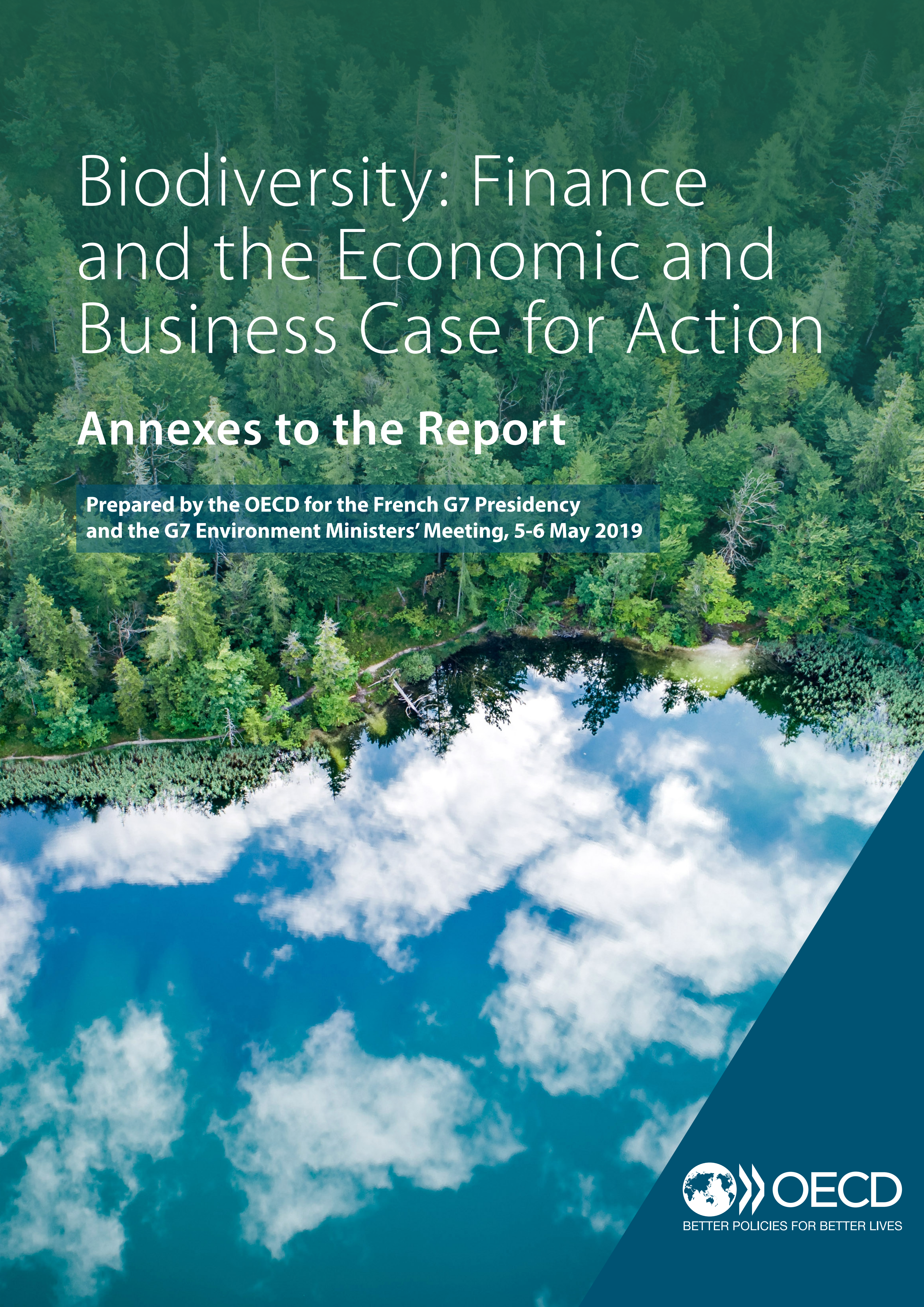

Biodiversity: Finance and the Economic and Business Case for Action

Annexes to the Report

Prepared by the OECD for the French G7 Presidency and the G7 Environment Ministers' Meeting, 5-6 May 2019

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Please cite this publication as:

OECD (2019), *Biodiversity: Finance and the Economic and Business Case for Action*, report prepared for the G7 Environment Ministers' Meeting, 5-6 May 2019.

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Chapter 4 Annexes

Annex A.4.1. Biodiversity-related risks to businesses

Biodiversity-related risks to businesses are categorised as:[1]

- *Ecological risks*, i.e. risks related to biodiversity-related *ecological* impacts and dependencies, linked to biodiversity loss or ecosystems degradation
- *Liability risks*, where parties who have suffered biodiversity-related loss or damage seek compensation for those they hold responsible
- Risks related to achieve transformative change for biodiversity, including *regulatory risks, market risks* and *financial risks.*

Ecological risks on operations

Businesses and financial organisations (including banks, insurers and investors) can face important ecological risks as a result of biodiversity impacts and dependencies. Such risks are mainly operational risks associated with resource dependency, scarcity and quality. Such risks can be linked to: increased raw material or resource costs (e.g. limited natural resources like timber or fresh water); deteriorated supply chains (e.g. because of resource scarcity or more variable production of key natural inputs); or disrupted business operations (CBD, 2019[1]) (Natural Capital Coalition, 2016[2]). In the agri-food business for instance, biodiversity for food and agriculture is declining, including at genetic, species and ecosystem levels (FAO, 2019[3]). This creates risks for agriculture and food businesses: the share of livestock breeds at risk of extinction is rising, and the diversity of genetic crops used in farmers' fields has reduced. In addition, businesses face the risk of clean up and compensation costs associated with biodiversity loss or disruption of ecosystems. Biodiversity also creates risk for the provision of quality infrastructure (e.g. associated to biodiversity loss with wind turbines or highways).

