

Sustainable finance and biodiversity

A guide for financial operators



ItaSIF Italian Sustainable
Investment Forum

ADVANT Nctm

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As part of the process of adopting sustainable practices, ADVANT Nctm has long been working on the implementation of ESG aspects, a work that requires commitment, passion and action, to achieve the UN Sustainable Development Goals (SDGs): an issue that is now fundamental for the firm and its stakeholders, first and foremost its clients. ADVANT Nctm believes that it must be part of the change, thus promoting the development of greater awareness on the part of clients and supporting them in the necessary planning and economic transformation to take full advantage of the opportunities of a just and sustainable transition. The firm assists asset managers, banks, SGRs, and companies (listed and SMEs) in managing climate change-related risks and legal aspects associated with “ESG” (Environmental, Social and Governance) aspects, to support them in adopting and implementing their sustainability strategy. The application of “ESG” aspects first and foremost results into the knowledge and management of risks related to environmental, social and governance factors. More specifically, best practice and soft law require operators in any sector of the economy (SMEs, large companies, banks, SGRs, insurance companies, etc.) to be aware of the potential environmental, social and governance risks that may affect their activities and, consequently, to prepare measures and strategies to best address them, as well as to contribute effectively to the achievement of the climate objectives set by international and European legislation.



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Etica Sgr is the only Italian asset management company that exclusively offers ethical and responsible financial investment products. It was founded in 2000 with the aim of creating medium to long-term return opportunities by focusing on the real economy and rewarding companies and countries with the highest environmental, social and governance (ESG) ratings. The careful selection of securities that make up the funds is a distinguishing feature of Etica. All analyzed issuers undergo a double screening to identify the most virtuous countries from a socio-environmental perspective and the companies most attentive to sustainability and collective well-being. Through stewardship activities, Etica constantly engages with the management of the companies in which the funds invest, also exercising voting rights at shareholders' meetings to encourage more responsible behavior from companies. Additionally, Etica engages with governments and legislators through advocacy activities to promote the integration of ESG issues into social, economic, and legislative policies. In Etica's vision of responsible investment, the goal of achieving potential positive financial performance is always associated with generating positive effects for the environment and society. The Impact Report is the annual document that illustrates the impact results of Etica's fund investments. Etica was the first Italian company to adhere to the United Nations' Principles for Responsible Investment (PRI) in 2009, committing to incorporate ESG criteria into its investment and active ownership decisions.

Table of contents

Executive summary	4
Introduction	6
1. Biodiversity: where do we stand?	8
1.1. Biodiversity and ecosystem services	8
1.2. Biodiversity at the global, European and Italian levels	8
1.3. Biodiversity and climate change	11
1.4. The leading causes of biodiversity loss	12
2. Why biodiversity is relevant to finance and vice versa	14
2.1. The value of biodiversity	14
2.2. Economic and financial risks related to biodiversity	18
2.3. Climate and biodiversity sanctions and litigation	19
2.4. Funding biodiversity	21
3. The European regulatory framework	25
3.1. Nature Restoration Law and Regulation on Deforestation-free ... products	25
3.2. CSRD, CSDDD and SFDR	26
3.3. European taxonomy for sustainable activities	27
4. Inclusion of biodiversity in financial processes and products	28
4.1. Exclusions and divesting	31
4.2. Engagement	32
4.3. Thematic investment and impact investing	33
4.4. Nature-related certificates and biodiversity credits	34
4.5. Insurance products	36
4.6. Guidelines to include biodiversity in financial processes and products	37
Conclusion	39
Bibliography	40

Executive summary

Human well-being and survival depend on the complex interactions between living organisms in nature. **An adequate level of biodiversity maintains ecosystem balance**, providing essential benefits for humans, including clean air, drinking water, climate regulation, pollination, soil regeneration, habitat creation and maintenance, and the prevention of hydrogeological instability. Furthermore, biodiversity represents a crucial factor in **mitigation** (thanks to the absorption of CO₂) and **adaptation** to climate change.

To enhance the understanding of the topic and increase awareness of the economic and financial value of biodiversity, the Italian Sustainable Investment Forum (ItaSIF) has launched a **working group** exclusively for its members, which is intended for **dissemination and informational purposes**. Additionally, it aims to provide **guidelines** for financial operators on integrating biodiversity into financial policies, processes, and products.

BIODIVERSITY TODAY

Despite the benefits mentioned, **human activities generate highly negative impacts on biodiversity**: every day, around 50 living species disappear, a rate that is estimated to be up to 1,000 times higher than the natural extinction rate (ISPRA 2024b).

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) identifies several direct and indirect causes of the ecosystem crisis (IPBES 2019). Direct causes of biodiversity loss include: direct exploitation (for example, fishing or intensive agriculture); changes in land and/or sea use (for example, deforestation); climate change; air, soil and water pollution, and the presence of alien and invasive species. The impact of these factors varies by geographical area; however, on a global scale, the main culprits are changes in land and/or sea use and the direct exploitation of resources (IPBES 2019).

At the international level, the most significant initiative for biodiversity conservation is the **Kunming-Montréal Global Biodiversity Framework (GBF)**, signed by 196 countries. Its goal is to preserve, improve, or restore ecosystems and prevent species extinction.

THE ECONOMIC VALUE OF BIODIVERSITY

Awareness of the economic and financial significance of biodiversity is increasingly spreading. In fact, more than half of the world's GDP (around

US\$44 trillion) is closely tied to natural resources (World Economic Forum 2020), and **entire economic sectors directly rely on ecosystem services** (for example, agriculture and the food industry, textiles, tourism, construction). The economic damages associated with biodiversity loss and environmental degradation are enormous. For example, costs related to invasive alien species have quadrupled every decade since 1970, reaching US\$423 billion in 2019 (IPBES 2023).

There is a **direct connection between the stability of the natural ecosystem and that of the economic system**: the loss of biological diversity increases the risk of extreme climate-related events and jeopardises food and water security. Furthermore, habitat loss and species decline can diminish agricultural and fisheries productivity, causing direct adverse economic impacts for these sectors.

From a double materiality perspective, it is necessary to consider both the risks stemming from the loss of biodiversity and the impacts of economic activities on ecosystems. These risks can be categorised similarly to climate risks: **physical risks** (related to disruption in ecosystem balances and the loss associated with essential services) and **transition risks** (resulting from challenges companies and investors face in anticipating regulatory, market, and technological developments). These risks, in turn, can impact **financial risks** such as credit and counterparty, operational, market, and liquidity risks. Therefore, financial institutions must carefully evaluate and manage these risks, as highlighted by the **Network for Greening the Financial System (NFGS)**.

Furthermore, achieving a global reversal of the biodiversity decline trend by 2030 will require an annual investment ranging between US\$722 and US\$967 billion over the next decade. However, there remains a significant **financing gap estimated at a range between US\$598 and US\$824 billion per year** (Paulson Institute 2020). In contrast, current public and private financial flows associated with negative environmental impacts amount to almost US\$7 trillion annually (UNEP 2023). Therefore, it is essential to **redirect the capital market** away from sectors and projects with negative environmental impacts towards those that positively contribute to its protection and restoration.

INTEGRATING BIODIVERSITY INTO FINANCIAL PROCESSES AND PRODUCTS

Financial operators have different tools, methodologies, and approaches at their disposal to integrate biodiversity considerations into their processes and products. These include indicators to analyse issuers' **transition plans; exclusions and disinvestment** from sectors, companies and countries with the most negative biodiversity impacts; **green bonds and Sustainability-Linked Bonds** to finance ecosystem conservation or restoration projects; **nature-related certificates and biodiversity credits** to demonstrate measurable improvements; ad-hoc **insurance coverage** to mitigate physical and transition risks, leveraging nature-based solutions.

In conclusion, financial operators can follow some guidelines to reduce negative impacts on biodi-

versity and increase positive outcomes. Firstly, it is crucial to incorporate biodiversity analyses and assessments (covering both risks and impacts) into governance frameworks, internal decision-making processes, and offering products and services. Additional recommendations include: publishing a **sustainability report** annually that incorporates, where relevant, the **ESRS E4**; encouraging **investee, financed or insured companies to collect and publish data** on biodiversity-related risks and impacts; joining global initiatives such as the **Finance for Biodiversity Pledge**; engaging in **dialogue and collaboration** with other stakeholders (financial and otherwise) to **improve standards** for assessing and measuring biodiversity-related risks and impacts; integrating biodiversity protection in all **lobbying and advocacy activities** with public institutions.

Introduction

The environmental dimension is now widely acknowledged as foundational for social welfare and economic development (Folke et al., 2016). The 2015 Paris Agreement has heightened awareness of the **economic and financial implications of climate change**, focusing on both risks and opportunities inherent in transitioning to a more sustainable ecological framework. However, due to environmental systems' deep interconnectedness, focusing solely on climate change is insufficient.

In addition to the imperative for global actions to reduce emissions and enhance the resilience of regions and economies against extreme climate events, it is **crucial to integrate biodiversity in all investment, financing, and insurance processes**. Biodiversity conservation is critical for human health and for all economic sectors that depend directly or indirectly on natural resources. Conversely, biodiversity loss and ecosystem collapse pose a severe threat. As of September 2023, six of the nine planetary limits – including the integrity of the biosphere – had been surpassed (Stockholm Resilience Centre 2023). These boundaries are essential for maintaining the stability and resilience of our planet. Breaching them increases the risk of sudden and irreversible environmental changes, which could trigger additional changes due to the complex interconnectedness of different biophysical systems.

Moreover, ecosystems such as forests, oceans, and wetlands are critical factors in climate change mitigation and adaptation processes. They help reduce CO₂ emissions and limit the negative impacts of phenomena such as droughts, storms or floods, which will increase in frequency and intensity due to global warming. Therefore, promoting **synergistic actions to achieve climate and biodiversity protection goals simultaneously is crucial**. The interconnection between these two areas is also highlighted by the United Nations' Sustainable Development Goals (SDGs) 2030 and, in particular, Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development, and Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat deser-

tification, and halt and reverse land degradation and halt biodiversity loss.

Awareness of the **economic and financial importance of biodiversity** is gradually spreading. Experts in the World Economic Forum's Global Risks Report (WEF 2024) identify the loss of biodiversity and ecosystem collapse as the main risks to the global economy in the medium to long term. However, these topics remain unfamiliar to the general public. According to Eurobarometer findings, 29% of **Europeans** have never heard the term "biodiversity", and 30% have heard of it but do not know its meaning (Eurobarometer 2019). Regarding **companies**, an analysis of the sustainability reports of 170 companies listed on European markets during 2018–2021 showed increased attention to biodiversity. However, nearly 85% of the companies surveyed do not consider biodiversity a strategic element, and only 34% have taken operational measures to protect ecosystems (Fondevilla et al., 2023). Only 2% of agribusiness, paper, and forestry companies have disclosed sufficient information about their impact on biodiversity. However, 44% have initiated a process to assess it, and 15% are measuring the extent to which their operations depend on nature (World Benchmarking Alliance 2023).

The Italian Sustainable Investment Forum (ItaSIF) initiated a **working group** for its members to raise awareness of the topic, particularly the economic and financial value inherent in biodiversity. Based on the insights that emerged during the three meetings held between February and May 2024 and with the support of experts and specialists on the topic, this paper was drafted for dissemination and informational purposes. In addition, the goal is to provide **guidelines** for financial practitioners to include biodiversity in their policies, processes, and products.



**It is crucial to promote
synergetic actions to
simultaneously achieve
climate and biodiversity
protection goals**

[CHAPTER 1]

Biodiversity: where do we stand?

[1.1.]

Biodiversity and ecosystem services

Article 2 of the Convention on Biological Diversity (see p. 9) defines **biodiversity** as “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”.

The well-being and survival of human beings

depend on the complex interactions among living organisms found in nature: **an adequate level of biodiversity keeps ecosystems in balance**, ensuring essential benefits for our species, known as “**ecosystem services**”. These include, among others: clean air; clean water; climate regulation; pollination; soil regeneration; habitat creation and maintenance; and prevention of hydrogeological disruption.

ECOSYSTEM

The totality of all life forms (biotic factors) and all non-living elements such as soil, water, air, and climate (abiotic factors). Interactions among organisms and between organisms and the environment determine ecosystem functioning and stability. Ecosystems can vary significantly in size and complexity, from small and relatively simple, such as waterholes, to vast and complex, such as rainforests (ISPRA 2024a).

HABITAT

The physical (e.g., light and temperature) and chemical (e.g., nutrient concentration) environmental conditions in which an organism grows and performs its vital functions. The set of organisms that occupy a habitat is called a “community” (ISPRA 2024a).

[1.2.]

