BIOFIN
The Biodiversity Finance Initiative

Insurance and Risk Finance Facility

UNDP

SUMMARY OF THE REPORT TO BE RELEASED Q4 2025

How Insurance Can Address Nature-related Risks: A Summary Guide

Acknowledgement

This report has been made possible through the collaboration of three key teams: UNDP Biodiversity Finance Initiative (BIOFIN), UNDP Insurance and Risk Finance Facility (IRFF) and AB Entheos.

Saurabh Sharma and Abbie Trinidad are the main preparers of the report.

From the BIOFIN team, we acknowledge the valuable inputs of Herve Barois, Bijendra Basnyat, Eva Bortolotti, Onno van den Heuvel, Ana Lucía Orozco Rubio, Pierre Lanfranco, Rinchen Tshering, Gaurav Gupta, Ronja Fischer and Aurora Audino.

From the IRFF team, we thank Rosamaría Vélez, Diana Gonzalez Moya, Marcelo Borré, Ceandra Faria, Miguel Solana, Tuga Alaskary and Justine Doody for their technical guidance and support throughout the development of this report.

The initial research was conducted by the AB Entheos team, including Barbara Chesire, Anne Kamau and Betty Chebet, whose contributions laid the foundation for this work.

Their collective expertise and collaboration have been instrumental in shaping this synthesis and advancing the integration of insurance into biodiversity finance.

We wish to acknowledge Midori Paxton, as it was her vision for BIOFIN to explore insurance as a finance solution, thus forging this partnership with IRFF. Finally, we are grateful to Lucretia Landmann, representing Switzerland in the BIOFIN Steering Committee, for her overall support for this work.

Suggested citation: UNDP BIOFIN, UNDP IRFF and AB Entheos (2024). *How Insurance Can Address Nature-Related Risks: A Summary Guide*. New York: United Nations Development Programme.

Disclaimer

Table of contents

List of figures and tables

Introduction

Biological diversity is "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".[1] It underpins the health of ecosystems and supports essential processes critical to human life and economic activity. But despite this significance, biodiversity is under unprecedented threat. Habitat loss, climate change, pollution, invasive species and overexploitation are putting ecosystems and species at risk.

Limited financing, misaligned expenditures and a general lack of awareness about financial tools hold back effective action to address the drivers of biodiversity loss and increase investments in biodiversity-positive actions. At the global level, the biodiversity finance gap is estimated at US$700 billion per year.[2] Bridging this gap requires a diversified approach: alongside developing new revenue sources, existing financial flows need to be realigned and future environmental costs must be avoided.[3]

Insurance, as a financial tool, can play a crucial role in biodiversity conservation by providing financial protection against risks to natural assets, incentivizing sustainable practices and securing key investments. This synthesis report provides an overview of how insurance can contribute to biodiversity protection, highlighting key concepts, case studies and recommendations for designing effective insurance solutions.

This summary guide is written to assist countries in preparing their National Biodiversity Finance Plans, especially during the stage in which finance solutions are selected, screened and designed.[4] It is also intended to be used by other stakeholders such as conservation agencies, community-based organizations, research institutions, non-governmental organizations (NGOs), private sector investors and development partners involved in developing biodiversity conservation and restoration plans. It makes the case for insurance as a potential finance solution that can address risks associated with loss of ecosystems, species and genetic biodiversity.

Abbreviations and acronyms

BIOFIN . . . . . Biodiversity Finance Initiative
CITES . . . . . Convention on International Trade in Endangered Species of Wild Fauna and Flora
GDP . . . . . Gross domestic product
GEP . . . . . Gross ecosystem product
GIS . . . . . Geographic information systems
HWC . . . . . Human-wildlife conflict
IPBES . . . . . Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IRFF . . . . . Insurance and Risk Finance Facility
KM-GBF . . . . . Kunming-Montreal Global Biodiversity Framework
LIFE . . . . . Livelihoods Insurance from Elephants
NDVI . . . . . Normalized difference vegetation index
NGO . . . . . Non-governmental organization
ORRAA . . . . . Ocean Risk and Resilience Action Alliance
PPP . . . . . Public-private partnership
TEV . . . . . Total economic value
VVF . . . . . Vatuvara Foundation

1. Loss of our biodiversity

Biodiversity loss has accelerated dramatically in recent decades, posing a grave threat to ecological stability and human well-being. Since 1955, human activities have driven biodiversity loss at a rate unprecedented in human history.[5] Monitored wildlife populations have declined by 73 percent since 1970, with freshwater species experiencing an 85 percent drop.[6]

Agricultural expansion alone contributes to nearly 90 percent of global deforestation, highlighting the urgent need for integrated conservation strategies.[7] Just seven agricultural commodities have accounted for 26 percent of global tree cover lost between 2001 and 2015, replacing 71.9 million hectares of forest.[8] The decline is not confined to individual species: it affects entire ecosystems that provide essential services such as clean air, water filtration, climate regulation and pollination. According to a report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), biodiversity loss is primarily driven by land and sea use change, overexploitation of organisms, climate change, pollution and invasive species, all influenced by broader socioeconomic factors.[9] These interlinked drivers compromise the resilience of ecosystems, reduce their ability to regenerate and ultimately impact the economic and social systems they support. The consequences are systemic and wide-ranging, spanning physical damage, financial instability and food and water insecurity.

Box 1: Human-wildlife conflict in selected countries

Human-wildlife conflict (HWC) is one of the major drivers of biodiversity loss, damaging livelihoods, harming wildlife population and reducing diversity. When animals raid crops, prey on livestock, damage grain storage and cause human injuries and casualties, livelihoods in local communities are negatively affected. This fuels conflict, which threatens the existence of wildlife, especially through retaliatory killing, ambushes and hostile attitudes towards conservation efforts.

HWC in the Kunming-Montreal Global Biodiversity Framework

Agreed at the United Nations Biodiversity Conference in 2022, the Kunming-Montreal Global Biodiversity Framework (KM-GBF) is a global commitment to stop and reverse nature loss. Addressing species extinction and managing HWC corresponds to Target 4 of the KM-GBF.

Kunming–Montreal
GLOBAL BIODIVERSITY FRAMEWORK

Target 4

Halt Species Extinction, Protect Genetic Diversity, and Manage Human-Wildlife Conflicts

Ensure urgent management actions to halt human induced extinction of known threatened species and for the recovery and conservation of species, in particular threatened species, to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild and domesticated species to maintain their adaptive potential, including through in situ and ex situ conservation and sustainable management practices, and effectively manage human-wildlife interactions to minimize human-wildlife conflict for coexistence.

HWC in Argentina

In Argentina, jaguars have lost 95 percent of their original habitat due to agricultural expansion, livestock grazing, infrastructure development and urbanization. Fewer than 250 jaguars remain in the country, mostly in the tropical forests of Misiones, the Yungas and the Chaco region. Nearly half of the jaguar population (93 individuals) is concentrated in Misiones province. Despite legal protections, retaliatory killings by cattle ranchers are still common in response to livestock predation, placing the species at continued risk. Without localized and concrete solutions to these incidents of HWC, jaguars could face extinction in Argentina by 2050.

The jaguar is a keystone species in its ecosystem. It plays a vital role in regulating herbivore populations, which helps prevent overgrazing, soil erosion and the degradation of biodiversity throughout the forest. In 2024, the Argentine government estimated the environmental damage associated with the killing of a single jaguar at $1.8 million.[10]

HWC in Bhutan

In Bhutan, HWC has intensified due to the expansion of protected areas and the increase in fallow lands, threatening the country's efforts towards food self-sufficiency. Reports indicate that in 15 out of 20 districts, more than 50 percent of the population is affected by HWC, with losses accounting for at least 18 percent of total household income. HWC has also affected social relationships, with farmers reporting that they spend more than 100 days per year guarding their crops and livestock.

