



System of
Environmental
Economic
Accounting



Administered by
THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP



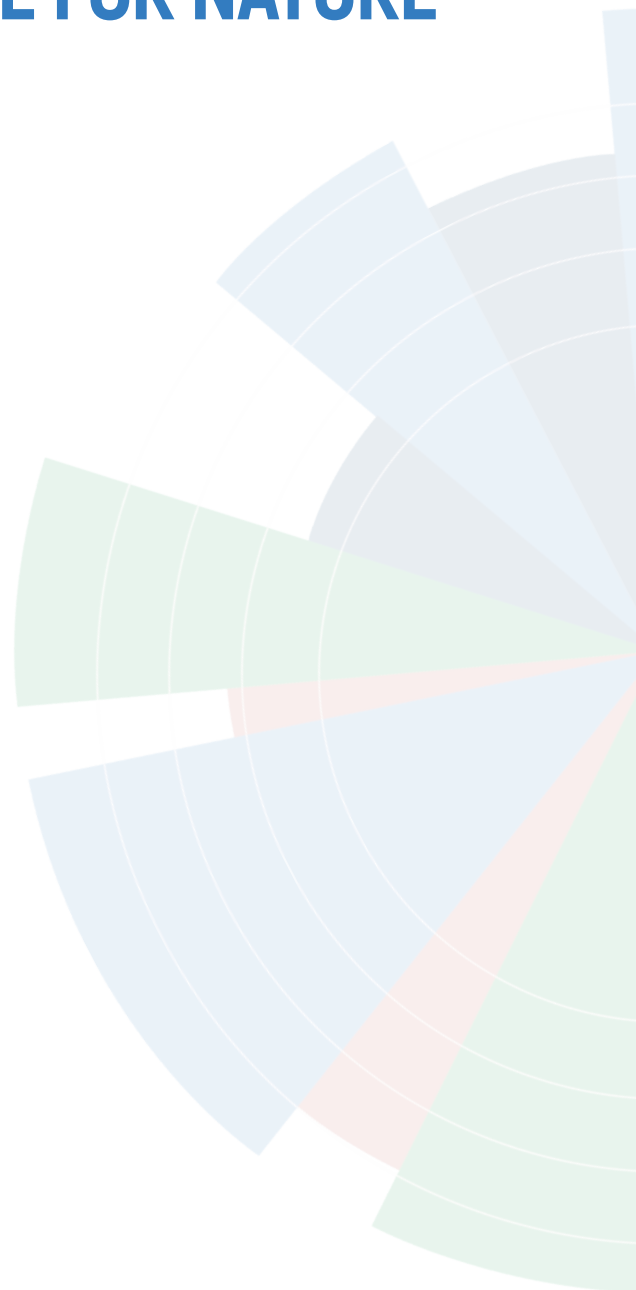
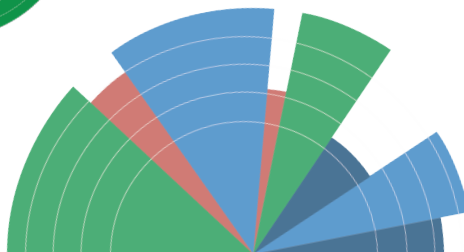
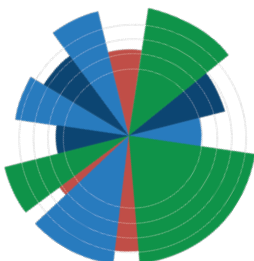
**United
Nations**

HOW NATURAL CAPITAL ACCOUNTING CAN HELP ACCELERATE FINANCE FOR NATURE

RUTGER HOEKSTRA

Metrics For The Future

October 26th 2022



CONTENTS

Executive Summary	1
Scope	3
Audience	3
Finance for Nature	4
Deterioration of Nature: Consequences and Drivers	4
Momentum for ESG and Climate but.... Acceleration Is Needed for Finance for Nature	4
Five Important Barriers to Finance for Nature	6
NCA and Finance for Nature	7
Measurement Frameworks	7
Natural Capital Accounting and System of Environmental Economic Accounting (SEEA)	8
Can the SEEA Help Overcome the Barriers to Finance for Nature?	11
Use Cases	13
Potential Uses and Users	13
Some Practical Considerations Unique to Biodiversity	14
Examples and Potential Use Cases	18
Boxes A through C illustrate how SEEA is currently being used or may be applied in the future.	18
Action Plan	21
1. Assess Data Needs	21
2. Continue the Alignment Process	21
3. Enhance Data Availability and Accessibility	22
4. Include NCA in Finance Education	23
5. Strengthen the Coalition for Finance for Nature	23
References	25

EXECUTIVE SUMMARY

Humanity's impact on nature is taking center stage as the world prepares for COP15 in Montreal, Canada. Financial institutions around the world are exploring ways to quantify nature-related risks and reduce the biodiversity impacts of their investments. However, this development is too slow, and finance for nature is still modest compared to total ESG investments (Environmental, Social and Governance). To flourish, finance for nature must overcome five barriers:

1. **Coalition.** Finance for nature requires various financial actors -- investors, (central) banks, government (at all levels) and others -- to work together. Current biodiversity finance is predominantly public investments, with comparatively little private money. Risks and opportunities are not generally priced into investment decisions and attractive financial returns are difficult without blended finance solutions.
2. **Standards.** There are many biodiversity measurement frameworks serving a variety of purposes. The lack of common standards make it hard to coordinate between financial actors.
3. **Data Availability/Accessibility.** Public resources for data collection have fallen across the globe, impeding

the availability and accessibility of high-quality biodiversity data.

4. **Scale and Scope.** Biodiversity projects are often local and small scale and cumulative impacts of projects are poorly understood. Finance also requires data on supply chain impacts ("Scope 3").
5. **Perverse Incentives.** Some government expenditures and subsidies target important government goals, such as food security and household incomes, but are also detrimental to biodiversity.

The main messages of this paper are:

- **Natural Capital Accounting (NCA) can help overcome these barriers.** In 2021, a global statistical standard for NCA, the System of Environmental Economic Accounting (SEEA), was adopted by international organizations and governments. This paper argues that the SEEA could help overcome these barriers. The SEEA provides a global standard as data availability expands. It can be applied at various spatial scales and the framework could help quantify perverse incentives.
- **NCA examples and potential applications are emerging.** There are various examples where NCA is

being adopted to facilitate finance for nature or where it shows potential.

