiple redesign options
3. Development of action plans
4. Implementation of action plans
5. Identification of institutional gaps that need to be addressed

The guide is the most operationally ready tool currently available for governments beginning the harmful subsidy identification process required under GBF Target 18. The guide is applicable across country income groups and has been piloted in over 40 countries through the BIOFIN program.

CASE STUDY

England's Environmental Land Management Schemes (ELMS)

England | Agricultural Subsidy Reform | Land Management

Before 2020, the UK's agricultural incentive framework was governed by the European Union's Common Agricultural Policy (CAP), delivered mainly through area-based payments, that linked incentives to the amount of land farmers owned. Although the CAP included some environmental requirements, the Basic Payment Scheme encouraged agricultural intensification at the expense of biodiversity and habitat outcomes, undermining soil health, water quality, climate mitigation and adaptation, and ultimately agricultural long-term productivity.

The 2020 Agriculture Act established a new framework for England to use public funds to support environmental outcomes, recognizing agriculture as a key sector for delivering national commitments on climate and biodiversity.

Design

The central principle underpinning ELMS is the concept of 'public money for public goods'. Rather than rewarding land ownership, farmers receive payments for delivering environmental benefits that are not adequately valued by markets.

ELMS design was also informed by the need to promote uptake and ensure ease of access. The schemes were designed in collaboration with farmers and stakeholders and have been updated over time in response to feedback. Design and implementation of the Schemes were deliberately phased to ensure a smooth and effective transition to the new incentive framework, supporting farmers in managing changing practices and payments. The Schemes were first piloted from 2021 and incrementally rolled out from 2022. Area-based direct payments will be phased out from 2027.

The ELMS are designed to deliver multiple objectives, thereby delivering greater value for public money, including nature recovery, climate mitigation and adaptation, water and air quality, food security and sustainable production, and long-term farm resilience.

Architecture

ELMS consists of four complementary schemes operating at different scales:

1. The Sustainable Farming Incentive (SFI) incentivizes adoption of environmentally sustainable farming practices across the farmed landscape, rewarding specific actions such as hedgerow management, integrated pest and nutrient management, soil health, water protection, and improved grasslands.
2. Countryside Stewardship Higher Tier (CSHT) supports more targeted environmental management, protecting and enhancing the natural environment, increasing biodiversity, improving habitats, expanding woodland areas, improving water quality, and supporting natural flood management.
3. Landscape Recovery supports large-scale, long-term ecosystem restoration that extends beyond 20 years, blending public and private finance, and involves multiple landowners.
4. ELM Capital grants pay for capital items to carry out management actions and improve environmental outcomes.

Collectively, the four schemes provide land managers with different access points to improved land management, shifting incentives from rewarding landownership to rewarding how land is managed and outcomes for food security, productivity, resilience, climate, and biodiversity.



Challenges

Shifting incentives from direct payments to incentives for environmental outcomes represented a significant change for farmers and land managers. Uncertainty and fears around farm profitability generated opposition, as did concerns over administrative burdens, monitoring and verification, access for tenant farmers, and impacts on specific sectors. The policy faced some opposition from farming unions seeking to protect the incomes of their members from perceived changes.

Changing political leadership has created policy uncertainty and volatility during the agricultural transition.

Lessons learned

ELMS demonstrates that politically sensitive agricultural incentives can be reoriented towards environmental objectives, and that repurposing is more politically feasible than simply removing incentives altogether. A just, managed, and phased transition is essential for managing all stakeholders and bringing the sector along with the reforms.

Policy and political volatility should be kept to a minimum: Farmers benefit when there is a clear, structured, and long-term transition plan in place. Gradual implementation accompanied by income support during the transition, clear communication, and consistent engagement with land managers, are critical.

Redesigning incentives should not be seen in isolation. Transitions can and should be accompanied by wider policy reforms to create an enabling environment for large-scale nature and climate outcomes. In England, the Environment Act 2021 and Agriculture Act 2020 created legislative frameworks from which multiple reforms could be implemented to support a long-term transition to sustainable land management. This includes introducing private finance mechanisms for nature, such as through Biodiversity Net Gain (see Section 2.1.3), improved land use and spatial planning through the Land Use Framework, and the wider Environmental Improvement Plan for England, which sets a decadal strategy for halting and reversing nature loss.

England's Environmental Land Management Schemes represent one of the most ambitious recent attempts to reform environmentally harmful agricultural subsidies. By replacing area-based payments with incentives for environmental stewardship, ELMS illustrates how public expenditure can be redirected toward nature-positive outcomes.

Source: The Nature Conservancy

Recommendations

Governments and legislatures should urgently identify, disclose and prioritize reform of subsidies and incentives harmful to nature under GBF Target 18. Reform should be treated as a whole-of-government process involving the ministries of finance, environment, relevant sector ministries, and elected officials. Relevant parliamentary/congressional committees should help build cross-party support for transparent, phased reform that can endure election cycles. The process should include affected industries and workers, civil society, and IPLC to reduce political resistance. Governments should use public expenditure reviews, BIOFIN/OECD/IMF tools, and GBF reporting to improve transparency, strengthen accountability, and prioritize the most damaging subsidies for phased reform by 2030.

Ministries of Finance should co-own and lead the fiscal analysis to identify, review and repurpose subsidies harmful to nature and collaborate with environment and sector ministries to connect subsidy reform to budget planning. Ministries of Finance should map biodiversity-harmful subsidies across the budget, tax, underpriced public resources, and other public risk-bearing projects and estimate fiscal costs, savings, foregone revenue, and downstream costs related to subsidies; as well as redirect existing public support toward nature-positive incentives. The Ministry of Finance should evaluate Payment for Ecosystem Services (PES) and natural capital maintenance as fiscal investments rather than only as recurrent expenditure.

Ministries of Environment and related sectors should work with Ministries of Finance to turn subsidy analysis into practical subsidy reform options. This work should rely on analytical tools from the OECD, IMF, and BIOFIN to identify and prioritize harmful incentives to reform and assess biodiversity impact pathways for major subsidies and develop positive incentive instruments, such as PES and results-based finance. Positive incentive programs should include safeguards for additionality, benefit sharing, IPLCs, monitoring, and enforcement.

MDBs, DFIs, donors, and international organizations should support country-led subsidy reform and provide technical assistance. Support should build government capacity to identify harmful subsidies, estimate fiscal and biodiversity impacts, apply available tools and create politically feasible reform pathways. This work should link subsidy reform to public expenditure reviews, National Biodiversity Strategy and Action Plan (NBSAP), Nationally Determined Contributions (NDC), and national development plans, and promote comparable methodologies for identifying harmful subsidy identification and biodiversity-impact assessment.

2.1.2 Spatial Planning for Biodiversity Conservation

Spatial planning is a foundational instrument for resolving conflicts between development and conservation and, as identified in the 2020 Financing Nature report, a key pathway to closing the biodiversity financing gap. Spatial planning determines and delineates where nature must be strictly protected, where development may proceed, and how competing demands are reconciled. As land- and sea-use change are the primary drivers of biodiversity decline,[2] spatial planning directly addresses the root cause of ecosystem degradation by steering harmful activities away from ecologically critical areas. GBF Target 1 relies on spatial planning to bring the loss of areas of high biodiversity importance close to zero—calling for all land and sea areas to be covered by participatory, biodiversity-inclusive spatial planning by 2030.[34]

These cost-effective frameworks enable sustainable and resilient development pathways and shift policy strategy from reactive restoration to preventive risk management. They are critical early-stage investment decision-making tools and can help avoid future restoration, redesign, permitting and conflict costs. Avoiding biodiversity damage through well-designed zoning is typically cheaper than financing restoration and species recovery or purchasing offset schemes after degradation has occurred. Many ecosystems cannot be meaningfully restored once lost.

Although Environmental Impact Assessment (EIA) has long been used as a tool for managing impacts at the site level, comprehensive and landscape-scale spatial planning expands the planning vision to larger geographic and temporal scales and allows better assessment of trade-offs. When planning frameworks are fully integrated into, and used to inform, investment decision-making and consistently enforced, they can greatly reduce future restoration costs.

Macro-level spatial planning establishes a national-level framework to identify ecological “no-go” zones, designate and connect protected areas, steer infrastructure and development toward lower-impact locations, and enable more sustainable and resilient development pathways. This allows countries to align national development strategies with biodiversity

protection goals and ensure growth is not at odds with nature. China's nationwide Ecological Conservation Redline initiative[35] (ECR) represents an evolution toward comprehensive, nationwide spatial optimization, while integrated coastal zone management in the Caribbean provides another example of this trend.[36]

Despite these benefits, adoption remains limited and uptake uneven, particularly when plans are not integrated into investment decision-making or consistently enforced. Quantifying the financial benefits of spatial planning can be difficult, as the savings stem from avoiding risks and costs associated with non-compliance.

Technology is essential for effective spatial planning and rapid advances in remote sensing, geospatial analytics, and artificial intelligence are helping to address implementation challenges. As these technologies lower implementation costs, spatial planning is becoming an increasingly scalable and finance-relevant policy tool.[37,38]

Protected areas

Protected areas represent one of the most established forms of spatial planning for nature conservation. By restricting or prohibiting human activities in ecologically important areas, they provide essential refuges for biodiversity and help maintain critical ecosystem functions—particularly against the backdrop of rapidly diminishing natural spaces. Globally, as of March 2025, approximately 17.54% of land and inland water areas and 8.45% of marine areas are under some form of protection or conservation.[37]

Protected areas are also central to biodiversity finance. As the backbone of global conservation efforts, they require sustained public investment not only to manage and strengthen existing areas effectively but also to establish new ones. When managed effectively, they help prevent habitat degradation, avoiding the substantially higher costs of ecological restoration if damage occurs. At the same time, they present governments with both the challenge and the opportunity to maximize the return on conservation investments by improving the effectiveness of protected area networks, for example, through greater ecological connectivity and more representative coverage, so that existing funding delivers greater biodiversity outcomes.

Historically, the design of protected areas often focused on specific species, habitats, or scenic landscapes, with less emphasis on broader ecological systems and



landscape-scale integration. This limitation reflected the absence of a systematic, science-based spatial approach to protected area planning.

By contrast, more recent approaches to protected area design seek to address these limitations by emphasizing spatial coherence, ecological integrity, and system-level planning.[38] China's nascent national park system has been conceived, designed, and implemented within a broader spatial planning framework, with a stronger emphasis on maintaining ecosystem integrity, enhancing habitat connectivity, and integrating conservation with restoration across large landscapes.

CASE STUDY

China's Ecological Conservation Redline System: Integrating Protected Areas into National Spatial Planning[39]

China | Spatial Planning | National Policy

China's biodiversity conservation challenge has been shaped by rapid economic growth, urbanization, and infrastructure expansion demands for land-use change, the primary global driver of biodiversity loss, coupled with a fragmented national biodiversity protection strategy. Over time, China has established an extensive network of protected areas, mainly nature reserves. About a decade ago, China began reforming and consolidating its protected areas, and the current system consists of national parks, nature reserves, and natural parks. While these efforts significantly expanded conservation coverage, earlier generations of protected areas were often developed in isolation with overlapping mandates and uneven ecological representation. To address this fragmentation and piecemeal approach, China sought to introduce a more comprehensive, science-based framework to coordinate conservation and development nationwide.

In response, China rolled out the ECR initiative[39] as a nationwide spatial-planning component of its broader spatial-planning framework, which organizes territorial space into urban, agricultural, and ecological categories.[40] First piloted in the early 2010s and scaled nationally by 2017, the policy delineates and intends to protect areas critical for ecological security, biodiversity conservation, and ecosystem services as "no development zones" where industrial and production activities are generally prohibited. Boundary adjustments are rare and subject to stringent review by national authorities.

Together with permanent arable land designations and urban development boundaries, the ECR has become a central pillar of a unified national spatial planning framework, aligning economic activity with national ecological priorities. As of 2023, China has delineated approximately 3.19 million square kilometers of ecological redline areas, including about 3.04 million square kilometers on land, over 30% of the country's total land area, and around 150,000 square kilometers in marine areas.[41] The ECR is expected to be fully implemented by 2030.

The ECR effort was not without challenges.[42] A key issue is planning conflict, where strict ecological boundary controls conflict with guiding sustainable development objectives within the same zones. Redline areas are often inhabited, and their designation can constrain or even displace the livelihoods and land-use rights of local communities. Compensation schemes are often limited in scope and precision. At the same time, regulatory approaches may rely on uniform restrictions, undermining local support, weakening conservation incentives, and posing risks to long-



term policy effectiveness. The mechanisms to balance ecological protection with development needs must improve over time.

Coordination challenges further complicate ECR implementation. The redline system involves multiple actors and layers of government, with potential misalignment between central objectives and local realities. Fragmentation across agencies, such as overlapping mandates, uneven authority, and data-sharing barriers, can undermine policy coherence and weaken enforcement effectiveness.

China's ECR model demonstrates how protected areas can be embedded within a broader, integrated, and forward-looking national planning framework that strengthens ecological outcomes while supporting sustainable development and investment. The approach is most relevant for countries facing rapid land-use change, biodiversity loss, and expanding infrastructure pipelines, particularly where national governments have the authority and capacity to set and enforce nationwide spatial planning frameworks. However, long-term effectiveness requires adaptive management, differentiation within zones, and credible mechanisms to safeguard local livelihoods, including targeted compensation and development of nature-compatible economic opportunities to ensure local support.

Source: Paulson Institute



De-conflicting Climate and Nature in Energy Transition

The energy transition presents a genuine dilemma. Renewable energy infrastructure is essential for climate goals, but poorly sited projects can significantly impact biodiversity. There is growing evidence that poorly planned climate action in the renewables sector, including generation facilities, transmission lines, and associated infrastructure, can undermine biodiversity conservation.[43] To protect biodiversity, spatial planning that identifies locations of energy projects with the least ecological and community conflict must guide this rollout. Publicly available ecological mapping can improve energy project investor confidence, reduce uncertainty for developers and lenders, accelerate permitting and project development, and reduce conflict with local communities.[44]

Governments face considerable pressure to deploy renewable energy, increasing the risk of poorly sited wind and solar infrastructure that can fragment habitats, disrupt migratory flyways, and affect species from pollinators to apex predators. Research combining satellite imagery with biodiversity data found that, among renewables, solar installations cause the greatest aggregate negative biodiversity impact and that the negative impact of renewables on biodiversity has grown substantially as projects are sited in increasingly sensitive locations.[45,46] Transmission infrastructure, by slicing through multiple ecosystems, can add or worsen linear fragmentation. Investment frameworks must ensure that permitting fast-tracking and public investment guarantees are conditioned on siting.

Renewable energy expansion has been accelerated by the global transition away from fossil fuels[47] as well as the increasingly compelling economics of renewables. According to the International Energy Agency, global renewable electricity capacity additions are projected to reach 4,600 GW by 2030, equivalent to the current installed power capacity of China, the European Union, and Japan combined, and roughly double the expansion in 2019–2024.[48] At these levels of size and growth, siting decisions will have large implications for biodiversity, land use, community approval, and investment risk.

The key risks stem from fragmented governance frameworks that treat climate and nature as separate policy domains, limited awareness of cumulative



ecological impacts, and insufficient spatial planning at both national and project levels. The consequences can be ecologically significant, ranging from habitat degradation and fragmentation to the disruption of wildlife migratory pathways and ecosystem functions. Early access to spatial plans is particularly valuable for renewable energy projects.[49]

While sensitivity maps provide a strong analytical foundation, their effectiveness depends on integration into the formal planning, permitting, and policy frameworks.

At the international policy level, efforts to address these trade-offs remain incomplete. While GBF Targets 8 and 14 call for minimizing the negative impacts of climate action on biodiversity and promoting strategic environmental impact assessments, respectively,[34] they fall short of explicitly addressing the specific risks associated with renewable energy expansion and project siting. A critical first step is the creation and adoption of national and regional spatial plans that identify low-impact zones best suited for renewable energy development and clearly delineate ecologically sensitive "no-go" areas before project capital is committed. This science-based pathway allows countries to pursue their renewable energy ambitions while safeguarding biodiversity, in line with the mitigation hierarchy's prioritization of avoidance.[50, 51]

While sensitivity maps provide a strong analytical foundation, their effectiveness depends on integration into the formal planning, permitting, and policy frameworks. Biodiversity mapping must be linked to land-use planning, grid capacity, permitting rules and regulatory processes, and regularly reviewed and updated to reflect evolving scientific, technological, environmental, and local community priorities.[52]

Crucially, the spatial and ecological footprint of the energy transition extends beyond renewable infrastructure to include the extraction of critical minerals that underpin it. The same spatial planning and no-go areas logic should apply to mining (see Section 2.3.2). Governments should embed renewable energy deployment, transmission plans, and mineral extraction into a unified spatial planning framework.

CASE STUDY

Smart Siting Renewable Energy in Croatia: Biodiversity Sensitivity Mapping for Renewable Energy Development[53]

Croatia | Spatial Planning | Renewable Energy Siting

Croatia faces a dual challenge of accelerating renewable energy deployment while safeguarding its rich biodiversity. Under the European Green Deal, Croatia is targeting 42.5% of energy consumption from renewables by 2030. However, with more than 38% of its territory covered by protected areas and Natura 2000[54] sites, renewable expansion risks encroaching on ecologically sensitive areas.[53]

Recognizing the need for a more systematic approach to spatial planning, Croatia's Ministry of Environmental Protection and Green Transition collaborated with the Hrvoje Požar Energy Institute and The Nature Conservancy to develop national biodiversity sensitivity maps. The maps identify the areas with high solar and wind potential and comparatively low ecological conflict, providing a science-based foundation for spatial planning and designation of Renewable Acceleration Areas.[55]

Drawing on over one million observations across more than 350 species, including birds, bats, and large carnivores, the high-resolution analysis identified approximately 148,000 hectares suitable for solar PV and 1,700 hectares for wind energy with relatively low biodiversity conflict—demonstrating that renewable energy targets can be pursued while minimizing impact on sensitive ecosystems.[56] By identifying low-conflict areas early, the maps shifted decision-making upstream and reduced potential trade-offs between development and conservation. They can help lower permitting uncertainty, redesign costs, and investor risk.



Croatia's experience underscores that political commitment, accessible data, and technical partnerships are critical to embedding biodiversity in renewable energy planning. Collaboration with external partners, including NGOs with established methodologies and technical expertise, can strengthen analytical rigor and accelerate implementation.

The smart siting approach is particularly relevant for countries with high biodiversity value and expanding renewable energy ambitions. The program extension to neighboring countries, Serbia, North Macedonia, and Montenegro, demonstrates its applicability across national contexts.

Source: Paulson Institute



Early alignment with "go-to" and "no-go" zones can reduce development risk, avoid costly redesign, accelerate approvals, and improve access to other types of finance.

Recommendations

Governments should embed credible, transparent, and science-based spatial planning into national development planning. Spatial plans should guide infrastructure, urban, agricultural, mining, and energy strategies, and direct development away from ecologically critical areas and toward low-conflict areas. Spatial plans, ecological redlines, protected-area boundaries, and enforcement rules should be legally binding and accessible to investors to reduce restoration, offsetting, redesign, and permitting risks and costs.

Governments should use spatial planning to de-conflict development strategies and biodiversity protection, particularly for renewable energy in development in energy transition. National and regional plans should identify "go-to" areas and ecologically sensitive "no-go" areas before committing capital to projects. Biodiversity mapping should inform land-use, grid, and renewable-energy planning to reduce permitting uncertainty, redesign costs, and investor risk.

MDBs and DFIs should support governments with concessional finance and technical assistance for spatial planning systems. Support should prioritize biodiversity mapping, ecological redlines, renewable energy no-go and go-to mapping, and integration of these tools with development planning, public investment, permitting, and safeguards.

Project developers and private investors should use national spatial plans and biodiversity sensitivity maps at the earliest stage of project identification and site selection. Early alignment with "go-to" and "no-go" zones can reduce development risk, avoid costly redesign, accelerate approvals, and improve access to other types of finance.

2.1.3 Managing Infrastructure for Nature: Reducing Risk and Mobilizing Private Finance

Infrastructure is one of the largest drivers of biodiversity loss and one of the largest untapped levers for closing the biodiversity financing gap.[57] Roads, energy grids, dams and dikes, water works, and urban expansion can directly destroy and fragment habitats, disrupt hydrological systems, and introduce pollution and invasive species.[58, 59] This damage reflects an investment system that does not price the value of the biodiversity it harms or the ecosystem services it depends on. Government budgets

routinely subsidize infrastructure that damages natural systems and bear the costs of replacing the ecosystem services lost. When these costs are eventually incurred, they fall on different ministries, budget lines, and often different political cycles.

As a result, governments and responsible departments may not be aware of the link between restoration spending and the infrastructure decision that caused it. Smarter public sector leadership on infrastructure, through regulation, investment, budgeting, procurement, and design, can break this cycle and reduce biodiversity damage and lower future conservation costs.

This section highlights the intertwined concepts of reducing harm from conventional "gray" infrastructure while investing in nature-based solutions (NbS). Both strategies require policy that makes biodiversity costs and benefits visible, regulatory frameworks that incentivize private actors, and public investment. The instruments covered below—mitigation hierarchy, net gain requirements, and NbS investments—function best when projects align with spatial plans, protected areas, ecological corridors, and no-go zones covered in Section 2.1.2. Where spatial frameworks are absent or weak, the instruments covered in this section are less effective, harder to predict, and more costly. This framework is also increasingly important for the fast-growing infrastructure frontiers of renewable energy, data centers, and critical minerals, where rapid investment can threaten biodiversity.

Reducing Negative Impact of Gray Infrastructure

The costs of poorly designed and poorly managed infrastructure are substantial and disproportionately charged to public budgets. When infrastructure destroys wetlands that prevent flooding, governments may have to pay for flood defense and damage response. When it degrades watersheds that naturally filter water, utilities face higher treatment costs. When projects fragment habitats to the point where species cannot recover without intervention, conservation agencies pay for managed recovery programs. Retroactive restoration costs are inefficient and typically exceed what avoidance and mitigation would have cost.

Poor biodiversity management increases financial risk. Infrastructure projects that damage critical habitats can face permitting delays, legal challenges, redesign, and in some cases license revocation. Retroactive litigation, redesign, and remediation are likely the most expensive outcomes and are often paid disproportionately from public budgets. In the future, as regulatory frameworks tighten and international financial standards strengthen, projects that have externalized biodiversity costs face greater exposure to stranded assets. Governments, developers, and lenders should therefore price biodiversity risks into infrastructure project design, appraisal, and investment criteria before capital is committed.

Avoiding biodiversity impacts through better siting and design is least costly at the planning stage. Mitigating impacts during construction is more expensive but often manageable. However, offsetting residual damage through habitat restoration or creation, if done to a genuine standard, is most expensive. Governments have a direct fiscal interest in pushing biodiversity protection decisions upstream.

Regulatory Instruments that Incentivize the Private Sector toward Biodiversity Positive Investment

Regulation, not fiscal action, is the primary public lever for motivating infrastructure developers and financiers to internalize biodiversity risk and impact. The process is often formalized through the mitigation hierarchy: avoid, minimize, restore, offset. Regulators should assume that private developers and investors internalize biodiversity costs only when required. Strategic environmental assessment and spatial planning are upstream inputs to help guide governments and developers in identifying where nature impacts should be avoided or minimized before projects are permitted or financed. Offsets, biodiversity net gain, and habitat banking are later-stage tools in the hierarchy and should apply only to impacts remaining after avoidance, minimization, and restoration.

Mitigation hierarchy is a common tool for managing biodiversity risk in infrastructure, mining, energy, and water project finance. The best-known articulation of the mitigation hierarchy is found in the IFC's Performance Standard 6 on biodiversity [60], which has also been adopted by the 100+ financial institution members of the Equator Principles,[60–62] setting the de facto international standard for public and private investors. The mitigation hierarchy consists of four phases:

1. *Avoid:* prevent negative impacts on biodiversity and ecosystem services from the start, recognizing that some critical conservation areas are off limits.

2. *Minimize:* where impacts are unavoidable, reduce the scale, intensity and duration of such impacts.

3. *Restore:* rehabilitate degraded and impacted habitats to their original condition.

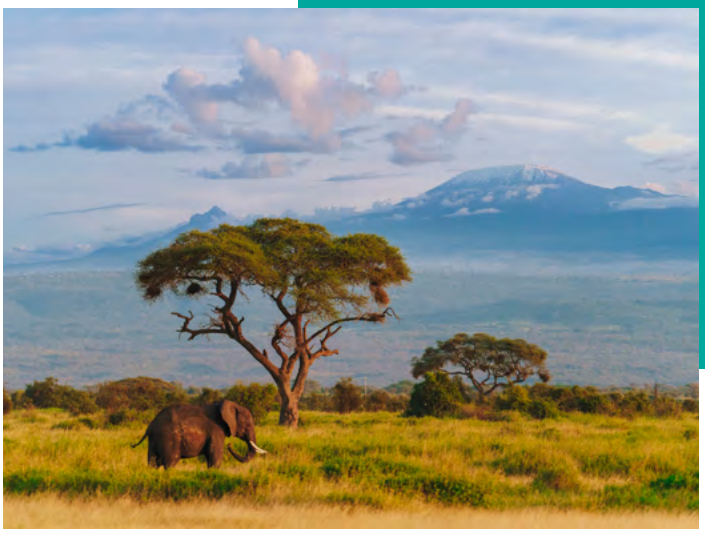
4. *Offset:* compensate for residual negative impacts resulting after avoidance, minimization, and restoration through positive conservation and restoration efforts, at least on a one-for-one basis and preferably resulting in a net gain for biodiversity.

