From Net Zero to Nature Positive – Why the German Financial Sector Must Address Biodiversity

An Analysis of Developments, Risks, and Opportunities with regard to Biodiversity Loss and the Level of Implementation in German Financial Institutions

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Foreword

In light of catastrophic flooding, devastating forest fires, and sustained droughts, the global climate crisis is currently being felt more than ever before. The UN Biodiversity Conference in Montreal in December 2022 also focused attention on another major crisis which humanity is facing: both the extinction of species and the loss of ecosystems are accelerating at an unprecedented speed worldwide. According to *WWF's Living Planet Report 2022*, the population of vertebrate species has plummeted by 69% since 1970.

Climate change and biodiversity loss are closely interlinked, given our need for healthy ecosystems such as tropical forests to offset further greenhouse gas emissions. At the same time, an increasing number of ecosystems, both on land and under water, are threatened by factors including rising temperatures. Dangerous tipping points for the stability of the earth system threaten to upset life on the planet – with incalculable repercussions. There is no doubt that this will also entail economic consequences. All economic sectors depend on biodiversity to a certain degree, and 50% of them even depend on it to a large or moderate extent.

Nevertheless, financial institutions have barely integrated the associated risks into their processes, although the regulatory pressure coming from policymakers and regulators has increased rapidly in recent years. In order to make progress here, institutions must realise that taking biodiversity into account is of their own interest. The risks which are already looming are tied directly to accelerating biodiversity loss and shifting political framework conditions. However, this situation also yields opportunities for companies, including new business areas and possibilities for cooperation, among others. This puts more emphasis on taking responsibility for steering the respective banking, insurance, and investment business models in accordance with the protection or restoration of biodiversity and ecosystem services.

We aim for this study to provide you with current facts on natural capital as the total stock of renewable and non-renewable natural resources. In addition, we are presenting the results of a focus survey conducted with German financial institutions in the summer of 2022. We would like to take this opportunity to thank all of the study's participants for their time and willingness to provide information.

In general, the results have shown that more and more banks, asset owners, and asset managers are starting to address the risks of biodiversity loss to a greater extent, including in Germany. Although this development is a welcome sign, they still have a long road ahead of them compared to other European and international institutions. That is why this study also strives to provide initial assistance for implementation. In doing so, we focus on current tools and initiatives, as well as on the framework currently under development by the Taskforce on Nature-related Financial Disclosures (TNFD).

Our impulses for shifting financial economies from net zero to nature positive can only provide inspiration here.

Nevertheless, there is great urgency for concrete and comprehensive action throughout the German financial sector. We hope you enjoy reading this report and are looking forward to an in-depth discussion of this topic with you.

Angela McClellan
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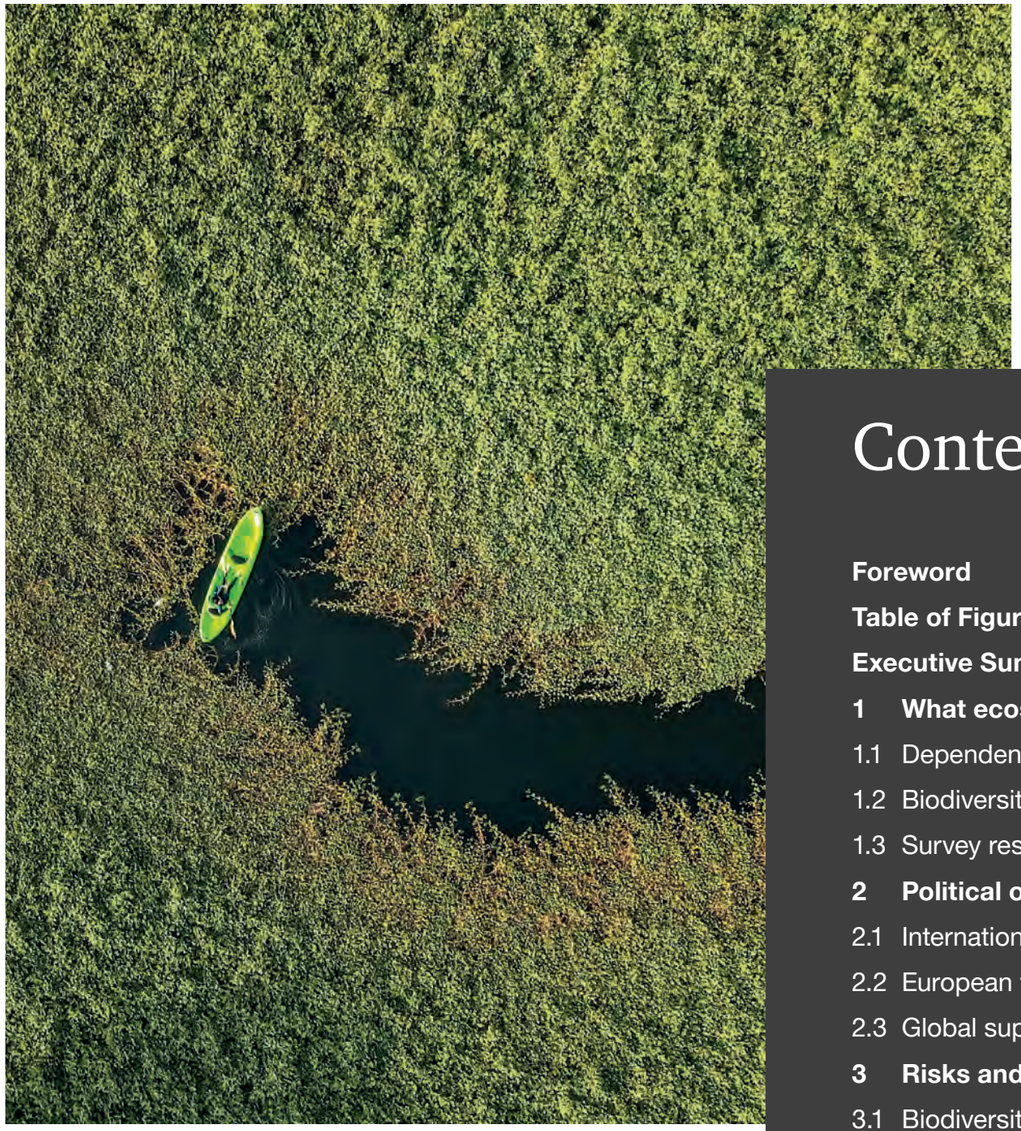
Matthias Kopp
Director Sustainable Finance, WWF Germany



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Executive Summary

The topic of biodiversity is becoming increasingly important for the German financial sector across several levels. Although awareness is rising among market players for the relevance and urgency of this topic, companies cite the outstanding final details of the regulation and numerous questions relating to the practical implementation of initiatives as obstacles – this is indicated both in this analysis as well as in the evaluation of other studies. The German financial sector remains hesitant compared to several of its European neighbours. However, the momentum relating to the integration of biodiversity aspects in decision-making processes is striking in Europe. What exactly does this mean?

The escalating biodiversity crisis demonstrates the great dependency on ecosystem services. Nevertheless, this has barely been considered in the risk management of financial institutions.
All global economic output depends on diverse ecosystem services to some extent, and more than half of global economic output even depends on it to a great or moderate degree. According to the World Bank, if climate change and biodiversity loss reach critical tipping points, annual losses of US$ 2.7 trillion would threaten the global economy. The materiality of nature-related financial risks is also emphasised by the European Central Bank (ECB), which will continue to focus more intensively on environmental risks beyond climate change. However, both the evaluation of studies and a focus survey conducted in the German financial sector have shown that there is great room for improvement within financial institutions in Germany regarding the level of awareness and implementation.

Regulatory requirements, the Post-2020 Global Biodiversity Framework (GBF), and stakeholder expectations will make greater consideration for biodiversity aspects indispensable for financial institutions in the future.
In particular the EU regulations on Sustainable Finance with a strong focus on disclosure and supply chains illustrate that the topics of biodiversity and the protection of ecosystems will gain particular attention in coming years. Furthermore, the Montreal-Kunming Global Biodiversity Framework (GBF) will inform national action plans on biodiversity. Additionally, there are specific initiatives driven by the private sector (such as the deforestation initiative) whose signatories have already committed to concrete targets. Financial institutions will need to modify their processes.

Biodiversity risks could impact existing risk types and cause financial losses.
Survey participants assess transition biodiversity risks as being more relevant than physical biodiversity risks. Implications are anticipated for regulatory and legal risks, systematic risks, reputation risks, and market (price) risks. Their assessment that physical risks and the effects on credit risk are less relevant could be due to the lack of knowledge regarding the connection between biodiversity and economic output. Evaluating the influence of physical risks better, in particular using scenario analyses with natural scenarios, is particularly important in this regard.

In individual cases, the opportunities associated with a nature-positive economy are already being recognised and utilised. German financial institutions are lagging behind in terms of relevant initiatives and product development, though.
According to the World Economic Forum, a market volume of US$10 trillion is associated with the transformation to a nature-positive economy. In this context, there is an emphasis on more sustainable agriculture. Furthermore, biodiversity-focused financial products (e.g. funds, bonds, insurance solutions) are emerging – however, it seems that this development has hardly reached Germany.

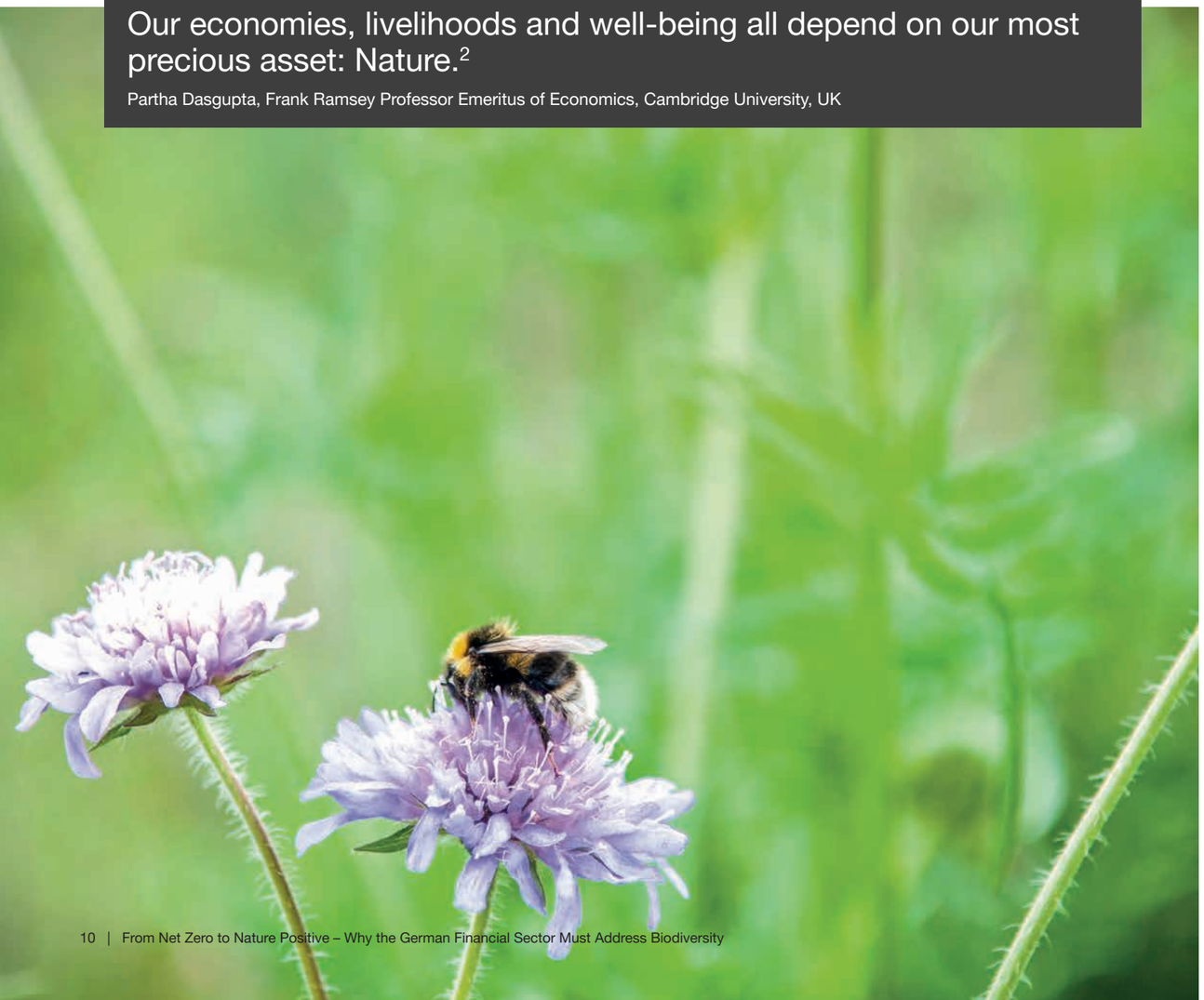
Learning from dealing with the climate crisis underlines the importance of defining mandatory objectives. But many financial institutions are still cautious in terms of setting biodiversity objectives. At the same time, there are already numerous initiatives, tools, and metrics which can help when drafting and prioritising biodiversity-related objectives.
On the one hand, it is challenging that the international biodiversity framework, e.g. on science-based targets, is just now being developed. On the other hand, participants in the focus survey emphasised that when quantifying targets and progress, they are dependent on data and metrics which are not yet standardised. Survey participants anticipate further specification and consolidation in the short term with regard to the topic of tools and standards, including in connection with the upcoming regulation.

The focus survey, along with other studies, has revealed that the degree of implementation in terms of integrating biodiversity aspects into various processes has been minimal so far. Guides such as the LEAP-FI, which is geared towards financial institutions, offer customised points of entry and facilitate progress towards disclosure.
The framework by the Taskforce on Nature-related Financial Disclosures (TNFD) is currently undergoing beta testing. Financial institutions can enter into the analysis and management of biodiversity-related risks and opportunities with the assistance of the LEAP process.

1 What ecosystems provide – and why conserving them is vital

Nature is our most valuable capital. Without clean air and water, without healthy soil and oceans, without the diversity of animal and plant species, human life on our planet would be unthinkable. Furthermore, natural resources are the foundation of all economic activities and potential prosperity. They are often essential in making the creation of value possible and are often complexly interlinked. Amongst others, the British economist Partha Dasgupta urgently emphasised these vital connections in his highly regarded report[1] in 2021.

> “Our economies, livelihoods and well-being all depend on our most precious asset: Nature.[2]
>
> Partha Dasgupta, Frank Ramsey Professor Emeritus of Economics, Cambridge University, UK



According to the definition by the Convention on Biological Diversity (CBD)[3], biodiversity means “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.”[4] Thus, it means the genetic diversity, the variability among plants, animals, fungi, and micro-organisms and ultimately their respective communities and natural habitats. Strictly speaking, biodiversity represents a component and a prerequisite for “natural capital”. The term “natural capital” refers to the entire stock of renewable and non-renewable natural resources (e.g. plants, animals, air, water, soil, minerals) which as a whole constitute a benefit to humankind.[5] Natural capital provides, regulates, and conserves ecosystem services. These services stand for each benefit ecosystems provide to life on earth, humankind, and economic players.

1.1 Dependency on natural resources

An exact quantification of the significance of ecosystem services for our economy can only be approximated. If anything, it can be assumed that these estimates are at the lower end of the actual value range. For example, Costanza et al. (2014) calculated the value of ecosystem services for the global economy at US$ 125 trillion annually.[6] More recent estimates from 2020 on the basis of the same method assume an economic benefit of approximately US$ 170 to 190 trillion annually. Each of these would correspond to twice the global economic output.7 In other words, according to the World Bank, the current loss in biodiversity and ecosystem services could cost the global economy US$ 2.7 trillion annually if critical tipping points are reached by 2030.[8]

Numerous different performance aspects are behind these figures – beginning with drinking water and agricultural food production, including e.g. pollination by insects,up to the absorption of greenhouse gases and heat regulation. Thus, the services provided by nature pertain to the material foundation of life and the economy. Not all ecosystem services are directly tangible, but they can be directly relevant to economies and can be expressed in monetary values as providing, regulatory, supporting, or cultural contributions.

[1] Cf. Dasgupta, P. (2021), Final Report-The Economics of Biodiversity: The Dasgupta Review, https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review.
[2] Cf. Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review - Headline Messages, p.1, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957629/Dasgupta_Review_-_Headline_Messages.pdf.
[3] The Convention on Biological Diversity (CBD) is an international convention ratified by 196 nations with the objective of encouraging actions which will lead to a sustainable future by means of conserving biodiversity. Cf. United Nations (o.D.), Convention on Biological Diversity, key international instrument for sustainable development, http://www.un.org/en/observances/biological-diversity-day/convention.
[4] Cf. CBD (2016), Text of Convention-Article 2, https://www.cbd.int/convention/text/.
[5] Cf. Capital Coalition (2016), Nature Capital Protocol, https://capitalscoalition.org/capitals-approach/natural-capital-protocol/?fwp_filter_tabs=guide_supplement.
[6] Cf. Costanza, R. et al. (2014), Changes in the global value of ecosystem services, https://capitalscoalition.org/capitals-approach/natural-capital-protocol/?fwp_filter_tabs=guide_supplement.
[7] Cf. NABU & BCG (2020), Wirtschaften im Einklang mit der Natur – Handlungswege zur Sicherung der Biodiversität, http://www.nabu.de/imperia/md/content/nabude/biodiv/200923-nabu-bcg-studie-biodiv2.pdf.
[8] Cf. NABU & BCG (2020), Wirtschaften im Einklang mit der Natur – Handlungswege zur Sicherung der Biodiversität, http://www.nabu.de/imperia/md/content/nabude/biodiv/200923-nabu-bcg-studie-biodiv2.pdf.