- **An action plan is needed.** In principle, the SEEA can play a role in accelerating finance for nature. However, several steps are required to facilitate this development.
 - *Assess Data Needs.* It is beyond the scope of this paper to provide a comprehensive overview of the information needs for finance for nature. However, such an assessment should be done to fully understand the role that NCA might play.
 - *Continue Alignment Process.* The measurement of biodiversity impacts and dependencies are set to gain momentum through the post-2020 Global Biodiversity Framework (GBF), an update of the Global Reporting Initiative (GRI), the final report of the Taskforce for Nature-related Financial Disclosures (TNFD), and the E.U.'s Corporate Sustainability Reporting Directive (CSRD). These and other initiatives are using the SEEA standard, and this alignment and convergence of initiatives should continue.
 - *Enhance Data Availability/Accessibility.* National and international data providers should improve the the availability of high-quality biodiversity data with links to socio-economic data. Improved data accessibility for public and private sectors will play an important role. Middle and low-income countries with vulnerable ecosystems would also benefit.
 - *Include NCA in Finance Education.* The current and next generation of sustainable finance professionals need to learn about NCA and how it may be used in finance for nature.
 - *Strengthen the Coalition for Finance for Nature.* The SEEA standard will not, by itself, create a broader coalition for biodiversity finance. However, if governments initiate further collaboration, the SEEA can help facilitate by providing the “common language” needed for closer cooperation on crucial solutions such as blended finance.

SCOPE

Biodiversity and ecosystems are deteriorating at rapid rates. Finance could help to resolve this problem, but finance for nature is still modest and mostly restricted to public expenditures. To slow, and reverse, the declines it is essential to mobilize private capital and other resources. This paper will argue that a global statistical

standard for natural capital accounting (NCA), the System of Environmental and Economic Accounting (SEEA), could help to overcome the barriers that exist to finance for nature. Recognizing that, while NCA is not a silver bullet, it could play a valuable part in accelerating biodiversity finance.

AUDIENCE

This paper is meant as a thought-provoking discussion piece for the participants of the [“6th Policy Forum on Natural Capital Data for Better Decision Making: Financing for Nature”](#) to be held on November 2-3, 2022. The primary audience for this paper includes forum participants working in private finance institutions, finance and environmental ministries, central banks, pension funds, NGO/philanthropic investors, ESG data providers, ESG standard setters, auditors, sustainable finance academics and other institutions involved in finance

for nature. It may also be of use for NCA practitioners providing data at national statistical offices or on a global scale who would like to understand more about how their data could be used in finance.

While some of the above organizations work closely together, collaboration needs to intensify. One of the core messages of this paper is that NCA/SEEA can help shape the common language and data architecture for this community.

FINANCE FOR NATURE

DETERIORATION OF NATURE: CONSEQUENCES AND DRIVERS

Biodiversity and ecosystem services are foundational to the economy and human wellbeing. The World Economic Forum estimated that currently [US\\$44 trillion dollars](#) of value added, about half of global GDP, is generated in industries that are moderately or highly dependent on biodiversity¹. Given that the most recent Living Planet report has found an average decline of 69% in species populations since 1970², this deterioration poses a major threat to the prosperity of current and future generations. The stage is set for crucial decisions to be made at the UN Biodiversity Conference (COP15) in [December 2022](#).

What is causing the deterioration in nature? The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has identified [five main drivers](#) of biodiversity loss: land use and sea use change, overexploitation, pollution, climate change and invasive species³. Simply put, economic and financial systems are [not aligned](#) with sustainable development objectives.⁴

MOMENTUM FOR ESG AND CLIMATE BUT.... ACCELERATION IS NEEDED FOR FINANCE FOR NATURE

Given these threats to nature, the financial world is increasingly targeting broader goals for sustainable development instead of short-term profits. This is sometimes referred to as the shift from shareholder capitalism to stakeholder capitalism. Alternatively, this development uses the label “ESG” which refers to Environmental, Social and Governance.

Bloomberg estimates that ESG is already around [a third](#) of total assets under management and might increase to US\$50 trillion by 2025⁵. Climate finance refers to ESG investing focused on climate impacts or risks. Analysts at the Climate Policy Initiative have tracked public and private sector climate finance flows from a variety of sources on a yearly basis since 2011. In 2019, they estimated that annual climate finance reached more than [US\\$600 billion](#)⁶. Nature stands to gain from the momentum in ESG because these investments often include biodiversity goals. Similarly, since global warming is a driver of biodiversity loss, climate finance will indirectly have positive impacts on nature.

However, targeted finance for nature is currently a modest part of total ESG finance. Table 1 shows a breakdown of estimates by the OECD related to various types of biodiversity finance. The table shows that the total figure is around US\$78-91 billion. This amounts to only around 0.1% of global GDP.⁷ The table is ranked according to the size of the investments, showing the dominance of domestic public expenditures (around US\$72-77 billion). There are only five categories which exceed US\$1 billion.

The rationales behind finance for nature can be twofold⁴:

- **Financing Green.** Financing projects that

contribute—or intend to contribute—to the conservation, restoration, and sustainable use of biodiversity and its services to people. For example, public expenditures overtly geared towards nature conservation. This also includes so-called impact investors which specifically target investments that have positive impacts on biodiversity (or other social or environmental goals).

- **Greening Finance.** Directing financial flows away from projects with negative impacts on biodiversity and ecosystems to projects that mitigate negative impacts or pursue positive environmental impacts as a co-benefit of their primary activity.

Table 1. Estimated Finance Flows for Biodiversity (annual average between 2015–2017)
Source: Adapted from [OECD's Comprehensive Overview of Global Biodiversity Finance](#)⁷

SOURCE	TYPE	AMOUNT (MILLIONS USD)
Domestic Public Expenditures	Public	67800
Bilateral Flows	Public	3541 - 8407
Biodiversity Offsets	Private	2600 - 7300
Sustainable Commodities	Private	2300 - 2800
Conservation NGOs	NGOs/Philanthropic	1200 - 2300
Multilateral Flows	Public	327 - 922
Private Finance Mobilized by DAC Countries ODA Finance Interventions	Private	200 - 510
Philanthropic	NGOs/Philanthropic	222 - 380
Private Finance Leveraged by GEF	Private	41 - 155
Forest and Land Use Carbon Finance	Private	30 - 116
Water Quality Trading and Offsets	Private	32
Payment of Ecosystems Services for Watersheds	Private	15
Total Public Flows		71668 - 77129
Total NGOs/Philanthropic Flows		1422 - 2680
Total Private Sector Flows		5218 - 10928

FIVE IMPORTANT BARRIERS TO FINANCE FOR NATURE

Why is finance for nature still so modest despite the urgency of the biodiversity crisis? What are the barriers holding it back? The World Bank's [Mobilizing Private Finance for Nature](#)⁴ identifies core barriers, five of which will play an important role in the remainder of this paper:

1. Lack of standards. There are many ESG measurement frameworks which include biodiversity indicators. There are also dedicated frameworks specifically aimed at biodiversity or ecosystems. However, there is no fully agreed standard for measuring biodiversity impacts or risks.
2. Lack of data and accessibility issues. Various biodiversity datasets exist but not always at the necessary spatial details or in a format that is linkable to company or investment data. Moreover, public resources for data on natural resources has been shrinking. Data accessibility is also an issue as the use of these complex databases require a high degree of expertise and resources.
3. Scale mismatch. Biodiversity projects are often small and localized, as they are concerned with a specific region or conservation area. In addition, the cumulative impacts of multiple projects and other exogenous factors are less well understood.
4. Perverse incentives. Governments spend US\$500 billion on initiatives potentially harmful to biodiversity, 5-6 times more than the spending to protect biodiversity⁸. Many of these expenditures and subsidies target food security or other social and economic policies. Lessening perverse incentives while minimizing the social and economic trade-offs is a major challenge.
5. Failure to mobilize a coalition of financial actors. Table 1 shows that finance for nature is currently dominated by public investments. Flows from the private sector, NGOs or philanthropic actors are small partially because it is inherently difficult to deliver private returns. Mobilizing financial resources at scale for biodiversity requires a composite set of solutions, including blended finance. This is difficult, as financial institutions have their own roles, data, and expertise.

The next section will argue that the SEEA can play a role in overcoming these five barriers.

NCA AND FINANCE FOR NATURE

MEASUREMENT FRAMEWORKS

Finance is heavily dependent on quantitative information. Whether it is financing green or greening finance, it is crucial to quantify the impacts on nature and relate those to monetary investments. This helps investors and investees fully consider a project. With this data also comes a means of communication between the parties involved in a deal.

While progress has been made on quantification of ESG (including climate and biodiversity indicators) there is no globally accepted standard. The heterogeneity is partially justified because different frameworks may have different purposes. Still, there is a need for greater harmonization of classifications, methodologies and terms. Some well-known ESG frameworks are:

- Global Reporting Initiative ([GRI](#)). KPMG reports that this remains the most popular private sector framework.⁹ GRI is [updating](#) their [current biodiversity indicators](#)¹⁰, including indicators on operational sites close to nature, products that impact biodiversity, habitat restoration and endangered species affected by operations.
- Sustainable Development Goals ([SDG](#)). SDG 15, focused on biodiversity, strives to: “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”. This is translated into 9 targets and a multitude of specific indicators. However, KPMG concludes that while SDGs are being quickly adopted, “SDGs linked to protecting biodiversity are least commonly prioritized by businesses”⁹

There are many other frameworks which include biodiversity in some way. The CBD overview¹¹ of relevant frameworks include the [UN Global Compact](#), [OECD Guidelines for Multinational Enterprises](#), [ISO standards](#) and other frameworks. In August 2022, the [International Integrated Reporting Council](#) (IIRC) and the [Sustainability Accounting Standards Board](#) (SASB) were placed under the auspices of the [International Sustainability Standards Board](#) (ISSB) of the [IFRS Foundation](#). There are also other consolidation initiatives such as the [Value Balancing Alliance](#), which aims to harmonize the methodologies used for “impact assessment”, including the monetary valuation of impacts. In addition,

there are other initiatives that are using, developing and piloting measurement systems including the [Capitals Coalition](#), [BIOFIN](#) (UNDP), [Business for Nature](#), [Biodiversity Finance – Internalize the Externality](#) (World Economic Forum), [Natural Capital Project](#), [IPSASB](#) and many others.

An acceleration in the guidance and consolidation of biodiversity indicators is on the horizon as a result of four important initiatives:

- Taskforce on Nature-related Financial Disclosures (TNFD). The [TNFD](#) was created to help understand the financial risks companies face due to biodiversity loss and the biodiversity impacts of business activities. A [draft framework](#)¹² is available and will be finalized in September 2023.
- Global Reporting Initiative (GRI). GRI will [update](#) its current disclosures for biodiversity (originally from 2016)¹⁰ in the second quarter of 2023. Given that GRI is the dominant ESG framework⁹, new guidelines will have a significant impact.
- Post-2020 Global Biodiversity Framework (GBF). At COP15, in December 2022, agreement will be sought for the post-2020 GBF to identify targets for

improving biodiversity and ecosystems. A [draft](#)¹³ has been published and the final version is currently being negotiated.

- EU Corporate Sustainability Reporting Directive (CSRD). For the financial year 2024, around 50,000 EU companies will be legally obligated to report their ESG impacts using a CSRD system. Once in place, it will be influential in Europe and potentially globally.

NATURAL CAPITAL ACCOUNTING AND SYSTEM OF ENVIRONMENTAL ECONOMIC ACCOUNTING (SEEA)

The above measurement frameworks are mostly applied at the company level. Yet, as the overview showed, there is no global standard at this level. However, there is a global standard for measuring biodiversity and ecosystem services at the national level. Since 2012, a statistical standard for natural capital accounting (NCA) called the System of Environmental Economic Accounting (SEEA) has been endorsed by the UN Statistical Commission, the highest global statistical authority. Note that the terms NCA and SEEA are both used in this paper, but they are not identical. For details, see Box 1.

The SEEA consists of two main standards: the SEEA Central Framework (CF) (2012)¹⁴ and SEEA Ecosystem Accounting (EA) (2021)¹⁵ (see

Box 1). The implementation of the SEEA CF and SEEA EA are progressing rapidly. For example, the EU has made certain accounts of the SEEA CF (such as air emissions and material flows) compulsory for its member states. Currently, 90 countries compile SEEA accounts, including many developing countries. The World Bank and UNSD are actively promoting the production

of SEEA accounts in developing countries, and the SEEA is also increasingly being used in government [policies](#)¹⁶. Recently, the [United States](#) has also pledged to develop SEEA accounts¹⁷, and the UK's Treasury published the influential [Dasgupta report](#),¹⁸ a powerful endorsement of NCA being used in government policy and financial decision-making.

BOX 1. BASICS OF NATURAL CAPITAL ACCOUNTING AND THE SYSTEM OF ENVIRONMENTAL-ECONOMIC ACCOUNTING

(SOURCE: [HTTPS://SEEA.UN.ORG/CONTENT/FREQUENTLY-ASKED-QUESTIONS](https://seea.un.org/content/frequently-asked-questions))

Natural capital accounting (NCA) is an umbrella term for all efforts using an accounting framework to measure stocks and flows of natural capital. The underlying premise is, since the environment is important to society and the economy, it should be recognized as an asset. It must, therefore, be maintained and managed, with its contributions (services) better integrated into commonly used frameworks like the System of National Accounts (SNA) (which defines important economic variables such as GDP).