HWC in Nepal

In Nepal, the most problematic wild animals are three species of large cats, the tiger, the common leopard and the snow leopard, and two megaherbivores, the elephant and the rhinoceros. These species are causing substantial financial losses to rural communities.[11] Despite this, populations of these

animals have been increasing, primarily due to the promotion of community-based conservation measures along with strong enforcement of protective legislation and deployment of armies in protected areas, especially in national parks. The rhino population in Nepal increased from 484 in 1994 to 752 in 2020, while the tiger population has increased from 121 in 2009 to 355 in 2022.

However, as conservation efforts, especially those focused on species protection, continue to succeed, competition for space between humans and wildlife has intensified, exacerbating HWC. Furthermore, habitat fragmentation has taken place, mainly because of road and transmission line construction, and climate change has led to an increase in natural hazards such as forest fires and drought, resulting in habitat degradation. This has worsened HWC. From 2017 to 2022, the average annual incidence of crop raiding and livestock predation was 4,162 and 2,671, respectively, with crop and livestock predation incidents increasing by 20.4 percent and 43.1 percent annually.

1.1 Ecosystem- and species-level threats to biodiversity

Ecosystems and species are inherently valuable regardless of their economic use. Non-use values, such as bequest value (preserving nature for future generations), option value (maintaining the potential for future use) and existence value (valuing biodiversity simply for its existence), can be significant when expressed in monetary terms. Safeguarding biodiversity by addressing threats to these values is therefore essential.

Biodiversity loss manifests across two critical dimensions: the ecosystem level and the species level. These dimensions are interconnected, with disruptions in one often cascading into the other, accelerating degradation and diminishing ecosystem resilience.

- **Ecosystem-level threats:** Among the most vulnerable terrestrial and aquatic ecosystems are forests, coral reefs, wetlands, mangroves and freshwater systems. Forests are threatened by deforestation for agriculture, infrastructure development and logging. Between 1990 and 2020, an estimated 420 million hectares of forest was deforested (converted to other land uses).[12] Coral reefs face multiple stressors including ocean acidification, rising sea temperatures and pollution. Between 2009 and 2018, approximately 14 percent of the world's coral reef cover, around 11,700 square kilometres, was lost.[13] The main driver of this decline was the rise in sea surface temperatures. Wetlands are also particularly vulnerable, facing degradation from urbanization and conversion to agricultural land. Since 1970, an estimated 35 percent of natural wetlands have been lost, at a rate even faster than that of forested areas.[14] Mangrove ecosystems, which sequester carbon and shield coastlines, are being cleared for aquaculture and urban development at alarming rates. These pressures significantly compromise the ecological integrity of these critical ecosystems.

- **Species-level threats:** Many species are being driven to extinction due to habitat loss, poaching, retaliatory killings, climate change and pollution. Between 1970 and 2020, monitored wildlife populations declined by an average of 73 percent.[15] Freshwater species saw the most severe drop at 85 percent, followed by terrestrial populations at 69 percent and marine populations at 56 percent.[16] The leading species-level threats include habitat loss, degradation and overexploitation, primarily driven by global food systems, along with invasive species, disease and climate change. Invasive alien species intensify threats by outcompeting native species for resources and altering habitats. For example, the introduction of the Nile perch in Lake Victoria led to the collapse of native biodiversity, affecting food security and regional economies.[17] Species extinction not only represents a loss of genetic diversity but also erodes cultural identities and traditional knowledge systems linked to nature.

1.2 Risks from biodiversity loss

The loss of biodiversity presents multifaceted and far-reaching risks that impact economic, social and environmental systems on a global scale. These risks are escalating and increasingly interconnected, making them harder to predict, prevent and manage. They emerge as physical, transition and systemic threats that can destabilize industries, governments, communities and ecosystems.[18]

- **Physical risks:** These encompass the direct, tangible impacts of biodiversity loss on natural systems and human well-being. The degradation of ecosystems leads to a reduction in the essential services they provide, such as pollination, soil fertility, carbon sequestration and natural disaster buffering. For example, the loss of mangroves compromises their ability to reduce the impact of

storms and floods – an ecosystem service that is estimated to prevent over $65 billion in property damage each year and protect more than 15 million people.[19] As biodiversity-rich areas are depleted, agricultural productivity also declines, endangering food security and increasing commodity price volatility. It has been estimated that 35 percent of global production volumes from crops are dependent upon animal pollination.[20] Therefore, the collapse of pollinator populations will directly affect crop yields, undermining livelihoods and creating economic instability in regions dependent on agriculture. The loss of wetlands, which act as natural water filtration systems, results in increased water contamination and reduced water quality, posing health risks to communities and creating higher operational costs for businesses. Each hectare of wetland loss is estimated to cost communities an average of $1,840 per year, with the figure rising to as much as $8,000 annually in more developed regions.[21]

- **Transition risks:** These risks arise from societal responses to biodiversity loss, including shifts in policies, markets, technologies and consumer preferences. As awareness of biodiversity-related risks grows, governments are implementing stricter regulations aimed at conservation and sustainable resource management. New legislation, such as protected area expansions, deforestation bans and mandatory biodiversity disclosures for corporations, increases compliance costs and necessitates changes in operational practices. In 2019, the Netherlands introduced stricter regulations to curb nitrogen emissions from intensive livestock farming. As a result, permits for high-emission activities were suspended, leaving some farms unable to operate and triggering financial insolvency for several borrowers.[22] Market trends are also shifting, as investors increasingly scrutinize companies' biodiversity footprints and integrate nature-related risks into their financial assessments. Technological changes aimed at mitigating biodiversity loss, such as regenerative agriculture, could disrupt traditional industries that fail to adapt. Companies with unsustainable practices may face reputational damage and loss of market share as consumers demand more ethically sourced and environmentally responsible products.

- **Systemic risks:** The most profound and potentially catastrophic threats posed by biodiversity loss are systemic in nature, affecting not just localized ecosystems but entire socioeconomic and ecological frameworks. As biodiversity degradation progresses, the resilience of natural systems declines, amplifying the risk of abrupt, large-scale collapses. More than half of global gross domestic product (GDP), equivalent to $41.7 trillion, is dependent on healthy biodiversity and ecosystem services.[23] Yet, one in five countries faces a high risk of ecosystem collapse due to declining biodiversity and the loss of critical natural functions.[24] The degradation of ecosystem services impacts a wide range of sectors, including agriculture, health and energy, by reducing productivity, increasing vulnerability to climate extremes and undermining natural processes.

Furthermore, as natural systems degrade, financial systems become increasingly vulnerable. Insurers face rising claims from natural disasters exacerbated by ecosystem loss, while investors face depreciating assets linked to declining biodiversity. Interconnectedness between ecosystems and economic activities means that the collapse of one system can trigger cascading failures across multiple sectors, leading to widespread instability.

Table 1: Categories of risk caused by biodiversity loss.