The 2020 Financing Nature report found that, if universally applied to the impacts of the mining and infrastructure sectors as the Biodiversity Convention suggests, biodiversity offsets could be one of the most significant sources of financing for biodiversity, generating upwards of US$ 160 billion per year in compensatory payments for nature.[62]

Strategic environmental assessment (SEA) is a decision-support process that ensures that environmental impacts are integrated into policies, plans, and programs. SEAs move biodiversity screening from individual project permitting to the level of sector plans, national infrastructure strategies, and spatial frameworks. Rather than assessing each road or power line in isolation, an SEA identifies where biodiversity sensitivity is highest before routes and sites are chosen, dramatically reducing the costs and conflicts that arise when poorly sited projects reach the permitting stage. For private investors, SEAs reduce uncertainty. Projects developed within a clear SEA framework face fewer late-stage surprises, lower permitting risk, and more predictable timelines. Governments that invest in this robust process can reduce the transaction costs of their entire infrastructure pipeline.

Mandatory biodiversity net gain (BNG) is a planning requirement that ensures infrastructure developers leave the natural environment and wildlife habitats in a measurably better state than before construction. BNG embeds the mitigation hierarchy at its core by requiring developers first to avoid, minimize, and restore impacts before relying on offsets or credits to address ecological harm. BNG policy can create compliance-driven demand for biodiversity offsets and habitat-bank credits. This demand can generate predictable revenue for private-sector developers and make restoration projects more bankable than voluntary credit markets.

Habitat banks, designated areas of environmental value that preserve or restore nature, can complement BNG requirements and create an investable pipeline of nature projects. They provide biodiversity credits that developers with licensed projects can purchase to offset



negative impacts or fulfill "net gain" requirements.[63] Rather than developers implementing restorations on a site-by-site basis, habitat banks aggregate restoration and conservation activities across larger sites. This can improve ecological outcomes, create more predictable revenue streams, and drive private investment into long-term land management.

The critical element is public regulation, as governments must design and enforce market rules, ensure credit quality, and maintain oversight. To deliver real outcomes, policies need clear sequencing, robust and standardized metrics, additionality requirements, permanence safeguards, independent verification, and prioritization of like-for-like offsets.

Mandatory nature-related financial disclosure, including requirements aligned with the TNFD framework, can help lenders and investors price biodiversity risk in infrastructure finance as discussed in Section 2.4.1.

For private investors, the absence of clear mandatory standards disadvantages the developers who voluntarily invest in higher biodiversity performance. Regulatory floors, such as minimum environmental thresholds, level the playing field, reward developers with stronger environmental practices rather than exposing them to lower-cost competition from weaker practices. For finance ministers, this process can be a cost-avoiding strategy that shifts preventable costs to asset owners today, making public co-investment available only where returns are primarily public goods that private operators cannot capture, such as connectivity, flood regulation, and fisheries productivity. In both cases, spending on upfront upgrades is often cheaper than restoring degraded ecosystems and lost services in the future.

CASE STUDY

UK Biodiversity Net Gain

England | Regulation | Habitat Restoration

Biodiversity Net Gain (BNG) is England's attempt to hardwire nature into development and infrastructure planning, while creating a regulated source of private finance for nature recovery. Since 2024, most new developments in England have been required to deliver at least a 10% net gain in biodiversity. BNG is being extended to nationally significant infrastructure projects from November 2026, making it directly relevant to major transport, energy, water, and other infrastructure schemes.

The Environment Act 2021 introduced the legal framework for mandatory BNG in England. With new evidence that the UK is one of the most nature-depleted countries in the world, and yet with high demands for land in a small but populated island, the Act sought to address some of the key drivers of biodiversity loss while integrating nature into sectors such as infrastructure.

How BNG works

BNG sits alongside existing habitat and species protections and reinforces the mitigation hierarchy. Developers must first avoid and reduce impacts through site selection, design and mitigation. Any residual impact must then be addressed through a Biodiversity Gain Plan, which shows how the 10% gain will be achieved and how habitats will be managed and monitored for at least 30 years. Planning permission cannot be granted until this Plan is approved, thereby embedding biodiversity into the planning process.

Biodiversity value is measured in standardized Biodiversity Units, calculated through a statutory Biodiversity Metric[64] which uses habitat as a proxy for biodiversity and compares the pre-development baseline with the post-development state. This standardization is central to the scheme: It creates a common accounting unit for developers, planning authorities, landowners, and investors.

Developers are expected to prioritize onsite delivery, consistent with the Biodiversity Gain Hierarchy.[65] Where the full uplift cannot be achieved onsite, developers can purchase offsite units, usually obtained from habitat banks or directly paying landowners to restore nature. Units close to the development are incentivized through the Metric so that ecological and community benefits remain local. As a last resort, developers can buy statutory biodiversity credits from the government, priced to avoid undercutting the private market.

Achievements

BNG's main achievement is institutional. It requires developers to treat biodiversity as material to planning and project-delivery, rather than as an optional environmental enhancement. It also gives planning authorities a clearer basis for requiring measurable nature outcomes.

BNG has also created one of the clearest examples of a regulated biodiversity market. Early market analysis suggests strong growth potential: The BNG unit market has been projected to reach around £3 billion by 2035.[66] Separate analysis suggests offsite BNG could protect more than 80,000 hectares of habitat by 2042 if current delivery trends continue.[67] While only forecasts, these figures indicate the scale of private finance that a mandatory, rules-based planning instrument can mobilize.

For landowners, BNG can provide a diversified income stream for nature recovery. For local communities, onsite or nearby delivery can support better green infrastructure, access to nature, urban cooling, flood attenuation and other co-benefits. This makes BNG a mechanism for aligning infrastructure investment with place-making and resilience.



Challenges

The preference for onsite delivery is ecologically justified, but it can constrain demand for offsite units and therefore the depth of the habitat banking market. Onsite gains may also be harder to protect from disturbance and may require long-term monitoring capacity that local planning authorities and developers do not always have.

The Metric is habitat-based and may not fully capture species outcomes or wider ecosystem functioning. It can also favor habitats that are easier and quicker to create over more complex ones such as grassland, slow-maturing habitats such as woodland and wetland.[68] Exemptions are another concern: Analysis of BNG's first year found that a very high proportion of planning applications claimed exemptions. If too much development falls outside the regime, both biodiversity outcomes and market confidence are weakened.[69]

Key lessons

BNG shows how nature can be integrated into infrastructure policy through enforceable rules, standardized measurement, and long-term management obligations. Its most important contribution is that it makes biodiversity a costed, planned component of development, supporting locally-significant nature enhancement and conservation, improved place-making and access to nature, and enhanced resilience for infrastructure.

BNG highlights the importance of public capacity. A robust, verifiable and enforceable net gain requirement over 30 years necessitates ecological capacity with local planning authorities. Without sufficient ecological expertise in local authorities and clear rules for exemptions, the system risks becoming a compliance exercise rather than a driver of genuine nature recovery.

The standardized statutory Biodiversity Metric is a significant element, ensuring that all developers use the same measurements and creates a level playing field for the market in biodiversity units. However, going beyond habitat as a proxy could be considered by future schemes to ensure they deliver for species and other ecosystem functions.

Source: The Nature Conservancy

Nature-Based Solutions and Green & Blue Infrastructure

NbS encompass a wide range of natural approaches that deliver services in place of built assets, such as watershed protection, wetland and floodplain restoration, coastal habitat management, urban greening, and reforestation. Infrastructure appraisal should view NbS as a preferred option where they outperform gray infrastructure on cost, resilience, and ecosystem benefit, as opposed to a compensatory addition to nature-negative projects. Unlike built infrastructure, most NbS are delivered and maintained through the ongoing stewardship of landowners, communities, or land managers, rather than through one-time construction. NbS typically require lower upfront capital than gray alternatives, but their performance depends on sustained funding for land stewardship, ecological management, and monitoring. The investment case for NbS over conventional infrastructure depends on three factors: cost competitiveness, climate resilience, and co-benefits. These benefits are not automatic and depend on siting, design, maintenance, and risk management of drought, fire, invasive species, disease, and changing climate.

The evidence supporting NbS infrastructure cost competitiveness is stronger than commonly recognized. Studies across multiple continents show that watershed protection consistently outperforms water treatment infrastructure for maintaining drinking water quality in forested catchments. Wetland and floodplain restoration often provides flood attenuation at lower whole-life cost versus hard flood defense. Coastal mangrove and reef systems provide storm surge protection at a fraction of the cost of seawalls in low-income coastal economies most exposed to climate risk.[70]

The co-benefits of NbS are directly relevant for national budgets. NbS investments that restore watersheds can also sequester carbon that can generate revenues through carbon markets and protect fisheries productivity, support food security, reduce the need for future subsidies and cut energy demand and public health costs. In many cases these co-benefits make NbS investment attractive for private capital. During planning and project preparation governments should identify these co-benefits and decide how they should be jointly supported across public budgets, utilities, private investors, and the communities that deliver the underlying stewardship.

Despite the investment case, NbS remain severely underfunded relative to gray infrastructure alternatives. To level the playing field for NbS, public leadership must create the institutional conditions NbS needs to scale: durable public cash flows and disbursement pathways, recognized asset categories, regulatory approvals, revenue models, and performance metrics as an additional layer needed to access private capital markets where relevant.

Perhaps the ripest path to scaling up finance for NbS is through national infrastructure planning and investments. Recent scans of nature-based infrastructure investments in Latin America and Sub-Saharan Africa have found national governments lead most projects, and that MDBs most often finance them through ordinary capital loans and concessional loans. This trend largely mirrors infrastructure investment writ large, where private capital remains a minority contributor to overall investment despite sustained international efforts to grow its share. For finance ministries, this suggests the highest-leverage near-term reforms lie in public financing mechanics—multi-year budget commitments, MDB loan structuring that accommodates NbS's cost profile, and durable revenue mechanisms like dedicated utility tariffs or endowed trust funds.

Utility watershed partnerships, where water utilities contract with upstream landowners or conservation organizations to maintain forest cover in exchange for payments funded through water tariffs, also demonstrate viability at scale and have been replicated across multiple continents (see Section 2.1.3). The financial benefit is straightforward—watershed protection provides the service cheaper than the treatment infrastructure it replaces. Where utilities are publicly owned or regulated, finance ministries should direct or incentivize this reallocation directly.

Blended finance vehicles address two persistent finance barriers of size and risk (see Section 2.2.2). Blending can reduce NbS project risk to levels required by investors through credit enhancement from MDBs or DFIs, typically through first-loss capital or guarantees (see Section 2.1.4). Blended finance can also help aggregate smaller NbS projects into portfolios of projects to meet the minimum investment size threshold required by institutional investors. Finance ministries can support these structures by capitalizing the higher-risk tranches and by ensuring that domestic regulatory environments allow NbS assets to be approved for infrastructure investment portfolios.

Barriers to NbS Investment and Public Remedies

Barriers to mobilizing NbS investment are institutional as much as financial. The Nature Conservancy's (TNC) *Power of Policy* research across 17 country case studies finds that enabling conditions for NbS cut across legal frameworks, institutional coordination, financing structures, and community trust and capacity, with the relative weight of each varying by country context; no single reform unlocks investment on its own.[71] Within this broader picture, two barriers stand out for the public sector specifically.

The first main barrier is budget accounting classification: In many countries, NbS are treated not as capital investment but as recurrent environmental expenditure. This convention excludes NbS not only from infrastructure budget lines, but also from public-private partnership frameworks and MDB financing windows. Correcting this classification, recognizing NbS as capital infrastructure, is a necessary reform, though evidence from jurisdictions that have added natural capital to public balance sheets shows it is not sufficient alone; it must be paired with the reforms below and with attention to the legal and social barriers that operate outside the scope of this section.

The second main barrier facing the public sector is the absence of reliable long-term offtake commitments. Annual budget cycles cannot provide the multi-year revenue certainty that NbS investment requires. Ministries can provide this certainty through multiple approaches for NbS activities, such as establishing mandates, long-term concessions, incentive frameworks, or clarity for infrastructure service providers to establish tariffs, fees, or dedicated capital expenditure or operating budget. Once sustainable revenue sources and budget arrangements are established, other financing strategies, such as green bonds and blended finance, discussed in Sections 2.1.4, 2.2.2 and 2.2.3, can help mobilize upfront capital.

For the private sector, the two main barriers to NbS investment are uncertainty in performance measurement and non-standard asset classification. Until biodiversity impacts and dependencies are reported in standardized, comparable, market-accepted terms, as climate-related risks increasingly are, biodiversity will remain an unpriceable externality of infrastructure project finance. This is compounded by the fact that much of the existing evidence base for NbS performance is predictive, modeled projections of avoided costs, rather than drawn from long-term, standardized monitoring data that could anchor valuation methodologies and benchmarks. While the inflation-linked and long-duration investment characteristics of NbS project cash flows are often attractive to private institutional investors, their investment mandates typically require assets that fit in recognized categories. Because NbS lack established valuation methodologies and performance benchmarks, they do not consistently fit into these categories.

These financial and classification reforms are necessary but not sufficient. NbS delivery depends on land access and sustained relationship-building with communities to develop a shared vision of ecosystem management, work that takes longer than gray infrastructure procurement, so project cycles built around gray infrastructure timelines routinely run out before NbS components are ready. Because NbS benefits are typically delivered by communities and ecosystem managers over many years rather than through a single contractor build, procurement and contracting frameworks built for one-time capital works often have no legal pathway to pay them—a gap that requires reforming contracting rules. Infrastructure providers, which remain legally accountable for service delivery, have little incentive to share responsibility with community partners and often are not mandated to do so. Regulators and finance ministries should therefore treat NbS integration as a condition of the license to operate, rather than leaving it as a discretionary risk providers can decline to take on.

Alongside these reforms, public sector leadership is needed to support increased private institutional investment by developing standardized NbS asset classification, credible performance metrics, and reporting frameworks. Governments working in coordination with MDBs, and through bodies, including the International Organization for Standardization (ISO), the International Capital Markets Association (ICMA), TNFD (see Section 2.4.1), as well as through national infrastructure classification systems, can help create the common standards needed for wider market adoption. These measures can help attract institutional investors but do not replace public sector obligations.

Payment for Ecosystem Services as a Fiscal Instrument

PES mechanisms create recurring payments usually from beneficiaries of ecosystem services to landowners, communities, public entities, or conservation

providers that protect and restore these services. In the infrastructure sector, PES is most efficient when beneficiaries are clearly identified, and the avoided costs or service benefits are easily measurable. For example, investing in coastal habitat conservation reduces expenditure on hard flood defenses and disaster response, or investing in biodiversity-rich landscapes can reduce the remediation costs that accumulate when those landscapes are damaged. The fiscal logic is the same as any infrastructure investment—spending now to avoid larger spending later.

Several positive financing instruments can support nature-based infrastructure, including PES, biodiversity-conditional finance, and natural capital investment. These are not compensatory, but fiscal instruments with measurable returns that reduce the downstream costs that governments would otherwise bear. Government-to-landowner payments for watershed protection, carbon sequestration, and biodiversity maintenance are the most direct PES instruments, often funded through water tariffs, fiscal transfers, or dedicated levies.

The evidence for PES fiscal returns is strongest in the water sector. A review of 27 US drinking water utilities found that treatment costs fall approximately 20% for every 10% increase in forest cover in source watersheds.[72] New York City's Catskills watershed protection program, a public investment in upstream land management as a substitute for filtration infrastructure, has been independently assessed as avoiding billions of dollars in capital expenditure. Quito's FONAG program delivered $2.15 for every $1 invested in watershed protection, measured through avoided treatment costs, over 20 years.[73]

As with NbS, one important reform for making PES fiscally viable is for governments to reclassify ecosystem maintenance as capital investment. In many public accounting frameworks, conservation payments are classified as recurrent environmental expenditure, in the same category as park maintenance or species monitoring. Reclassification of PES as capital investment, on the grounds that they maintain natural assets with long-term fiscal value, would make the payments eligible for capital budgets. Government accounting systems that do not account for PES in this way will exclude PES from infrastructure budget lines, public-private partnership frameworks, and MDB financing windows.

Multi-year budget commitments are a prerequisite for effective PES design. Landowners and conservation investors cannot make the long-term management and investment decisions required for ecosystem maintenance if long-term cash flows remain uncertain and subject to annual budget review. Multi-year PES contracts, covering 10–30-year management periods, require fiscal commitments that annual budget cycles undermine. Mechanisms for providing multi-year fiscal certainty, whether through statutory payment frameworks, dedicated trust funds, or long-term concession structures, are a design priority.

Natural capital accounts underpin PES budgeting. Where governments have developed natural capital accounting frameworks that value ecosystem assets alongside physical and financial assets in national accounts, PES investment can be directly linked to maintaining quantified natural capital values. This gives Ministries of Finance a basis for recognizing PES as a long-term investment rather than simply a recurring environmental expense.

PES instruments carry specific risks. Finance ministers and other government stakeholders should ensure these risks are addressed in program and project design.

- *Additionality risk* stems from payments for conservation that would have occurred anyway, reducing fiscal returns without generating additional ecological value. Robust baseline assessment and independent verification diminish this risk.
- *Permanence risk:* conservation that is subsequently reversed undermines the long-run fiscal benefits. Long-term legal agreements, land tenure security, and monitoring systems with enforcement mechanisms are the necessary safeguards.
- *Elite capture risk:* payments that accrue to large landowners, while smallholders bear the costs of land-use restrictions, undermine both equity and political durability. Program design must explicitly address benefit distribution.

A newer, and in some respects more urgent, challenge is the recent wave of infrastructure investment driven by the energy transition, the explosive expansion of artificial intelligence/digital infrastructure, and the extraction of critical minerals.[79] These three categories form an integrated supply chain and common biodiversity footprint. The energy transition's massive deployment of solar, wind, and grid infrastructure has significant land and habitat implications. Both industries depend on critical minerals, whose extraction is often concentrated in the world's most biodiverse geographies and in vulnerable or low-income economies.

CASE STUDY

Greater Cape Town Water Fund and Cape Water Performance-Based Bond

South Africa | Water Fund & Outcome-based Finance | Nature-based Infrastructure

Water funds are a widely used watershed investment mechanism that enable water users to invest in nature-based solutions (NbS). The Greater Cape Town Water Fund (GCTWF) coordinates and finances water catchment restoration to increase water supply and reliability.[74] In 2018, a drought, coupled with anticipated population growth, exposed Cape Town's water supply vulnerability and the need for long-term, cost-effective solutions. Analysis showed that removing thirsty invasive vegetation from priority catchment areas could increase water yield by 55 billion liters per year, equivalent to one-sixth of the current supply, within five years and at one-tenth the unit cost of alternative options.[75]

Financed through pooled City of Cape Town, corporate bulk water users, and philanthropic contributions, the GCTWF has supported removal of invasive species from priority catchment areas, restoring native ecosystems and creating over a thousand local jobs.

By 2026, the GCTWF had successfully cleared invasive plants from 41,000 hectares and completed follow-up treatment to prevent regrowth. TNC estimates this work has restored more than 37 billion liters of water annually to rivers and streams upstream of water intakes.[76] The restoration also supports the recovery of native fynbos in the Cape Floral Region, home to more than 20% of Africa's plant life, while reducing wildfire risk and protecting freshwater habitat.[77]

That track record later provided the foundation for the Cape Water Performance-Based Bond, launched in April 2026 to support continued restoration efforts.[78] The Cape Water Performance-based Bond extends this nature financing model into the capital market by linking investor returns to verified restoration outcomes, although in this case the additional outcome payments are funded largely by development finance and philanthropic partners rather than directly by the municipal water utility. FirstRand Bank issued the R2.5 billion bond, arranged and structured by Rand Merchant Bank, with investor returns linked to independently verified hectares of invasive vegetation cleared.

The bond's financial structure combines market investors with concessional outcome funding. IFC, FSD Africa Investments, and Aluwani were co-anchor investors that helped draw in South African institutional investors. Roughly R150 million from outcome funders is expected to support five years of additional restoration through GCTWF. The Development Bank of Southern Africa and FirstRand Foundation each supported restoration and the bond outcome payments with R50 million grants alongside other philanthropy and corporate donors. TNC serves as implementation agent, while Conservation Alpha provides independent technical verification of outcomes. The new funding extends the program to target four priority catchment areas.

The case shows how a proven PES model can create the operating track record, measurement systems, and institutional confidence needed to attract capital-market and DFI participation. However, the path to a fully sustainable payment stream from the principal beneficiaries now lies in wider reforms such as introducing a dedicated water charge. Indeed, covering the long-term maintenance of restored areas may depend on converting part of the value created for the city and water users into long-term funding for catchment maintenance.

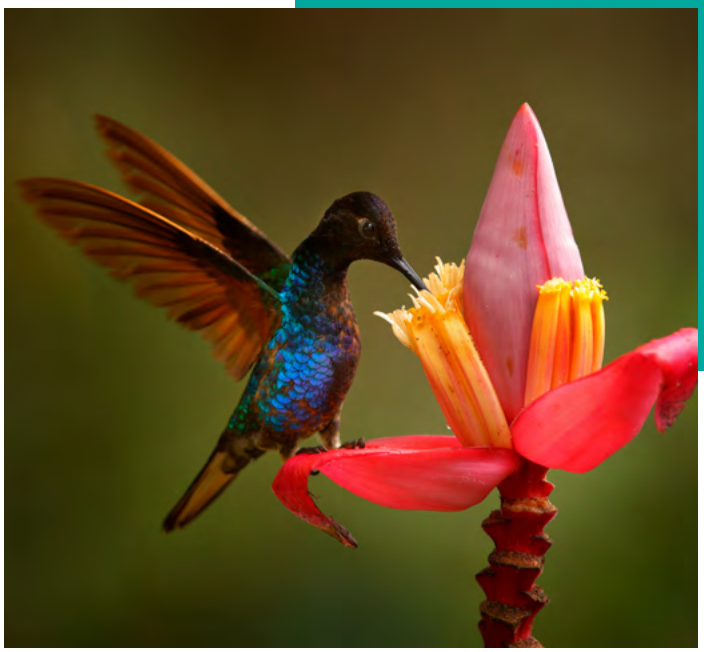
Source: The Nature Conservancy

The rapid expansion of data centers, particularly AI infrastructure, carries significant environmental implications. The International Energy Agency predicts global electricity consumption from data centers will more than double by 2030 with fossil fuels projected to remain an essential part of electricity generation.[80] The cooling systems data centers require can place direct pressure on freshwater ecosystems and threaten biodiversity through direct water withdrawal and energy-driven impacts on aquatic habitat. Roughly two-thirds of data centers built since 2022 were built in water-stressed regions.[81] These projects often face significantly lighter environmental scrutiny than comparable industrial facilities.[82] A major concern is that investment decisions are being made faster than regulation and governance frameworks can manage their impact. Renewable-energy siting is addressed in Section 2.1.2, critical-mineral safeguards in Section 2.3.2, and corporate data-center responses in Section 2.4.3.

Addressing these infrastructure frontiers requires planning. Siting decisions require rigorous and integrated assessment (see Section 2.1.2). Regulatory frameworks must be updated and adjusted to cover these investment categories. International coordination is essential as biodiversity standards that apply in importing countries but not in producing countries can create regulatory arbitrage that undermines global outcomes.

Recommendations

Governments should integrate biodiversity risk and opportunities into infrastructure decision-making and apply biodiversity screening at the earliest stages of infrastructure design. Infrastructure planning, public investment appraisal, procurement, permitting, and fiscal risk assessment should account for the future fiscal costs of biodiversity loss. Apply spatial planning, strategic environmental assessment, and the mitigation hierarchy before approving project sites, routes, and financing. Fast-track permitting, public guarantees, concessions, and subsidies should be conditioned on projects that avoid high-biodiversity areas, align with low-conflict development zones, and assess energy, water, land, biodiversity, community, and supply-chain impacts. Countries should report through Convention on Biological Diversity (CBD) frameworks on how they integrate biodiversity into planning, permitting, budgeting, and investment.



Governments and regulators should create predictable demand and the enabling conditions for bankable nature-positive investment. Clear legal mandates, institutional coordination, and delivery capacity are needed to support financing mechanisms**.** Mandatory no-net-loss, biodiversity net gain, habitat banking, biodiversity credit systems, PES contracts, utility payments, and green infrastructure concessions can create predictable revenue streams. Rules should require avoidance and minimization before offsetting, prioritize local and like-for-like compensation, and include robust metrics, additionality, and safeguards.