Liability risks

Businesses can also face liability risks linked to biodiversity. Lawsuits with implications for businesses on biodiversity include:

- The 2010 Deepwater Horizon Oil Spill Case, which cost USD 65 billion to British Petroleum and the Exxon Valdez Case on oil spills' devastation of natural resources and marine biodiversity (Bousso, 2018[4]).
- The Sierra Club versus Morton Case on preservation of national parks and forests (Shaw, 2016[5]).
- Lawsuits to protect spotted owls against logging. In 1991, a U.S. federal court ruling protected the Northern subspecies of spotted owl under the Endangered Species Act, thereby restricting much of the Northwest forests to logging. Those lawsuits illustrate both the power of the species-protection law and the cautionary

[1] See the typology of climate-related risks in Bank of England Governor Mark Carney's call-to-action speech in September 2015 (Carney, 2015[194]); also see the final recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), launched by the Financial Stability Board (FSB) in 2015; (TCFD, 2017[195]).

tale against it, as the ruling proved insufficient to protect spotted owls against other challenges like barrel owls (Welch, 2009[6]).

As transparency increases through enhanced disclosure and reporting on companies' biodiversity impact assessments, especially at local, site-level, the risk of legal suits may increase. While the risk of litigation can serve to encourage businesses to take positive steps to avoid or mitigate impacts on biodiversity, it may also deter companies from voluntarily disclosing site-level impact assessments.

In addition, under the *OECD Guidelines for Multinational Enterprises*, a National Contact Point (NCP) can handle "specific instance" complaints against companies and contribute to their resolution (OECD, 2011[7]). Cases to the NCPs involving environmental issues account for 20% of all submissions since 2001 (i.e. 88 cases, including 38 cases in mining and quarrying, and 7 cases in agriculture, forestry and fishing). Examples of NCP cases with specific references to biodiversity include: a copper mining in Ecuador (2013); Barrick Gold Corporation and FOCO case in Argentina (2011); and a nickel project in the Philippines (2009) (OECD, 2018[8]).

Regulatory risks

As policy makers scale up policy action on biodiversity, businesses and financial institutions need to anticipate and respond to regulatory changes in a timely manner, or risk being caught out. Regulatory risks include: restrictions on land and resources access (e.g. in ecologically sensitive areas for threatened biodiversity resources); clean-up and compensation costs (see Chapter 3); procurement standards; and licensing and permitting procedures (e.g. for infrastructure) or moratorium on new permits. For instance:

- Several Asia-Pacific countries have imposed total or partial bans on logging in natural forests, or similar restrictions on timber harvesting, such as Indonesia's 2011 two-year forest moratorium on new concessions to convert primary natural forests and peat lands to oil palm and timber plantations and selective logging areas, (which was renewed and expanded since).
- In March 2019, the Solomon Islands Environment Advisory Committee revoked a development consent for a bauxite mining project, notably based on the grounds of unacceptable impacts to the environment and local population, inconsistency with the CBD and the Declaration on the Rights of Indigenous Peoples.

As policy makers and businesses scale up action on biodiversity, businesses and financial actors may face broader risks linked to changes in policy, law, technology or markets. Regulatory, market and technological change (such as greening of agricultural value chain) may create a change in demand for forest-related commodities, and a loss of value for producers of unsustainable forest commodities (Rautner et al., 2016[9]).

Reputational risks

Businesses face increasing pressure from investors, consumers, shareholders, policy makers and civil society to assess, report and manage environmental, social and governance (ESG) risks, including biodiversity risks. According to UEBT Biodiversity Monitor 2018, the awareness and understanding of biodiversity is growing globally, especially among youth; respecting people and biodiversity in purchase behaviour is of growing concern for consumers; and people expect companies to respect biodiversity, but do not trust that they do (UEBT, 2018[10]). In France for instance, 77% of French consumers interviewed for the survey believe that companies have a moral obligation to make sure they have a positive impact on society, people and biodiversity. However, only 26% of French respondents are confident that companies pay serious attention to "ethical sourcing" of biodiversity (UEBT, 2018[11]).[2] Consumer preferences can even lead to product or natural resources boycotts, e.g. on Bluefin tuna or palm oil. Civil society campaigns against business activities can increase not only reputational risk but also financial risk, e.g. in the garment and footwear sector (Natural Capital Coalition, 2016[12]). In addition, several industry and infrastructure sectors often need to secure an informal "license to operate" from local communities and civil society through stakeholder engagement (e.g. in infrastructure provision and mining).

Market risks

Changes in consumer preferences (towards products with reduced biodiversity impacts) or purchaser requirements (e.g. biodiversity safeguards in supply chain requirements) can create market risks for companies (Girvan et al., 2018[13]). Consumers' awareness and understanding of biodiversity is also increasing globally, according to the Biodiversity Barometer (Table 4.1) (UEBT, 2018[10]). A majority of consumers (79%) feel that companies have a moral obligation to have a positive impact on biodiversity and people in their sourcing of natural ingredients (CBD and UEBT, 2018[14]).