RISK CATEGORY	DESCRIPTION	STAKEHOLDERS AFFECTED	EXAMPLES
PHYSICAL	Direct impacts resulting from the degradation of natural ecosystems and the subsequent loss of ecosystem services	Agriculture Fisheries Healthcare Communities	• Pollination decline: Reduction in bee populations leading to crop decreases • Increased climatic losses: Decline of natural barriers like mangroves leading to increased losses from weather events like cyclones
TRANSITION	Risks arising from shifts towards sustainable practices, including policy changes, regulatory measures and evolving market preferences aimed at mitigating biodiversity loss	Businesses Investors Consumers	• Regulatory changes: Implementation of stricter environmental laws affecting operational costs • Market shifts: Consumer demand moving towards sustainably sourced products, impacting businesses that do not adhere to such practices
SYSTEMIC	Broad, interconnected risks that can lead to the collapse of entire ecosystems or economic systems due to cumulative environmental degradation	Global economy Financial institutions Countries	• Financial instability: Increased insurance claims and reduced asset values in biodiversity-dependent sectors • Public health crises: Emergence of new diseases due to ecological imbalances

2. Insurance sector and biodiversity

The escalating loss of biodiversity poses significant risks not only to ecological balance but also to economic stability and human well-being. The insurance industry, with its expertise in risk management and financial protection, is uniquely positioned to contribute to biodiversity conservation.

This chapter explores the multifaceted role that insurance can play in safeguarding biodiversity, detailing mechanisms through which insurers can support conservation efforts, the investment potential within the insurance sector and the reciprocal benefits that biodiversity confers upon the insurance industry.

2.1 Mechanisms for protecting biodiversity through insurance

2.1.1. Insurance's role in managing ecosystem- and species-level threats to biodiversity

Ecosystem- and species-level threats, such as habitat destruction, overexploitation, pollution, invasive species and climate change, directly jeopardize biodiversity. The insurance industry can counteract these threats through insurance products, underwriting policies and enabling investments:

INSURANCE PRODUCTS:

- **Parametric insurance:** Insurers can develop parametric policies that provide immediate payouts to be used for restoration based on predefined environmental triggers, such as specific weather events or ecological indicators. For example, parametric insurance has been used to protect coral reefs in Mexico's Quintana Roo region, providing rapid funds for reef restoration following hurricane damage.
- **Liability insurance:** Insurers can offer coverage for environmental damages, which can encourage companies to adopt preventive measures and adhere to environmental regulations, thereby reducing activities that lead to biodiversity loss.

UNDERWRITING POLICIES:

- **Sustainable underwriting practices:** Incorporating environmental risk assessments into underwriting processes can incentivize clients who implement biodiversity-friendly operations. By offering favourable terms such as premium discounts to these clients, insurers can promote sustainable practices across various industries.

ENABLING INVESTMENTS:

- **Securing investments:** Investments towards ecosystem-based economies can be encouraged by de-risking investments through insurance products.
- **Facilitating biodiversity credits and offsets:** Insurers can support the creation of markets for biodiversity credits, enabling companies to offset their ecological footprint by investing in conservation projects.
- **Investing in conservation projects:** By allocating funds to initiatives aimed at preserving and restoring natural habitats, such as reforestation or wetland restoration, insurers can contribute to the overall health and resilience of ecosystems.

Table 2: Insurance products for threats to ecosystem and species-level risks

ECOSYSTEM– AND SPECIES–LEVEL RISKS TO BIODIVERSITY AND INSURABILITY		
THREAT	INSURABILITY	EXAMPLES OF INSURANCE
Forest and steppe fires caused by naturally occurring events, such as droughts	Yes	**Potential insurance product:** Forestry insurance **Perils covered:** Fire (wildfires, lightning and accidental ignition), windstorms, snow, ice and hail damage, floods, earthquakes and pest infestations and diseases (in certain markets) Example: Swiss Re's forestry insurance has been deployed in multiple countries, including Chile, China, France, South Africa and Sweden.[25] In Chile, for example, insurance coverage for forestry plantations includes protection against fire, hail, frost and wind damage. The policies also include firefighting cost reimbursement, ensuring rapid response to minimize damage.
Forest and steppe fires caused by human-related activities, such as unattended campfires, discarded cigarettes, burning debris, slash and burn farming, etc.	Yes	
Destruction of wetland ecosystems due to droughts	Yes	**Insurance product:** Parametric wetland ecosystem insurance **Perils covered:** Hurricanes and tropical storms, flooding, drought and wildfires Example: China's National Wetland Park Insurance: A parametric insurance solution was implemented to protect the gross ecosystem product (GEP) value of a National Wetland Park in China against risks from typhoons and droughts.[26] This innovative approach ensures that financial resources are available to support the park's ecological functions following such events.
Coral reef destruction due to oil spills, massive pollution, mining accidents	Yes but taken up by potential polluting industries	**Insurance product:** Environment liability insurance **Perils covered:** Covers the financial liability of the insured party as defined by legal frameworks (such as international maritime liability) Example: Incidents involving ships such as MS Caledonian Sky and MV Wakashio have caused damage to reefs in countries such as Indonesia and Mauritius.[27] After the MV Wakashio oil spill in Mauritius, insurance paid compensation to fishers and fishmongers affected by the incident.[28] Liability as determined by various local and international frameworks is being paid by insurers for other such occurrences.
Coral reef destruction due to maritime accidents, including ship grounding		

ECOSYSTEM– AND SPECIES–LEVEL RISKS TO BIODIVERSITY AND INSURABILITY		
THREAT	INSURABILITY	EXAMPLES OF INSURANCE
Coral reef destruction brought about by naturally occurring events such as storms and hurricanes	Yes	I**nsurance product:** Parametric coral reef insurance **Perils covered:** Tropical cyclones and floods. The policy uses a parametric trigger mechanism, meaning payouts are automatically activated based on predefined parameters such as the cyclone's maximum windspeed and its proximity to the reef. Example: Fiji's first coral reef insurance programme uses parametric insurance to provide funds for restoration.[29] The payout amount increases depending on the wind speed and the proximity of the hurricane to the reef. When payouts are made, the policyholder will lead rapid reef response activities (e.g. reattaching broken corals and debris clean-up) and provide community assistance activities to alleviate food and water security concerns caused by storm damage. Fiji's Vatuvara Foundation (VVF) is the policyholder of the insurance.
Mangrove destruction due to typhoons/ hurricanes/cyclones	Yes. Unlike coral reefs, mangroves do not usually require rapid post-storm interventions in order to survive. In this case, an indemnity insurance policy (non-parametric) can also be used.	**Insurance product:** Parametric mangrove ecosystem insurance **Perils covered:** This insurance policy is designed to provide financial protection against damage to mangrove forests resulting from hurricanes. The policy uses a parametric trigger mechanism, meaning payouts are automatically activated based on predefined parameters such as the hurricane's wind intensity and its proximity to the protected mangrove area. Example: The San Crisanto Mangrove Insurance Programme in Mexico provides protection against the effects of hurricanes.[30] Insurance is automatically activated when a hurricane hits the protected area. The community receives up to $100,000 to repair damage caused by the hurricane, depending on wind intensity and proximity to the centre of the protected area.
Human-wildlife conflict, possibly resulting in species extinction	Yes	**Insurance product:** HWC insurance **Perils covered:** This insurance scheme is designed to compensate small-scale farmers for losses resulting from interactions with wildlife, specifically crop damage (the destruction or loss of crops due to wildlife incursions) and livestock predation (the loss of livestock caused by predatory wildlife species). Additionally, coverage is provided for human injury or fatality (incidents where individuals are harmed or killed by wildlife). The product also covers destruction of property because of negative interactions with wildlife. Examples: 1. The Livelihoods Insurance from Elephants (LIFE) project in Kenya and Sri Lanka aims to facilitate private markets to insure small-scale farmers against damages caused primarily by elephants.[31] The project operates in regions where human-wildlife conflict is a serious threat to livelihoods and biodiversity, with active participation from private insurers to address this gap in the market. 2. The Human-Wildlife Conflict Insurance and Compensation scheme launched in Kenya by the Government of Kenya leverages public-private partnerships through its administration and management by private entities in the insurance sector.

