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OPINION

Integrating Climate and Biodiversity Agendas: The challenge and the opportunity for the COP30 in Brazil

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ABSTRACT. Biodiversity loss, land degradation, and climate change are deeply interlinked. We present the main conclusions of an initiative led by the United Nations Department of Economic and Social Affairs (UNDESA), which focuses on the synergies between the objectives of the 2030 Agenda and its Sustainable Development Goals, as well as climate change policies and plans, to increase the potential for achieving both agendas. Conserving biodiversity and restoring ecosystems helps stabilize the climate, while climate action supports the health of ecosystems. Nature-based Solutions (NbS), through conservation, restoration, and ecosystem management, can contribute to a mutual reinforcement of multiple goals. Quantified benefits of these synergies often outweigh costs, especially long-term. Integrated policies are urgently needed to align biodiversity and climate goals and financing, as well as to address trade-offs and environmental injustice. However, fragmented governance, as exemplified by the global conventions on biological diversity, climate change, and desertification, and siloed financing, hinder joint action. Policy levers could overcome barriers and accelerate action. The Conference of the Parties to the Convention on Climate Change in Brazil, a megadiverse country with significant greenhouse gas emissions from the land-use sector, represents an opportunity to integrate policy agendas and explore synergies that can accelerate action.

KEYWORDS. Adaptation, global conventions, mitigation, nature conservation, synergies.

The Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), and the United Nations Framework Convention on Climate Change UNFCCC are interlinked global frameworks addressing biodiversity loss, land degradation, and climate change, respectively. Their goals overlap significantly, as healthy ecosystems are critical for climate resilience, biodiversity, and land conservation. The CBD goals include halting biodiversity loss, ensuring the sustainable use of resources, and promoting equitable benefit-sharing (as outlined in the post-2020 Global Biodiversity Framework). The 30×30 Target aims to protect 30% of land/oceans by 2030. The UNCCD promotes practices that avoid, reduce, and reverse land degradation, aligning with Sustainable Development Goal 15 (*Life on Land*) and the goal of achieving Land Degradation Neutrality. The main goal of the UNFCCC, following the Paris Agreement, is to stabilize greenhouse gas concentrations to limit global warming to well below 2 °C compared to pre-industrial temperatures (with a 1.5 °C target). The three conventions are mutually reinforced. As protecting biodiversity, avoiding land degradation, and restoring ecosystems stabilize the climate, and climate action safeguards ecosystems (e.g., forests, grasslands, wetlands, oceans), quantifying these impacts underscores the urgency of integrating Nature-based Solutions (NbS), which encompass nature conservation, restoration, and ecosystem management, into climate policies.

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To focus on the synergies between the Sustainable Development Goals and Climate action, an Expert Group was co-convened by the United Nations Department of Economic and Social Affairs (UNDESA) and the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat in May 2023, with experts from diverse thematic and geographic backgrounds. The Group provided up-to-date analysis and recommendations on how to tackle climate and SDG action in synergy, based on scientific evidence and innovative approaches (https://sdgs.un.org/climate-sdgs-synergies).

Herein, we present the main findings of the Thematic Report on Nature Conservation and Climate that contributed to the final Synthesis Report, launched in September 2025 (UN 2025). We assessed studies quantifying the economic benefits of synergies between nature conservation and climate action. The negative impacts of biodiversity loss are based on recent reports from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and case studies in scientific literature.

Later, we discuss the synergies between ecosystem services and Sustainable Development Goals and how strategic investments and policies that align incentives (e.g., payments for ecosystem services) can mitigate upfront costs and opportunity trade-offs. Quantitatively, these synergies present a compelling case for integrated biodiversity and climate policies. Although the economic benefits often outweigh the costs, especially when considering long-term and global benefits, upfront costs and local opportunity costs can be barriers. Finally, some strategies to overcome barriers, including the siloed approach of the Rio Conventions, are discussed.

Decline of biodiversity and its impacts

The recently released Thematic Assessment Report on the Interlinkages among Biodiversity, Water, Food, and Health by the IPBES (IPBES 2024) indicates that, over the past 30 to 50 years, all evaluated indicators point to a biodiversity decline of 2% to 6% per decade. Since 2001, ten out of twelve key indirect drivers of biodiversity loss have intensified, amplifying the impacts of direct drivers.

