

Reframing Climate and Nature Investment as Strategic Security Action

Executive Summary

The degradation and potential collapse of critical ecosystems represent an underappreciated threat to global security. Critical ecosystems, such as the Amazon and Congo Basin forests and warm-water coral reefs, function as foundational components of the global climate system. It is upon these ecosystems that the global economy, food production, water cycling, coastal protection, and livelihoods for hundreds of millions of people depend. As these systems approach irreversible tipping points, the risks that arise from their degradation are no longer environmental alone. They are systemic, cascading across economic, financial, and geopolitical domains.

This brief applies a human and national security lens to examine how ecosystem degradation translates into concrete risks for local populations as well as the international community. Ecosystem collapse operates as a risk multiplier, exacerbating existing vulnerabilities and generating new pressures on food and water systems, local livelihoods, supply chains, fiscal stability, and geopolitical dynamics.

Despite growing awareness of these risks and tipping point thresholds for critical ecosystems, international public climate and nature finance is decreasing, particularly concessional finance such as Official Development Assistance (ODA).¹ We argue that ODA and funds earmarked for international climate and nature investment must be understood as a core risk prevention instrument and strategic investment. Alongside coordinated action with global partners and private finance, such funding can reduce drivers of fragility, support economic stability, and deliver returns in the form of avoided costs across humanitarian, financial, and security domains.

The brief highlights two pathways through which ecosystem degradation generates national security risk. First, **tropical forest ecosystems**, including the Amazon and Congo Basin, are critically important due to their role in regulating climate, rainfall, and globally traded commodities. Their degradation threatens agricultural productivity, disrupts supply chains, and contributes to inflationary pressures and economic instability in import-dependent markets such as the UK and EU. In more fragile regions, forest loss weakens livelihoods and governance, increasing the risk of conflict, illicit economic activity, and displacement.

Second, the degradation and collapse of **marine and coastal ecosystems**, particularly coral reefs, undermines fisheries, tourism, and natural coastal protection, weakening the economic foundations of small island and coastal states. As revenues decline and climate shocks intensify, these economies face rising debt burdens and reduced capacity to recover, increasing the risk of sovereign debt distress and financial instability that can cascade throughout the global economy.

This brief outlines a set of targeted recommendations across forest and marine systems. Taken together, these recommendations underscore a central conclusion: **protecting critical ecosystems is not only an environmental imperative but a cost-effective strategy for safeguarding global economic stability and human and national security**. Failure to act will result in significantly higher long-term costs, while timely investment offers the opportunity to reduce systemic risk and strengthen resilience at scale.



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Introduction

Critical ecosystems underpin the planet's life-support systems and sustain the livelihoods of hundreds of millions of people worldwide. Yet many of these ecosystems are approaching critical tipping points, with some already beginning to fail.² The cost of that collapse – across food and water systems, economic stability, and human security – will far outweigh the costs of immediate preventative action. At the same time, major donors are reducing development assistance with dangerous implications for the climate and biodiversity crises, despite increasing evidence that international climate finance delivers direct security and stability benefits.^{3,4}

Throughout this brief, we adopt a human security lens, one that extends beyond the absence of violent conflict to encompass the full range of risks and insecurities individuals and communities face. In this framing, security is grounded in the social, political, economic, and environmental conditions necessary for “freedom from fear, freedom from want, and freedom to live in dignity.”⁵ Human insecurity compounds to create national security risks with global implications.

Investment in the protection, management, and restoration of natural systems is more cost-effective than the consequences of inaction, particularly for ecosystems that provide globally significant services,

such as tropical forests and coral reefs. These systems can be understood as “too big to fail.”⁶ While most climate and nature finance will come from domestic resource mobilisation, Official Development Assistance (ODA) and international public finance flows play a critical role in enabling developing economies to pursue climate-smart, nature-positive development pathways, particularly in light of donor countries' obligations under multilateral environmental frameworks.^{7,8}

Yet, as ecosystem degradation accelerates, concessional finance is contracting. Climate and nature ODA to Congo Basin countries, for example, fell 27.5% in 2024 compared to 2023 levels.⁹ This decline comes even as a growing body of evidence shows that international nature and climate finance can reduce drivers of instability, strengthen economic resilience, and deliver clear returns through avoided humanitarian and security costs.^{10,11,12} At least half of the global economy is moderately to highly dependent on nature;¹³ in the UK alone, nature degradation could cause a 12% loss to GDP by the 2030s.¹⁴ Nature and climate finance aimed at preventing ecosystem degradation is therefore a critical risk management strategy for global security.¹⁵

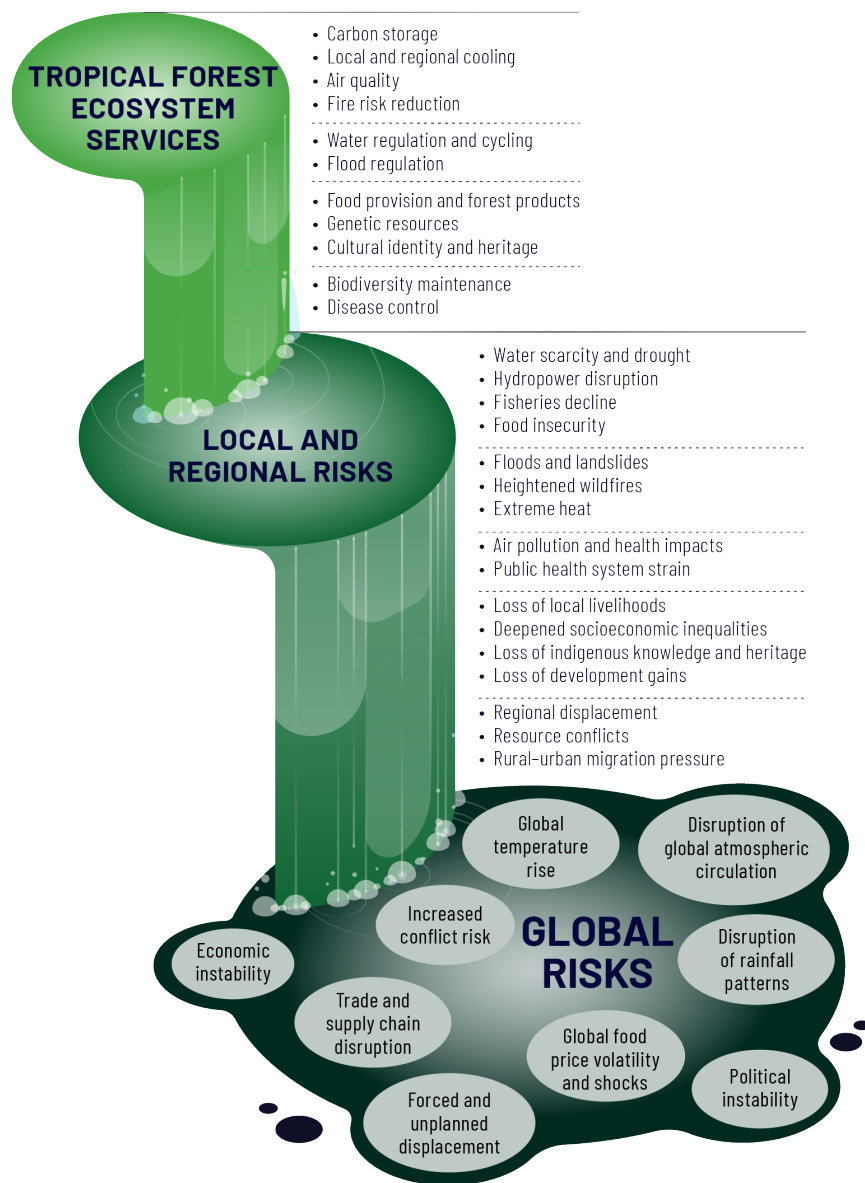


FIGURE 1: CASCADING RISKS OF FOREST ECOSYSTEMS. Degradation of tropical forest ecosystems could lead to local and regional impacts, such as loss of local livelihoods, and ultimately cascade to global risks, like trade and supply chain disruption.

Critical Forest Ecosystems

In its recently published national security assessment on ecosystem collapse, the UK highlighted the Amazon and Congo Basin as two of six ecosystems critical for UK national security.¹⁶ Collectively, these two rainforests store between 240-290 billion tons of carbon,^{17,18} equivalent to roughly 18 years of total global emissions, making them fundamental for mitigating climate change.¹⁹ They also play critical roles in regulating weather patterns and providing ecosystem services upon which local, national, and international economies depend.

The Amazon Basin

The **Amazon Basin**, the world's largest tropical rainforest and most biodiverse terrestrial ecosystem, is essential to global and regional climate stability. It stores vast amounts of carbon, recycles moisture, and generates rainfall across South America, fuelling the region's agricultural production.^{20,21,22} Home to more than 47 million people, including 3 million Indigenous Peoples from 375 ethnic groups, the Amazon is also a megadiverse cultural landscape.

Despite its global importance, the Amazon faces severe deforestation pressures. An estimated 17% of the forest has already been lost, an area roughly the size of France.²³ Mounting evidence indicates that the Amazon is approaching a tipping point, beyond which large areas could irreversibly collapse into a savanna-like ecosystem, with profound consequences for global climate stability, biodiversity, economic systems, and sociocultural heritage.²⁴

The Amazon Shapes Local and Regional Human Security

Rainfall is perhaps the Amazon's most valuable export. The Basin provides an estimated USD \$20 billion annually in ecosystem services to regional agriculture, water and energy systems, and transport. Through evapotranspiration, Amazon forests release 20 billion tonnes of water into the atmosphere each day, sustaining water supply for agricultural areas across the continent.²⁵ Forest degradation and destruction undermine the Amazon's capacity to function as South America's water tower. Amazon collapse would reduce precipitation across South America by an estimated 25-35%, destabilizing food, water, and energy systems at continental scale.