2.1.2 Insurance's role in mitigating risks arising from biodiversity loss

The decline in biodiversity introduces physical, transition and systemic risks that can disrupt economies and societies. The insurance sector can mitigate these risks through:

INSURANCE PRODUCTS:

- **Parametric insurance solutions:** Insurers can develop policies that provide immediate financial support based on predefined triggers to businesses and communities following ecological disasters such as floods intensified by deforestation or coral reef loss. These products can help reduce the recovery time and fiscal shock associated with ecosystem-driven disasters.
- **Business interruption insurance:** Coverage can be offered for businesses affected by biodiversity-related disruptions, such as supply chain interruptions due to loss of natural resources, including, for example, fishery collapse or crop failures from pollinator decline.
- **Insurance-backed sovereign response mechanisms:** Insurance schemes can be established to provide rapid liquidity to governments following biodiversity-related disasters, enabling immediate action for controlling zoonotic disease outbreaks, restoring ecosystem services or supporting affected communities, thereby reducing long-term economic impact.
- **Sovereign risk pools:** Regional or global sovereign risk pools can help share the financial risks of biodiversity and climate-related shocks. These pooled instruments increase affordability and access to payouts for member countries, while enabling coordinated investments in ecosystem resilience and nature-based disaster risk reduction..

UNDERWRITING POLICIES:

- **Risk assessment integration:** Insurers can incorporate biodiversity risk assessments into underwriting criteria to identify and manage potential exposures related to biodiversity loss. This proactive approach enables insurers to adjust coverage and pricing accordingly.
- **Client engagement:** Insurers can collaborate with policyholders to develop risk mitigation strategies that address biodiversity-related challenges such as regulatory penalties, reputational damage or raw material scarcity.

ENABLING INVESTMENTS:

- **Green bonds and environmental impact investments:** Capital can be allocated to financial instruments that fund environmental conservation projects, such as reforestation or habitat restoration. These investments support the transition to a sustainable economy while yielding financial returns.
- **Public-private partnerships (PPPs):** Insurers can collaborate with governments and conservation organizations to finance large-scale biodiversity projects, such as the establishment and management of protected areas, ensuring long-term conservation efforts. An example of this approach is the use of habitat banks, which are conservation areas created or restored to generate biodiversity credits that can be sold to developers needing to offset their environmental impacts.
- **Blended finance mechanisms:** Combining public and private funds can reduce investment risks associated with biodiversity projects, attracting more capital into conservation initiatives that might otherwise be deemed too risky.

POTENTIAL NEGATIVE IMPACTS

Alongside the well-recognized positive impacts of insurance on biodiversity, it is important to acknowledge the negative consequences that could arise from the complex interconnections between the insurance sector and biodiversity. Insurance has historically supported activities that harm biodiversity, such as fossil fuel extraction, deforestation and industrial agriculture. Underwriting can create moral hazard by shielding businesses from the consequences of environmental damage, while high premiums or denial of coverage can exclude green technologies and vulnerable communities. In agriculture, evidence shows that crop insurance can drive unsustainable practices, such as increased water-intensive farming, exacerbating resource

depletion.[32] Additionally, insurers' investment portfolios can finance environmentally destructive industries, reinforcing biodiversity loss rather than mitigating it. Insurers need to adapt their strategies to address these biodiversity-negative outcomes.

2.2 Positive impacts of biodiversity on the insurance industry

Insurers should view biodiversity conservation as integral to their core business strategy. Biodiversity offers essential natural defences that help mitigate physical, transition and systemic risks, thereby strengthening the resilience of insurance markets and reducing long-term financial exposure.

PHYSICAL RISK REDUCTION

Healthy ecosystems protect investments against catastrophic risks and promote stability in agricultural production, potentially reducing financial losses and lowering claims numbers:

- **Reducing catastrophic risks:** Natural barriers like mangroves and coral reefs reduce storm surge energy significantly, minimizing flood damage to coastal properties and infrastructure. Their degradation can result in higher claims for property damage, business interruptions and costly disaster recovery.
- **Maintaining agricultural stability:** Biodiversity supports food production by providing essential services like pollination, pest control and soil fertility. Effective ecosystems reduce crop failures, stabilize yields and lower agricultural insurance claims.

TRANSITION RISK MANAGEMENT

Biodiversity enhances insurers' ability to adapt to changing regulatory, market and technological landscapes:

- **Improving risk assessment accuracy:** Stable ecosystems provide more predictable environmental conditions, facilitating precise risk modelling and premium calculations. Biodiverse regions experience fewer disruptions in crop yields, water supply and disaster frequency.
- **Aligning with evolving standards:** Insurers that incorporate biodiversity considerations into their underwriting and investments are better positioned to comply with emerging regulations and market expectations tied to frameworks such as the Kunming-Montreal Global Biodiversity Framework.

SYSTEMIC RISK REDUCTION

Biodiversity supports the stability of broader financial and economic systems, reducing the potential for market-wide disruptions:

- **Strengthening financial resilience:** Ecosystem degradation can cause economic shocks that impact supply chains, public health and financial markets. Preserving biodiversity promotes economic stability, keeping risks insurable and premiums affordable.
- **Preventing long-term environmental degradation:** Loss of ecosystem services, such as water purification, carbon sequestration and disease regulation, can exacerbate risks across insurance sectors. A proactive focus on biodiversity conservation mitigates these systemic threats, ensuring long-term industry sustainability.

Insurers that recognize biodiversity's role in mitigating physical, transition and systemic risks can integrate nature into their risk management strategies. This approach can strengthen financial resilience and support a more sustainable global economy.[33]

Yet, despite biodiversity's critical role in risk mitigation, only 26 percent of insurance supervisors globally have issued or are planning to issue guidance on nature-related risks.(Add ref no.) Closing these gaps by strengthening regulatory frameworks, improving risk data and building industry capacity is essential to fully integrate biodiversity into insurance risk management and unlock its potential to enhance financial resilience.

2.3 Global examples of biodiversity-related insurance

The table below presents global examples of biodiversity insurance implemented to address diverse threats to biodiversity. The BIOFIN Catalogue provides details on nature-related insurance products.[34]

Table 3: Examples of biodiversity-related insurance produc

Type of threat to biodiversity	Country	Implementation organizations	Perils covered	Use of claim payouts	Governance mechanism
Human-wildlife conflict	Kenya	Government of Kenya, Local insurers	Property damage, human death and injury, crop damage	Compensation to affected households	National Wildlife Compensation Programme
	Nepal*	Government of Nepal, Local insurers	Crops and livestock	Compensation for loss of crops and livestock	Agricultural insurance
	Sri Lanka*	Wildlife and Nature Protection Society Department of Wildlife Conservation	Killing of Sri Lankan leopards	Compensation for Livestock	Government-led insurance and non-monetary compensation for livestock losses
	Bhutan*	Ministry of Agriculture	Crops and livestock loss	Compensation for livestock and crops	Government-led agricultural insurance
Coral reef loss[35]	Fiji	Vatuvara Foundation Willis Tower Watson Pacific Catastrophe Risk Insurance Company	Cyclones	Reef response and community assistance activities	Local community-led
	Indonesia*	Ministry of Marine Affairs and Fisheries Swiss Re Ocean Risk and Resilience Action Alliance (ORRAA) Blue Planet Fund		Reef response and community assistance activities	Government-led
Mangrove degradation[36]	Mexico	ClimateSeed San Crisanto-Foundation AXA Climate AXA Mexico	Hurricanes	Mangrove restoration, livelihood support	Community-based
Water ecosystem loss[37]	Colombia*	World Wildlife Fund Local Insurer UNDP	Wildfire	Páramos restoration, public-private investment protection	Water Fund – public-private stakeholders investors governance