About one-third of reef-building coral species are at high risk of extinction, and coral reefs could disappear globally within the next 10 to 50 years (Lyu et al. 2022). These losses would impact around 1 billion people living within 100 km of a reef (approximately 13% of the global population; Wong et al. 2022). Air and water pollution caused approximately 9 million premature deaths in 2019 (Fuller et al. 2022), accounting for 16% of all deaths worldwide.

The IPBES report (IPBES 2024) highlights the misalignment of economic and financial decisions that harm biodiversity and, consequently, climate integrity, as biodiversity loss and climate change reinforce each other, reducing ecosystem resilience and affecting all interconnected elements. Current economic and financial systems invest approximately $7 trillion annually in activities that harm biodiversity and other environmental elements (UNEP 2023). The negative externalities from the fossil fuel, agriculture, and fishing industries are estimated to be between $10 trillion and $25 trillion per year (IPBES 2024). Private financial flows directly harmful to biodiversity are estimated at $5.3 trillion annually, while public subsidies for such activities amount to approximately $1.7 trillion per year. Illegal resource extraction activities generate between $100 billion and $300 billion in annual revenue (IPBES 2024).

On the other hand, in 2023, approximately $58 trillion in economic activity, more than half of global GDP, was generated in sectors moderately or highly dependent on nature, more than half of the world's population lives in areas severely impacted by biodiversity loss, water scarcity, food insecurity, and health risks exacerbated by climate change (Evison et al. 2023).

Funding for biodiversity conservation accounts for significantly less than 1% of global GDP, totaling approximately $200 billion per year. The biodiversity finance gap—estimated at $700 billion per year—represents the shortfall in financial resources required to protect and restore nature effectively. Additionally, the extra investment required to achieve the Sustainable Development Goals (SDGs) most directly related to water, food, health, and climate change is at least $4 trillion per year (IPBES 2024). However, the cost of addressing biodiversity loss could double if action is delayed by a decade (e.g., from 2021 to 2030). Additionally, the adaptation finance gap is estimated to be $187 billion to $359 billion per year (UNEP 2024). Exposure to climate change risks could double between a global warming level of 1.5 °C and 2 °C and double again between 2 °C and 3 °C, severely impacting multiple sectors.

Four case studies from different regions are presented in Box 1, exemplifying the economic costs of the impacts of ecosystem degradation and biodiversity decline.

Synergies Between Ecosystem Services and the Sustainable Development Goals (SDGs)

Protecting up to 30% of terrestrial, freshwater, and marine areas, as agreed upon by the parties to the CBD, could generate significant environmental and social benefits,

Box 1. Case studies associating economic costs with ecosystem degradation and biodiversity decline.

Colombian Andes: Landslides are 581% more likely to occur in deforested areas causing hundreds of dollars in damage to infrastructure and dozens of casualties yearly. Restoring forests proved to be 16 times more cost-effective in preventing and buffering the damage of new landslides on infrastructure (Grima et al. 2020).

India: The collapse of vulture populations led to an increase of more than 4% in human mortality rates from all causes, implying approximately 104,386 additional deaths per year, resulting in estimated mortality damages of $69.4 billion per year (Frank and Sudarsha 2024).

U.S.: In counties affected by White-Nose Syndrome in bats, crop revenue declined by $7,960 per square kilometer, a decrease of 28.9%, and there were 1,334 additional infant deaths valued at $12.4 billion, totaling combined damages of $39.4 billion, or $1,932.20 per capita (Frank 2024).

Netherlands: A 2020 study estimated that at least 36% (€510 billion) of the financial investments held by Dutch institutions were highly or very highly dependent on one or more ecosystem services (Dasgupta 2021).

provided they are effectively managed for both nature and people. Increasing this protection beyond 30% would bring additional benefits for biodiversity but could create trade-offs for food production.

Quantifiable synergies (e.g., carbon storage in biodiverse habitats) highlight the need for integrated policies, financing, and monitoring. Aligning the post-2020 biodiversity framework with the National Determined Contributions (NDCs) and ensuring Indigenous inclusion are critical to maximizing co-benefits. For example, Colombia, a megadiverse country, integrated its NDCs and biodiversity targets, pledging to reduce deforestation by 50% by 2025 (avoiding 10 Mt CO_2/year) and protect 30% of land/oceans, and the European Union, in its Biodiversity Strategy 2030, links habitat restoration to climate goals (e.g., planting 3 billion trees to sequester carbon).