These risks are already materializing. Extreme droughts, forest degradation, and aquatic ecosystem decline are causing severe socioeconomic disruptions. Water shortages are blocking river navigability, with droughts in 2024 reducing cargo in the Amazon by 60%.²⁶ They are also disrupting hydropower generation, threatening fish stocks, increasing food prices, and intensifying wildfires that, in 2024, affected 24 million people, with measurable health impacts.^{27,28,29,30,31} Up to \$1 billion of soy shipped from two major Brazilian ports could be disrupted by climate- and deforestation-driven droughts by 2060.³² These impacts disproportionately affect Indigenous Peoples and local forest communities, accelerating displacement from ancestral lands, and driving migration and poverty in both rural and urban areas.³³

Continued deforestation of the Amazon is no longer economically rational for many countries. Accounting for climate and hydrological externalities reveals that deforestation generates net economic losses of USD \$25,000 - \$90,000 per hectare, based on the social cost of carbon.³⁴ Losses linked to reduced rainfall, hydropower, and agricultural productivity further compound these costs. In the Southern Brazilian Amazon, for example, estimated productivity losses of USD \$186.4 billion by 2050 from soy and beef production far outweigh the estimated USD \$19.5 billion in conservation opportunity costs.³⁵ Put simply, ongoing

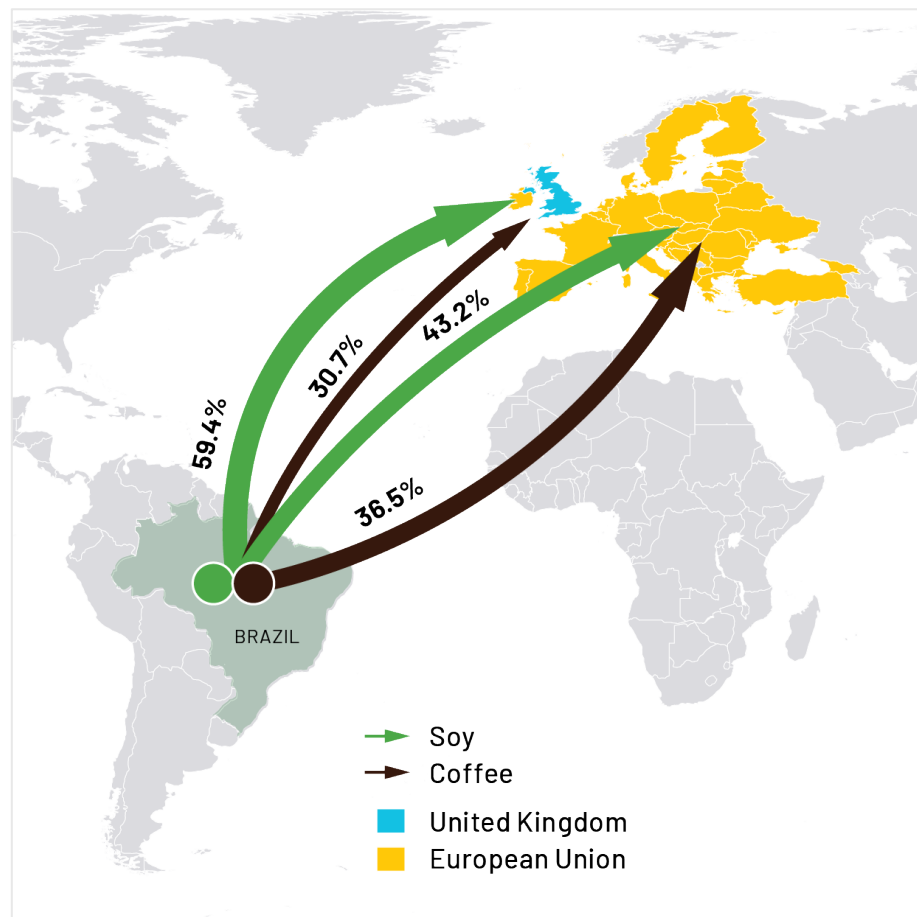


FIGURE 2: BRAZIL IS A LEADING SOURCE OF SOY AND COFFEE IMPORTS FOR THE UK AND EU. This map shows the 2023-2025 average share of total soy and coffee imports, by trade volume, sourced from Brazil for the UK and EU. For example, 59.4% of the UK's total soy imports are sourced from Brazil, while 43.2% of the EU's total soy imports are sourced from Brazil.

Source: UN Comtrade Database. Average annual import volumes (kg), 2023-2025. Reporters: European Union and United Kingdom; trade flow: imports; partners: all countries (Partner 1) and world (Partner 2); commodity codes: 1201 (soybeans, whether or not broken) and 090111 (coffee, not roasted, not decaffeinated) and 090121 (coffee, roasted, not decaffeinated), aggregated as 'coffee.' Accessed June 2026. <https://comtradeplus.un.org/>.

deforestation directly undermines long-term economic growth and resilience for Amazonian countries and communities.

The Global Impacts of Amazon Degradation

The ecosystem services provided by the Amazon are not only irreplaceable for local communities and neighbouring countries; Amazon Basin collapse would have global implications. The rainforest stores 150–200 billion tonnes of carbon.³⁶ As a result, even partial dieback in vulnerable areas could release ~30 billion tonnes of CO₂, equivalent to more than 50% of total global emissions in 2024,³⁷ driving an additional ~0.1°C of global warming and up to 2°C of regional warming.³⁸

The loss of the Amazon's critical ecosystem services, valued at USD \$417 billion per year, would trigger food and climate shocks worldwide. Such shocks are already observable. For example, high deforestation rates have delayed rainfall in key agricultural zones, leading to USD \$760 million of lost soy production between 2006 and 2019, as farmers are no longer able to harvest multiple growing cycles annually.³⁹ With roughly 43% of European and 60% of UK soy imports coming from Brazil alone over the last three years, further Amazon degradation would directly translate into higher food and feed costs in Europe.⁴⁰

Overall, the global economic damages of Amazon dieback are valued from USD \$957 billion to USD \$3.5 trillion,⁴¹ with impacts cascading through food supply chains, commodity markets, and financial systems worldwide. The costs of action to prevent Amazon forest collapse are one to two orders of magnitude lower than the projected economic damages.⁴² While Indigenous Peoples and forest-dependent communities would face the most immediate and severe impacts, the resulting shocks would reverberate globally, acting as a risk multiplier for food insecurity, economic and political instability, and long-term development reversals.⁴³

The Congo Basin

The Congo Basin and its forests form one of the world's most significant carbon sinks, annually sequestering an amount of CO₂ equivalent to roughly three times France's total annual emissions.⁴⁴ The Congo Basin spans six countries in Central Africa and directly supports the livelihoods of approximately 80 million people, providing essential benefits from agriculture, logging, and non-timber forest products.⁴⁵ Its tropical forests also regulate rainfall in Central Africa and across West Africa, supporting critical water sources for an estimated 300 million Africans.⁴⁶ Yet in 2020 alone, the Congo Basin lost more than 8.6 million hectares of forest, a rate of deforestation equivalent to around 23 football fields every minute.⁴⁷ The implications of deforestation and resulting ecosystem collapse in the Congo Basin are dire for local communities and will have cascading impacts globally.

Local and Regional Reliance on the Congo Basin

Deforestation and degradation across the Congo Basin threaten water security for roughly one in five Africans.⁴⁸ The Basin supplies approximately 17% of the moisture across West Africa, influencing weather patterns nearly 3,000 kilometres away in Côte d'Ivoire, and 30–40% of rainfall in the Ethiopian highlands.^{49,50,51,52,53} Within the Basin itself, the livelihoods and food security of millions hinge on rain-fed agriculture, with more than 80% of production reliant on seasonal rainfall.⁵⁴ Shifting precipitation patterns driven by deforestation are deepening food insecurity and economic instability, threatening to halt or reverse development gains in a region where poverty remains widespread.⁵⁵ Water stress, food insecurity, and loss of livelihoods act as risk multipliers, driving migration, political instability, and conflict.^{56,57}

Ecosystem degradation is also a risk multiplier for armed conflict and organised crime. The illicit trade of raw materials, including gold and rare earth minerals, supports paramilitary groups such as M23 in the Democratic Republic of the Congo (DRC), which increasingly finance

operations through resource extraction.⁵⁸ These illicit activities generate millions of dollars for armed groups, while governments capture little to no revenue, reinforcing cycles of fragility and underdevelopment.⁵⁹ As forest-based livelihoods erode, individuals are more likely to engage in illegal forest trade or to seek protection from organised criminal groups. Illegal logging and associated trade from the plundering of the region's valuable forest resources is estimated to cost Africa USD \$17 billion annually.⁶⁰

The Congo Basin's Outsized Global Footprint

The impacts of Congo Basin degradation are not confined to the region. The same hydrological and ecological processes that underpin local food, water, and livelihood security also transmit risk, exposing global commodity supply chains and financial markets to disruption.

The Congo Basin generates over USD \$1 trillion annually in global ecosystem services, most of which stems from its role as the world's most efficient carbon-capturing ecosystem.⁶¹ Beyond carbon storage, ecosystem services include rainfall regulation, water cycling, soil fertility, and pollination, supporting agricultural systems across Africa.