Financial risks

Businesses, banks and investors may also face financial risks. First, they can face insurance risks, e.g. linked to higher insurance premiums from biodiversity loss (e.g. coral reefs in Cancun, Mexico), insurance claims or lower returns on investments caused by extreme weather events worsened by environmental degradation. Second, financial risk can be linked to access to capital, due to higher cost of capital or lending requirements from negative impacts or dependencies on biodiversity. Third, corporations and investors may face loss of investment opportunities, as investors increasingly adopt impact investing or exclusion strategies that would prioritise investments that reduce adverse impacts on biodiversity or even support positive impacts (Girvan et al., 2018[13]).

As biodiversity-related ecological risks to businesses increase, business and financial organisations may face value depreciation of assets, e.g. in agriculture and food production. Indeed, ecological risk factors and pressures (such as land degradation, biodiversity loss, increased risk of agricultural disease, virus and pests, and climate change) may create risks to both ecological or "physical" assets in operations (e.g. degradation of forests through drought and heat, or damage to physical infrastructure) and financial assets (e.g. loss of value for forestry and infrastructure owner) (Caldecott and McDaniels, 2014[15]). Business and financial organisations might also face the risk of value depreciation of "stranded assets"[3] linked to regulatory risks (e.g. regulatory risks in agriculture and food production), although to a smaller extent than for climate change (e.g. coal assets) (Rautner et al., 2016[9]) (Baron and Fischer, 2015[16]).

Materiality of risks

Several initiatives and stakeholders increasingly recognise that biodiversity loss can create a "material" risk to the profitability of businesses and investors (Dempsey, 2013[17]).

[22] I.e. to ensure companies incorporate Ethical BioTrade practices into their systems for sourcing and innovating natural ingredients; UEB, 2019.

[3] Stranded assets can be defined as assets that "have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities" (Caldecott and McDaniels, 2014[15]).

Businesses, investors and regulators are beginning to recognise the materiality of biodiversity impacts and dependencies, although to a lesser extent than climate risks:

- The company Unilever identified the need to reduce environmental impact for deforestation and agricultural sourcing (including biodiversity) as very high priority issues in its 2017-18 materiality assessment (Unilever, 2019[18]).
- California public pension fund CalPERS recognised in 2018 deforestation as a material risk in its investment portfolio (Friends of the Earth (FOE), 2018[19]).
- The Dutch central bank DNB published in 2019 a new report on the risks that environmental and social challenges such as raw material scarcity and biodiversity loss pose to financial institutions. The report called on improved risk management to identify how challenges that have a material impact on the balance sheets or operations of financial institutions can be taken into consideration (DNB, 2019[20]).

Several OECD instruments and other international guidelines calls on businesses and financial actors to assess the materiality of biodiversity impacts. The *OECD-FAO Guidance for Responsible Agricultural Supply Chains* for instance specifically calls on companies and investors to consider biodiversity impacts in conducting supply chain due diligence and to take steps to maintain biodiversity and limit ecosystem degradation (OECD/FAO, 2016[21]).

Assessing the materiality of biodiversity issues for companies however, remains extremely challenging, especially at project and site-level ((Alliance for Corporate Transparency Project, 2019[22])). More work is needed to integrate biodiversity considerations into risk management and integrated reporting (including through aggregation tools to reflect local materiality issues at corporate group level or portfolio level), as well as accountability at the board and management level. Chief financial officers (CFOs) need to participate more actively in integrated materiality assessment, to help them understand biodiversity and other sustainability challenges, and assess the scale of their impacts and dependencies on business and integrate these considerations into the financial aspects of business operations (CEF and WEC, 2015[23]).

Annex A.4.2. Translating international biodiversity goals into corporate biodiversity goals

Table A.4.2 provides suggestions to translate international biodiversity goals into corporate biodiversity goals (Smith et al., 2018[24]).

Table A.4.2. Translating the international biodiversity goals into corporate biodiversity goals

International Biodiversity Goals	Corporate Biodiversity Goals	Example of business actions
Address causes of biodiversity loss by mainstreaming biodiversity across government and society	Mainstream and embed biodiversity into decision-making	• Integrate biodiversity in business and investment decisions • Adopt voluntary certification schemes and standards
Reduce the direct pressures on biodiversity and promote sustainable use	Reduce impacts and promote sustainable use in operations or supply chain	• Reduce or eliminate impacts on species and habitat directly affected by operations or supply chain • Adopt measures to ensure sustainable use of resources • Prevent the introduction or spread of invasive species
Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	Improve the status of biodiversity	• Establish private protected areas or support establishment or management of public protected areas • Implement ecosystem restoration actions • Invest in nature-friendly solutions, e.g. natural infrastructure
Enhance the benefits to all from biodiversity and ecosystem services	Enhance the benefits society draws from biodiversity	• Account for the needs of indigenous groups, women, the poor • Ensure access to, and benefit sharing from, natural resources while operating within sustainable limits • Adhere to or incorporate international, domestic and sub-national rules that related to biodiversity
Enhance implementation through participatory planning, knowledge management and capacity building	Stakeholder engagement, support and knowledge sharing	• Engage in stakeholder dialogue to manage biodiversity impacts • Incorporate traditional knowledge into strategic planning for sustainable management of biodiversity • Share biodiversity monitoring data to assist decision-making and adaptive management

Source: Adapted from (Smith et al., 2018[24]).