The System of Environmental-Economic Accounting (SEEA) is the accepted international standard for environmental-economic accounting, providing a framework for organizing and presenting statistics on the environment and its relationship with the economy. It brings together economic and environmental information in an internationally

agreed set of standard concepts, definitions, classifications, accounting rules and tables to produce internationally comparable statistics.

The SEEA is developed and released under the auspices of the United Nations, the European Commission, the Food and Agriculture Organization of the United Nations, the Organisation for Economic Co-operation and Development, International Monetary Fund and the World Bank Group. It consists of two parts:

The SEEA Central Framework (SEEA CF) was adopted by the UN Statistical Commission as the first international standard for environmental-economic accounting in 2012. The Central Framework looks at “environmental assets”, such as water resources, energy resources, forests, and fisheries. It considers their use in the economy and returns to the

environment in the form of waste, air and water emissions. In addition, there are methodological documents that take a sectoral approach, such as SEEA-Energy; SEEA-Water and the SEEA Agriculture, Forests and Fisheries.

The SEEA Ecosystem Accounting (SEEA EA) complements the Central Framework and was adopted by the UN Statistical Commission in 2021. It takes the perspective of ecosystems and considers how individual environmental assets interact as part of natural processes within a given spatial area. Ecosystem accounts enable the presentation of indicators of the level and value of “ecosystem services” in a given spatial area.

The SEEA Ecosystem Accounts (SEEA EA) consist of five different types of accounts, depicted in Figure 1:

1. ECOSYSTEM EXTENT accounts record the total area of each ecosystem, classified by type within a specified area (ecosystem accounting area). Ecosystem extent accounts are measured over time in ecosystem accounting areas (e.g., nation, province, river basin, protected area, etc.) by ecosystem type, thus illustrating the changes in extent from one ecosystem type to another over the accounting period.

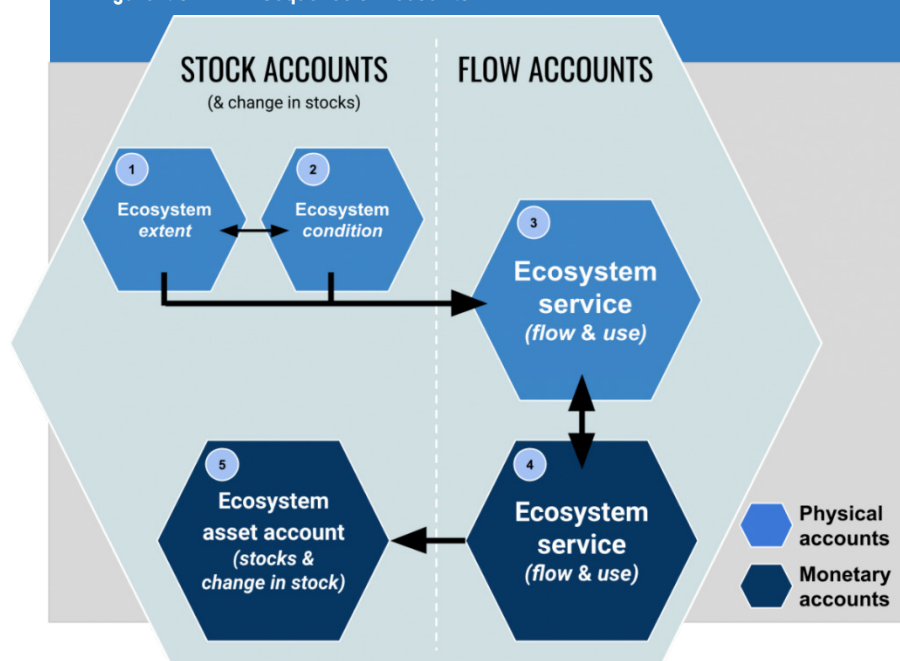
2. ECOSYSTEM CONDITION accounts record the condition of ecosystem assets in terms of selected characteristics at specific points in time. Over time, they record the changes to their condition and provide valuable information on the health of ecosystems.

3. & 4. ECOSYSTEM SERVICES flow accounts (physical and monetary) record the supply of ecosystem services by ecosystem assets and the use of those services by economic units, including households.

5. MONETARY ECOSYSTEM

ASSET accounts record information on stocks and changes in stocks (additions and reductions) of ecosystem assets. This includes accounting for ecosystem degradation and enhancement.

Figure 1. SEEA-EA Sequence of Accounts



CAN THE SEEA HELP OVERCOME THE BARRIERS TO FINANCE FOR NATURE?

Accelerating finance for nature is an ambitious goal requiring great effort from the many financial actors involved. While the SEEA will not solve all problems, it could help to overcome the five barriers mentioned in Section 1.

Global Standard

The SEEA is a global standard at the national level and might help with consolidation of the various measurement frameworks at the corporate level. The SEEA EA has a globally agreed list and definitions of ecosystems services (provisioning, regulating and cultural services), ecosystem types and assets. It also includes economic categories such as industry classifications and products which are used in the System of National Accounts (SNA). Note that, in some cases, the SEEA EA adopted existing classifications, thereby making them part of the standard. For example, the IUCN's [Global Ecosystem Typology](#)¹⁹ was adopted as the reference classification for ecosystem types of the SEEA EA.

Full consistency of the SEEA with corporate measurement systems is probably unwanted because the metrics might have different purposes. However, the SEEA can provide

a standard with which to promote greater consistency and alignment where possible. There is already active coordination between the SEEA EA and important frameworks such as GRI, GBF and TNFD. The Capitals Coalition is working with UNSD and other partners on the Combining Forces project to build [better linkages](#) between private sector natural capital accounting, reporting standards and the SEEA.

Scale and Scope

Biodiversity projects often take place at a small spatial scale. While the SEEA EA focuses mostly on national level data, it can be applied to other spatial scales because its foundation is geospatial data. As a result, it has been applied at the company level (by [Forico](#), a forest estate, in Tasmania²⁰) as well as at the supra-national level ([European Union](#))²¹. The SEEA EA framework and its indicators are therefore spatially flexible.

The SEEA is flexible in a second way. ESG finance is increasingly demanding information about biodiversity impacts in supply chains. It is no longer sufficient to know the direct impacts of an investment because negative impacts may occur earlier in the supply chain. This area, which is also sometimes referred to as “Scope 3 impacts” by investors, is a domain where SEEA carbon data is already

widely used (see Section 3, Box B).