*Indicates ongoing pilots by UNDP's BIOFIN and IRFF teams

3. Designing insurance for biodiversity

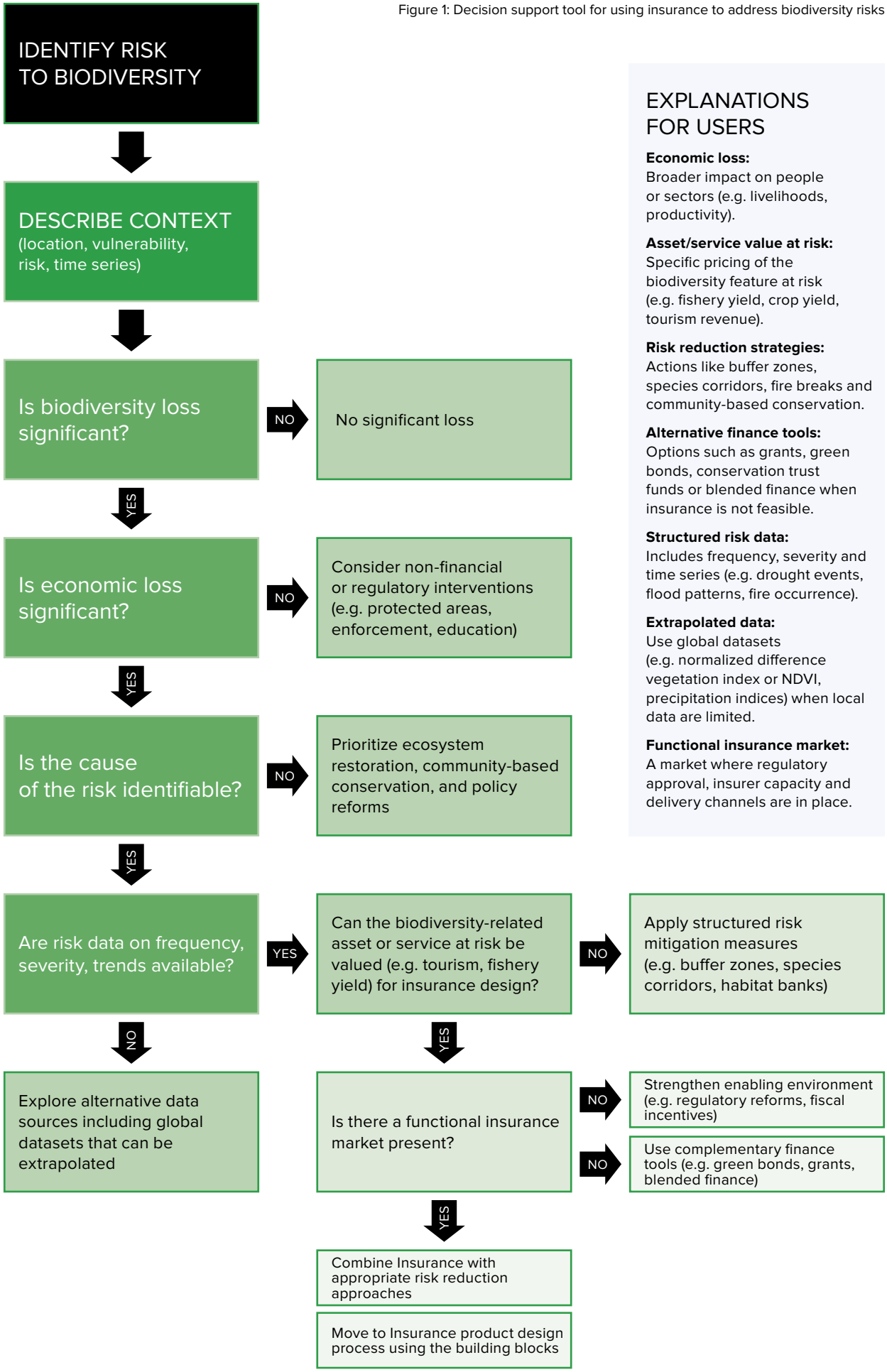
Developing insurance solutions for biodiversity protection requires a structured approach that integrates ecological, financial, legal and social considerations. Effective design involves first identifying whether insurance is the correct financing mechanism and then defining the building blocks essential to the creation of biodiversity-related insurance products.

The framework is informed by practical insights from the development of **biodiversity-linked agricultural insurance in Nepal** and **water fund insurance in Colombia**. In Nepal, BIOFIN is supporting the implementation of the national agricultural insurance scheme by integrating human-wildlife coexistence-related principles. This approach aims to protect the country's valuable wildlife while simultaneously strengthening financial resilience in the agriculture sector. Colombia's water fund insurance, born out of an Insurance Innovation Challenge implemented by UNDP Insurance and Risk Finance Facility, UNDP Colombia, Fasecolda and Banca de las Oportunidades, is an innovative parametric insurance product designed to protect aquatic ecosystems such as páramos and mangroves, which are vital for water regulation, biodiversity and climate resilience.

3.1 Decision support tool: is insurance the correct finance mechanism?

This decision support tool offers a framework for assessing the feasibility of using insurance as a mechanism to address biodiversity risks. It serves as a flexible template that can be adapted to a range of biodiversity contexts, including coastal resilience, human-wildlife coexistence and ecosystem restoration.

Figure 1: Decision support tool for using insurance to address biodiversity risks



EXPLANATIONS FOR USERS

Economic loss:
Broader impact on people or sectors (e.g. livelihoods, productivity).

Asset/service value at risk:
Specific pricing of the biodiversity feature at risk (e.g. fishery yield, crop yield, tourism revenue).

Risk reduction strategies:
Actions like buffer zones, species corridors, fire breaks and community-based conservation.

Alternative finance tools:
Options such as grants, green bonds, conservation trust funds or blended finance when insurance is not feasible.

Structured risk data:
Includes frequency, severity and time series (e.g. drought events, flood patterns, fire occurrence).

Extrapolated data:
Use global datasets (e.g. normalized difference vegetation index or NDVI, precipitation indices) when local data are limited.

Functional insurance market:
A market where regulatory approval, insurer capacity and delivery channels are in place.

Key considerations when using the decision support tool:

1. The flowchart in figure 1 is a simple decision-making tool to determine appropriate use of insurance, since not all biodiversity risks can or should be transferred to an insurer. Once the risk has been assessed, the next questions in the tool relate to the significance of the biodiversity loss. This can draw from existing plans or targets from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) or from National Biodiversity Strategy Action Plans. Cultural and religious factors can also help define what the "significance of biodiversity loss" might mean in a country context.