Biodiversity at the global, European and Italian levels

Despite all the benefits mentioned, **human activities generate substantial negative impacts on biodiversity**: about 50 living species disappear every day, a rate estimated to be up to 1,000 times higher than the natural extinction rate (ISPRA 2024b). Between 1970 and 2018, there was an average decline of 69% in the abundance of wildlife populations globally and as much as 94% in Latin America¹ (WWF 2022). On a **global scale**, 44,000 species are threatened with extinction, including 41% of amphibians, 26% of mammals,

34% of conifers, 12% of birds, and 21% of reptiles (IUCN 2024).

As for **Europe**, only 16% of habitats and 23% of species are in a favourable conservation status (European Environment Agency 2020). **Italy** is among the European countries richest in biodiversity, due to the great variety of animal and plant species and the high rate of endemic species resulting from lithological, topographical, and climatic diversity. Unfortunately, however, the

¹ Latin America is the richest biodiversity region in the world: it is home to about one-third of all existing plant species (95,000 out of 300,000). Ecuador, while occupying only 0.02% of the planet's surface area, is home to 10% of all existing species varieties (in fact, 25,000 different species are counted) (Dirzo 2014).

loss of biodiversity is alarming. Italy is the only country in the European Union (EU) **where more than 50% of species are at risk of extinction**, with a constantly worsening trend (Rondinini et al.

2022). In addition, only 11.2% of marine areas are protected (ISPRA 2021), a slightly higher share than the Aichi 2020 target² of 10%.

International initiatives to protect biodiversity

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

The CBD is an international treaty officially enacted in 1993. It has three objectives: 1) the conservation of biological diversity; 2) the sustainable use of its components; and 3) the fair and equitable sharing of benefits arising from genetic resources¹.

UNITED NATIONS CONFERENCE ON BIOLOGICAL BIODIVERSITY (COP15)

The 15th United Nations Conference on Biological Biodiversity (COP15), held in December 2022 in Montréal, Canada, represents the most significant global effort to protect lands and oceans and to secure the funding needed to protect biodiversity in developing countries. The conference concluded with adopting a historic agreement signed by 196 countries: the **Kunming-Montréal Global Biodiversity Framework (GBF)**. The GBF defines four macro-objectives: 1) to maintain, enhance, or restore ecosystems and counter species extinction; 2) to use and manage biodiversity sustainably; 3) to fairly and equitably share the monetary and nonmonetary benefits arising from the use of genetic resources and protect traditional knowledge in this regard; and 4) ensuring that the means of implementing the agreement, including financial resources, are equitably accessible to all Parties by progressively closing the gap in biodiversity funding.

Twenty-three specific targets have been identified to achieve these four macro goals. Among them, **Target 15** calls for introducing legal, administrative or policy measures to encourage and support businesses and financial actors in **monitoring, assessing and reporting biodiversity risks, dependencies and impacts** in their operations, value chains and investment portfolios while highlighting their role in promoting sustainable consumption patterns. **Goal 19** is also relevant: a commitment for signatory countries to **increase financial resources for biodiversity** to US\$200 billion per year by 2030, drawing from all sources (domestic, international, public, private, and through blended finance mechanisms). In addition, at least US\$20 billion by 2025 and at least US\$30 billion by 2030 should be disbursed annually to developing countries².

NATURE POSITIVE INITIATIVE

The GBF has set a global goal of ending nature loss³ and reversing the current trend by 2030 (see Figure 1). The Nature Positive Initiative is a coalition of international and environmental organisations⁴ that aims to preserve the integrity of the global goal for nature, to ensure its measurability for all stakeholders (governments, businesses, financial actors, and civil society), and to provide guidelines and practical tools for its achievement⁵.

1 For more information: www.cbd.int/gbf

2 For more information: www.cbd.int/gbf

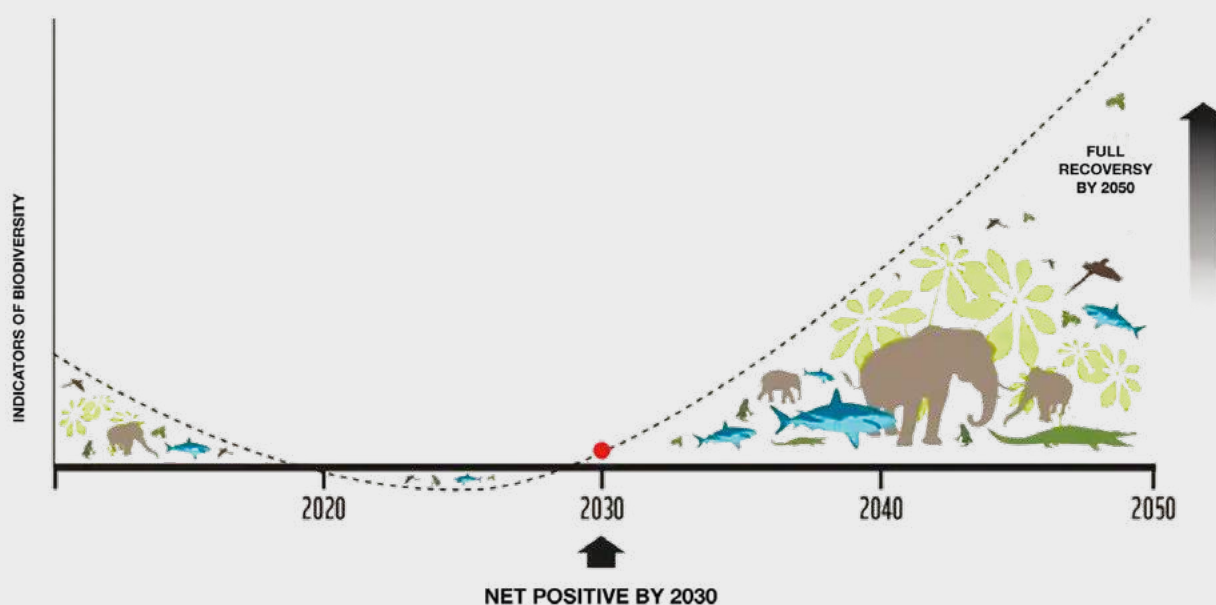
3 “Nature” here means the natural world, with an emphasis on the diversity of living organisms (including humans) and their interactions with each other and the environment (TNFD 2023).

4 Founding members include WWF, WRI, WCS, WBCSD, TNFD, SBTN, PRI, IUCN, GRI.

5 For more information: www.naturepositive.org

2 In 2010, the international community established the 20 Aichi Targets, grouped into five categories: to address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society, to reduce the direct pressures on biodiversity and promote sustainable use, to improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity, to enhance the benefits to all from biodiversity and ecosystem services to enhance implementation through participatory planning, knowledge management and capacity building. Unfortunately, none of these goals have been achieved; in some countries, the situation in 2020 was even worse than in 2010.

FIGURE 1. NATURE POSITIVE BY 2030



Source: Nature Positive Initiative

The importance of biodiversity monitoring

By Andrea Monaco, Technologist, ISPRA

The assessment made by the Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services (IPBES)¹ in 2019 described a grim picture of the global biodiversity crisis, with **significant and steady erosion in the number of animal and plant species**. The detailed analysis highlights **profound differences across continents**, creating a critical picture for the Global South, particularly Central and South America.

Although the biodiversity crisis can generate enormous social inequalities, society's perception of the risks associated with it is still insufficient. Therefore, the need for profound cultural transformation to **increase awareness**, for which improving biodiversity knowledge is also essential, emerges.

Recently, the issue of the **importance of biodiversity monitoring** in future scenarios of societal and economic development has come into focus, emphasising the need to bridge

geographic disparities in terms of the distribution of available biodiversity data (Chapman et al. 2024). With hundreds of billions of dollars to be invested in the conservation, restoration, and sustainable management of ecosystems in the wake of the Kunming–Montreal Accords (see p. 9), these disparities are a problem, and their mitigation will be crucial to the creation of effective data-driven solutions to biodiversity loss.

In a view limited to the **European continent**, the knowledge about the status of biodiversity stems from obligations set by the EU legal framework, including the **Birds Directive** (1979), the **Habitats Directive** (1992), and the **Alien Species Regulation** (2014). Although very restrained in general terms, this cognitive framework nonetheless appears sufficient to outline priorities for intervention and investment to achieve the continental and global conservation targets.

¹ The IPBES is the equivalent of the Intergovernmental Panel on Climate Change (IPCC) for biodiversity.

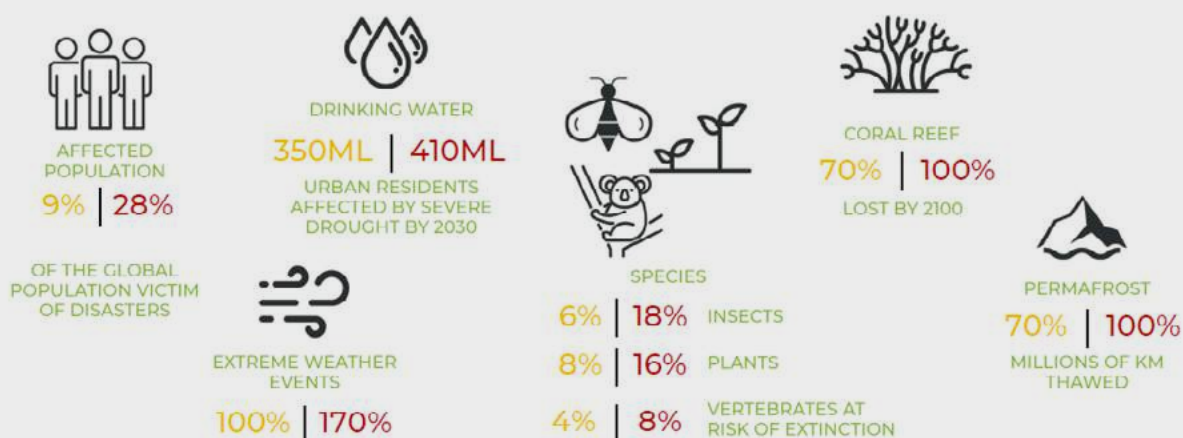
[1.3.]

Biodiversity and climate change

Biodiversity and climate change are profoundly interconnected. Indeed, **climate affects ecosystem balances**: under a scenario aligned with the 1.5°C target increase in global average temperatures, the negative consequences on biodiversity are less severe than under a scenario of a 2°C target increase (see Figure 2). **Biodiversity**, in turn, **determines significant climate effects** and is a crucial factor in mitigation (through CO₂ absorption)

and adaptation (Finance for Biodiversity Foundation 2023). For example, coastal, riverine, and mangrove forests are crucial in protecting against extreme climate events. Tree roots provide defence against waves and act as natural reservoirs during heavy rainfall; conversely, in areas where forest cover has been reduced or even eliminated, there is an increase in landslides and property damage (Dunn Rutherford and Liske 2021).

FIGURE 2. COMPARISON OF 1.5°C AND 2°C INCREASE IN GLOBAL AVERAGE TEMPERATURES



Source: Revised version by Save the Planet APS from IPCC 2018

Altering ecosystems can also accelerate climate change by releasing CO₂ into the atmosphere instead of absorbing it. For example, between 2001 and 2019, rainforests³ absorbed about 18% of all anthropogenic carbon emissions. However, deforestation of the Amazon has led to the loss of 17% of its original extent (RAISG 2020), with the risk of reaching a **tipping point** beyond which the forest will lose its essential functions and potentially contribute to further deterioration of climate conditions (Boulton et al. 2022). When forests are compromised, **the balance between carbon uptake and release may reverse**, thus exacerbating the issue of global warming. Forests, now powerful allies in the fight against climate change, could release more CO₂ into the atmosphere than they absorb. In addition, the so-called “savanisation” of the Amazon could trigger a series of self-rein-

forcing events, such as increased spread of tropical diseases, alteration of precipitation and ocean currents (IPCC 2022).

Tropical forests⁴ may continue to play the role of carbon sink if **daytime temperatures** are kept **below 32°C** (Sullivan et al. 2020). However, under a +2°C global scenario, three-quarters of forests would be above this threshold, thus triggering a vicious cycle leading to further temperature increases. Beyond 2°C, each degree of temperature increase would imply the release of 51 billion tons of CO₂ from tropical forests into the atmosphere (Sullivan et al. 2020), a larger share than global CO₂ emissions in 2022 (estimated at more than 37 billion tons by the Global Carbon Budget 2023).

³ Rainforest is a forest characterised by high rainfall, indicatively over 1,500 mm annually (Treccani 2024).

⁴ Tropical forest is a type of rainforest that grows in equatorial zones, namely areas characterised by high temperatures (between 20 and 28°C) and heavy rainfall (2,000-4,000mm annually) (WWF 2009).



In conclusion, the relationship between climate change and biodiversity is broad and complex, and some key dimensions must be considered.

[1.4.]