The role of fauna in sustaining forests, and thus preserving vital carbon sinks, is also significant and should not be overlooked. A study in the southern Amazon demonstrated that tapirs play a key role in facilitating the regeneration of degraded forests (Paolucci et al. 2019). Similarly, research conducted in a 30-hectare forest plot in Thailand found that tree species reliant on seed dispersal by large frugivores account for nearly one-third of the total carbon biomass. The decline or loss of these animals could result in a 2.4 to 3.0% reduction in stored carbon (Chanthorn et al. 2019).

Ecosystem services (ES), the benefits humans derive from nature, are foundational to achieving the SDGs. Protecting and restoring these services can simultaneously advance climate resilience, poverty reduction, biodiversity, and human well-being. Table 1 presents a synthesis of key synergies, supported by both quantitative and qualitative evidence while Table 2 illustrates cross-cutting co-benefits and quantitative synergies.

Climate Action and Sustainable Development Metrics

Studies conducted across global, regional, and national settings report that climate action (SDG 13) has a measurable impact on sustainable development (Barbier and Burgess 2021). Several papers state that climate action, health (SDG 3), and energy (SDG 7) interact positively, with strong evidence linking improved health outcomes and increased renewable energy investments to reduced healthcare costs and better energy performance (Fujimori et al. 2020). Positive interactions are also noted between climate action, clean water (SDG 6), sustainable cities (SDG 11), and life on land (SDG 15). These interactions yield moderate benefits such as enhanced water-use efficiency and increased forest value through carbon pricing (Fujimori et al. 2020).

Conversely, studies highlight notable trade-offs (Campagnolo and Davide 2019). Evidence shows that integrating climate action with poverty reduction (SDG 1), hunger alleviation (SDG 2), and economic growth (SDG 8) can result in adverse short-term effects, including increases in poverty rates (up to +4.2%) and declines in GDP (as much as -0.034%), with mixed findings for reduced inequalities (SDG 10) and land use (SDG 15) (Campagnolo and Davide 2019). Economic metrics vary widely; for instance, GDP impacts range from -0.034% to +12,737 per capita and shifts in energy prices and health-related costs follow regional and policy-specific patterns (Barbier and Burgess 2021).

Key areas of investment are renewable energy infrastructure, energy efficiency measures, climate-smart agriculture, research and development, and capacity building

Table 1. Direct Contributions of Ecosystem Services to SDGs.

Ecosystem Service	Linked SDGs	Key Synergies
Provisioning Services (e.g., food, water, raw materials)	SDG 2 (Zero Hunger), SDG 6 (Clean Water), SDG 7 (Affordable Energy)	– Agriculture depends on pollination (valued at $235–577 billion/year globally) (IPBES 2016). – Forests supply 75% of accessible freshwater for cities and agriculture (UN 2021).
Regulating Services (e.g., climate regulation, flood control)	SDG 13 (Climate Action), SDG 3 (Good Health), SDG 11 (Sustainable Cities)	– Coastal wetlands avert $65 billion/year in flood damages (Herrera-Silveira 2022). – Forests sequester ~30% of annual CO_2 emissions (Harris et al. 2021). – Peatlands sequester ~0.4 billion tons of CO_2 annually (Joosten 2010).
Supporting Services (e.g., soil fertility, nutrient cycling)	SDG 15 (Life on Land), SDG 12 (Responsible Consumption)	- Healthy soils boost crop yields by 20–30% (FAO 2022), critical for food security (SDG 2).
Cultural Services (e.g., recreation, spiritual value)	SDG 4 (Quality Education), SDG 8 (Decent Work)	– Nature-based tourism generates $343 billion/year globally, providing 21.8 million jobs and supporting education (WTTC 2022). – Payments for ecosystem services have mobilized up to $42 billion per year from public and private sources (IPBES 2024).

Table 2. Cross-cutting co-benefits of Sustainable Development Goals (SGDs) and quantitative evidence of synergies.