Rainfall regulation is a key transmission channel through which Congo Basin degradation creates global supply-chain risk. Deforestation in the Congo Basin could reduce rainfall by up to 40% locally and 20% along the West African coast,⁶² reducing cacao yields, threatening producer livelihoods, and amplifying price volatility in global markets.

Deforestation-driven production losses are projected to account for up to 40% of total cocoa price in 2050, with cumulative additional costs of USD \$256 billion for EU importers.⁶³

Protecting the Congo Basin is a lower-cost strategy than absorbing the costs of these long-term supply chain shocks. Investments in forest conservation could deliver between USD \$1.80 to USD \$6.00 in avoided cost for every dollar invested.⁶⁴ Beyond agriculture, similar risks extend to

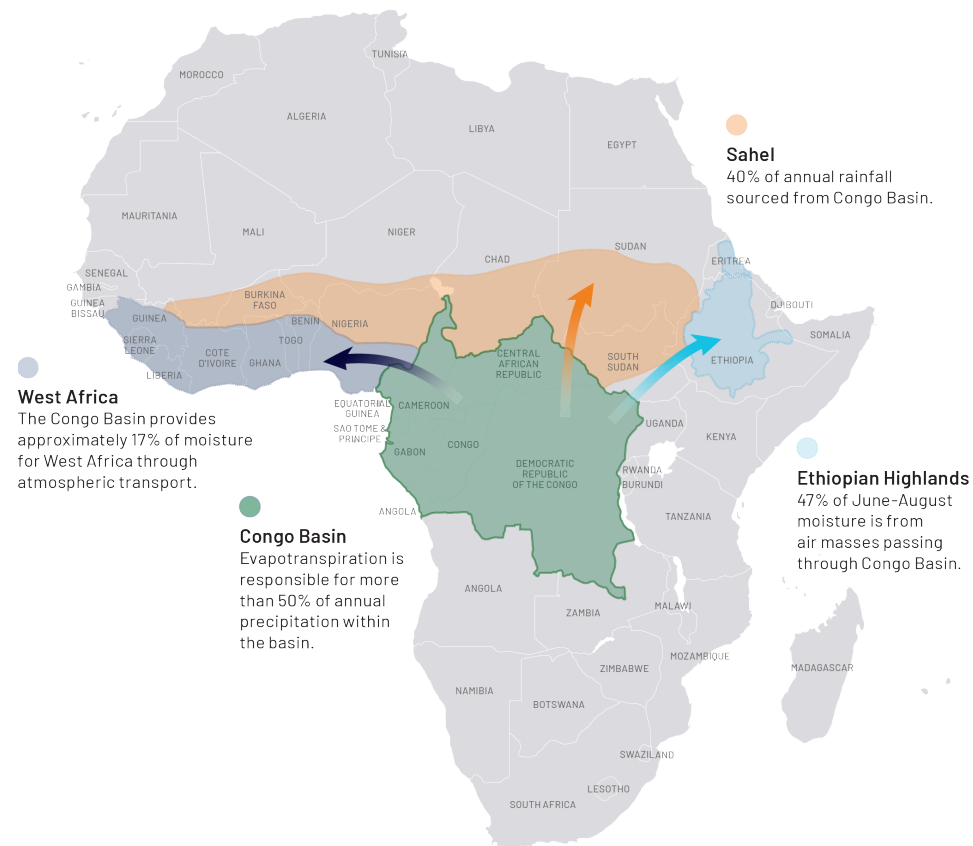


FIGURE 3: THE CONGO BASIN IS A CRITICAL DRIVER OF RAINFALL ACROSS AFRICA. The Congo Basin supports rainfall patterns not only within Central Africa but across the continent, sustaining key sectors such as cocoa production in West Africa and coffee production in Ethiopia's highlands.

Sources: Rondrotiana Barimalala, Erik Wilhelm Kolstad, Douglas John Parker, and D. Aled Williams, *Effects of the Congo Basin Rainforest on Rainfall Patterns*, Report no. 12-2023 (Bergen, Norway: NORCE Climate and Environment, 2023), <https://eprints.whiterose.ac.uk/id/eprint/205301/1/Effects%20of%20the%20Congo%20Basin%20Rainforest%20on%20Rainfall%20Patterns.pdf>; Cuiling Gong and Elfatih Eltahir, "Sources of Moisture for Rainfall in West Africa," *Water Resources Research* 32, no. 10 (October 1996): 3115–21, <https://doi.org/10.1029/96WR01940>; Abubakr A. M. Salih, Qiong Zhang, and Michael Tjernström, "Lagrangian Tracing of Sahelian Sudan Moisture Sources," *Journal of Geophysical Research: Atmospheres* (2015), <https://doi.org/10.1002/2015JD023238>; and Ellen Viste and Asgeir Sorteberg, "Moisture Transport into the Ethiopian Highlands," *International Journal of Climatology* (2013), <https://doi.org/10.1002/joc.3409>.

strategic mineral supply chains on which the EU is heavily dependent. The DRC produces around 70% of the world's cobalt and is a major source of copper and other critical minerals, leaving European industries particularly exposed to environmental degradation, climate impacts, and instability in the region.⁶⁵

Recommendations

For the UK and Europe, the risks posed by forest ecosystem collapse translate into national security risks, as already recognized in recent government assessments from both the UK and the EU.^{66,67} The risks associated with Amazon and Congo Basin degradation are not confined to South America and West Africa, but rather, will propagate through global systems in ways that could directly affect the stability and security of Europe.

Reliance on imported commodities leaves Europe exposed to food price volatility and supply disruptions, which can drive inflationary pressures, constrain fiscal space, and limit governments' ability to respond to strategic priorities, as demonstrated by recent supply chain disruptions in the Middle East. At the same time, the erosion of forest-based livelihoods increases the risk of political and economic instability in affected regions. In the Congo Basin, this can fuel organized crime, illicit resource extraction, and armed group activity. In the Amazon, it may intensify land grabbing, illicit mining, and expansion of organized crime networks, undermining governance and regional stability. These dynamics can in turn heighten conflict, amplify risks, and increase the need for humanitarian and stabilization responses. Ecosystem degradation drives human insecurity which cascades into national security risk.

Preventing large-scale degradation of tropical forest systems therefore serves environmental objectives as well as core security interests. By sustaining livelihoods, stabilizing economies, safeguarding critical supply

chains, and reducing causes of conflict and displacement, investment in forest protection helps preserve the conditions necessary for peaceful, resilient societies and sustainable economic growth.

Reversing these trends will require scaled and sustained investment. While domestic resources and private finance are essential, Official Development Assistance (ODA) and international climate and nature finance play a catalytic role in enabling forest countries to pursue climate-smart, nature-positive development pathways. In this context, international finance should be understood not only as development support but as a strategic investment in global stability and security, addressing the upstream drivers of conflict, displacement, and economic disruption.

The following recommendations can reduce forest degradation and deforestation, helping to preserve these critical ecosystems for those who depend on them—locally and globally—and safeguarding against irreversible tipping points.

1. **Secure land tenure and scale indigenous finance: empowering Indigenous Peoples and forest-dependent communities**

Key Actors: *Donor governments, national and subnational governments, Indigenous Peoples, community-based organizations, multilateral development banks (MDBs)*

Indigenous Peoples steward more than one-third of the world's remaining intact forests, maintaining some of the lowest deforestation rates and highest levels of carbon storage globally.^{68,69} Less than half of their lands, however, are formally recognized.⁷⁰ In the Amazon, for example, Indigenous Territories include over half of the region's carbon stock and contribute more than USD \$5 billion to the global economy annually,⁷¹ while undesignated public forests account for 82% of emissions from deforestation.^{72,73} Despite their proven role in safeguarding climate-

critical ecosystems, Indigenous Peoples and community-based organizations receive less than 1% of international climate finance. Their lack of formal tenure often leaves communities vulnerable to land grabbing, displacement, loss of livelihoods, cultural erosion, and weakened self-determination, reinforcing cycles of vulnerability and exclusion under accelerating climate change. It also leaves globally significant ecosystems vulnerable to further degradation towards irreversible tipping points, with consequences for tackling climate change, sustaining water and commodity supplies for hundreds of millions of people, eradicating poverty, and avoiding displacement and increased resource competition.

Closing the gap in indigenous climate finance and land tenure recognition is both a climate imperative and a matter of justice. European donors and investors should expand support to the Forest Tenure Funders Group and fulfil commitments under the Intergovernmental Land Tenure Pledge to urgently secure Indigenous and community land rights across the Amazon and Congo Basins.⁷⁴ Investing in secure land tenure delivers one of the highest-impact, lowest-cost strategies to reduce deforestation, strengthen climate resilience, and uphold the rights and leadership of the communities most essential to protecting these ecosystems.

2. Deforestation and conversion-free commodities: enhancing agricultural productivity and transitioning towards climate-smart and regenerative agriculture systems

Key Actors: *Financial institutions, private companies, consumer countries, producer country governments and agricultural authorities, commodities traders*

Conversion to agricultural use caused 95% of deforestation in the Amazon over the last 40 years,⁷⁵ and 84% of deforestation in the Congo Basin between 2000–2014.⁷⁶ Meeting food and commodity demand without further degrading these ecosystems necessitates decoupling agricultural production from land conversion and unsustainable land use.