MDBs and DFIs should help countries build nature-compatible infrastructure pipelines. Support should include technical assistance and concessional finance for SEA systems, biodiversity metrics, habitat banking rules, NbS project preparation, community engagement and capacity, monitoring systems, and where blended finance can address specific risks and mobilize capital. MDBs and DFIs can also help aggregate smaller NbS projects into investable portfolios.

MDBs, DFIs, private lenders, and insurers should address biodiversity risk before capital is committed. Biodiversity screening and mitigation-hierarchy compliance should be incorporated into due diligence, site selection, project design, credit assessment, insurance pricing, financing conditions, and asset management. They should avoid high-conflict sites, use offsets only after demonstrating avoidance and minimization, and support NbS where ecosystem services reduce whole-life costs, strengthen resilience, or create revenue.

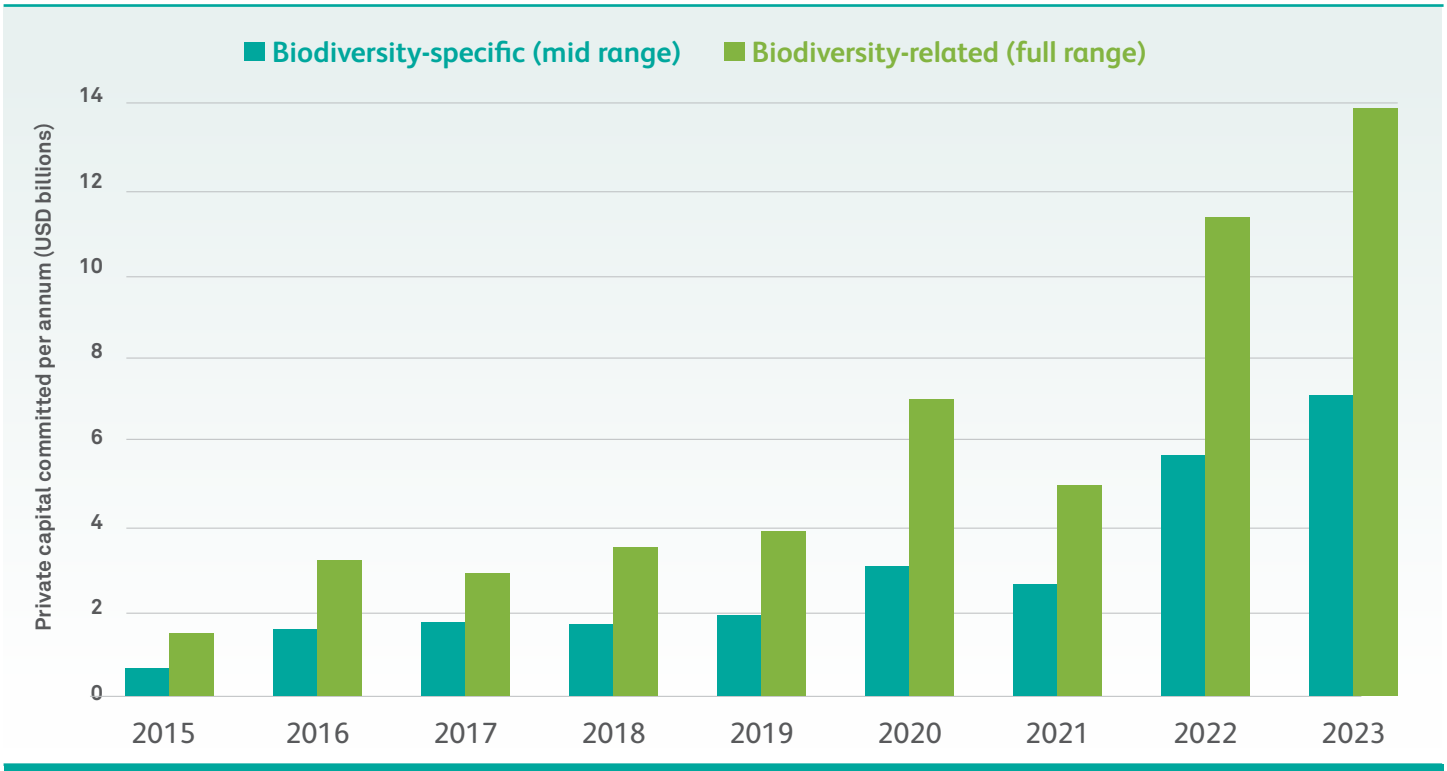
2.1.4 Multilateral Development Banks as Catalysts for Biodiversity Finance

MDBs occupy a distinctive position within the global financial architecture. Capitalized and mandated by their shareholder governments, these institutions, the World Bank Group and the regional development banks, hold collective balance sheets in the trillions of dollars and provide concessional and non-concessional loans, credit enhancement, grants and technical assistance to projects that would otherwise struggle to attract funding at the required scale. As both borrowers and lenders, developing country governments have deep, long-standing relationships with MDBs whose in-country teams work directly with finance ministries, sector ministries, and regulators. Each client country has a limited funding envelope, guided by a country partnership framework agreed with the bank. For nature, a critical first step is to build support for its inclusion in that framework, which paves the way for investment.

MDB engagement with nature has evolved rapidly, and a coordinating architecture is already in place. Historically, nature was confined to environmental safeguards designed to limit harm. A landmark change came in 2021, when ten MDBs signed the Joint Statement on Nature, People and Planet at the UN Climate Change Conference (COP26), committing to mainstream nature across their policies, analysis, investments, and operations. Through the MDB Heads, the major banks now coordinate on biodiversity-related lending policy, safeguards, and metrics, with COP26, COP28, and COP30 serving as recurring checkpoints. In 2023, the MDB Common Principles for Tracking Nature-Positive Finance defined nature finance as covering the restoration and conservation of biodiversity and ecosystem services, the reduction of direct drivers of biodiversity loss, and the integration of nature-based solutions across sectors;[83] In 2025, the Common Principles were strengthened for GBF implementation,[83,84] and a new MDB Common Nature Finance Taxonomy was added.

Quantifying MDB spending on nature remains a challenge. Climate finance across the MDB system reached US$ 137 billion in 2024, a meaningful but not yet fully disaggregated share of which carries nature co-benefits. Multilateral biodiversity-related finance publicly reported reached almost US$ 14 billion in 2023,[85] and the true figure is likely higher, as not all institutions disclose. This is far below the level implied by GBF Target 19, but rising. Set against nature-negative flows, however, it remains alarmingly small. MDBs need to increase direct nature finance and strengthen safeguard implementation to reduce nature-negative impacts.

FIGURE 7. Total Biodiversity Finance Flows from Multilateral Providers (US$ billion)[85]



Source: The Nature Conservancy

BOX 2: The Inter-American Development Bank's Nature Finance Focus

Almost all major MDBs now have a nature objective in their overall strategy and three have nature components within their climate finance targets, but only the IDB has set a nature-specific finance target.[86]

As initial co-chair of the MDB Nature Working Group, the IDB helped develop the Common Principles for Tracking Nature-Positive Finance and then piloted them through its own green finance tracking methodology, recording US$ 1.3 billion of nature finance in 2023 and more than US$ 1.6 billion in 2024.[85]

The IDB has also been among the leading credit enhancers and arrangers of commercial debt-for-nature swaps, providing principal guarantees for Barbados and the Bahamas and liquidity facility guarantees for both Ecuador transactions. Building on this experience, it co-chairs the Task Force on Sustainability-Linked Sovereign Financing for Nature and Climate, launched at COP28 and composed of the world's largest MDBs, DFIs and global funds, which has released Voluntary Principles for the Deployment of Credit Enhancement Instruments.[87]

The Catalytic Roles of MDBs

Beyond direct project finance, MDBs play several roles that can catalyze biodiversity finance. Roughly one-third of recent MDB commitments sit in sectors with material nature-related dependencies and impacts, agriculture, infrastructure, energy, and water, giving them substantial embedded influence over biodiversity outcomes.[88] That influence is exercised within a demand-driven model where borrowing governments decide what they finance, so raising nature finance depends as much on generating credible sovereign demand, through upstream analysis and country partnership frameworks, as on the supply of MDB capital.

Direct investment. The core MDB role of deploying its own capital, through loans, grants, guarantees and equity, is particularly suited to nature-positive activities that deliver public goods, generate weak revenues, or



are otherwise uninvestable—such as protected area management, ecological restoration, sustainable land use, and ocean governance.

Institutional reform and policy lending. Reform support is central to the MDB mandate, delivered through policy dialogue, public expenditure reviews and policy-based operations. Policy lending is attractive because funds can be deployed quickly: Asian Development Bank (ADB) has completed two US$ 500 million policy loans, with Indonesia[89] on marine plastics and the Philippines[90] on the blue economy, and the IDB and World Bank have used them extensively in Latin America. MDBs are also well positioned to help governments identify and repurpose harmful subsidies under GBF Target 18, a lever left largely unused given political sensitivity, though recent World Bank Group and ADB strategies signal growing appetite.[91]

Mobilizing private capital. MDBs can provide first-loss tranches, guarantees and subordinated debt, and pilot instruments such as payments for ecosystem services, outcome bonds, biodiversity credits, and debt-for-nature swaps (see Section 2.2), using their credit ratings to lower risk. This is constrained by risk appetite: Private-sector transactions in agri-business and natural capital are often viable only with heavy grant and technical assistance blending, a conservatism that itself limits private-sector confidence—MDBs should be prepared to take more risk on their own balance sheets.

Financing regional public goods. A distinctive MDB capability is financing of ecological systems that cross borders. Watersheds, marine areas, and migratory corridors generate benefits no single government can capture and losses none can prevent alone, leaving them chronically underfunded by domestic budgets. Applying MDBs' regional integration mandate to transboundary ecological networks is among the clearest examples of MDBs shaping the architecture of nature finance rather than simply supplying capital to it.

BOX 3: Financing Flyways: MDBs and Transboundary Ecological Networks

Migratory birds illustrate a conservation good that no single country can secure. A flyway functions as a network, and the loss of one critical stopover can undermine investment at every other site along the route. Country-by-country lending is structurally mismatched to this problem, precisely the coordination failure that MDBs, holding simultaneous relationships across many borrowing governments, are equipped to address.

ADB established the model. Launched at COP15 in Kunming in October 2021 with BirdLife International and the East Asian–Australasian Flyway Partnership (EAAFP), the Regional Flyway Initiative (RFI) was the first MDB-led program to treat a flyway as a single investment landscape. The EAAF is the most threatened of the world's eight major flyways, extending across 22 countries and supporting more than 50 million migratory waterbirds of over 210 species, a fifth of them globally threatened; its wetlands deliver ecosystem services to close to 200 million people. The RFI aims to mobilize US$ 3 billion over ten years and has used systematic spatial prioritization to identify around 150 high-priority wetland sites across 11 developing member countries, with early projects in Cambodia, the People's Republic of China, and the Philippines.[92]

The model has since diffused across institutions. In 2023, CAF (the Development Bank of Latin America and the Caribbean) launched the Americas Flyways Initiative with BirdLife and the National Audubon Society, moving into implementation in January 2025 and targeting more than 30 landscapes and seascapes along routes crossing 35 countries.[93] In November 2025, the World Bank and BirdLife launched the African–Eurasian Flyway Initiative, covering a corridor used by more than two billion birds of over 500 species from the Arctic tundra to southern Africa, with the explicit aim of embedding flyway considerations in large-scale infrastructure planning, including renewable energy siting.[94]

Four elements of the structure are particularly relevant for replication:

- **It converts a diffuse public good into an investable pipeline.** Science-based site prioritization produces a pre-screened portfolio of projects across multiple jurisdictions, addressing directly the absence of a bankable pipeline that constrains nature lending.
- **It makes the economic case in infrastructure terms.** Flyway wetlands deliver flood attenuation, water security, fisheries productivity and coastal protection. The RFI was explicitly designed to build the business case for nature-based solutions rather than to fund conservation as a standalone good.
- **It uses the MDB convening function.** No other class of institution can hold sovereign relationships across ten or twenty countries simultaneously and align them behind a common investment framework and a shared monitoring system.
- **It connects nature finance to safeguards and siting.** The African–Eurasian initiative's focus on bird-friendly infrastructure planning links flyway conservation to the mitigation hierarchy and spatial planning agenda (see sections 2.1.2 and 2.1.3), where avoidance is far cheaper than compensation.

These initiatives remain early relative to their targets, and disbursement has lagged announcement. But their diffusion from ADB to CAF to the World Bank within four years suggests a replicable architecture for financing transboundary ecological networks.

Constraints and Enabling Conditions

Progress has been constrained by limited shareholder pressure, capacity gaps, measurement challenges, and weak borrower demand. The IMF and the World Bank are also exploring the macro-criticality of nature and the relationship between nature degradation and sovereign credit risk, with a view to incorporating it into formal debt sustainability analyses.

Targets and disclosure

Though most MDBs now include nature as a lending pillar, commitment remains low;[88] the IDB, the only institution with a nature finance target, aims at five per cent of approved financing, and no major MDB has a strategy to meet GBF Target 19. Only a minority have adopted TNFD-aligned reporting (see Section 2.4.1), despite around one-third of their exposure sitting in nature-material sectors, evidence that nature is a material portfolio risk. GRI 101, Biodiversity,[95] effective from January 2026, is a useful stepping stone and several MDBs, including ADB, are preparing to report against it.

Standards and Capacity

Practice is uneven. Most MDBs commit to no net loss of biodiversity, with IFC Performance Standard 6 the common reference point (now itself being updated). The EIB has gone further, moving from "no net loss" to "no loss" and committing to integrate biodiversity externalities into project economic analysis—establishing that a higher standard can secure board approval and that valuing nature within project economics is already being attempted. Staff expertise in nature-related risk, meanwhile, needs to scale up and be better distributed across sector portfolios.

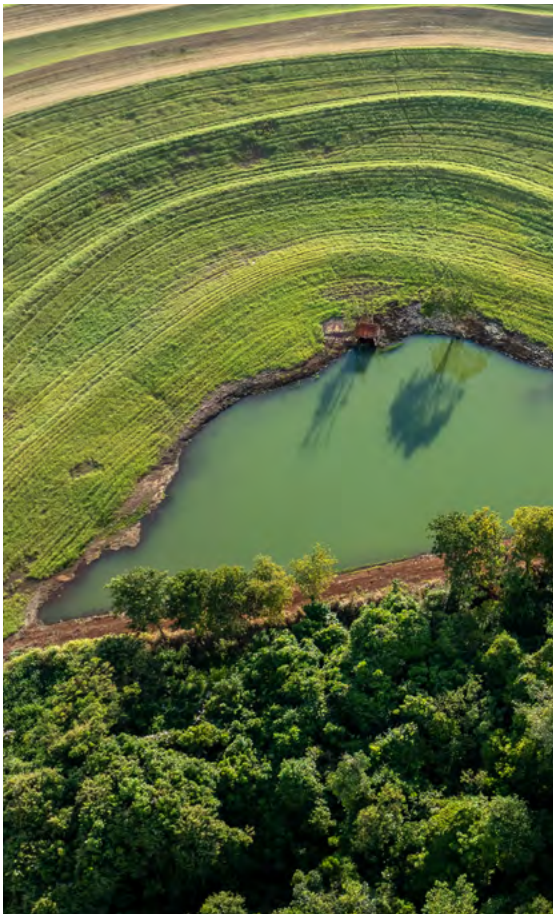
Guarantees and credit enhancement

The G20 has called on MDBs to expand guarantees to catalyze capital markets, and usage is increasing.[96] Guarantees remain challenging because they count against a country's borrowing envelope and require co-guarantors, but solutions are emerging, including private reinsurance[97] and dedicated private sector facilities (see case study below).

Shareholder mandate

Because MDBs are shareholder-driven, strong political mandates from governments remain the principal driver of institutional change. Countries supporting the GBF should press for increased MDB activity on nature, reduced harm, and dedicated biodiversity finance strategies with measurable targets. IDB's recent Natural Capital and Biodiversity Mainstreaming Action Plan serves as a model, as it treats biodiversity as both an investment-worthy sector in its own right and a cross-cutting concern across key sectors such as agriculture, infrastructure, mining, and energy.

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CASE STUDY

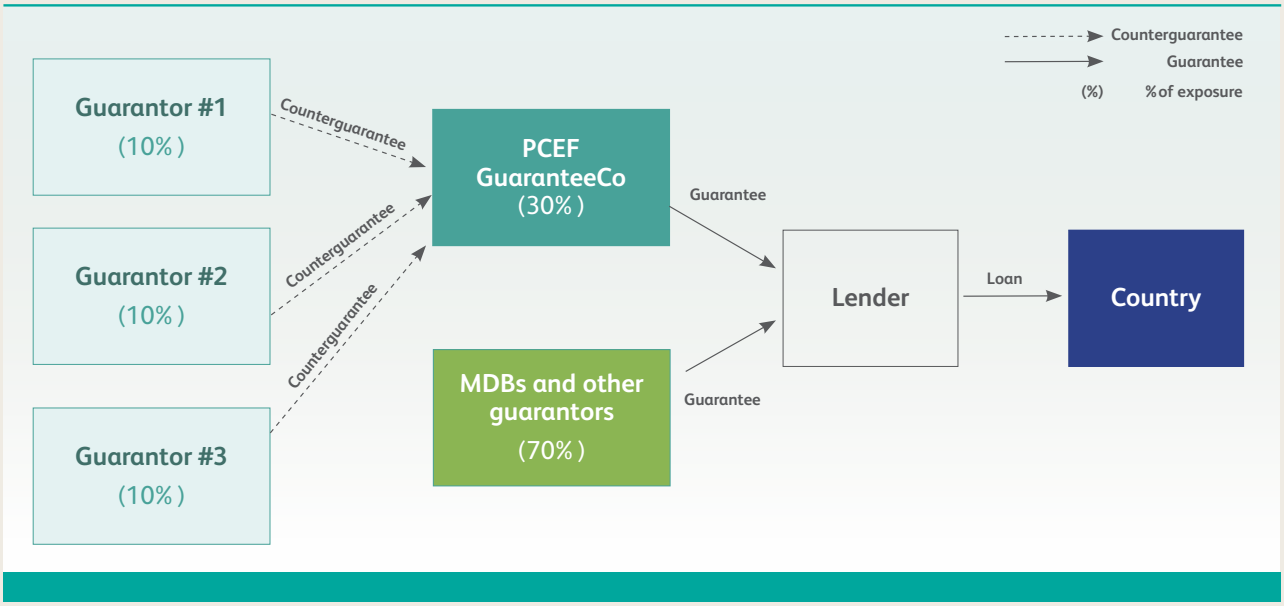
Mobilizing Private Credit Enhancement to Scale Debt-for-Nature Swaps

Global South | Credit Enhancement | National-level Biodiversity Conservation

Credit enhancement (guarantees, political risk insurance, etc.) in sovereign debt transactions has proven a valuable tool in helping countries lower their cost of borrowing while enabling investment in conservation of natural capital. Historically, this type of credit enhancement almost exclusively came from MDBs and DFIs, but private credit enhancement is playing an increasingly important role in enabling positive conservation outcomes while expanding the lending capacity of these institutions.

Enosis Capital created the Debt-for-Nature Private Credit Enhancement Facility (PCEF) to allow private investors to earn a risk-adjusted return by providing guarantees alongside DFIs and MDBs. Developed in partnership with ZOMA LAB, the family office of Ben and Lucy Ana Walton, PCEF aggregates pledged assets from multiple private investors to back guarantees in debt-for-nature swaps or other sustainable debt transactions. Investors keep their pledged assets in their own accounts, continue earning the market return on those pledged assets, and receive a market-based guarantee fee for participating in the PCEF structure. In Fall 2025, ZOMA LAB announced they would anchor PCEF with a US$ 100 million commitment.[98]

Enosis Capital Private Credit Enhancement Facility Structure



The 2024 Bahamas US$ 300 million debt conversion, launched by the Government of The Bahamas, The Nature Conservancy, the Inter-American Development Bank and several financial partners through TNC's Nature Bonds Program, demonstrated the importance of private credit enhancement. In this transaction, Builder's Vision, a private investment and philanthropy platform, and AXA XL, an insurance company, combined to provide a US$ 100 million credit enhancement package alongside a US$ 200 million guarantee from IDB. Without the additional private guarantee support, the transaction could not have proceeded because IDB typically provides only partial guarantees and had limited capacity in its country lending envelope for the Bahamas. The credit enhancement package helped lower the Bahamas' borrowing costs by approximately 300 basis points, facilitating US$ 124 million in marine conservation investment over the next 15 years.[99] The participation of Builders Vision in the Bahamas transaction was arranged by The Nature Conservancy and represents the prototype for how PCEF will be deployed.

PCEF was built as the scalable, replicable model for investors, MDBs, and DFIs to provide credit enhancement for public nature financing at scale. However, many investors perceive guarantees as operationally intensive compared to more traditional investments and inherently "high risk." The central challenge for scaling the participation of private guarantees in commercial debt-for-nature swaps is to educate investors on why that is not necessarily the case.

To keep the operational burden light, Enosis Capital has developed a straightforward investment process that manages guarantee structuring and administration end to end. PCEF is then deployed alongside MDBs, helping to meet their goal of mobilizing private capital for development initiatives. Having a source of flexible, private-sector capital is an enormous resource to them in expanding their own lending capacity and managing balance sheet risk. For investors, PCEF is a way to leverage MDBs' institutional status and rigorous underwriting processes as a risk mitigant, making PCEF participation less risky than direct emerging markets investments.[100] In addition to unlocking significant conservation impact, PCEF also provides investors with an opportunity to diversify their portfolio with investment returns historically uncorrelated with traditional financial market performance.

To provide technical expertise, Enosis Capital has developed a close partnership with the Debt for Nature Coalition.[101] Together, they have developed a global pipeline of transactions for PCEF that spans continents and landscapes and could generate much-needed funding to protect some of Earth's most biodiverse ecosystems.

Enosis Capital and PCEF serve as a bridge between impact investors and Global South countries, finding capital-efficient, creative solutions to finance nature conservation, and other development priorities.

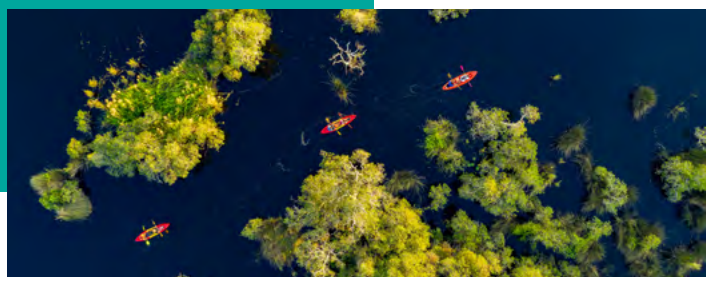
Source: Enosis Capital

Integrating Nature into MDB Climate and Infrastructure Finance

The major MDBs have well-developed climate finance strategies, tracking methodologies, and dedicated teams; biodiversity finance remains at an earlier stage and is harder to track. Political pressure is asymmetric: The G7, G20, and the Coalition of Finance Ministers for Climate Action all provide robust channels for communicating climate expectations, while biodiversity has no equivalent. Aligning the climate and nature agendas is essential, both to grow nature finance and to address the biodiversity impacts of climate investment, since climate finance that is not nature-aware can cause direct harm (see Section 2.1.3), particularly in energy transition finance. Alignment must be done carefully as much of the reported MDB climate finance sits in large infrastructure—rail, grid, renewables—whose methods and counterparties differ materially from nature investment. The opportunity lies in using climate finance systems as a platform to build equivalent biodiversity capacity, while applying full mitigation-hierarchy screening so decarbonization does not itself drive habitat loss.

The most consequential shift available to MDBs may be analytical rather than financial. Project appraisal prices the induced economic benefits of built infrastructure—a road's internal rate of return rests on reduced travel times and increased trade—while the ecosystem services that the same project degrades sit outside the calculation. A road through a watershed that causes downstream flooding, water treatment costs, and lost fisheries productivity registers none of those liabilities in its IRR. Reflecting ecosystem-service values in appraisal works both ways: Nature-positive projects become more viable as their service flows are recognized, and degrading projects less so as their true costs appear. Relatedly, MDBs should champion nature as infrastructure, treating high-integrity ecosystems as productive public assets that deliver water security, flood protection and coastal resilience (see Section 2.1.3). Asian Infrastructure Investment Bank (AIIB) and European Bank for Reconstruction and Development (EBRD) are already reframing ecosystems as infrastructure-grade assets, able to compete within infrastructure pipelines rather than remaining confined to environmental budgets.[102]

MDBs are not simply sources of capital for nature. They are institutions capable of shaping the architecture of nature finance—moving biodiversity from a safeguard concern into a core component of public finance, country strategy, infrastructure planning, and private investment mobilization.