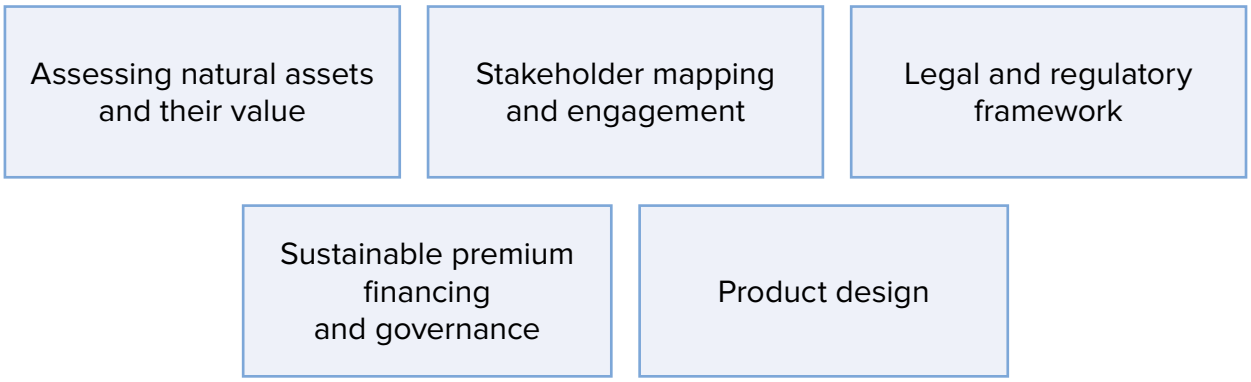
2. Economic loss or financial loss is the value of production (crops or livestock), land, coral reef or mangrove area that is at risk or threatened, and the significance can be determined relative to the total area (of mangroves or coral reefs) and the corresponding value.

3. Data are essential in determining the design of insurance as well as the frequency and severity of occurrence of the threat. In human-wildlife conflict cases, the correlation between wildlife deaths and incursions into farms is not always readily available, but a good triangulation of data from government and private insurers can be applied; otherwise, data transfers from similar situations based on the literature or actual data from similar contexts may be used.

4. Insurance should not replace risk reduction measures, but rather, should complement them as part of an integrated risk management strategy. In Nepal, for example, a holistic approach is being implemented to enhance the effectiveness of the national agricultural insurance scheme and promote coexistence between humans and wildlife. Nepal's approach aligns well with the decision support tool by demonstrating how insurance can be effectively integrated with complementary risk reduction strategies. Its structured focus on four pillars including literacy, access, capacity-building and collaboration can be applied at various stages of the tool to strengthen both the enabling environment and the design of insurance solutions for biodiversity-related risks.

3.2 Building Blocks

Figure 2: Building blocks for effective biodiversity insurance coverage



Creating insurance products that address biodiversity risks requires assembling key building blocks that collectively provide a framework for effective coverage. These building blocks are interconnected and require careful coordination to ensure the success and sustainability of the insurance product. By no means are these building blocks construed to be sequential in nature; they can be adapted to suit different contexts and entry points. For example, Nepal's experience in developing a national agricultural insurance scheme that incorporated human-wildlife coexistence followed an approach that began with (1) a policy and institutional review; (2) risk valuation and preventive practices; (3) stakeholder mapping; (4) feasibility assessment; and (5) product development. Nepal's steps 2, 4 and 5 are clustered under the block on product design in this framework.

BUILDING BLOCK 1. ASSESSING NATURAL ASSETS AND THEIR VALUE

The foundation of biodiversity insurance lies in accurately assessing natural assets and understanding their value. To frame biodiversity in a way relevant to insurance, it is essential to clearly define biodiversity's value, which includes both its ecological functions and economic benefits. Identifying who owns or holds rights over this asset value, whether it be governments, local communities, private entities or conservation organizations, is equally critical. Establishing ownership and value attribution enables insurers to design appropriate coverage models and ensure equitable distribution of financial benefits. This process includes:

- Mapping ecosystems: Creating detailed inventories of natural assets such as coral reefs, mangroves, forests, wetlands and biodiversity hotspots. Geographic Information Systems (GIS) and remote sensing technologies can be used to gather comprehensive data.
- Valuing ecosystem services: Estimating the economic, social and environmental benefits provided by ecosystems. This includes provisioning services (e.g., food, raw materials), regulating services (e.g., carbon sequestration, flood control), cultural services (e.g., tourism, recreation) and supporting services (e.g., nutrient cycling, habitat provision).
- Quantifying vulnerabilities: Identifying which ecosystems are most susceptible to risks such as climate change, habitat destruction, invasive species, pollution and overexploitation.
- Applying valuation frameworks: Using methods such as the total economic value (TEV) framework, gross ecosystem product (GEP) and natural capital accounting to quantify the value of ecosystem services. These frameworks aid in setting appropriate premiums and designing effective payout mechanisms.
- Evaluating socioeconomic dependencies: Understanding how communities and industries depend on biodiversity and how their livelihoods are impacted by ecosystem degradation.

BUILDING BLOCK 2.
STAKEHOLDER MAPPING AND ENGAGEMENT

It is crucial to ensure inclusivity, legitimacy and effectiveness in designing biodiversity insurance products. Relevant stakeholders include:

- Governments: Environment, finance, agriculture and tourism ministries and regulatory agencies responsible for policymaking, funding and enforcement.
- Conservation organizations: NGOs, research institutions and advocacy groups working to protect ecosystems and promote sustainable practices.
- Private sector actors: Insurance companies, reinsurance firms, agribusinesses, tourism operators, fisheries and forestry companies whose business models intersect with biodiversity.
- Local communities and indigenous peoples: Those directly affected by biodiversity loss, who often possess valuable traditional knowledge about ecosystem management.
- Civil society groups: Networks and coalitions advocating for environmental justice, equity and inclusive development.

In Nepal, the stakeholder analysis first ascertained the reasons for low uptake of agriculture insurance despite an 80 percent subsidy on premium payments. All stakeholders raised concerns about moral hazard issues, untimely and unfair payment, and poor administration of agricultural insurance. Although all stakeholders, including community institutions, the private sector, local governments and management authorities of the protected areas, expressed willingness and interest in participating in the insurance scheme, they also demanded minimal administrative burdens, transparent valuation and limited transaction costs, together with fair and timely payment.

BUILDING BLOCK 3.
LEGAL AND REGULATORY FRAMEWORKS

Insurance solutions must operate within established legal and regulatory frameworks to ensure legitimacy, compliance and effectiveness. Key considerations include:

- Understanding regulatory requirements: Reviewing existing insurance, environmental and conservation laws relevant to biodiversity protection.
- Navigating ownership rights: Clarifying ownership of natural resources, especially where communal or customary rights may apply.
- Aligning with international agreements: Ensuring compliance with global frameworks such as the Convention on Biological Diversity and the Kunming-Montreal Global Biodiversity Framework.
- Identifying gaps: Recognizing regulatory barriers that may hinder the development or scaling of biodiversity insurance products.
- Advocating for policy support: Collaborating with policymakers to establish enabling environments for innovative insurance solutions.

In Colombia, three articles were approved in Colombia's National Development Plan (2022–2026) with IRFF support, enabling the issuance of non-agricultural parametric insurance. This created the necessary legal space for innovation in ecosystem-based insurance products.

The policy and institutional environment in Nepal supports the implementation of insurance schemes in alignment with the 16th periodic development plan, which placed high priority on rolling out insurance to cover wildlife-related losses of crops and livestock. Moreover, the Agriculture, Livestock and Herbs Insurance Directive of Nepal, 2022, issued by the Insurance Board, requires non-life insurance companies to allocate at least 5 percent of their insurance portfolio to agriculture, livestock and herbs.

BUILDING BLOCK 4.
SUSTAINABLE PREMIUM FINANCING AND GOVERNANCE

Premium financing mechanisms must be designed to ensure the long-term viability and scalability of biodiversity insurance products. Essential components include:

- Blended finance: Combining grants, premiums, investment returns and donor contributions to diversify funding sources.
- Public-private partnerships: Engaging insurers, governments, NGOs and investors to pool resources and share risks.
- Biodiversity-linked bonds and securities: Developing financial instruments that attract capital for conservation and resilience-building projects.
- Governance structures: Establishing oversight bodies, advisory boards or steering committees made up of stakeholders to enhance transparency, accountability and coordination.
- Monitoring and evaluation: Implementing performance assessment frameworks to ensure financial sustainability and effectiveness in achieving biodiversity protection goals.