The leading causes of biodiversity loss

The IPBES identifies various direct and indirect causes of the nature crisis (IPBES 2019). **Indirect causes** include certain parts of global human society, such as demographics, sociocultural, economic, and technological aspects, institutions, governance, conflicts, and epidemics. These elements, in turn, affect the **direct causes** of biodiversity loss in different ecosystems (terrestrial, marine, and freshwater): direct exploitation (e.g., fishing); land and/or sea use change (e.g., deforestation); climate change; air, soil, and water pollution; and the presence of alien and invasive species. The relative weight of these factors varies by geographic area; however, globally, the most significant contributors are **land and/or sea use change and direct exploitation of resources** (IPBES 2019).

- **The interconnection**

Climate change directly affects biodiversity and vice versa. **Extreme weather events** such as prolonged droughts, floods, and storms can cause **habitat loss** and ecosystem alteration and contribute to species extinction. At the same time, biodiversity loss can **reduce the ability of ecosystems to provide essential services**, even to the point of **reversing the balance of emissions** from negative (absorption) to positive (release into the atmosphere). Conversely, protecting biodiversity is critical in terms of mitigation and adaptation; therefore, this should be included in climate targets and decarbonisation strategies.

- **The localisation of risks**

Climate hazards occur on a global, national, or regional scale, although extreme weather events can also occur in a confined location (e.g. hailstorms and tornadoes). In contrast, **risks related to biodiversity loss** are often **more localised and specific to particular ecosystems or habitats**. For example, deforestation in a given area results in habitat loss for many endemic species but may have little impact on a global scale. Consequently, the **exposure** of territories and companies to biodiversity risks can **vary widely**, depending on their reliance on local ecosystem services and the vulnerability of surrounding habitats.



Regarding endangered or near-endangered species⁵, 72% are threatened by the direct exploitation of land and oceans (thus mainly by the food and beverage sector), 29% by the expansion of infrastructure and anthropised environments, and 18% by the energy and mining sector⁶.

In general, the scientific community agrees on attributing **prominent responsibility to the agri-food system** concerning biodiversity loss (FSEC 2024, Mouratiadou et al. 2024). The conversion of entire ecosystems to intensive agricultural production of monocultures and feed for intensive livestock production has, as its first consequence, habitat depletion (or destruction) (UNEP 2021)⁷. The food system in its prevailing form – geared toward the dual goal of increasing the amount of food produced and, at the same time, lowering its

cost – is among the leading causes of soil degradation (UNEP 2021).

Regarding the massive use of **pesticides and chemical fertilisers**, the European Environment Agency (EEA) highlights how member states use them extensively to maintain crop yields: despite Europe-wide pesticide use reduction targets⁸, from 2011 to 2020, sales of these products remained relatively stable, with severe environmental consequences. In 2020, 22% of **European river and lake** monitoring sites detected pesticide content above the maximum allowable threshold (EEA 2023). The **agricultural soil data** is even more worrying: 58% of the areas tested contained residues of two or more pesticides; the percentage rises to 83% when considering soils containing residues of at least one pesticide (EEA 2023).



⁵ The reference is to the so-called “red list” of the International Union for Conservation of Nature (IUCN).

⁶ The sum of the percentages does not give 100% because the same endangered species may be threatened by several sectors at once.

⁷ Globally, more than 80% of land use changes are caused by the agribusiness system. The habitats most affected are tropical habitats, which are characterised by the greatest loss of biodiversity; in just 20 years, from 1980 to 2000, the transformation of large portions of land caused the loss of 42 million hectares of tropical forest in Latin America (for livestock farming) and 6 million hectares in Southeast Asia (for palm oil production).

⁸ As part of the European Green Deal, the Zero Pollution Action Plan sets several targets regarding the fight against pollution. For chemical pesticides, the targets are a 50% reduction by 2030 and total elimination by 2050, in line with the proposed regulation (Regulation (EU) 2021/2115, so-called Sustainable Use Regulation (SUR), which also included a ban on the use of pesticides within Natura 2000 protected sites and other sensitive areas. However, following the negative vote by the European Parliament and the European farmers’ protests, the proposed regulation was withdrawn, as was the entire Farm to Fork policy strategy, which was intended to reform the European agri-food system and make it more sustainable.

[CHAPTER 2]

Why biodiversity is relevant to finance and vice versa

[2.1.]

The value of biodiversity

More than half of the world's GDP (about US\$44 trillion) is strictly linked to natural resources (WEF 2020), **with entire economic sectors directly dependent on ecosystem services** (e.g., agriculture and food processing, textiles, tourism, construction). In the euro area, approximately 72% of companies are highly dependent on at least one ecosystem service, and 75% of bank loans are granted to companies that are highly dependent on biodiversity (ECB 2023).

The economic damages associated with biodiversity loss and environmental degradation are

significant: for example, costs associated with alien species invasions have quadrupled every decade since 1970 and reached US\$423 billion in 2019 (IPBES 2023). There is a **direct connection between natural ecosystem stability and economic system stability**: loss of biological diversity implies an increased risk of climate-related extreme events and compromised food and water security. In addition, the loss of natural habitats and species reduction can lead to decreased agricultural and fisheries productivity, causing direct economic damage to these sectors.

Fisheries and marine ecosystems

The livelihoods of about 3 billion people derive from marine and coastal biodiversity; 200 million people are employed directly or indirectly in marine fisheries (UNRIC 2024). **Overfishing and unsustainable practices, such as trawl fishing, generate annual losses of about US\$83 billion and US\$13 billion in damages related to plastic pollution**, which implies significant clean-up costs (Credit Suisse 2020). In addition, trawling releases up to 370 million tons of CO₂ into the atmosphere

annually, with severe consequences for **marine ecosystems and the climate** (Frontiers in Marine Science 2024)⁹. However, awareness of marine biodiversity's value (including economic value) still seems insufficient. Among the SDGs, **Goal 14**, related to ocean conservation, has the lowest percentage of resources allocated globally, equivalent to 2% of the total (TOSSD 2024).

Despite their significance, national and international economic indicators do not adequately consider the **economic and financial impact of biodiversity loss**. As a matter of fact, the economic value of ecosystem services is difficult to quantify for several reasons. First, the **non-commercial nature** of benefits derived from nature, such as air purification, water filtration, and climate regulation,

means they are not directly reflected in market prices of goods and services and have historically been available without explicit monetary transactions. Thus, there has been a widespread belief that these benefits are free and infinite, contributing to underestimating risks associated with overexploitation and subsequent degradation of ecosystems (Dasgupta 2021).

⁹ Trawling on the seabed relies on the use of metal "gates" that can weigh 5 tons each. The mechanical action of the nets erodes carbon sediments on the seafloor and releases them into the water, thus triggering a carbon dioxide emission process, causing damage comparable to deforestation (Watling & Norse 2008).

There is a direct connection between natural ecosystem stability and economic system stability: the loss of biological diversity increases the risk of climate-related extreme events and compromises food and water security





Second, it is necessary to mention the **complexity of quantifying** both the benefits related to biodiversity and the damages associated with its deterioration: assigning monetary values to intangible elements, such as the improvement of mental health resulting from immersion in natural environments or, conversely, the negative impacts generated by species extinction presents significant challenges. This difficulty in quantification hinders the inclusion of nature in traditional economic frameworks. Third, the adopted **time horizon** needs to be considered since economic actors often prioritise immediate returns and do not consider costs and opportunities in the long run. On the other hand, the services provided by nature yield long-term benefits and are essential

for the sustainability of ecosystems and human societies over time.

As awareness about the importance of preserving biodiversity has spread, some **methodologies** have been developed to **economically value ecosystems** and incentivise conservation and sustainable management of natural resources through the market and its mechanisms (e.g., through nature-related certificates and biodiversity credits – see §4.4.). These approaches aim to include nature in decision-making processes involving resource allocation, considering ecosystems' economic value.

Measuring biodiversity

Unlike climate-related targets, which are measured in standardised and globally applicable carbon units, there is no single unit of measurement for nature-related targets due to the complexity and geographic differentiation of ecosystems. However, there are methodologies for measuring the critical dimension of biodiversity in the context of the Convention on Biological Diversity (see p. 9).

For example, the **Species Threat Abatement and Restoration (STAR)** method¹⁰ measures the contribution of economic activities to reducing the risk of species extinction. This method can support governments, financial actors and businesses in directing investments and activities toward achieving tangible biodiversity conservation outcomes¹¹.

¹⁰ <https://tinyurl.com/36h6hnya>

¹¹ Other tools available for analysing biodiversity data are listed in this portal of the Taskforce on Nature-related Financial Disclosures (TNFD): <https://tinyurl.com/3y76anx6>

The ecological transition of the agribusiness system

As pointed out (see p. §2.1.), the food system, in its prevailing form, is among the main contributors to biodiversity loss. Therefore, **the ecological transition of agribusiness** is urgently needed to make the current model more sustainable, both from the social (from the perspective of protecting human health) and environmental (in terms of biodiversity conservation and restoration and climate change mitigation and adaptation) points of view. The **benefits** would far outweigh the transition costs, as highlighted by a recent report by the Food System Economics Commission (FSEC 2024).

On the one hand, the **prevailing food system** has managed to keep pace with rapid population growth, reducing some forms of malnutrition and increasing life expectancy and quality of life globally; on the other hand, these gains are distributed in a highly uneven manner and are accompanied by **severe** and steadily worsening **critical issues** (obesity, loss of biodiversity, environmental degradation and climate change, but also undernutrition and malnutrition in the most vulnerable segments of the population). The annual cost associated with these problems is about US\$15 trillion, a figure that far exceeds the contribution of the agri-food system to world GDP (FSEC 2024)¹.

Approximately US\$200–500 billion per year (0.2% to 0.4% of annual global GDP) will be required to implement the ecological transition of food systems. This amount is relatively small compared with a cost reduction of at least US\$5 trillion annually to mitigate the above-mentioned problems (FSEC 2024). However, to achieve the transition of food systems, several **obstacles and challenges** must be overcome, including:

- the **increase in food prices** (inevitable, also to ensure fair remuneration for farmers, but to be offset by subsidies for the less well-off);
- the **loss of jobs** (which, however, would be offset by the creation of other job opportunities in the new sustainable supply chain – ILO 2020 and McKinsey & Company 2021);
- the **spread of “anti-ecological” ideologies** (which must be countered with research and dissemination of science-based data);
- **global inequalities** (from the perspective of “just” transition, the intervention of multilate-

ral development banks is crucial to ensure equitable and sufficiently rapid progress);

- the **interests of few specific lobbies** (in this regard, public benefits should be emphasised, multi-stakeholder approaches should be adopted, and fiscal proceeds from transition measures should be linked with interventions that receive broad support).

The **indispensable elements for an effective transition** to a sustainable agrifood system can be grouped into four main categories:



DIET

Changing the global diet pattern by **drastically reducing the consumption of animal products** (UNEP 2021) and **limiting food waste** throughout the production, supply and consumption chain (UNEP 2021 and FSEC 2024);



LAND USE

No allocation of additional land for agribusiness production and reduction of the number of areas already used for this purpose. **Protecting land from intensive exploitation** is probably the most effective way to preserve biodiversity; in addition, it is essential to restore ecosystems on land taken away from intensive practices (UNEP 2021, EEA 2023 and FSEC 2024);



SUSTAINABLE AGRICULTURE

Replace intensive farming and monoculture with **organic and polyculture practices** or, in any case, with innovative and environmentally friendly farming methods² (UNEP 2021, EEA 2023 and FSEC 2024);



ALIGNING ECONOMIC INCENTIVES AND TAXATION WITH THE TRANSITION

Reform tax systems and incentives to align with ecological transition goals and **make sustainable patterns of food production and consumption more accessible and affordable**. At the same time, environmentally harmful subsidies should be removed, and mechanisms should be introduced to discourage the relocation of agricultural and production activities to countries with less environmentally stringent regulations (FSEC 2024).

¹ The paper, published at the end of a four-year survey of global economic experts, delves into the economic, environmental and social implications of existing food systems and outlines a path toward a healthier, more inclusive, sustainable and also economically efficient system of food production, transportation, processing, distribution and consumption.

² Low-impact farming techniques include: organic farming, precision farming and vertical farming. Organic farming only allows the use of natural substances; certified organic farms do not use chemicals (pesticides, fertilisers, fungicides, herbicides, etc.), adopt only traditional techniques (such as crop rotation) and use natural fertilisers. Precision agriculture collects, processes, analyses and combines data to guide crop choices toward resource use efficiency, sustainability, quality and productivity of agricultural production. Vertical farming is based on soilless cultivation techniques (hydroponics, aquaponics, aeroponics) and involves growing crops on multiple levels vertically, ensuring less consumption of resources, starting with soil and water.

[2.2.]

Economic and financial risks related to biodiversity

The same risk categories used for climate risks (TNFD 2022) can be used to analyse economic and financial risks resulting from the loss of biodiversity.