SDGs	Cross-cutting co-benefits
Climate Action (SDG 13) & Biodiversity (SDG 15)	Restoring 30% of terrestrial and marine ecosystems could safeguard 500 Gt CO_2 in carbon stocks and prevent 60% of projected species extinctions (Strassburg et al. 2020).
Poverty Reduction (SDG 1) & Health (SDG 3)	Mangrove conservation in Southeast Asia supports 15 million people with fisheries and storm protection, reducing poverty and disaster risks (Spalding et al. 2021). 56 - 57% of the global ecosystem service value (ESV) that benefits the world's poorest people originates from areas identified as high priorities for biodiversity conservation (Turner et al. 2012). More than 60 thousand species of plants, animals, fungi, and microbes are used to produce medicines (Landrigan et al. 2024).
Water Security (SDG 6) & Gender Equality (SDG 5)	Women in rural areas spend 200 million hours/day collecting water; restoring watersheds reduces this burden (UN Woman 2023).
	Quantitative Evidence of Synergies
SDG 2 (Zero Hunger)	Conservation agriculture results in an average 21% increase in soil health and supports similar levels of crop production after long-term warming compared to conventional agriculture (Teng et al. 2024).
SDG 7 (Clean Energy)	Sustainably managed forests provide 40% of global renewable energy (biomass), reducing reliance on fossil fuels (FAO 2018)
SDG 14 (Life Below Water)	Coral reefs support 25% of marine species and provide $2.7 trillion/year in goods/services (Souter et al. 2021).

(Liu et al. 2020). In developed economies, climate action aligns with technological innovation, despite challenges in transitioning away from carbon-intensive industries, while developing economies face steeper short-term economic impacts but benefit from opportunities to leapfrog to cleaner technologies (Campagnolo and Davide 2019).

Climate change mitigation and biodiversity

Recent research highlights the potential for synergies between biodiversity conservation and climate action. Nature-based solutions play a key role in addressing both crises simultaneously (FANC 2023). Implementing climate mitigation strategies that consider biodiversity can lead to "win-win" outcomes, such as increasing offshore wind capacity and rehabilitating natural areas surrounding onshore turbines (Gorman et al. 2023). The contribution of nature to climate change mitigation can strengthen links between international biodiversity and climate agreements (De Lamo et al. 2020). One promising approach is utilizing biomass from protected areas for bioenergy production. For instance, non-forest ecosystems in Natura 2000 could produce 17.9 Tg of dry biomass annually, potentially avoiding 12.5 Tg of CO2 equivalent emissions and 1.2-2.8 million ha of indirect land-use change (Van Meerbeek et al. 2016). These synergies offer opportunities to address both biodiversity loss and climate change effectively.

While synergies dominate, mismanagement can create conflicts. For example, misaligned incentives and conflicting priorities such as the overexploitation of forests for bioenergy and large-scale afforestation with monocultures (e.g., eucalyptus), may harm biodiversity. Integrated policies (e.g., REDD+, "climate-smart conservation") can protect biodiverse carbon sinks such as old-growth forests.

Climate change adaptation, biodiversity, and SDGs

Unlike climate mitigation, which primarily yields global benefits through the reduction of greenhouse gas net emissions, climate adaptation demands localized responses. Effective adaptation requires local strategies tailored to specific social, ecological, and climatic contexts. In this sense, the participation of local communities and Indigenous Peoples is essential, as their traditional knowledge and active engagement are crucial for the sustainable management of ecosystems and long-term resilience.

The global application of an analytical framework has shown that climate change poses a significant threat to achieving of the 2030 Agenda. Out of the 169 Sustainable Development Goal (SDG) targets, 86% may be adversely affected by acute climate hazards, and 37% are more likely to be undermined than supported by slow-onset climate impacts (Fuldauer et al. 2022). The threat is particularly severe in the most vulnerable countries, where rapid adaptation in sectors such as wetlands, agriculture, infrastructure, and housing is critical to safeguard up to 68% of SDG targets by 2030 (Fuldauer et al. 2022).

Despite these risks, adaptation also offers significant opportunities to protect and advance progress toward the SDGs. Ecosystem-based adaptation can directly contribute to safeguarding 62% of targets (Fuldauer et al. 2022). Adaptation in essential public infrastructure could help protect up to 81%, while interventions in primary and secondary economic sectors support 40% of the targets (Fuldauer et al. 2022). Importantly, 21% of climate-sensitive targets require integrated actions across both ecological and socioeconomic domains, reinforcing the need for cross-sectoral approaches (Fuldauer et al. 2022).