PCEF was built as the scalable, replicable model for investors, MDBs, and DFIs to provide credit enhancement for public nature financing at scale. However, many investors perceive guarantees as operationally intensive compared to more traditional investments and inherently "high risk." The central challenge for scaling the participation of private guarantees in commercial debt-for-nature swaps is to educate investors on why that is not necessarily the case.

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Enosis Capital and PCEF serve as a bridge between impact investors and Global South countries, finding capital-efficient, creative solutions to finance nature conservation, and other development priorities.

Recommendations

MDB shareholder governments should direct MDB management to adopt the following, and management should advance them under existing mandates wherever shareholder action is not required. Finance ministers can signal change by ensuring biodiversity is explicitly included in the MDB engagement agenda.

MDBs should set explicit nature finance targets and expand lending capacity, taking more risk onto their own balance sheets. Every MDB should establish and publicly disclose quantitative nature finance targets aligned with GBF Target 19 and the US$ 200 billion per year goal, rather than relying on voluntary commitments. Shareholders should support the G20 capital-adequacy measures needed to fund them, including not counting guarantees dollar-for-dollar against country lending ceilings. Nature should be built into the upstream analysis guiding country partnership frameworks, with technical assistance, policy dialogue, and project preparation used to build country capacity, bankable projects, and sovereign demand for nature finance. Reliance on heavy grant and technical-assistance blending to satisfy internal risk thresholds constrains the volume and demonstration value of private-sector transactions; MDBs should be prepared to take more risk on their own account.

MDBs should strengthen and actively enforce their existing safeguard policies. Rather than negotiating new board-approved standards, the immediate priority is rigorous implementation of the safeguards MDBs already have. The mitigation hierarchy should be genuinely applied to every relevant project, with avoidance fully explored and documented before minimization, restoration, or offset; biodiversity impact assessment should be standard for climate, energy, infrastructure, and mining lending; and offsets from MDB-financed projects should be tracked for compliance and effectiveness. Consistent enforcement of existing commitments would in itself be a substantial improvement.

MDBs should make nature visible in project appraisal and treat ecosystems as infrastructure. MDBs should require ecosystem-service values to be quantified on both sides of the ledger in economic analysis for projects in nature-material sectors, working jointly towards a common methodology so results are comparable across institutions. They should require evaluating natural and nature-based infrastructure options before conventional gray infrastructure proceeds and support integrating green and gray-green hybrid options into national pipelines. This change moves nature from a safeguard applied after a project is selected to a factor in whether it is selected at all.

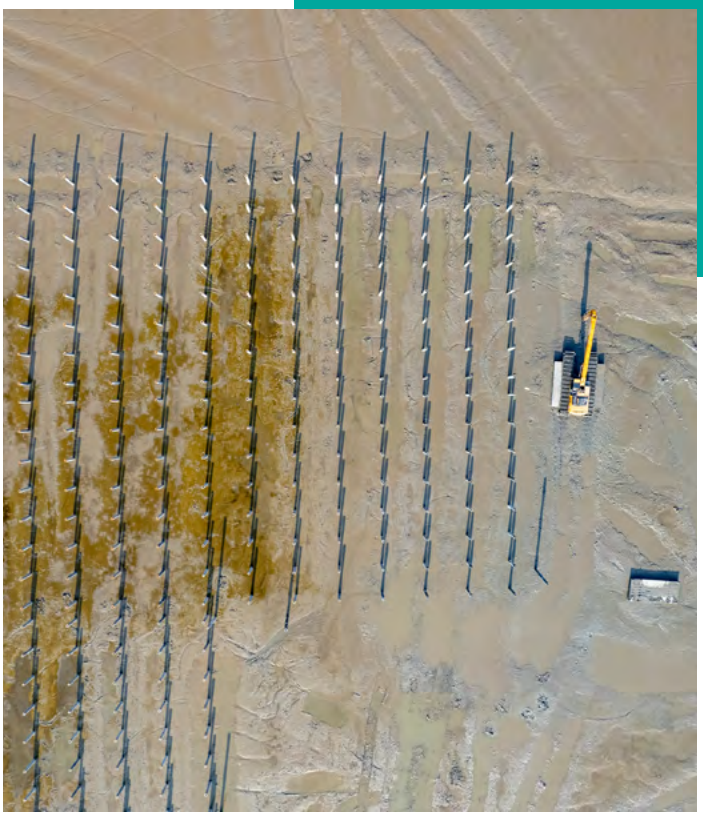
MDBs should set a course towards full alignment with the Global Biodiversity Framework. MDBs committed to Paris alignment, and that commitment reshaped how they screen, appraise, and report; no equivalent commitment exists for nature. The measures above are near-term steps rather than the destination. Shareholders should ask MDBs to publish a timetable and methodology for GBF alignment, since institutions are unlikely to volunteer for it.

2.2 Mobilizing Financial Markets for Nature

Financial markets, including capital markets and commercial lending, are among the largest and most powerful mechanisms for allocating capital. Through standardization and risk pricing, these markets match financial resources with investment needs at scale.[103] These well-regulated and efficient markets can play critical roles in directing funds toward nature, reporting on progress, and, if strong policies are in place, avoiding harm to nature by redirecting funds away from nature-negative investments. To reach the GBF goals, it is imperative to develop innovative pathways and strong policy guidance to tap this vast pool of capital for nature. Global equity and fixed income markets alone are estimated at US$ 272 trillion.[104] Even a modest reallocation of global financial markets toward nature-positive investments could materially narrow the biodiversity financing gap.

Financial markets do not typically allocate capital directly to environmental outcomes; private investors require acceptable risk-adjusted returns. Nature-positive investment therefore scales only when enabling policy frameworks, credible revenue models, risk-sharing mechanisms, and investment-ready project pipelines create commercially viable opportunities. Financial innovation can help accelerate capital mobilization, but it cannot substitute for the underlying economic and regulatory conditions that make nature investable.

While efforts to tap financial markets for biodiversity conservation have grown in recent years, progress has been limited by low or uncertain revenue streams, weak project pipelines and metrics, and the perception of nature as a public good. Investment horizons are often misaligned with ecological restoration, which typically unfolds over decades, while financial markets generally focus on shorter-term returns. In addition, deficiencies in enabling policy frameworks, incentive alignment, and local institutional capacity keep the pipeline of bankable, investment-ready projects underdeveloped.



However, notable advances in nature are emerging. Labeled bonds, sustainability-linked instruments, blended finance and nature-related investment strategies are beginning to support capital market investment for nature-based solutions, regenerative agriculture, and sustainable forestry.[105] At the sovereign level, commercial debt conversions, sustainability-linked debt, and green bonds have gained momentum in recent years, which shows how public finance can redirect large amounts of capital toward conservation.[105]

Despite this encouraging progress, these transactions remain small relative not only to the magnitude of the biodiversity financing gap, but also to the vast scale of global capital markets. This section covers emerging models and mechanisms that can help build a more nature-supportive financial market, demonstrating how enabling policy frameworks aligned among key stakeholders can begin to bridge the divide between ecological value and financial return.

Ultimately, private capital will flow to nature at scale only when investors find genuine value in it, meaning competitive, risk-adjusted returns rather than concessional or reputational ones. This is the central lesson of green and climate finance, which remained a philanthropic and policy-driven niche until falling technology costs, clearer standards, and real revenue streams made it commercially attractive, at which point mainstream capital arrived at

Nature-positive investment scales only when enabling policy frameworks, credible revenue models, risk-sharing mechanisms, and investment-ready project pipelines create commercially viable opportunities.



scale. Nature finance today sits closer to that earlier stage, still heavily dependent on public budgets, concessional finance, and philanthropy. Regulation and disclosure are necessary to reveal risk and level the playing field. They are not sufficient on their own, however, because disclosure tells an investor what to avoid, not what to fund. Moving nature from the balance sheets of foundations and development agencies into mainstream portfolios requires business models that convert ecological outcomes into dependable cash flows, through payments for ecosystem services, offtake agreements, compliance-driven markets, and productivity or resilience gains that reach the bottom line. The instruments and enabling conditions in this section ultimately serve that goal: not merely to regulate the private sector or improve its reporting, but to make protecting nature something the private sector invests in because it pays to do so.

2.2.1 Leveraging Financial Markets and Products to Finance Nature Positive Investment

Despite the rapid growth in green finance over the past decade, most of the green capital does not flow toward nature-related projects. Given the broad definition of what qualifies as "green," only a limited share of these flows ultimately filters down to biodiversity conservation and ecosystem restoration. Concerns of greenwashing continue to pose risks to market credibility. However, momentum is growing through the rise of labeled bonds, nature markets, and heightened activity in investment and asset management strategies.

The sustainable debt market has grown considerably, with green bond issuance alone expanding to over US$ 650 billion in 2025,[106] but only 15% of green and sustainability bonds have funded nature projects, according to Moody's.[107] Despite this, momentum is growing. Increased activity in labeled debt and commercial debt-for-nature conversions shows how global and local fixed-income markets can support conservation outcomes.

Momentum is building around nature markets, biodiversity credits, and nature-based carbon credits, although these remain in the early stages of development. Compliance-based nature markets are generally larger than voluntary markets as regulation creates the demand. Recent estimates suggest that more than 130 biodiversity credit projects are currently being developed or implemented globally, with activity concentrated in Latin America, Oceania, and Europe.[108] However, voluntary biodiversity credit market activity remains small, with Bloom Labs reporting cumulative sales of less than US$ 8 million as of late 2025.[108] Given the largely voluntary nature of these markets, their ability to scale remains uncertain without stronger policy support, clearer demand signals, and more consistent market standards. The more mature carbon credit market shows how demand for verified emissions reductions can generate revenue that helps finance restoration and conservation at scale.

CASE STUDY

BTG Pactual Timberland Investment Group (BTG Pactual TIG) Latin American Reforestation Strategy

Brazil & Uruguay | Blended Finance | Sustainable Forestry & Natural Capital

Despite their global benefits, forests are under increasing pressure from land use conversion and short-term extraction, with nearly 11 million hectares of forest lost annually,[109] and remain significantly underfunded. Long investment horizons, exposure to biological and climate risks, and limited liquidity constrain investment in long rotation, sustainably managed forestry systems.[110]

To address this financing gap, the BTG Pactual Timberland Investment Group (BTG Pactual TIG), a branch of the Brazilian financial company BTG Pactual, established The Reforestation Fund to channel institutional capital into large-scale conservation, restoration, and sustainable commercial reforestation in Latin America. The market-leading strategy raised US$ 1.24 billion for Latin American reforestation, one of the largest private reforestation funds to date, demonstrating how public capital can mobilize private investment at scale.

The strategy targets investments across approximately 660,000 acres of degraded landscapes in Latin America, combining sustainable commercial timber production with conservation and restoration of native ecosystems at scale. The model is designed on an approximately 50/50 allocation between sustainably managed commercial tree farms and protection and restoration of native ecosystems, enabling both revenue generation and ecological impact within the same landscape. The portfolio aims to strengthen habitat connectivity across landscapes with all forests certified under Forest Stewardship Council (FSC) standards.

Commercial timber and emerging environmental markets, including carbon credits, will generate diversified income streams while restoring habitat and enhancing biodiversity across connected landscapes. Conservation International serves as Impact Adviser, integrating conservation objectives into investment and operations decisions.

The investment case is driven by four economic drivers: growing demand for renewable, wood-based materials, Timberland's historical role as an inflation hedge, increasing investor demand for climate-aligned nature-based investments, and long-term appreciation of productive timberland assets. Conservation International, serving as Impact Adviser, integrates biodiversity, climate, and community objectives into project and investment design and implementation.

BTG Pactual TIG operates as a specialized timberland investment manager, leveraging a private-equity fund structure and asset-level debt to access a variety of different kinds of capital. While the fund generates meaningful impact, it is not designed as an impact-only fund. Targeting commercial timber rates, the fund attracts investment from traditional institutional investors such as pension funds, endowments, and insurers. The fund incorporates criteria from



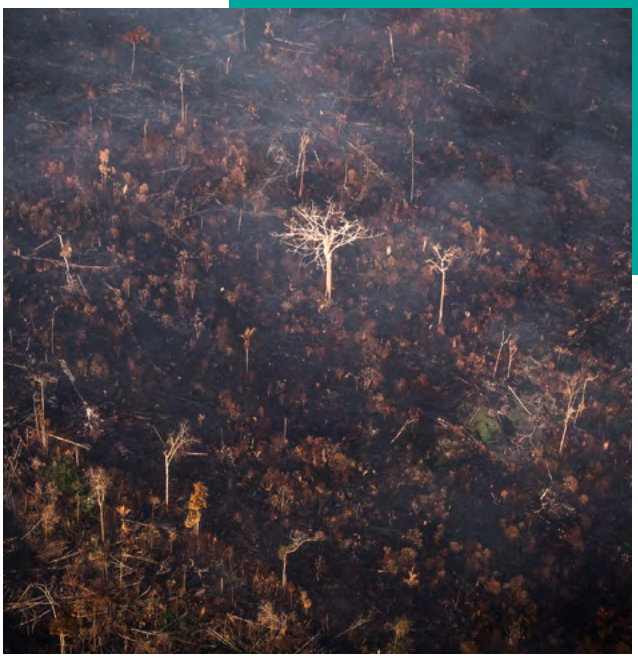
IFC investment principles and environmental management systems relevant to the Brazilian context, in alignment with global investors' needs.

The strategy raised funding from an assorted group of investors. Private investors included Azarine, Green Spark Ventures, GenZero, and Vale, alongside development finance institutions such as BNDES, CAF, FMO, and DEG, as well as the New Zealand Superannuation Fund, among others. IFC provided a US$ 50 million sustainability-linked loan package that rewards outcomes in biodiversity restoration, habitat connectivity and water resource protection, while DFC provided a US$ 50 million loan to one of the portfolio companies in the strategy.[111]

The model is designed to create diversified revenue streams, with long-term returns from the sale of sustainably harvested timber and value-added wood products, while carbon credits and offtake agreements provide cash flow during the restoration and maturation period. Geographic and species diversification, long-rotation forest management, and certification help reduce nature, market, and operational risk, while linking financial performance to restoration and carbon storage. Long-term offtake purchase agreements, signed in 2024, provided an early-stage revenue stream to help manage the long-term return horizons of restoration credits and harvest.[112,113]

The model faces some limitations. Investment in timberland and restoration requires long holding periods and is relatively illiquid compared to most mainstream investments. The revenues from ecosystem services and carbon credits are relatively limited. The strategy must also mitigate the risks associated with commercial forestry and address concerns that commercial objectives could push aside restoration goals. Clear mandates, impact targets and delivery, and monitoring are essential. The partnership of BTG Pactual TIG's forestry and investment experience coupled with Conservation International's conservation science expertise and mission ensures that commercial targets do not displace restoration and biodiversity goals. With this in place, combining known investment structures, diversified revenues, and long-term investor horizons with the support of development finance can make restoration attractive to institutional investors.

Source: Conservation International & BTG Pactual



Interest has grown considerably among large global funds and asset managers investing in nature-positive assets and incorporating nature risk assessment into their portfolio investment strategies and disclosures (see Section 2.4.1). Investment managers, such as Norges Bank Investment Management,[114] are encouraging their portfolio companies to follow the TNFD guidance on assessment and disclosure and formally integrate nature into investment and stewardship strategies. Temasek illustrates how institutional investors can move nature into investment strategy and engagement with portfolio companies (see Temasek case study).

Many large asset managers have been active in the nature fixed income markets, financing large green, blue, and nature bonds and commercial debt-for-nature conversions. Legal & General, Britain's largest asset manager, committed to investing US$ 1 billion in commercial debt-for-nature conversions over the next five years.[115] Investors can play an important role in strengthening nature commitments and can influence the quality of the KPIs and the inclusion of nature. When considering an investment in the World Bank Amazon Reforestation-Linked Outcome Bond, Nuveen engaged directly with Mombak, the local implementation agent, to ensure that the impact reporting included not just the amount of carbon sequestered but other KPIs focused on forest health, biodiversity, and community impact.[116]

CASE STUDY

Temasek, Managing Nature Risks and Opportunities for Long-Term Portfolio Resilience

Global | Nature Risk Management | Equity

Temasek is a global investment company headquartered in Singapore, with a net portfolio value of US$ 401 billion as of March 31, 2026. Temasek's purpose, "So Every Generation Prospers" guides it to make a difference for today's and future generations. Temasek seeks to build a resilient, forward-looking portfolio that will deliver good, sustainable returns over the long term.

Temasek pursues an integrated investment strategy centered on Net Zero, Nature Positive, and Inclusive Growth, embedding climate, nature, and social considerations into its business and investment decisions. Temasek has developed a Nature Roadmap to deepen its understanding of nature dependencies and impacts across its portfolio and to assess how nature-related risks and opportunities can be managed more effectively, including through the adoption of nature-positive business models and practices. To this end, Temasek takes a whole-of-system approach by investing in solutions, engaging portfolio companies that have material impacts and dependencies on nature and collaborating with partners to address market gaps.

Temasek's Sustainability Approach: Net Zero, Nature Positive & Inclusive Growth

Financing nature requires capital not only for projects and companies that protect and restore nature, but also for solutions that help avoid and reduce harm to ecosystems. Accordingly, Temasek leverages various platforms and partnerships intended to play complementary roles in deploying capital, catalyzing markets, supporting conservation, and scaling solutions. Temasek's Sustainable Living trend-aligned investments direct capital toward companies whose products and services advance environmental or social objectives, including addressing the key drivers of biodiversity loss. This US$ 38 billion portfolio spans areas such as sustainable water use, the circular economy, and resource efficiency. Investments include the Emerald Global Water Fund II, a fund accelerating innovation across the entire water value chain by investing in early- to growth-stage companies worldwide that are developing solutions in infrastructure and business resilience, advanced treatment, water reuse, digitally enhanced monitoring, prediction, decision-making, and automation as well as technologies to address emerging contaminants. Another example is Samsara Eco, a biotech company using an AI-powered enzyme platform designed to unlock circularity for the world's most valuable materials, starting with hard-to-recycle plastics and textiles.

In 2022, Temasek established GenZero, an investment platform company that seeks to accelerate decarbonization globally. GenZero supports investable nature-based solutions at the nature-climate nexus that deliver credible climate mitigation while generating broader environmental benefits, including biodiversity protection and improved ecosystem resilience, alongside community benefits. One example is Aurora Sustainable Lands, a US-based forestland owner and manager in which GenZero has invested. By incorporating

carbon finance, Aurora has reduced timber harvesting by at least 50% across its portfolio, extending the rotational age of its forests through a dedicated carbon stewardship approach. Today, Aurora is one of the largest private forest owners in the US, managing approximately 1.6 million acres across 15 states. These managed forests are estimated to sequester approximately 5.8 million metric tons of CO2e annually,[117] provide habitat for 133 tree species, over 60 mammal species, and 225 bird species, and protect 5,500 miles of rivers. Aurora's carbon credits carry the ICVCM Core Carbon Principles label and have been purchased by Microsoft, TotalEnergies, and JPMorgan.

In collaboration with Mandai Wildlife Group, Temasek helped establish Mandai Nature, a non-profit organization dedicated to protecting threatened species, nurturing healthy ecosystems and supporting vibrant communities. Now part of the Temasek Trust Collective, Mandai Nature supports on-the-ground conservation action in Asia, with an emphasis on Southeast Asia. Its work provides a practical example of pairing financial innovation and market-building with tangible conservation action and local stewardship.

Together, these initiatives demonstrate Temasek's approach to integrating nature considerations into its broader strategy, reflecting its view that nature is not a standalone agenda but an integral part of long-term value creation, resilience, and responsible ownership.

Source: Temasek

Despite these developments, financial innovations continue to face a range of challenges. Long preparation time, complex transactions, and the scale of enhancement required raise questions about the scalability and replicability of instruments ranging from labeled bonds and debt-for-nature swaps to equity investments and credits.[118] In addition, fragmented methodologies, inconsistent metrics, uncertainty around long-term ecological outcomes, and unclear demand signals continue to constrain the credibility, effectiveness, and long-term viability of emerging nature markets.[119]

Overall, recent innovations in nature-related finance reflect successful and growing efforts by both public and private actors to access capital markets and commercial finance for nature conservation. As the case studies show, these approaches signal growing momentum and point to pathways and enabling conditions for scaling investment and integrating biodiversity more fully into mainstream financial systems.

Recommendations

Governments and regulators should establish credible market rules and demand signals for nature-related financial products. Frameworks should clarify eligible activities, disclosure, verification, and integrity requirements for labeled debt, biodiversity credits, and nature-based carbon credits. Consider compliance-based demand where voluntary markets do not provide sufficient scale or certainty.

Issuers, banks, investors, and asset managers should design and assess nature-related financial products around measurable outcomes. Nature should be incorporated into green and sustainable finance frameworks from the outset, supported by clear use-of-proceeds requirements or KPIs, credible baselines, reporting, independent verification, and appropriate safeguards.

2.2.2 Blended Finance for Nature

Blended finance, the strategic use of public, philanthropic, or concessional capital to catalyze private investment that would not otherwise materialize, has emerged as one of the most prominent approaches for mobilizing private capital toward biodiversity conservation and restoration. Blending makes nature-related projects more bankable by reducing investment risks, lowering transaction costs, improving risk-adjusted returns, and/or supporting enabling conditions through technical assistance, project preparation, and capacity building.[120]

This approach is particularly relevant for biodiversity, as many nature-related projects struggle to generate the predictable revenue streams private-sector investors require, despite delivering significant public benefits such as watershed regulation, flood protection, pollination, and cultural value.[62] Governments, development banks, and philanthropic organizations can use concessional loans, first-loss capital, guarantees, political risk insurance, subordinated debt, foreign exchange hedging, grants, and technical assistance to close the gap. Blended finance is most effective when it addresses clearly identified financing barriers or risks that prevent an otherwise viable project from obtaining private investment.

CASE STUDY

Unlocking Investment in Community-Led Marine Conservation: Rare's Small-Scale Fisheries Impact Bond

Indonesia | Outcomes-Linked Financing | Marine Protection

For more than a decade, Rare has worked to revitalize coastal fisheries while strengthening local livelihoods across the Global South. At the heart of it is a community-led fisheries management system called Managed Access with Reserves (MA+R), which pairs sustainable use with effective protection of fishing areas. This approach has engaged 165,000 fishers across 2,300 communities in eight countries and placed over 105,000 square kilometers under sustainable, community-led management—an area larger than South Korea.

As the model has shown it can restore ecosystems and strengthen local livelihoods, the challenge now is to expand financing beyond traditional grant funding.

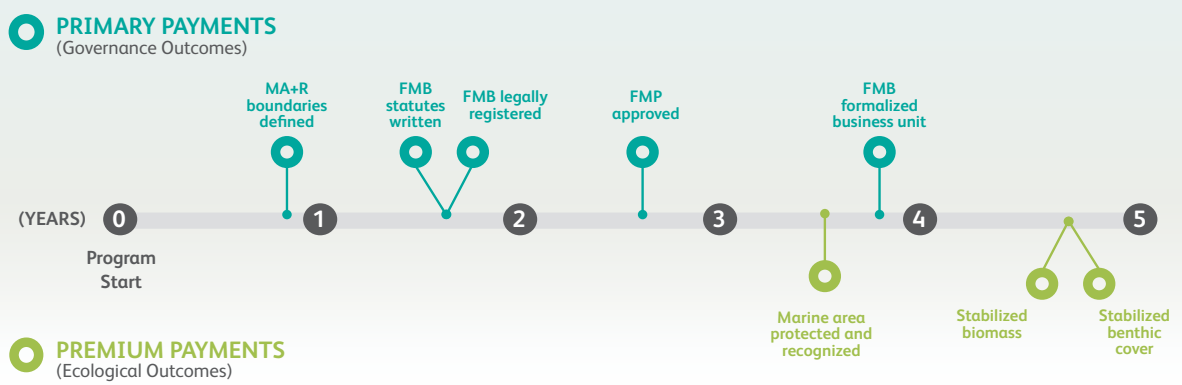
Building on the success and evidence base of its work to restore coastal fisheries, Rare launched the **Small-Scale Fisheries (SSF) Impact Bond** in 2024, the world's first impact bond designed specifically for small-scale fisheries. Operating from 2025 to 2030, the five-year pilot covers three coastal fisheries in Southeast Sulawesi, Indonesia, where Rare has worked for years. This financing instrument provides countries with a sustainable pathway to meet their 30x30 goals while safeguarding marine biodiversity, strengthening climate resilience, and helping coastal communities capture greater economic value from sustainably managed fisheries.

The SSF Impact Bond uses a pay-for-success model structured through a results-based contract with both principal and interest returns tied to independently verified outcomes. Primary outcomes trigger repayment of investors' principal plus a base return, while the premium outcomes, reflecting stronger results for nature, generate an additional return.