- **Physical risks**
Risks related to the alteration of ecosystem balances and the subsequent loss of essential services related to them, with negative consequences for the economic sectors that depend on them, directly or indirectly;
- **Transition risks**
Risks arising from the difficulty companies and investors face in anticipating changes in the international and national regulatory framework (e.g., the introduction of increased environmental and/or reporting constraints) and the target market (e.g., changes in consumer preferences, increased competition for ecosystem services, volatility and increased cost

of materials); reputational risks; technological risks (related to the diffusion of more efficient and less environmentally harmful technologies).

The different risk categories mentioned above can significantly impact **financial risks**: credit risk, counterparty risk, operational risk, market risk, and liquidity risk. Therefore, it is essential for financial institutions to carefully assess and manage these risks. The loss of biodiversity can increase the **probability of default** by companies highly dependent on ecosystem services and cause financial losses for creditors and shareholders. In addition, environmental degradation increases the **risk of supply chain disruption**. For example, a company relying on raw materials obtained from areas threatened by deforestation could experience limitations in its ability to operate due to government restrictions.

FIGURE 3. BIODIVERSITY RISKS, ECONOMIC RISKS, AND FINANCIAL RISKS



Source: Italian Sustainable Investment Forum - ItaSIF

The recommendations of the Taskforce on Nature-related Financial Disclosures (TNFD)

The TNFD was created in 2021 to address the growing need to include nature-related factors¹² and biodiversity in decision-making and investment processes. The main objective of the TNFD is to provide guidelines for reporting on the risks and impacts inherent in biodiversity loss and

ecosystem degradation. In September 2023, TNFD published the final version of its recommendations, which include a set of general requirements and 14 specific requirements structured around four pillars: 1) governance, 2) strategy, 3) risk and impact management, and 4) metrics and targets¹³.

¹² As anticipated (see note 5 p. 13), “nature” here means the natural world, with an emphasis on the diversity of living organisms (including humans) and their interactions, with each other and the environment (TNFD 2023).

¹³ For more information: <https://tnfd.global/>

The Biodiversity risk assessment framework of the European Commission

In March 2024, the European Commission published a proposed framework to help financial institutions **quantify biodiversity risks more effectively** (European Commission 2024). The framework defines **various steps in the risk assessment process**, analysing the following aspects:

- potential risks;
- sources of potential risks;
- company's exposure to these risks and the consequences on business operations;
- degree to which different sectors are dependent on ecosystem services and the joint impacts of these dependencies;
- relevance, i.e. "materiality" of the different risks identified;
- measures to manage and minimise the identified risks.

According to the Commission's guidelines, financial institutions should equip themselves with appropriate models for quantifying nature-related financial risks before finally integrating mitigation measures. The framework is in line with approaches adopted by the Taskforce on Nature-related Financial Disclosures (TNFD) and the Network for Greening the Financial System (NFGS) (see p. 23).

Economic activities that depend on exploiting natural resources may be subject to stricter regulations and even legal sanctions if they negatively impact climate or biodiversity. This also applies to states, as evidenced by the 18 infringement proceedings on environmental issues initiated by the EU against Italy for violations of EU law and failure to implement directives. In the area of biodiversity, the following proceedings stand out:

- non-compliance with the Birds Directive for national hunting regulations¹⁴;
- failure to fulfil obligations under the Habitats Directive regarding by-catch of marine species and birds¹⁵;
- failure to complete the designation of sites in the Natura 2000 European Network of Protected Areas¹⁶;
- failure to designate Special Areas of Conservation (SACs) and adopt conservation measures¹⁷.

Based on 2022 data, environment-related sentences resulted in a **total payment** to the Italian state treasury of **more than €697 million** (nearly 10 times the amount Italy allocates annually to all its national parks) (WWF 2024).

In general, the increasing attention by civil society, media, and institutions regarding environmental issues increases issuers' exposure (public or private) to significant **legal risks**. Since the 2015 Paris Agreement, **climate change litigation** has increased, often set up "strategically" to generate broader change beyond the concerns of the individual litigant (Setzer et al. 2022). The Sabin Center's Climate Change Litigation database has more than 2,600 cases, including 1,897 in the U.S. and 789 in all other jurisdictions or regional courts (Vincro and Henke, 2023). Notable examples include:

¹⁴ Procedure No. 2023_2187: Non-compliance with the Birds Directive Directive 2009/147 and REACH Regulation 2006/1907 as amended by EU Regulation 2021/57 due to changes introduced in national hunting regulations.

¹⁵ Procedure No. 2023_2181: Failure to comply with its obligations under Habitats Directive 43/1992 regarding by-catch of marine and bird species.

¹⁶ Procedure No. 2021_2028: Failure to complete the designation of Natura 2000 Network sites. Natura 2000 is the European Network of Protected Areas, the main instrument of European Union policy for the conservation of biodiversity. It was established under the Habitats Directive to ensure the long-term maintenance of threatened or rare natural habitats and species of flora and fauna.

¹⁷ Procedure No. 2015_2163: Failure to designate Special Areas of Conservation (SACs) and adopt conservation measures (violation of the Habitats Directive).

Milieudefensie et al. v. Royal Dutch Shell plc (2021)

In a ruling issued on May 26th, 2021¹⁸, a **private company was for the first time obliged to reduce emissions** based on Dutch law, human rights obligations and those arising from the Paris Agreement. The court made its decision provisionally enforceable: Shell will be required to meet its emission reduction obligations even during the later stages of the trial. An appeal is currently taking place.

KlimaSeniorinnen v. Switzerland (2024)

The European Court of Human Rights (ECHR), in its judgement against Switzerland¹⁹ on April 9th, 2024, established, for the first time, a **direct link between the protection of human rights and the effects of climate change**. The Court recognised that the adoption of insufficient measures to mitigate the impact of climate change violates Article 8 of the European Convention on Human Rights concerning the right to respect private and family life.

ITLOS Advisory Opinion (2024)

On May 21st, 2024, the International Tribunal for the Law of the Sea (ITLOS) issued an advisory opinion regarding the climate obligations of signatory countries to the United Nations Convention on the Law of the Sea (UNCLOS)²⁰. Specifically, ITLOS determined that to protect the oceans, **countries should take all necessary measures to mitigate climate change**, choosing a precautionary approach and strengthening international cooperation on these issues. Furthermore, as ocean acidification significantly affects all forms of marine life, states must take action to **enhance the adaptive capacity of marine ecosystems and ensure biodiversity conservation**.

Although lawsuits concerning climate change often refer to the preservation of biodiversity, **biodiversity litigation** is emerging as a distinct category, with cases focusing specifically on the conservation of endangered species and habitats and the sustainable management of natural resources. The following are some examples.

Notre Affaire à Tous et al. v. France (2022)

In January 2022, five organisations²¹ sued the French state for failing to adequately assess risk

procedures in the use of pesticides, which are among the leading causes of biodiversity loss. On June 29th, 2023, the Paris Administrative Court established a **direct link between the failure to meet targets for reducing pesticide²¹ use and the decline of biodiversity** in France²². As a result, the French state was required to take all necessary measures to restore compromised ecosystems and to prevent further environmental damage, with particular attention to groundwater contamination. However, the environmental associations' request to oblige the state to **reform the pesticide risk assessment procedure** was not granted. As a result, the associations filed an appeal with the Paris Administrative Court of Appeals to address the critical issues of the pesticide use authorisation system and the new Ecophyto 2030 government plan, which the associations believe is inadequate for limiting the negative impact of pesticides on biodiversity.

ClientEarth and Lipu-BirdLife v. Lazio Region (2024)

In the area around Lake Vico (Italy), classified as a Natura 2000 site, intensive farming practices with the massive use of pesticides have altered local ecosystems due to the abnormal spread of red algae, which are harmful to wildlife and even to people (the lake's water is not anymore drinking water and thus become compromised). On May 7, 2024, the Council of State ordered the Lazio Region to take immediate action to counter the destruction of the protected habitat and granted six months to take the necessary measures²³.

OPIAC et al. v. Casino Group

In 2020, a group of associations representing Indigenous peoples of the Amazon²⁴ and several French and U.S. NGOs²⁵ sued the Casino Guichard-Perrachon group. The plaintiffs have alleged damages in terms of **deforestation** and damage to their livelihoods, which would be a violation of Indigenous peoples' rights. In particular, the Casino group is accused of failing to take the necessary measures to prevent the **importation of beef that originated on land taken from the Amazon rainforest**. The trial began in 2021; in 2022, the plaintiffs refused judicial mediation, stressing that the issue was of general interest and should be the subject of public debate and a judicial decision²⁶.

18 Milieudefensie v. Royal Dutch Shell, May 26, 2021, District Court of The Hague, ECLI:NL:RBDHA:2021:5337 (Milieudefensie), English translation ECLI:NL:RBDHA:2021:5339: <https://tinyurl.com/bdf7e927>

19 Verein KlimaSeniorinnen Schweiz and Others v. Switzerland (dec.) [GC], No. 53600/209, Apr. 9, 2024, E.d.u. Court, (ECHR), Grand Chamber, ECLI:EC:ECHR:2024:0409JUD005360020, available in English: <https://tinyurl.com/42cvtw7b>

20 ITLOS Advisory Opinion in Response to Request for Advice from a Group of Small Island States on Climate Change and International Law, No. 31, May 21, 2024, available in English: <https://tinyurl.com/2s3j2cry>

21 These are: Notre affaire à tous, Pollinis, Biodiversité sous pieds, Association pour la protection des animaux sauvages, Association nationale pour la protection des eaux et rivières.

22 These objectives derive from international and European Union law and, in particular, from the SUR Regulation (see p. 17).

23 Notre Affaire à Tous and others v. France, Paris Administrative Court, No. 2200534/4-1, June 29, 2023, available in French: <https://tinyurl.com/3u9af4au>

24 Council of State, Sec. IV, No. 3945, April 30, 2024.

[2.4.]

Financing biodiversity

In 2019, financial flows geared toward ecosystem protection reached between US\$124 and US\$143 billion (Paulson Institute 2020): although three times higher than the funding provided in 2012, this figure still needs to be increased to meet global biodiversity conservation and restoration goals. Globally, between US\$722 billion and US\$967 billion annually over the next ten years are needed to reverse biodiversity decline by 2030²⁷, with a funding gap between US\$598 billion and US\$824 billion annually (Paulson Institute 2020).

GLOBAL BIODIVERSITY FUNDING GAP

The difference between the total annual current capital flows directed toward biodiversity conservation and the funds needed to achieve global ecosystem protection and restoration goals.

(both public and private) allocated to ecosystem conservation and restoration should be increased, starting with a coordinated and shared effort by governments, international organisations, businesses, financial actors and civil society. As large as they are, annual investments in biodiversity are far less than the expected economic costs of lost ecosystem services: if current trends are not reversed, global GDP could contract by US\$2.7 trillion per year from projected levels by 2030 (Paulson Institute 2020). As noted, the GBF binds signatory countries to progressively increase financial resources to implement national biodiversity strategies and action plans (see p. 9). In addition, under the European Biodiversity Strategy 2030 (see p. 25), member states have committed to allocate €20 billion per year for biodiversity protection and restoration through European, national, and private funds (European Council, 2024).

Conversely, public and private financial flows associated with negative environmental impacts amount to nearly US\$7 trillion annually (UNEP 2023). Specifically, private funds allocated to economic activities with direct negative impacts on nature are US\$5 trillion, 140 times greater than private investment in nature-based solutions (UNEP 2023).

NATURE-BASED SOLUTION (NBS)

Actions to protect, restore, and sustainably manage natural and semi-natural ecosystems. Examples include sustainable forest management, regenerative agriculture, protection of watersheds, wetlands, and infiltration areas²⁸.

It is, therefore, essential to redirect financial flows from sectors and projects with negative impacts on nature to those that can contribute positively to its protection. Environmentally harmful public subsidies should be phased out, and resources

25 The indigenous peoples' associations are: Organizacion Nacional de los Pueblos Indigenas de la Amazonia Colombiana (OPIAC), Coordenação da Organizações Indígenas de Amazonia Brasileira (COIAB), Federation of Indigenous People of Pará (FEPIPA), Federação dos Povos and Organizações Indígenas de Mato Grosso (FEPOIMT).

26 The international associations are: Mighty Earth; Notre Affaire à Tous; Seattle Avocats; Sherpa; Canopée Forêts Vivantes; and France Nature Environnement.

27 For more information, on this and other environmental and biodiversity-related lawsuits: <https://tinyurl.com/49x69nmp>

28 Also included in the calculation of required resources are costs associated with the ecological transition in high-impact sectors such as agribusiness and infrastructure.

29 The GBF (see p. 9) explicitly mentions these activities, particularly in Goals 11 (restore, maintain and enhance ecosystem services) and 19 (increase financial resources for biodiversity).