Annex A.4.3. Targets, goals, metrics, indicators and measurement approaches of biodiversity for businesses and financial organisations

Targets and goals

Biodiversity goals and targets for businesses and financial institutions include:

- Societal targets and international biodiversity goals, i.e. the Aichi Targets and the SDGs (especially SDG 14 and 15). The Aichi Targets and post-2020 framework could further emphasise their relevance to businesses and investors. There is also an opportunity to build on businesses' increasing awareness of the SDGs. As of 2015, 92% of businesses were already aware of the SDGs (Smith et al., 2018[24]).
- No Net Loss (NNL) or Net Positive Impact (NPI; or Net Gain) goals on biodiversity, which are increasingly being adopted by businesses (and are closely linked to biodiversity offsets). As of 2015, 32 companies had adopted similar goals, mostly in the mining sector, and including 18 with specific biodiversity considerations (Rainey et al., 2015[25]).
- Science-based targets. The industry-led EU High-Level Expert Group (HLEG) on Sustainable Finance recommended to develop science-based targets for biodiversity, natural capital management and restoration (HLEG, 2018[26]).

- Corporate-level biodiversity commitments. Kering for instance adopted a target, as part of its 2025 Sustainability Strategy, to reduce its Environment Profit & Loss (EP&L) footprint by 40% across its supply chain by 2025, relative to its growth, using a 2015 baseline (Box A.4.1 in Annex 4.3.2) (Kering, 2017[27]).
- Other targets linked to regulator and permitting requirements (e.g. in site-level environmental impact assessments of biodiversity state, pressure and response), voluntary standards and agreements, and lender requirements (e.g. guarantees).

Metrics and indicators

Key metrics for biodiversity include:

- Mean Species Abundance (MSA), an indicator of naturalness or biodiversity intactness, defined as the mean abundance of original species relative to their abundance in undisturbed ecosystems;
- Potentially Disappeared Fraction (PBF), the rate of species loss in a particular area of land or volume of water during a particular time due to unfavourable conditions associated with e.g. land change, toxicity or increase in average global temperature;
- Risk of extinction, measured for instance by the Biodiversity Return on Investment Metric (BRIM); and
- Natural capital value, whether expressed in monetary terms or using Environment Profit & Loss (EP&L) Account (Box A.4.2).

Box A.4.2. Environment Profit & Loss (EP&L) Account

A few industry leaders like Kering have developed Environment Profit & Loss (EP&L) accounts to value and monetise the costs associated with the impacts and dependencies of their activities on biodiversity and the environment. An EP&L account is "a business management tool providing an in depth analysis of the resulting impacts a company's activities have on the environment, which also helps decision makers consider this valuable information alongside traditional financial metrics." Kering's EP&L follows key steps: decide what to measure; map the supply chain; identify priority areas; collect primary and secondary data; determine the monetary value of the data; and calculate and analyse the results. Using its EP&L, Kering estimated the impacts of its operations and supply chains on the environment to be EUR 482 million annually in 2017.

Kering's EP&L builds on the first EP&L completed by Puma in 2011, which then belonged to PPR (Kering's former name). Puma's EP&L valued environmental impacts at EUR 145 million in 2010, including: EUR 51 million from land use, air pollution and waste across the value chain; and EUR 94 million for GHG emissions and water consumption. Stella McCartney, which was owned by Kering until 2018, published two annual global EP&L reports in 2016 and 2015; it estimated its EP&L account to EUR 7 million per year. Other companies with EP&L accounts include: Philips, which valued its EP&L account at EUR 7.2 billion in 2017, based on a Life-Cycle Assessment; and AkzoNobel, which has used a 4-Dimensional Profit & Loss (4D P&L) accounting methodology (human, social, natural, and financial capitals) to assess its operations since 2014.

Sources: (Kering, 2017[27]); (Puma, 2011[28]); (Stella McCartney, 2017[29]) (Philips, 2017[30]) (WBCSD, 2019[31]).

Biodiversity measurement approaches for businesses and financial institutions

Key ongoing measurement approaches and indicators are summarised in Table A.4.3 below (Lammerant et al., 2018[32]) (Lammerant et al., 2019[33]). There are other assessments under the Life Cycle Assessments and the Natural Capital Protocol. While there is data available, what is currently missing is a harmonised methodology to measure, assess and aggregate data across sectors and segments of the value chains.