The financial structure transforms a proven conservation model into a multi-party outcomes-based financing agreement involving:

- **Investors:** The Pershing Square Foundation and Minderoo Foundation provided the upfront capital to fund the initial conservation efforts.
- **Service Providers:** Rare, alongside local providers, communities and government partners, implements the community-led conservation and co-management model.
- **Technical Partners:** Levoca and Reed Smith LLP provide technical expertise and legal support.
- **Independent Evaluator:** IPB University's Center for Coastal and Marine Resources Studies (PKSPL IPB) verifies predefined governance and biodiversity outcomes.
- **Outcome Funders:** Builders Initiative, Milkywire, Pershing Square Foundation, Rumah Foundation, United Kingdom Department for Environment, Food, & Rural Affairs through the Ocean Risk and Resilience Action Alliance (ORRAA), and Walton Family Foundation.

Primary and Premium Payments



Investors committed up to US$ 2.1 million in upfront capital to initiate implementation across the five-year pilot. Before implementation, outcome funders committed US$ 6 million to repay investor capital once pre-defined outcomes are independently verified on a contracted schedule. The bond payment structure uses eight verifiable outcome metrics informed by more than ten years of verified implementation experience, helping to ensure the metrics are realistic, measurable, and locally relevant.

Primary Outcomes are results within the implementers' control that repay principal investment:

1. MA+R boundaries defined
2. Fisheries Management Bodies (FMB) statutes written
3. FMBs legally registered
4. Fisheries Management Plan (FMP) approved
5. FMB formalized business unit

Premium Outcomes offer a return on investment when achieved:

1. MA+R officially recognized
2. Fish biomass stabilized or increased
3. Benthic coverage stabilized or increased

Achievements

- Raised US$ 2.1 million in upfront investment & pooled US$ 6 million in outcome commitments
- Established 3 MA+R systems
- Brought 22,156 hectares under improved community-led fisheries management
- Engaged 1,596 participants
- Achieved 1st performance milestone two months ahead of schedule and independently verified by PKSPL-IPB

Lessons for Scaling

Financing innovation should follow evidence. The bond works because it finances a conservation model with a demonstrated track record that investors can understand.

Governance is a financeable outcome. Transparent decision-making, participatory mapping, and formalized local management bodies are measurable institutional assets that reduce implementation risk before ecological outcomes emerge.

Verification converts impact into financeable results. Credible independent verification gives outcome-seeking funders and investors confidence that the payments are tied to verified conservation progress rather than implementer reporting.

Finance should strengthen, not replace, community institutions. Investors can finance implementation, but communities sustain conservation. Outcomes-based finance is most effective when it reinforces local governance systems rather than creating parallel structures.

Design challenges

As a first-of-its-kind mechanism for small-scale fisheries, the SSF Impact Bond required substantial upfront investment in legal structuring, governance design, outcome metrics, stakeholder alignment, and verification systems, funded by the Pershing Square Foundation. It also required financing terms that could accommodate ecological time horizons, since biodiversity recovery takes longer than most grant cycles. Securing long-term outcome commitments was difficult because many philanthropic funders operate on two- to three-year cycles.

These challenges are precisely what the pilot is designed to address. If documentation, metrics, verification systems, and partnership roles can be standardized, future transactions should become faster, cheaper, and easier to replicate. Indonesia's experience suggests that finance is most effective when it scales proven community-led conservation rather than attempting to replace it.

Source: Rare

Blended finance can complement regulatory reform. Reforming harmful subsidies, strengthening environmental regulations, or incorporating the value of nature into economic systems remain critical, but they often face political resistance and lengthy implementation timelines.[121] Blended finance can work through existing financial market mechanisms, using relatively modest amounts of public or philanthropic capital to reduce or remove risks and mobilize large pools of private capital, while broader policy reforms are being developed.

Because of these advantages, blended finance has grown significantly over the past decade across climate, infrastructure, agriculture, and other sectors. Projects that cannot generate enough revenue to meet private investors' required returns can benefit from public concessional capital to reduce risk and lower the required return.

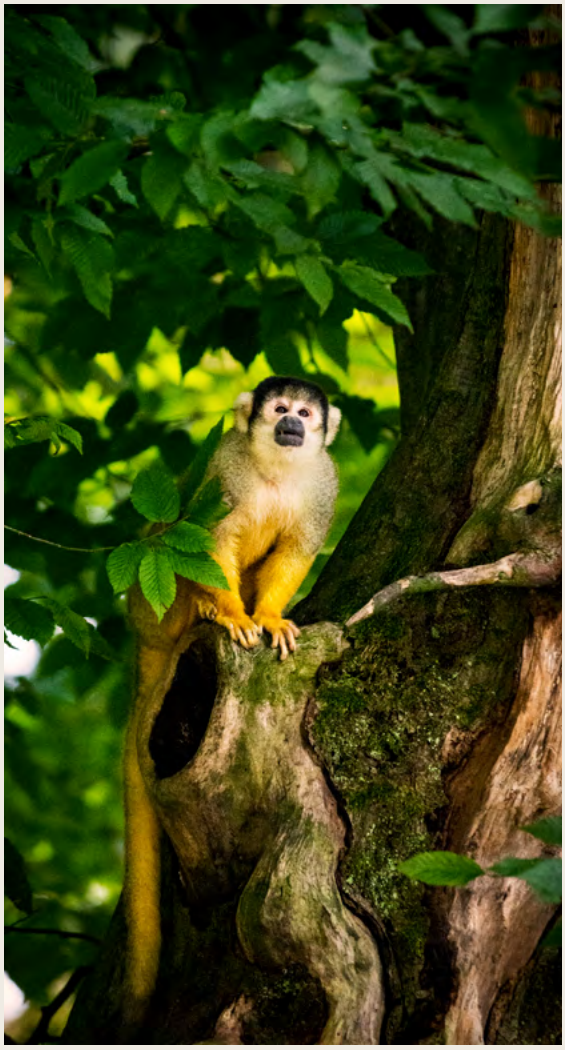
Convergence, the blended finance network, estimates that blended finance mobilized approximately US$ 276 billion in capital toward sustainable development in developing countries by early 2026.123 Convergence reports that 48 NbS projects obtained US$ 4.7 billion in blended finance between 2015 and 2023. This analysis found that nature transactions are generally smaller, have longer maturities, often incur higher transaction costs, and require more technical assistance than climate investments because of specialized assessment needs.[122] The challenges constraining private financing for NbS, complexity, long time horizons, and hard-to-measure risks, can often be addressed with blended finance structures. Another important use of blended finance is aggregation, pooling smaller nature-based investments into portfolios large enough to meet institutional investor requirements.

Closely related to blended finance is the growing interest in applying public-private partnership (PPP) models to nature conservation, ecosystem restoration and natural infrastructure. Traditionally associated with infrastructure development, PPPs are project delivery arrangements that combine public oversight with private-sector expertise and operational capacity. Governments typically retain responsibility for policy, planning, and regulation, while private partners undertake implementation and operational responsibilities.[123] As interest grows in ecosystem-based natural infrastructure and NbS, PPP models are being explored.[102] With appropriate

CASE STUDY

Tropical Forests Forever Facility: Blended Finance for Forests[127]

Global | Blended Finance | Tropical Forest Conservation



The Tropical Forests Forever Facility (TFFF) is a blended finance solution for tropical forest conservation on a global scale. If fully capitalized and effectively implemented, the TFFF could become one of the most significant efforts to leverage global capital markets for long-term tropical forest conservation.

The fund aims to raise US$ 125 billion of capital in two tranches: US$ 25 billion in first-loss capital from sponsor governments and philanthropies in the form of long-term loans, grants, and guarantees, which will leverage US$ 100 billion of senior debt through the international capital markets. The first-loss component will make the senior bonds highly rated and lower the cost of capital. The raised capital will be invested through fixed-income sovereign and corporate bonds, with the World Bank providing Secretariat and treasury services. The fund will generate long-term funding for tropical forest conservation by capturing the yield difference between its investment portfolio and the credit-enhanced bonds it issues.

TFFF is targeting US$ 4 billion per year. Countries with tropical forests and low deforestation rates will receive performance-based payouts of US$ 4 per hectare of forest per year. This will be reduced if deforestation or forest degradation increases.[128] Countries with high levels of deforestation will not be eligible. At least 20% of funds are required to flow directly to IPLCs.

So far, TFFF has secured more than US$ 6.7 billion in announced contributions, as well as endorsements from 66 countries.[129] Notably, Brazil and Indonesia, two emerging economies, were the first countries to announce investments in the TFFF. It has set an interim target of US$ 10 billion to begin issuing its own bonds and start the income-generation cycle.

Modeled on blended finance principles, the TFFF reflects growing ambition and increasing international interest in using sponsor capital, MDB participation, and capital markets to finance biodiversity conservation globally. The initiative highlights that blended finance only works where credible governance systems, standardized monitoring, clear forest ownership, and private investor participation align. If successful, the TFFF could provide proof of concept for applying similar risk-layering models to other globally significant ecosystems and conservation priorities.

Source: Paulson Institute

risk allocation, revenue structures, credit enhancement, and performance incentives, some NbS and natural infrastructure projects could eventually evolve into an investable asset class.

Transactions often remain highly complex, costly, and time-intensive, limiting scalability and replication.[124] Emerging economies with overstretched public finances, many of which are home to rich biodiversity, are often less able to implement and benefit from blended finance structures.[125] In addition to credit enhancement, technical assistance from MDBs and DFIs is often a crucial component of blended finance. Transparency, accountability, and environmental integrity are also essential. Without robust safeguards and long-term monitoring systems, blended finance structures risk concentrating short-term financial gains among private sector actors while leaving governments and the public sector exposed to longer-term environmental or fiscal liabilities.[126] In addition, increasing fiscal pressures can limit the use of scarce public resources for de-risking private investment. Questions surrounding fairness, additionality, and value for money are likely to become more pronounced as governments confront tightening budgets and competing social priorities.

Despite these challenges, blended finance can be an important mechanism for scaling biodiversity investment where it addresses specific risks or financing barriers. While not a substitute for broader systemic reform, blended finance can offer a pragmatic approach to accelerate financing of conservation and restoration efforts while longer-term regulatory, economic, and institutional transformations continue to evolve.

Recommendations

Governments, MDBs, DFIs, and philanthropic funders should support blended finance only where it is additional and provides value for money. Structures should identify the specific financial barrier preventing private investment and demonstrate why the financing would not proceed on commercial terms alone. Risk allocation, the amount of public or concessional capital committed, and the private capital mobilized should be transparent.

MDBs, DFIs, donors, and fund managers should invest in project preparation, technical assistance, aggregation, and long-term monitoring. These resources should help standardize and combine smaller nature projects into investable portfolios, build stronger pipelines, and improve access for least-developed countries and local project sponsors. Blended finance and PPP structures should include robust safeguards, long-term monitoring, and clear allocation of environmental and fiscal liabilities.

2.2.3 Sovereign Nature Finance Options for LMICs

Sovereign balance sheets are by far the largest funders of nature conservation. Public domestic expenditure finances around 90% of global NbS.[5] For LMIC governments, the challenge is both mobilizing more capital and identifying the right financing instrument for nature investment. The main sources of government funding for nature protection projects are taxes, fees, and sovereign borrowing. In recent years, a growing number of capital market and commercial bank debt instruments have demonstrated how sovereigns can link borrowing to nature protection, although these transactions remain limited and have not yet reached scale.[130]

Sovereign nature finance strategies differ by country income level, access to global capital markets, and sophistication of local bond markets. Higher-income countries can fund nature projects through their larger tax base, dedicated taxes and fees, and deep domestic bond markets, while LMICs face a more difficult financing challenge. Many countries face high debt burdens, shallow capital markets, shrinking grant financing, and higher borrowing costs.[131] These pressures reduce fiscal space for nature and all public spending. LMIC governments, therefore, need to identify which nature projects are suitable for borrowing, which require grants or concessional financing, and which can be financed through blended finance or dedicated revenues.

Governments face a borrowing dilemma when financing nature. Nature loss can weaken growth, exports, revenues, and debt sustainability, while investments in nature conservation can reduce long-term risks. However, many do not generate direct cash flows, and the benefits are often not reflected in sovereign credit assessments. Ministries of Finance, in particular Debt Management Offices, must connect nature priorities to financing plans, KPIs, and borrowing instruments best suited to the investment need.

Sovereign Borrowing for Nature: Enabling Conditions

Government borrowing for nature starts with a clear financing plan and framework. Credible financing plans, as called for in GBF Target 19 b & c, should identify the national conservation priorities, estimate the costs of

projects, and match nature spending with the best source of finance, such as general budget, dedicated taxes, ODA, concessional financing, commercial borrowing, and blended finance structures. Ministries of finance, environment, and planning should all actively participate in creating the NBSAP and national Biodiversity Financing Plan (BFP) so nature priorities are matched with realistic financing sources based on cash flow, public-good benefits, implementation, and bankability. UNDP's Biodiversity Finance Initiative (BIOFIN), with support from GEF, has assisted 91 countries in creating national BFPs.[132] These plans provide the foundation for financing frameworks that can support access to global capital markets, increased investor pools, credit enhancement, and innovative structures.

Sustainable financing frameworks allow governments to translate national conservation strategies into a format that investors, credit enhancement providers, and international partners can assess, compare, and use in financing decisions. These frameworks define eligible projects, link biodiversity financing to other relevant national plans, and define the Key Performance Indicators (KPIs), reporting mechanisms, and verification methods. KPIs are critical for sustainability-linked debt as they make policy commitments measurable and reportable. These frameworks establish credibility and transparency; however, financing still depends on multiple other factors such as repayment ability, fiscal benefits, investor demand, and risk allocation.

Almost 70% of official sector sustainability-linked bond issuances use an independent second-party opinion (SPO) provider to assess the alignment of KPIs with the framework.[133] Framework-supported borrowing often requires independent Measurement, Reporting, and Verification (MRV) agents to track KPI achievement over the life of the borrowing. SPOs and MRV reviews add cost but can strengthen credibility, reduce greenwashing concerns, and help broaden the investor base, particularly for large and innovative issuances. Governments may need technical assistance from donors, MDBs, DFIs, or specialized advisors to design KPIs, build reporting systems, and ensure nature commitments are credible for investors, lenders, and credit enhancement providers.

With the planning and framework foundation in place, governments can then identify and choose the debt instruments best suited for individual nature projects based on the type of financing needed, the credibility of the KPIs, and access to capital markets. This work can demonstrate enhanced capacity and sophistication of debt management operations as well as cross-government collaboration, helping build credibility with investors and broaden the range of financing options.

Sovereign Debt Markets and Instruments for LMICs

Borrowing allows governments to fund large nature conservation and restoration projects upfront without incurring the long-term cost in a single year's budget. This allows governments to start conservation efforts years earlier and increase the likelihood of avoiding high future costs, such as disaster recovery, ecosystem collapse, or expensive restoration (see Section 2.1.3). As debt is paid back over time, it matches the cost of conservation with the future beneficiaries, where protected ecosystems generate long-term public benefits, fiscal savings, and public revenues such as nature-linked fees, taxes, levies, and offsets. However, borrowing is appropriate only where governments have credible sources of repayment from the general budget, dedicated revenues, or fiscal savings. The choice of debt instrument depends on whether a government needs policy-linked finance, project finance, refinancing, credit risk reduction, or local currency financing.

Over the past few years, several innovative debt instruments have demonstrated how sovereigns can link financing to nature-related objectives, although their use remains limited. These instruments are designed to solve different problems. Use-of-proceeds bonds finance identified nature projects. Sovereign Sustainability-Linked Bonds (SLBs) and Sustainability-linked Loans (SLLs) provide general budget finance linked to policy-linked commitments. Commercial debt-for-nature conversions can refinance existing debt to create fiscal savings and fund conservation, while credit enhancement can improve borrowing terms when sovereign risk makes borrowing too expensive.

Use-of-proceeds bonds, including labeled bonds such as green, blue, and nature bonds, require a credible pipeline of investment-ready projects. The funds raised from these bond issuances must be earmarked for financing specific ESG activities, such as ocean or nature. Over the last several years, issuance of labeled bonds has averaged over US$ 1 trillion annually.[134] However, BloombergNEF estimates that in 2021-2022 less than 4% of funds raised through green bond issuance went to biodiversity projects.[3] Labeled bonds can be issued in domestic and global markets and have dedicated guidance principles provided by global bodies such as ICMA.[135]

Green bonds are the deepest and most established labeled bond market. Nature-related projects can be included within these established frameworks. These bonds are governed by established market standards such as the ICMA Green Bond Principles [136] and the Climate Bonds Initiative taxonomy.[137] Blue bonds are a specialized subset of green bonds that raise capital earmarked for marine and freshwater protection and restoration, often channeling capital toward clean water infrastructure, sustainable fisheries, marine biodiversity conservation, and coastal resilience. ICMA also provides guidelines for nature bonds, which it considers green bonds that exclusively fund nature-related costs.[138] Sovereigns should prioritize ensuring that nature is included in green and sustainable finance frameworks from the outset.

SLBs and SLLs, unlike use-of-proceeds bonds, raise capital for general budget purposes and do not require proceeds to be earmarked for nature project spending. The borrowing terms are tied to government performance against KPIs such as emissions reduction, forest protection, and ecosystem restoration. SLBs and SLLs can lower or increase borrowing costs through step-down and step-up conditions that adjust the coupon (interest cost) depending on whether the government meets or fails to achieve its KPI commitments. Sovereign use remains limited, but Uruguay and Chile led the sovereign SLB market in 2022. Both countries incorporated nature-based KPIs in their SLBs and started by creating strong sustainability frameworks based on their NDC commitments, including a target to maintain native forests [139] and protection of terrestrial and freshwater ecosystems in-line with GBF Target 3.[140] More recently, Côte d'Ivoire extended this approach to the sovereign SLL market with a loan supported by MDB credit enhancement, demonstrating how nature-related KPIs can also be incorporated into sovereign bank financing.[141]

Domestic bond markets, where sufficiently developed, can be preferable for governments as local currency borrowing avoids the foreign exchange risk associated with international borrowing. Sustainability-linked bond guidelines can be applied in domestic markets, provided local investors adhere to the framework and KPIs and accept the reporting standards. Well-established domestic debt programs can also attract international investors to invest in local markets.

Credit enhancement can be an important tool to lower borrowing costs and extend maturity by shifting some or all the risk from the sovereign to the higher-rated MDBs, DFIs, and private insurers. Guarantees, first loss coverage, and political risk insurance (PRI) can be especially useful when sovereign risk makes borrowing too expensive. However, these tools are limited and are not yet commonly used for sovereign bond issuance. One transaction can use multiple types of credit enhancement from multiple sources (see Enosis case study).



Commercial debt-for-nature swaps or debt-for-nature conversions can create long-term conservation funding by refinancing expensive sovereign debt with cheaper credit-enhanced debt and using the savings to fund nature commitments over 15 to 20 years or more. Credible government nature commitments, together with sufficient refinancing savings, help make these debt conversions attractive to credit enhancement providers and investors. These transactions can generate biodiversity financing without increasing, and at times even decreasing, a country's debt burden. Debt-for-nature conversions are only feasible for countries with the right debt profile to generate sufficient savings and nature policy commitments strong enough to attract credit enhancement and investors. Where these conditions exist, Ministries of Finance should review their debt portfolio for potential opportunities for debt-for-nature conversions when creating nature financing plans.

CASE STUDY

Commercial Debt-for-Nature Swaps, Ecuador's Amazon Biocorridor Financing

Amazon | Commercial Debt-for-Nature Swap | Forest & Wetland Protection



In December 2024, Bank of America, acting as Sole Structuring Agent, partnered with the Republic of Ecuador and The Nature Conservancy to execute a landmark US$ 1 billion commercial debt-for-nature conversion, made possible through TNC's Nature Bonds Program, that demonstrates how innovative capital markets solutions can mobilize private investment for biodiversity at scale. The transaction refinanced a portion of Ecuador's outstanding sovereign debt and is expected to generate more than US$ 800 million in fiscal savings by 2035. It is also expected to unlock approximately US$ 400 million in new conservation funding plus an estimated US$ 60 million in endowment returns over the life of the financing, roughly 17 years. The conservation funding will support Ecuador's Amazon Biocorridor Program, strengthening the management of 4.6 million hectares of protected areas, protecting an additional 1.8 million hectares of forests and wetlands, conserving approximately 18,000 kilometers of rivers, and supporting Indigenous communities and local livelihoods.

A key objective of the transaction was to reduce Ecuador's borrowing costs while expanding the funding available for conservation. To accomplish this, Bank of America structured the financing through a special purpose vehicle supported by political risk insurance from the US International Development Finance Corporation (DFC) and a liquidity guarantee from the Inter-American Development Bank (IDB). Rather than relying solely on Ecuador's sovereign credit profile, the structure enabled the issuance to achieve investment-grade ratings of Aa2 from Moody's and AA from Fitch. The credit-enhanced structure significantly reduced financing costs, allowing a larger share of the economic benefits generated by the refinancing to be directed toward conservation rather than debt service. Accessing the international Rule 144A and Regulation S market broadened the pool of eligible institutional investors, improving liquidity and enhancing execution.

Bank of America led an extensive global investor engagement process, meeting with more than 100 investors and securing investor interest sufficient to cover the deal prior to launch. Strong market interest ultimately produced an order book of approximately US$ 1.7 billion, representing roughly 1.7 times oversubscription. The depth and quality of demand enabled pricing guidance to tighten while maintaining investor participation, resulting in a final coupon rate of 6.034 %. The transaction demonstrated that benchmark-sized, long-tenor debt-for-nature financings can successfully access international capital markets when supported by a well-designed risk allocation framework and transparent conservation objectives.

This was Ecuador's second commercial debt-for-nature swap, representing a return to the market and providing evidence that governments view this structure as a useful financing tool. In this deal, Ecuador expanded the model beyond

marine conservation of the first swap to support terrestrial and freshwater ecosystems in the Amazon Basin. The transaction also demonstrated growing investor familiarity with debt-for-nature structures and increasing demand for investment opportunities that combine attractive risk-adjusted returns with measurable environmental outcomes. Larger issuance sizes, longer maturities, and broader institutional participation suggest the market is becoming increasingly capable of mobilizing private capital for conservation across diverse geographies and ecosystems.

Several lessons emerge for governments, DFIs, and capital market participants considering similar transactions.

1. Early collaboration among sovereign issuers, structuring banks, conservation organizations and public-sector partners is critical to designing a financing structure that aligns fiscal objectives with conservation outcomes.
2. Credit enhancement and strong credit ratings can substantially reduce financing costs and broaden the investor base, increasing the fiscal resources available for nature.
3. Transparent governance arrangements and clearly defined conservation commitments help build investor confidence while ensuring that savings generated through refinancing translate into measurable environmental benefits.

As countries seek innovative approaches to address debt challenges while financing biodiversity conservation, Ecuador's transaction provides a replicable model for mobilizing private capital at scale. By combining capital markets expertise, strategic partnerships, and robust conservation objectives, the project demonstrated how commercial banks can connect sovereign issuers, credit enhancement providers, and institutional investors to generate fiscal savings and durable conservation funding and protection. The transaction offers valuable lessons for sovereign issuers, DFIs, investors, and NGOs looking to expand the use of market-based solutions to finance biodiversity in the years ahead.

Source: Bank of America

These instruments can help governments raise or redirect capital for nature, but another potentially significant opportunity is demonstrating that investment in nature can strengthen sovereign creditworthiness and debt sustainability.

Nature Risk and Investment in Sovereign Creditworthiness

A potential next stage in sovereign financing for nature protection lies in linking government nature conservation efforts to debt sustainability, creditworthiness and sovereign borrowing costs. The economic effects of nature degradation can directly lower growth, decrease fiscal revenues, and hinder resilience, weakening debt sustainability and raising sovereign credit risk. The IMF has begun incorporating climate risk into debt sustainability analysis, but it has not yet included nature. Research covering nature-related sovereign economic and financial risks signals a potential move in this direction.[15] The IMF Resilience and Sustainability Trust can also provide long-term concessional financing to support resilience-enhancing policy reforms.[142] Credit rating agencies are beginning to review natural capital and biodiversity in credit risk, but their sovereign rating methodologies do not yet fully incorporate nature as a macro-critical factor. Sovereign ratings tend to reflect exposure to nature-related risks but do not yet systematically recognize the potential credit benefits of investments that reduce those risks.

Ministries of Finance can strengthen consideration of nature's effect on debt sustainability by highlighting evidence of how nature protection and ecosystem stability affect economic growth, fiscal health and sovereign creditworthiness. If this evidence is incorporated into the IMF's debt sustainability frameworks and rating agencies' sovereign risk methodologies, governments could begin to quantify where nature-protecting investments reduce sovereign risk and borrowing cost.

CASE STUDY

Embedding Nature and Resilience Investments in Uganda's Sovereign Debt Dynamics and Credit Profile[15]

Uganda | Sovereign Risk Assessment | Nature and Resilience Investment



Like many LMICs, Uganda's economy depends on nature, but the international financial system treats investment in nature and resilience as a fiscal cost, not a driver of creditworthiness. This constrains access to affordable finance precisely when Uganda needs to invest more in resilience.