Corporate Biodiversity Footprint: measuring corporate impacts on biodiversity

By Axa Investment Managers

All economic segments are dependent on nature and produce an impact through their activities. Biodiversity loss, therefore, affects all sectors, with particularly noticeable effects in agriculture, fisheries, forestry, mining, and manufacturing. Unsurprisingly, primary sector activities require greater sustainability in natural resource usage. Farming and extraction involve intensive use of resources and can put significant pressure on the environment. In the **agribusiness sector**, the leading cause of biodiversity loss relates to changes in land use, mainly because large tracts of land are needed for growing crops or raising livestock.

Moreover, **mining activities** can lead to water scarcity and release toxic components into the water. Extraction not only alters the natural landscape but also expands into new territories when resources in one area are depleted. Finally, the **manufacturing sector** involves different value chains, and the effects differ depending on the resources used in processes and final products.

One of the most popular ways to measure the effects on biodiversity caused by a company is through the **Biodiversity Footprint**. While there is

no single indicator for measurement, Axa Investment Managers utilises the Corporate Biodiversity Footprint (CBF), developed by Iceberg Data Lab, in which it has a stake. This indicator estimates the **adverse effects on biodiversity resulting from a company's economic activities** along the value chain in a given year. It considers the impact caused by various factors related to a company's processes, products, and supply chains (e.g., changes in land use, pollution, and greenhouse gas emissions equivalent to a particular share of km² of pristine forest lost).

The need for more sustainable production and consumption patterns opens numerous **investment opportunities**. Value can be created by investing in companies that provide solutions to biodiversity loss through alternative products, services, and technologies that enable better conservation and protection of ecosystems (e.g., precision or regenerative agriculture, production of plant-based foods and sustainable packaging, water treatment). Investment opportunities are steadily increasing as companies place increasing importance on biodiversity by setting specific targets.

The work of the Network for Greening the Financial System in the area of biodiversity

By Franco Panfili and Livia Girolami,
Markets and Payment Systems Department, Banca d'Italia (Bank of Italy)¹

The Network for Greening the Financial System (NGFS), founded in December 2017, consists of a group of Central Banks and supervisors participating on a voluntary basis. Its purpose is to contribute to developing environmental and climate risk management within the financial sector and mobilise financial resources to support the transition to a sustainable economy. NGFS members come from all geographic areas, with a good diversification between developed, emerging and developing countries.

To address the risks related to biodiversity loss, in April 2021, NGFS established a Joint Study Group with the International Network for Sustainable Financial Policy Insights, Research, and Exchange (INSPIRE) on Biodiversity and Financial Stability.

Biodiversity loss has been integrated into a broader framework alongside sources of **environment-related financial risk**, defined by NGFS as risks posed by financial institutions' exposure to activities that may potentially cause or be affected by environmental degradation and the loss of ecosystem services.

In its early work, the NGFS-INSPIRE Study Group showed how **biodiversity loss** and the failure of economic actors to align their efforts to halt and reverse it (physical and transitional risk, respectively) could **negatively impact financial and price stability**. In May 2022, the Group released a final report analysing different approaches for developing **scenarios to integrate nature-related risk developments** and conducting preliminary assessments for **stress tests** to assess the impact of potential physical and transition shocks on financial stability (NGFS 2022).

In April 2022, the NGFS established the **Taskforce on Biodiversity Loss and Nature-related Risks** with a two-year program. In September 2023, based on the task force's work, the NGFS published a conceptual framework on **nature-related financial risks** (NGFS 2023). The publication aims to establish a shared framework and a common

language for nature-related financial risks. The NGFS proposes a three-step **process for assessing these risks**:

1. An initial phase of identifying sources of physical and transitional risk;
2. an intermediate stage of assessing the associated economic risks;
3. a final stage aimed at assessing risks in the financial system as a whole.

The **first step** involves identifying and **prioritising physical and transitional risks**, which is instrumental in assessing them. To this end, it is helpful to analyse the current exposure of economic and financial activities to identify **the economic sectors most at risk and the ecosystems they depend on to identify possible sources of vulnerability**. The diversity of natural environments in different regions of the planet requires granular data for the **geographic location of likely impacts** and considering the **connections between different ecosystems** to comprehensively assess their potential effects, which could ultimately have systemic implications.

The second step requires the assessment of risks and possible economic impacts that could result from the exposures identified in the first step. The NGFS framework suggests that economic impacts related to environmental risks should be considered in the assessment:

- **direct and indirect effects**
economic impacts extend beyond direct effects to diffuse impacts across value chains, different sectors and other parts of the economy;
- **effects at the microeconomic, sectoral, regional and macroeconomic levels**
assessing impacts on businesses and consumers reliant on ecosystem services at the microeconomic level, and potential implications for prices, productivity, investment, socioeconomic behaviour and capital flows at the macroeconomic level;

¹ *Disclaimer:* the opinions expressed are attributable solely to the authors and do not bind the employing institution in any way.

² The NGFS consists of 138 members and 21 observers (March 2024). In 2019, Banca d'Italia joined the Network and was a temporary member of the NGFS Steering Committee in 2022-2023 and continues to actively contribute to the work by co-chairing, together with the New Zealand central bank, the "Net zero for Central Banks" working group www.ngfs.net

- **vulnerability and the ability to adapt to shocks from physical and transitional hazards**

the possibility of substituting endangered ecosystem services, which could take place on a geographic basis between different ecosystems (e.g., by changing suppliers or using different products) – often difficult to implement – and technological innovation (using technological innovation to make up for the loss of ecosystem services).

In the **third stage**, Central Banks and supervisors are asked to consider the **direct or indirect financial risks** that could arise from the previously identified exposures. Nature’s degradation could affect financial institutions by **devaluing financial assets and collateral in lending operations and/or reducing corporate profits**.

An additional important consideration is that **economic actors** are not only exposed to nature-related physical and transitional risks but also **contribute directly, negatively or positively to these risks themselves**³.

The **Taskforce on Biodiversity Loss and Nature-related Risks** recently set out the work program for the next biennium (2024-2025). The work will focus on improving the **identification of data and**

metrics for assessing natural risks for the financial system. Efforts will be made to identify which ecosystems (and related services) have the potential to be most relevant from a macroeconomic and financial perspective (and which among them is at risk of decline/collapse).

These research strands will seek to provide answers to the various critical issues present in the development of finance geared toward preserving biodiversity and managing nature-related financial risks. Nature investments are very long-term (often taking several decades to see realisation) and challenging for the traditional investor with a short to medium-term time horizon. They are a type of investment and project-related risk that requires specific knowledge and analytical skills, which are often not present even in the world of central banks. The work of NGFS contributes to solving these critical issues through analysis, recommendations, and knowledge formation, with the understanding that the degradation of nature and actions to preserve it have a detected impact on economic and financial systems.

³ This is the so-called concept of dual materiality. This concept takes into consideration both the impacts that the economic and financial system has on the ecosystem and the effect that the ecosystem has on the economic and financial sector.

[CHAPTER 3]

The European regulatory framework

As previously highlighted, biodiversity loss, alongside climate change, is currently the primary environmental threat on a global scale. In response to this pressing issue, the European Union set a goal in 2010 to halt ecosystem degradation by 2020 and to restore ecosystem services in the EU while contributing to averting global biodiversity loss³⁰.

In 2020, the Commission published the new **Biodiversity Strategy 2030**³¹, reviving the ambitions of its predecessor. The document is one of the cornerstones of the **European Green Deal**. Among the

Strategy's 14 key targets are: halting the decline of pollinators, planting three billion trees, reducing the use and risk of pesticides by 50%, reducing by 50% the number of species on the so-called "red list"³² that are threatened by invasive exotic species, and designating at least 30% of European land and seas as protected areas. Member States committed to implementing more than 100 actions by 2030 to reach these goals³³.

[3.1.]

Nature Restoration Law and Regulation on Deforestation-free Products

The **Nature Restoration Law**³⁴ is a vital element of the European Biodiversity Strategy and is aligned with the Kunming–Montréal Global Biodiversity Framework (see p. 9). The law mandates the restoration of **at least 20% of the EU's land and sea areas by 2030 and all ecosystems needing restoration by 2050**. The regulation contains specific binding targets for Member States, including reversing the decline of pollinator populations by 2030, protecting forest ecosystems, improving urban ecosystems, restoring marine habitats, and removing barriers that prevent the connectivity of surface waters. EU countries are expected to submit National Restoration Plans to the Commission within two years of the Regulation coming into force (so by mid-2026), showing how they

will deliver on the targets.

Another crucial piece of legislation is the **Regulation on Deforestation-free Products**³⁵, adopted in 2023. The Regulation requires relevant companies to conduct strict **due diligence** if they place on the EU market or export from its **commodities linked to deforestation** such as: palm oil, cattle, soy, coffee, cocoa, wood and rubber, and some of their derived products (such as leather, furniture or chocolate)³⁶. As noted above, deforestation contributes significantly to global warming³⁷ and biodiversity loss; therefore, it is crucial to ensure responsible sourcing of raw materials and consumption of products without negative impacts on forests.

³⁰ The European Biodiversity Strategy to 2020 set six main targets: conserving and restoring nature, maintaining and enhancing ecosystems and their services, ensuring the sustainability of agriculture and forestry, ensuring sustainable use of fisheries resources, combating invasive alien species, and addressing the global biodiversity crisis. The latter goal included reducing indirect biodiversity losses, mobilising additional resources, cooperating in "biodiversity-proof" development, and equitably sharing benefits from the use of genetic resources.

³¹ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, EU Biodiversity Strategy 2030, COM/2020/380, May 20, 2020: <https://tinyurl.com/2t6rarh9>

³² The European Red List of Species contains information on the conservation status of more than 10,000 European species (mammals, birds, reptiles, amphibians, freshwater and marine fish, butterflies, dragonflies, freshwater mollusks, selected groups of beetles, terrestrial mollusks, vascular plants, including medicinal plants, bees, grasshoppers, locusts and crickets, lycopods and ferns). The list was compiled based on guidance from the International Union for Conservation of Nature (IUCN).

³³ Italy has also developed a national biodiversity strategy, which outlines two strategic objectives across eight areas of intervention. These areas include protected zones, species, habitats and ecosystems, food and agricultural systems, livestock, forests, urban greenery, inland waters, marine environments, and soil. Additionally, there are cross-cutting areas of action designed to facilitate, strengthen, and support the achievement of these objectives.

³⁴ Proposal for a Regulation on nature restoration, COM/2022/304: <https://tinyurl.com/467xua3v>

³⁵ Regulation (EU) 2023/1115 of the European Parliament and of the Council of 31 May 2023 on the making available on the Union market and the export from the Union of certain commodities and products associated with deforestation and forest degradation.

³⁶ The Regulation establishes rules concerning the making available on the Union market and the export from the Union of certain products associated with deforestation. The obligations apply to all operators (natural or legal persons) who in the course of a commercial activity place the products concerned on the market or export them.

³⁷ According to the Commission, preventing forest degradation would reflexively result in the avoidance of about 32 million tons of carbon emission into the atmosphere each year (with potential economic savings of at least €3 billion per year) with positive impacts in terms of combating climate change and protecting biodiversity: <https://tinyurl.com/3kk3zu87>

[3.1.]

CSRD, CSDDD and SFDR

At the European level, the critical legislation on sustainability reporting is the **Corporate Sustainability Reporting Directive (CSRD)**³⁸, which requires companies to **disclose sustainability information on the risks and impacts** of their activities. Companies subject to the CSRD have to use the European Sustainability Reporting Standards – ESRS, including **ESRS E4 on Biodiversity and Ecosystems**. It covers factors contributing to biodiversity loss, impacts of different economic activities on species, and their dependence on ecosystem services. Companies must publish a transition plan compatible with different targets: 1) no net loss³⁹ of biodiversity by 2030, 2) net gain from 2030⁴⁰, and 3) full recovery by 2050.

Companies also have to disclose information on how business models and strategies align with the goals of the **Global Biodiversity Framework (see p. 9)** and the **European Biodiversity Strategy 2030**. In addition, companies will have to disclose impact metrics related to their material impacts resulting in biodiversity and ecosystem change, such as the impacts of company activities on species and their risk of extinction. Finally, following the dual materiality approach, the standard also calls for analysing exposure to biodiversity-related risks and opportunities⁴¹.

GRI Standard 101: Biodiversity 2024

At the international level, the Global Reporting Initiative (GRI) has published the new **GRI Standard 101: Biodiversity 2024**, which will come into effect on January 1, 2026⁴². The Standard will

enable an organisation to publicly disclose nature-related risks and their most significant impacts on biodiversity and how it manages them.

Another relevant piece of legislation is the **Corporate Sustainability Due Diligence Directive (CSDDD)**, which requires large European companies⁴³ to **identify and address adverse human rights and negative environmental impacts** resulting from their actions. Among the negative environmental impacts that companies must address through appropriate due diligence processes, the Directive also identifies those related to biodiversity, according to Article 10 (b) of the Convention on Biological Diversity (see p. 9).