Data Availability and Accessibility

There have been various reports on the availability and accessibility of NCA information. A Capitals Coalition [report](#) found that while NCA data is available, it is not flowing from data providers to users.²² A more recent TNFD [data report](#) provides an inventory of current datasets²³. When assessing the data availability, it is important to be specific about the use of the data in finance. In the case of reporting ESG impacts, there are quite a few sources. This includes data initiatives that are looking at nature from a global perspective, (e.g. [ARIES](#) or [INVEST](#)) although these are more aggregated. It also includes global databases such as [WIOD](#), [EXIOBASE](#), [EORA](#), [GTAP](#) and [ICIO](#) that are used to measure supply chain impacts using SEEA accounts. However, when it comes to making investment decisions about small scale biodiversity projects, much of the spatial data available is too low-resolution or not linkable to socio-economic variables at a detailed spatial level. Notably, there are other concerns about the data to keep in mind: timeliness, continuity and robustness across sectors.

There are examples of countries with advanced GIS data and statistical capacity ([the Netherlands](#), [UK](#)) developing detailed

SEEA accounts. However, more high-resolution data for a broader range of countries is needed. This is especially true for low and medium-income countries that lack the statistical expertise and resources but are simultaneously vulnerable to ecosystem losses. These countries may need to start the development of SEEA by using global databases as a foundation for their work. For example, [Senegal](#) is using ARIES to develop their SEEA ecosystem accounts.

While there is data, a lack of accessibility is a serious constraint. Linking detailed spatial data on nature, population, and socio-economic variables to a particular investment project or company is probably one of the hardest things to do in ESG. It requires specialized knowledge, software and modeling tools. This contributes to the problem that biodiversity is one of the topics covered least in ESG reporting.⁹

Perverse Incentives

A significant amount of government expenditures and subsidies are detrimental to nature. While these policies are often aimed at food security, urban development or other political goals, they may have harmful impacts on nature.⁸ Reducing or redirecting these financial flows would go a long way to lessen pressure on biodiversity and ecosystems. However, there would be some

serious trade-offs between environmental versus social and economic goals.

The SEEA is useful in this discussion in two ways. Firstly, the SEEA provides a framework which can links these financial flows to macro-economic aggregates such as GDP. This is important for assessing the size of these flows. Secondly, since the SEEA is linkable to socio-economic data, the trade-offs can be modelled and policies can be implemented which minimize social and economic impacts.

Coalition of Financial Actors

One of the biggest problems in biodiversity finance is that it is dominated by public expenditures. A broader coalition that includes other financial

actors is essential. While a standard like the SEEA cannot organize this collaboration, it can help facilitate it.

It is sometimes said that financial accounts are the “language of business” because they provide the vocabulary with which to transmit financial information. The financial accounting terms and conventions are an integral part of financial conversations and negotiations. In the field of NCA, such a language is lacking. The SEEA, together with the other frameworks, could evolve into this NCA language for business. It would help define the classification and concepts for companies, investors, and governments as well as all the other actors in finance for nature. What is more, it would provide the data which corresponds to these terms.

USE CASES

POTENTIAL USES AND USERS

How does NCA help institutions involved in biodiversity finance? To answer this question let us first look at the use of the SEEA Central Framework which measures variables such as emissions and material flows. The SEEA CF is emerging as a shared framework for application

at the government level.¹⁶ Some SEEA CF accounts, such as the air emission accounts, are frequently used by companies in their carbon reporting (see Box B).

However, there are only a few examples of the SEEA EA accounts being used for biodiversity applications. In part, this has to do with the fact that the SEEA CF (which includes the

air emissions accounts) was adopted in 2012 and the SEEA EA in 2021. If the SEEA EA follows the same trajectory, its use by governments and finance is likely to also expand rapidly. However, this will only occur if the SEEA EA provides a clear advantage to the actors involved in biodiversity finance.

Who might use NCA? How might they use it? While it is beyond the scope of this paper to provide a comprehensive overview of all the users and uses of NCA, this section provides some examples. To start this exploration, it is important to understand that a broad range of institutions are involved in finance for nature. Table 2 shows a non-exhaustive list of 11 categories of financial institutions. These institutions are offering a variety of financial tools and instruments, including:

- Financial instruments like loans, bonds, insurance, mortgages and grants given by private financial institutions, NGOs and philanthropic foundations.
- Public instruments such as public expenditures, taxes, and subsidies which can be adopted by central, regional or local governments.
- Data collection, collation and ESG reporting services provided by accountancy and consultancy firms

and data collation organizations.

- Supervisory services. This includes central banks and company auditors that play a crucial role in safeguarding the stability of the financial system.

SOME PRACTICAL CONSIDERATIONS UNIQUE TO BIODIVERSITY

Table 2 provides suggestions for ways various financial actors may use NCA. However, there are some unique characteristics of biodiversity finance to consider:

- **Ecosystem health and drivers of biodiversity loss.** Key performance indicators for biodiversity are more difficult to define compared to climate change, which has two obvious KPIs: greenhouse gas emissions and global temperature. There is no scientific consensus on an ecosystem health indicator, so the SEEA includes various options. There is, however, more agreement on the drivers of biodiversity loss: land and sea use change, overexploitation, pollution, climate change and invasive species.³ NCA deals with all of these drivers well, except perhaps invasive species.

Biodiversity finance is often linked to one of these drivers because it is easier to deal with existing assets, such as land. It is also conceptually easier to link the impact to an investor.

- **Current state of biodiversity finance.**

When thinking about accelerating finance for nature it is also useful to look at the current financial flows above US\$1 billion in Table 1. These are, in descending order: domestic public expenditure, bilateral flows, biodiversity offsets, sustainable commodities and conservation NGOs. These are cases where biodiversity finance has historically evolved and where the largest financial flows are already mobilized. It is useful to see whether these flows can be expanded by creating blended finance solutions based on the sizeable public expenditures.

- **ESG and Climate Finance.** Another way to identify opportunities for finance for nature is to analyze where ESG and climate finance have been successful. This may provide lessons or networks to help grow biodiversity finance. There are countless examples where biodiversity trails ESG and climate processes. The SEEA EA followed the SEEA CF (which included air emissions accounts). The Taskforce for Climate-related Financial Disclosures (TCFD) preceded the Taskforce on Nature-related Financial Disclosures (TNFD). The Intergovernmental Panel on Climate Change (IPCC) was the model for the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES). Biodiversity finance should take advantage of the fact that ESG and climate finance have paved some of the way.