Redirecting finance away from environmentally harmful practices is essential to achieving climate and biodiversity goals. Consumer countries, such as the EU and UK, can accelerate this shift by setting clear market expectations for deforestation and conversion-free (DCF) imports and pairing these signals with financial and technical support.⁷⁷ Additionally, innovative finance for DCF commodities can de-risk investment and crowd in private sector actors whilst incentivizing transition to zero-conversion practices. ODA can play a unique and strategic role in this derisking of private investment, such as in instruments like Catalytic Capital for Agriculture Transition (CCAT) in Brazil. Such mechanisms must work in concert with regulatory mechanisms that redirect financial flows towards more sustainable production models. Enhancing traceability in food and critical mineral supply chains through public and private investment in traceability technologies and Monitoring, Reporting and Verification (MRV) is essential for verifying the sustainability of products.

Once these supply chain and financial signals are in place, regenerative and climate-smart agriculture provides the means to increase production without clearing additional land, ensuring that agricultural production can thrive in conjunction with biodiversity and climate goals. By restoring degraded soils, improving water retention, investing in agroforestry, improved pasture management, and diversified crop-livestock systems, producers can increase yields on existing cropland while improving resilience to droughts, heat, and other climate impacts. These practices reduce pressure on forests, stabilize rural livelihoods, and reinforce the ecological processes—rainfall recycling, soil fertility, pollination—on which long-term agricultural productivity in the Amazon and Congo Basins depends.

Together, strong DCF market expectations driven by consumer countries, corporate action, strategically placed derisking finance, investor-driven transitions, and scaled regenerative agriculture form a coherent pathway

to meet global commodity demand while preventing the degradation and collapse of the world's two most climate-critical forest ecosystems.

3. Expand high-integrity international forest finance: Jurisdictional REDD+ and the Tropical Forest Finance Facility (TFFF)

Key Actors: Donor governments, forest countries, private companies, financial institutions, MDBs and climate funds

Large scale efforts are critical to halting deforestation by 2030, as called for by Parties at COP28.⁷⁸ Jurisdictional REDD+ (JREDD) is a key tool to help reverse the economic incentives of deforestation, supporting communities and governments to conserve, rather than cut, forests. Early JREDD efforts such as the Forest Carbon Partnership Facility (FCPF) benefited from international development assistance and have already supported 13 countries and delivered 94 million tonnes in verified emissions reductions and removals.⁷⁹ International climate finance for JREDD is critical: despite the USD \$1 trillion in value provided by the Congo Basin, local governments received less than 1% of this amount in domestic benefits in 2020. Investing in JREDD can help to reduce this deficit and ensure country governments have the tools and capacity necessary to halt and reverse deforestation.

TFFF is another emerging solution that aims to provide sustained long-term incentives to governments for the value their tropical forests provide, while also ensuring that a significant portion of funding reaches communities on the ground.⁸⁰ TFFF and JREDD are highly complementary, and investments in the two together can ensure both forest conservation and reduced emissions from deforestation are rewarded.

4. Build inclusive forest economies: scaling the socio-bioeconomy

Key Actors: Donor governments, SMEs, international NGOs, subnational governments, local forest communities

The "bioeconomy" recognizes the link between biodiversity and social systems, offering an alternative economic model rooted in traditional knowledge and self-determination, promoting sustainable production chains and job creation.⁸¹ This model, which centers sustainable development,⁸² is more empowering for Indigenous and traditional communities and better for nature. For example, a study in the Brazilian state of Pará found that livestock generated USD \$1.11 billion in 2019, while sustainable production based on biological and social diversity and forest conservation generated USD \$1.12 billion.⁸³ And because this figure excludes ecosystem service values, the true contribution generated by sustainable and equitable production in the socio-biodiversity chain is likely even greater.⁸⁴

For the three million Indigenous Peoples in the Amazon, the forest has always been the source of their livelihoods.⁸⁵ The growing number of Indigenous and community-owned businesses in the bioeconomy are a key lever to reducing deforestation from unsustainable land use: emerging research shows that traditional livelihoods offer a viable economic model for communities while also promoting carbon storage, protecting forests, and empowering Indigenous self-determination. With the right incentives and public policies, bioeconomy products could generate an annual value of up to USD \$43 billion by 2040,⁸⁶ supporting climate and economic resilience. International climate and nature finance, alongside technical assistance, market access, and participation in initiatives such as the Bioeconomy Challenge launched at COP30,⁸⁷ can address key gaps in finance and market development to generate ecosystem services as well as benefits for Indigenous Peoples and traditional communities.

Critical Marine Ecosystems

Critical coastal and marine ecosystems not only form the backbone of local livelihoods in many parts of the world, but they also provide vital food security, coastal protection, stormwater filtration, and climate resilience to coastal regions. These coastal and marine ecosystem services further impact global trade, food security, and economic stability.

Warm-Water Coral Reefs

Warm-water coral reefs are the most biodiverse marine ecosystems in the world, supporting 25% of marine fish species and up to one third of all known marine biodiversity.^{88,89,90} The surface warming tipping point for these ecosystems is estimated at 1.2°C, which has already been surpassed.⁹¹ The climate crisis, compounded by stressors such as ocean acidification, overfishing and destructive fishing practices, pollution, and invasive species, are severely affecting reef functioning and ecosystem services. Reef degradation and collapse pose dire consequences for marine habitats and fish populations, local livelihoods, and coastal resilience, and cascading impacts on global seafood supply chains and political stability.

Coral Reefs as the Cornerstone of Local Livelihoods and Regional Economies

The degradation or collapse of coral reef ecosystems will threaten the economic and food security of, and coastal protection for, the 500 million people dependent on reef systems globally.⁹² When reefs degrade, fish biomass has been seen to decline by between 60 and 80%.⁹³ In the Caribbean, where reef degradation has reached critical levels in some areas, fisheries have experienced a 40% production decline in just the last three decades.⁹⁴ Globally, reduced catch would lead to reduced



FIGURE 4: CASCADING RISKS OF MARINE ECOSYSTEMS. Degradation of coral reef ecosystems could lead to local and regional impacts, such as the collapse of coastal fisheries, and ultimately cascade to global risks, like global fish price volatility and shocks.

income for the estimated 6 million coral reef fishers worldwide and eliminate critical protein for around 1 billion people,^{95,96} most of whom live in less developed countries. Reefs account for 20-25% of the fish caught by developing nations, underscoring their importance for both nutrition and economic stability.⁹⁷

It is estimated that tourism associated with coral reefs generates USD \$36 billion annually.⁹⁸ Degraded reefs result in an estimated 80% decline in coral reef tourism, threatening tourism-dependent local businesses and the over 1 million reef-based tourism jobs worldwide. A decline in reef-based tourism therefore impacts the many coastal economies that depend on tourists.

Reefs are also critical for protection of coastal communities and infrastructure, absorbing up to 97% of wave energy,⁹⁹ an ecosystem service that is becoming increasingly valuable as storms intensify and sea levels rise. Across reef coastlines, reefs reduce annual expected damages from storms by more than USD \$4 billion. Without these reefs, annual damages would more than double and flooding of land would increase by 69%, affecting 81% more people.¹⁰⁰ For example, Indonesia and the Philippines, situated in the Coral Triangle, benefit from annual averted damages of USD \$639 million and USD \$590 million each year thanks to coastal corals.¹⁰¹ These benefits are part of a broader coastal protection system that includes mangroves and other natural infrastructure. As extreme storm events become more frequent due to climate change, this natural infrastructure becomes increasingly important for coastal resilience and human security.

Reef degradation and the subsequent reduction in protection from coastal flooding storm events has material impacts on the vulnerability of coastal communities, property prices, and insurability. The losses from fisheries, tourism, and coastal protection will have profound impacts on food, economic, and physical security.

Global Reliance on Reefs

Coral reefs are critical to the global economy, providing USD \$9.9 trillion annually in ecosystem services, including USD \$109 billion in GDP that benefits 1 billion people worldwide.^{102,103} Reefs' collapse would have impacts throughout the global economy. With reduced subsistence on fish and tourism, local communities will be forced to search for alternative livelihoods. In many small island developing states (SIDS) and coastal communities, such alternatives may not exist, resulting in greater food insecurity and local inflation. Income loss from reduced tourism could result in significant GDP impacts. In the Caribbean, for example, tourism accounts for 25% to up to 90% of GDP across ten countries, illustrating the challenge in developing alternative economic models for coastal communities.¹⁰⁴

Further, nearly all countries that depend on fish for nutrition are in the Global South. More than 10% of the global population (845 million people) could face nutritional deficiencies if fish catch continues to decline.¹⁰⁵ Food and economic insecurity, coupled with reduced coastal protection and sea level rise during a time of worsening storms, could lead to displacement of coastal communities and heightened mobility as people seek viable livelihoods and safety in the context of constrained adaptation options.

Furthermore, increased vulnerability of nations to extreme storm events due to erosion of natural infrastructure like reefs and mangroves risks exposure to greater property destruction and economic disruption, resulting in higher GDP losses. There is growing evidence of the correlation between nature and climate shocks, debt sustainability, and sovereign credit ratings.¹⁰⁶ These dependencies create a vicious cycle where decreasing sovereign creditworthiness reduces capacity for investment in mitigation and adaptation, increasing future vulnerability.¹⁰⁷ This is nowhere more obvious than in SIDS and low-income coastal states, vulnerable to increasing extreme weather events and rising sea levels. In the case of Belize, the 2021 Blue Bond and

resulting commitments to protecting 30% of its marine area are estimated to reduce economic stress following hurricane events by producing avoided losses equivalent to 1.5% of GDP while lowering borrowing costs by 10 basis points.¹⁰⁸ Where natural infrastructure such as coral reefs and mangroves is continually degraded, increased debt-to-GDP ratios alongside lower capacity to meet debt repayments due to economic disruption from extreme weather events could result in higher borrowing costs and fiscal instability. The loss of coral reefs therefore would have critical implications for global food systems, trade, and economic and geopolitical stability.