Finally, under the **Sustainable Finance Disclosure Regulation (SFDR)**⁴⁴, financial market participants are also required to disclose the impacts of their activities on biodiversity and ecosystems⁴⁵. Specifically, they will have to disclose the **share of investments in investee companies with sites/operations** located within or near **biodiversity sensitive areas**, specifying whether these sites/operations have negative impacts on such areas.

38 Directive (EU) 2022/2464 of the European Parliament and of the Council of December 14, 2022, as regards corporate sustainability reporting.

39 As made explicit in ESRS E4, any “net loss” is avoided when the negative impacts on biodiversity caused by a project (or plan or program) are balanced or offset by measures taken to avoid and minimise the negative impacts of the project (or plan or program), to achieve the restoration of local ecosystems, and, finally, to compensate for residual negative impacts.

40 A “net gain” is achieved when the positive impacts on biodiversity outweigh the losses, understood as negative impacts.

41 At present, corporate sustainability reports devote little space to biodiversity. An analysis of the sustainability reports of 170 companies listed on European markets over the period 2018–2021 even found a decrease in the amount of information published on the subject: in fact, the use of GRI indicators fell from 36.5% to 30.5% and the use of other quantitative indicators from 22.3 to 21.8. In general, companies disclose less data on biodiversity than on other environmental issues, such as circular economy, climate change, and efficient resource management (Fondevilla et al. 2023).

The standard takes into account the Global Biodiversity Framework (GBF) of Kunming–Montréal, the Science Based Target Network and the Taskforce on Nature-related Financial Disclosures.

43 European companies with at least 1,000 employees and at least €450 million in turnover according to the proposed Directive approved in March 2024 by the Parliament and Council on Corporate Sustainability Due Diligence Directive.

44 Regulation (EU) 2019/2088 of the European Parliament and of the Council on sustainability-related disclosures in the financial services (SFDR) applies to two distinct macro categories of financial market participants. First, operators that provide services that involve making investment decisions defined as “financial market participants” including, among others: an insurance firm that makes an insurance investment product available, an investment firm that provides portfolio management services, an institution for occupational retirement provision (IORP), and a credit institution that provides portfolio management services. Also included in the scope of SFDR are practitioners who provide investment recommendations, referred to as “financial advisers”.

45 The Principal Adverse Impact indicator n.7 according to Commission Delegated Regulation (EU) 2022/1288 of April 6, 2022 supplementing the SFDR.

[3.3.]

European taxonomy for sustainable activities

The **EU Taxonomy for sustainable activities** (Regulation (EU) 2020/852) is a **classification system** that defines criteria for economic activities that can be considered environmentally sustainable⁴⁶. It is designed as a tool to direct investments to the economic activities most needed for the transition to a climate-neutral economy. Activities are selected based on their **substantial contribution to at least one of six European environmental objectives** (including the protection of biodiversity and ecosystems)⁴⁷. In addition, to align with the Taxonomy, economic activities **must not cause significant harm to any of the other objectives** (according to the Do No Significant Harm - DNSH principle) and must comply with a series of minimum social safeguards.

Compliance with specific **Technical Screening Criteria (TSC)** determines whether an activity contributes to the objective of protecting biodiversity and ecosystems. According to the Environ-

mental Delegated Regulation, the activities that can contribute to this objective are the **protection and restoration of ecosystems and accommodation activities**. It is essential to point out that the issue of biodiversity will assume a relevant role in developing future TSCs for activities related to some high-impact sectors (e.g., the mining and agricultural sectors).

Regarding the generic criteria for **DNSH to protect and restore biodiversity and ecosystems**⁴⁸, an Environmental Impact Assessment (EIA) or screening must be completed following Directive (EU) 2011/92. In addition, for sites and operations located in or near biodiversity-sensitive areas (including the Natura 2000 Network), further assessment must be conducted, and the necessary mitigation measures must be implemented.



⁴⁶ Biodiversity-related measures in the EU Taxonomy are mainly contained in:

- Regulation (EU) 2020/852 of the European Parliament and of the Council of June 18, 2020, in particular Articles 3 (b), 9, 15;
- Commission Delegated Regulation (EU) 2021/2139 of June 4, 2021- Appendix D;
- Commission Delegated Regulation (EU) 2023/2486 of June 27, 2023.

⁴⁷ The other environmental goals are climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, and pollution prevention and control.

⁴⁸ Commission Delegated Regulation (EU) 2021/2139 of June 4, 2021

[CHAPTER 4]

Inclusion of biodiversity in financial processes and products

By incorporating biodiversity into financial processes and products, investors, banks, and insurance companies can achieve a dual objective: on the one hand, **reducing negative impacts** of human activities on biodiversity; on the other, **increasing positive impacts** in terms of ecosystem protection and restoration. Similarly to climate change (ItaSIF 2021 and 2020), biodiversity can be incorporated into financial decisions across asset classes and economic sectors through different approaches⁴⁹.

During a meeting of the ItaSIF Working Group focused on Sustainable Finance and Biodiversity, a survey showed that the **main obstacles** to investing in biodiversity are the **difficulty in measuring impacts** and the **lack of knowledge on the topic**. Following these, uncertain short-term returns and misinformation were also cited⁵⁰. Conversely, the **primary advantage** identified is the **positive impact**, followed by **risk reduction**⁵¹.

Lastly, ItaSIF Members were asked to identify their **priorities** for encouraging investments in biodiversity. In order of importance, the following measures were mentioned: **harmonising methodologies for measuring biodiversity**, introducing tax breaks for companies and investments with a positive impact on biodiversity, enacting stringent regulations to protect biodiversity, and increasing biodiversity reporting requirements for companies⁵².

Although many challenges remain and the regu-

latory framework can be improved, an increasing number of financial actors are incorporating biodiversity considerations into their policies and products. In the following pages, we provide **examples of ESG approaches** for integrating biodiversity into investment, financing, and insurance decisions, drawing from the **experiences of some ItaSIF Members**.

Regardless of the methodology adopted, evaluating not only the outcomes and impacts (positive or negative) generated by issuers in the past but also their **transition plans is crucial**. These plans should align with **international standards** and include measurable intermediate targets. In addition, to counter the phenomenon of **greenwashing** (ItaSIF 2022), the following elements should be checked for consistency: governance structures, products and/or services, operational strategies, data, and progress monitoring systems.

As noted (see p. 18), supervisory authorities recognise the **financial relevance of environmental risks** related to climate change and biodiversity loss. The new Capital Requirements Regulation (CRR3)⁵³ and the European Banking Authority's (EBA)⁵⁴ draft guidelines on ESG risks, in part thanks to the NGFS contribution, will increasingly require banking operators to assess biodiversity impacts and their dependencies. They will also need to pursue EU objectives on the protection and restoration of ecosystems, including those outlined by the GBF.

49 ESG criteria can be included in investment, financing, or insurance decisions according to different approaches, each distinguished by specific objectives and methodologies. These approaches are not mutually exclusive: in fact, several approaches can be applied to the same portfolio at the same time. For more information: <https://investiresponsabilmente.it/glossario/approcci-esg/>


50 The first question of the survey, "What is the main obstacle to investment in biodiversity?" included spontaneous responses. The question was answered by 30 people with a total of 36 responses.

51 The second survey question "What is the main benefit of investing in biodiversity?" included spontaneous responses. The question was answered by 33 people with a total of 42 responses.

52 The third question of the survey, "What is the priority for fostering investment in biodiversity?" required ordering four response options in order of importance. Forty-three people responded to the question.

53 Basel III finalisation (CRR 3) - Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 575/2013 as regards requirements for credit risk, credit valuation adjustment risk, operational risk, market risk and the output floor, and amending Regulation (EU) No 806/2014

54 For more information, see: <https://tinyurl.com/42dxyyym>

An aerial photograph of a lush green forest with a winding river and several islands. The water is a deep blue-green color, and the forest is a vibrant green. The text is overlaid on the center of the image.

**By incorporating
biodiversity into
financial processes
it is possible to
achieve a dual objective:
reducing negative
impacts and increasing
positive impacts**

Accurate and comparable data is essential to integrate biodiversity in financial processes and products. The first set of information pertains to the **impact of each industrial sector** on biodiversity loss. There are various sources reporting these impacts, notably the Biodiversity Impact Assessment Tools. This tool provides specific data by country and is available in open-source formats, such as Bioscope. A second set of information relates to **data already available for specific areas**, particularly protected ones, based on methodologies such as the Potentially Disappeared Fraction of Species (PDF) and the Mean Species Abundance (MSA). These methodologies help measure species loss and the average number of individuals per species.

By correlating the level of PDF or MSA in one or more protected areas near a given industrial site (within a certain radius), it is possible to measure biodiversity loss, although this data does not account for the specific impact of each site. Based on this correlation, a **KPI** can be developed and included **in the company's transition plan**. Risk mitigation initiatives should correspond to this

KPI and biodiversity restoration activities, which include funding allocations to protected areas near the sites. The adoption of **specific indicators** can have significant positive repercussions, such as 1) increased reliability of available data; 2) internalisation of negative externalities; 3) scalability of the identified solutions, which can be applied to multiple industries; 4) bureaucratic simplification, as no public acts are required other than deeds of allocation; and 5) multiplier effect if a significant number of companies adopts the KPI in a specific area or if lending institutions and investors request it from a sufficient number of companies.

Other biodiversity-related KPIs relate to **restoring areas used for raw material extraction**, such as limestone and clay quarries for cement plants and iron for steelworks and their major customers (automotive, construction, and shipbuilding companies). Although identifying the specific quarry or mine from which the raw material originates can be complex, the financing entity or investor should ideally complete this process beforehand⁵⁵.

⁵⁵ A study on 10 Italian foundries revealed that environmental impacts from extraction activities account for an average of 74% of the overall environmental impact of a foundry, using life-cycle assessment methodology (Monteleone et al., 2024).

The ADVANT Nctm Transition Finance Toolkit

By Riccardo Sallustio, Partner, ADVANT Nctm

ADVANT Nctm has developed, among other services, the *Advantage by ADVANT Nctm* toolkit for evaluating transition plans of companies in specific hard-to-abate sectors (steel, cement, automotive, shipping, and soon-to-be real estate). The toolkit differs in an innovative way from scoring-based tools available on the market and was built considering the interconnectedness of three key themes concerning the banking sector:

- need for **training** on technological and policy aspects;
- need to have an **operational action plan for customer engagement** on transition governance management, its risks, opportunities and transition plans, including the use of specific indicators;
- **contractual protection** of the bank and investor from greenwashing related to transition plans.

The toolkit is aimed to provide a helpful methodology for incorporating transition-related enablers and risks into banking policies and products and is addressed to those within lending institutions

involved in ESG, education, credit, risk, origination, compliance, legal aspects and banking products. Specifically, the *Advantage by ADVANT Nctm* includes the following:

1. **training** on key transition risks and drivers and impacts of the Green Deal, CRR3 and EBA guidelines, as well as individual industry sector trends and new decarbonisation technologies;
2. **engagement with customers** on transition governance, including *carbon lock-in risk*⁵⁵ and credibility of transition plans;
3. **KPIs whose underlying data are easily identifiable**, also structured to offset specific negative impacts on biodiversity. In addition, the toolkit includes **contract standards** for transition financing to transfer some legal risks to borrowers regarding the credibility of transition plans.

¹ Carbon lock-in risk can be defined as the risk of continuing to use infrastructure or assets with a high level of emissions, even where the possibility exists to replace them with low-emission infrastructure and assets (OECD 2023).

The directions of the Science Based Targets Network (SBTN)

Science Based Targets (SBTs) guide companies in aligning their activities with identified environmental goals on a global scale. SBTs are defined by the Science Based Target Network, a broad consortium of organisations coordinated by the same founding group as the Science Based Targets Initiative (SBTi) (WWF, UN Global Compact, WRI and CDP). In May 2023, the SBTN published the first list of targets concerning nature and biodiversity (Science Based Targets for Nature) regarding four strategic areas: water resources, biodiversity, land use and oceans. The proposed methodology is divided into three phases:

Step 1: identify key themes and areas to focus on when setting goals on natural capital and biodiversity;

Step 2: set priorities in goal setting, including environmental, social and financial considerations;

Step 3: set targets for land use and water management, thereby addressing some of the most relevant factors for biodiversity loss and climate change.

[4.1.]

Exclusions and divesting

A sustainable investment policy should aim to prevent or minimise adverse impacts on ESG factors stemming from investments. The most common strategy employed for this purpose is the exclusion strategy, which involves **reducing the investable universe** by explicitly excluding certain issuers, sectors, products or countries.

Exclusions, however, only affect future capital allocations; therefore, to reduce the negative impacts generated by investments, it is essential to also have a **divestment** policy that is consistent with the planned exclusions. This allows for addressing decisions made in the past and the current composition of the portfolio. Full or partial divestment is a **complex process** that can be time-consuming but has significant benefits: first, it ensures a rapid reduction of negative impacts at the portfolio level; and second, it can be effective as a “market signal”, especially when undertaken within broader divestment initiatives involving networks or consortiums of investors.