> Our economy runs on nature.[9]
>
> Frans Timmermans,
> Vice-President of the EU Commission

Intact ecosystems and their biodiversity play a key role in a variety of sectors – often without us being aware of it:

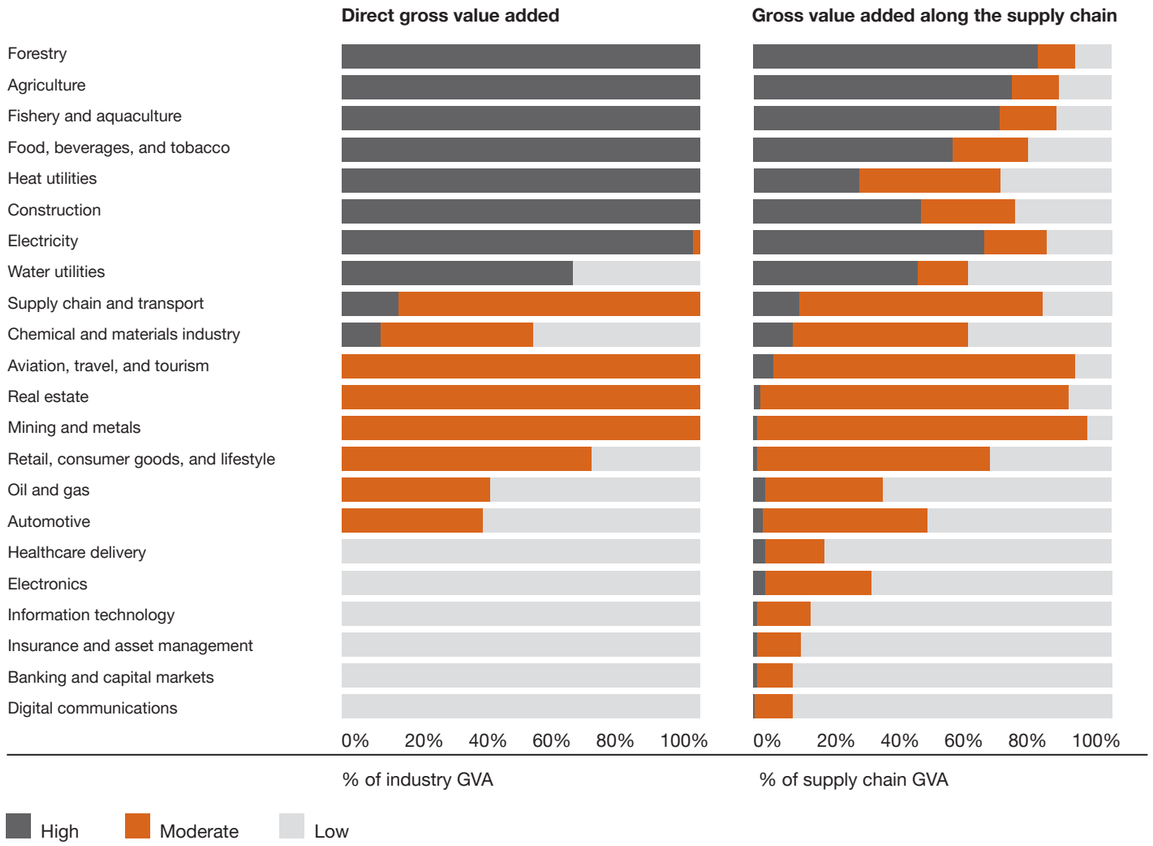
- **Mangrove forests**, which are located in coastal areas around the equator, make an important contribution to creating value and minimising risk in the **insurance sector**. They protect coastal communities located behind them from flooding and storms, thus reducing property damage by more than 16%, which corresponds to more than US$ 82 billion annually.[10] For example, the property damage caused by Hurricane Irma in Florida was 25% lower thanks to coastal mangroves, which lowered the magnitude of property damage by US$ 1.5 billion.[11]
- **Sharks** are true all-rounders. They ensure a healthy equilibrium in our oceans and thus help battle climate change.[12] Furthermore, their DNA could even be the key for important medical progress, including rapid wound healing and the treatment of cancer and autoimmune disorders.[13] The first drugs for these purposes are already in the clinical trial phase, while others are undergoing clinical research.[14] The global market for marine **pharmaceuticals** amounted to US$ 26.50 billion in 2020, and there is an expectation that it will grow to US$ 48.13 billion by 2027.[15]
- Although they do not often receive as much attention as bees, **bumblebees** and other wild bees are indispensable for **agriculture**. They are particularly efficient and robust pollinators which are active at lower temperatures, as well as in any wind and weather conditions. Bumblebees stop at up to 1,000 blossoms while flying for up to 18 hours each day.[16] 80% of all wild and cultivated plant species in Germany rely on pollination from bumblebees, bees, and other insects. The value of this service is estimated at EUR 3.8 billion per year.[17]

Humankind is also fundamentally dependent on the natural resource of water. The topic of water is often addressed separately in this context, e.g. in regulatory frameworks and risk analysis, and it is distinguished from biodiversity in the narrower sense. Nonetheless, there are also overlaps here. A 2022 study shows that companies operating globally in key sectors already have to expect US$ 15 billion in stranded assets or assets at risk.[18] These figures are calculated taking various factors into account, including increasing water shortages and corresponding regulatory modifications, worsening pollution to lakes, rivers, and oceans, as well as a shift in the perception and behaviour of relevant stakeholders. In contrast, financial institutions have invested US$ 2.5 trillion in heavily water-consuming companies within the past ten years – often without performing a corresponding risk assessment.

[9] European Commission (2022), Europäischer Grüner Deal: Weniger chemische Pestizide, umfassende Renaturierung, https://germany.representation.ec.europa.eu/news/europaischer-gruner-deal-weniger-chemische-pestizide-umfassende-renaturierung-2022-06-22_de.
[10] Cf. The Nature Conservancy et. al (2018), The Global Value of Mangroves for Risk Reduction, http://www.conservationgateway.org/ConservationPractices/Marine/crr/library/Documents/GlobalMangrovesRiskReductionTechnicalReport10.7291/V9DV1H2S.pdf.
[11] Cf. The Nature Conservancy et. al (2019), Valuing the Flood Risk Reduction Benefits of Florida's Mangroves, https://www.nature.org/content/dam/tnc/nature/en/documents/Mangrove_Report_digital_FINAL.pdf.
[12] Cf. Spiers, Elisabeth K.A. et al. (2016), Potential role of predators on carbon dynamics of marine ecosystems as assessed by a Bayesian belief network, https://doi.org/10.1016/j.ecoinf.2016.10.003.
[13] Cf. SOSF Shark Research Center (2017), Study reveals that understanding shark immunity genes could benefit human medical treatment, https://saveourseas.com/sosf-shark-research-center/study-reveals-that-understanding-shark-immunity-genes-could-benefit-human-medical-treatment/
[14] Cf. Almac (2022), Almac Discovery nominates a first candidate molecule from its Protein Drug Conjugate (PDC) Platform to progress into pre-clinical development, https://www.almacgroup.com/news/almac-discovery-nominates-a-first-candidate-molecule-from-its-pdc-platform/.
[15] Cf. Globe Newswire (2021), Marine Pharmaceuticals and Marine Derived Drugs Market Size and Share 2021 Global Industry Analysis By Trends, Key Findings, Future Demands, Growth Factors, Growth Strategy, Emerging Technologies, Leading Players Updates and Forecast 2027, https://www.globenewswire.com/en/news-release/2021/10/10/2311473/0/en/Marine-Pharmaceuticals-and-Marine-Derived-Drugs-Market-Size-and-Share-2021-Global-Industry-Analysis-By-Trends-Key-Findings-Future-Demands-Growth-Factors-Growth-Strategy-Emerging-Te.html.
[16] Cf. WWF (2021), Hummeln: 15 Fakten über die Teddys der Lüfte, https://blog.wwf.de/hummel-fakten/.
[17] Cf. Universität Hohenheim (2020), Bestäubung durch Insekten: Ökonomischer Nutzen vermutlich weit höher als angenommen, https://www.uni-hohenheim.de/pressemitteilung?tx_ttnews%5Btt_news%5D=49932.
[18] CDP & Planet Tracker (2022), High and Dry - How water issues are stranding assets, https://www.cdp.net/en/research/global-reports/high-and-dry-how-water-issues-are-stranding-assets; cf. CDP (2022), Financial institutions deeply exposed to stranded assets caused by global water crisis, https://www.cdp.net/en/articles/media/financial-institutions-deeply-exposed-to-stranded-assets-caused-by-global-water-crisis.

The growing importance of biodiversity as an overarching risk category was also recognised in the Global Risks Report 2022 of the World Economic Forum (WEF).[19] A study conducted by WWF and PwC in 2020 also comes to the conclusion that all economic output worldwide depends on biodiversity, whereas at least 50% even indicate a high to medium dependency on it (Fig. 1).[20]

Fig. 1 Dependency on natural resources



Source: World Economic Forum (2020), Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy, p. 14

[19] Cf. World Economic Forum (2022), Global Risks Report 2022, https://www.weforum.org/reports/global-risks-report-2022/.
[20] Cf. World Economic Forum & PwC (2020), Nature Risk Rising: Why the Crisis Engulfing Nature matters for Business and the Economy, https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf.

> We need a financial system that channels financial investments – public and private – towards economic activities that enhance our stock of natural assets and encourage sustainable consumption and production activities.[21]
>
> Partha Dasgupta, Frank Ramsey Professor Emeritus of Economics, Cambridge University, UK

It is already evident here: nature and its ecosystem services must be included in economic and political decision-making much more intensely and at key points. The significance of entire sectors depending on natural resources should also not be underestimated. For example, the Dutch financial sector has invested or financed more than EUR 500 billion each year in exposure to companies worldwide with particularly high dependency on specific ecosystem services. This figure was calculated by the Dutch central bank in 2020.[22] The situation is similar in France. 42% of the value of securities held by French financial institutions comes from issuers that are highly or very highly dependent on one or more ecosystem service.[23] These studies reveal an overall trend: an increasing focus is being placed internationally on biodiversity factors and the associated risks by central banks and supervisory bodies.[24] In doing so, they underline the fundamental role of nature and ecosystems for the stability of our economies. For example, within the scope of its thematic review on environmental and climate-related risks, the European Central Bank explicitly emphasised in 2022 that the institutions it supervises must, in addition to climate-related risks, also consider additional environmental risks, including biodiversity risks, in its strategy, governance, and internal risk management (for more information on these risks, please see Section 3.1).[25]

> [...] Since we have explicitly recognised the materiality of nature-related financial risks, it is no longer a matter of principle that the work on environmental risks is less advanced than the work on climate.[26]
>
> Frank Elderson, Member of the ECB's Executive Board and Deputy Chair of the Supervisory Board of the ECB

Supervisory bodies will also have to pay closer attention to how biodiversity-related risks are handled in the area of insurance and pension funds in the future. A relevant mandate from the European Insurance and Occupational Pensions Authority (EIOPA) is currently being discussed.[27]

It can be assumed that this development will be strengthened with additional new approaches to measure and illustrate the value of nature which take various stakeholders into account.[28] Environmental organisations are already working in close alliance with scientists in this field. Thus, in September 2022 more than 90 non-governmental organisations, think tanks, and scientists called on central banks around the world to intensify their activities in this field.[29]

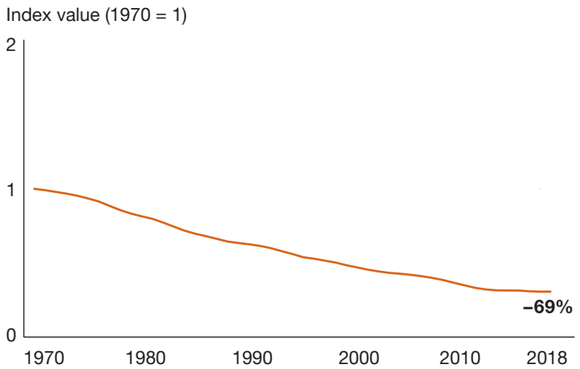
1.2 Biodiversity crisis: Ecosystems on the brink of collapse

Although awareness for biodiversity and ecosystems is growing among individual stakeholders, the topic has barely been discussed in Germany in contrast with the public's focus on climate change. At the same time, current findings and forecasts are extremely worrisome. At present, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) refers to approximately one million animal and plant species which are threatened with extinction.[30] Estimates assume that up to 130 species are currently disappearing each day from our planet for ever. WWF's global *Living Planet Report 2022* also establishes a dramatic loss of species diversity. Between 1970 and 2018 alone, the average decrease was an alarming 69% (Fig. 2).[31]

[21] 21 Cf. Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review - Headline Messages, p.5 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957629/Dasgupta_Review_-_Headline_Messages.pdf.
[22] Cf. DeNederlandscheBank (2020), Indebted to nature, https://www.dnb.nl/en/general-news/dnbulletin-2020/indebted-to-nature/.
[23] Cf. Banque de France (2021), A "Silent Spring" for the Financial System? Exploring Biodiversity-Related Financial Risks in France, https://publications.banque-france.fr/en/silent-spring-financial-system-exploring-biodiversity-related-financial-risks-france.
[24] Cf. NGFS (2022), Statement on Nature-Related Financial Risks, https://www.ngfs.net/sites/default/files/medias/documents/statement_on_nature_related_financial_risks_-_final.pdf; cf. NGFS (2022), NGFS acknowledges that nature-related risks could have significant macroeconomic and financial implications, https://www.ngfs.net/en/communique-de-presse/ngfs-acknowledges-nature-related-risks-could-have-significant-macroeconomic-and-financial; cf. NGFS & INSPIRE (2022), Central banking and supervision in the biosphere: An agenda for action on biodiversity loss, financial risk and system stability, https://www.ngfs.net/sites/default/files/medias/documents/central_banking_and_supervision_in_the_biosphere.pdf.
[25] Cf. European Central Bank (2022), Walking the talk - Banks gearing up to manage risks from climate change and environmental degradation, https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.thematicreviewcerreport112022~2eb322a79c.en.pdf; cf. PwC (2022), The results of the ECB 2022 thematic review on C&E risks, https://blogs.pwc.de/de/sustaining-values/article/234341/the-results-of-the-ecb-2022-thematic-review-on-c-e-risks/.

[26] 26 Cf. European Central Bank (2022), Keynote speech Frank Elderson: Natura finis magistra – acknowledging nature-related risks to make finance thrive, https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220929_2~d6497c36da.en.html.
[27] Cf. European Council (2022), Solvency II: Council agrees its position on updated rules for insurance companies, https://www.consilium.europa.eu/en/press/press-releases/2022/06/17/solvency-ii-council-agrees-its-position-on-updated-rules-for-insurance-companies/.
[28] Cf. IBPES (2022), IPBES Values Assessment - Decisions Based on Narrow Set of Market Values of Nature Underpin the Global Biodiversity Crisis, https://ipbes.net/media_release/Values_Assessment_Published.
[29] Cf. WWF (2022), Call to Action to Ensure Transition to a Net Zero and Nature Positive Economy, https://wwfint.awsassets.panda.org/downloads/call_to_action_2022_september.pdf.
[30] Cf. IPBES (2019), Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, p. 16, https://doi.org/10.5281/zenodo.3831673.
[31] Cf. WWF (2022), Living Planet Report 2022, https://livingplanet.panda.org/.

Fig. 2 Timeline of species extinction



Source: WWF (2022), Living Planet Report 2022, p. 32

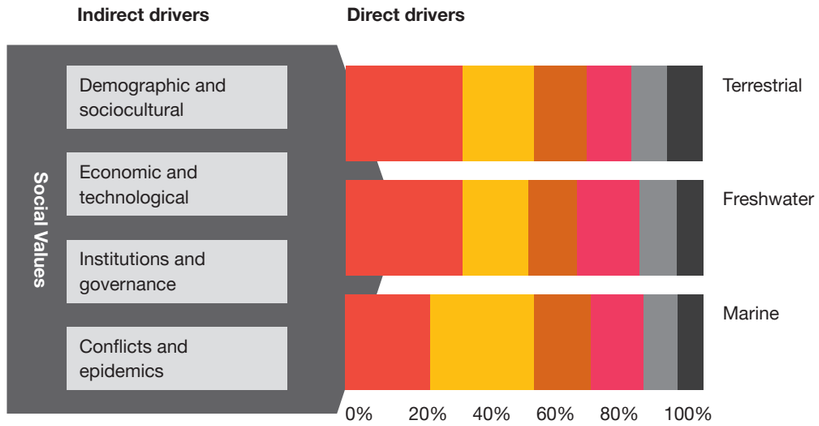
The reasons for the current mass extinction of animal and plant species have long been recognised; climate change is one of the five key drivers (Fig. 3). It causes habitats to change or shrink, and at worst they disappear completely. Sensitive ecosystems become unbalanced, and heat waves or flooding occur more frequently. For example, global warming of 1.5 degrees Celsius will result in the death of 70 to 90% of coral worldwide – a catastrophe for numerous other animal and plant species and not least for the impacted regions.[32]

The five key drivers of biodiversity change[33]
- Climate change
- Expansion of the use of terrestrial, marine, and freshwater areas
- Pollution
- Natural resource use and exploitation
- Invasive species

Indirect drivers include inter alia:
- Demographic trends
- Economic-technological development
- Human behaviours in general

[32] Cf. WWF (2022), FEELING THE HEAT: Die Zukunft der Natur bei einer globalen Erhitzung von 1,5 °C und darüber hinaus, https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Klima/WWF-Report-Feeling-the-heat-2022.pdf.
[33] Cf. IPBES (o.D.), Models of drivers of biodiversity and ecosystem change, https://ipbes.net/models-drivers-biodiversity-ecosystem-change.

Fig. 3 Drivers of the biodiversity crisis



Source: IPBES (2019), The science-base for post-2020 global biodiversity framework -lessons from IPBES & elsewhere, p. 14

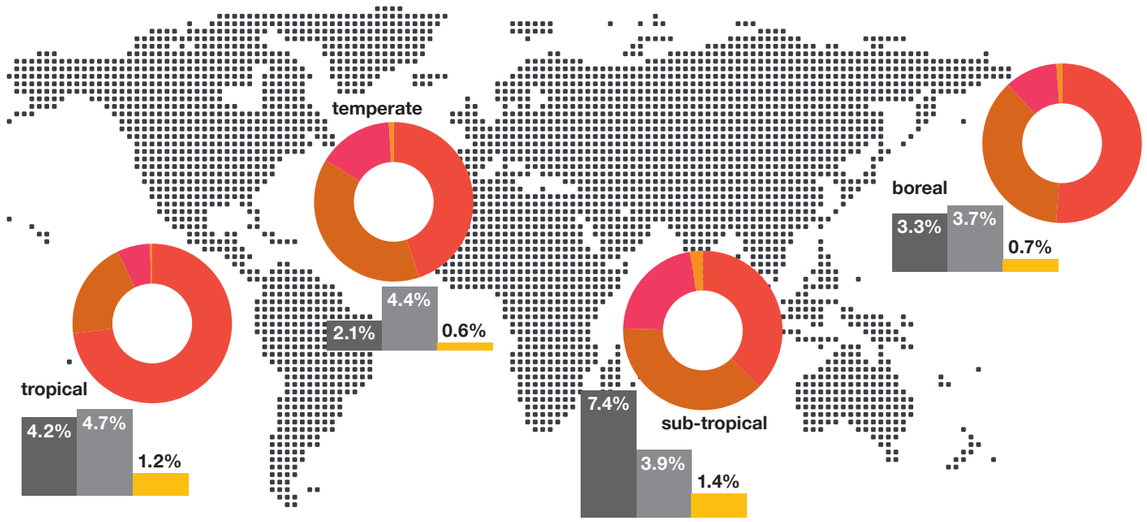
The expansion of terrestrial land use is another key driver. At present, the threatening implications are becoming particularly evident in the Amazon. Slash-and-burn operations continue to be carried out there to clear land for other uses, e.g. for growing animal feed for the global meat industry. These operations already reached a new record high in mid-2022. This is occurring despite abundant warnings that dangerous and irreversible tipping points are already looming there.[34]

> “Nature-related risks [...] could have significant macroeconomic implications, and [...] failure to account for, mitigate, and adapt to these implications is a source of risks for individual financial institutions as well as for financial stability.[35]
>
> NGFS

[34] 34 Cf. DW (2022), Abholzung des Regenwalds in Brasilien schreitet weiter voran, https://www.dw.com/de/abholzung-des-regenwalds-in-brasilien-schreitet-weiter-voran/a-62106676; vgl. Boulton, C.A., Lenton, T.M. & Boers, N. (2022), Pronounced loss of Amazon rainforest resilience since the early 2000s, https://www.nature.com/articles/s41558-022-01287-8.
[35] Cf. NGFS (2022), Statement on Nature-Related Financial Risks, https://www.ngfs.net/sites/default/files/medias/documents/statement_on_nature_related_financial_risks_-_final.pdf.

The consequences are far-reaching, not just in the Amazon, but also at numerous other locations where key habitats are being destroyed (Fig. 4). Thousands of plant and animal species are disappearing together with the forests, wetlands, moors, steppes, and savannas. Furthermore, the deforestation and degeneration of natural environments are leading to the loss of vital opportunities to absorb greenhouse gases effectively. As a result, climate change is advancing all the more. The EU has also realised this and in November 2022 laid a key foundation for compliance with its climate targets. Natural carbon sinks, including healthy forests and lands, shall absorb 310 million tonnes of CO_2 equivalents by the end of 2030. In the past, only approximately 225 million tonnes were stipulated. The protection and restoration of natural carbon sinks should contribute to the EU being able to lower its CO_2 emissions by 57% compared to 1990 levels (rather than the previously stipulated 55%).[36]

Fig. 4 Global deforestation



Source: WWF (2021), Deforestation Fronts - drivers and responses in a changing world, p. 22

[36] Cf. European Council (2022), "Fit for 55": Provisional agreement sets ambitions carbon removal target in land use, land use change and forestry sector, https://www.consilium.europa.eu/de/press/press-releases/2022/11/11/fit-for-55-provisional-agreement-sets-ambitious-carbon-removal-targets-in-the-land-use-land-use-change-and-forestry-sector/.