Marine Ecosystems Beyond Reefs

Beyond reef ecosystems, degradation of critical marine ecosystems, such as the Humboldt Current, present additional cascading risks for human and national security. These ecosystems are critical for food supply chains and climate regulation. The Humboldt Current, which stretches along the coast of South America, provides up to 15% of the world's fish catch and is responsible for 50% of the world's fishmeal production, used as animal feed for aquaculture, poultry farming, and livestock. Estimates suggest that the direct total economic value of the goods and services provided by the Humboldt current reach USD \$19.5 billion each year.¹⁰⁹ Pressures on marine areas such as the Humboldt include rising sea temperatures, plastic pollution, and illegal fishing and overfishing. Continued unsustainable use and increasing climatic instability could undermine the productive nature of the Humboldt and the economic value and food security it generates for both the countries on the west coast of South America and the global economy.

Recommendations

In Southeast Asia and the Pacific, where tens of millions are projected to face internal climate displacement by 2050,¹¹⁰ reef loss compounds high exposure to sea-level rise and extreme weather, accelerating the

displacement of coastal communities and placing additional strain on urban centers and neighbouring states. With food systems and economic connections as transmission channels, these impacts would then cascade through the global economy.

At the same time, the erosion of reef-dependent fisheries and tourism revenues weakens the economic foundations of many small island and coastal economies, contributing to rising debt burdens, declining creditworthiness, and reduced capacity to recover from climate shocks. As fiscal space contracts, governments face increasing difficulty servicing external debt and financing post-shock recovery, raising the risk of sovereign debt distress and disorderly default. These pressures can spill over into global financial systems, increasing capital market volatility and placing additional strain on international financial institutions and creditor governments. In highly exposed regions such as Southeast Asia and the Pacific, fiscal stress and resulting political instability can also reshape patterns of external financing and strategic alignment, creating greater scope for inter-state competition.

At 2°C of global warming, the IPCC projects that 99% of coral reefs will be lost, compared to a decline of 70-90% at 1.5°C.¹¹¹ Rapid and immediate greenhouse gas reductions and removals are therefore crucial to preserving remaining reefs.

In this context, the degradation of marine ecosystems represents a systemic risk to coastal states and a source of cascading pressure on global economic and political stability, making marine and coastal governance a macro-critical economic and security issue. It is therefore critical to integrate marine and coastal policy into global climate governance, developing adaptation plans for the decline of coral reefs and its implications for food security, trade, and geopolitical stability. In this context, international public finance should be understood as a cost-effective intervention to stabilize vulnerable regions and reduce the likelihood of cascading security risks.

1. Scale and strengthen Marine Protected Areas: conservation under the High Seas Treaty

Key Actors: *National governments, regional fisheries management organizations, multilateral bodies, donor governments, DFIs, Indigenous Peoples, local communities, conservation NGOs*

Marine protected areas (MPAs) are a crucial tool to conserve coral reefs and other biodiversity-rich ocean regions. Establishing well-designed, equitable, and sustainably managed and enforced coastal MPAs can protect coral reefs from harmful activities such as trawling and pollution, safeguard biodiversity, and restore fish stocks, preserving critical ecosystem services that underpin fisheries, tourism, and coastal resilience. Rather than resulting in opportunity costs, well-managed MPAs can produce spillover benefits, with increases in fish stocks in adjacent areas.¹¹² Furthermore, MPAs support climate adaptation. Though the average individual biomass of fisheries is expected to decrease 5-15% per degree Celsius of atmospheric warming, MPAs are projected to offset the worst impacts on biomass under 2.6-2.9°C of warming, safeguarding livelihoods and food security for future generations.¹¹³

With the adoption of the High Seas Treaty (BBNJ), countries now have a new instrument to promote the conservation and sustainable use of marine biodiversity in the High Seas to protect vital biodiversity hotspots and their ecosystem services. Key ecosystems for MPA site designation under BBNJ include the Salas y Gomez and Nazca Ridge, Walvis Ridge, and Micronesia. Working with partners through technical assistance and targeted funding, European countries have an opportunity to support the success of BBNJ and the benefits of its implementation to safeguarding the critical ecosystem services provided by the ocean.

The establishment, management and enforcement of coastal and high seas MPAs therefore can deliver tangible security returns. MPAs protecting coral reefs and mangroves absorb wave energy and reduce

storm damage, sustaining reef-dependent livelihoods for millions of fishers and people in the tourism industry, reducing economic shocks from extreme weather, and thereby supporting economic and climatic resilience. It is crucial MPAs include Indigenous Peoples and local communities to ensure that protection is durable and delivers preferred benefits for coastal communities. When implemented at scale and integrated into a comprehensive marine spatial plan, well-managed MPAs can strengthen resilience by preventing degradation of the ecosystems that millions of livelihoods depend on while contributing trillions to the global economy annually. International climate and nature finance can be targeted to support emerging economies and least developed countries establish and manage MPAs effectively, acting as strategic investments into the long-term health of the ocean, and therefore in the critical security and resilience benefits of functioning coastal and marine ecosystems.

2. Eliminate Overfishing and Illegal, Unreported, and Unregulated (IUU) fishing: supply and demand-side controls

Key Actors: *National fisheries authorities, regional fisheries management organizations, coast guards and enforcement agencies, consumer countries (e.g. UK, EU), donor governments, private sector seafood companies and retailers, small-scale fishing communities*

Overfishing remains one of the most immediate drivers of marine ecosystem decline, directly threatening food security and economic stability. Addressing it requires action on the supply side, by setting science-based catch limits, improved fisheries management, and enforcement, and the demand side, by reducing market access for illegally or unsustainably caught fish. Together, these measures help stabilize fish stocks, support local livelihoods, and reduce the risk of sudden supply collapses that reverberate through global seafood markets.

Traceability systems, including at-sea electronic monitoring, are one of the most effective means of collecting accurate and verifiable data to set the right catch limits to prevent overfishing, monitoring compliance to prevent illegal fishing, and providing information on bycatch of sensitive species to prevent broader ecosystem impact. Building system operability across jurisdictions is key and supports cross-border and high seas cooperation and management of this transboundary resource. For small-scale fisheries that often lack data on the health of the fishery, the number and type of fishers, and broader ecosystem characteristics results in a lack of management. Tools such as FishPath have been created to support fisheries authorities to get small-scale fisheries on a path to sustainability.

Consumer countries should play a decisive role by enforcing import controls, traceability standards, and transparency requirements that prevent IUU fishing from entering global supply chains. However, these tools are only effective when source data is accurate and verifiable, as can be achieved through electronic monitoring systems. When combined with capacity building and funding for coastal and developing states, these measures strengthen producer country compliance rather than penalizing them, while also supporting the fight against illegal activities at sea. International climate and nature finance can support countries in establishing the systems and measures to tackle overfishing and IUU activities, a strategic preventative strategy for global security. Sustaining fisheries reduces the risk of economic displacement, food shortages, and fiscal stress in countries already facing climate-related shocks.

3. Insuring ecosystems to reduce climate risk: reef insurance and parametric instruments

Key Actors: *National and subnational governments, insurance and reinsurance companies, multilateral development banks, donor governments, financial institutions and investors, conservation NGOs, local coastal communities*

Insuring natural infrastructure offers a powerful tool for managing climate risk and strengthening coastal resilience. Healthy coral reefs play a crucial role in coastal protection, dissipating up to 97% of wave energy before it reaches shore. Yet repairing reefs after extreme weather events is costly, and delayed recovery can permanently erode their protective function. Parametric insurance offers pre-agreed payouts based on the occurrence of set parameters—such as wind speed exceeding a specified velocity in a defined location—rather than compensation for actual loss. This enables faster and predictable payouts for post-event response, minimizing delay in community and ecosystem recovery.

Early applications demonstrate the relevance of this approach for security and economic stability. In Quintana Roo, Mexico, parametric reef insurance payouts following major hurricanes enabled the rapid deployment of trained response teams to repair damaged reefs, supporting faster ecosystem recovery and helping preserve coastal protection and tourism dependent revenues.¹¹⁴ By providing immediate, predictable financing after extreme storms, reef insurance reduces reliance on emergency aid and ad-hoc budget reallocations.

Donor governments can scale the impact of parametric insurance by focusing support on the regulatory and market conditions that enable uptake. This includes helping partner countries establish legal authority for public entities to purchase parametric products, and strengthening supervisory capacity to assess triggers, ensure consumer protection, and oversee international providers. Targeted technical assistance can build expertise on product design, while investment in data infrastructure can reduce basis risk and improve pricing. UK and EU policymakers can also leverage their advanced insurance sectors to promote innovation, support regional risk pools, and facilitate partnerships between public institutions and private insurers. Aligning these efforts can strengthen fiscal resilience, reduce reliance on post-disaster aid, and integrate climate risk into financial stability frameworks.