Table A.4.3. Measurement approaches of biodiversity for businesses and financial institutions

Name	Lead Organisation	Description	Status (as of March 2019)	Private Sector Engagement
Global Biodiversity Score	CDC Biodiversite	Estimate corporate's or portfolio's biodiversity footprint based on economic activities	Under development until early 2020	B4B+ Club
Biodiversity Impact Metric	Cambridge Institute for Sustainability Leadership (CISL)	Measure companies' impact on biodiversity from land use to produce a commodity	Piloting with members of CISL's Natural Capital Impact Group	Natural Capital Impact Group members*
Biodiversity Indicators for Extractives	UNEP-WCMC, Conservation Fauna & Flora International, supported by IPIECA	Screen operations to identify sites with potentially high biodiversity sensitivity, using state-pressure-response (SPR) framework	Piloting with extractive companies	Proteus Partners and some ICMM members**
Product Biodiversity Footprint	I Care & Consult, Sayari	Quantify the impacts of a product on biodiversity along product's life cycle by identifying biodiversity hotspots	Tested for agriculture, ongoing testing for other sectors	Kering, Avril and L'Oréal
Biodiversity Footprint Approach	ASN Bank	Provide an overall biodiversity footprint of financial institutions	Operational	ACTIAM and Finance in Motion, originated from ASN Bank
Biodiversity Return on Investment	IUCN	Measure change in risk of species extinction attributable to investment	Piloting completed and reports being finalised	Smallholder agriculture
Agrobiodiversity Index	Biodiversity International	Focus on agricultural biodiversity at genetic, species and landscape levels to detect material agrobiodiversity-related risks and opportnities	Ongoing development	Clarmondial AG
Biodiversity Footprint Calculator	Plansup	Assess biodiversity footprint of a company's product at landscape level	Operational	Public funding
LIFE Impact Index	LIFE Institute	Identify impacts and design strategic plan to reduce, mitigate and compensate them	Operational in Brazil and Paraguay, plan to expand in Europe and Latin America	28 companies or organisations
Bioscope	Platform BEE	Provide information on biodiversity impacts in supply chain	Operational	n/a

Notes : ** Members include Kering, ASDA, Mondi, Volac, Mars, The Crown Estate, Anglian Water, Yorkshire water and Primark; * And IPIECA Biodiversity and ecosystem service working group.
Source: Adapted from (Lammerant et al., 2018[32]) (Lammerant et al., 2019[33]).

Annex A.4.4. Integrating biodiversity into business and finance decision-making process

Annex A.4.4 discusses key business actions and elements of a framework for businesses and financial actors to integrate biodiversity into key areas, including: governance; strategy; impact and dependency assessment and risk management; due diligence; disclosure and external reporting; voluntary industry standards, labels and certification schemes; and communication.

Strategy

Embedding biodiversity issues in the strategy of businesses and financial actors (especially investors and lenders) is critical to integrate biodiversity in private sector decisions. Priorities include:

- Integrating biodiversity in the overall corporate strategy;
- Aligning corporate targets and goals with corporate strategy and management standards (including at site level); and
- Integrating biodiversity across investment strategies.

Corporations, investors and lenders can develop a biodiversity or environmental policy, strategy, plan or management plan to integrate biodiversity in overall corporate strategy. This is the case of several mining companies. AngloAmerican for instance developed Biodiversity Action Plans, in co-operation with Fauna & Flora International (AngloAmerican, 2018[34]). Leading companies like Kering have also developed broader sustainability strategies that incorporate quantitative biodiversity assessments. Corporations like Toshiba Group have also developed biodiversity guidelines and environmental action plan to assess and manage linkages between business activities and biodiversity (Smith et al., 2018[24]). Banks, asset owners and asset managers can also adopt sustainable strategies accounting for biodiversity. BNP Paribas Asset Management for instance launched in March 2019 a new Global Sustainable Strategy that considers environmental sustainability and set a target to support global efforts to halve forest loss by 2020 and end forest loss by 2030 (BNP Paribas Asset Management, 2019[35]). Business can also adhere to international and national rules, pledges and other international platforms that relate to biodiversity and incorporate them into corporate strategies.

Companies, investors and lenders also need to ensure that biodiversity targets and goals are feasible, credible and consistent with the corporation's strategy across operations and supply chain, including with management standards at site-level. Rio Tinto for instance adopted in 2004 a "net positive impact" commitment on biodiversity across its operations. However, Rio Tinto then concluded that this commitment was impractical, and instead adopted a more targeted and collaborative approach by developing in 2018 a new biodiversity protection and natural resource management standard (Rio Tinto, 2019[36]).

Banks, asset owners (especially pension funds and insurance companies) and asset managers can influence the behaviour of investee corporations across asset classes and investment strategies. Lessons from climate change suggest that relevant investment strategies to help integrate biodiversity factors into investment decisions include (adapted from (Ang and Copeland, 2018[37]) (OECD, 2017[38])):

- Active ownership (i.e. stewardship) and engagement, a strategy whereby investors use their ownership stake in a company to influence its decision-making (including but not limited to proxy voting on shareholder resolutions).
- Divestment, i.e. the action or process of selling off subsidiary business interests or investments motivated by risks like climate change or biodiversity (Baron and Fischer, 2015[16]). Norges Bank Investment Management for instance, which manages the USD 1 trillion Government Pension Fund of Norway, has set divestment criteria on unsustainable palm oil production for deforestation risk, as well as metals and mining companies for water and biodiversity risks (Norges Bank Investment Management, 2016[39])The French bank BNP Paribas has endorsed policies to protect ecosystems when financing activities which could impact them. Divestment for biodiversity risks however remains smaller than for climate risks.
- Exclusionary screening in the due diligence process, by blacklisting sectors or companies or excluding assets based on biodiversity metrics. Investors can exclude companies from major ESG indices due in part to their impact on biodiversity and ecosystem services. benchmark providers and credit ratings agencies can play a role in integrating biodiversity factors in benchmarks and equity indices, for investment strategies in listed equity (including passive investing).
- Best-in-class investing tailored to biodiversity. Best-in-class investing is a type of inclusionary screening strategy for the best-performing companies within each sector or industry, according to biodiversity or ESG factors or based on the expected investment effects of biodiversity or ESG factors.
- Thematic investment through investment in thematic funds or direct investment in sustainable businesses that have a positive impact on biodiversity and ecosystem services (e.g. natural infrastructure), including through impact investing strategies. REDD+ projects for example can attract impact investors (Mair, 2018[40]).