The fact that humans advancing into previously unspoiled habitats could entail grave implications is evident not least because of the emergence of zoonoses and pandemics.[37] In many places, the spread of Covid-19 did not only cause great human suffering, but it also led to tremendous economic losses. The economic losses in 2020 and 2021 amounted to EUR 330 billion in Germany alone. Losses in value creation for example due to education gaps and mental exhaustion have not been factored in here.[38] Thus, it is not surprising that the top three spots in the current risk assessment of the World Economic Forum (WEF) are held by "Climate change"/"Lack of climate protection", "Extreme weather", and "Biodiversity loss" (Fig. 5).[39] This is exacerbated by the fact these risks mutually reinforce one another (for more information, see Section 3.1).

Fig. 5 Global Risks Report, WEF 2022, p. 14

Identify the most severe risks on a global scale over the next 10 years.

1	Climate action failure	6	Infectious diseases
2	Extreme weather	7	Human environmental damage
3	Biodiversity loss	8	Natural resources crises
4	Social cohesion erosion	9	Debt crises
5	Livelihood crises	10	Geoeconomic confrontation

Economic · Environmental · Geopolitical · Societa · Technological

Source: World Economic Forum (2022), The Global Risks Report (17th edition) – Insight Report, p. 14

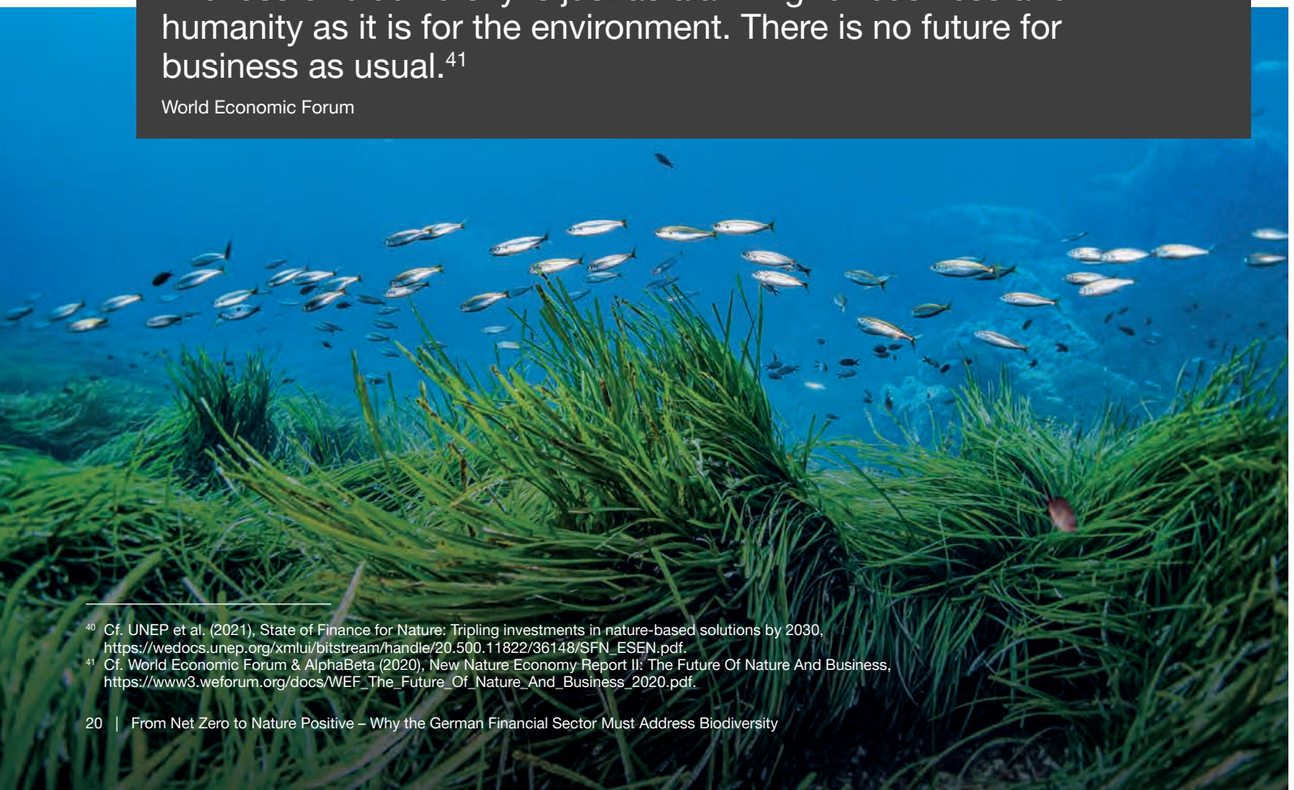
[37] Cf. WWF (2021), WWF-Statement zur Erklärung des WHO-Expertenteams in Wuhan: Illegaler Schmuggel idealer Nährboden für Virensprünge, https://www.wwf.de/2021/februar/artenschutz-ist-gesundheitsvorsorge.
[38] Cf. ifo Institut (2022), Corona brachte Deutschland wirtschaftliche Ausfälle von 330 Milliarden Euro, https://www.ifo.de/pressemitteilung/2022-02-17/corona-brachte-deutschland-wirtschaftliche-ausfaelle-von-330-milliarden.
[39] Cf. Word Economic Forum (2022), Global Risks Report 2022, https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf.

Both science-based and political-economic assessments come to the same conclusion here: the loss of biodiversity belongs at the very top of the agenda together with climate change.

Effective measures and course setting are needed to face this double and systematic crisis. Decisive factors here include necessary investments in the trillions, for example investments in nature-based solutions such as the renaturation of forests, mangrove forests, and moors, which are required to achieve global targets relating to biodiversity, climate change, and land degradation. The UN Environmental Programme estimates the requirement at US$ 8.1 trillion by 2050. US$ 536 billion would have to be invested annually thereafter. For better understanding, investments of just US$ 133 billion are currently made in nature-based solutions annually.[40]

Beyond that, fundamental rethinking is necessary in business and financial policy, as well as in economic and financial systems. Companies on the financial and capital market must prioritise biodiversity and climate risks and gear capital flow towards the targets for preserving natural capital. In doing so, they play their macroeconomic control role and contribute to maintaining the functionality of the entire economic system.

> The loss of biodiversity is just as alarming for business and humanity as it is for the environment. There is no future for business as usual.[41]
>
> World Economic Forum



[40] Cf. UNEP et al. (2021), State of Finance for Nature: Tripling investments in nature-based solutions by 2030, https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/36148/SFN_ESEN.pdf.
[41] Cf. World Economic Forum & AlphaBeta (2020), New Nature Economy Report II: The Future Of Nature And Business, https://www3.weforum.org/docs/WEF_The_Future_Of_Nature_And_Business_2020.pdf.

1.3 Survey results: Biodiversity has barely been on the agenda

What relevance do biodiversity aspects currently have in the financial sector? Studies have shown that this topic is barely considered by financial institutions at present, apart from a few exceptions. For instance, the WWF Bank Rating 2021[42] concludes that while the 15 largest German banks are showing progress in terms of climate issues, they barely consider biodiversity and ecosystem services. There are usually no suitable processes, instruments, or targets in place to control risks associated with the extinction of species and the loss of ecosystems. The impact is also not measured systematically for the respective portfolio. Furthermore, the participation of German banks in the number of active international initiatives and collaborations on the topic of biodiversity remains far below potential.[43] In WWF's overall rating, only five of the banks analysed were ranked in the midfield in terms of biodiversity. The vast majority was classified as "stragglers".

This impression is also confirmed when other financial market areas are taken into account. For example, a survey among international asset owners and asset managers published in 2021[44] showed that 84% are fundamentally concerned about the increasing loss of biodiversity. Approximately half (51%) of those surveyed additionally consider biodiversity to be one of the most significant topics in the investor community between now and 2030. However, nearly any specific implementation steps can be observed: 91% of the investors do not have any measurable biodiversity-related targets in place, while more than one-quarter (27%) do not address biodiversity topics in any way.

When biodiversity is considered to a greater degree in the business processes of finance companies, this is frequently linked to country-specific regulatory specifications. This is why institutions located in France or the Netherlands are often more advanced in terms of biodiversity.[45] But a recent study[46] indicates there is catching-up to do even there. While Dutch financial institutions are fundamentally showing good progress with regard to risk analysis and the realisation of initial concrete actions, a more comprehensive approach remains outstanding here, e.g. for the scope of dependency and impact assessments or regarding engagement and governance aspects. For example, more than 40% of Netherlands-based participants in the study reported having only little insight regarding current dependencies on nature. The share of those institutions which stated that they had completely integrated nature-related risks in their business processes speaks for itself: namely, it is 0%.

[42] Cf. WWF (2021), Deutsche Banken müssen Fahrt aufnehmen - Nachhaltigkeitsanalyse deutscher Banken, https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Unternehmen/WWF-Zweites-Bankenrating.pdf.
[43] This is also evident in the comparatively low participation of German stakeholders within the framework of the TNFD beta phase, cf. TNFD (2022), The TNFD Nature-Related Risk and Opportunity Management and Disclosure Framework - Beta v0.2, p.17, https://framework.tnfd.global/wp-content/uploads/2022/07/TNFD-Framework-Document-Beta-v0-2-v2.pdf.
[44] Cf. Credit Suisse (2021), 5 facts about biodiversity finance and investing, https://www.credit-suisse.com/about-us-news/en/articles/news-and-expertise/unearthing-investor-action-within-biodiversity-finance-202101. html?t=152_0.8774889503430421.
[45] Cf. TNFD (2021), France's Article 29: biodiversity disclosure requirements sign of what's to come, https://tnfd.global/news/frances-article-29-biodiversity-disclosure-requirements-sign-of-whats-to-come/.
[46] Cf. WWF & Deloitte (2022), Nature is next - Integrating nature-related risks into the dutch financial sector, https://www.wwf.nl/api/Download/Download?fileId=264844.

Focus survey: Biodiversity is, in the first place, considered a compliance topic within the German financial sector

This analysis conducted by PwC Germany and WWF Germany builds upon existing studies and focuses on causes and backgrounds. For this purpose, the assessments of experts from various financial institutions were reported on questionnaires, and their analysis was supplemented with qualitative interviews. This allowed insight to be gained into the current level of awareness and implementation relating to biodiversity aspects in the German financial sector with questions such as: How do banks, asset owners (insurance companies, pension funds), and asset managers approach the topic? What barriers do they see? Where do they set priorities?

The results first confirm the impression obtained by other studies. According to the assessment of the experts surveyed, biodiversity does not yet feature highly on the agenda of German financial institutions (Fig. 6). However, there are indications that a trend reversal is imminent. Half of those surveyed currently assess the relevance of biodiversity and ecosystem aspects to be relatively low or very low; in contrast, the other half considers its significance to be high or very high.

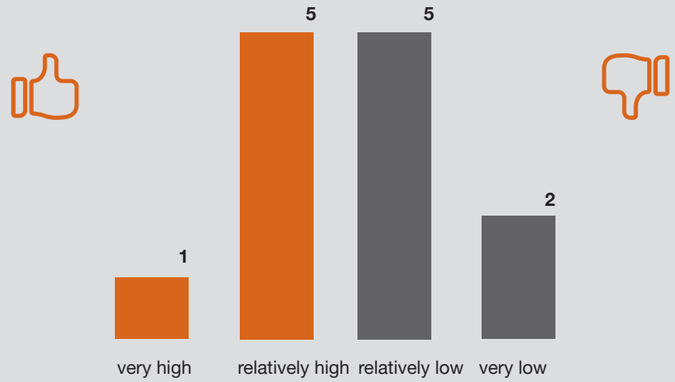
“The topic of biodiversity [loss] does not yet have the same significance as climate change, but it is developing in that direction. By now, no one needs an explanation on why biodiversity is important. However, at present only few people know how to take concrete action in this area,” responded an interview participant from the field of asset management.

“I now have climate-related indicators on which companies also report. There is a good understanding of the topic overall. Many would like to address the topic of biodiversity in more depth. Everyone is aware that it is an important issue, but it is more difficult to grasp. Many people are not yet able to correlate it to companies,” responded another interviewee.

According to those surveyed, the reason it is essential to address biodiversity is primarily because climate change and biodiversity loss are directly connected (Fig. 7). In this way, protecting biodiversity can also contribute to lowering CO_2 emissions. Those surveyed also seem to be aware of the fact that the economy and gross domestic product both depend on nature-based resources. Further grounds include that financial portfolios can entail significant valuation risks, the expectations of external stakeholders, and the exploitation of the opportunities associated with investing in nature-based business models.

Fig. 6 Significance of the topic, N = 13

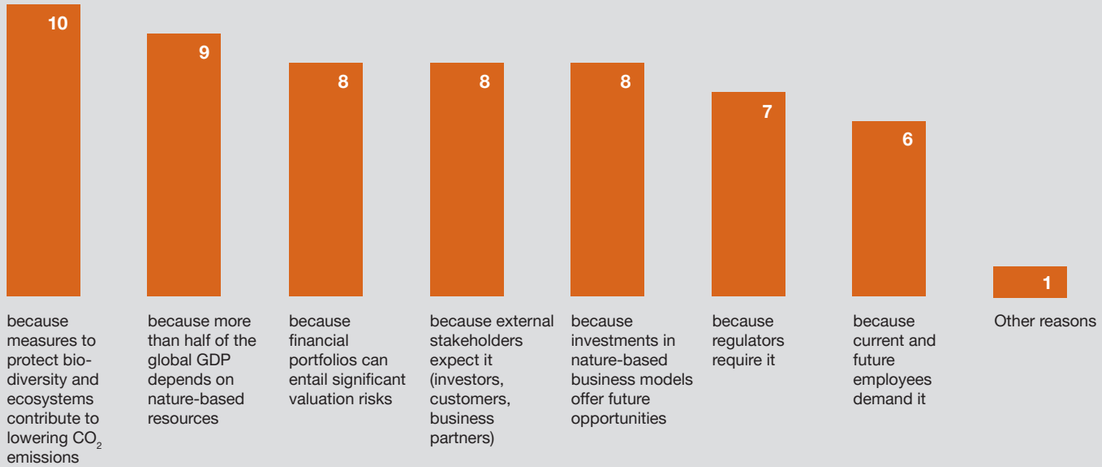
Significance of biodiversity and ecosystem aspects in the financial sector



Source: PwC

Fig. 7 Reasons for addressing biodiversity, N = 13

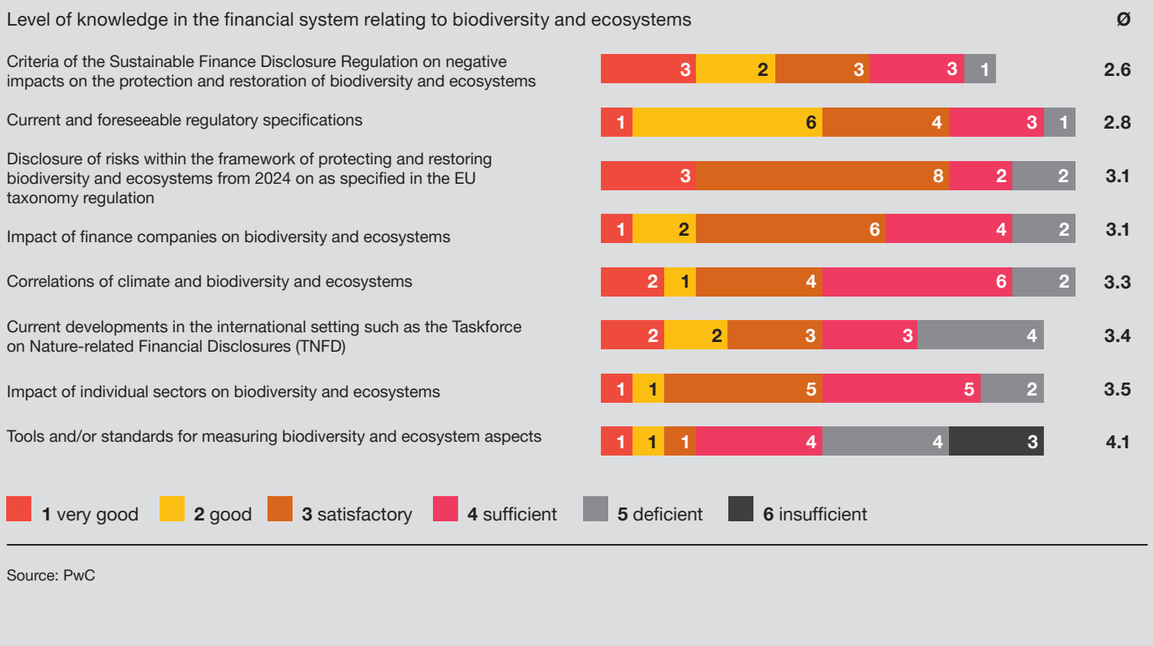
Reasons for delving into the risks and opportunities of protecting and restoring biodiversity and ecosystems



Source: PwC

Due to tightening regulations, we assume that the significance granted to biodiversity by financial institutions will continue to rise in coming years. Study results also indicate that compliance aspects represent a vital driver of development (Fig. 8). This is also illustrated in the question of awareness-related focal points. Those surveyed responded that they are most familiar with the criteria of the EU Sustainable Finance Disclosure Regulation relating to biodiversity (average score: 2.6), followed by regulatory requirements in general (average score: 2.8) and the disclosure regulations within the framework of EU taxonomy (average score: 3.1). The level of knowledge on specific tools and standards is the weakest (average score: 4.1).

Fig. 8 Knowledge on biodiversity aspects (N = 12/15/15/15/15/14/14/15)



Source: PwC

2 Political objectives and frameworks

Since the binding convention under international law, the Convention on Biological Diversity (CBD), was ratified in 1992, the objectives and frameworks relating to biodiversity have intensified further. They apply both at international level as well at European and national levels. The financial sector is also explicitly addressed in many of the conventions, directives, and legislation.

2.1 International conventions and agreements

At a global level, the Post-2020 Global Biodiversity Framework (GBF), which was agreed on in December 2022 by the signatories of the CBD at the 15th UN Biodiversity Conference (COP15) in Canada, is particularly relevant at present. Among other things, the further development of reporting standards and tools for companies and financial institutions will be geared towards this framework (for more information on the tools, see Section 4.2). The GBF may take on a similar meaning as the Paris Agreement on climate change passed in 2015, which has sustainably impacted the economic and financial world.

The final text of the GBF includes four objectives for living in harmony with nature until 2050 and 23 sub-objectives for 2030. Figure 9 gives an overview on the most important agreements of the GBF.[47]

There are four objectives with high relevance for the financial sector:

- Goal 14: Align tax and financial flows with the goals and objectives of the GBF
- Goal 15: Biodiversity reporting for companies and financial institutions
- Goal 18: Reduce subsidies with a negative impact on biodiversity by at least $500 billion per year
- Goal 19: Increase funding for biodiversity protection by at least USD 200 billion per year

The GBF has implications for different stakeholders. The ISSB announced that it will include biodiversity in its climate reporting standard. The European Commission might consider extending the reporting obligation on biodiversity in the CSRD to the supply chain.Finally, in order to implement the GBF, all State Parties have to design and roll out national action plans and provide the relevant funding.

[47] Convention on Biological Diversity (2022), Final text of Kunming-Montreal Global Biodiversity Framework available in all languages, https://prod.drupal.www.infra.cbd.int/sites/default/files/2022-12/221222-CBD-PressRelease-COP15-Final.pdf.

[48] Cf. UNEP Financial Initiative (2022), The Global Biodiversity Framework: why aligning financial flows is key, https://www.unepfi.org/themes/ecosystems/the-global-biodiversity-framework-why-aligning-financial-flows-is-key/#_ftn1.