Colombia's water fund insurance secured premium funding through a combination of private sector contributions, public capital investments and support from international donors. This diversified approach ensures financial sustainability and shared ownership.

BUILDING BLOCK 5.
PRODUCT DESIGN

Effective product design is essential to ensure that insurance solutions adequately address biodiversity risks and provide incentives for conservation. Key elements include:

- Defining coverage: Determining which biodiversity risks are insured, for example, habitat destruction, climate-induced disasters, invasive species and human-wildlife conflict.
- Establishing triggers: Identifying objective criteria for payouts, which may be based on weather-based parameters (e.g., wind speed, rainfall, temperature) or physical indicators (e.g., population decline, habitat degradation).
- Data sourcing: Establishing reliable sources of data from governments and other stakeholders to facilitate the product design process.
- Pricing models: Setting premiums that reflect the value of natural assets, the likelihood of adverse events and the cost of restoration or mitigation.
- Incorporating incentives for conservation: Designing policies that reward sustainable practices and penalize harmful activities.
- Claims processes: Creating efficient and transparent systems for assessing losses and disbursing funds and harnessing technological advancements and innovations to further streamline claims reporting, verification and payment.

The structured use of the building blocks was key in the development of Colombia's water fund insurance, an innovative parametric insurance product tailored to local ecosystem risks. The scheme is based on a precipitation index, with negative anomalies triggering early forest fire alerts that enable pre-emptive mitigation in páramo areas. Compensation is linked to the cost of fire prevention activities, ensuring that payouts are timely and directly support ecosystem protection efforts.

Building blocks for insurance product: **case of Water Fund Insurance**

Assessing natural assets and their value	Stakeholder mapping and engagement	Legal and regulatory framework	Sustainable premium financing and governance	Product design and mitigation activities
8.313 hectares protected, more than 100 properties, 344 families, 36 water system suppliers, linked in the Fund	Private sector: Bavaria, BH hotels, Coca Cola	Regulatory framework enable insurance companies issue non-agricultural parametric insurance. 3 Articles approved in the National Development Plan 2022–2026 with IRFF support.	Private sector contribution	The prototype parametric scheme has been structured with a precipitation index (SPI)
Investment: $4 billion pesos initial in investment in the Fund	Public private sector: Bogota Water and Sewerage Company		Public capital investments	Negative anomalies correlate with the issuance of forest fire alerts allowing for immediate disbursement to the fund to implement mitigation actions before the event materializes.
Definition of parameter (NDVI)	Development banks: IDB		International donors	Compensation is defined based on detailed costing of fire prevention activities in páramo areas.
	Donors: TNC, UNDP			Fire mitigation and prevention with payments

Nepal's insurance product design incorporated the valuation of risk (sum insured) based on either production costs or the value of agricultural output. Where data were available, claim ratios for crops and livestock were analysed in correlation with wildlife predation. The study assessed four insurance modalities:

(a) Community-based insurance
(b) Upscaling of existing insurance products (e.g., agricultural insurance),
(c) Development of innovative products in collaboration with private insurers
(d) Creation of a new product focused solely on wildlife-related losses to crops and livestock.

These modalities were evaluated against 10 predefined criteria, revealing that three (community-based insurance, upscaling existing products and development of innovative models) were considered feasible. The findings were validated at both the study sites and national level with key stakeholders.

A key feature of Nepal's approach is the emphasis on achieving a minimum threshold of participation to enhance the scheme's viability. The government currently allocates $11.6 million annually as an agriculture insurance subsidy, which could benefit farmers near protected areas, provided that challenges such as moral hazard and implementation hurdles are addressed. Given that over 30 commodity-specific insurance policies already exist, promoting these products at the group level could lower transaction costs for both farmers and insurers. Consequently, upscaling and improving the effectiveness of existing products was identified as the most viable financial solution for addressing wildlife-related losses.

4. Conclusion and call to action

- **Biodiversity is declining at an alarming rate** due to a combination of ecosystem-level and species-level threats. Ecosystems such as forests, wetlands, coral reefs and mangroves are being degraded or lost, while species face increasing pressure from habitat destruction, overexploitation, invasive species and climate change. This loss is creating physical, transition and systemic risks that threaten ecosystems, economies and long-term resilience, underscoring the urgent need for coordinated action.

- **Insurance can serve as a critical enabler** in biodiversity protection, by transferring risk, incentivizing preventive action and enabling faster recovery. Innovative mechanisms such as Colombia's parametric water fund insurance and Nepal's biodiversity-linked agricultural scheme demonstrate the potential of insurance to support both conservation and community resilience.

- **The building blocks outlined in this report offer a practical pathway** for countries and partners to develop biodiversity insurance solutions. These include assessing ecosystem value, engaging stakeholders, navigating regulatory frameworks, securing sustainable financing and designing effective products.

- **Insurance must be combined with other risk reduction measures.** It cannot stand alone. Integrated approaches that promote coexistence (as seen in Nepal), restore degraded ecosystems and reduce vulnerability are essential to maintain insurability and ecological integrity.

- **Cross-sectoral collaboration is essential.** Governments, insurers, regulators, conservationists, communities and donors must work together to create enabling environments and innovative financial models that scale biodiversity insurance solutions.

- **Negative impacts must be avoided:** While insurance can promote biodiversity, it can also reinforce harmful practices if poorly designed – such as by underwriting environmentally destructive activities or excluding green solutions. Insurers must integrate safeguards and monitor the ecological impact of both products and investments to avoid unintended consequences. Impact measurement must be an essential element of any insurance scheme. After deploying insurance, effective risk avoidance must be measured, by asking, for example, whether the insurance scheme has prevented deterioration of human-wildlife conflict. The extended version of this report will also include impact measurements with respect to insurance firms adopting disclosure frameworks and moving into nature-positive investments.

- **The cost of inaction is high.** For example, each hectare of wetland loss can cost up to $8,000 annually in developed areas,[38] and the loss of a single jaguar in Argentina has been valued at $1.8 million in environmental damage.[39] These figures underscore the need for forward-looking financial tools that protect nature as a shared asset.

- **This is the moment to act.** By incorporating insurance into biodiversity finance plans and restoration efforts, we can secure vital ecosystems, support vulnerable communities and build a more resilient, nature-positive future.