Governance

Aligning corporate governance frameworks with biodiversity factors through strong leadership and changes in governance at board and management level is critical to ensure consistency of business action for diversity across organisational levels (product, project, site, corporate, portfolio, supply chain, sectors). Available business action include for instance: strengthening the board’s and executive committee’s oversight of biodiversity; clarifying management’s role in addressing and managing biodiversity; creating incentives for the board and management to consider biodiversity; co-ordinating at group level the mainstreaming of biodiversity across key business activities and teams; appointing biodiversity experts to boards, and increasing in-house expertise (through recruitment of new staff, training and education); and aligning the selection of business or investment managers with corporate strategy on biodiversity.

Impact assessment and risk management

Businesses and financial institutions can usefully integrate biodiversity in their risk management. Several tools and approaches are available for corporations to better consider biodiversity-related risks in their risk management. Beyond the measurement approaches described in the Table A.4.3, existing tools include:

- Biodiversity risk screening tools and calculating devices to assess biodiversity risks for companies, such as: the Integrated Biodiversity Assessment Tool (IBAT) for Business, a programme led by BirdLife International, Conservation International, IUCN and UNEP-WCMC (Dempsey, 2013[41]).
- Biodiversity monitoring tools to evaluate and monitor the impacts of business activities and decisions on biodiversity and determine the effectiveness of mitigation measures, including examples such as: the Rangelands Production & Biodiversity Model developed by Stanford University's Natural Capital Project (Smith et al., 2018[24]); a programme set by the Japanese company Ajinomoto tagging the bonito species so as to track its location and migration patterns (Ajinomoto, 2015[42]); and Toshiba's Fifth Employee Assistance Programme (EAP), which assessed the effects of the company's efforts to protect more than 100 rare species with surveys to monitor progress (Smith et al., 2018[24]) Better sharing of data is needed to assist decision-making and feed into adaptive management approach, i.e. management systems to monitor ecological change and revise management policy, practice and systems accordingly. Biodiversity monitoring tools need to be better tailored to specific sectors, e.g. agriculture (Powers and Jetz, 2019[43]).
- Valuation techniques, e.g: WBCSD's 2011 Guide to Corporate Ecosystem Valuation (CEV) for instance provided information on how to assess quantitatively risks and opportunities related to ecosystem services (Hanson et al., 2012[44]). Several corporate champions have used measurement approaches to assess their environmental impacts and dependencies, despite challenges to factor biodiversity (Zeller et al., 2016[45]). Hugo Boss for instance developed environmental impact valuation for its Sustainable Fashion strategy, drawing on the life cycle assessment (LCA) and Natural Capital Protocol (NCP) approaches (Zeller et al., 2016[45]).
- Materiality risk assessment, such as Unilever's matrix (Unilever, 2019[18]).

Additional work is needed to integrate local biodiversity impact assessment in corporate- or portfolio-level risk management and valuation techniques.

Due Diligence

In addition to assessing impacts, dependencies and risks associated with biodiversity at site-level, businesses, lenders and investors need to integrate biodiversity and broader responsible business conduct (RBC) risks in their due diligence process. The *OECD Guidelines for Multinational Enterprises* recommend that enterprises conduct due diligence in order to identify, prevent or mitigate and account for how actual and potential adverse impacts associated with their operations, supply chains and other business relationships are addressed (OECD, 2011[7]).Responsible business conduct (RBC) risks are defined as possible adverse impacts on society and the environment related to the environment, human rights, workers, bribery, consumers and corporate governance. The *OECD Due Diligence Guidance for Responsible Business Conduct* provides practical support to enterprises on the implementation of the OECD Guidelines (OECD, 2018[46])**.** OECD due diligence approach can help businesses and investors prioritise RBC impacts, including biodiversity.

The OECD has also developed sector-specific guidance in agriculture, garment and footwear, mineral supply chains, and financial sector, such as: the *OECD-FAO Guidance for Responsible Agricultural Supply Chains* (OECD/FAO, 2016[21]); the *OECD Due*

Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector (OECD, 2017[47]); and the *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas* (OECD, 2016[48]), In addition, the OECD report *Responsible Business Conduct for Institutional Investors* explains the application of the *OECD Guidelines for Multinational Enterprises* in the context of institutional investors (OECD, 2017[49]). The paper highlights key considerations for institutional investors in carrying out due diligence that will help to identify and respond to environmental and social risks.