> “
>
> The success of the Global Biodiversity Framework (GBF) hinges on the alignment of financial flows with nature-positiv outcomes.[48]
>
> UNEP Financial Initiative

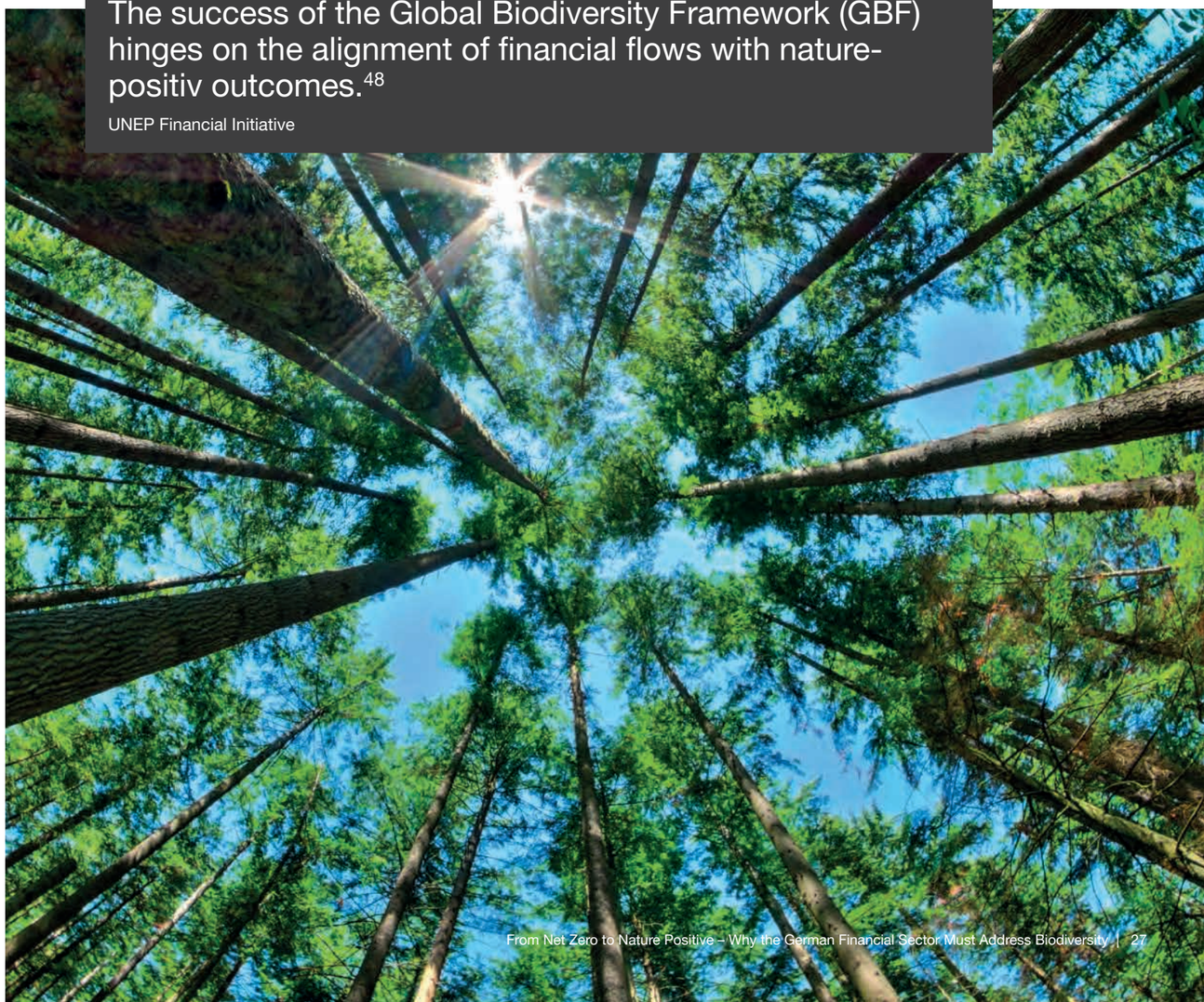
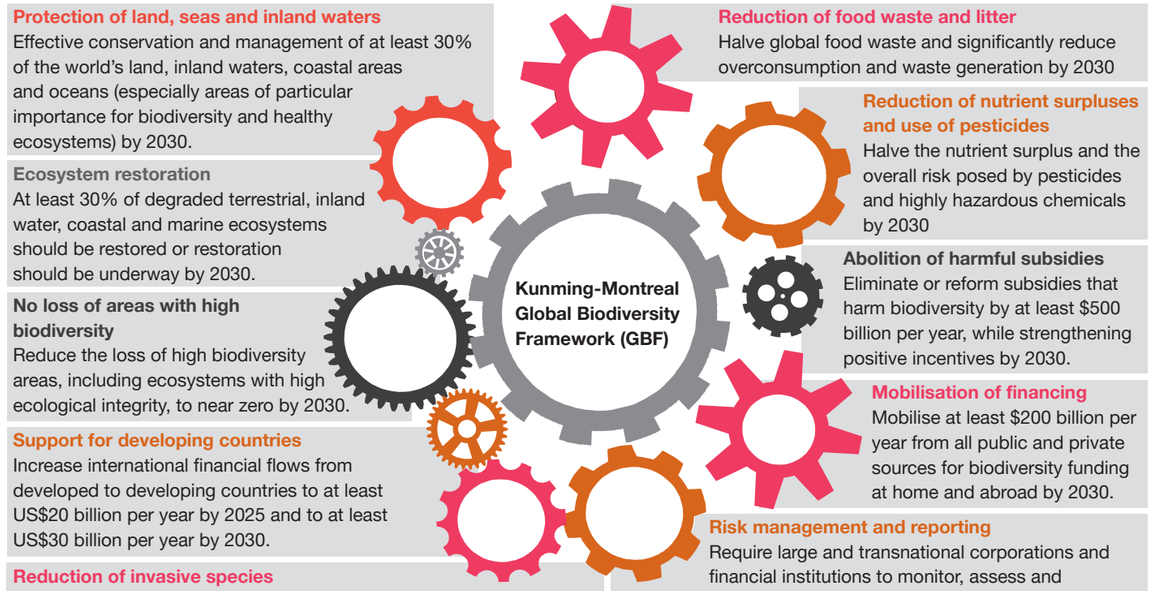


Fig. 9 Most important objectives of the Global Biodiversity Framework (GBF)[49]



Source: PwC

The results and objectives of the GBF are expected to have a significant impact on European and domestic biodiversity policy over the next ten years. Against this backdrop, for example, the current EU biodiversity strategy[50] was concretised in June 2022 with proposed legislation by the EU Commission to restore nature.[51] This proposal seeks to restore ecosystems, habitats, and biodiversity. The legislation should encompass at least 20% of areas in the EU on land and at sea by 2030, and all ecosystems requiring restoration by 2050.[52] Furthermore, it strives to halt the decrease in pollinator populations, restore rivers and moors, and expand urban green areas. In addition, the use of pesticides should be cut in half by 2030. In this context, the EU Commission is also emphasising the economic opportunities associated with these measures for restoring nature: Each euro invested in protecting biodiversity is said to result in up to € 38 growth in value if one considers the benefits for food security, resilience, climate protection, and health.[53]

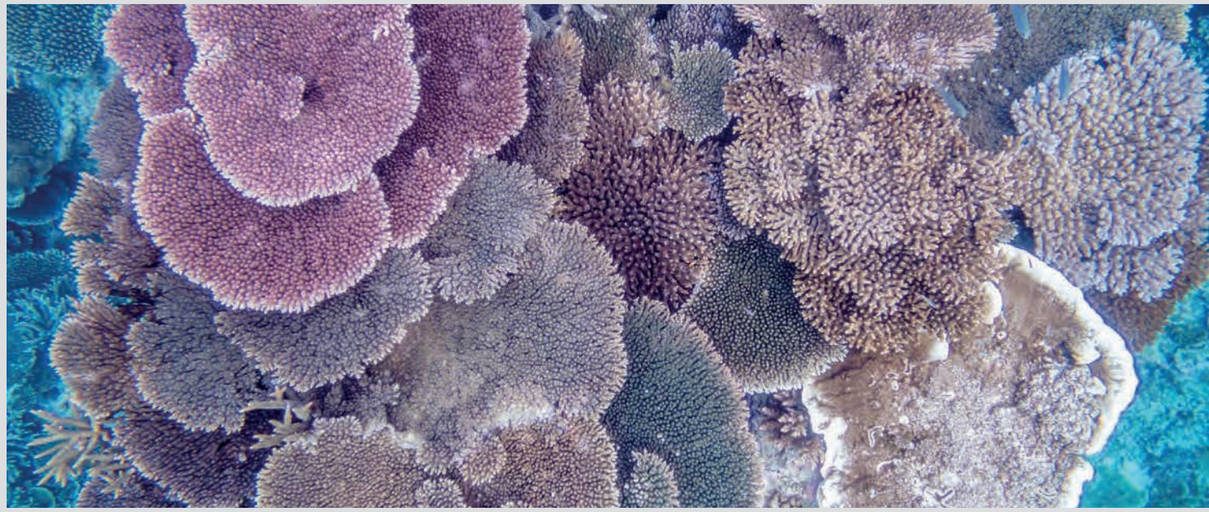
[49] Cf. Convention on Biological Diversity (2022), Final text of Kunming-Montreal Global Biodiversity Framework available in all languages, https://prod.drupal.www.infra.cbd.int/sites/default/files/2022-12/221222-CBD-PressRelease-COP15-Final.pdf.
[50] Cf. European Commission (undated), Biodiversitätsstrategie für 2030, https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_de.
[51] Cf. Europäische Kommission (2022), Europäischer Grüner Deal: Weniger chemische Pestizide, umfassende Renaturierung, https://germany.representation.ec.europa.eu/news/europaischer-gruner-deal-weniger-chemische-pestizide-umfassende-renaturierung-2022-06-22_de.
[52] Cf. European Commission (undated), Nature restoration law, https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en.
[53] Cf. Europäische Kommission (2022), Europäischer Grüner Deal: Weniger chemische Pestizide, umfassende Renaturierung, https://germany.representation.ec.europa.eu/news/europaischer-gruner-deal-weniger-chemische-pestizide-umfassende-renaturierung-2022-06-22_de.

Bending the curve – with the target of a nature-positive economy

Given the dramatic decline in biodiversity and intact ecosystems, it is vital to act resolutely and stop the downward trend in the coming years. At present, the resource consumption of humankind exceeds the planet's natural capacities: 1.75 Earths would be necessary to perpetuate our current lifestyle and economy.[54] Irreversible tipping points in various areas are already threatening to upset the entire system[55] – with unforeseeable consequences for life on Earth.

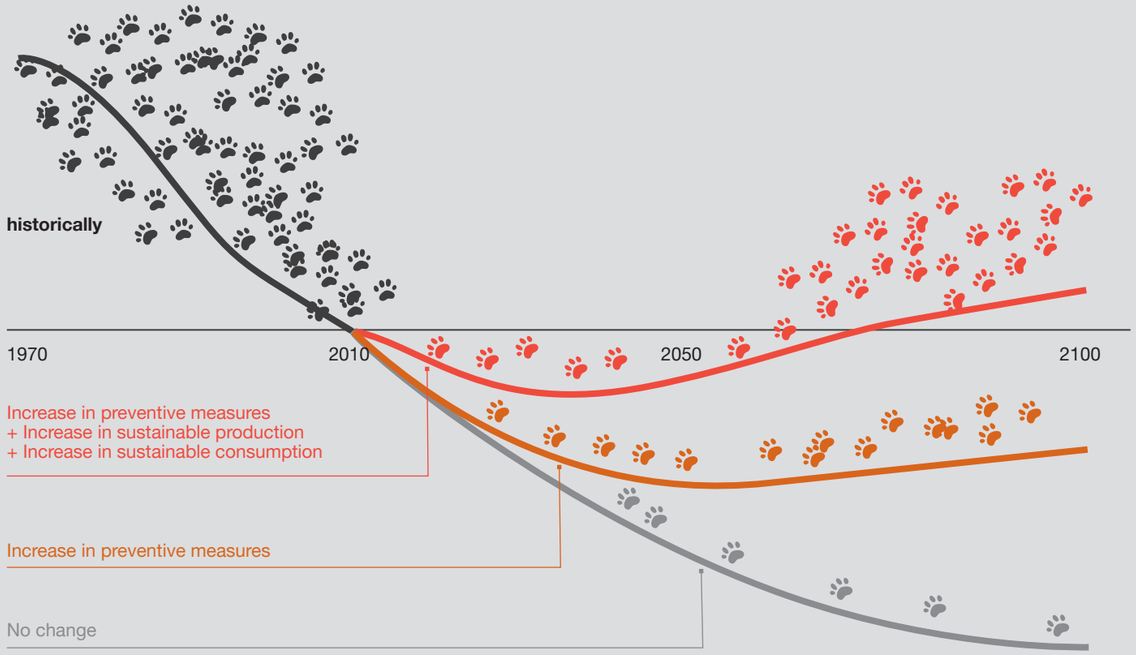
So what can be done to stop and reverse this negative trend by bending the curve to facilitate life within the planetary boundaries (Fig. 10)? The year 2030 is considered a key target mark. By then, the net loss in biodiversity should not only be stopped – but a nature-positive lifestyle and economy should be achieved.[56] There is an endeavour to recover the natural environment fully by 2050 – "live well in harmony with Mother Earth," as the GBF defines.[57]

In order to achieve this reversal, intensified conservation efforts including the corresponding financing is extremely important. However, they are not sufficient, as corresponding scenario analyses have shown (Fig. 10).[58] Therefore, modified production and consumer behaviour, e.g. in the areas of nutrition and agriculture, are also necessary to achieve a nature-positive world (see the infobox in Section 3.2).



[54] Cf. Global Footprint Network (undated), https://www.footprintnetwork.org/.
[55] Cf. Armstrong McKay, D.I. et al. (2022), Exceeding 1.5°C global warming could trigger multiple climate tipping points, https://www.science.org/doi/10.1126/science.abn7950.
[56] Cf. Locke, H. et al. (undated), A Nature-Positive World: The Global Goal for Nature, https://www.nature.org/content/dam/tnc/nature/en/documents/NaturePositive_GlobalGoalCEO.pdf; vgl. UNEP & CBD (2022), Report of the open-ended working group on the post-2020 global biodiversity framework on its fourth meeting, https://www.cbd.int/doc/c/3303/d892/4fd11c27963bd3f826a961e1/wg2020-04-04-en.pdf.
[57] Cf. Convention on Biological Diversity (2022), Final text of Kunming-Montreal Global Biodiversity Framework available in all languages, https://prod.drupal.www.infra.cbd.int/sites/default/files/2022-12/221222-CBD-PressRelease-COP15-Final.pdf.
[58] Cf. Leclère et al. (2020), Bending the curve of terrestrial biodiversity needs an integrated strategy, https://doi.org/10.1038/s41586-020-2705-y.

Fig. 10 Bending the curve – by means of more conservation and sustainable production and consumption



Source: WWF (2020), Living Planet Report 2020 – Bending the curve of biodiversity loss, p. 116 ff.

The objective to become nature positive complements the net zero efforts in the climate field. In addition, these two objectives are closely tied: greenhouse gas emissions are a key driver of biodiversity loss. The limitation of global warming to a maximum of 1.5 degrees makes a crucial contribution to conserving ecosystems and endangered species. Inversely, the function of intact seas and forests as CO_2 sinks can hardly be overestimated: Between 2001 and 2009, global forests absorbed 7.6 billion tonnes of CO_2 each year (net).[59]

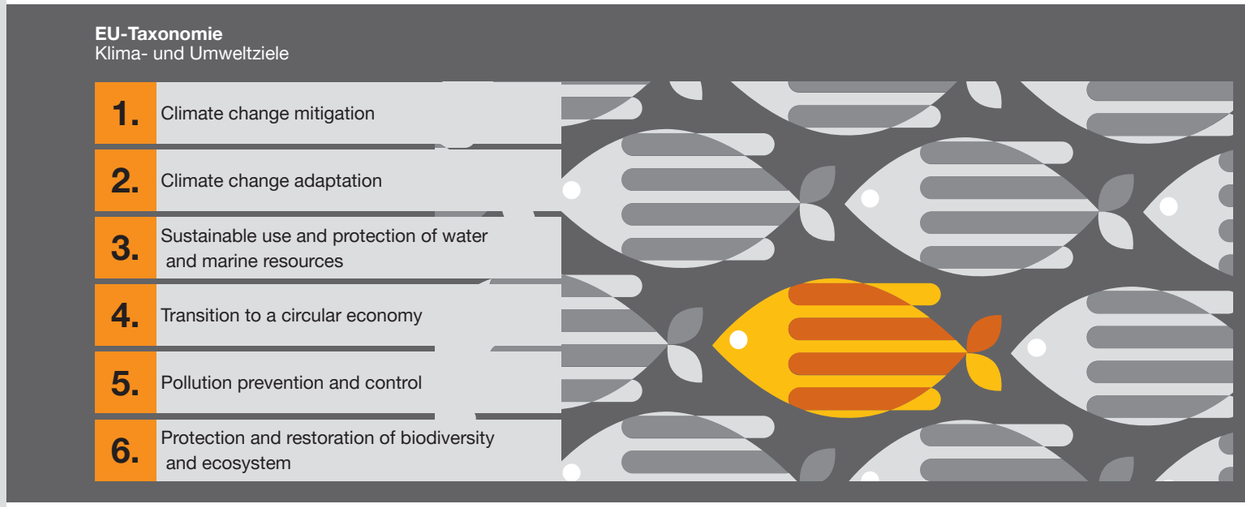
What exactly does “nature positive” mean for companies? Nature-positive economies denote economies which consider planetary boundaries and play a measurable role in conserving and expanding natural capital.[60] In doing so, the various driving forces behind biodiversity loss (see Section 1.2) must be addressed: In addition to limiting climate-damaging emissions, minimising land loss and ceasing deforestation must be achieved. Furthermore, pollution must be prevented, over-utilisation (e.g. of marine resources) must be ceased, and the spread of invasive species must be limited.

[59] Cf. Global Forest Watch (2021), Forests Absorb Twice as Much Carbon as They Emit Each Year, https://www.globalforestwatch.org/blog/climate/forests-carbon-emissions-sink-flux/.
[60] Cf. Science-Based Targets (undated), Science-Based Targets for Nature, Initial Guidance for Business, Executive Summary, https://sciencebasedtargetsnetwork.org/guidance-highlights/.

2.2 European financial market regulation: Taxonomy and reporting

Particularly strong impulses with regard to biodiversity are currently coming from Brussels. Strong momentum for financial institutions is evolving above all due to the EU’s current reporting and disclosure requirements. This development is based on the call on European politicians defined for the first time in the EU action plan on financing sustainable growth to channel capital flows towards sustainable investments, anchor sustainability more securely in risk management, and to promote transparency and a focus on the long term.[61] Another key point of reference is the EU Taxonomy Regulation with a total of six climate and environmental objectives (Fig. 11). Biodiversity is reflected in particular as part of the sixth objective “the protection and restoration of biodiversity and ecosystems”. However, all activities contributing to the other five environmental objectives, are not allowed to have a substantial adverse effect on biodiversity Therefore, activities which significantly harm the good condition and resilience of ecosystems or the restoration level of habitats and species are fundamentally ruled out (“Do No Significant Harm”). While measurement criteria and disclosure responsibilities relating to the first two (climate) objectives of the EU taxonomy are already in force, the delegated acts for the other four objectives – including biodiversity – are expected for mid-2023. The EU’s Platform on Sustainable Finance made a proposal for the technical criteria relating to biodiversity in March 2020. This proposal includes criteria for more than 60 economic activities from twelve sectors.[62]

Fig. 11 Climate and environmental objectives of EU taxonomy



Source: Platform on Sustainable Finance (2022), Platform on Sustainable Finance: Technical Working Group – Part A: Methodological report March 2022, p. 8

[61] Cf. European Commission (2018), Action Plan: Financing sustainable growth, https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:52018DC0097.
[62] Cf. Europäische Kommission (2022), Platform on Sustainable Finance’s report with recommendations on technical screening criteria for the four remaining environmental objectives of the EU taxonomy, https://ec.europa.eu/info/files/220330-sustainable-finance-platform-finance-report-remaining-environmental-objectives-taxonomy_en und Europäische Kommission (2022), Annex to the Platform on Sustainable Finance’s report with recommendations on technical screening criteria for the four remaining environmental objectives of the EU taxonomy, https://ec.europa.eu/info/files/220330-sustainable-finance-platform-finance-report-remaining-environmental-objectives-taxonomy-annex_en.