Healthy ecosystems, through services such as pollination, water purification, flood control, and pest regulation, are foundational to human well-being and directly support 24% of all SDG targets (Fuldauer et al. 2022). Restoring forests, wetlands, and freshwater systems strengthens resilience in both ecological and human communities (IPCC 2022). However, the effectiveness of Ecosystem-based Adaptation (EbA) declines as global warming intensifies, underscoring the urgency of timely implementation (IPCC 2022).

Furthermore, the intersection between climate adaptation and gender equality (SDG 5) is increasingly recognized. A literature review of adaptation efforts found that while some climate adaptation actions yield mixed outcomes, those explicitly designed to promote gender equity, however, consistently show positive results and synergies with other nine SDG targets (Roy et al. 2022). Yet, the current SDG 5 target framework may not fully capture the multidimensional and cross-cutting nature of gender-related impacts (Roy et al. 2022). An expanded framework (SDG 5+), encompassing 29 gender-relevant targets across 11 additional SDGs, has been proposed to assess adaptation outcomes in this domain better (Roy et al. 2022).

Payment for Ecosystem Services (PES): Regional models, multifaceted benefits, and challenges

Payment for Ecosystem Services (PES) programs have emerged as pivotal tools to align environmental conservation with economic incentives, addressing climate change, biodiversity loss, and SDGs by providing financial incentives for landholders to implement good land management practices (Capodaglio and Callegari 2018). Despite the potential of PES for multiple objectives, its effectiveness varies across contexts. A systematic review of the effect of programs on environmental and socioeconomic outcomes covered 18 programs from 12 countries in Latin America and the Caribbean, East Asia and the Pacific, South Asia, and Sub-Saharan Africa finding that PES may increase household income, reduce deforestation and improve forest cover. However, the quality of the evidence is low and very low based on a small number of programs (Snilsveit et al. 2019). Incorporating ecosystem services-based baselines and spatial targeting can enhance PES effectiveness in addressing regional development challenges (Ding et al. 2019). Additionally, the impacts of climate change should be considered when designing PES arrangements, as they affect the provision of ecosystem services (Ocampo-Melgar et al. 2024). Key factors influencing PES additionality include spatial targeting, payment differentiation, and strong conditionality (Ezzine-de-Blas et al. 2016).

Experts recommend integrating scientific knowledge and methods into PES design and implementation, emphasizing the need for guidelines to ensure effectiveness and scalability (Naeem et al. 2015). Schemes vary widely across regions, reflecting local ecological priorities, governance structures, and socioeconomic contexts. To evaluate the quantifiable impacts on climate resilience, biodiversity conservation, and socioeconomic development, we present cases from Latin America, North America, and Asia.

Latin America: Costa Rica's National PES Program and Chile's Climate-Adaptive Approach

Costa Rica's PES Program *(Pagos por Servicios Ambientales* – PSA) (FONAFIFO 2025) was launched in 1997 and is one of the earliest and most comprehensive national PES initiatives. It explicitly recognizes four ecosystem services: carbon sequestration, biodiversity protection, hydrological regulation, and scenic beauty. The program has increased forest cover from 21% in 1987 to over 50% by 2020, sequestering 107 million tons of CO_2 by 2019 (Salazar et al. 2021). Landowners receive direct payments when adopting sustainable land-use and forest-management techniques. The program is funded through Costa Rica's fuel tax and water charge, as well as its own initiatives, such as Certificates of Conservation of Biodiversity, carbon credits, and strategic alliances with the public and private sectors. Between 1997 and 2019, more than 18,000 families benefited from the program, with an investment of USD 524 million in PES projects and over 1.3 million hectares under PES contracts (UNFCCC 2021).

In Chile's Altos de Cantillana Reserve region, which contains the only Mediterranean forests of South America, PES faces challenges from climate uncertainty, such as prolonged droughts that impact water-related ecosystem services. One study proposes bundling services (e.g., carbon sinks, habitat provision) and linking payments to climate risk assessments (Ocampo-Melgar et al. 2024). Adaptive payment models could adjust compensation based on projected changes in water availability or biodiversity resilience, if institutional flexibility allows, addressing climate-driven uncertainties - a gap in traditional PES frameworks.