4. Scale restorative Aquaculture: Sustainable Development and Food Production

Key Actors: *National governments, aquaculture producers and SMEs, private sector investors, international organizations, research institutions, NGOs, local coastal communities*

A growing body of research demonstrates that aquaculture can help restore ocean health, as well as support economic development and food production in coastal communities worldwide – if the right practices are deployed in the right places.¹¹⁵ Poorly sited aquaculture farms can significantly affect natural habitats and affect marine ecosystems critical for climate mitigation and adaptation. Donor governments can play a role in developing and supporting implementation of best practice in scaling restorative aquaculture, expanding technical capacity for siting and species selection, as well as transfer of farming technology that maximizes environmental benefits.

Restorative aquaculture should be economically viable and feasible to implement. It should seek to return social and economic benefits to communities, including opportunities for livelihoods. Market-based mechanisms that foster socioeconomic outcomes from restorative aquaculture practices, such as payment for ecosystem services, could be an important means to support widespread implementation of restorative practice and outcomes. International climate and nature finance can support countries set up enabling conditions for regenerative aquaculture, through strategically targeted funding as well as technical assistance and capacity building. And while the majority of products may have short supply chains, they can help foster regenerative aquaculture economies by supporting market access.

Conclusion

The degradation of critical ecosystems is no longer a peripheral environmental concern, but a driver of global economic and national security risk. From tropical forests that regulate rainfall and sustain global commodity markets to marine ecosystems that underpin coastal economies and protect vulnerable coastal communities, natural systems are fundamental to the stability of interconnected human and economic systems. As tipping points approach, the costs of inaction will far exceed the costs of preventative intervention.

In this context, international climate and nature finance is a strategic investment in global stability and resilience. Addressing the upstream drivers of fragility by supporting sustainable livelihoods, stabilizing economies, and protecting critical ecosystem services offers a clear return in avoided economic disruption, reduced humanitarian need, and strengthened geopolitical stability. For the UK and Europe, safeguarding these ecosystems is not only a matter of environmental stewardship, but a core component of long-term national security and economic resilience.

ENDNOTES

- 1 Matthew Pearce, "UK, German and French Aid Cuts Will Take 'Devastating Toll' on Most Vulnerable, Says Study," *The Guardian*, May 23, 2026, <https://www.theguardian.com/global-development/2026/may/23/uk-german-and-french-aid-cuts-will-take-devastating-toll-on-most-vulnerable-says-study>.
- 2 Lenton et al., *The Global Tipping Points Report 2025*. (Exeter: University of Exeter, 2025)
- 3 Ibid.
- 4 Natural Capital Finance Alliance et al., *ENCORE Insights: Country Dashboard*, accessed June 3, 2026, <https://countries.encorenature.org/profiles/>.
- 5 United Nations Trust Fund for Human Security, *Human Security Handbook: An Integrated Approach for the Realization of the Sustainable Development Goals* (New York: United Nations, 2016), <https://www.un.org/humansecurity/wp-content/uploads/2017/10/h2.pdf>.
- 6 N. Ranger and E. O'Donnel, *Too big to fail: tropical forests as anchors of economic prosperity and resilience*. (London: London School of Economics, 2025) <https://www.lse.ac.uk/granthaminstitute/news/too-big-to-fail-tropical-forests-as-anchors-of-economic-prosperity-and-resilience/>
- 7 Convention on Biological Diversity (CBD), *Decision 15/4: Kunming-Montreal Global Biodiversity Framework* (Montreal: CBD, 2022), Target 19.
- 8 United Nations Framework Convention on Climate Change (UNFCCC), *Decision 1/CP.21, Article 9*, <https://unfccc.int/process-and-meetings/the-paris-agreement>.
- 9 Source: OECD DAC RioMarkers Database. Figures represent ODA commitments targeting climate and nature objectives (Rio Markers: Biodiversity, Climate Change Mitigation, Climate Change Adaptation; Significant and Principal scores combined) from DAC Members to Congo Basin countries (Cameroon, Central African Republic, Congo, Democratic Republic of the Congo, Gabon). Values in constant 2024 USD millions. OECD Data Explorer, DAC RioMarkers: Aid (ODA) activities targeting global environmental objectives. Last accessed [06/04/2026]
- 10 United Nations Development Programme (UNDP), *Climate Finance for Sustaining Peace: Making Climate Finance Work for Conflict-Affected and Fragile Contexts* (New York: UNDP, 2021), <https://www.undp.org/publications/climate-finance-sustaining-peace-making-climate-finance-work-conflict-affected-and-fragile-contexts>.
- 11 Department for Energy Security and Net Zero (DESNZ), *Climate Transition and Global Financial Stability: Literature Review* (London: UK Government, 2026), <https://assets.publishing.service.gov.uk/media/6964ac2a8d599f4c09e1ff2e/climate-transition-and-global-financial-stability-literature-review.pdf>.
- 12 "Climate Finance May Lower Conflict Risk in 85 Developing Countries, Analysis Suggests," *Phys.org*, April 23, 2026, <https://phys.org/news/2026-04-climate-conflict-countries-analysis.html>.
- 13 Green Finance Institute, *UK Nature-Related Risks: Full Report* (2025), <https://www.greenfinanceinstitute.com/wp-content/uploads/2025/12/GFI-UK-NATURE-RELATED-RISKS-FULL-REPORT.pdf>.
- 14 Environmental Change Institute, University of Oxford, "Nature Degradation Could Cause 12% Loss in UK GDP," <https://www.eci.ox.ac.uk/news/nature-degradation-could-cause-12-loss-uk-gdp>.
- 15 Natural Capital Finance Alliance et al., *ENCORE Insights*.
- 16 Department for Environment, Food & Rural Affairs (Defra), *Global Biodiversity Loss, Ecosystem Collapse and National Security: A National Security Assessment*, 2026 https://assets.publishing.service.gov.uk/media/696e0eae719d837d69afc7de/National_security_assessment_-_global_biodiversity_loss_ecosystem_collapse_and_national_security.pdf.
- 17 Congo Basin figures: World Bank, Publication on Environmental or Economic Impacts (details limited), <https://openknowledge.worldbank.org/entities/publication/7c432652-9ad2-4972-af06-f05428402f8d>
- 18 Amazon Basin figures: World Wide Fund for Nature (WWF UK), "Amazon," <https://www.wwf.org.uk/where-we-work/amazon>.
- 19 Using 2024 annual global emissions at roughly 57.7 gigatons of CO₂. 1 ton of carbon is equivalent to roughly 3.67 tons CO₂, so the two forest basins store a combine 15-18 years' worth of emissions in 2024 terms. United Nations Environment Programme (UNEP), "Emissions Gap Report 2025" (Nairobi: UNEP, 2025), <https://wedocs.unep.org/rest/api/core/bitstreams/4830e1a8-14c0-44a5-a066-cdd2ba5b3e10/content>.
- 20 Thomas E. Lovejoy and Carlos Nobre, "Amazon Tipping Point," *Science Advances* 4, no. 2 (2018): eaat2340, <https://doi.org/10.1126/sciadv.aat2340>; Bernardo M. Flores et al., "Critical Transitions in the Amazon Forest System," *Nature* 626, no. 7999 (2024): 555-564, <https://doi.org/10.1038/s41586-023-06970-0>.
- 21 Bernardo M. Flores et al., "Critical Transitions in the Amazon Forest System," *Nature* 626, no. 7999 (2024): 555-564, <https://doi.org/10.1038/s41586-023-06970-0>;
- 22 Gustavo R. S. Pinto and João Pedro Arbache, *When the River Runs Dry: How Amazon Deforestation Threatens the Brazilian Economy* (San Francisco: Climate Policy Initiative, October 10, 2025), <https://www.climatepolicyinitiative.org/publication/when-the-river-runs-dry-how-amazon-deforestation-threatens-the-brazilian-economy/>.
- 23 InfoAmazonia, "Deforestation in the Amazon: Past, Present and Future," March 21, 2023, <https://infoamazonia.org/en/2023/03/21/deforestation-in-the-amazon-past-present-and-future/>.
- 24 Flores, B.M., Montoya, E., Sakschewski, B. et al. Critical transitions in the Amazon forest system. *Nature* 626, 555-564 (2024). <https://doi.org/10.1038/s41586-023-06970-0>.
- 25 World Wide Fund for Nature (WWF UK), "Amazon," <https://www.wwf.org.uk/where-we-work/amazon>.