Given the qualitative and quantitative objectives, the recommendation is primarily geared towards the EU biodiversity strategy specifying the year 2030 as the target mark to stop and reverse dramatic biodiversity loss (net gain principle).

According to the platform draft, the economic activities which make a significant contribution can be assigned to one of three categories:

1. **Protection or improvement of the condition of ecosystems**, whereas there is largely a focus here on natural ecosystems such as old-growth forests
2. **Assurance of the sustainable use of managed ecosystems**, e.g. pastures, and/or the reduction of negative impact on these ecosystems
3. **Mitigation of previous damaging impact on ecosystems**; "offsetting" of activities causing damage is not possible here.[63]

Following the taxonomy, the Corporate Sustainability Reporting Directive (CSRD), which will be applicable in 2025 for the financial year 2024, will create more transparency with regard to corporate data. This directive will shape sustainability reporting because in the future approximately 50,000 companies in Europe (and more than 15,000 in Germany) will have to provide information on sustainability aspects with more specifics and detail. Companies generating net revenue of more than EUR 150 million in the EU and maintaining at least one subsidiary or branch office located in the EU are also subject to sustainability reporting from 2028 on.[64]

One of the guiding principles of the CSRD is the principle of double materiality: Attention must be paid both to the companies' own risks and dependencies on the environment (outside-in analysis), as well as to the companies' impact on the environment and society (inside-out analysis).

The EU Commission instructed the European Financial Reporting Advisory Group (EFRAG) to draft European Sustainability Reporting Standards (ESRS) for the CSRD. The drafts, which were initially published for consultation this summer, indicate a great level of detail. The ESRS E4 is the reporting standard on biodiversity (see infobox). Among other things, it includes the formulation of biodiversity-related objectives, as well as a resilience analysis.

Infobox

ESRS E4 – Key Points
(based on the version submitted to the EU Commission by EFRAG)

By preparing the ESRS E4 standard, the European Financial Reporting Advisory Group (EFRAG) submitted a recommendation on the disclosures mandatory for companies in the future relating to biodiversity and ecosystems to the EU Commission in November 2022. In the course of applying the CSRD, which will take effect in 2025 for 2024 data, this standard will gradually become mandatory for more and more companies. Among other things, companies will have to analyse and disclose the impact their activities have on biodiversity and ecosystems and their dependencies on nature.

At the beginning, this reporting is limited only to the companies' own production sites. However, there will be a future focus on the entire value chain. The risks and opportunities which arise for the companies as a result should also be disclosed and in the future taken into account with regard to resulting financial effects. At the same time, the EFRAG is working on sector-specific standards which will include additional obligations for reporting on biodiversity and ecosystems, e.g. for agriculture or energy utilities.

The expanded specifications in MiFID II – to be applied since August 2, 2022 – are linked to the taxonomy regulation, inter alia. The topic of biodiversity is addressed within the framework of alternative possibilities for enquiring about "sustainability preferences". In this context, the disclosure and addressing of adverse sustainability factors (Principal Adverse Impacts, PAIs), as defined in the EU Sustainable Finance Disclosure Regulation (SFDR) which took effect in March 2021, are particularly important in practice. In the wake of this, financial institutions must stipulate those activities which have an adverse impact on areas with a sensitive biodiversity status. However, they rely on suitable corporate data for this purpose, much of which is not yet available in a sufficient quality for many activities and areas.

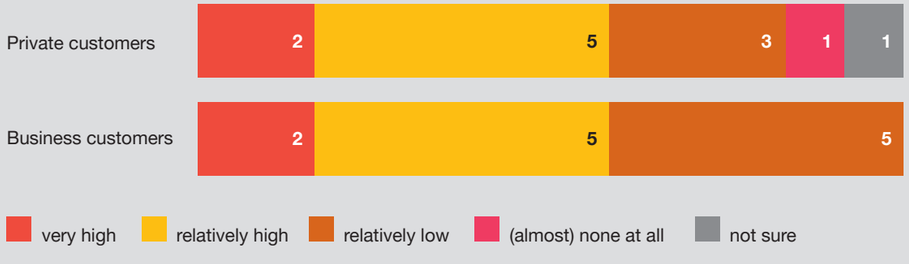
[63] Cf. Platform on Sustainable Finance (2022), PLATFORM ON SUSTAINABLE FINANCE: TECHNICAL WORKING GROUP, Part A: Methodological Report, https://finance.ec.europa.eu/system/files/2022-04/220330-sustainable-finance-platform-finance-report-remaining-environmental-objectives-taxonomy_en.pdf.
[64] Cf. European Council (2022), New rules on corporate sustainability reporting: provisional political agreement between the Council and the European Parliament, https://www.consilium.europa.eu/en/press/press-releases/2022/06/21/new-rules-on-sustainability-disclosure-provisional-agreement-between-council-and-european-parliament/.

Focus survey: Demand for biodiversity-related products is still limited

How do participants of the focus study assess demand for financial products with a focus on biodiversity and the conservation of ecosystems (Fig. 12)? Seven of the twelve respondents perceive a very high or relatively high level of interest among both private and business customers. However, the remaining respondents see a low level of interest.

Fig. 12 Interest in financial products with a focus on biodiversity, N = 12

Customers' interest in products with a focus on the protection and restoration of biodiversity and ecosystems



Source: PwC

The expert interviews also reveal the assessment that customers had not yet become aware of the topic. "It is my impression that the sustainability preference assessment is still somewhat complex. Neither the consultants nor the end customers are really familiar with the topic yet. I assume that biodiversity is even further off [than climate change]. The topic of biodiversity also remains under-represented among business customers. It is extremely important to some individuals," replied a Germany-based asset manager. "It always takes a while for it to reach consumers," according to a Germany-based insurer.

Within the course of implementing MiFID II, there is an assumption that demand-side preferences will play a bigger role in the area of climate and environmental protection in the future.[65]

[65] Cf. forsa (2022), Nachhaltige Geldanlagen, Ergebnisse einer repräsentativen Befragung unter Finanzentscheidern, https://www.geld-bewegt.de/sites/default/files/2022-04/2022_chartbericht_nachhaltige-geldanlagen.pdf.

2.3 Global supply chains: Intensified due diligence requirements

Regulations relating to due diligence requirements along global supply chains will also have extensive implications for financial institutions at the EU level. The planned EU Corporate Sustainability Due Diligence Directive (CSDDD) defines wide-ranging due diligence obligations relating to compliance with human rights, as well as to environmental protection and biodiversity aspects.[66] A Deforestation Regulation for supply chains is being developed at the same time. This is intended to link the importation of key goods like wood, beef, soy, coffee, palm oil, and cocoa into the EU to compliance with certain criteria. According to a recommendation of the EU Parliament, financial institutions in particular could also be held accountable here. In line with the EU Parliament proposals, financial institutions with registered head offices or operations in the EU should confirm to authorities that their services do not support any activities which would lead directly or indirectly to deforestation or forest damage. Moreover, the provisions relating to penalties should be intensified, and market players should be required to offset the damage that could have been prevented had the due diligence requirements been observed.[67] This legislation will necessitate new due diligence requirements and risk assessments.[68] The law aims to stop "imported deforestation" in order for example to protect the tropical rainforest better (Fig. 13). Even if the European Parliament's ambitious demands are downgradhampered by the EU Commission and the member states during the trilogue process, this aspect could be readdressed in a future revision of the directive.

Fig. 13 Causes of deforestation

More than 80% of the deforestation of tropical forests was caused by the production of these six goods between 2005 and 2017:

Source: WWF (2021), Stepping Up? The continuing impact of EU consumption on nature worldwide, p. 21

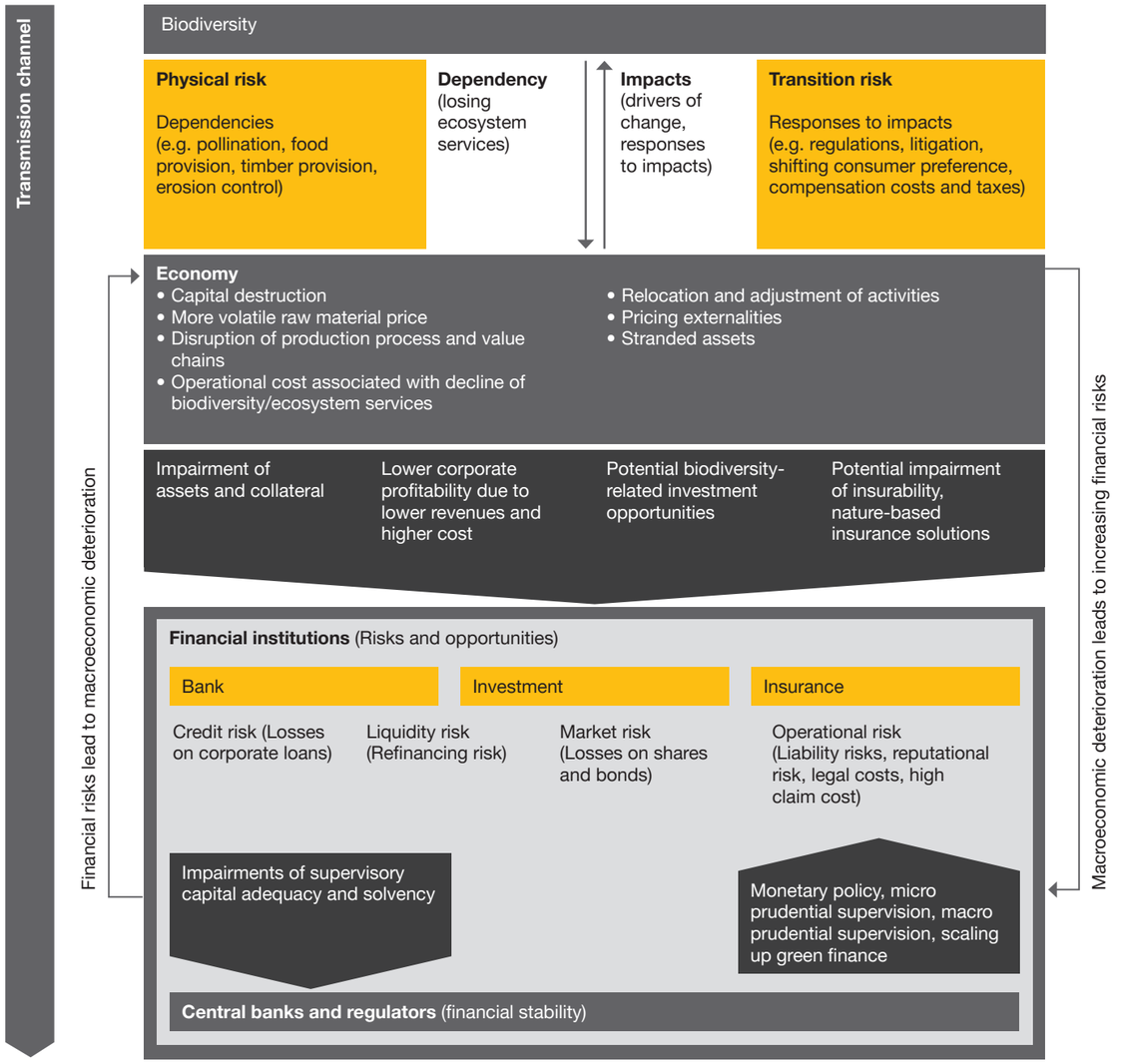
The Due Diligence in Supply Chains Act (*Lieferkettensorgfaltspflichtengesetz* – LkSG), which is in effect in Germany since 2023, also defines due diligence requirements to be observed along the supply chain. The subjects of protection are extremely specific here. The protection of biodiversity is covered indirectly, e.g. by means of prohibiting the causation of adverse soil changes and water pollution, which considerably compromise the natural basis for conserving and producing food.

[66] Cf. European Commission (2022), Proposal for a Directive on corporate sustainability due diligence and annex, https://ec.europa.eu/info/publications/proposal-directive-corporate-sustainable-due-diligence-and-annex_en.
[67] Europäisches Parlament (2022), Verordnung über entwaldungsfreie Produkte, https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/733624/EPRS_ATA(2022)733624_DE.pdf.
[68] Cf. European Commission (2021), Proposal for a regulation on deforestation-free products, https://environment.ec.europa.eu/publications/proposal-regulation-deforestation-free-products_en.

3 Risks and opportunities arising for financial institutions

Engaging with biodiversity aspects is increasingly importantvital for financial institutions, whether this refers to banks, insurance companies, asset owners, or asset managers – not only due to. This does not just arise from regulatory requirements (see Section 2.2). In fact, on the one hand, the urgency it relates to new insights obtained from considering dependencies on natural capital. On the other hand, it stems from the impact of operating activities on biodiversity (Fig. 14). Questions like these must be answered: What causes both direct and indirect risk? How can finance institutions make a direct impact here? How can opportunities arising from new business fields regarding biodiversity and ecosystem protection be exploited?

Fig. 14 Biodiversity risks and opportunities for financial institutions



Source: NGFS & INSPIRE (2022), Central banking and supervision in the biosphere: An agenda for action on biodiversity loss, financial risk and system stability, p. 25

3.1 Biodiversity risks as financial risks

Biodiversity risks arise from both the dependencies of individual industries and companies on ecosystem services and the impact of economic activities on biodiversity. Only the integrated consideration of this double materiality can fully gauge the extent of biodiversity risks. By way of example, companies in the agriculture sector are highly dependent on water, soil composition, and pollination. At the same time, their consumption of land and water and use of fertilisers impact the environment and contribute to biodiversity loss.

Exactly like climate risks, biodiversity risks can influence the stability of individual companies and entire economies in a fundamental way. According to a survey conducted by a Swiss bank, financial institutions fear productivity losses in particular here. However, risks along the supply chain or reputational and liability risks also concern the respondents.[69]

Although the assessment of biodiversity and climate change risks is currently being superseded by other crises such as Covid-19 and the war in Ukraine with its associated supply and energy shortages, nothing will change the prominent position of the global ecological crises in the medium and long term. Unlike social and (geo)political events, their momentum cannot be controlled, as well as irreversible if potential tipping points are reached.

The risk categories which have been acknowledged when addressing climate risks can also be transferred to biodiversity and ecosystems.[70] In doing so, biodiversity risks also affect existing risk types (Fig. 15).

[69] Cf. European Commission (2022), Proposal for a Directive on corporate sustainability due diligence and annex, https://ec.europa.eu/info/publications/proposal-directive-corporate-sustainable-due-diligence-and-annex_en.
[69] Cf. European Commission (2021), Proposal for a regulation on deforestation-free products, https://environment.ec.europa.eu/publications/proposal-regulation-deforestation-free-products_en.
[69] Cf. Responsible Investor & Credit Suisse (2021), Unearthing investor action on biodiversity, p. 24, freely translated from English, www.credit-suisse.com/media/assets/microsite/docs/responsibleinvesting/unearthing-investor-action-on-biodiversity.pdf.
[70] Cf. PwC & WWF (2020), Nature is too big to fail, S. 17, www.wwf.ch/sites/default/files/doc-2020-01/Nature%20is%20too%20big%20to%20fail_EN_web.pdf.

Fig. 15 The effect of biodiversity risks on existing risk types

	Credit risk	Market risk	Operational risk (incl. reputational risk)
Transition Risk	Investee suffers substantial losses due to sanctions, management damages or increased taxes stemming from its negative impact on biodiversity	Long-term price increases as a result of biodiversity change	Image loss resulting from failure to switch to biodiversity
Physical risk	Revaluation of debt-servicing and collateral	Rating downgrades and share price losses after biodiversity loss	Biodiversity loss affects balance sheet
Litigation risk	• Litigation as pertaining to biodiversity loss and breach of the underlying legal frameworks • New regulatory rules impose limitations on investing in activities with an impact on biodiversity • Damages due to false reporting of biodiversity risks • Damages due to greenwashing		
Systematic Risk	Economy can no longer be insured at reasonable cost markets	Market-threatening effects from biodiversity loss in an entire region	Reputational losses for entire industries/entire

Source: PwC & WWF (2020), Nature is too big to fail – Biodiversity: the next frontier in financial risk management, p.27

Transition risks can arise for example due to changes in tax and subsidy policy, modified import regulations, production requirements, changes in the sentiments of stakeholders, and above all due to changes to the legislative frameworks at European or domestic level (see Section 2). Biodiversity risks could even entail a higher transition risk than climate risks because biodiversity risks are always location-specific. This means that an ecosystem crisis at a certain location can result in the abrupt involvement of individual sectors.

Physical risks relate to potential damage arising from the actual loss of biodiversity and ecosystem services. The probability of these losses is rising steadily given the influences listed in Section 2 and the potential of tipping points being reached. For instance, the loss of pollinator populations could lead to serious crop failures.

Diverse examples from recent years have shown that legal risks and/or liability risks can also play a key role. The keyword “greenwashing” with its associated lawsuits and reputational losses is of particular note in this context. Mere presumptions of greenwashing and intense public discourse are often enough, for example, to cause share prices to fall or managers to be dismissed. Moreover, new approaches in case law, such as extending rights to natural objects, can incite completely new legal conditions in some areas.[71] For instance, Lake Mary Jane has recently attracted attention by filing a lawsuit in Florida with the help of its representatives against planned development projects on its banks.[72] There are also already developments along the same lines in Europe. For instance, Spain has granted the endangered saltwater lagoon Mar Menor the status of legal person,[73] and in Germany the North Sea could soon also receive similar rights.[74] Consequently, people could take legal action on behalf of ecosystems in order to enforce their rights, such as the intactness of a location.

Furthermore, discussions are taking place at the EU level to recognise “ecocide” (severe and either widespread or long-term damage to the environment) as a criminal offence in the EU directive on environmental crime. In doing so, it will be irrelevant whether this ecocide was caused with negligence or intent.[75]

Systemic risks relate to risks which arise from biodiversity loss and/or the ecosystem collapse of entire regions and impact the functioning of the economic processes in place. For example, models indicate that extensive credit rating downgrades must be expected if biodiversity loss continues to proceed rapidly in individual countries and regions.[76]

[71] Cf. Haas, M. (2022), Der Fluss, der gegen seine Verschmutzung klagt, https://sz-magazin.sueddeutsche.de/die-loesung-fuer-alles/naturrechte-earth-laws-garn-91595.
[72] Cf. Kolbert, E. (2022), A Lake in Florida Suing to Protect Itself, https://www.newyorker.com/magazine/2022/04/18/a-lake-in-florida-suing-to-protect-itself.
[73] Cf. Spiegel Ausland (2022), Spanien verleiht Lagune Mar Menor Personenstatus, https://www.spiegel.de/ausland/spanien-verleiht-lagune-mar-menor-personenstatus-a-f4767bca-4e16-4ef9-b8bc-f93bee0a2b4c.
[74] Cf. Bäunker, L. (2022), “Die Nordsee soll mitentscheiden können”, https://www.zeit.de/green/2022-09/umweltschutz-spanien-lagune-mar-menor-rechtspersoenlichkeit-oekosystem?wt_zmc=sm.ext.zonaudev.whatsapp.ref.
[75] Cf. Tagesspiegel Background (2022), Ökozid soll als Straftatbestand ins EU-Recht, https://background.tagesspiegel.de/sustainable-finance/oekozid-soll-als-straftatbestand-ins-eu-recht.
[76] Cf. Finance for Biodiversity Initiative (2022), Nature Loss and Sovereign Credit Ratings, https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/06/NatureLossSovereignCreditRatings.pdf.