Table 2: Financial Actors and Potential Uses of NCA

FINANCIAL INSTITUTIONS	DESCRIPTION OF INSTITUTIONS	POTENTIAL USES OF NCA
Government Institutions	These are national, regional and local governments which aim to conserve or restore nature. At the supranational level, it includes organizations like the European Union, United Nations, World Bank, IMF, and OECD.	NCA can make visible the effectiveness of government expenditures in nature conservation and help track improvement in biodiversity. The accounts on ecosystem extent & condition are particularly useful as well as the monetary ecosystem service accounts which might be linked to payments for ecosystem service or to quantify financial agreements in blended finance.
Investees	These include companies, governments, non-profits and households that are seeking finance for nature	NCA can help investees make clear to financiers the potential biodiversity impacts of their investment projects. To do so, investees will need to link their investment projects to SEEA data on ecosystem condition and ecosystem services. Ecological modelling is then needed to simulate the impacts of investment. Crucially, the ecosystem service accounts can make clear which stakeholder will benefit from restoration (or reductions in pressures on nature).
Depository Institutions	Deposit-taking institutions that accept and manage deposits and make loans, including banks, building societies, credit unions, trust companies, and mortgage loan companies	NCA could help depository institutions assess the biodiversity risks of the deposits under management or to assess their impacts on nature. An example of this type of SEEA analysis is shown in Box 3 where land and carbon footprint are linked to reductions in biodiversity.
Contractual Institutions	These include insurance companies and pension funds	Combining NCA with ecosystem and climate modelling would help insurers better understand nature-related risks. Reductions in ecosystem services will often equate to economic damages that may be insured. Pension funds will also be interested in nature-related risks but also an assessment of the biodiversity impacts of their funds (see depository institutions).
Investment Institutions	Investment banks, underwriters, and other financial entities managing investments.	See depository institutions.

FINANCIAL INSTITUTIONS	DESCRIPTION OF INSTITUTIONS	POTENTIAL USES OF NCA
Impact Institutions	These could be NGOs or philanthropic organizations that want to have an impact on biodiversity by financing green.	These are usually impact investors which strive to “finance green”. These investors will be particularly interested in ecosystem condition accounts and overall biodiversity indicators that summarize the ecosystem health in a single index.
Supervisory Institutions	Central banks which have a supervisory role related to the stability of the financial system.	As part of their supervisory duties, central banks have been using NCA as part of the risk assessment of nature loss (see Box C).
Framework/ Standard Setters	ESG frameworks are defined by special, usually non-profit, institutions. ESG standards are usually set by governments and international institutes with legal authority.	Standard setters would stand to benefit from more coherent measures of biodiversity impacts and risks. This makes it easier to communicate the frameworks to prospective users.
Data Providers	There are many data providers, such as Bloomberg, which offer ESG data for investors.	NCA consolidation implies data on fewer indicators will lead to more clarity and perhaps also lead to quality improvements because resources are used on fewer data points.
Reporting/ Accounting /Auditing Institutions	Companies are increasingly reporting their ESG impacts. They are generating their reports with help from consultancies and accounting firms. Increasingly, these reports are being audited to verify the quality of ESG statements.	NCA consolidation will be particularly helpful to streamline the many different frameworks that currently require in-house expertise across several different guidelines.
Multilateral Development Banks	These institutions offer varieties of development financing, including blended finance solutions for private-public partnerships.	MDBs often provide development finance for poverty reduction or other economic or social goals. NCA could help verify the nature impacts of these projects. MDBs can also stimulate the production and use of national and international databases.

EXAMPLES AND POTENTIAL USE CASES

Boxes A through C illustrate how SEEA is currently being used or may be applied in the future.

BOXA: BLUE CARBON BONDS IN AUSTRALIA

Australia has multiple examples of projects where the SEEA plays a crucial role. A [project](#) announced in 2021 by HSBC and The Nature Conservancy Australia (TNC Australia) aims to accelerate the issuance of blue impact bonds and other assets that can be used to fight climate change and improve livelihoods in coastal regions. The project, Blue Impact Bonds for Nature, will be funded by a US\$800,000 grant from HSBC. TNC Australia will use the grant to identify nature-based restoration activities to improve livelihoods, biodiversity and climate change mitigation outcomes on the mid-north New South Wales coast. The Australian-first project also builds on previous [Mapping Ocean Wealth Australia](#) research funded by HSBC and supported by TNC Australia. This ocean wealth project was based on the SEEA-EA and quantified both the economic contribution of marine ecosystems and the role blue carbon plays in protecting the environment.

The Australian government has also established the Blue Carbon Conservation, Restoration and Accounting [Program](#) which is meant to help pave the way for scaling up investment in coastal blue carbon ecosystems, supporting management decisions, and contributing to global goals for climate and the environment. The government has allocated a total of \$30.6 million Australian Dollars to be invested from 2021 to 2025 for implementing on the ground blue carbon restoration and conservation activities in Australia and overseas. Project-level SEEA accounts will demonstrate how restoration and conservation activities lead to climate, biodiversity and livelihood outcomes, and enhance collaborations and knowledge exchange in Australia and across the region.

The SEEA will also be used to assess the Blue Carbon Ecosystem Restoration Grants (for projects within Australia) and the Blue Carbon Accelerator Fund (for projects outside Australia).

BOX B: SUPPLY CHAINS OR “SCOPE 3” IMPACTS

Many investors do not want to only know about direct impacts of an investment. They are also interested in supply chain impacts. Companies are increasingly held responsible for the negative impacts of their supply chains, sometimes referred to as “Scope 3 impacts”. This term comes from the Carbon Disclosure Project (CDP) which is the dominant methodology for reporting on climate change impacts. According to [CDP](#), “Over 680 investors with over US\$130 trillion in assets requested companies disclose through CDP on climate change, water security and forests.”

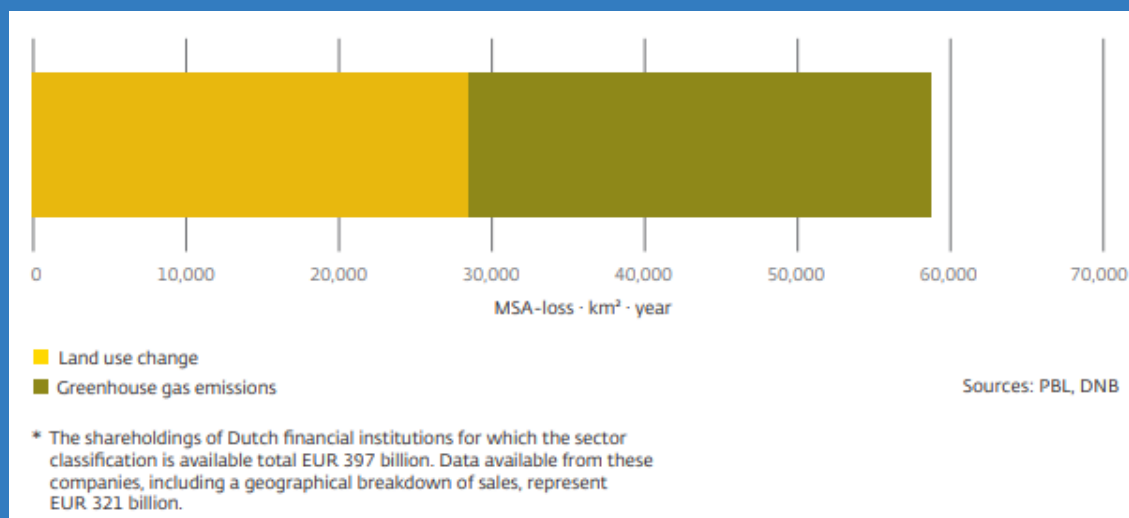
The CDP framework distinguishes 17 types of GHG emissions. Some of the “Scope 3” emissions have to do with upstream supply chain emissions such as the carbon embodied in “purchased goods and services”, “capital goods” or “transportation and distribution”. For these categories, SEEA data is instrumental, although this is not well known because the dataflow is opaque:

1. SEEA data on carbon dioxide emissions (from Eurostat, OECD etc) are used in global databases such as EXIOBASE, WIOD, EORA GTAP, and ICIO which link these data to the global economy. Using input-output modelling, the emissions are linked to supply chains.
2. These databases are used by commercial parties to calculate Scope 3 emissions ([Quantis](#) uses WIOD, PwC’s [Total Impact Measurement & Management](#) (TIMM) uses GTAP and KPMG regularly uses EXIOBASE) or to provide specialized commercial tools (e.g. [Vitalmetrics’ Carbon 360](#) tool uses its own SEEA-based database).
3. Businesses hire these commercial parties to help them report on their carbon impacts. (e.g. [Novartis](#) and many other companies).

Biodiversity footprints are currently less prevalent than carbon footprints. However, scientists²⁴ and policy institutes²⁵ have been developing methods to create “biodiversity footprints” based on SEEA data. These methods are currently being tested in finance tools (e.g. [Biodiversity Footprint Financial Institutions](#) (BFFI)²⁶). In addition, ASN Bank used a SEEA method to calculate the biodiversity footprint of its [portfolio](#).²⁷

BOX C. CENTRAL BANKS AND BIODIVERSITY RISKS

Some central banks now consider environmental risks part of their supervisory role. The rationale being if banks have large exposure in sectors that are vulnerable to global warming or nature deterioration, these risks translate into liabilities which could destabilize the financial system. This development was led by the [Dutch Central Bank](#)²⁸ which first started reporting on nature-related risks. The figure below is taken from this study, done in collaboration with the PBL environmental assessment agency. The calculations show the loss of mean species abundance (MSA- an aggregate measure of biodiversity) caused by land use change and greenhouse gas emissions. The calculations are done using SEEA-based land use and carbon footprint calculations (see Box B) which are then combined with MSA data. The Network for Greening the Financial Sector (NGFS), a network of banks from 70 countries, has also [supported](#) this approach. The Coalition of Finance Ministers for Climate Action has also recently come out with a statement stressing the importance of nature-related risks.



ACTION PLAN

This paper has argued that NCA, based on the SEEA global standard, could play a role in accelerating finance for nature. While NCA is not a panacea, it can contribute to overcoming five crucial barriers to biodiversity finance. To maximize the positive impact of NCA, an action plan is needed.

1. ASSESS DATA NEEDS

This paper did not provide a comprehensive assessment of the information needs of finance for nature. To generate a full assessment, it will be necessary to look at all financial actors and instruments involved in biodiversity finance and how NCA could be used. Table 2 provides a first inventory of relevant financial institutions and instruments. When doing the needs assessment, it is important to consider some unique aspects related to finance.

- Ecosystem health and drivers of biodiversity loss. There is no scientific consensus on ecosystem health and while the SEEA provides guidance, it does not advocate a single summary measure. There is far more convergence on the most important drivers of biodiversity loss, which are often also easier to measure. In completing this

needs assessment, pragmatic choices will have to be made about the adequacy of the indicators, as well as the ability to measure them effectively within the context of a specific financial decision.

- Current state of biodiversity finance. The OECD has provided an overview of the current state of biodiversity finance (see Table 1). The categories which exceed US\$1 billion signal areas in which finance for nature is already sizeable and may be accelerated. For example, large public expenditures may also indicate opportunities for blended finance.
- ESG and climate finance. When exploring potential areas to accelerate finance for nature, it is useful to refer to ESG and climate finance because biodiversity often trails these areas. By identifying key players and networks, perhaps using the SEEA, new opportunities may be identified.

2. CONTINUE THE ALIGNMENT PROCESS

The measurement of biodiversity and ecosystem services is likely to develop rapidly. Several major initiatives have deadlines in the not-too-distant future:

- Post-2020 Global Biodiversity

Framework (December 2022) – Launch of the post-2020 GBF will be decided at COP15 in Montreal.

- Global Reporting Initiative (Q2 of 2023) – GRI will update its disclosures for biodiversity (originally from 2016).
- Taskforce on Nature-related Financial Disclosures (September 2023) – The TNFD will finalize its report in the summer of 2023. This is likely to have a large influence on the world of finance like its predecessor, the Taskforce on Carbon-related Financial Disclosures (TCFD).
- Corporate Social Responsibility Directive (2024) – 2024 will be the first accounting year for which 50,000 European companies will be legally obligated to report their ESG impacts according to the CSRD standard.

The SEEA EA is already being discussed in the context of the post-2020 GBF process, GRI update and TNFD. Once the CSRD starts to discuss specific indicators for natural capital, the SEEA is likely to play an important role as well. It would be a valuable step for biodiversity finance if these discussions, and the many other convergence processes, lead to more coherent biodiversity impact and risk metrics.

3. ENHANCE DATA AVAILABILITY AND ACCESSIBILITY

There are currently quite a few national statistical offices developing SEEA accounts. There are also databases such as ARIES and INVEST that are providing global NCA data, although they generally provide less detailed information than national NCA initiatives. There are also other global databases such as EXIOBASE, EORA, WIOD and GTAP that are providing SEEA-based calculations for the environmental impacts of supply chains. For some investments, the small scale of biodiversity investments means that the current data availability will need further improvement in both resolution and the ability to be linked to the relevant socio-economic variables. Timeliness and data continuity must also be considered.

The use of these databases is set to increase as the post-2020 GBF, GRI, TNFD, CSRD and other initiatives raise the profile of biodiversity impacts and risks. However, a major obstacle is the data's ease of use. The databases mentioned above often include complex GIS information and require considerable expertise and specialized software to link it to the relevant company data. Biodiversity impacts are probably some of the most difficult ESG categories to calculate and so the users need support to improve the ease of use.