Uganda's Ministry of Finance, Planning and Economic Development (MoFPED) is in the second phase of developing a practical approach for integrating the macro-fiscal benefits of nature and resilience investments into sovereign risk assessments, including Debt Sustainability Analysis (DSA) and sovereign credit ratings. The work is led by MoFPED, with support from Systemiq, NatureFinance, the London School of Economics, and Teal Insights. In Uganda, the work focuses on investments in agroforestry, forestry, and sustainable land management.

As Co-Chair of the Coalition of Finance Ministers for Climate Action, Uganda aims to support other countries to undertake similar work. The aim is to build the evidence base to integrate climate and nature resilience into the IMF-World Bank's debt sustainability frameworks, credit rating methodologies, and ultimately, capital allocation decisions.

Rationale

Nature is vital to Uganda's economy. Agriculture, which underpins the country's growth, is increasingly exposed to climate and nature risks, including land degradation, droughts, and floods. These pressures are visible in sovereign risk assessments. As risks rise, borrowing costs increase and fiscal space tightens.

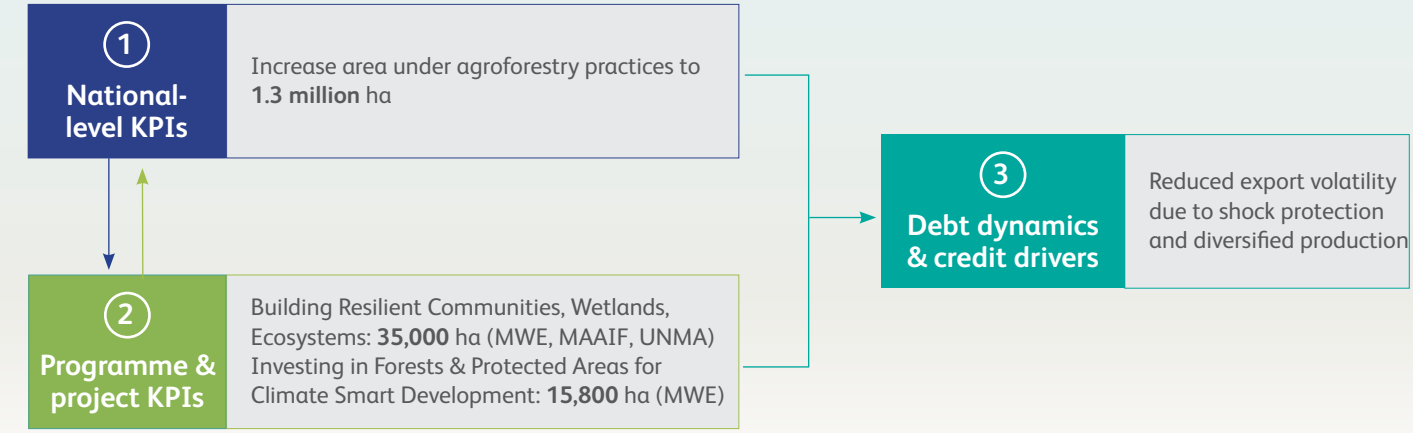
This reflects an asymmetry in sovereign risk assessment as sovereign risk assessments capture the fiscal costs of climate vulnerability, but not the credit uplift of nature investments. This creates a bias against investing in nature and resilience as finance ministries prioritize investments, such as roads and power plants, whose returns are more readily reflected in existing DSA and sovereign credit rating methodologies. Uganda is one of the first countries to address this asymmetry in practice.

MoFPED is integrating the macrofiscal benefits of nature and resilience investments not as a theoretical exercise, but in its own DSA. This exercise strengthens the sovereign financing case for nature and resilience and helps prioritize public spending, strengthen engagement with the IMF, World Bank, rating agencies, and investors.

Approach

MoFPED is beginning this work by focusing on nature and resilience investments in Uganda's agro-industrialization program, where climate

Uganda agroforestry KPI approach[143,145]



and nature exposure, natural capital, and economic transformation intersect most directly. The analysis links nature investment to sovereign credit outcomes across three levels of indicators to create a chain of evidence linking policy ambition and delivery to the metrics used in sovereign risk assessments:

1. National-level KPIs, which anchor resilience ambition within fiscal, development, and public financial management strategies
2. Program and project KPIs, which track execution and verify delivery of resilience ambition
3. Debt dynamics and credit drivers, which translate delivery of resilience ambitions into changes in growth, fiscal performance and debt dynamics

The first phase focuses on the clearest entry point for the DSA—how nature and resilience investments absorb one-off acute economic shocks, especially droughts and floods. The analysis found that nature and resilience investments in the agro-industrialization program can reduce shock severity, protecting at least 0.76 percentage points of GDP in severe shock years, and keeping the present value of public debt around 1.1-1.2 percentage points of GDP lower than the unmitigated path.



The next phase will extend to chronic effects, including land degradation, which directly undermines the productivity assumptions central to Uganda's agro-industrialization strategy.

The KPI-linked approach can also support access to sustainability-linked sovereign finance by connecting national-level KPIs to measurable macro-fiscal and credit-relevant outcomes. KPIs in sustainability-linked instruments could support lower interest costs through credit enhancement or interest-rate step-down mechanisms, if targets are achieved. The KPIs could generate credit uplift through macro-fiscal channels by reducing risk, strengthening growth, and improving debt dynamics.

Challenges

The key implementation challenge is methodological. The analytical process is labor-intensive and technical. Nature risk models must feed into macroeconomic impact models, and those results must translate into debt sustainability frameworks.

Together with its technical partners, Uganda is developing open-source Sovereign Technology (SovTech).

These tools make IMF and World Bank models easier to use and more responsive to nature and resilience. For example, the Q-CRAFT Explorer is an open-source web tool and companion guide that lets users adjust climate policy assumptions and see how different scenarios affect projected debt, growth, and fiscal balances.[144] The next step is for SovTech tools to connect nature risk, macroeconomic impact, and debt sustainability frameworks, like the World Bank-IMF LIC DSF.

Uganda's experience can be scaled in three ways:

- More proof-points as other early-mover countries extend the approach to cover different nature-dependent sectors and nature investment priorities, broadening the evidence for how nature and resilience investments can be integrated into sovereign risk assessment.
- Open-source tools can support other countries, even beyond the initial country proof-points, to run this analysis quickly, transparently, and consistently using methodologies aligned with IMF-World Bank standards. This also supports uptake by IMF and World Bank staff.
- Informing sovereign risk assessment methodologies—evidence from Uganda and other early movers can inform IMF-World Bank debt sustainability frameworks, credit rating methodologies, and wider approaches to sovereign risk assessment.

Source: Systemiq



Recommendations

Ministries of Finance should treat nature finance as part of the sovereign financing strategy, not as a side environmental expenditure. They should work with environment, planning, and sector ministries to turn NBSAPs, BFPs, NDCs, and national development plans into costed project pipelines, financing plans, and frameworks, and match nature investments with the appropriate source of finance.

Governments should build credible nature-finance frameworks before going to market. Frameworks should include clear KPIs, reporting, and verification systems, and include nature in green and sustainable finance frameworks from the beginning.

MDBs and DFIs should use guarantees, concessional finance, and technical assistance to help countries convert conservation priority projects into bankable transactions. Support should include project preparation, KPI design, MRV systems, risk allocation, and transaction structuring. Credit enhancement should be used where it can lower borrowing costs, extend maturities, or mobilize private capital, including by bringing in co-guarantors to leverage the MDB country envelope.

IMF and World Bank debt-sustainability teams, credit rating agencies and investors should strengthen their assessment models for nature-linked finance and nature-related sovereign risk. The IMF and World Bank should improve the incorporation of natural capital in the LIC DSF through the Long-Term Module being introduced in mid-2027. Investors should focus on transactions with credible use of proceeds, baselines, KPIs, reporting, verification, safeguards, and clear links to reduced economic, fiscal, or environmental risk. Debt-sustainability and credit-risk assessments should incorporate both nature-related risks and the potential contribution of nature investment to growth, resilience, and creditworthiness.

2.3 Strengthening Supply Chain Resilience for Business and Nature

2.3.1 Sustainable Agriculture and Food Systems

Agriculture is the main driver of deforestation and land conversion. Commodity production, particularly beef, soy, timber, palm oil, and cocoa, remains the dominant driver of forest and other ecosystem loss.[145] The 2025 Forest Declaration Assessment found the world permanently lost 8.1 million hectares of forest in 2024. Permanent agriculture as a driver accounted for an average of about 86% of the global deforestation over the past decade.[146] Global deforestation and associated emissions have increased since 2015, despite international pledges to halt and reverse forest loss and degradation. The 2030 deadline to halt and reverse deforestation and forest degradation is fast approaching, and the world is failing to meet it. Financial flows remain poorly aligned with deforestation and conversion-free (DCF) objectives. In 2024, private financial institutions held US$ 8.9 trillion in exposure to high-risk deforestation sectors, and 60% of the most exposed institutions still lacked deforestation policies.[147]

Agriculture often depends on the natural systems that it degrades, such as healthy soil, stable water supply, and sufficient pollinators. As discussed in Section 2.1.1, subsidies often incentivize land conversion; agricultural lending and commodity supply-chain finance can do the same when they are not aligned with protection of natural assets. The challenge is to transition financing toward nature-positive while supporting food security, livelihoods, and supply chains.

Closing the gap for nature finance requires reducing finance that drives deforestation and land conversion and increasing finance for DCF production through coordinated action by all actors across supply chains in the food and agriculture industries, as well as public finance and financial institutions. In short, four things need to happen in tandem. First, governments in both producer and consumer countries need to develop and enforce DCF regulations to drive sustainable farming and trade practices. Second, producers and traders, incentivized by regulatory requirements and signals from consumers and investors, need to adopt zero DCF practices and sourcing requirements. Third, investors in commodity producers and suppliers need to support and finance the transition to DCF and remove deforestation and land-conversion risk from their portfolios. Fourth, consumer countries need to integrate DCF requirements into bilateral or multilateral commodity trade agreements to help producer countries transform their production policies and practices.

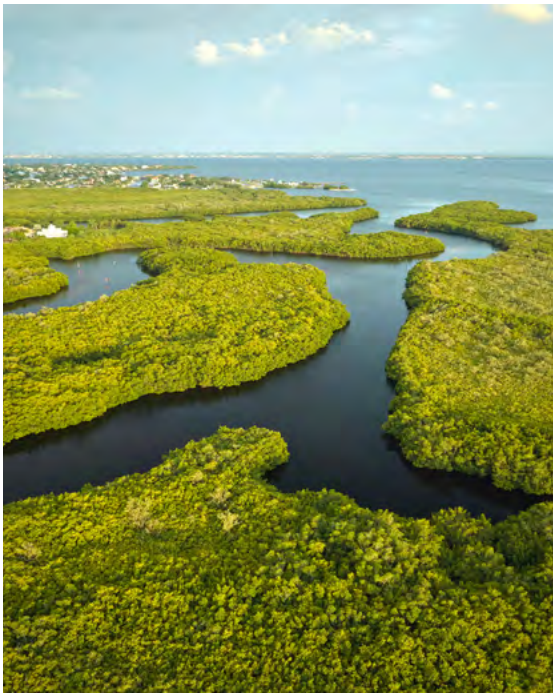
The transition to DCF supply chains faces deep structural barriers. While solutions exist, shifting from short-term, extractive production models to sustainable, resilient practices requires systemic change. The main obstacles are not technological; they stem from strong resistance to change among global traders, insecure land tenure, misaligned incentives and financial signals, and fragmented governance. Shifting market dynamics driving deforestation and land conversion will require a combination of robust policy frameworks in both producer and consumer countries, full traceability in commodity supply chains, efforts from producers and traders to remove deforestation and land conversion from their supply chains and commitments from financial institutions and asset owners to align their investments for DCF.[148]

Traders and finance providers can help counter deforestation incentives by linking access to finance and purchasing standards to verified DCF production.[62] Traceability, or tracking commodities through the supply chain to their origin, can support DCF financing by providing buyers and lenders with credible information on whether commodity production meets DCF requirements. Shared information systems can reduce duplication of effort and costs.[149] DCF compliance requirements, documentation, reporting, and verification requirements must be practical for smallholders and verified by independent agents.

Small-scale farmers transitioning to DCF likely face upfront costs but often have limited access to affordable finance, collateral, and technical assistance. DFIs and MDBs that provide concessional finance and catalyze commercial finance through blended finance instruments can help ensure access to financing and lower the cost of financing for small-scale agrifood actors transitioning to regenerative practices. Where available, these risk mitigation programs can also provide technical assistance for borrowers and lenders.[150] Strong relationships between producers and buyers can reduce the cost of lending with monitoring and collection as well as use of alternative collateral.[151]

At a larger scale, IFC's Global Trade Supplier Finance (GTSF) program, a US$ 1 billion short-term lending facility, provides short-term working capital finance to commodity suppliers and offers sustainability-linked

Companies with a large footprint should not limit action to their own suppliers and should join broader landscape or jurisdictional efforts to improve land governance and reduce deforestation and land conversion.



pricing when borrowers meet environmental standards.[152] Companies with a large footprint should not limit action to their own suppliers and should join broader landscape or jurisdictional efforts to improve land governance and reduce deforestation and land conversion.[153]

DCF production can only scale in commodity supply chain systems where protecting nature results in economic value through lower financing costs, reliable purchasing relationships, and reduced risk. Without these benefits, DCF transition is more likely to be viewed as a compliance cost than an investable transition.

In 2022, the Accountability Framework initiative called on all companies that produce or source agricultural or forestry products to set targets by 2025 to end deforestation and conversion.[154,155] The Science Based Targets Initiative (SBTi) has established net-zero standards for corporates and investors, and developed specific guidelines for the forest, land use, and agriculture sectors.

SBTi requires robust no-deforestation commitments that cover:

- All commodities directly produced by the company;
- Key global deforestation-driver commodities sourced by the company (i.e., cattle, cocoa, coffee, oil palm, rubber, soy, and timber), if the sourced volumes of any of these commodities represent 1% or more of the company's total sourced FLAG (Forest, Land, and Agriculture) commodity volume by tonnage;
- Commodities sourced by the company in significant volumes (i.e., 5% or more of the total sourced FLAG commodity volume by tonnage), if that commodity poses deforestation risks;
- Commodities already assessed as deforestation-free by the company.

No-deforestation commitments must be achieved no more than two years after submitting FLAG targets for validation, with an absolute deadline by the end of 2030.[156]

The SBTi's Financial Institutions Net Zero (FINZ) guidelines encourage investors that have significant exposure to deforestation in their portfolios to commit to no deforestation and publish an engagement plan to address deforestation.[157] Taken together with the SBTi FLAG standard, investment portfolios should be deforestation-free by 2030.

The UN-convened Net Zero Asset Owners Alliance, comprising 86 institutional investors with US$ 9.5 trillion in assets under management, has made this explicit in its Guidelines and Recommendations for Halting Deforestation: Investors are

CASE STUDY

Restoring Drakensberg Grasslands Through Incentivized Carbon Finance

South Africa | Carbon Finance | Sustainable Livestock



The International Crane Foundation and Endangered Wildlife Trust's Drakensberg Grasslands Project spans approximately 227,000 acres across 13 commercial livestock farms in South Africa's Drakensberg system. The landscape supports Blue Cranes and numerous other threatened or near-threatened species. The project seeks to restore the soil organic carbon that supports vegetation, water infiltration, nutrient cycling, and the food webs that sustain wildlife, while supporting biodiversity conservation and livestock production across a productive agricultural landscape.

South African farmers do not receive agricultural subsidies and contend with drought, livestock disease, volatile export markets, and political uncertainty. Under these conditions, investing in improved land management can impose additional upfront costs without generating additional income. The project helps finance these improved practices by creating a new revenue stream through verified soil carbon credits, allowing improved land management to generate financial returns without additional public expenditure.

A commercial project developer covers the upfront costs of project development, soil sampling, technical work, independent validation and verification, monitoring, and market access.

Participating farmers fund on-farm interventions, retain ownership and operational control of their businesses, and receive an agreed share of the carbon credit proceeds. Building on relationships developed over more than a decade through its Crane Custodian Program, the Foundation provided technical support that helped landowners and livestock producers understand and access the carbon credit market and use it to generate cash flow for rangeland management. Between 2018 and 2022, Verra issued 805,971 Verified Carbon Units to the project. All credits were sold internationally, and participating farmers received payment in December 2025. Participating farmers will continue to receive payments over time if they remain in the program—providing sustained revenue for conservation-friendly land use over the long term. These payments also serve to attract other farmers to the program and enable scaling to further secure biodiversity across the Drakensberg landscape.

The Drakensberg Grasslands Project demonstrates that technical support, grounded in trusted partnerships and combined with financial incentives provided by carbon markets, can incentivize landowners and commercial livestock producers to adopt improved land management practices that support biodiversity conservation and access carbon markets. Long-term carbon-credit revenue can then help justify the upfront costs associated with measurable land management changes that restore soil organic carbon, improve grassland condition and habitat connectivity, and sustain biodiversity conservation within a productive agricultural landscape. More broadly, the project illustrates how innovative private finance can support agricultural producers while conserving imperiled ecosystems embedded within working landscapes, providing a programmatic pathway for building more sustainable agricultural supply chains.

Source: International Crane Foundation and Endangered Wildlife Trust

encouraged to evaluate their portfolio exposure to deforestation and linked human rights abuses, phase out deforestation and forest conversion risks by 2030, actively engage with companies, asset managers, and policymakers, and disclose their actions, risks, and progress using measurable data.[158]

Collectively, these guidelines outline emerging best practices for investors to push deforestation and land conversion out of commodity supply chains through their investment decisions. Better and more transparent data collection is also essential to drive better exposure awareness and decision-making. Investment in interoperable national traceability and monitoring systems can reduce compliance costs, improve transparency, and support market access for producers, including smallholders.

Recommendations

Governments in producer countries should adopt and enforce strong DCF-aligned policies, and ensure full traceability of commodity production. They should integrate ambitious DCF goals into NDCs, NBSAPs, and National Adaptation Plans. They should also promote inclusive trade agreements with human rights safeguards, facilitate regional cooperation, and provide technical and financial support for farmers' transition to sustainable, regenerative practices.

Governments in importing and consumer countries should embed DCF standards in trade, procurement, and due diligence laws. They should monitor the global deforestation and land conversion footprint of their trade and consumption and align climate and biodiversity strategies to phase out deforestation and land conversion immediately. Financial and technical cooperation with producer countries should be scaled up to accelerate the transition towards sustainable supply chains.

Companies operating in or sourcing from forest areas should set measurable and verifiable targets to phase out deforestation and land conversion by 2030 in line with the Accountability Framework initiative and SBTi FLAG standard. This should include ensuring full traceability and transparency across their supply chains, applying equivalent DCF standards to all commodities and regions to prevent leakage, and collaborating with IPLCs and civil society to enable just, inclusive, and nature-positive production systems.

Financial institutions with exposure to deforestation and land conversion risk should commit to DCF principles and publish an engagement plan to address the risk in line with the SBTi's Financial Institutions Net Zero. This should include eliminating deforestation, land conversion, and human rights abuses from all portfolios, engaging clients to adopt DCF policies with time-bound targets, and expanding green finance instruments, such as sustainability-linked loans, green bonds, and mechanisms like the Tropical Forest Forever Facility (TFFF), to incentivize DCF production and trade.

MDBs and DFIs should help reduce the cost and risk of financing the agricultural transition. Guarantees, concessional finance, blended-finance instruments, and, in particular, technical assistance can help local lenders and producers adopt DCF practices and respond to market and regulatory signals.

2.3.2 Responsible Sourcing of Minerals in Energy Transition

One of the most important tensions in the global sustainability agenda is the need to rapidly expand clean energy technologies while simultaneously protecting biodiversity and vulnerable communities from the impacts of mineral extraction. The transition to renewable energy is essential for reducing greenhouse gas emissions. Building solar panels, wind turbines, batteries, and utility-scale transmission systems requires large quantities of energy transition minerals (ETMs), including chromium, cobalt, copper, graphite, lithium, manganese, molybdenum, nickel, rare earth elements, and zinc. The International Energy Agency estimates that meeting the Paris Agreement goals would require a fourfold increase from today's mineral inputs for clean-energy technologies by 2040.[159]

Given the strategic importance of critical minerals and the financing challenges facing many projects, governments are increasingly deploying public finance to de-risk investment across supply chains, particularly in strategically important markets and for early-stage projects. According to the International Energy Agency's 2026 Global Critical Minerals Outlook, public investment in critical minerals quadrupled from 2023 to US$ 65 billion in 2025, while private investment by major mining companies fell slightly to US$ 49 billion in 2025. This shift highlights an increased importance of public finance conditions in shaping which mining projects move forward. Advanced economies are increasingly combining direct state equity investment through sovereign funds, export credits, state-owned enterprise participation and development bank co-investment

with risk-sharing tools such as loan guarantees and offtake-backed facilities.[159] This increased public investment role gives governments and public financial institutions greater influence to require biodiversity safeguards, responsible sourcing standards, and community protections as a condition of support.

As financing flows into the sector, governments and investors should adhere to the agreed standards that protect high-biodiversity areas, apply the mitigation hierarchy, respect IPLCs, and support circularity. The energy transition that the world committed to under the Paris Agreement requires a significant expansion in global capacity for critical minerals mining and processing. If not done responsibly, the transition could undermine global biodiversity goals. Fortunately, countries have already agreed to the framework and tools to deconflict these climate and biodiversity goals.

In adopting the Convention on Biological Diversity Decision 14/3 on "Mainstreaming of biodiversity in the energy and mining, infrastructure, manufacturing and processing sectors,"[160] countries agreed to apply a combination of spatial planning (see Section 2.1.2), the mitigation hierarchy, and best practices for sustainable production and consumption to the mining sector. This approach to extraction and processing should be coupled with developing a downstream circular economy approach to reduce future reliance on raw materials extraction. Responsible sourcing of critical minerals should apply the mitigation hierarchy discussed in Section 2.1.3, starting with avoidance of high-biodiversity and socially sensitive areas, followed by minimization, restoration, and compensation for any residual impacts.

The resource extraction, transportation, and processing needed to supply these minerals can significantly degrade ecosystems and negatively affect the rights and well-being of IPLCs. While the transition will still require additional ETM mining, the overall mining footprint could decline as fossil fuel extraction decreases. A 2023 study by WWF and BCG found that rapidly transitioning to clean energy by 2050 would reduce the total area actively mined for minerals and fossil fuels by 25% relative to today.[49] Realizing this potential requires a full life-cycle approach from upstream measures governing appropriate extraction to downstream measures governing reuse and recycling.

Looking at the biodiversity impacts of ETMs, WWF has mapped projected mining claims and found that roughly 60,000 square kilometers overlap with terrestrial Key Biodiversity Areas (KBAs), sites that significantly contribute to nature conservation. This area is about twice the size of Belgium. Africa and Oceania account for the largest overlap areas, while significant impacts are also observed

As financing flows into the sector, governments and investors should adhere to the agreed standards that protect high-biodiversity areas, apply the mitigation hierarchy, respect IPLCs, and support circularity.



Figure 8: Approximate Area of Mines that overlap with KBAs (km^2) by Continent[160]



Source: WWF

across Asia, North America, and South America. Some ecoregions experience overlap levels exceeding 10% of their total KBA area, indicating substantial conservation concerns.[160] Beyond environmental issues are the social consequences of mining. IPLCs are often disproportionately affected because many mineral resources are located on or near Indigenous lands. More than half of the minerals needed for the energy transition occur on or near Indigenous territories.[160]

Due to the geographic concentration of key deposits, this expansion falls disproportionately on tropical forests, wetlands, and indigenous territories of exceptional and often irreplaceable ecological value: lithium in the Andean salt flats, cobalt in the Democratic Republic of Congo, nickel in Indonesia and the Philippines, rare earths in a handful of other jurisdictions. Projects that bypass prior and informed consent and community rights can face litigation, permitting delays, and redesign costs. Early planning should avoid high-conflict sites before capital is committed. Environmental governance capacity in many of these jurisdictions is frequently outmatched by pressure for investment.

Beyond the application of the mitigation hierarchy, critical minerals extraction needs to include rigorous environmental management, transparent governance, protection of Indigenous rights, fair labor conditions, meaningful stakeholder engagement, and restoration of affected land after extraction, such as those developed by the Initiative for Responsible Mining Assurance.[161]

In order to minimize future demand for raw material extraction of critical minerals, players across the renewable energy value chain should adopt the "Reduce, Reuse, Recycle" approach to minimizing reliance on raw material extraction. Reuse and recycling should complement reduction efforts by extending the lifecycle of materials and further decreasing the need for virgin resource extraction. A recent SINTEF/WWF report concluded that by 2050, recycling could supply most minerals needed to support the clean energy transition. The report concludes that the secondary market could supply about 20% of critical transition minerals between 2022 and 2050, as more minerals enter circulation and recycling processes and facilities are built out.[162] A similar study by the International Energy Agency (IEA) examined the potential for circularity to meet future demand, concluding that recycling could reduce demand for new mining by up to 40% by 2050. Without increased recycling, the financial cost of new mining needed to reach net zero would

be 30% higher.[163] Strong policies are needed to create investment incentives to scale up the development of the recycling infrastructure and reuse processes needed to reduce future reliance on mineral extraction.