North America: Market-Driven and Regulatory Models – United States' Conservation Reserve Program (CRP) and Salt Lake City's Watershed Management

The CRP, established in 1985, is administered by the Farm Service Agency (FSA). It is a voluntary program that encourages agricultural producers and landowners to convert highly erodible and other environmentally sensitive land to vegetative cover, such as native grasses, trees, and riparian buffers. By 2020, it had reduced soil erosion by more than 9 billion tons and sequestered 49 million metric tons of CO_2 equivalent annually (FSA 2020). Biodiversity benefits include habitat restoration for pollinators and migratory birds, as well as generating economic benefits for farmers. Biodiversity benefits include habitat restoration for pollinators and migratory birds, while generating economic payouts to farmers.

Salt Lake City's Watershed Management is hybrid model (Salt Lake City Public Utilities 2025) that combines public funding with regulatory mechanisms, preserving 75% of its watershed through land purchases and conservation easements. This strategy provides more than half of the drinking water that 360,000 people rely on every day while supporting recreational tourism, illustrating how PES can effectively integrate ecological and economic priorities.

Asia: China's Grain for Green Program

China's Sloping Land Conversion Program (SLCP), initiated in 1999, is the world's largest payments for ecosystem services (PES) scheme (He and Sikor 2019). It uses public funds to convert marginal cropland located in upper watersheds into forests, engaging millions of mountain-dwelling households in the process (He 2014). As of 2020, the SLCP has restored over 34 million hectares of land (Deng et al. 2023). Li et al. (2021) concluded that the effect of the SLCP on sample rural households' total income per capita, including the SLCP subsidy, is not significant from 1999 to 2014, achieving the short-term economic objective of the SLCP because total income per capita does not decline when part of the cropland is withdrawn from production.

The role of Indigenous Peoples and Local Communities Territories

Extensive scientific evidence highlights the vital role of Indigenous Peoples and local communities in safeguarding global biodiversity while ensuring ecosystem services and mitigating climate change. Indigenous territories host a significant share of the world's remaining biodiversity and overlap with nearly 40% of all protected terrestrial areas and ecologically intact landscapes (Garnett et al. 2018, Nitah 2021). In regions such as Latin America and the Caribbean, studies show that when Indigenous peoples have secure land rights, their territories store more carbon, maintain denser forests, and support greater biodiversity compared to lands managed by other actors (FAO and FILAC 2021).

In Brazil's Legal Amazon, Indigenous Territories (ITs) cover approximately 23% of the region and serve as critical barriers to deforestation, accounting for only 3% of deforestation between 2019 and 2023 (Mattos et al. 2024). This effectiveness is directly linked to Indigenous land management practices, which are deeply integrated with ecosystem processes and promote species and ecosystem diversity. Despite the critical role of Indigenous Territories (ITs) in protecting forests and biodiversity, this contribution is not reflected in socioeconomic development. A study by Den Braber et al. (2024) shows that although Indigenous communities in the Brazilian Legal Amazon actively contribute to reducing deforestation, they experience lower income, sanitation, and education levels, with higher rates of inequality compared to medium and large landholders in the same region. A technical report (Mattos et al. 2024) revealed the critical link between the Amazon's Indigenous Territories and Brazil's agricultural success. The study found that rainfall from these Indigenous Territories supplies 80% of the country's agricultural activity, generating a staggering R$338 billion in 2021—57% of the national total. The conclusion is that the impact of protecting Amazonian Indigenous Territories extends beyond environmental benefits, playing a vital role in ensuring Brazil's water security, food security, and economic stability.

Another study by Fonseca and Bustamante (2025), conducted in the Cerrado-Amazon transition zone, highlights the critical role of Indigenous Territories (ITs) in maintaining key ecosystem services related to water provision, water quality, and climate regulation. The research found a strong spatial correlation between ITs and areas of high groundwater recharge, sediment retention, carbon storage, and habitat quality across the four river basins analyzed.

Recognizing Indigenous territorial rights and integrating Indigenous and Local Knowledge (see Box 2 as an example of traditional strategies) into conservation strategies are proven, cost-effective approaches for reducing deforestation and enhancing land stewardship, both of which are essential for meeting global biodiversity and climate goals.