Disclosure and external reporting

Disclosure and external reporting of biodiversity impacts, dependencies, risks and opportunities remain limited so far compared to climate disclosure. A recent study assessed the sustainability reports of the top 100 of the 2016 Fortune 500 Global companies (the Fortune 100) to estimate the current state of corporate biodiversity accountability and reporting (Addison, Bull and Milner-Gulland, 2018[50]). Results showed that while half (49) of the Fortune 100 mentioned biodiversity in their reports, only 31 included clear biodiversity commitments, of which only five were specific, measurable and time bound. In addition, companies rarely report or disclose biodiversity impacts and internal impact assessments, and instead focus on qualitative narrative on biodiversity actions. According to the same study, while several companies disclosed biodiversity-related activities (e.g. managing impacts, investing in biodiversity and restoring biodiversity), only nine companies provided quantitative indicators to verify the impacts of their activities; and no company reporting quantitative biodiversity outcomes (Addison, Bull and Milner-Gulland, 2018[51]). Another study assessed over 100 companies' reporting under the EU Non-Financial Reporting Directive (NFRD; see Section 4.4). Results shows that companies which did identify biodiversity risks in their reporting typically did not report on concrete biodiversity impacts and their management (Alliance for Corporate Transparency Project, 2019[22]). Unlike for climate change, companies need to disclosure how they assess the impacts and dependencies of their operations and value chain on biodiversity, society and the environment, not just risks and opportunities for their businesses. The study highlights challenges to measure impacts on biodiversity by means of standardised quantitative performance indicators, also known as key performance indicators (KPIs). Corporate reporting could usefully specify which concrete information is material, such as adverse impacts on land use, or identification of concrete biodiversity risks and impacts, and how to manage them.

Businesses, banks and investors can thus significantly improve the mainstreaming of biodiversity indicators and measurement approaches in their reporting and disclosure schemes, including through integrated reporting of both financial and non-financial criteria. Conversely, any approach towards a harmonised framework or protocol for measuring biodiversity should ensure it is compatible with existing reporting and disclosure frameworks. Key reporting and disclosure initiatives and frameworks that are worth targeting to integrate biodiversity in non-financial disclosure include: Global Reporting Initiative (GRI), Climate Disclosure Project (CDP), EU Directive on Non-Financial Reporting Directive (NFRD; see section 4.4.), corporate annual reports, Post-2020 SDGs (especially SDG 14), Natural Capital Protocol, ISO 14040, FSC annual reports, Dow Jones SI, and biodiversity benchmarks. Financial institutions have a key role to play in encouraging investee corporations to better integrate biodiversity and other environmental, social and governance (ESG) factors in their decision-making, as corporates are lagging behind investors in disclosing ESG factors (PwC, 2019[52]).

Voluntary industry standards and certification schemes

Voluntary industry standards, labels and certification schemes can help companies to embed biodiversity concerns in products, services, operations and supply chains. Examples include: standards and certification schemes in the garment and footwear sector (e.g. from Textile Exchange on cotton, down, wool and organic content) (Textile Exchange, 2019[53]); certification standards for sustainable palm oil trade (RSPO, 2019[54]) (Azizuddin, 2018[55]); multiple eco-labelling schemes for organic agriculture and sustainable forestry and fisheries.

Internal and external communication

Communicating internally and externally on biodiversity impacts and dependencies is critical for businesses to raise awareness about biodiversity, and encourage education, knowledge sharing and engagement with key stakeholders. This entails notably:

- Communication to and education of corporate staff, to raise awareness about biodiversity internally, e.g. amongst employees. Toshiba for instance runs environmental education events environmental certification programmes for employees (Smith et al., 2018[24]).
- Communication to and education of consumers, to influence consumer behaviour.
- Public awareness raising of local communities. In the UK for instance, Gatwick airport has launched various initiatives to improve understanding of biodiversity amongst their employees and the local community (Smith et al., 2018[24]).
- Communication to shareholders (including through external reporting).

Business efforts should build on public education initiatives, which are important to sensitise an increasingly urbanised world to the importance of biodiversity.

Stakeholder engagement of civil society and local communities is also particularly important to consider human wellbeing and human rights issues, and factor potential trade-offs between desired biodiversity outcomes and desired social outcomes (e.g. land rights and human rights issues with indigenous communities and deforestation). Additional work is needed to better communicate on biodiversity benefits in terms of employment, social inequalities and regional disparities (e.g. in terms of local rural development) and global food challenges. SUSTAIN-Africa initiative for instance works to integrate water, land and ecosystem management with sustainable business to demonstrate inclusive green growth, through collaboration between communities, business and governments.

Annex A.4.5. Policy and regulatory tools to help businesses and investors integrate biodiversity

Policy makers, businesses, financial institutions and civil society need to co-operate to strengthen the business case for biodiversity and ecosystem services. Although additional analysis is needed on how to strengthen domestic policy frameworks for enhancing the business case for biodiversity and ecosystem services, preliminary research suggest that policy makers could notably:

- Develop a framework for measuring and integrating biodiversity and ecosystem services in business and investment decisions (see Chapter 8), including in metrics, strategy, governance, risk management (as well as corporate accounting standards, monitoring tools and valuation techniques), due diligence, disclosure.