-
- 26 Zero Carbon Analytics (2026) *Almost USD1 billion in Europe-bound Brazilian soy exposed to river port disruption annually by mid-century*. <https://zerocarbon-analytics.org/nature/almost-usd-1-billion-in-europe-bound-brazilian-soy-exposed-to-river-port-disruption-annually-by-mid-century/>.
- 27 José A. Marengo et al., "Long-term Variability, Extremes and Changes in Temperature and Hydrometeorology in the Amazon Region: A Review," *Acta Amazonica* 54 (2024): e54es22098, <https://doi.org/10.1590/1809-4392202200980>.
- 28 Corrie Monteverde et al., "Changing Climates, Changing Lives: Voices of a Brazilian Amazon Farming Community in a Time of Climate Crisis," *PLOS Climate* 3, no. 11 (2024): e0000522, <https://doi.org/10.1371/journal.pclm.0000522>.
- 29 Karin Begazo-Curie and Liesbet Vranken, "Forests' Contribution to Rural Livelihoods and Food Security," *Food Security* (2025), <https://doi.org/10.1007/s12571-025-01521-z>.
- 30 Timothy M. Lenton et al., *Global Tipping Points Report 2025* (Exeter: Global Systems Institute, University of Exeter and Earth Commission, 2025), <https://global-tipping-points.org/>.
- 31 Alipio Ferreira, "Amazon deforestation: Drivers, damages, and policies," *Land Use Policy* 160 (January 2026), <https://doi.org/10.1016/j.landusepol.2025.107810>.
- 32 Zero Carbon Analytics (2026) *Almost USD1 billion in Europe-bound Brazilian soy exposed to river port disruption annually by mid-century*. <https://zerocarbon-analytics.org/nature/almost-usd-1-billion-in-europe-bound-brazilian-soy-exposed-to-river-port-disruption-annually-by-mid-century/>.
- 33 Eduardo S. Brondizio et al., "Social and Health Dimensions of Climate Change in the Amazon," *Annals of Human Biology* 43, no. 4 (July 2016): 405-14, <https://doi.org/10.1080/03014460.2016.1193222>.
- 34 Alipio Ferreira, "Amazon deforestation
- 35 Note figures are in 2021 net present values; Bernardo B. N. Strassburg et al., "Global Priority Areas for Ecosystem Restoration," *Nature Communications* 12 (2021), <https://doi.org/10.1038/s41467-021-22840-7>.
- 36 Yadvinder Malhi et al., "Chapter 6: Biogeochemical Cycles of the Amazon," in *Amazon Assessment Report 2021*, ed. Carlos Nobre et al. (New York: United Nations Sustainable Development Solutions Network, 2021), <https://doi.org/10.55161/TAKR3454>.
- 37 European Commission Joint Research Centre, *EDGAR Emissions Database for Global Atmospheric Research: 2025 Report* (2025), https://edgar.jrc.ec.europa.eu/report_2025.
- 38 David I. Armstrong McKay et al., "Exceeding 1.5°C Global Warming Could Trigger Multiple Climate Tipping Points," *Science* 377, no. 6611 (2022): eabn7950, <https://doi.org/10.1126/science.abn7950>.
- 39 Rainforest Foundation Norway, "Rainforest Payback: How Deforestation Fails Farmers in the Amazon," <https://www.regnskog.no/en/news/rainforest-payback-how-deforestation-fails-farmers-in-the-amazon>.
- 40 Source: UN Comtrade Database. Commodity code used: Soybeans - 1201 (Soybeans, whether or not broken). Quantities are reported in kilograms. EU27 import share calculated using the World aggregate row (W00) as denominator; UK import share derived by summing individual partner country rows due to incomplete W00 data. Brazil's share represents the average across 2023-2025. Data available from [UN Comtrade](https://comtrade.un.org/). Reporters and partners selection guide can be accessed [here](https://comtrade.un.org/). Last accessed [06/4/2026]
- 41 David Lapola, "Liming the High Impacts of Amazon Forest Dieback..."
- 42 Ibid.
- 43 Timothy Lenton, "Global Tipping Points Report 2025."
- 44 Wannes Hubau et al., "Asynchronous Carbon Sink Saturation in African and Amazonian Tropical Forests," *Nature* 579 (2020): 80-87, <https://doi.org/10.1038/s41586-020-2035-0>.
- 45 Congo Basin Science Initiative, "Facts," <https://congobasinscience.net/resources/facts/>.
- 46 Solomon Gebreyohannis Gebrehiwot et al., "The Nile Basin Waters and the West African Rainforest: Rethinking the Boundaries," *WIREs Water* 6, no. 1 (2018): e1317, <https://doi.org/10.1002/wat2.1317>.
- 47 Minette Nago et al., *A Fair Deal for Congo Basin Countries and the Protection of the Rainforest* (London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science, November 2025), <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2025/11/Fair-deal-for-the-Congo-Basin-countries-and-the-protection-of-the-rainforest.pdf>.
- 48 The African population as of 2025 is 1.5 billion. The Congo Basin provides water to 300 million Africans. Worldometer, "Africa Population," <https://www.worldometers.info/world-population/africa-population/>.
- 49 Rondrotiana Barimalala, Erik Wilhelm Kolstad, Douglas John Parker, and D. Aled Williams, *Effects of the Congo Basin Rainforest on Rainfall Patterns*, Report in External Series 12-2023 (Bergen, Norway: NORCE Climate and Environment, 2023), <https://eprints.whiterose.ac.uk/id/eprint/205301/1/Effects%20of%20the%20Congo%20Basin%20Rainforest%20on%20Rainfall%20Patterns.pdf>.
- 50 Alliance Sahel, "Priority: Food Security," accessed April 14, 2026, <https://www.alliance-sahel.org/en/news/agriculture-rural-development-and-food-security/priority-food-security/>.
- 51 Program on Forests (PROFOR), "Understanding Forest-Water Interactions in the Congo Basin," <https://www.profor.info/knowledge/understanding-forest-water-interactions-congo-basin.29>.
- 52 Rondrotiana Barimalala, Erik W. Kolstad, Douglas J. Parker, and D. Aled Williams, *Effects of the Congo Basin Rainforest on Rainfall Patterns*, Report 12-2023 (Bergen: NORCE Climate and Environment, 2023).
- 53 Abubakr A. M. Salih, Qiong Zhang, and Michael Tjernström, "Lagrangian Tracing of Sahelian Sudan Moisture Sources," *Journal of Geophysical Research: Atmospheres* 120, no. 14 (2015): 6793-6808, <https://doi.org/10.1002/2015JD023238>.

-
- 54 Michael K. Nyasulu et al., "African Rainforest Moisture Contribution to Continental Agricultural Water Consumption," *Agricultural and Forest Meteorology* 346(2024): 109867, <https://www.stockholmresilience.org/publications/publications/2024-10-18-african-rainforest-moisture-contribution-to-continental-agricultural-water-consumption.html>.
- 55 Carlo Holleman et al., *The Impact of Climate Variability and Extremes on Agriculture and Food Security: An Analysis of the Evidence and Case Studies* (Rome: Food and Agriculture Organization of the United Nations, 2019), <https://openknowledge.fao.org/handle/20.500.14283/cb2415en>.
- 56 Defra, *National Security Assessment: Global Biodiversity Loss*.
- 57 The Oakland Institute, *Shafted: The Scramble for Critical Minerals in the Democratic Republic of the Congo* (2025), <https://www.oaklandinstitute.org/sites/default/files/2025-10/shafted-scramble-for-critical-minerals-drc.pdf>.
- 58 Africa Center for Strategic Studies, "A Regional Security Imperative: Protecting the Congo Basin," <https://africacenter.org/publication/asb44en-regional-security-imperative-protect-congo-basin/>.
- 59 Global Witness, *River of Gold: How the State Lost Out in an Eastern Congo Gold Boom, While Armed Groups, a Foreign Mining Company and Provincial Authorities Pocketed Millions*, July 5, 2016, <https://www.globalwitness.org/en/campaigns/conflict-resources/river-of-gold-drc/>.
- 60 Bob Koigi, "The Illegal Chinese Timber Business That Is Devastating African Forest," *Fairplanet*, September 5, 2018, <https://www.fairplanet.org/story/illegal-chinese-timber-business-that-is-devastating-african-forest/>.
- 61 Johan Rockström et al., "We Need Biosphere Stewardship That Protects Carbon Sinks and Builds Resilience," *Proceedings of the National Academy of Sciences* 118, no. 38 (2021): e2115218118, <https://doi.org/10.1073/pnas.2115218118>.
- 62 Rong Fu et al., "Increased Dry-Season Length over Southern Amazonia in Recent Decades and Its Implication for Future Climate Projection," *Journal of Geophysical Research: Atmospheres* 120, no. 3 (2015): 1125-1144, <https://doi.org/10.1002/2014JD022586>.
- 63 Zero Carbon Analytics, "Congo Basin Deforestation Threatens Regional Rainfall and Global Cocoa Supply," <https://zerocarbon-analytics.org/insights/briefings/congo-basin-deforestation-threatens-regional-rainfall-and-global-cocoa-supply/>.
- 64 Ibid.
- 65 Christian Gérard Neema, "Navigating Critical Mineral Supply Chains: The EU's Partnerships with the DRC and Zambia," Africa Policy Research Institute, March 6, 2024, <https://afripoli.org/navigating-critical-mineral-supply-chains-the-eus-partnerships-with-the-drc-and-zambia>. [afripoli.org]; European Environment Agency, *European Climate Risk Assessment*, EEA Report 01/2024, March 10, 2024, <https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment>.
- 66 Department for Environment, Food & Rural Affairs (Defra), *Global Biodiversity Loss, Ecosystem Collapse and National Security: A National Security Assessment*, 2026 https://assets.publishing.service.gov.uk/media/696e0eae719d837d69afc7de/National_security_assessment_-_global_biodiversity_loss_ecosystem_collapse_and_national_security.pdf.
- 67 European Environment Agency (EEA), *European Climate Risk Assessment* (Copenhagen: European Environment Agency, 2024), <https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment>.
- 68 Alain Frechette et al., "A Global Baseline of Carbon Storage in Collective Lands (Rights and Resources Initiative, September 2018), https://rightsandresources.org/wp-content/uploads/2018/09/A-Global-Baseline_RRI_Sept-2018.pdf.
- 69 Julia E. Fa et al., "Importance of Indigenous Peoples' Lands for the Conservation of Intact Forest Landscapes," *Frontiers in Ecology and the Environment* 18, no. 3 (2020): 135-140, <https://doi.org/10.1002/fee.2148>
- 70 World Resources Institute, "How State Action on Land Rights Drives Climate and Forest Goals," <https://www.wri.org/technical-perspectives/state-action-land-rights-drives-climate-and-forest-loss-goals>.
- 71 Juliana Siqueira-Gay, Laura J. Sonter, and Luis Enrique Sánchez, "Exploring Potential Impacts of Mining on Forest Loss and Fragmentation within a Biodiverse Region of Brazil's Northeastern Amazon," *Resources Policy* 67 (2020): 101662.
- 72 Emma L. Bullock et al., "Satellite-Based Estimates Reveal Widespread Forest Degradation in the Amazon," *Global Change Biology* 26, no. 5 (2020): 2956-2969, <https://doi.org/10.1111/gcb.15029>.
- 73 Sophie Kruid et al., "Beyond Deforestation: Carbon Emissions from Land Grabbing and Forest Degradation in the Brazilian Amazon," *Frontiers in Forests and Global Change* 4 (2021), <https://doi.org/10.3389/ffgc.2021.645282>.
- 74 Sonam Lama Hyolmo, "What Was Achieved for Indigenous Peoples at COP30?," *Mongabay*, November 2025, <https://news.mongabay.com/2025/11/what-was-achieved-for-indigenous-peoples-at-cop30/>.
- 75 Alipio Ferreira, "Amazon deforestation: Drivers, damages, and policies."
- 76 Alexandra Tyukavina et al., "Congo Basin Forest Loss Dominated by Increasing Smallholder Clearing," *Science Advances* 4, no. 11 (November 2018): eaat2993, <https://doi.org/10.1126/sciadv.aat2993>.
- 77 Matthew Sielski et al., *The Resilience Dividend: Reframing Deforestation and Conversion-Free Policy as a European Strategic Priority* (April 2026), https://www.conservaiongateway.org/content/dam/tnc/conservation/cg-documents/e/u/Europe_DCF_Brief_Final.pdf.
- 78 United Nations Framework Convention on Climate Change (UNFCCC), *Decision 1/CMA.5*, paragraph 33, <https://unfccc.int/process-and-meetings/the-paris-agreement>.
- 79 World Bank Group, "Forest Carbon Partnership Facility Annual Report 2025," (2025), <https://documents1.worldbank.org/curated/en/099335411042585231/pdf/IDU-9605b341-8a10-4a92-aceb-4695a9adb87d.pdf>.