Implementing Synergies Between the Rio Conventions: Overcoming Barriers and Balancing Trade-offs

The Rio Conventions, the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the United Nations Convention to Combat Desertification (UNCCD), were established to address interconnected planetary crises and share a common foundation: land and ecosystems. So, coordinated action can amplify benefits (Aleksandrova et al. 2024). In previous sections, we explored synergies among their goals and opportunities for joint implementation. Still, it is also crucial to identify key barriers and evaluate trade-offs inherent in integrated approaches.

Some barriers include fragmented governance and competing agendas as each convention operates with distinct mandates, funding streams, and reporting frameworks. Ministries and governance levels working in isolation exacerbate the fragmentation. Funding competition and misaligned incentives are also factors of concern as financial flows remain siloed, with climate finance dominating global agendas (Petorelli et al. 2021). Additionally, monitoring and accountability gaps persist as challenges. Two examples from the previous section exemplify this point. Costa Rica's PES program utilizes forest cover as a proxy for biodiversity, whereas Chile's adaptive models incorporate climate risk projections, underscoring the need for standardized metrics.

Strategies to overcome barriers and trade-offs should be developed, covering different aspects such as policy integration and cross-sectoral frameworks, financial mechanisms for blended action and innovative financing, institutional reforms, capacity building, and technology and data harmonization (regarding this topic, see previous report UN Climate SDG Synergies Report-091223B_1.pdf of The Expert Group on Climate and SDG Synergy advocating for standardized indicators to track cross-convention progress).

Trade-offs also include equity considerations when short-term costs are compared to long-term gains (for example, costs associated with land restoration against long-term savings). Top-down programs risk marginalizing smallholders demanding the establishment of safeguards and inclusive design for benefit distribution (Aleksandrova et al. 2024).

Realizing the full potential of synergies demands moving beyond a sectoral approach and embracing strategies to interweave nature conservation and restoration, as well as climate action, while addressing trade-offs and inequities.

Box 2: The Satoyama Initiative.

The Satoyama Landscape refers to a traditional Japanese rural environment characterized by a mosaic of managed ecosystems, including secondary forests (such as oak, pine, and bamboo groves), grasslands, rice paddies, orchards, irrigation ponds, and villages (NCB 2009). These landscapes have been shaped over centuries by local communities through sustainable agricultural and forestry practices. This long-term human-nature interaction has created diverse habitats that support a wide range of plant and animal species, many of them threatened. The active management of Satoyama is crucial for maintaining biodiversity, as it enables the coexistence of ecological and agricultural systems. Beyond its ecological importance, Satoyama holds deep emotional and cultural value for the Japanese people and continues to inspire traditional practices and cultural expressions.

These complex landscapes inspired the Satoyama Initiative, which spreads a vision for sustainable rural societies living in harmony with nature. Its main goal is to gather and share data about traditionally sustainable managed lands worldwide and to promote a land and resource management approach that balances the dual needs of biodiversity.

Final remarks

Integrating biodiversity conservation and climate action into policy frameworks is essential to avoid siloed approaches and maximize synergies. The benefits are substantial: gigatons of carbon sequestered, enhanced disaster resilience, and billions in economic savings. Yet, the current financial imbalance is striking, with governments providing significant direct subsidies that harm biodiversity, in addition to the impacts of environmental externalities. In contrast, domestic public finance for biodiversity, as well as global biodiversity-related flows—public and private combined—amount to approximately 0.1% of global GDP in 2019 (Dasgupta 2021). Closing this gap requires scaling up finance for nature- and climate-positive actions, phasing out harmful subsidies, and streamlining mechanisms for monitoring, financing, and capacity building to optimize resources and reduce transaction costs.

Global initiatives, such as the UN Decade on Ecosystem Restoration (2021–2030), Nationally Determined Contributions to UNFCCC, and the Kunming-Montreal Global Biodiversity Framework, demonstrate the feasibility and urgency of synergistic action. To maximize synergies and minimize trade-offs, integrated policies must be designed within specific contexts, promoting regional cooperation and knowledge exchange, while also strengthening capacity building and technology transfer. Advancing these approaches is critical to achieving global biodiversity and climate targets while securing long-term economic resilience and sustainable development.

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