- Require business and financial organisations to publish long-term plans factoring in the assessment and management of biodiversity
- Mainstream quantitative biodiversity assessments in reporting requirements (e.g. the EU Non-Financial Reporting Directive and its guidelines), impact assessments and risk-management tool. Financial regulators could require investors and investee corporations to assess impacts and dependencies on biodiversity and ecosystem services, and how they become financially material, as recommended by the EU High-Level Expert Group on Sustainable Finance (HLEG, 2018[26]).
- Set policies promoting improved due diligence for responsible business conduct (e.g. France's 2017 Duty of Vigilance Law), drawing on O*ECD Due Diligence Guidance for Responsible Business Conduct* (OECD, 2018[46]).
- Encourage policy coherence and alignment across and within levels of government, to better engage energy, mining, agriculture and finance ministries and financial regulators on biodiversity issues. Environment policy makers can notably raise awareness among financial regulators of the global, systemic implications of biodiversity factors, which do not only have local impacts.
- Encourage biodiversity mapping (e.g. in Latvia) and further integration of biodiversity issues through environmental impact assessments, guidelines and standards and national action plans (e.g. in France and the UK).
- Encourage businesses, financial organisations and other stakeholders to make and share commitments and contributions to biodiversity through the Sharm El-Sheikh to Kunming Action Agenda for Nature and People, in order to mobilise action in advance of COP15.
- Mainstream biodiversity issues in public procurement and tendering procedures for infrastructure projects.
- Address investor protection while ensuring access and benefit-sharing (ABD), and factor biodiversity concerns in land leasing or acquisition criteria.
- Encourage investment promotion in investment opportunities that help prevent biodiversity loss (e.g. Egypt's investment mapping portal for environment friendly investment)
- Set standards, certification schemes and labels, to complement industry-led initiatives.
- Mainstream biodiversity in green, sustainable finance (Chapter 7).
- Set communication, education and public awareness programmes.

Chapter 6 Annex

Annex A.6.1. Role of innovation in addressing data gaps

The rapid development technology has led at an explosion the volume and types of data that can be collected across many sectors of the economy, society and environment. Biodiversity is no different and several novel, emerging or developing technologies have the potential to change the types of data that can be collected and the way existing data can be used by the public sector, private sector and private individuals. Table A.6.1 provides a brief overview of 4 technologies which are likely to have significant impacts on the generation and usage of data for biodiversity.

In some cases these impacts are being felt already, for example emerging AI techniques, combined with remoting data collection from camera traps and acoustic monitoring, has already proved a powerful tool for identifying species and even individual animals (Kwok, 2019[56]). The increased capacity for monitoring that results from these new technologies will be a boon to both the private and public sectors, if harnessed effectively. Relatively rapid, cheap and technically simple DNA sequencing for example, could increasing the efficacy of monitoring wildlife trade by facilitating the identification of species and place of origin for objects without the need for specific expertise. Blockchain technology could be used to ensure end-to-end transparency of supply chains, enhancing the ability of retailer to ensure sustainability of end products. Further, democratising sustainability data though technologies such as blockchain, allows individual consumers to make informed choices about the sustainability of their own consumption, without the need to rely on often opaque and confusing certification standards. This is also true with biodiversity data, where growing data platforms such as GBIF and ebird function not only as databases monitoring biodiversity state changes, but also as vital public engagement portals, though with individuals, particularly youth, can re-engage with biodiversity.

Finally the emergence of new technologies represents a major opportunity for new business. Earth observation from space, for example, is worth US$ 7.5 billion a year and is estimated to grow by 15% a year until 2019[4]. Many additional opportunities will likely emerge though investment in new technology, and the G7 can play a key role in leading the development and implementation of innovations for biodiversity.

[4] https://www.pwc.fr/en/industrie/secteur-spatial/earth-observation.html

Table A.6.1 Examples of innovation for biodiversity

Technology	Data generated	Innovation and availability	Data Gap addressed	Key beneficiaries	Caveats
Nanopore DNA sequencing	DNA sequence data	Allows for the manufacture of desk-top DNA sequencers which are highly mobile, rapid at a much lower cost than more traditional techniques. Available now, but more research needed for full application	Genetic diversity, microbial diversity, monitoring and enforcement of wildlife trade (through sample identification)	Public sector, Private sector	Complementary DNA library and barcodes need to be developed to utilise effectively
Block chain	NA	The structure of a block chain database, should allow for the entire supply chain of a product to be accessible by the end-user, be that the consumer or retailers. Currently available	Supply chain sustainability, transparency of product origin. Useful for food, beverages, timber and other wildlife products	Public Sector, Private sector, Individuals	High energy use and not currently mobilised
Artificial intelligence (AI) and machine learning	Various	Remote sensing networks generate vast quantities of data (for example camera traps and acoustic monitoring). AI techniques can process this data into useful information which can them be used to monitor many dimensions of biodiversity (species occurrence, population dynamics, habitat disturbance)	State, pressures and responses	Public Sector, Private sector, Individuals	Availability of training data is low for many cases, creating training libraries is labour intensive
Citizen led data collection	Various	Democratises biodiversity data collection, currently utilised widely, most notably though GBIF. Allows for individual engagement with biodiversity	State of biodiversity	Public Sector, Individuals	Data generated is difficult to use and biased, requires more sophisticated analytical techniques than currently available (better developed AI for example)

Source: Authors.

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Biodiversity: Finance and the Economic and Business Case for Action

The Convention on Biological Diversity's 15th Conference of the Parties (CBD COP15) in 2020 marks a critical juncture for one of the defining global challenges of our time: the loss of biodiversity and ecosystem services, which underpin nearly all of the Sustainable Development Goals (SDGs). Transformative changes are needed to ensure biodiversity conservation and sustainable use, and the delivery of the ecosystem services upon which all life depends. This document provides the annexes to the report *Biodiversity: Finance and the Economic and Business Case for Action*.

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OECD Environment Directorate,
May 2019