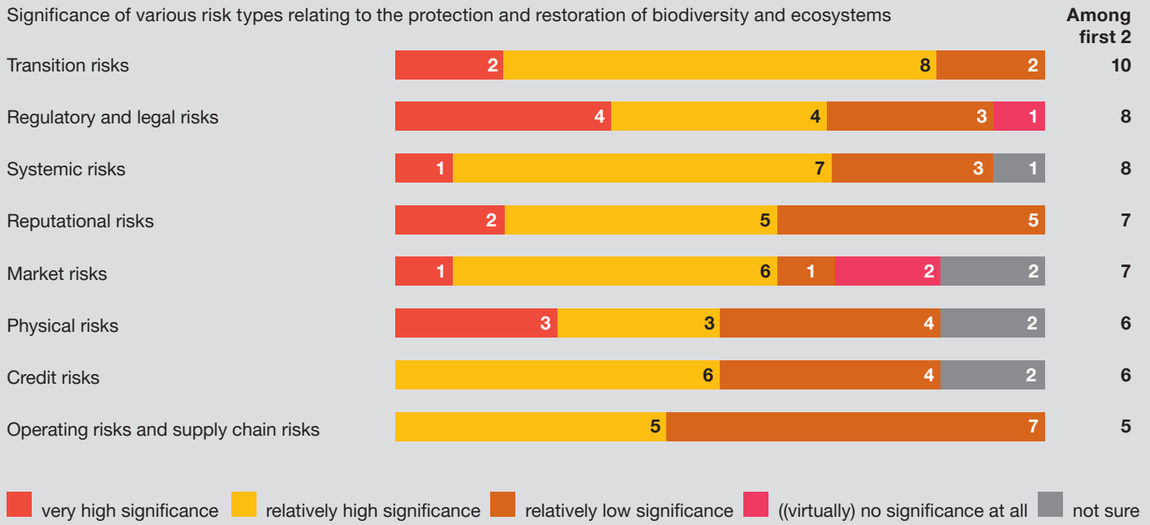
Focus survey: Transition risks are perceived as more important than physical risks

Transition biodiversity risks have a higher importance overall for financial institutions than physical biodiversity risks (Fig. 16). Ten of the twelve institutions surveyed consider transition risks to be relatively meaningful or very meaningful, while only six attach the same importance to physical risks. The implications of biodiversity risks are considered highest on the risk types of regulatory and legal risks, systemic risks, as well as reputational and market risks. The majority of respondents ascribe an extremely high or relatively high significance to these risk types. An interview with one employee of an insurance company also underlined this assessment by emphasising the risk of greenwashing allegations. The employee said that because of the DWS case[77], the entire German financial sector has become extremely cautious to prevent allegations like this.

The rather low assessed significance of physical risks, credit risks, and supply chain risks could be due to a lack of knowledge about the impact and chain reactions of biodiversity loss, as well as the economic dependency on biodiversity as a whole.

In this connection, one of the interviewees emphasised, “The crucial issue will be how transition and physical biodiversity risks could actually be translated into financial risks. How do risks like these impact the portfolio?”

Fig. 16 Relevance of the various risk types in connection with biodiversity, N = 12



Source: PwC

[77] Cf. for example ZDF (2022), Grüne Täuschung bei der DWS-Gruppe?, www.zdf.de/nachrichten/wirtschaft/greenwashing-deutsche-bank-woehrmann-100.html.

> Investors who rely on nature-blind measures of creditworthiness will be unable to correctly identify, price, and manage risk across their portfolio.[78]
>
> Finance for Biodiversity Initiative

When assessing risk, it is indispensable to pay close attention to the interactions of biodiversity and climate change. If a critical level is reached in one area, the impacts mutually amplify one another. This multiplies the overall risk, and financial stability begins to teeter more quickly.[79]

The impact of biodiversity risks on the risk types of credit risks, market risks, and operational risks (including reputational risk) are especially noteworthy. For instance, credit risks can emerge when borrowers are affected by the repercussions of a biodiversity loss that leads to credit defaults. By way of example, fisheries are severely affected when coral bleaching occurs because fish populations decline. Furthermore, unstable and vanishing reefs lead to exposed coasts, which in turn causes the probability of flooding in coastal areas to rise and thus the probability of the destruction of real estate to increase. Market price risks result when a company or a branch experiences the negative implications of biodiversity loss. For example, pronounced coral bleaching in a popular tourist region could cause a sharp drop in tourism, which in turn has a negative effect not only on local residents, but also airlines, hotel chains, and tour operators because credit spreads, interest rates, and exchange rate could change adversely.

Reputational risks can occur, for example, when financial institutions advertise that they advocate for biodiversity protection, for instance by joining respective networks (see Section 4 for an overview) while also investing in industries or companies which verifiably destroy biodiversity. Non-governmental organisations (NGOs) and consumers are focusing more closely on these aspects and do not hesitate to confront financial institutions about them publicly.[80]

Biodiversity risks are also relevant for insurance companies. Insurers have already begun refusing to cover real estate in certain areas with a high risk of flooding against natural disasters. Because of coral bleaching, the risk of flooding can increase in a number of regions or even affect new regions. Furthermore, insurers are exposed to greater damages owing to the rising number and severity of natural disasters, and the likelihood will continue to grow because of the biodiversity crisis.

[78] Cf. Finance for Biodiversity Initiative (2022), Nature Loss and Sovereign Credit Ratings, p. 7, https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/06/ NatureLossSovereignCreditRatings.pdf.
[79] Cf. PwC & WWF (2020), Nature is too big to fail, p. 17, www.wwf.ch/sites/default/files/doc-2020-01/Nature%20is%20too%20big%20to%20fail_EN_web.pdf.
[80] Cf. for example Harvest & Deutsche Umwelthilfe (2022), Finanzierung der Entwaldung, www.duh.de/fileadmin/user_upload/download/Projektinformation/Naturschutz/Entwaldung/220902_DUH_Harvest_Finanzierung_der_Entwaldung.pdf.

3.2 Opportunities of a nature-positive economy

As progress is made towards becoming an economy which is climate-neutral and aware of the importance of biodiversity, opportunities definitely also emerge for companies and finance. These opportunities must then be recognised and exploited. Thus, it can be assumed that the future-looking management of biodiversity risks entails advantages with regard to compliance risks and capital requirements. Additionally, specific market opportunities also arise, especially during the current early phase. The potential market volume of a nature-positive economy is estimated at more than ten trillion US dollars annually, with nearly 400 million jobs which could be created by 2030 (Fig. 17).[81] The EU Commission also repeatedly emphasises the economic possibilities which arise in the area of conserving and/or restoring biodiversity and ecosystems.[82]

Fig. 17 Economic opportunities of biodiversity

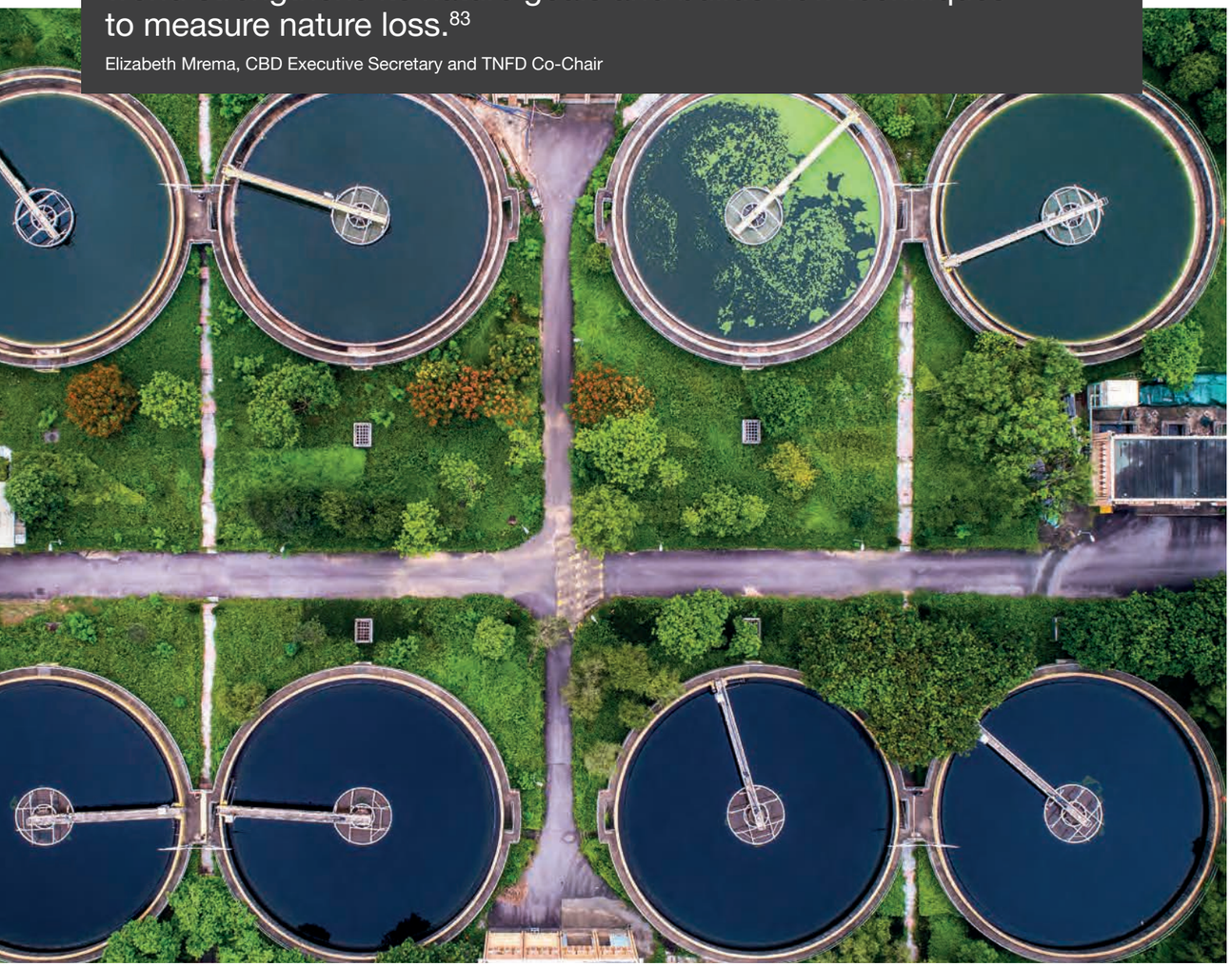
15 transitions in the three socio-economic systems could deliver $ 10.1 trillion of annual business opportunities and 395 million jobs by 2030.

Source: World Economic Forum & AlphaBeta (2020), New Nature Economy Report II – The Future Of Nature And Business, p. 9

The opportunities for industrial companies relating to biodiversity are growing and range from reforestation and renaturation projects to sustainable forms of agriculture, forestry, construction, and fisheries. There is always an emphasis on reducing or preventing negative influences on ecosystems, as well as on positive development. Finance plays a crucial role here because it has to finance the necessary transformation and can systematically channel the flow of resources towards a nature-positive economy, which also gives rise to opportunities for financial market players.

[81] Cf. World Economic Forum (2020), The Future Of Nature And Business, www3.weforum.org/docs/WEF_The_Future_Of_Nature_And_Business_2020.pdf.
[82] Cf. Europäische Kommission (2020), EU-Biodiversitätsstrategie für 2030, Mehr Raum für die Natur in unserem Leben, https://ec.europa.eu/info/sites/default/files/communication-annex-eu-biodiversity-strategy-2030_de.pdf und Europäische Kommission, Vertretung in Deutschland (2022), Europäischer Grüner Deal: Weniger chemische Pestizide, umfassende Renaturierung, https://germany.representation.ec.europa.eu/news/europaischer-gruner-deal-weniger-chemische-pestizide-umfassende-renaturierung-2022-06-22_de.

> The financial community has a critical leveraging role when it comes to pioneering nature-positive impacts. The call for the financial community to act will become even louder, as the world strengthens its nature goals and builds new techniques to measure nature loss.[83]
>
> Elizabeth Mrema, CBD Executive Secretary and TNFD Co-Chair



[83] CBD, Financial Sector Guide for the Convention on Biological Diversity, p. 3, www.cbd.int/doc/c/8e24/f151/326b69024f014a8fb9684a8d/cbd-financial-sector-guide-f-en.pdf.

Countless ideas and approaches for the strategic integration of biodiversity in the financial sector have been developed in recent years, including for the area of product development. Most recently, the first biodiversity-oriented funds were created.[84] These include both traditional mutual funds and investment solutions in the area of impact investing. Additionally, biodiversity-related exchange traded funds (ETFs) and loans[85] or bonds committed to biodiversity protection have emerged on the basis of initial indicators and targets. A further ascent of biodiversity-related product development is expected due to the sustainability-related changes in the MiFID II (see Section 2.2) and the emergence of the first biodiversity-related indexes[86].

Initial innovative solutions have also been introduced in the insurance industry. For example, a regional government in Mexico insured its adjacent coral reef which helps the surrounding region to earn approximately US$ 6.2 billion each year from tourism, commercial fishing, and the development of coastal areas. The NGO The Nature Conservancy and a Swiss insurer developed an insurance product tailored for this purpose, which was triggered by Hurricane Delta in 2020. The US$ 800,000 which was paid out was used to resolve the damage to the reef and thus sustain the functioning economy.[87]

Parallel to the emerging investment and insurance solutions, specific public promotion schemes which are extended to consider biodiversity and ecosystems when granting loans (including “blended finance solutions”) could boost this momentum further in the future.[88] The fact that the demand for sustainable investment solutions is expected to increase further must also be remembered – in the middle of 2022, German investors held more funds with sustainability properties than ever before.[89] All these aspects demonstrate how valuable it is to commit to this topic at an early stage. It is essential to assemble the necessary expertise and the corresponding capacities in a timely manner. Ultimately – unlike with other traditional hot topics – rising demand is literally predestined by worsening climate change and biodiversity crises. Nevertheless, German financial institutions appear to lag behind other international companies, whether in terms of product development with a focus on biodiversity or dedication to professional networks and initiatives.[90]

[84] For example: the ASN Biodiversity Fund, Rabobank Agri3Fund, Karner Blue Biodiversity Impact Fund, Federated Hermes Biodiversity Equity Fund, and the Eco Business Fund, created by the German funds manager Finance in Motion in cooperation with the KfW and the NGO Conservation International.
[85] For example: HSBC World ESG Biodiversity Screened Equity UCITS ETF and Rabobank Biodiversity Loan.
[86] For example: HSBC Biodiversity Screened World Index.
[87] Cf. World Economic Forum (2021), Mexico’s Mesoamerican Barrier Reef is now being protected with insurance - here’s how, www.weforum.org/agenda/2021/09/mesoamerican-coral-reef-mexico-using-insurance-to-protect-ecosystem/.
[88] Cf. Responsible Investor & Credit Suisse (2021), Unearthing investor action on biodiversity, www.credit-suisse.com/media/assets/microsite/docs/responsibleinvesting/unearthing-investor-action-on-biodiversity.pdf.
[89] Cf. BVI (2022), der nachhaltige Fondsmarkt im zweiten Quartal 2022, www.bvi.de/fileadmin/user_upload/Statistik/Research/Fokus_Nachhaltigkeit Q2_2022_.pdf.
[90] Cf. WWF (2021), Deutsche Banken müssen Fahrt aufnehmen, www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Unternehmen/WWF-Zweites-Bankenrating.pdf.

Infobox

Sustainable agriculture as driver of opportunities

According to a recent study[91], reforming agriculture and our nutrition systems, in particular at the interface to biodiversity and ecosystem services, is a major key to overcoming the current climate crisis. Healthy soil is especially suited to act as a natural CO_2 sink. A higher degree of above-ground and below-ground biodiversity is a necessary condition for this. Agricultural systems featuring greater diversity of genes, species, and ecosystems are more resistant to outside stressors such as heat waves or droughts. This can be decisive, especially when it comes to climate change.

In addition to a fundamental shift in our eating habits, the growth of more sustainable agriculture is considered a promising approach which also entails monetary benefits for society. The macroeconomic advantages of transforming food and agricultural systems by 2030 are estimated at US$ 5.7 trillion.[92] Even though it originates from a low level, a clear trend seems to be emerging towards expanding regenerative forms of cultivation. This is also met by growing demand from consumers, especially in the USA.[93] A study conducted in Germany in 2021 also indicates that 38% of respondents purchase organic products frequently or exclusively. Worth mentioning is that 51% say that environmental or climate protection is the most important factor in doing so, while 27% named it the second most important aspect.[94]

A comprehensive agricultural shift is complex and is also not less linked to global, regional, and national political framework conditions.[95] Financing is not the decisive lever in every case here. Nevertheless, in countries in the South where numerous resources along our food chains are produced, many small and mid-sized agricultural producers are still also facing financing challenges. Taking these agricultural businesses into account is not only vital in light of the success of more sustainable farming – it is also crucial with regard to shaping a just transition. According to the OECD, blended-finance solutions, which use a combination of public and private financial resources, could be a way to close existing funding shortfalls more rapidly.[96] A field is evolving here and increasingly being discovered by established private investors.

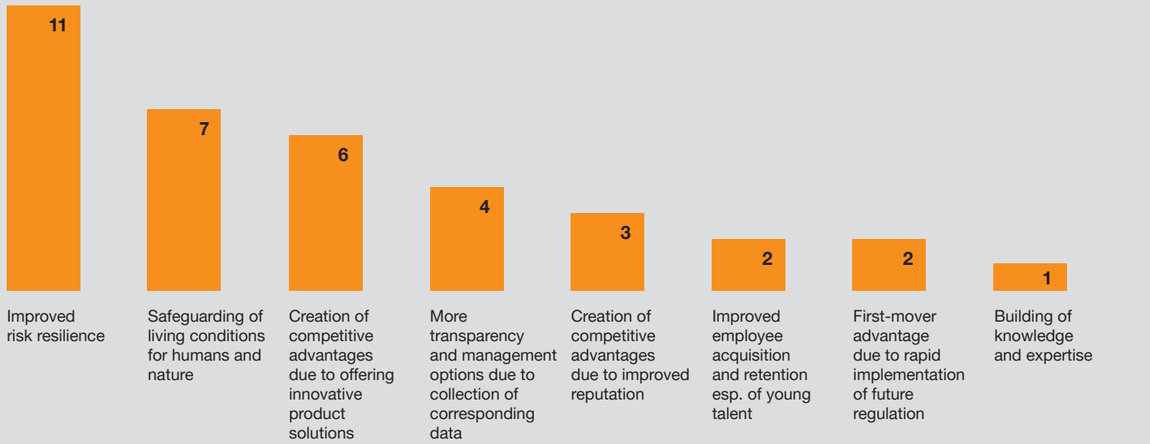
[91] Cf. Conservation International (2022), Exponential roadmap für natural climate solutions, https://cicloud.s3.amazonaws.com/docs/default-source/s3-library/publication-pdfs/exponential-roadmap-for-natural-climate-solutions.pdf.
[92] Cf. Convention on Biological Diversity (2022), Agricultural Biodiversity, www.cbd.int/agro/.
[93] Cf. Forbes (2021), Regenerative Agriculture: The Next Trend In Food Retailing, www.forbes.com/sites/forbesbusinesscouncil/2021/08/19/regenerative-agriculture-the-next-trend-in-food-retailing/?sh=646662c92153.
[94] Cf. German Federal Ministry of Food and Agriculture (2021), Öko-Barometer 2021, www.bmel.de/SharedDocs/Downloads/DE/Broschueren/oekobarometer-2021.pdf? blob=publicationFile&v=9).
[95] Cf. WWF (2019), Vielfalt auf den Acker! Ansätze für eine nachhaltigere Landwirtschaft in Deutschland, www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Landwirtschaft/wwf-studie-vielfalt-auf-den-acker.pdf.
[96] Cf. OECD (o.D.), Blended Finance, https://www.oecd.org/dac/financing-sustainable-development/blended-finance-principles/.

Focus survey: Opportunities with regard to the protection and restoration of biodiversity and ecosystems

Why do financial institutions address biodiversity (Fig. 18)? Where do they perceive related opportunities? The vast majority of respondents name an improved risk resilience. Additional vital opportunities are seen in safeguarding living conditions for humans and nature, as well as in attaining competitive advantages by offering innovative products. One of the respondents said that planetary boundaries have already been exceeded: “Mitigating the consequences is the goal.”