Clean energy transition is both necessary and achievable, but must be implemented in a way that safeguards nature and human communities. Ultimately, we need a future that is carbon neutral, nature-positive, and equitable.

Recommendations

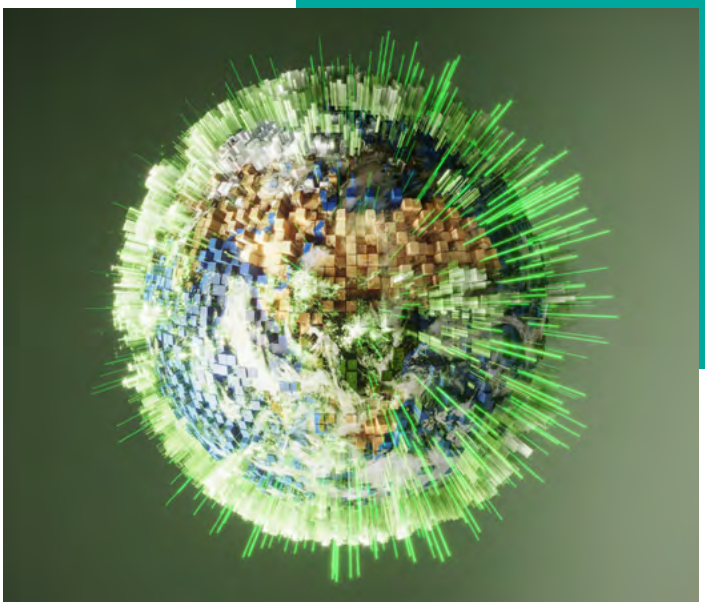
While critical minerals mining currently overlaps with important biodiversity areas and presents real environmental and social risks, these impacts can be managed through the following key recommendations:

Governments (upstream) should fully implement the mitigation hierarchy for critical mineral development. National-level spatial planning should delineate no-go mining areas in ecologically sensitive areas and ensure that unavoidable impacts are fully compensated through mandatory biodiversity offsets, resulting in a net gain for nature.

Governments (downstream) should implement regulatory frameworks for full circularity of transition minerals. Policy should support reduction, reuse, and recycling over their full lifecycle to reduce future demand for raw materials extraction, and create incentives for investment in recycling infrastructure and reuse processes.

Mining and refining companies should comply with environmental and social best industry practices. This should include full compliance with the mitigation hierarchy, transparent governance, protection of Indigenous rights, fair labor conditions, stakeholder engagement, and restoration of affected land.

Private and public investors, including MDBs, should condition financing and support for the critical minerals sector on full application of the mitigation hierarchy and circularity. Conditions should include application of the mitigation hierarchy and compensatory biodiversity offsets, adherence to international best practice standards by mining and refining companies, and the establishment of national and regional systems for full circularity.



2.4 Advancing Corporate Leadership and Harnessing Technology for Nature Finance

The business sector plays a pivotal role in closing the biodiversity financing gap. Beyond reducing the biodiversity impacts of their investments, operations, and supply chains, as discussed in the preceding sections, companies can also leverage their technological capabilities, industry expertise, financial insights, and market influence to strengthen the enabling conditions for nature finance. By improving biodiversity monitoring and measurement, advancing disclosure and transparency, lowering conservation costs and overcoming technical barriers that have long constrained private investment, corporate leadership can reduce future financing needs and unlock larger flows of private capital for nature conservation and restoration.

Companies operate within the confines of regulatory frameworks and commercial realities. Corporate decisions are shaped by policy signals, shareholder expectations, competitive pressures, and profitability considerations. When governments set clear rules that reduce environmental harm while maintaining economic competitiveness, businesses can respond quickly and at scale and accelerate nature protection. Policies and regulations that reward conservation, restoration, sustainable sourcing, nature-related disclosure, and innovation can align private sector activities with the long-term health and resilience of natural systems.

Yet regulation alone does not explain the full extent of corporate action. A small number of companies are choosing to move beyond basic environmental



compliance, reactive risk management, and reduction of operational and supply chain environmental footprint. These industry leaders are helping to build the enabling systems, technologies, standards, and knowledge infrastructure necessary to scale nature-positive action more broadly. Corporate support for standardized nature-related disclosure, for example, is improving transparency of nature-related risks, dependencies, and operational impacts.[164]

Technological innovation is also rapidly transforming how nature conservation and restoration are monitored, measured, and potentially financed. Advances in geospatial technologies, artificial intelligence, and digital platforms are enabling near real-time monitoring of ecosystem change at unprecedented scale and accessibility. These technologies improve the ability to track biodiversity change, measure ecological outcomes, strengthen verification and accountability, and reduce costs, while enabling conservation planning and implementation at much greater scale. At the same time, like any other technology, AI is a double-edged sword. Realizing its transformative potential for biodiversity conservation will require appropriate policies, robust governance, and strong guardrails to ensure it supports, rather than undermines, the objectives of the GBF.

While corporate leadership and technological innovation alone will not solve the biodiversity loss crisis, they can be catalytic accelerators when combined with strong public policy.

Scaling these tools that empower conservation requires cross-sector collaboration among technology companies, financial institutions, the conservation community, and others. These industry-leading efforts go well beyond offsetting the negative impacts of individual business operations. By improving the availability of decision-support systems, lowering monitoring and verification costs, and strengthening confidence in biodiversity outcomes, they can help build the foundations needed to mobilize larger flows of capital into nature conservation and restoration. At the same time, ensuring that the infrastructure underpinning these technologies is developed responsibly is becoming an increasingly important consideration for biodiversity conservation.

While corporate leadership and technological innovation alone will not solve the biodiversity loss crisis, they can be catalytic accelerators when combined with strong public policy.

2.4.1 Improving Corporate Transparency Through Disclosure Regimes

Disclosure of nature-related risks and its impact is valuable for companies. Effective disclosure can help businesses systematically examine where operations and supply chains depend upon nature,

where they generate environmental impacts, and how nature loss itself may create operational, financial, or reputational risks.[165] Companies can incorporate this knowledge into business strategy and investment decisions that reduce pressure on biodiversity and ecosystems.[166] Identifying, assessing, and disclosing nature-related risk allows companies to structure risk-mitigation strategies, set measurable targets, and take concrete actions to strengthen their resilience to biodiversity loss.

Both mandatory and voluntary disclosure frameworks can help accelerate this transition. Mandatory reporting regimes, such as the European Union's Corporate Sustainability Reporting Directive (CSRD),[167] use a stepped implementation approach to expand requirements for companies to disclose material sustainability risks and impacts related to biodiversity and ecosystems. Voluntary initiatives such as the TNFD help establish globally consistent approaches for identifying, assessing, managing, and disclosing nature-related risks and opportunities.[168] These frameworks provide structured methodologies and step-by-step guidance to help companies navigate what remains a technically complex and evolving field.

Financial institutions are also adopting the disclosure frameworks. As discussed in Section 1.3, nature-related risks in an economy get aggregated into financial sector portfolios. As of late 2025, 179 banks, insurance companies, and asset managers with US$ 22 trillion in assets under management had registered as TNFD adopters.[169]

Disclosure frameworks alone will not solve the problem. They are ultimately a means to an end, improving corporate performance and reducing harm to nature through increased transparency, accountability, more informed decision-making and improved business strategy. Their effectiveness will depend on the rate of adoption and the rigor and credibility of implementation. Adoption of disclosure practices faces headwinds, as many companies face practical challenges, and even mandatory disclosure regimes such as CSRD have recently been adjusted in response to market and industry concerns.[170] Continued progress in developing more accessible verification systems, metrics, and datasets is essential to improve the effectiveness, interoperability, and credibility of nature-related disclosure efforts over time. Country-level investment in sectoral guidance, baseline datasets, and data infrastructure will also be critical to help companies operationalize disclosure requirements and conduct more robust nature-related risk assessments.

Broader use of nature risk disclosure frameworks will depend on early adoption by market leaders. For market-leading companies, this process is not merely a matter of regulatory compliance but a transformative business strategy exercise where firms reassess business models, operational practices, sourcing strategies, and investment decisions through the lens of nature-related dependencies.[171] TNFD adopters committing to publish disclosures in annual corporate financial reporting play an important demonstration role, showcasing best practices and encouraging wider corporate engagement on biodiversity issues (see Banco Bolivariano Case Study).

Disclosure improves transparency, accountability, and business strategy, but scaling nature finance also requires better tools to monitor and measure outputs in ways that governments, companies, investors, and conservation organizations can use.

2.4.2 Building the Technological Foundations for Scalable Nature Finance

Companies can help narrow the biodiversity financing gap not only through direct funding commitments, but also by making their technologies, expertise, and resources accessible to the broader conservation community. In many cases, the ability to monitor ecosystems, measure biodiversity outcomes, verify impacts, and quantify risks remains a major constraint on the scale and credibility of nature-related investment opportunities.[179,180] Technological innovation therefore has the potential to play a catalytic role in strengthening the underlying infrastructure needed for more effective and scalable conservation finance.

Advances in geospatial technologies, artificial intelligence, and digital platforms are making it possible to monitor ecosystem change at unprecedented speed and scale. Deployment of company-supported digital platforms and monitoring technologies can significantly improve transparency and accessibility for conservation practitioners. Platforms that track forest cover loss, habitat degradation, land-use change, and ecosystem health are helping conservation organizations, governments, investors, and local communities better identify threats, prioritize interventions, and improve accountability. By making sophisticated proprietary technologies available to the wider conservation community, technology companies can help lower monitoring costs and build more accessible infrastructure for biodiversity conservation and environmental monitoring.

CASE STUDY

Banco Bolivariano: Reporting Against the TNFD Recommendations to Unlock Nature-Related Lending[172]

Ecuador | Commercial Bank | Blue Bond

Banco Bolivariano is one of Ecuador's largest commercial banks, with heavy exposure to the nature-dependent sectors, such as agriculture and aquaculture. The bank adopted TNFD analysis to understand its lending risk in its portfolio and identify sustainable finance opportunities. Supported by investment and technical assistance from DFIs, the bank built the internal capacity and lending practices to access blue-bond financing, followed by a larger biodiversity bond financed by MDB private-sector arms and DFIs.[173]

In 2022, the bank's sustainability strategy acknowledged that environmental risks could affect financial performance and access to finance, and the bank committed to adopting TNFD recommendations. In 2023,[174] Banco Bolivariano operationalized this commitment by issuing a blue bond linked to TNFD disclosure as a condition of financing. IDB Invest technical assistance helped the bank develop its TNFD implementation roadmap, lending methodology, monitoring, and client training.[175] Using the LEAP framework moved the bank beyond using TNFD solely as a disclosure tool to identifying portfolio risks, improving client relationships, and expanding financing opportunities.

The blue bond was a US$ 80 million issue funded by IDB Invest and FinDev Canada. The use-of-proceeds bond financed sustainable shellfish production, water and wastewater management, and solid-waste management, while promoting SME participation in the supply/value chains. It was the first blue bond to include targeted incentives linked to adherence to TNFD practices. Failure to meet these objectives would trigger increased payment to bond investors.[175] Compliance with the TNFD and other sustainability-linked outcomes provides the bank a 20-basis-point reduction in interest rate.[176] The blue bond's impacts on nature included over 400 tons of seafood produced with sustainable certifications, over 170,000 m^3 of wastewater saved and prevented from being discharged untreated, roughly 130 tons of industrial plastic recycled or reused in 2024.[172]

As an investor, IDB Invest required the bank to create a sustainability department including nature and social risk experts and not rely on the bank's risk management department to oversee sustainability.



LEAP Framework

L LOCATE	E EVALUATE	A ASSESS	P PREPARE
Where does the organization interact with nature?	What does it depend on, and how does it affect nature?	What risks and opportunities arise?	How should strategy, financing, targets, and disclosure change?

This led to the creation of a four-member sustainability team and a Sustainability Committee comprised of senior executives from risk, finance, corporate banking, innovation, sustainability, and marketing.[172]

The TNFD LEAP approach[177] provides a practical process for using nature-risk information in business strategy decisions. The process follows four steps: Locate, Evaluate, Assess, and Prepare. LEAP is a continuous process, not a one-time reporting exercise. Organizations often begin the process with priority sectors or areas and expand the analysis as their internal capacity improves. The Prepare stage is where Banco Bolivariano moved from portfolio risk assessment and disclosure to new financing frameworks and lending criteria.

At the portfolio level, the LEAP process identified aquaculture, forestry, agriculture, and commerce as priority sectors and three priority locations where nature-related risks were concentrated. At the transaction level, the bank built capacity to apply the LEAP approach using ENCORE, a tool that helps identify dependency and impact on natural capital, as well as the WWF's Biodiversity Risk Filter and Global Forest Watch. Client credit applications for funding from the sustainability bonds are reviewed through SARAS, the bank's environmental and social risk-management system.[176]

The use of TNFD and SARAS helped the bank identify additional pipeline of nature-related loans. In 2026, Banco Bolivariano issued Ecuador's first biodiversity bond, under the bank's ICMA-compliant Biodiversity Financing Framework. The US$ 120 million five-year maturity bond, financed by IFC, IDB Invest, and FMO,[178] was used to finance bank loans to clients across five sectors: productive land use and agriculture, sustainable production in freshwater and marine ecosystems, waste and plastics management, forestry and plantations, and tourism and ecotourism. The bank loans must finance projects that demonstrate positive and measurable environmental impacts.[178]



This case demonstrates how TNFD nature-risk disclosure practices can expand across a company's operations, influence investment strategy, and create new financing opportunities to match lending needs and reduce the cost of capital. As a financial institution, Banco Bolivariano's nature-positive actions can reach across the economy and influence the practices of multiple sectors and regions. By incorporating TNFD disclosure outputs into financing, the bank demonstrates how financing can not only lower the cost of capital but also help identify and address gaps in risk assessment, operations, and financing capacity and mobilize partnerships to close them. The increased capacity allowed the bank access to new financial markets and investors. For other banks and MDBs/DFIs, as well as institutional investors, the case provides a replicable model for using nature-risk disclosure practices, technical assistance, financing incentives, and capacity-building to expand nature financing.

Source: the Authors



Box 4: Technology Platforms Enabling Scalable and Cost-Effective Nature Conservation

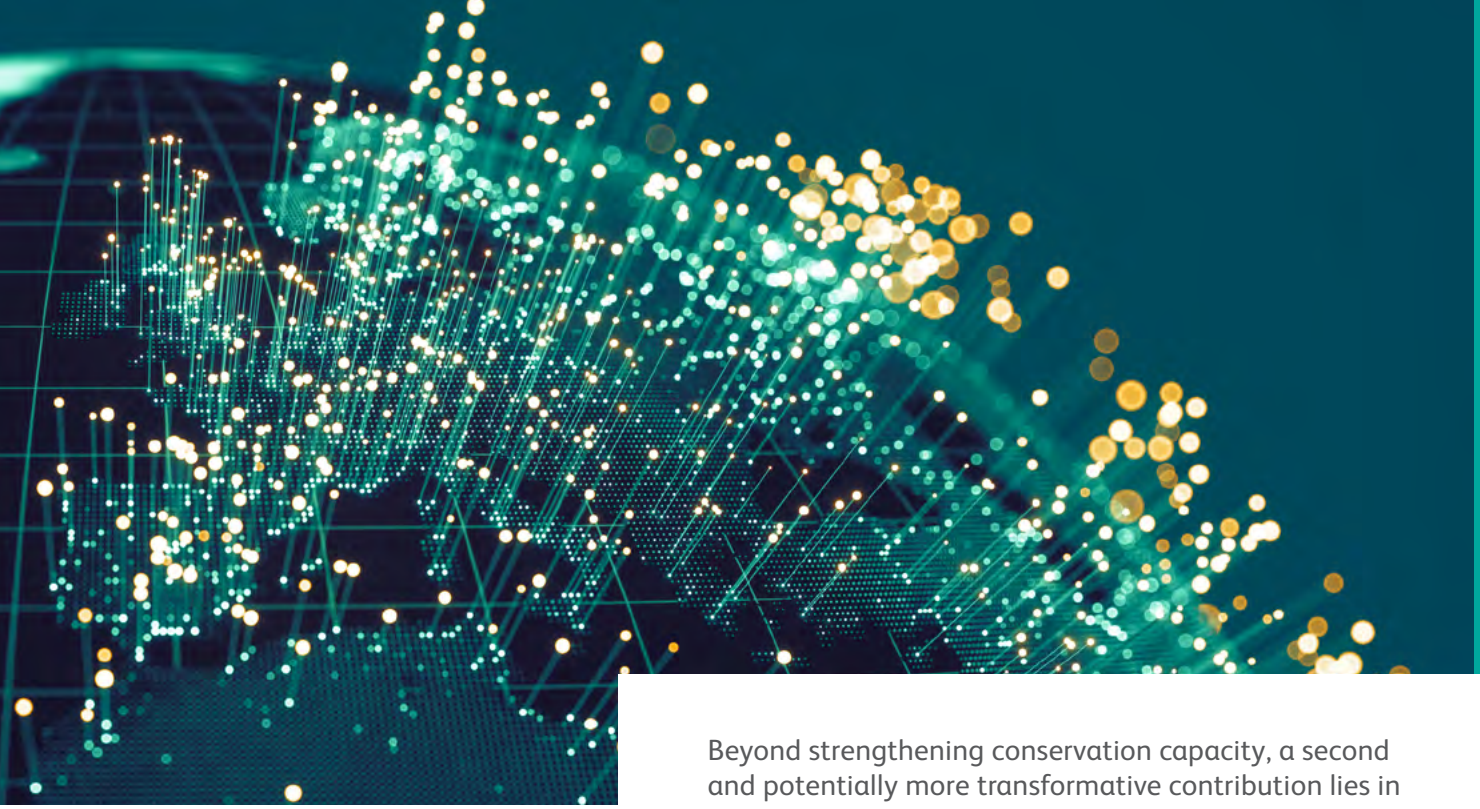
In addition to supporting nature conservation and restoration directly, a small group of technology companies is empowering the broader conservation community by making their technological capabilities, data infrastructure, and artificial intelligence tools more widely accessible. By broadening access to advanced computing, satellite imagery, and analytical tools, these companies are helping reduce the cost of biodiversity monitoring, improve transparency, and strengthen the technical foundations needed to improve the bankability and scalability of nature conservation projects.

Google has been among the pioneers in this space. Its Google Earth Engine has become one of the world's most widely used cloud-based platforms for environmental analysis, enabling researchers to process petabytes of satellite imagery without requiring expensive computing infrastructure. The platform underpins numerous global conservation initiatives, including Global Forest Watch,[181] which provides near real-time monitoring of forest loss, helping governments, Indigenous communities, and civil society detect illegal deforestation and prioritize enforcement and restoration efforts.

Building on this digital infrastructure, Google has also developed and open-sourced a growing suite of AI tools specifically designed for biodiversity monitoring. SpeciesNet and Wildlife Insights[182] use artificial intelligence to automatically identify wildlife from millions of camera-trap images, reducing processing times from months to minutes. Other models, including Google DeepMind's Perch[183] for bioacoustic monitoring and its species-distribution mapping models, combine satellite imagery, ecological observations, and machine learning to improve the mapping of species distribution and ecosystem change at unprecedented scales.

Technology companies are also increasingly collaborating to improve energy infrastructure decision-making beyond biodiversity monitoring. Microsoft, Planet Labs, and The Nature Conservancy jointly launched Global Renewables Watch,[184] an open platform that maps utility-scale solar and wind installations worldwide using satellite imagery and artificial intelligence. By making renewable energy infrastructure more visible at the global level, the platform enables governments, developers, investors, and conservation organizations to identify opportunities for renewable energy expansion while helping minimize conflicts with important wildlife habitats and other sensitive ecosystems. Such tools support more informed spatial planning and help better align climate and nature objectives.

Collectively, these efforts demonstrate how corporate technological leadership can generate public goods that extend well beyond individual business operations. By improving biodiversity measurement, making environmental information openly accessible, and lowering monitoring costs, these shared platforms strengthen the enabling infrastructure for more effective conservation planning, better-informed investment decisions, and the mobilization of larger-scale nature finance.



Advances in artificial intelligence and ecological modeling combined with scientific expertise are improving the ability to evaluate species abundance, ecosystem health, and biodiversity outcomes with greater precision and efficiency.

Beyond strengthening conservation capacity, a second and potentially more transformative contribution lies in advancing technologies that improve the quantitative analysis of biodiversity that can enable scalable nature finance. This includes supporting foundational research, integrating financial-sector expertise into measurement tools and methodologies, and identifying the major bottlenecks that prevent investment from scaling. Compared with climate finance, where carbon measurement is relatively standardized, biodiversity is more complex and far more difficult to assess across ecosystems and geographies. The absence of standardized metrics and reliable, cost-effective assessment tools has hindered the development and application of scalable market-based biodiversity financing. However, advances in artificial intelligence and ecological modeling combined with scientific expertise are improving the ability to evaluate species abundance, ecosystem health, and biodiversity outcomes with greater precision and efficiency.

Corporate support for research partnerships, sector-specific expertise sharing, pilot initiatives, and biodiversity measurement platforms can play an important catalytic role in improving conservation outcomes and mobilizing finance. By supporting the development and acceleration of more robust, scalable, and consistent biodiversity metrics and monitoring systems, companies can help build the technological foundations necessary for more outcome-based conservation approaches and unlock larger flows of private capital into nature-related investments. This support strategy resembles traditional catalytic financing. Rather than directly financing conservation activities, it invests in the enabling infrastructure that can support significantly larger investment flows over time.

CASE STUDY

AI for Biodiversity Measurement and Nature Finance

Global | Technology and Measurement Innovation | Corporate Partnership

One of the key constraints on scaling private capital for nature is measurement. While global finance flows to nature-based solutions reached approximately US$ 220 billion in 2023, the majority continues to come from public sources.[5] One key barrier to mobilizing private capital at scale is the lack of biodiversity data that meets the cost, quality, and consistency requirements of financial markets. Fragmented baselines, limited geographic coverage, and high monitoring costs reduce investor confidence and limit the scalability of nature-related financial mechanisms.

To help address this gap, Goldman Sachs joined with the MIT–IBM Watson AI Lab ("the Lab") to explore how artificial intelligence could improve biodiversity measurement and support capital mobilization for nature.[185] Over an 18-month collaboration, the Lab developed and tested research-stage AI models that integrate satellite imagery, field data, and ecological expertise to generate more reliable, scalable biodiversity insights. Goldman Sachs provided financial sponsorship for the research and helped identify potential areas where improved measurement could inform financial decision making, risk management, and the structuring of nature-based financing solutions.The collaboration focused on practical measurement challenges that corporates and investors face when assessing nature-related risks and opportunities, including coarse data resolution, poor reliability, and data gaps. Across three research stage pilots, AI-enabled models showed targeted improvements in biodiversity measurement, including improving the reliability of species occupancy estimates by ~27% [186] and achieving ~95% accuracy in peatland identification.[187] Importantly, the work reinforced that AI is not a substitute for scientific expertise: Human validation and interpretation remain essential to ensure outputs are decision useful and ecologically sound.

This work highlights the potential for innovation in measurement to support downstream financial applications. More reliable baselines and monitoring could help reduce uncertainty for sustainability-linked financing, strengthen verification in carbon and biodiversity markets, and support portfolio-level assessment of nature-related risks and dependencies. While the models remain at a research stage, this work demonstrates initial proofs of concept for how improved measurement could help lower barriers to capital deployment.

The pilots show meaningful potential but also highlight the need for continued development and market engagement. Beyond research, scaling nature finance will depend on enabling policy and capital mobilization. Blended-finance structures, regulatory clarity, standardized disclosures and metrics, and policy incentives can help derisk early investment and catalyze a more credible, liquid market for nature-positive outcomes.

Building on this work, Goldman Sachs is working with The Conservation Fund (TCF) to explore how AI-enabled biodiversity monitoring could be applied across real world conservation projects and market mechanisms. This exploration will aim to demonstrate how improved measurement can enhance project credibility, support capital mobilization, and contribute to the maturation of nature finance markets.

Private capital will only scale where risks and outcomes can be measured, monitored, and trusted. Advances in biodiversity measurement, grounded in scientific rigor and enabled by cross-sector collaboration, can help to translate ecological outcomes into decision-useful insights and, ultimately, support the mobilization of capital for nature at scale.

Source: Goldman Sachs

CASE STUDY

Microsoft Climate Innovation Fund, Building an Investable Natural Capital Portfolio

Global | Catalytic Investment Fund | Natural Capital

Nature finance encompasses a broad range of assets and outcomes, but the market often views transactions through a narrow carbon lens: identify a project, quantify the emissions reduction or removal, sell carbon credits, and repeat. While that model helped establish demand for nature-based climate solutions, it captures only part of the value natural systems create. The next phase requires a broader view that treats nature as a multi-asset system rather than a single-output project.