-
- 80 Tropical Forest Finance Facility, Executive Summary (August 2025), <https://tfff.earth/wp-content/uploads/2025/08/200825-TFFF-Executive-Summary.pdf>.
- 81 The Nature Conservancy, "Sociobioeconomy Rooted in Tradition," <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/sociobioeconomy-rooted-in-tradition/>.
- 82 International Advisory Council on Global Bioeconomy, High-Level Principles on Bioeconomy (2024), https://bioeconomyassociation.org/wp-content/uploads/2024-09-11-high-level-principles_on_bioeconomy-final_version.pdf.
- 83 Allison Voss and Janice Rodrigues Maciel, "Unleashing the Potential of the Amazon's Socio-Bioeconomy," World Economic Forum, December 2023, <https://www.weforum.org/stories/2023/12/unleashing-the-potential-of-the-amazon-s-socio-bioeconomy/>.
- 84 The Nature Conservancy, Sociobioeconomy Policy Brief for Pará, Brazil, https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_ParaBrazil_SocioBioeconomy_PolicyBrief.pdf.
- 85 The Nature Conservancy, "Climate Finance Playbook," <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/climate-finance-playbook-guide/>.
- 86 The Nature Conservancy, Sociobioeconomy Policy Brief for Pará, Brazil, https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_ParaBrazil_SocioBioeconomy_PolicyBrief.pdf.
- 87 NatureFinance, "Brazil and Global Partners Launch the Bioeconomy Challenge at COP30, Reinforcing the Bioeconomy as a Driver of a Just Transition," <https://www.naturefinance.net/brazil-and-global-partners-launch-the-bioeconomy-challenge-at-cop30-reinforcing-the-bioeconomy-as-a-driver-of-a-just-transition/>.
- 88 Timothy Lenton et al., "Global Tipping Points Report 2025"
- 89 Laurence Plaisance et al., "The Diversity of Coral Reefs: What Are We Missing?" PLOS ONE 6, no. 10 (2011): e25026, <https://doi.org/10.1371/journal.pone.0025026>
- 90 Dan Laffoley and John M. Baxter, eds., Explaining Ocean Warming: Causes, Scale, Effects and Consequences (Gland, Switzerland: IUCN, 2016), <https://doi.org/10.2305/IUCN.CH.2016.08.en>.
- 91 World Meteorological Organization, "WMO Confirms 2024 as Warmest Year on Record at about 1.55°C above Pre-Industrial Level," <https://wmo.int/news/media-centre/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level>.
- 92 Timothy Lenton et al., "Global Tipping Points Report 2025."
- 93 Samuel Teicher, "The Economic Impact of Coral Reef Loss," Coral Vita, <https://coralvita.co/coral-cafe/economic-impact-of-coral-reef-loss/>.
- 94 Ibid.
- 95 Louise S. L. Teh, Lydia C. L. Teh, and U. Rashid Sumaila, "A Global Estimate of the Number of Coral Reef Fishers," PLOS ONE (June 19, 2013), <https://doi.org/10.1371/journal.pone.0065397>.
- 96 Hanny E. Rivera, Andrea N. Chan, and Victoria Luu, "Coral Reefs Are Critical for Our Food Supply, Tourism, and Ocean Health. We Can Protect Them from Climate Change," Science Policy Review 1, no. 4 (2020), https://sciencepolicyreview.org/downloads/2020/08/Vol1no4_Rivera.pdf.
- 97 Coral Reef Alliance, "Why Care About Reefs? Food," <https://coral.org/en/coral-reefs-101/why-care-about-reefs/food/>.
- 98 Mark Spalding et al., "Mapping the Global Value and Distribution of Coral Reef Tourism," Marine Policy 82 (August 2017): 104–113, <https://www.sciencedirect.com/science/article/pii/S0308597X17300635>.
- 99 Laretta Burke and Mark Spalding, "Shoreline Protection by the World's Coral Reefs: Mapping the Benefits to People, Assets, and Infrastructure," Marine Policy 146 (December 2022): 105311.
- 100 Michael W. Beck et al., "The Global Flood Protection Savings Provided by Coral Reefs," Nature Communications 9 (2018): 2186, <https://doi.org/10.1038/s41467-018-04568-z>.
- 101 Ibid.
- 102 Laretta Burke and Mark Spalding, "Shoreline Protection..."
- 103 Robert Costanza et al., "Changes in the Global Value of Ecosystem Services," Global Environmental Change 26 (2014): 152–158, <https://doi.org/10.1016/j.gloenvcha.2014.04.002>.
- 104 Paul Pearce-Kelly et al., "Considerations for Determining Warm-Water Coral Reef Tipping Points," Earth System Dynamics 16, no. 1 (2025): 275–292, <https://doi.org/10.5194/esd-2023-35>.
- 105 Christopher D. Golden et al., "Fall in Fish Catch Threatens Human Health," Nature 534 (June 16, 2016), https://labs.eemb.ucsb.edu/mccauley/doug/publications/Golden_et_al.2016.pdf.
- 106 Expert Review on Debt, Nature and Climate, *The Interim Report of the Expert Review on Debt, Nature and Climate: Tackling the Vicious Circle* (2024) https://d1legfwifltz5.cloudfront.net/documents/Tackling_the_Vicious_Circle.pdf.
- 107 Arend Kulenkampff et al., Nature as a Shock Absorber: A Financial Materiality Assessment of Forestry-Linked Sovereign Indicators in Ghana (2025), <https://www.naturefinance.net/wp-content/uploads/2025/02/NatureAsAShockAbsorber-4.pdf>.
- 108 Forthcoming TNC Nature Bonds analysis.
- 109 Tomás Mariano Gutiérrez et al., "Current State of Goods, Services and Governance of the Humboldt Current Large Marine Ecosystem in the Context of Climate Change," Environmental Development 22 (2017): 175–190, <https://doi.org/10.1016/j.envdev.2017.02.006>.
- 110 Kanta Kumari Rigaud et al., *Groundswell Part II: Acting on Internal Climate Migration* (Washington, DC: World Bank, 2021), <http://hdl.handle.net/10986/36248>.
- 111 Intergovernmental Panel on Climate Change (IPCC), *Global Warming of 1.5°C: Summary for Policymakers*, in V. Masson-Delmotte et al., eds., *Global Warming of 1.5°C* (Cambridge: Cambridge University Press, 2018), 3–24, <https://doi.org/10.1017/9781009157940.001>.

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- 112 Bede F. R. Davies et al., "Ecosystem Approach to Fisheries Management Works—How Switching from Mobile to Static Fishing Gear Improves Populations of Fished and Non-Fished Species inside a Marine-Protected Area," *Journal of Applied Ecology* 58, no. 11(2021): 2463–2478, <https://doi.org/10.1111/1365-2664.13986>.
- 113 William W. L. Cheung et al., "Projecting Contributions of Marine Protected Areas to Rebuild Fish Stocks under Climate Change," *npj Ocean Sustainability* 3 (2024): 11, <https://doi.org/10.1038/s41546-024-00000-0>.
- 114 The Nature Conservancy, "Insuring Nature to Ensure a Resilient Future," last modified May 26, 2026, <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/insuring-nature-to-ensure-a-resilient-future/>.
- 115 The Nature Conservancy (TNC), *Global Principles of Restorative Aquaculture* (Arlington, VA: The Nature Conservancy, 2021), https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_PrinciplesofRestorativeAquaculture.pdf.

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