Fig. 18 Opportunity assessment for the integration of biodiversity, N = 13, multiple responses possible

Opportunities with regard to the protection and restoration of biodiversity and ecosystem aspects in the financial sector



Source: PwC

When responding to a TNFD survey (see Section 5), many within more advanced financial institutions in terms of their transition highlighted the competitive advantage arising from a transition which is nature-related and in particular biodiversity-related. Several interviewees stated that their more environmentally friendly services tend to attract more investments and generate business growth.[97]

3.3 Applying lessons learnt from dealing with climate risks and opportunities

More and more financial institutions are recognising the fundamental significance of biodiversity and ecosystem services for their risk management and ultimately for the future viability of their business models. In doing so, they can draw on experience, models, and processes from the management of climate risks, in particular from the following two approaches:

1. Science-based targets

Numerous companies worldwide have now undersigned clear commitments for achieving the climate targets specified in the Paris Agreement. For instance, more than 3,500 companies are active in the Science Based Targets initiative (SBTi) and are pursuing defined pathways to reduce their greenhouse gas emissions.[98] The Glasgow Financial Alliance for Net Zero (GFANZ) unites over 450 companies in the financial sector with more than US$ 130 trillion in managed capital.[99] This alliance also calls for fundamental transition plans of the participating companies and climate neutrality by 2050.

As already noted, target setting in the field of biodiversity is less advanced. The Global Biodiversity Framework (GBF) described in Section 2 defines the goal to bring biodiversity loss of areas of high biodiversity importance close to zero by 2030 (no net loss) in order to live in harmony with nature by 2050. The five key drivers of the biodiversity crisis (see Fig. 3 in Section 1.2) should be used as a basis here. In light of the interactions between the drivers, it is vital to minimise risky dependencies.

Initial guidance on target setting for biodiversity and the conservation of ecosystems from the Science Based Targets Network (SBTN) is anticipated at the beginning of 2023. Yet, there are already possibilities – and even the necessity – for companies and financial institutions to act now. Setting targets with fixed timeframes and gearing them towards possible scenarios is crucial.[100] For example, the prevention of deforestation (zero deforestation) can be promoted in accordance with SBTN's interim targets.

[97] Cf. The Biodiversity Consultancy et al. (2022), TNFD Financial Markets Readiness Assessment, www.unepfi.org/wordpress/wp-content/uploads/2022/10/07-Financial-Market-Readiness-Assessment-2.pdf.
[98] Vgl. Science Based Targets (undated), ambitious corporate climate action, https://sciencebasedtargets.org/.
[99] Vgl. Glasgow Financial Alliance for Net Zero (undated), Accelerating the transition to a net-zero global economy, https://www.gfanzero.com/.
[100] Cf. TNFD (2022), The TNFD Nature-Related Risk and Opportunity Management and Disclosure Framework, Beta v0.2, p. 21, https://framework.tnfd.global/wp-content/uploads/2022/06/TNFD-Framework-Document-Beta-v0-2.pdf.

In this context, the following five actions recommended by the SBTN as an action framework for interim targets can be used as a guide:[101]

- **Avoid** negative impacts on the environment, for example zero deforestation or land conversion from 2023 on along the entire supply chain
- **Reduce** negative environmental influences, for example by reducing water withdrawals in parts of the supply chain by X% by 2030
- **Regenerate** ecosystems, for example by ensuring that X% of natural habitats is regenerated in working lands along the supply chain
- R**estore** healthy ecosystems, for example by increasing the share of land under restoration in all ecosystems (land, freshwater, ocean) in the company's area of influence
- **Transform** fundamental processes on which biodiversity loss and its drivers are based, for example with technological innovations and shifts in underlying values and behaviours

It is clear that, given the twofold crisis, dual targets will become increasingly important in the future, referring to net zero and nature positive targets – both on the basis of scientific results and corresponding transition pathways.

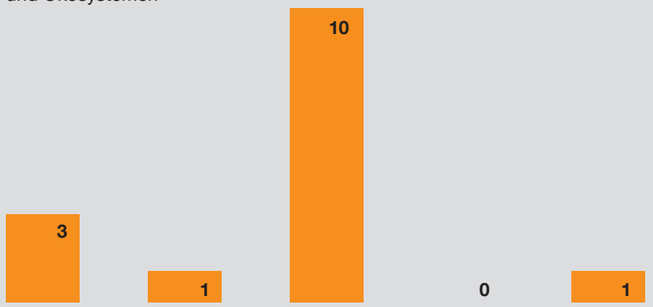
[101] Cf. Science Based Targets Network (o.D.), SBTN Interim Targets, https://sciencebasedtargetsnetwork.org/take-action-now/take-action-as-a-company/what-you-can-do-now/interim-targets/.

Focus survey: Biodiversity target setting in process

Only a few of the surveyed institutions have already formulated specific targets for the protection and restoration of biodiversity and ecosystems (Fig. 19). However, nearly all others aim to do so in the future or are already working on it.

Abb. 19 Biodiversitätszielsetzungen, N = 15

Formulierung konkreter Ziele im Bereich Schutz und Wiederherstellung vom Biodiversität und Ökosystemen



Source: PwC

Where both the focuses and challenges associated with the current targets lie became evident in the interviews. “Ultimately, it does not make sense to formulate objectives until they can be supported with data. Otherwise, the targets are not credible and there is almost no way to ascertain how close you are to achieving them”, emphasises one of the respondents. Various initiatives are also causing a great deal of movement here.

This momentum also impacts the dialogue envisaged for some sustainability funds with the portfolio companies with which business relationships are maintained (“engagement”): “There are not yet systematic KPIs in place. They are still extremely company-specific because reference to [certain] biodiversity aspects differs widely for companies from various sectors. Biodiversity aspects already play a major role for consumer staples, in particular in European companies. Some of these companies already have concrete targets to only procure certified sustainable raw materials by 2025. The topic has not yet really arrived in other sectors, such as mining and energy.”

“The topic is also more difficult for our engagement activities because the goals are hazier. Overall, the topic of climate change has attained solid penetration – companies know what we are talking about and understand our demands.”

> “While (…) comparatively substantiated and established reporting on climate risks is already in place for companies, considerations of biodiversity risks and ecosystem services (...) continue to play a minor role.[102]
>
> Helmholtz Centre for Environmental Research, UFZ

2. Transition plans

The keyword “transition pathways” refers to a second material issue which is already familiar from dealing with climate change. This focuses on credible explanations of what kind of transformation is possible how quickly and in accordance with scientific findings, as well as relating to which areas, sectors, regions, and asset classes could see this transition. For example, sector-specific transformation plans are effective in describing the progress of implementation towards the defined climate targets and represent a suitable instrument to support companies along the transition, in particular those with a high impact and/or great dependencies.[103] Established commitment formats can also continue to be used for the area of biodiversity to achieve results in the short term. Banks can require companies to submit transition plans on a sector or regional basis, e.g. relating to the reduction of negative impacts on natural capital. Plans like this can also be agreed upon as a condition for financing agreements.

The conservation and restoration of biodiversity and ecosystems place great demands on companies. A distinction is made between short-term and long-term actions. While alternative (e.g. recycled) raw materials can easily be used for some products, more extensive research and development efforts are required to transform other production processes.[104]

The application of relevant legal and regulatory requirements along the entire supply chain is also challenging. All of this speaks for comprehensive transition planning whichmust include aspects of governance, strategy, and risk management.

[102] Cf. Helmholtz Centre for Environmental Research & NABU (2022), Study: Sustainable Finance – Die Berücksichtigung von Biodiversität und Ökosystemleistungen, p. 24, https://www.nabu.de/imperia/md/content/nabude/sustainablefinance/090622_sustainable_finance_biodiversitaet.pdf

[103] Cf. for example Pathways to Paris (o.D.), Pathways to Paris, Transformation gestalten: Chancen der Klimawende nutzen. https://pathwaystoparis.com/.

[104] Cf. Osnabrück University of Applied Sciences (2020), extensive Dachbegrünung mit gebietseigenen Wildpflanzen am Beispiel Nordwestdeutschlands, www.hs-osnabrueck.de/fileadmin/HSOS/Forschung/Recherche/Laboreinrichtungen_und_Versuchsbetriebe/Labor_fuer_Botanik_Vegetationsoekologie/pdf/Praxisleitfaden_Extensive_Dachbegruenung_mit_gebietseigenen_Wildpflanzen_web.pdf.

4 What matters most when managing biodiversity risks and opportunities

Forward-looking management regarding biodiversity and ecosystem services first requires that financial institutions measure dependencies and the impacts of real economic companies in their portfolio or loan book. This is the only way for a company to determine its own dependencies and impacts, and for it to recognise its biodiversity-related risks and opportunities and take action. Appropriate instructions, tools, data, and standardised measurement methods are necessary for this purpose. Communication with peers and other stakeholders in networks can prove helpful for implementation.

There is now an established ecosystem of action frameworks and targets for the field of climate change, including metrics, disclosure standards, and implementation guidance. These also include voluntary commitments that have been made throughout the entire financial market. On the basis of these experiences with regard to climate change, extremely dynamic initiatives relating to the topic of biodiversity and ecosystems are currently forming. Occasionally, existing initiatives and concepts should be integrated into a more comprehensive system. For example, the Task Force for Nature-related Financial Disclosure (TNFD) refers to the work of the Task Force for Climate-related Financial Disclosure (TCFD), among other resources. It has also been observed elsewhere that there are equivalences to climate-related initiatives in the area of biodiversity and ecosystems. Overall, there is an expectation that the solutions – subject to the determination of concrete and ideally internationally binding targets – will continue to develop so quickly at the various levels. Sufficient concrete suggestions with guidelines are already available for the first steps.

4.1 Initiatives

The most important initiatives and cooperations at present include inter alia the Taskforce on Nature-related Financial Disclosures (TNFD, see Section 5), the Science Based Targets Network (SBTN, see Section 3.3), the Finance for Biodiversity Pledge and its foundation, Nature Action 100+, the Partnership for Biodiversity Accounting Financials (PBAF), and the UNEP Finance Initiative/PRI. There are a number of other initiatives founded by institutions such as Business@Biodiversity (B@B) or which emerged from pooling various financial market players. These initiatives and cooperations do not only have differing approaches, they also provide support for various stages of biodiversity-related integration, meaning that an ecosystem comprising initiatives, instructions, and tools is taking shape (Fig. 20).[105]

Which of the tools will be applied will primarily depend on the individual starting points, possibilities, and targets of the financial institution. Which tools does my company already have? Which tools may already be in use and can or should be expanded upon? And above all, what is the primary objective of the analysis? Is it mainly being performed for risk assessment and management purposes, or is there a focus on product development (for example)? The responses to these questions will help to make an appropriate selection.

For example, there are initiatives which are focussed on the development of action frameworks. In this context, – analogous to the Intergovernmental Panel on Climate Change (IPCC) – the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is particularly noteworthy. This platform is widely supported by science and plays a decisive role in shaping international targets, e.g. as part of the UN Convention on Biodiversity. Other initiatives emphasise disclosure, while some focus on formulating metrics and assessment approaches. Still others primarily support operational implementation. The scope of the initiatives is not always clearly delineated and there are many overlaps. Fig. 20 seeks to provide an overview. Furthermore, concrete tools and data access (see Section 4.2) are being developed which can support financial institutions in particular by initially taking stock of dependencies and (potential) impacts, opportunities, and risks in their portfolio.

Section 5 contains a separate description of one of the best-known initiatives, the TNFD and its framework. Financial institutions can use the TNFD framework and the associated assessment process to set out and analyse their own biodiversity-related risks and opportunities.

[105] For example, when selecting the suitable initiative a detailed overview of the Finance for Biodiversity Pledge is helpful, cf. Finance for Biodiversity (2022), Finance and Biodiversity, Overview of initiatives for financial institutions, www.financeforbiodiversity.org/wp-content/uploads/Finance_and_Biodiversity_Overview_of_Initiatives.pdf.

Fig. 20 Ecosystem with biodiversity-related initiatives

(not all-encompassing, sorted by focus)

Source: PwC

4.2 Tools

Furthermore, there is an increasing number of specific aids available for implementing biodiversity analyses in finance.[106] The approaches and instruments which exist at present have differing focal points, are sometimes based on different economic methodologies and data sources, and pursue specific targets.

ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)[107], a tool developed by the Natural Capital Finance Alliance, has attained a relatively high level of awareness and prevalence. Financial institutions are increasingly using ENCORE as an entry point to determine their own biodiversity-related risks. The tool is also recommended by central banks, e.g. the ECB, within the scope of a thematic review of climate and environmental risks. ENCORE rudimentarily follows the principle of double materiality and provides insight on the dependencies on biodiversity, as well as on the impacts of economic activities on biodiversity for some areas. ENCORE can be used to obtain an initial assessment regarding which sectors and production processes are exposed to biodiversity risks, i.e. how dependent the companies in their portfolios are on natural capital and in turn the impact their portfolio has on biodiversity.

The analysis is performed at the production process level and already covers eleven sectors and 157 sub-sectors with their respective production processes. For example, this is how a Netherlands-based asset manager found that approximately one-third of his assets were located in sectors with potentially high or extremely high impacts on the main driver of biodiversity loss. These sectors include in particular pharmaceuticals, integrated telecommunications services, speciality chemicals, packaged food and meat, and clothing, accessories, and luxury goods. It also became evident that many of the invested sectors depend to a great extent on five ecosystem services, namely climate regulation, the availability of groundwater and surface water, water flow, and protection from flooding and storms. This particularly applies to agricultural products, followed by forestry products and a series of other industries, including energy suppliers and telecommunications.[108] For the next step, the Natural Capital Finance Alliance recommends a location-specific evaluation of dependencies and impacts. Decisions regarding the resulting risks should not be taken until this evaluation is complete.

In addition to the general ENCORE tool, the initiative also issued a special biodiversity tool.[109] It allows the indicators “Species Threat Abatement and Restoration” (STAR) and “Ecological Integrity Risk” to be measured for the agriculture and mining sectors at a country and/or corporate level. STAR stands for the potential of minimising the risk of species extinctions. A high score means that a large share of the portfolio overlaps with the habitats of endangered species, so that there is greater potential to abate the extinction of species. (Fig. 22). The second indicator stands for the portfolio’s possible impacts on the integrity of select habitats and thus signifies the extent to which it is possible to improve the intactness of ecological communities within the portfolio.

[106] By way of example, a comprehensive overview of the key tools was published in mid-2022 by the TNFD Data and Analytics working group led by PwC, cf. TNFD (2022), Discussion Paper, A Landscape Assessment of Nature-related Data and Analytics Availability, https://tnfd.global/wp-content/uploads/2022/03/TNFD_DataDiscussionPaper.pdf. An overview which is updated regularly can also be found on the homepage of the Finance for Biodiversity Pledge, cf. Finance for Biodiversity (undated), Guide on biodiversity measurement approaches (2nd edition), www.financeforbiodiversity.org/publications/guide-on-biodiversity-measurement-approaches/.
[107] Cf. ENCORE (o.D.), Exploring Natural Capital Opportunities, Risks and Exposure, https://encore.naturalcapital.finance/en.
[108] Cf. Robeco (2022), Robeco’s approach to biodiversity, www.robeco.com/docm/docu-202201-robecos-approach-to-biodiversity-white-paper.pdf.
[109] Cf. ENCORE (o.D.), biodiversity module, https://encore.naturalcapital.finance/en/tools/biodiversity-goals.

The analysis using the ENCORE tool is currently only approximate based on estimates for the individual sectors. With a view to familiar specific drivers of both climate change and biodiversity loss, some specific surveys can already be conducted at the corporate level. For example, the Trase Finance initiative has developed a tool with a thematic focus on deforestation which already covers a comparatively high number of deforestation risks for companies today.[110] For instance, this tool will support a Norway-based asset manager in fulfilling his voluntary commitment to deforestation-free portfolios by 2025.[111]

Several other tools deal with impact measurement, e.g. with biodiversity footprinting. The biodiversity footprint is an indicator for the impact of a company's own corporate actions on biodiversity. Thus, a biodiversity footprint of one hectare means that all the plant and animal life in an area of that size will be lost within one year. The absolute size of the biodiversity footprint should be interpreted with caution because the measurement methods are quite different and thus the results are difficult to compare. Nevertheless, the tool can help prioritise targets and actions because it shows which sectors have the greatest potential impacts. For example, a France-based asset manager – not least due to relevant French regulatory requirements – estimated that his investments could potentially cause a completely degraded area five times the size of London, above all because of the driver of land usage.[112]

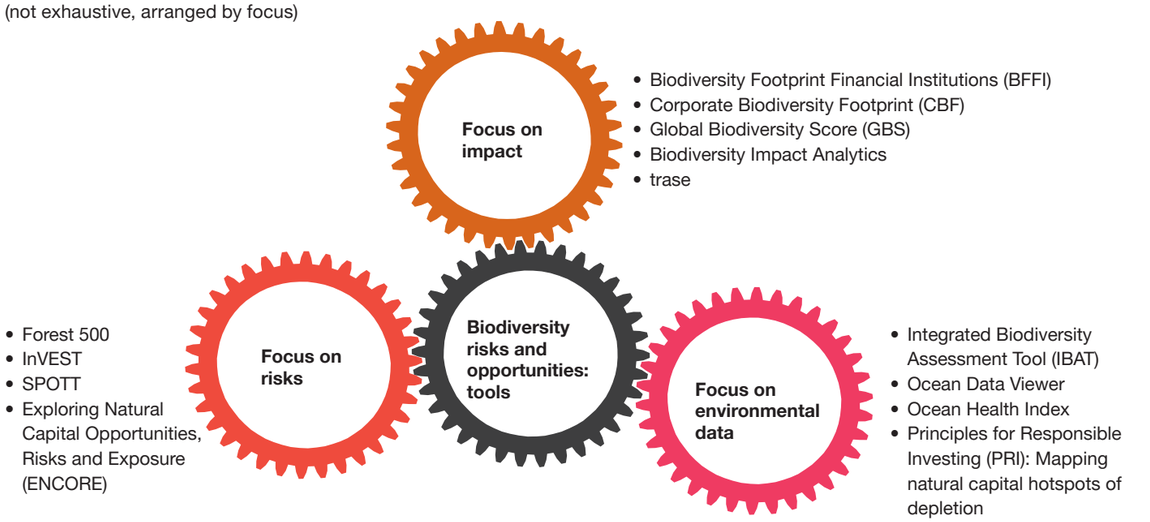
Figure 21 shows a selection of tools grouped by their focus.

The tools shown use different metrics. Figure 22 provides an overview of metrics frequently used to measure biodiversity loss. Some of the various tools use these metrics, but some also use a combination of them or even other metrics. In this context, it is important to underline that there is no uniform or standardised metric for biodiversity loss like there is for climate issues (CO_2-equivalent emissions). Moreover, none of these metrics fully covers all the dimensions of biodiversity, which means it is definitely possible for several metrics or a combination of various metrics to prevail as a commonly agreed standard.

[110] Cf. Trase finance (undated), Search Commodity Traders & Financial Institutions, https://trase.finance/search.
[111] Cf. Trase.Earth (2021), Storebrand Asset Management deforestation risk assessment, https://cdn.sanity.io/files/n2jhvipv/production/e24e006f62267641bc6a12a3ebd99b536dc8e5bf.pdf.
[112] Cf. Finance for Biodiversity (2021), Guide on biodiversity measurement approaches, p. 8, https://ec.europa.eu/environment/biodiversity/business/assets/pdf/2021/Finance%20for%20Biodiversity_Guide%20on%20biodiversity%20measurement%20approaches.pdf.

Fig. 21 Various tools with a focus on risks, environmental data, or impact[113]

(not exhaustive, arranged by focus)



Source: PwC

Fig. 22 Metrics for measuring biodiversity loss[114]

Metric	Definition
MSA: Mean Species Abundance	MSA measures the integrity by comparing the actual abundance of native species in a certain ecosystem with its (estimated) abundance which the ecosystem would have in its undisturbed condition. All species are valued the same, regardless of whether they are endangered. An MSA value of 100% means that this ecosystem's biodiversity is the same as the original condition and has not been impacted by human activities.
PDF: Potentially Disappeared Fraction	PDF also measures integrity. This metric indicates the percentage of species which have been lost on one square meter (land) or in one cubic meter (water) within one year in a certain area due to environmental impacts. All species are weighted the same: based on regressions between the intensity of the separate impacts and their effects on the survival of species.
STAR: Species Threat Abatement and Restoration	STAR measures the risk of a species becoming extinct. STAR is the sum of the species' risk of extinction, weighted by their threat status. This metric can be useful in identifying measures with the greatest potential for taking countermeasures.