Endnotes

1 Convention on Biological Diversity, Article 2.
2 UNDP Biodiversity Finance Initiative, *BIOFIN Workbook 2024: Finance for Nature* (New York, 2024). Available at https://www.biofin.org/knowledge-product/biofin-2024-workbook.
3 Ibid.
4 A comprehensive version of this report featuring updated case studies of BIOFIN / IRFF countries work on biodiversity-relevant insurance schemes is being finalized.
5 Center for Sustainable Systems, University of Michigan, "Biodiversity Factsheet", Pub. No. CSS09-08 (Ann Arbor, 2022). Available at https://css.umich.edu/sites/default/files/2022-09/Biodiversity_CSS09-08.pdf.
6 WWF, *Living Planet Report 2024 – A System in Peril* (Gland, 2024). Available at https://www.wwf.org.uk/sites/default/files/2024-10/living-planet-report-2024.pdf.
7 FAO, "FAO Remote Sensing Survey reveals tropical rainforests under pressure as agricultural expansion drives global deforestation" (Rome, 2021). Available at https://openknowledge.fao.org/server/api/core/bitstreams/fe22a597-a39d-4765-8393-95fbcaed6416/content.
8 M. Weisse and E. Goldman, "Just 7 commodities replaced an area of forest twice the size of Germany between 2001 and 2015", World Resources Institute, 11 February 2021. Available at https://www.wri.org/insights/just-7-commodities-replaced-area-forest-twice-size-germany-between-2001-and-2015.
9 IPBES, *Summary for Policymakers of the Global Assessment Report On Biodiversity And Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (Bonn, 2019). Available at https://zenodo.org/records/3553579.
10 Argentina, National Parks Administration, "Cálculo de daño ambiental de yaguareté (Panthera onca) cazado en Formosa" [Estimate of environmental damage from jaguar hunting in Formosa] (Formosa, 2024). Available at https://chacodiapordia.com/storage/2024/08/Informe-Yaguarete-APNAC.pdf.
11 Nepal, Department of National Parks and Wildlife Conservation, *Profiling of Protected and Human-Wildlife Conflicts Associated Wild Animals in Nepal* (Kathmandu, 2017). Available at https://dnpwc.gov.np/media/files/Profiling_of_Protected_and_Human__Wildlife_Conflict_Associated_Wild_Aninal_in_Nepa_M87TxjX.pdf.
12 FAO, *The State of the World's Forests 2022: Forest pathways for green recovery and building inclusive, resilient and sustainable economies* (Rome, 2022), Chapter 2. Available at https://openknowledge.fao.org/server/api/core/bitstreams/8f599970-661d-45f5-a598-2ea46ca1605f/content/src/html/deforestation-land-degradation.html#ref-note-1
13 D. Souter, S. Planes, J. Wicquart, M. Logan, D. Obura and F. Staub, eds., *Status of the Coral Reefs of the World: 2020 Report* (Townsville, Global Coral Reef Monitoring Network and International Coral Reef Initiative, 2021). Available at https://gcrmn.net/2020-report-v1-2023/.
14 Convention on Wetlands, *Global Wetland Outlook: Special Edition 2021* (Gland, 2021). Available at https://www.global-wetland-outlook.ramsar.org/report-1.
15 WWF, *Living Planet Report 2024 – A System in Peril*.
16 Ibid.
17 Tokyo Institute of Technology, "Nile perch invasion triggered genetic bottlenecks in lake Victoria's endemic cichlids, analyses suggest", Phys.org, 17 June 2024. Available at https://phys.org/news/2024-06-nile-perch-invasion-triggered-genetic.html.
18 Taskforce on Nature-related Financial Disclosures, The TNFD Nature-related Risk and Opportunity Management and Disclosure Framework (London, 2022). Italicize The TNFD Nature-related Risk and Opportunity Management and Disclosure Framework.
19 P. Menéndez, I. J. Losada, S. Torres-Ortega, S. Narayan and M. W. Beck, "The global flood protection benefits of mangroves", *Scientific Reports*, vol. 10, No. 1 (March 2020). Available at https://www.nature.com/articles/s41598-020-61136-6.
20 A. M. Klein, B. E. Vaissière, J. H. Cane, I. Steffan-Dewenter, S. A. Cunningham, C. Kremen and T. Tscharntke, "Importance of pollinators in changing landscapes for world crops", *Proceedings of the Royal Society B: Biological Sciences*, vol. 274, No. 1608 (February 2007). Available at https://royalsocietypublishing.org/doi/10.1098/rspb.2006.3721.
21 C. A. Taylor and H. Druckenmiller, "Wetlands, flooding, and the Clean Water Act", *American Economic Review*, vol. 112, No. 4 (April 2022). Available at https://www.aeaweb.org/articles?id=10.1257/aer.20210497.
22 AFD, "Biodiversity degradation: 3 risks for finance", 29 October 2021. Available at https://www.afd.fr/en/actualites/biodiversity-degradation-3-risks-finance.
23 Swiss Re, "A fifth of countries worldwide at risk from ecosystem collapse as biodiversity declines, reveals pioneering Swiss Re index", 23 September 2020. Available at https://www.swissre.com/media/press-release/nr-20200923-biodiversity-and-ecosystems-services.html.
24 Swiss Re Institute, *Biodiversity and Ecosystem Services: A Business Case for Re/insurance* (Zurich, 2020). Available at https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-biodiversity-and-ecosystems-services.html.
25 Swiss Re, "Forestry insurance: A largely untapped potential" (Zurich, 2015). Available at https://www.swissre.com/dam/jcr:0b1ba752-40e7-40a6-9e29-4895dc66804b/2023-08-sr-forestry-.
26 Swiss Re, "Using innovative insurance to help protect the economic value of natural ecosystems: China: Wetlands typhoon and drought cover". Available at https://www.swissre.com/our-business/public-sector-solutions/case-studies/china-typhoon-and-drought-cover.html.
27 G. Ollano, "'Insurance is not enough,' says government on damaged coral reef", Insurance Business Magazine, 17 March 2017. Available at https://www.insurancebusinessmag.com/asia/news/breaking-news/insurance-is-not-enough-says-government-on-damaged-coral-reef-62997.aspx; AllAfrica, "Insurer pays compensation to Mauritian fishers after oil spill", 21 December 2021. Available at https://allafrica.com/view/group/main/main/id/00080579.html.
28 AllAfrica, "Insurer pays compensation to Mauritian fishers after oil spill".
29 WTW, "WTW launches first ever coral reef insurance policy in Fiji", 5 February 2024. Available at https://www.wtwco.com/en-ke/news/2024/02/wtw-launches-first-ever-coral-reef-insurance-policy-in-fiji.
30 A. Pachon, "AXA Climate, AXA Seguros Mexico and ClimateSeed are jointly creating the 1st insurance policy for the protection of mangrove forests in Mexico", AXA, 11 December 2023. Available at https://climate.axa/publications/1st-insurance-policy-for-the-protection-of-mangrove-forests-in-mexico/.
31 International Institute for Environment and Development, "Livelihood Insurance from Elephants (LIFE) in Kenya and Sri Lanka". Available at https://www.iied.org/livelihoods-insurance-elephants-life-kenya-sri-lanka.
32 T. Deryugina and M. Konar, "Impacts of crop insurance on water withdrawals for irrigation", *Advances in Water Resources*, vol. 110, No. 5 (December 2017). Available at https://www.sciencedirect.com/science/article/abs/pii/S0309170817302427.
33 UNDP Sustainable Insurance Forum, "Nature-Insurance nexus: Sustainable Insurance Forum survey on nature-related risks". Available at https://sustainableinsuranceforum.org/nature-insurance-nexus/.
34 To come
35 WTW "WTW launches first ever coral reef insurance policy in Fiji".
36 Pachon "AXA Climate, AXA Seguros Mexico and ClimateSeed are jointly creating the 1st insurance policy for the protection of mangrove forests in Mexico".
37 UNDP, "Insurance innovation challenge to protect investments in biodiversity in Colombia", 24 September 2024. Available at https://irff.undp.org/press-release/insurance-innovation-challenge-protect-investments-biodiversity-colombia.
38 Taylor and Druckenmiller, "Wetlands, flooding, and the Clean Water Act".
39 Argentina, National Parks Administration, "Cálculo de daño ambiental de yaguareté (Panthera onca) cazado en Formosa".

BIOFIN is funded by:

Belgium
partner in development

In partnership with
Canada

Department
for Environment
Food & Rural Affairs

Co-funded by
the European Union

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

Flanders
State of the Art

MINISTÈRE
DE L'EUROPE
ET DES AFFAIRES
ÉTRANGÈRES
Liberté
Égalité
Fraternité

Norway

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Office for the Environment FOEN

The Global Biodiversity Finance
Programme is supported by:

gef
global
environment
facility
INVESTING IN OUR PLANET