There are two areas which warrant additional attention in terms of data availability:

- The data situation in low- and medium-income countries is a cause for concern. These are areas with many vulnerable ecosystems but with generally less high-quality data. Databases such as ARIES and INVEST offer a good starting point for these countries to create their own SEEA accounts. However, international organizations and academia should continue their efforts to stimulate NCA in these areas.
- The SEEA is a framework with the potential to measure perverse incentives such as expenditures and subsidies with a negative impact on biodiversity. The current SEEA does not have guidelines for these figures, although some experimental accounts have been proposed²⁹. These should be developed further to quantify the size of these perverse incentives. The SEEA data could also be used to quantify the trade-offs of biodiversity-impacts versus the socio-economic effects of these expenditures and subsidies.

4. INCLUDE NCA IN FINANCE EDUCATION

Universities that offer corporate finance courses increasingly include ESG investing in their curricula. The availability of masters-level courses, online tutorials and executive programs has expanded rapidly. Handbooks³⁰ on sustainable finance have been published to assist in teaching. These courses are playing an important role in enhancing ESG-knowledge to current and future generations of financial professionals. These courses would benefit from materials on the SEEA in order to educate students on the applications of NCA in finance for nature and climate change. E-learning materials such as the UNSD's [SEEA for Policy Makers](#) could be used to develop a SEEA for Finance module.

5. STRENGTHEN THE COALITION FOR FINANCE FOR NATURE

Currently, biodiversity finance is dominated by public expenditures. A broader coalition is needed in order to fill the financing gap. In practice, there are many financial institutions that could play a role. One of the most important advantages of the SEEA EA would be the provision of

a common language for these actors to communicate, with global terminology and expanding SEEA data. This would help to strengthen the collaboration of financial actors in this field and to explore solutions such as “blended finance”, which requires collaboration between various institutions.

All participants of the “6th Policy Forum on Natural Capital Data for Better Decision Making: Financing for Nature” or other readers of this paper are invited to think about how they can accelerate finance for nature. We encourage financial institutions to think about how NCA could help create more (blended) finance solutions. For data providers, it is imperative to consider

user needs, such as the scale, timeliness, robustness, and user-interface. Governments have the opportunity to use NCA to help broaden cooperation with businesses and assist with the collection of relevant data. International organizations are in the position to advance global databases and support capacity building in medium and low-income countries with vulnerable ecosystems.

We are currently in an experimental phase, searching for pathways to accelerate finance for nature and exploring ways in which NCA might help. This acceleration will only succeed if all actors are willing to take part in these experiments and move this agenda forward.

REFERENCES

- (1) WEF. Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy; World Economic Forum, 2020.
- (2) WWF. Living Planet Report 2022 – Building a Naturepositive Society.; World Wildlife Fund: Gland, Switzerland, 2022.
- (3) IPBES. The Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science- Policy Platform on Biodiversity and Ecosystem Services; 2019.
- (4) World Bank. Mobilizing Private Finance for Nature; World Bank Group, 2020.
- (5) Bloomberg. ESG Assets Rising to \$50 Trillion Will Reshape \$140.5 Trillion of Global AUM by 2025, Finds Bloomberg Intelligence. July 21, 2021.
- (6) CPI. Updated View on the Global Landscape of Climate Finance 2019. Climate Policy Initiative. December 18, 2020.
- (7) OECD. A Comprehensive Overview of Global Biodiversity Finance; Organisation for Economic Cooperation and Development, 2020.
- (8) OECD. Towards Sustainable Land Use: Aligning Biodiversity, Climate and Food Policies; OECD publishing: Paris, 2020.
- (9) KPMG. The Time Has Come: The KPMG Survey of Sustainability Reporting 2020; 2020.
- (10) GRI. GRI 304: BIODIVERSITY; Global Reporting Initiative, 2016.
- (11) CBD. BUSINESS REPORTING ON BIODIVERSITY; Convention on Biological Diversity, 2016.
- (12) TNFD. The TNFD Nature-Related Risk and Opportunity Management and Disclosure Framework. Beta v0.2; 2022.
- (13) CBD. FIRST DRAFT OF THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK; Convention on Biological Diversity, 2021.
- (14) UN; EC; FAO; IMF; OECD; World Bank. System of Environmental-Economic Accounting 2012- Central Framework; United Nations, European Commission, Food and Agriculture Organization of the United Nations, International Monetary Fund, Organisation for Economic Co-operation and Development and the World Bank: New York, 2014.
- (15) UN et al. System of Environmental-Economic Accounting— Ecosystem Accounting (SEEA EA). White Cover Publication, Pre-Edited Text Subject to Official Editing.; 2021.
- (16) Hoekstra, R. How Natural Capital Accounting Contributes to Integrated Policies for Sustainability; UN Statistical Division, 2020.

- (17) Department of Commerce. NATIONAL STRATEGY TO DEVELOP STATISTICS FOR ENVIRONMENTAL ECONOMIC DECISIONS A U.S. System of Natural Capital Accounting and Associated Environmental-Economic Statistics; Office of Science and Technology Policy, Office of Management and Budget, Department of Commerce, 2022.
- (18) Dasgupta, P. The Economics of Biodiversity: The Dasgupta Review; HM Treasury: London, 2021.
- (19) IUCN. IUCN Global Ecosystem Typology 2.0; 2020.
- (20) IDEEA Group. Making Every Hectare Count: Environmental-Economic Accounting for Forico's Surrey Hills Estate, Tasmania; 2018.
- (21) Eurostat. Accounting for Ecosystems and Their Services in the European Union (INCA) – 2021 Edition; 2021.
- (22) Natural Capital Coalition. Data Use in Natural Capital Assessments. Assessing Challenges and Identifying Solutions; 2019.
- (23) TNFD. A Landscape Assessment of Nature-Related Data and Analytics Availability. Discussion Paper; 2022.
- (24) Lenzen, M.; Moran, D.; Kanemoto, K.; Foran, B.; Lobefaro, L.; Geschke, A. International Trade Drives Biodiversity Threats in Developing Nations. *Nature* 2012, 486 (7401), 109–112. <https://doi.org/10.1038/nature11145>.
- (25) IEEP. Biodiversity Footprints in Policy- and Decisionmaking: Briefing on the State of Play, Needs and Opportunities, and Future Directions; 2021.
- (26) NEA. Biodiversity Footprint for Financial Institutions: Exploring Biodiversity Assessment; 2021.
- (27) ASN bank. ASN Bank Biodiversity Footprint: Biodiversity Footprint for Financial Institutions Impact Assessment 2016 – 2020; 2022.
- (28) DNB/PBL. Indebted to Nature: Exploring Biodiversity Risks for the Dutch Financial Sector; 2020.
- (29) Eurostat. Potentially Environmentally Damaging Subsidies; 2022.
- (30) Schoenmaker, D.; Schramade, W. Principles of Sustainable Finance; Oxford University Press, 2021.