Source: PwC

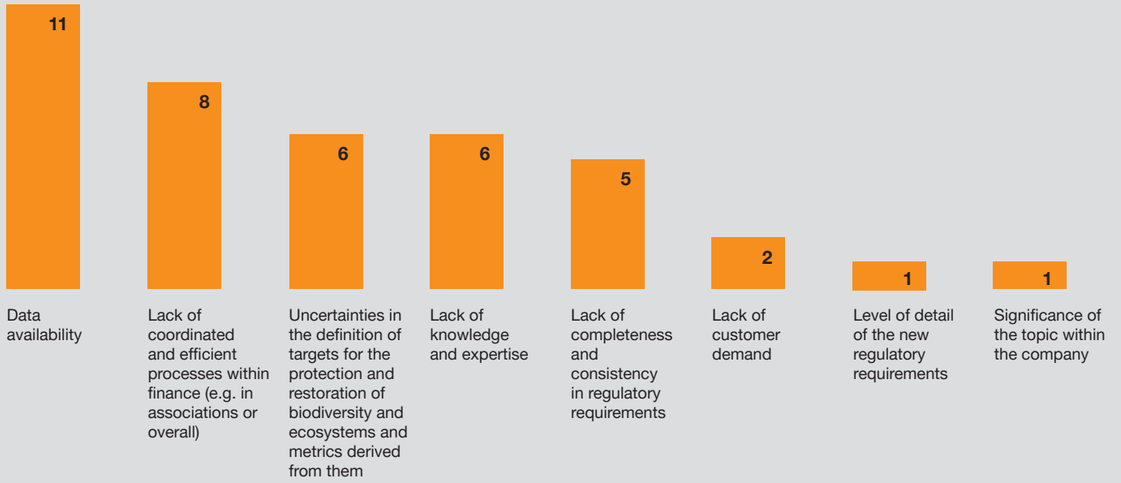
[113] List of tools based on Finance for Biodiversity (2021), Guide on biodiversity measurement approaches, https://ec.europa.eu/environment/biodiversity/ business/assets/pdf/2021/Finance%20for%20Biodiversity_Guide%20on%20biodiversity%20measurement%20approaches.pdf und UNEP & Finance for Biodiversity (2022), The Climate-Nature Nexus, www.naturefinance.net/wp-content/uploads/2022/09/F4B-UNEP-WCMC-Climate-Nature-Nexus-Investor-Guide_FINAL_130422-1. pdf. Unambiguous classification of the tools is not always possible; further tools can be found in the TNFD's publication, inter alia: https://tnfd.global/ wp-content/uploads/2022/03/TNFD_DataDiscussionPaper.pdf.
[114] Cf. Finance for Biodiversity (2021), Guide on biodiversity measurement approaches, p. 8, https://ec.europa.eu/environment/biodiversity/business/assets/pdf/2021/Finance%20for%20Biodiversity_Guide%20on%20biodiversity%20measurement%20approaches.pdf.

Focus survey: Implementation limited by a lack of coordination and data availability

Where do the institutions who participated in the focus survey see the greatest challenges in dealing with risks and opportunities relating to biodiversity (Fig. 23)? Data availability was specified most frequently in this regard. Nearly all those surveyed mentioned this issue, which also often took first place in other studies.[115]

Fig. 23 Key challenges for implementation, N = 14 (multiple responses possible)

Challenges in handling factors for the protection and restoration of biodiversity and ecosystem aspects in the financial sector



Source: PwC

As indicated in an interview, there is the issue relating to the topic of data availability that the data must be location-specific. If a company has more than one international locations (multi-location risk), you would have to know how large each of these locations in (use of space) and whether they are located in biodiversity hotspots.

Other challenges which were specified include the lack of coordinated and efficient processes in finance, uncertainties in the definition of targets and the respective metrics, the lack of knowledge and expertise, as well as the lack of completeness and consistency in regulatory requirements.

[115] Cf. Credit Suisse (2021), 5 facts about biodiversity finance and investing, www.credit-suisse.com/about-us-news/en/articles/news-and-expertise/unearthing-investor-action-within-biodiversity-finance-202101.html.

"There is clearly a lack of knowledge and expertise. This topic is definitely lagging behind. More communication would be desirable." Also: "We need external assistance for this topic. It is currently really difficult to manage alone," reported a Germany-based asset manager. Another interviewee has the feeling that a certain fatigue is palpable in the German financial industry when dealing with ESG and that it is difficult to mobilise and motivate employees. Therefore, there is often a lack of concrete action although there is awareness.deutlich weiter; es ist also durchaus möglich, jetzt schon zu handeln.

Furthermore, one asset manager points out that there is not yet a standardised metric for biodiversity loss like CO_2-equivalent emissions for climate issues. There is also no metric in place to cover biodiversity as a whole. Nonetheless, these challenges cannot be the reason to not yet address the issue. The financial sector in some countries is already much more advanced, so already acting now is absolutely possible.

> "There is a real risk that most investors are adopting a wait-and-see strategy, because they do not feel equipped to identify, asses, and act on biodiversity risks and opportunities.[116]
>
> CreditSuisse

[116] Cf. Responsible Investor & Credit Suisse (2021), Unearthing investor action on biodiversity, p. 24, freely translated from English, www.credit-suisse.com/media/assets/microsite/docs/responsibleinvesting/unearthing-investor-action-on-biodiversity.pdf.

5 Starting directly with the TNFD

The Task Force on Nature-related Financial Disclosures (TNFD) has existed since 2021 and is an initiative comprising 34 members from finance, industry, and the service sector. The TNFD aims to ease the first step towards nature-positive actions worldwide by providing its own framework. The TNFD is oriented towards the model of the Task Force on Climate-related Disclosures (TCFD). Analogous to the TCFD, which deals with the topic of climate-related disclosures, the TNFD is developing disclosure recommendations regarding nature-related and biodiversity-related risks and opportunities. These will become components in a science-based and user-oriented framework on biodiversity and for the protection of ecosystems.

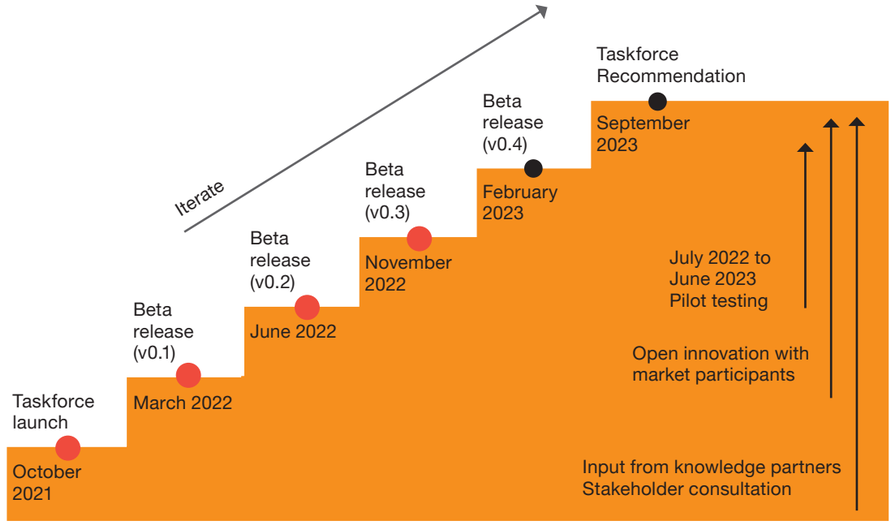
5.1 TNFD framework in its beta phase

The framework is currently undergoing beta testing (Fig. 24). Supplements and feedback should be continuously incorporated until the final version is released in September 2023. In doing so, the TNFD is counting on a collaborative approach which offers the testing companies and financial institutions the possibility to familiarise themselves with the framework and assess it during this initial phase.

Aspects added during development should include, inter alia, sector-specific elaborations orientated towards ISSB classification and a guideline for handling biodiversity-related and nature-related scenario analyses developed with the assistance of partners such as the Network for Greening the Financial System (NGFS). The first nature scenarios are scheduled to be released by the TNFD in the spring of 2023.[117] In preparing these scenarios, the TNFD is vigilant in ensuring compliance with other regulatory requirements and standards, e.g. with the CSRD and the European reporting standards, respectively (see Section 2). The Science Based Targets for Nature (SBTN) and the general global biodiversity framework (GBF, see Section 2.1) are also incorporated.

Furthermore, various stakeholders are integrated from the very beginning to assure that the resulting TNFD recommendation considers the regulations and level of implementation within companies, as well as current technical framework conditions (e.g. available data and tools). Noted points of debate from other standard setting processes also re-emerge here. In particular, calls for double materiality as set in the European context are also restated in this context. During the consultation phase on the initial drafts, several NGOs called for additional tightening, requesting that negative impacts of companies on ecosystems should also be disclosed.

Fig. 24 TNFD framework development timeline



Source: Taskforce on Nature-related Financial Disclosures (2022), The TNFD Nature-Related Risk and Opportunity Management and Disclosure Framework – Beta v0.2, p. 15

5.2 Using LEAP to identify areas of activity and implementation steps

Alongside the informative framework, the TNFD developed the LEAP process, an integrated assessment process for the management of nature-related risks and opportunities within individual companies. This process offers assistance when analysing internal risks and opportunities and provides a basis for the areas of strategy, corporate leadership, capital allocation, and risk management. The approach also supports companies in taking disclosure decisions, whereby not all corporate information collected in the LEAP process must be disclosed according to the TNFD's disclosure recommendations. Within the scope of the LEAP process, companies pass through four fundamental analytical steps, each of which is divided into four or five sub-items.

- **Locate**: What are the concrete interfaces with nature? Which sectors, activities, or asset classes tie the company to ecosystems? Which regions need to be granted particular attention?
- **Evaluate**: What dependencies and impacts on biodiversity and ecosystem(s) are there in the company, and how should they be assessed?
- **Assess**: What risks and opportunities arise? How can they be assessed and managed, and which should be disclosed in compliance with the TNFD?
- **Prepare**: What strategy can be used to respond to analytical results, and where should resources be used best? What targets are set, and how is it reviewed whether these targets are achieved? What is disclosed and/or reported where, and in what way?

[117] Cf. TNFD (o.D.), Approach to scenarios, https://framework.tnfd.global/disclosure-recommendations/approach-to-scenarios/.

The TNFD has recognised the decisive role of the financial sector in terms of biodiversity and has developed LEAP-FI, meant to precede the LEAP process, specifically for its purposes (Fig. 25).

With the assistance of various entry points, for example direct access to the Evaluate phase, LEAP-FI allows customised weighting of individual LEAP process steps. The individual entry point is determined by means of scoping questions (F1 to F3, see Fig. 24). First, the financial institution is asked about its type of business (e.g. asset management, lending or insurance business) and then determines the entry point and the type and depth of the subsequent analysis. For instance, there may be a focus on select sectors or regions, or also on specific assets classes or products, as well as on certain ecosystems like tropical forests. The level of aggregation can also be defined (e.g. project, company, or portfolio level). This allows the LEAP process to be specifically coordinated to the direction and emphasis of the corresponding financial institution.

Exactly like the corresponding framework, LEAP-FI is currently in the beta phase and can be tested and commented on until early June 2023; the final version will then be published in September 2023.[118] Similar to other important initiatives which are currently developing metrics and guidelines, the TNFD is thereby offering German financial institutions the possibility to integrate their specific requirements in the development process at the present time.

[118] The TNFD is offering users the opportunity to test LEAP-FI and the framework on its website: https://framework.tnfd.global/. The framework is currently in beta phase V0.2, cf. TNFD (2022), The TNFD Nature-Related Risk and Opportunity Management and Disclosure Framework, Beta v0.2, https://framework.tnfd.global/wp-content/uploads/2022/06/TNFD-Framework-Document-Beta-v0-2.pdf.

Fig. 25 LEAP framework with entry questions for FI

Scope the assessment

F1 Type of business
What is the nature of our business as a financial institution?
What are the main functional units within our business?

F2 Entry points
In which sectors/geographies do we allocate capital?
What asset classes/financial products do we have and what are their potential interactions with nature?
What biomes/ecosystems do our financial activities interact with and how?

F3 Type of analysis
What level of assessment is feasible/appropriate for our business, given the level of aggregation of financial products and services?

L Locate Interface with nature

L1 Business footprint
Where are our direct assets and operations, and our related value chain (upstream and downstream) activities?

L2 Nature interface Which biomes and ecosystems do these activities interface with? What is the current integrity and importance of the ecosystems at each location?

L3 Priority Location Identification
At which locations is our organisation interfacing with ecosystems assessed as being low integrity, high biodiversity importance and/or areas of water stress?

L4 Sector Identification
What sectors, business units, value chains or asset classes are interfacing with nature in these priority locations?

E Evaluate Dependencies and Impacts

E1 ID of relevant environmental assets and ecosystem services
What are our business processes and activities at each priority location? What environmental assets and ecosystem services do we have a dependency or impact on at each priority location?

E2 ID of dependencies and impacts
What are our nature-related dependencies and impacts across our business at each priority location?

E3 Dependency analysis
What is the size and scale of our dependencies on nature in each priority location?

E4 Impact analysis
What is the size and scale of our nature impacts in each priority location?

A Assess Material risks and opportunities

A1 Risk ID and assessment
What are the corresponding risks for our organisation?

A2 Existing risks mitigation and management
What existing risk mitigation and management approaches are we already applying?

A3 Additional risks mitigation and management
What additional risk mitigation and management actions should we consider?

A4 Materiality assessment
Which risks are material and should be disclosed in line with the TNFD disclosure recommendations?

A5 Opportunity identification and assessment
What nature-related opportunities does this assessment identify for our business?

P Prepare To respond and report

Strategy and resource allocation

P1 Strategy and resource allocation
What strategy and resource allocation decisions should be made as a result of this analysis?

P2 Performance measurement
How will we set targets and define and measure progress?

Disclosures

P3 Reporting
What will we disclose in line with the TNFD disclosure requirements?

P4 Presentation
Where and how do we present our nature-related disclosures?

Stakeholder engagement (in line with the TNFD recommendations)

Review and repeat

Source: Taskforce on Nature-related Financial Disclosures (2022), The TNFD Nature-Related Risk and Opportunity Management and Disclosure Framework – Beta v0.2, p. 8

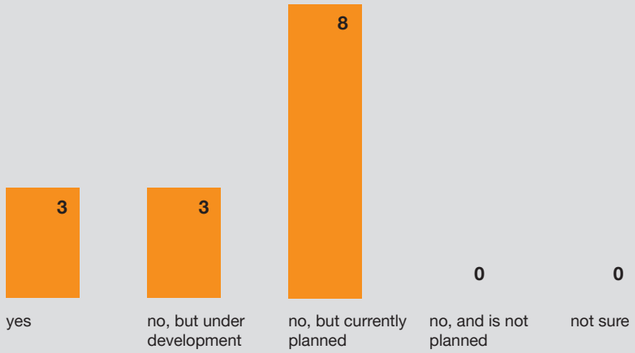
Focus survey: Process still in its early stages

Do those surveyed already have processes created in-house for risk and opportunities management relating to biodiversity and the protection of ecosystems (Fig. 26)? Only three respondents have already implemented processes like these, while all the others plan to do so or have already begun.

“In some cases, we can build on processes which are already established for climate issues. The challenge is to collect and map the complex biodiversity data appropriately,” reports an asset manager. But this needs to occur without any major delays. On the basis of the insight gained from product development, another asset manager clearly anticipates detailed specifications at the corporate level in 2023.

Fig. 26 Level of process implementation, N = 14

Establishment of specific processes for handling risks and opportunities arising from the protection and restoration of biodiversity and ecosystem

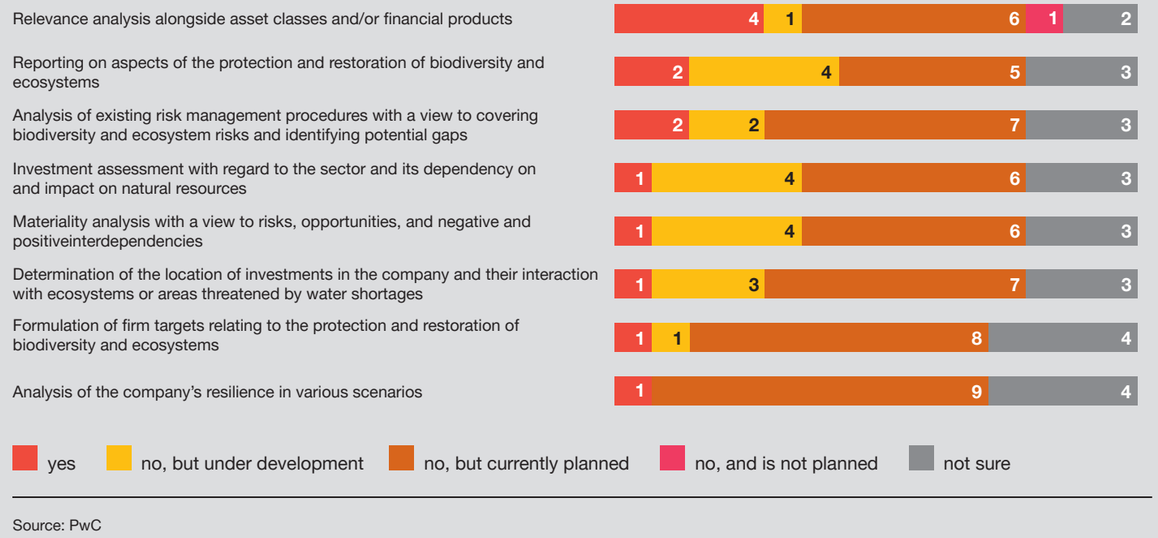


Source: PwC

The level of implementation of the process steps relevant within the framework of the TNFD’s LEAP approach Process steps vary among companies (Fig. 27). The percentage of institutions within the focus group who have not yet begun planning the various implementation steps is striking. However, four companies have already conducted a relevance analysis alongside asset classes and/or financial products.

Fig. 27 Level of implementation of the LEAP approach, N = 14

Level of implementation of the LEAP approach



Source: PwC

6 Outlook

Without a doubt, the topic of biodiversity and the associated economic risks and opportunities will continue to gain in importance in the near future. The cornerstone for nature-positive economies was laid at the COP15 in December 2022. A further topic will be setting global and binding biodiversity-related objectives. With the global biodiversity convention (GBF) and key initiatives such as the TNFD and the SBTN finalising their frameworks in 2023, it will be a crucial year for awareness of biodiversity and ecosystems in the financial sector.

What has already been recognised by many internationally has not yet been embraced in Germany. Financial institutions which have not yet addressed biodiversity must now urgently do so. The external pressure – be it from legislators, the expectations of stakeholders, or quite simply because of the increase in physical risks – is rising steadily and rapidly. Moreover, existing opportunities will be lost if they procrastinate too long. Many market players still perceive the topics of biodiversity and ecosystems as too complicated and too intangible. However, there is no lack of support for those who are already pursuing this topic. The development of an ecosystem encompassing industry initiatives, corresponding recommended actions and tools is currently highly dynamic. It is crucial to act now – not just by channelling efforts towards net zero, but also clearly in the direction of nature positive actions.

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Our clients face diverse challenges, strive to put new ideas into practice and seek expert advice. They turn to us for comprehensive support and practical solutions that deliver maximum value. Whether for a global player, a family business or a public institution, we leverage all of our assets: experience, industry knowledge, high standards of quality, commitment to innovation and the resources of our expert network in 152 countries. Building a trusting and cooperative relationship with our clients is particularly important to us – the better we know and understand our clients' needs, the more effectively we can support them.

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About the WWF
WWF Germany is a member of the international environmental organisation World Wide Fund For Nature (WWF). For more than 50 years, the WWF network around the globe has been striving to stop destruction of the environment and shape a future in which humans and nature can co-exist in harmony. In more than 100 national and international projects, WWF Germany is currently advocating for the conservation of biodiversity and our natural living conditions. Its more than 800,000 sponsors support WWF Germany in doing so.