It should be noted that both exclusions and divestment can be preceded by **engagement initiatives** (see §4.2.) and therefore applied only if dialogue with the issuer does not yield the desired results. Finally, exclusions can be combined with other approaches, such as the “best in class” approach, which selects or weighs issuers in the portfolio according to ESG criteria, favouring the best within

a universe, category, or asset class. For example, companies or countries with particularly negative impacts on nature can be excluded, and for other sectors (less damaging or more challenging to exclude altogether), the most virtuous share of issuers (e.g., the top 20% from the perspective of protecting ecosystems) can be selected.

The following are examples of **exclusion criteria** relevant in financial products geared toward biodiversity conservation and restoration:

- countries that have not signed the major international biodiversity conventions (e.g., Convention on Biological Diversity; Convention on International Trade in Endangered Species; Agreement to Protect Marine Life in the High Seas);
- issuers involved in environmental controversies;
- issuers who, in the absence of a specific biodiversity policy, operate in high-impact sectors (e.g., forestry, fishing and fish farming, textiles, etc.⁵⁶);
- issuers who, in the absence of a specific biodiversity policy, operate in sectors related to palm oil, soybean, livestock, timber and other products mentioned in the Directive on Imported Deforestation (see §3.1.);
- issuers that generate a negative impact on

⁵⁶ To identify sectors with particularly negative impacts on biodiversity, reference can be made to the list of high-impact sectors in the proposed Directive of the Parliament and the Council on the business duty of care for sustainability.

- endangered species and protected areas (e.g., on UNESCO heritage sites, wetlands cited in the Ramsar Convention, critical natural habitats cited by the International Union for Conservation of Nature – IUCN);
- issuers that produce pesticides;
- issuers that produce GMOs;
- issuers that conduct animal testing;
- issuers that produce plastic.

[4.2.]

Engagement

Engagement (understood as **investor-investee dialogue** on sustainability issues) can be an effective tool for including biodiversity protection in investment decisions. It can be adopted for **equity or bond investments** and is a **long-term process** aimed at positively influencing behaviour and increasing the degree of transparency.

Investors can join **collective engagement initiatives** on a global or national scale to make their actions more effective (ItaSIF 2023). In this regard, it is worth noting the permanent working group initiated by ItaSIF in 2021, aimed at facilitating joint engagement initiatives within the membership base.

The ItaSIF working group on engagement

Since 2021, ItaSIF Members who are part of the Engagement Working Group have participated in the **Sustainability Week promoted by Borsa Italiana**, engaging with companies regarding several issues considered priorities in ESG. **Introducing corporate policies for sustainable water resource management and biodiversity protection** is among the identified topics.

In addition, in 2023, 40 institutional investors and 37 other member organisations of ItaSIF –

led by Italian Pension Funds Cometa and Pegaso – initiated an engagement with the Italian Government, understood as an issuer and critical player in achieving the nationally set sustainability objectives and goals. The initiative aims to initiate a constructive discussion between investors and the Italian state on several sustainability issues that have economic and financial relevance, such as **water resource management, pollution prevention, and biodiversity protection** on the environmental side.

Internationally, the leading collective biodiversity engagement initiative is **Nature Action 100⁵⁷: more than 200 investors** (with more than US\$28.6 trillion in assets under management or advisory) engage with the **100 companies considered the most relevant to reversing the trend of nature and biodiversity loss by 2030**. Investors participating in the initiative have asked companies to urgently take the necessary steps to protect and restore nature and ecosystems, with a focus on the following sectors, which are considered crucial: biotechnology and pharmaceuticals, chemicals, retail, agribusiness (manufacturing and distribution), forestry, packaging, personal and household products, metals and mining.

Another initiative worth mentioning is the **Non-Disclosure Campaign (NDC)** coordinated by **CDP (formerly Carbon Disclosure Project)**. This direct engagement campaign targeted about 1,600 companies selected from high-impact companies that did not respond to CDP's climate change, deforestation, and water security questionnaires. Since 2024, the questionnaires have been unified, and **specific questions about the impact of corporate activities on biodiversity** have been included.

⁵⁷ The initiative is coordinated by Ceres and the Institutional Investors Group on Climate Change (IIGCC), with technical support from the Finance for Biodiversity Foundation and Planet Tracker. For more information: www.natureaction100.org

[4.3.]

Thematic investment and impact investing

Thematic investments are characterised by selecting issuers based on criteria focused on one or more sustainability themes. In the case of biodiversity, sectors with positive impacts, such as sustainable agriculture (organic or agroecology), agroforestry, and sustainable fisheries, may be favoured.

Impact investing, on the other hand, consists of investments in companies, organisations, states, and funds with the intention of generating a positive and measurable social and environmental impact along with a financial return. This approach can include investments in reforestation and ecosystem restoration projects, sustainable land and land use, sustainable fisheries, and ocean conservation. Financial instruments available in the market for impact investing include green bonds and Sustainability-Linked Bonds or Loans.

GREEN BOND

Bond where the use of proceeds is directly linked to financing projects with positive environmental impacts that must be measured and appropriately reported. Globally, the first green bond was the Climate Awareness Bond, launched by the European Investment Bank (EIB) in 2007. In Europe, green bonds can choose to comply with the **European Green Bond Standard (EUGBS)**, which ensures levels of transparency in line with market best practices. It includes strict constraints on the use of proceeds to finance activities aligned with the European Environmental Taxonomy (see §3.3.) and verification of the requirements by independent external reviewers.

SUSTAINABILITY-LINKED BOND (SLB)

Any bond with financial and/or structural characteristics that may vary depending on whether the issuer achieves or fails to achieve predefined sustainability targets to which issuers explicitly commit. Unlike green bonds, the proceeds from SLBs are used for general purposes (ICMA 2020).

Below are some examples of sustainable biodiversity bonds.

Next Generation EU Green Bond

Funds raised through the issuance of the Next Generation EU Green Bonds are intended to finance

environmental measures contained in the National Recovery and Resilience Plans (NRPs). EU GBS has established nine areas where proceeds from EU Green Bonds can be used, including biodiversity protection and restoration, climate change adaptation, energy efficiency and renewable energy.

Terna (2021): green bond for reduction of land consumption

In 2021, Terna issued a green bond to finance projects to reduce land consumption and loss of terrestrial biodiversity by **demolishing existing overhead lines**. Demolitions reduce the permanent land take caused by pylons and allow the underlying vegetation to be restored. The positive impact is most significant when the removed overhead lines cross areas of environmental interest, such as natural parks, wetlands and other protected areas. In addition, demolitions eliminate the risk of birds colliding with power lines. Finally, the alternative solutions identified, such as underground cables, reduce the visual impact of the electrical infrastructure, which is one of the most relevant ones for local stakeholders.

International Bank for Reconstruction and Development (2022): Wildlife Conservation Bond

In 2022, the International Bank for Reconstruction and Development (IBRD) raised US\$150 million for a sustainable bond structured on a **pay-for-success basis to protect South Africa's endangered black rhino population**. The five-year Wildlife Conservation Bond (WCB) will not pay a coupon to investors but will instead allocate a US\$10 million payment to two South African protected areas, Addo Elephant National Park and Great Fish River Nature Reserve, which harbour significant populations of endangered black rhinos. Investors will receive a return on their investment if the financing achieves its goals of increasing rhino populations. For example, investors will be eligible for maximum remuneration if the population grows by at least 4% (US\$91.73 per US\$1,000 bond held). Conversely, investors will not receive any remuneration if the population does not increase and the targets are not met.

States can also issue green bonds and Sustainability-Linked Bonds as sovereign debt. Following are some examples:

Italy (2021): sovereign green bond

In March 2021, Italy issued its first green BTP, a €8.5 billion bond, followed by a second €6 billion issue in September 2022. The bonds are tied to financing projects in the following areas: tran-

sportation (public transport, incentives for electric and hybrid cars, port infrastructure), energy efficiency (tax incentives for renovation expenses); and environmental and biodiversity protection.

Uruguay (2022): Sustainability-Linked Sovereign Bond

In 2022, Uruguay issued a sovereign SLB linking the government's financing strategy to achieving climate and nature-related goals established under

the Paris Agreement. The bond incorporates two KPIs: 1) reducing the intensity of greenhouse gas emissions and 2) preserving the area of primary forests in the country. Together, these KPIs contribute to mitigating global warming and protecting biodiversity.

[4.4.]

Nature-related certificates and biodiversity credits

Over 30 certification standards are available for biodiversity conservation and habitat restoration since 2022, indicating a strong market interest. The investable universe in this area is quite large, allowing for financing the development of different types of nature-based solutions (NBS).

The common elements of investments in activities with a nature-related certification are:

- **Enhancement of natural capital**
it is necessary to quantify the value of the reference unit (ecosystem or habitat) and its restoration and/or improvement to fund activities;
- **Improvement and/or conservation of ecosystem services**
measured indicators in the baseline situation, funded interventions must improve and/or maintain the provision of ecosystem services at a constant level (in case it is threatened); these improvements must be quantifiable, verifiable and certified by an independent third party;
- **Strict adherence to the mitigation hierarchy**
avoid and reduce negative impacts on nature as much as possible, restore damaged habitats and, only as a last resort, compensate;
- **Value retention**
in cases where funding is for compensation, the intervention must occur in a habitat (geographically proximate and of the same ecosystem type) comparable to the one that was destroyed.

Within the nature-related certificate market, **biodiversity credits** involve creating and exchanging standardised, measurable, and verifiable

units corresponding to biodiversity improvements. Companies can buy or sell them to finance projects and activities that produce positive, quantifiable biodiversity outcomes (Dasgupta 2021 and Manfrino 2024).

When taking into account the strengths and distortions of the carbon credit market, it is essential to set up this nascent market for nature-related certifications, including biodiversity credits, in a way that **prevents possible negative impacts on biodiversity**, as well as social and economic aspects (The Biodiversity Consultancy 2022). The **risks** to be considered are similar to those of other credit exchange-based instruments but may prove more challenging to manage due to biodiversity's specific and multidimensional nature. The main ones are as follows:

- **Incentives for harmful practices**
If not appropriately structured, nature-related certificates and biodiversity credits could create a mechanism akin to the "**right to pollute**" often associated with using carbon credits. Adopting the **mitigation hierarchy** can avoid the potential licence to trash.
- **Uncertainty and cost of monitoring**
It is easier (and less expensive) to evaluate the measures implemented rather than the **results achieved**. However, monitoring actions alone does not guarantee the achievement of biodiversity protection goals. Therefore, it is preferable to adopt a **differentiated approach on a case-by-case basis** to balance the dual needs of cost containment on the one hand and generating positive impacts on biodiversity on the other⁵⁸ (WEF 2023).

⁵⁸ For example, biodiversity credits issued for the restoration of a common and widespread habitat, with well-known restoration dynamics, could be successfully monitored through general and low-cost parameters; on the contrary, in the case of an intervention concerning a highly endangered animal species, more specific monitoring along with ad hoc studies and on-site surveys would be required.

- **Race to the bottom**

There is a need to discern between interventions with a considerable positive impact and interventions that provide only a **small marginal benefit**, thus limiting themselves to meeting the **minimum conditions sufficient** to warrant certification or biodiversity credit (Wunder 2024).

- **Leakage**

As with the CO₂ market, there is a risk of **biodiversity loss relocation**. However, biodiversity leakage is more complex to address because biodiversity is closely tied to specific habitats and locations. Therefore, it is necessary to minimise compensatory measures as much as possible if they are located far from the areas where negative impacts on biodiversity occur (WEF 2023).

- **Potential negative social effects**

The need to protect biodiversity may conflict with the well-being of local communities. Strong social safeguards, respecting Indigenous and local community traditions, ensuring informed stakeholder consent, and adopting the mitigation hierarchy are, therefore, critical (The Biodiversity Consultancy 2022, PWC 2023).