Since its launch in 2020, Microsoft's US$ 1 billion Climate Innovation Fund (CIF) has invested roughly US$ 800 million across 67 projects tied to Microsoft's carbon, water, waste, and ecosystem commitments. The fund supports catalytic financing structures, technologies, and market mechanisms needed to make energy, materials, and natural capital investable at scale.

CIF's natural capital thesis expands the unit of analysis beyond the carbon credit to the underlying ecosystem. The thesis treats ecological health and performance as potential drivers of financial performance: Investments that restore or improve biodiversity, water, soil health, and ecosystem function may reduce asset risk, strengthen operating resilience, and create durable sources of value.

Two pathways to investable ecosystem value

CIF's investments in Farmland LP and Pantheon Regeneration illustrate how this thesis applies across different ecosystems, business models, and return pathways. Farmland LP acquires conventional farmland in the western United States and converts it to organic production using regenerative practices intended to improve ecosystem function, support land productivity, and diversify revenue. At Burns Farm in California, the company transformed a nearly 3,000-acre conventional farm with no organic acreage and only three crops into an organic operation supporting 12 crops, reporting increased water efficiency and a 2.3x increase in gross margin per acre.[188] Farmland LP has applied a similar strategy across its nearly 20,000-acre portfolio.



Pantheon Regeneration applies a restoration model that combines project finance discipline, ecological expertise, and technology-enabled site selection and monitoring to rehabilitate degraded peatlands. Drawing on decades of peatland research through its partnership with Duke University, Pantheon uses its StratifyX platform [189] to convert multimodal environmental data into parcel-specific restoration plans, beginning with the 14,500-acre Pocosin Ecological Reserve 1 wetland site in the southeastern United States. By rebuilding ecosystem function while pursuing carbon removal, biodiversity, and water benefits, the Pantheon model seeks to make restoration financeable.

Alongside CIF investments in forestry, enhanced rock weathering, soil carbon measurement, biochar, and wildfire resilience, these examples show how natural capital investment can extend beyond a single asset or environmental outcome to a diversified portfolio of investable, scalable ecosystem strategies.

Scaling natural capital: structures, standards, and digital MRV

Scaling requires overcoming three forms of fragmentation: projects can be too small, performance metrics may vary across assets, and financing structures may be unfamiliar to mainstream capital providers. Addressing these constraints requires financing structures that aggregate opportunities, standardized metrics that make performance comparable, and technology-enabled monitoring that reduces uncertainty.

Project finance can translate long-term demand for environmental outcomes into upfront capital for project development and restoration. Pairing committed future revenues, such as long-term offtake agreements, with familiar credit structures can help developers aggregate smaller opportunities into larger portfolios that lenders and institutional investors can more readily evaluate.

Standardization and technology are equally important. Institutional capital needs ecological outcomes that are measurable, comparable, and auditable across larger areas and longer time horizons. For CIF, comprehensive digital MRV is an investment criterion, not merely a reporting feature. Nature-based companies may operate across thousands of acres, often beyond the capability of manual monitoring processes to deliver the required frequency or scale. Cloud data infrastructure, field sensors, geospatial data, AI-enabled analytics, and digital MRV can augment ecological expertise by tracking carbon,



biodiversity, water, permanence, and leakage at scale. These tools may help reduce information gaps and provide decision-useful data for asset managers, investors, lenders, buyers, and regulators.

From catalytic capital to mainstream finance

This systems lens can guide both individual investments and portfolio construction, and help investors diversify across ecosystems, value creation mechanisms, revenue streams, and risk profiles. CIF evaluates different natural capital pathways through a common lens: whether ecosystem health can be associated with measurable indicators relevant to long-term economic performance.

Catalytic capital can support emerging solutions and financing structures by validating new nature-based pathways, testing new approaches, helping participants evaluate execution risks, and signaling market interest in high-integrity outcomes. CIF demonstrates how a corporate fund, established as a strategic effort to address fragmentation and other barriers in nature finance, can use capital and technology to scale nature-based strategies from isolated projects to aggregated investable portfolios. The goal is not for catalytic capital providers to carry the market alone, but to establish evidence and structures to help banks, pension funds, insurers, infrastructure investors, and real asset managers evaluate participation with greater confidence.

Source: Microsoft

2.4.3 Reducing Environmental Footprint of AI Infrastructure Buildout

AI is increasingly defining the current wave of technological progress, creating both new tools to advance nature finance and new pressures on ecosystems. While AI can help make nature-related risks and outcomes more useful for decision-makers, these capabilities alone do not guarantee better outcomes for nature. AI can enhance decision-making across all sectors of the economy, including activities that drive biodiversity loss. As a result, the biodiversity implications of AI will depend not only on the technology itself, but also on the policies, incentives, and governance frameworks shaping its deployment. The rapid buildout of AI infrastructure illustrates this challenge: Decisions about where and how data centers and related infrastructure are developed can significantly affect land, water, energy systems, and biodiversity.

The substantial productivity gains already demonstrated by AI, coupled with expectations of even broader economic transformation ahead,[190] have triggered intense competition among technology companies to build data centers and related AI infrastructure at unprecedented scale and speed. Global investment in AI data centers reached US$ 580 billion in 2025,[191] with an estimated US$ 3 trillion more to come between 2026 and 2030.[192] Thousands of new data centers are being announced, financed, and constructed as tech companies race to secure computing capacity.

The rapid expansion of AI infrastructure may affect biodiversity through multiple pathways. Data centers and associated energy, water, and transmission infrastructure can place additional pressure on land, freshwater resources, and ecosystems. Siting and supporting-infrastructure decisions can drive habitat loss and fragmentation, while facility operations increase demand for electricity and water. While the direct footprint of data centers may be relatively limited, the associated demand for electricity, water, and supporting infrastructure can create broader, cumulative pressures on ecosystems, underscoring the importance of integrating biodiversity considerations into planning, investment, and governance decisions from the outset.[193]

Given the multidimensional nature of these impacts, responses need to address both how AI infrastructure is planned and where it is developed, as well as how facilities are powered and operated. Many of the most significant biodiversity outcomes are determined long before facilities become operational, through decisions about siting, supporting infrastructure, energy systems, and water use. Some operators are prioritizing renewable energy procurement or exploring on-site power generation. Others are exploring closed-loop cooling systems, recycled water use, and alternative cooling technologies aimed at significantly reducing freshwater consumption. Improvements in hardware efficiency, chip design, software optimization, and workload management are also helping reduce the energy intensity of AI computing over time.

As AI infrastructure continues to expand, getting decisions right from the outset will help ease concerns from local communities and strengthen companies' social license to operate. Proactive planning and mitigation can help reduce or avoid damage to ecosystems and natural resources, lowering future restoration needs and easing additional pressures on biodiversity finance systems already under considerable strain.

Recommendations

Corporations and financial institutions should adopt nature-related disclosure as a business strategy tool, not only as a compliance exercise. Leading companies should use TNFD-style assessments to inform strategy, capital allocation, risk management, and board-level decision-making. Market leaders should share how disclosure improves strategy, investor confidence, and organizational readiness for evolving regulations.

Technology companies, financial institutions, academic institutions, and the conservation community should collaborate to improve biodiversity measurement and make monitoring tools, platforms, data, and expertise more accessible. Collaboration should include governments, conservation organizations, researchers, and local communities and address weak baselines, inconsistent metrics, and costly verification while supporting accessible data systems, pilot programs, biodiversity measurement platforms, and tools for disclosure in investment and financing.

Technology companies, developers, investors, and regulators should reduce the environmental footprint of AI and digital infrastructure from the outset. Data centers and related infrastructure should be planned with integrated assessment of energy, water, land, biodiversity, and critical-mineral impacts. Companies should prioritize responsible siting, efficient cooling, renewable and reliable energy sourcing, supply-chain due diligence, and transparent disclosure so that AI infrastructure growth does not create additional pressure on biodiversity and increase future restoration costs.



2.5 Catalytic Philanthropy and Community-led Action

Philanthropic financing has long been a part of the foundation of nature conservation. Estimated at US$ 2-3 billion globally per year,[62] it represents a small share of overall biodiversity finance, but its influence exceeds its financial size. Philanthropy often occupies a specific niche in the biodiversity finance landscape as the sole provider of flexible, patient, and risk-tolerant capital that can support activities that can be overlooked by governments, commercial investors, and even DFIs.[194]

Recognizing that these resources cannot match the scale of global biodiversity needs, philanthropic donors focus their funding on areas of catalytic impact,[195] such as demonstrating proof of concept, advancing scientific research, strengthening local institutions, building technical capacity, empowering IPLCs, and mobilizing public engagement. Philanthropy regularly serves as both provider of early-stage capital, before successful models are adopted by others, [196] as well as continued sustainable support,[197] helping to establish the enabling conditions, knowledge and capacity, partnerships, and public support necessary to unlock larger and more durable flows of conservation finance.[198]

Beyond project implementation support, conservation organizations rely on philanthropic funding to diversify revenue streams, strengthen governance, develop technical expertise, build sustainable business models, and explore innovative financing mechanisms. The strategy is often to make investments that produce benefits beyond the original grant period, enabling organizations to deliver conservation outcomes long after the initial funding is exhausted.

Grassroots mobilization and community participation can play a decisive role in determining whether biodiversity investments generate lasting impact. Conservation NGOs, community organizations, IPLCs, and other local actors hold decision-makers accountable. Policies and regulations, while essential, can contain gaps and suffer from enforcement challenges. In cases where markets fail to properly value biodiversity and ecosystem services, community-led action supported by philanthropic funding can generate social and political momentum to safeguard important ecosystems before irreversible damage occurs.

Yet philanthropic support can be susceptible to political and economic forces. Changing policy priorities, economic downturns, market volatility, and evolving donor interests often influence the availability and direction of philanthropic giving. Recently, philanthropy is increasingly called upon to make up for reduced ODA levels. Many organizations working on the frontlines of biodiversity protection face an increasingly uncertain funding environment. This is a particular concern for organizations that heavily rely on grants to sustain their operations.

Strategic philanthropic financing is a critical bridge to durable financing and scaled conservation outcomes. Where possible, philanthropy should help organizations progress from grant dependence to a sustainable funding model. Combining this financing with community-led action will help ensure that biodiversity finance ultimately reaches the ecosystems and communities it is intended to serve while delivering lasting conservation benefits.

Recommendations

Philanthropic donors should deploy funding as catalytic capital that builds the evidence, capacity, and project preparation needed to unlock larger and more durable public, private, or MDB/DFI finance. Grants should support proof-of-concept projects, seed capital, technical assistance, governance, financial management, MRV, policy development, and advocacy. Funding should be flexible and long-term enough to help organizations diversify revenue and transition to sustainable financing models.

Philanthropic donors should prioritize financing through, or in partnership with, local and community-led organizations. Local ownership, community legitimization, political support, and on-the-ground monitoring can reduce implementation risk and increase the likelihood that the funding protects ecosystems and reaches intended communities. This local capacity is important for early-stage success and subsequent growth.

CASE STUDY

Financial Sustainability for Regional Conservation Nonprofits

Ecuador | Blended Finance | Regional Nonprofits

Two worldwide trends, the widening funding gap for protecting nature and the shrinking of governments' environmental budgets, require nonprofits to gain rapid financial sustainability. Traditionally, financial sustainability has been particularly challenging for small or regional NGOs that lack financial reserves to start with. This challenge is exacerbated by the fact that the core strength of regional conservation NGOs lies in protecting biodiversity on site, not in their business acumen. And yet, owing to their lean structures, regional NGOs provide some of the most cost-effective solutions to protecting global biodiversity. For example, Jocotoco protects 10% of all the species of birds in the world with an operational budget of US$ 2 million.

It's essential to run a non-profit the same as a for-profit venture, except that any surplus is invested into creating impact. To do so requires investing in business administration, typically a weak spot in many non-profits. Accounting, information and project management need to be streamlined and efficient, providing the basis for any future growth. Once operational efficiency is attained, effectiveness is key. This is where regional NGOs often excel.

The business opportunity of regional NGOs is having access to the stunning nature they protect. From the start, Jocotoco built lodges in its most important reserves to host visitors. Its ecotourism company, Jocotours, has always been profitable. Jocotours generates unrestricted income to cover the operational costs that are difficult to fund otherwise. This income provided an essential lifeline during turbulent times, such as the disbanding of USAID. Furthermore, access enables the public to witness nature in all its beauty. The increasingly urban public will not protect what they do not know. Access thereby illustrates the achievements, builds credibility and ultimately acceptance and representation by showcasing the regional benefits of providing water, pollination of crops, etc.

To accelerate scaling, Jocotoco founded another subsidiary company, Jocoambiente, to establish and manage reserves for third parties. Jocoambiente enables its clients to protect nature efficiently, building on decades of Jocotoco's knowledge to acquire and protect land. Jocoambiente is a win-win solution. Clients save costs in the acquisition and management of reserves, while Jocoambiente's surplus is reinvested into the purpose by providing unrestricted income for Jocotoco's operations.

Because of their very low overheads compared with international conservation NGOs, regional NGOs in the Global South provide some of the best solutions to preserve global biodiversity, as illustrated by Jocotoco. This is especially important, given the financial gap in funding nature adequately. A diversified revenue model of self-generated income and philanthropy enables nonprofits to perpetuate impact and to take the necessary risks to scale the protection of biodiversity. Financial resilience built through multiple income streams is thus a telltale sign that regional NGOs' efficiency in protecting global biodiversity leads to long-term effectiveness.

Source: Jocotoco

CASE STUDY

Defending the Okefenokee Swamp Through Community-led Action

USA | Philanthropy | Community Action

The 438,000-acre Okefenokee Swamp in Georgia is North America's largest blackwater wetland,[199] supporting more than 800 plant species and 400 vertebrate wildlife species, storing hundreds of millions of metric tons of carbon,[200] and attracting more than 800,000 visitors who spend over US$ 90 million annually.[201] Yet surrounding communities, where nearly 22% of residents live at or below the poverty level, have experienced limited economic opportunity, creating tensions between conservation and the economic promise of resource extraction. The lack of local economic development, investment, and job opportunities has opened the door for outside proposals that threaten biodiversity.

The most recent challenge emerged in 2018, when Twin Pines Minerals proposed a heavy mineral mine [202] on Trail Ridge, an ancient dune system that forms the hydrological boundary sustaining the Okefenokee. Over the following seven years, hundreds of conservation organizations, working alongside community members and Okefenokee supporters, opposed the Twin Pines mining proposal through demonstrations, legislative advocacy, and public petitions. In 2023, however, the US Supreme Court narrowed the definition of jurisdictional wetlands,[203] removing a key legal tool. Attempts to prohibit mining along Trail Ridge through state legislation also failed, and in 2024, the Georgia Environmental Protection Division issued a draft mining permit.

Despite these setbacks, sustained community mobilization and coalition-building maintained public pressure and ultimately created the conditions for a strategic land acquisition. In 2025, The Conservation Fund, working with One Hundred Miles and key government partners, secured US$ 60 million in philanthropic and private financing to acquire approximately 8,000 acres of the proposed mining site, effectively ending the immediate mining threat.

Philanthropic capital played two complementary roles: first, by providing flexible sustained funding for the local organizations, coalition-building, advocacy, and technical work; second, by financing the strategic acquisition of the proposed mining site. Funders included the Holdfast Collective, an environmental nonprofit funded by Patagonia, the James M. Cox Foundation, and many others.[201] The case demonstrates that conservation outcomes depended not only on funding availability but also on capable local organizations that translated financial resources into effective action.

The acquisition addressed only one proposed mine. Tens of thousands of acres along Trail Ridge remain unprotected, leaving the region vulnerable to future threats. Limited employment opportunities also continue to increase the appeal of extractive development. Long-term protection will require continued investment in local institutions, land conservation, scientific monitoring, and sustainable economic opportunities linked to maintaining a healthy ecosystem.

The Okefenokee is the region's identity and its main economic asset. With the elimination of the Twin Pines mining threat, the community now has a unique opportunity to generate wealth from a conservation economy rather than an extraction economy. Realizing this opportunity will require sustained collaboration among communities, governments, NGOs, and investors to align economic development with conservation. Such collaboration is essential not only for the long-term protection of the Okefenokee, but also for the preservation of biodiversity across the Southeast.

Source: One Hundred Miles



Conclusion

The biodiversity financing gap is still widening, but the foundations for closing it are stronger than they were in 2020. Governments, development institutions, businesses, financial institutions, philanthropy, and communities now have better tools, better data, and proven approaches that demonstrate what is possible when policy, finance, technology, and community action come together. The imperative now is not to wait for ideal solutions, but to scale what already works before continued nature loss makes the challenge harder and more expensive.

Our first priority is to stop making the problem worse. The world must stop financing nature loss. Governments must lead the way. Reforming and redirecting harmful subsidies are our best chance to change course. At the same time, nature has to be integrated into climate and development decisions before money is committed. Governments cannot do this alone. They must put in place the policies and incentives that make harming nature more costly and investing in nature more attractive. In turn, MDBs, philanthropy, and the private sector can deploy the available tools to provide the needed finance, risk-sharing, and technical support to complement, not replace, effective government policy and implementation.

This report shows what is possible. Practical solutions now exist across public policy, sovereign finance, blended finance, natural infrastructure, supply chains, technology, and community-led conservation. The task at hand is to adapt and institutionalize these models to local market conditions and needs. Harmful subsidies can be redirected from financing nature loss to supporting nature. Forests can remain standing while generating income. PES and credit markets can turn nature's benefits into dependable revenue. Debt markets can turn fiscal savings and investor capital into long-term

Practical solutions now exist across public policy, sovereign finance, blended finance, natural infrastructure, supply chains, technology, and community-led conservation.

conservation funding. Sustainable supply chains can financially reward forest protection instead of forest destruction. Corporate leadership can help make better data and technology available to conservation groups and private investors. Communities can build livelihoods around conservation rather than extraction. For this shift to happen, these approaches must move beyond isolated pilots and become part of standard public and private investment strategies.

The next step is practical. Governments can begin by reviewing how they spend, borrow, regulate, and invest and asking whether those choices support nature or threaten it. Finance ministries are especially well placed to lead this shift by connecting budgets, debt, public investment, and incentives. With the right enabling policies and incentives in place, the wide spectrum of other stakeholders can align their capital, expertise, and partnerships behind these priorities and help scale proven approaches.

None of this will happen automatically, and none of it is politically easy. Governments are contending with debt, conflict, and economic strain, and in that environment protecting nature can look like a task that can be postponed. But nature is not a competitor with these priorities; it underpins them. Let ecosystems unravel and every other challenge, from food security and public health to migration and fiscal stability, becomes harder and more expensive to solve. What is required now is not new knowledge but the political will and sustained leadership to act on what we already know, before ecological and economic losses mount to a scale that no amount of finance can reverse.



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Striated heron (Butorides striata) standing on a Victoria water lily pad, Pantanal, Brazil
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Aerial view of a patchwork of green pasture and ripening crops
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Young Jaguar resting along shore, Cuiabá River, Pantanal
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Chimpanzee, Uganda
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Hautes Fagnes (High Fens) moorland, eastern Belgium
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Coral reef teeming with fish and marine life
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White water lilies, Pocosin Lakes National Wildlife Refuge, North Carolina, USA
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Farmer's hands holding soil beside a soil meter
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Common blue butterfly (Polyommatus icarus), bee, and shield bug (Carpocoris fuscispinus) on a Rudbeckia flower
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Lone cypress tree among lily pads at sunset, Okefenokee Swamp, Georgia, USA
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Burned and fallen trees in a deforested area of the Brazilian Amazon
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Giraffe in the savanna with a butte behind, Entabeni Safari Conservancy, Limpopo, South Africa
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A scene along the Maple Glade Nature Trail of the Quinault Rainforest in Olympic National Park, Washington.
Photo: Rebecca L. Latson / Getty Images



Appendix: List of Acronyms

ADB	Asian Development Bank
AFDB	African Development Bank
AI	Artificial Intelligence
AIIB	Asian Infrastructure Investment Bank
BCG	Boston Consulting Group
BFP	Biodiversity Financing Plan
BIOFIN	Biodiversity Finance Initiative (UNDP)
BNG	Biodiversity Net Gain
CAF	Development Bank of Latin America and the Caribbean
CBD	Convention on Biodiversity
CBI	Climate Bonds Initiative
CIF	Climate Innovation Fund (Microsoft)
CSRD	Corporate Sustainability Reporting Directive (European Union)
DCF	Deforestation- and Conversion-Free
DFC	United States International Development Finance Corporation
DFI	Development Finance Institutions
DNS	Debt-for-Nature Swaps
DSA	Debt Sustainability Analysis
EBRD	European Bank for Reconstruction and Development
ECR	Ecological Conservation Redlines
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EPIC	Environmental Policy Innovation Center

ESG	Environmental, Social, and Governance	MoFPED	Ministry of Finance, Planning and Economic Development
ETM	Energy Transition Minerals	MRV	Measurement, Reporting, and Verification
EU	European Union	NAI	Nature as Infrastructure
FCLP	Forest and Climate Leaders Partnership	NAP	National Adaptation Plans
FINZ	Financial Institutions Net Zero	NbS	Nature-based Solutions
FLAG	Forest, Land, and Agriculture	NBSAP	National Biodiversity Strategy and Action Plan (UNCBD)
FSD	Financial Sector Deepening	NDC	Nationally Determined Contributions (UNFCCC)
GBF	Kunming-Montreal Global Biodiversity Framework	NEF	(Bloomberg) New Energy Finance
GBFF	Global Biodiversity Framework Fund	NGFS	Network for Greening the Financial System
GCF	Green Climate Fund	NPV	Net Present Value
GCTWF	Greater Cape Town Water Fund	ODA	Official Development Assistance
GEF	Global Environment Facility	ODF	Official Development Finance
GSS+	Green, Social, Sustainable, and other labeled bonds	OECD	Organization for Economic Co-operation and Development
GW	Gigawatts	PCEF	Private Credit Enhancement Facility
IBRD	International Bank for Reconstruction and Development (World Bank)	PES	Payment for Ecosystem Services
ICMA	International Capital Markets Association	PKSPL IPB	IPB University's Center for Coastal and Marine Resources Studies
IDA	International Development Association (World Bank)	PPP	Public-Private Partnerships
IDB	Inter-American Development Bank	PRI	Political Risk Insurance
IEA	International Energy Agency	REDD+	Reducing Emissions from Deforestation and Forest Degradation Plus
IFC	International Finance Corporation	SBTi	Science Based Targets Initiative
IMF	International Monetary Fund	SEA	Strategic Environmental Assessment
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services	SINTEF	The Foundation for Industrial and Technical Research
IPLC	Indigenous Peoples and Local Communities	SLB	Sustainability-linked Bonds
ISO	International Organization for Standardization	SLL	Sustainability-linked Loans
JREDD+	Jurisdictional REDD+	SPO	Second Party Opinion
KBA	Key Biodiversity Areas	SWF	Sovereign Wealth Fund
KPI	Key Performance Indicators	TFFF	Tropical Forest Forever Facility
LCDS	Low Carbon Development Strategy	TNC	The Nature Conservancy
LIC DSF	Low Income Countries Debt Sustainability Framework	TNFD	Taskforce on Nature-related Financial Disclosures
LMIC	Low- and Middle-Income Countries	WEF	World Economic Forum
LWCF	United States Land and Water Conservation Fund	WWF	World Wildlife Fund
MDB	Multilateral Development Bank		

About the Paulson Institute

The Paulson Institute is an independent, non-partisan organization advancing sustainable economic growth, climate and nature finance, and global economic stability. Founded by former US Treasury Secretary Henry M. Paulson, Jr., in 2011, the Institute applies economic and financial expertise to help address today's most pressing environmental and geopolitical challenges. The Institute helps mobilize capital for natural infrastructure and biodiversity conservation, strengthen global green and nature finance standards, and work to advance economic prosperity. With a diverse, globally experienced team, the Institute convenes leaders, advises institutions, and helps provide practical solutions that support a more resilient, sustainable, and nature-positive future.

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About The Nature Conservancy

The Nature Conservancy is a global environmental nonprofit working to create a world where people and nature can thrive. Founded in the U.S. through grassroots action in 1951, The Nature Conservancy (TNC) has grown to become one of the most effective and wide-reaching environmental organizations in the world. Thanks to more than a million members and the dedicated efforts of our diverse staff and over 1,000 scientists, we impact conservation in 83 countries and territories: 39 by direct conservation impact and 44 through partners.

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Website: www.nature.org; LinkedIn: The Nature Conservancy

About The World Wildlife Fund

Founded in 1961, WWF works to help people and nature thrive. As a global conservation organization, WWF operates in more than 100 countries, partnering with communities, companies, and governments to protect wildlife, conserve vital habitats, and advance sustainable solutions. Grounded in science and driven by collaboration, WWF works to help nature by conserving biodiversity, supporting resilient communities, and addressing climate change. Nearly 1 million people in the United States and more than 5 million globally are WWF members.

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