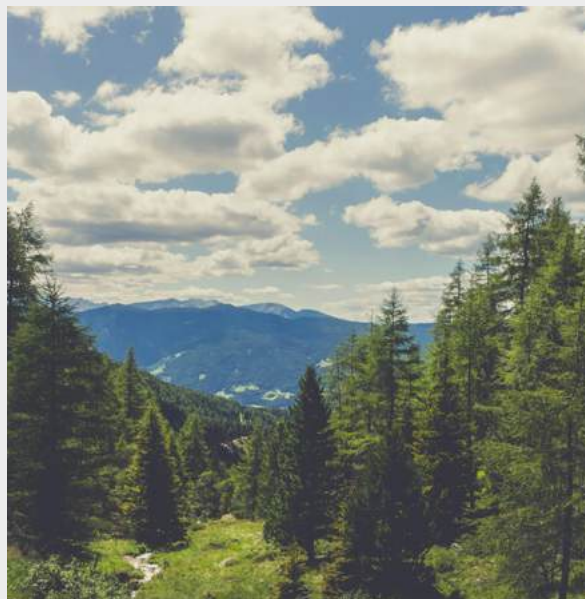
Some examples of nature-related certificates and biodiversity credits:

BioClima Initiative (Italy)

The BioClima initiative – developed by the Lombardy Region with support from Fondazione Cariplo and technical assistance from Etifor | Valuing Nature – involves an **innovative public-private financing model**. Thanks to co-financing from Fondazione Cariplo and funds provided by businesses and financial operators totalling €5 million, the initiative aims to **mitigate climate change and protect biodiversity in 12 regional parks**, ensuring the conservation and proper management of 3,000 hectares of forests, the restoration of 16 protected habitats (mountain and river) and the preservation of 20 target species. All projects will be certified according to the **International Forest Stewardship Council (FSC) standard**, which enables verification of improvement in the provision of ecosystem services such as water resources, biodiversity, and CO₂ absorption.

Biodiversity Net Gain (United Kingdom)

Starting from February 2024, all **new building or infrastructure construction projects** in the UK must ensure an **improvement on the biodiversity front** compared to the pre-construction baseline. There is a mandatory minimum increase



of 10%, accompanied by a requirement to ensure the conservation of local habitats for a minimum of 30 years. The 10% improvement is measured based on parameters such as size, quality, location, and habitat type. What makes the UK Biodiversity Net Gain particularly innovative is its **mandatory** nature. However, a critical aspect is the possibility of improving a different ecosystem from the one potentially impacted.

Cassowary Credits Scheme (Australia)

The nonprofit organisation Terrain Natural Resource Management (Terrain NRM) is developing a *biodiversity credit* scheme allowing investors to finance nonfarm landowners and managers to undertake **activities with quantifiable positive impacts on rainforests**. Rainforests provide habitat for the critically **endangered Australian cassowary**. A third-party environmental auditing firm will monitor projects, and the scheme will follow a *pay-by-success approach*: credits will be issued only when expected results are achieved (WWF 2023)⁵⁹.

Sustainable Development Unit (New Zealand)

To support a project to **restore a habitat home to some of New Zealand's most endangered species** (Maungatautari Mountain Sanctuary), New Zealand company EKOS launched the country's first biodiversity credits for the private sector in July 2022 (New Zealand Ministry of Environment 2023). *Through the Sustainable Development Unit program*⁶⁰, Profile Group Limited purchased biodiversity credits that enabled the **conservation management of 83 hectares of land in Maunga-**

⁵⁹ The scheme is not yet operational; it entered the field testing phase at the end of 2023.

⁶⁰ The program is based on the quantification of activities to sustain positive effects on biodiversity, not on the results achieved. Disadvantages of a by activity approach compared to a by outcome approach relate to the fact that the positive impact on biodiversity is assumed based on the activities undertaken; therefore, there is uncertainty regarding the actual achievement of the outcome. Advantages include the ability to issue credits more quickly and the possibility of recognising the efforts in terms of resources and time expended in carrying out activities.

tautari Reserve. These biodiversity credits were granted to achieve short-term biodiversity outcomes and do not constitute a form of compensation. The initiative's reliability rests on a system of standards and methodologies developed by EKOS and validated by a third-party environmental auditing firm.

Voluntary Credits for Biodiversity (Spain – Colombia)

In May 2022, ClimateTrade (Spain) and Terrasos (Colombia) created *Voluntary Biodiversity Credits* (VBCs) for **rainforest restoration in Colombia** (IIED 2022). Each VBC costs about US\$30 and is equivalent to a positive biodiversity contribution in an area of at least 10 m² within a preserved and/or restored ecosystem, managed technically, financially and legally for at least 20 years. The market architecture for the release of VBCs consists of two pillars: management and outcomes. **Management** requirements cover aspects such as: land acquisition and profit-sharing agreements with landowners, legal restrictions on land use, and financial guarantees. **Outcome assessment** is based on methodologies that analyse, for example, the increase in habitat size, restoration of degraded worked lands, and positive impact on species. Upon achievement of these goals, credits become available for purchase (IIED 2022).

[4.5.]

Insurance products

The insurance industry can play a significant role in achieving sustainability goals, including biodiversity protection. As previously highlighted (see §2.2.), **risks arising from biodiversity loss** and the alteration of ecosystem balances significantly affect companies' operations and balance sheets; as a result, the insurers of these companies may also suffer reduced revenues. In addition, the profitability of insurers providing life and health insurance may be undermined by increased health risks related to pollution, high temperatures, deforestation or habitat destruction. These risks include, for example, a rise in respiratory diseases and mental disorders, increased diseases derived from zoonoses and increased pandemics, and higher disease incidence and mortality due to the limited availability or absence of nature-based solutions for pharmaceuticals as a result of the depletion of raw materials (EIOPA 2023).

The European Insurance and Occupational Pensions Authority (EIOPA) has published a paper on **nature-related risks** and their relevance to the insurance industry (EIOPA 2023). The paper outli-

Debt for nature swap

Debt relief is used in exchange for investments that have positive impacts on, for example, climate or biodiversity. This is not the issuance of new credits but a **debt reduction as a function of environmental protection interventions** (IIGF 2021). The concept of an “exchange” (swap) refers to the fact that the creditor does not simply remit the debt but obtains “in return” something from the debtor (e.g., restoration of habitat, reduction of CO₂ emissions, or limitations on the use of certain pollutants). A debt-for-nature swap is typically a **bilateral or multilateral agreement** in which at least one of the two parties is a **public entity**. For example, in the case of the Barbados blue bonds for ocean conservation, the government of Barbados, The Nature Conservancy and the Inter-American Development Bank announced the conversion of US\$150 million of debt into funding for marine habitat conservation (Standing 2023). Another example is the agreement between Portugal and the Republic of Cabo Verde to convert part of the former Portuguese colony's debt into a fund to finance measures to counter marine biodiversity loss and mitigate climate change (Olabisi et al., 2023).

nes how these risks can translate into **risks for the assets and liabilities of insurers and reinsurers**, establishing a framework to identify key areas in supervisory and regulatory activity. The most relevant risks are **physical and transition risks** (see §2.2.), which can reduce the availability of insurable and investable assets. Therefore, these risks need to be considered by insurance companies to stem the possible negative impact on the activities of the insurance companies themselves and their stakeholders.

Environmental issues are increasingly becoming an integral part of the processes for defining insurance product offerings, as evidenced by the examples provided below.

Mesoamerican reef insurance

Policy developed by The Nature Conservancy, Swiss Re, the Mexican state of Quintana Roo, and the Hotel Owners Association of Cancún and Puerto Morelos to **insure approximately 60 km of coral reefs and beaches along the Yucatan coast** (Reguero et al. 2019). Insurance premiums are

paid through the Coastal Zone Management Trust. Insurance on this stretch of reef is parametric⁷³ to ensure timely restoration of ecosystems following damage from extreme weather events. Specifically, insurance coverage is triggered when wind speeds exceed certain thresholds (EEA 2021).

Nature-based solution for UNESCO site in the Netherlands

Swiss RE is providing insurance coverage for construction risks to support the **rehabilitation of the Prince Hendrick sand dam**. The dam protects a unique ecosystem on the island of Texel in the **Netherlands**, a UNESCO World Heritage site. The project aims to prevent a relevant failure of the dam due to sea level rise while **protecting biodiversity and the interests of the local community**, which benefits from both the physical protection

afforded by the dam and the economic opportunities from tourism and fishing (Swiss Re 2020).

Risk management and nature-based solution for the Mississippi River

Munich Re and The Nature Conservancy (TNC) are collaborating to develop NBS for **flood prevention along the lower reaches of the Mississippi River**. The project plans to combine an NBS (levee retreat) with community-based insurance to reduce damages during extreme weather events while extending insurance coverage through mutuality and risk-sharing mechanisms (Munich Re 2021).

[4.6.]

Guidelines to include biodiversity in financial processes and products

Starting from the various ESG approaches and financial instruments available, operators can incorporate biodiversity protection into investment, financing, or insurance decisions. Below are some general recommendations for starting this process⁶²:

1. **Include biodiversity-related analyses and assessments** (both on risks and impacts) in governance, all internal decision-making processes, product and service offering;
2. Regardless of whether it falls within the scope of CSRD, **publish an annual sustainability report** that also includes ESRS E4, where relevant, regarding the risks and impacts of financed, invested or insured activities;
3. **Encourage invested, financed, or insured companies to collect and publish data on** their exposure to biodiversity loss risks and the impacts of their activities on ecosystems, regardless of whether they fall within the scope of CSRD and CSDDD;
4. **Join global initiatives** such as the **Finance for Biodiversity Pledge**;
5. **Engage and collaborate** with other financial operators, certification bodies, regulators, and Third Sector organisations **to improve standards** for assessing biodiversity-related risks and impacts;
6. **Include biodiversity protection in all lobbying and dialogues with public institutions** (e.g., advocating for the monitoring and safeguarding of biodiversity at national and European levels and ensuring that related information is publicly accessible).

61 Parametric policies (or index-based policies) are insurance contracts that cover the loss of insured production due to quantity and quality damage as a result of an adverse climatic trend, identified through a positive or negative deviation from a biological and/or meteorological reference index. The relevant damage will be recognised on the basis of the actual deviation from the value of the said index (Legislative Decree No. 102/2004).

62 In 2022, the Finance for Biodiversity Foundation published a guide for financial practitioners with guidance on how to include the topic of biodiversity (Finance for Biodiversity Foundation 2022).

Finance for Biodiversity Pledge: Etica Sgr's commitment to biodiversity

By Cristina Colombo, ESG Analyst, Etica Sgr

In 2020, Etica Sgr signed the **Finance for Biodiversity Pledge**¹, an initiative promoted by financial institutions that are part of the European Union's F@B Community to protect and restore biodiversity. At the time of the launch, Etica Sgr was **the only Italian company among the 26 signatories**. To date, 170 signatory institutions are representing €22 trillion in assets management, sharing knowledge, dialoguing with companies to assess the impact of their investments, setting specific goals and reporting targets and progress. The role of financial institutions is crucial in preventing further biodiversity loss. This is an increasingly relevant investment issue because of the impacts on society and businesses, particularly those dependent on natural resources for their operations, due to the increasing difficulty of access to raw materials and the resulting increase in supply costs.

The Pledge calls on world leaders to reverse this trend by working together toward a highly ambitious goal: **calculating and mitigating the financial impacts on biodiversity by 2024**.

During 2021–2023, Etica Sgr is committed to pursuing the five goals in the Pledge. The activities carried out are **published in a dedicated section of the website**² and include **participation in events, webinars, and working groups**, implementation of **dialogue campaigns** on issues such as deforestation, circular economy, and water management, **evaluation of issuers through a proprietary methodology** that excludes companies involved in severe biodiversity disputes and considers specific KPIs in ESG analysis. In addition, Etica has set the goal of **annually monitoring companies with a critical impact on deforestation**.

¹ For more information: www.financeforbiodiversity.org

² www.eticasgr.com/finance-biodiversity-pledge

Conclusion

The environmental, social, economic, and financial significance of biodiversity is clear. However, despite our societies and economies' dependence on ecosystem services, human activities continue to negatively impact biodiversity: data on ecosystems and endangered species indicate a steadily worsening trend.

While governments and public institutions bear primary responsibility for addressing this issue financial actors play a crucial role in directing resources and economic activities toward ecosystem conservation and restoration goals. Therefore, they can significantly contribute to achieving internationally established goals by incorporating biodiversity-related assessments and analyses into financial processes and products.

Despite the challenges, it is essential to adopt a medium to long-term vision and take immediate action at all levels to reverse the current trend of nature's destruction, ensuring a more sustainable, equitable, and lasting well-being for all inhabitants of the planet.

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ItaSIF Italian Sustainable
Investment Forum

The Italian Sustainable Investment Forum (ItaSIF) is a not for profit association founded in 2001. Its membership base is multistakeholder: its members are financial actors and other organizations interested in the environmental and social impacts of financial activities. ItaSIF mission is to promote the awareness and the strategies linked to sustainable investments, with the aim to encourage the inclusion of environmental, social and governance criteria into financial products and processes. ItaSIF activities are divided into three main areas: research, projects, and advocacy. Within these sectors ItaSIF:

- runs research and education activities and facilitates working groups to promote best practice and contribute to the analysis and growth of sustainable investments;
- informs and advises the financial community, the media and society as a whole, on sustainable finance through the organization of communication campaigns, conferences, seminars and cultural events;
- engages with Italian and European institutions to encourage the implementation of a regulatory framework promoting sustainable investments.

Since 2012, ItaSIF has organized the Italian SRI Weeks, one of the leading initiatives in Italy on sustainable and responsible investment. ItaSIF is a member of Eurosif, the association for the promotion of sustainable investment in the European market.

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