WWF

GUIDEBOOK

FR

2019

NATURAL CAPITAL AND ORGANIZATIONS STRATEGIES: AN OVERVIEW OF AVAILABLE TOOLS

WWF

WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global Network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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TOOLS TO HELP REVERSE THE DECLINE OF NATURAL CAPITAL

NATURAL CAPITAL, AT THE CROSSROADS BETWEEN ECOLOGY AND ECONOMY

The concept of natural capital introduced by David Pearce (1988) is a metaphor illustrating the role of nature in the economic system: production in the economy should be considered as a function of physical capital, human capital, and natural capital. This concept is similar to the 18th century economic vision that included (physical) capital, labour, and land.

Natural capital is commonly defined as a stock of resources, both biotic (i.e. communities of living organisms such as plants, animals and micro-organisms) and abiotic (the non-living environment), some of which are renewable and others which are not (fossil fuels, minerals and ores). In the field of life sciences, natural capital is close to the concepts of ecosystems and biodiversity.

An ecosystem is defined by the Convention on Biological Diversity (CBD) as a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit (United Nations, 1992). Biodiversity is defined as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (United Nations, 1992). Natural capital should therefore be conceived as a set of dynamic systems, and its maintenance can only be achieved by preserving functioning ecosystems.

Natural capital resources are the origin of many services that humans benefit from, called ecosystem services. The CICES (*Common International Classification of Ecosystem Services*) refers to three types of ecosystem services (Haines-Young and Potschin, 2018):

- Supply services, which include all nutritional, material and energy production from living systems as well as abiotic production (e.g. food, fresh water, raw materials, medicinal resources);

- Regulatory services, which include all the means by which living organisms can regulate or moderate the ambient environment affecting human health, safety or comfort, as well as abiotic equivalents (e.g. carbon sequestration and storage, wastewater treatment, protection from natural disasters, pollination);

- Cultural services, which include the whole of the immaterial - and normally non-rival and non-destructive - production of ecosystems (biotic and abiotic) affecting the mental and physical state of human beings (e.g. tourism, sports activities, sense of belonging, aesthetic inspirations in culture and art, spiritual experiences).

A founding idea of natural capital considers that ecosystems, through the goods and services that humans derive from them, are at the heart of human well-being and value creation in our economies. Some support the functioning of the biosphere as a whole, and contribute to the maintenance of the Earth's habitability for humankind. In other words, human well-being, human activities, and the economic system organising the production, trade and consumption of goods and services fundamentally depend on ecosystem services, and so on the functioning of ecosystems.

Through the concept of natural capital, we can thus understand that ecosystems and biodiversity, through their role in the creation of value in the economy, represent strategic elements for both private and public organisations, and should be integrated into their decision-making processes.

HELPING DECISION-MAKERS TO TAKE ENVIRONMENTAL ISSUES INTO ACCOUNT

In the current context of biodiversity erosion and exponential ecosystem decline, it has become essential to provide public and private decision-makers with tools to measure, assess, manage and report on organisations' interactions with natural systems.

The 2005 Millennium Ecosystem Assessment report established that over the past 50 years, human populations had altered ecosystems faster and more profoundly than ever before (MEA, 2005). According to the latest IPBES report (2019), three-quarters of the terrestrial environment and two-thirds of the marine environment have been significantly altered by human action. The report also estimates that about one million animal and plant species are now threatened with extinction, particularly in coming decades. The extinction rate is already at least ten times higher than the natural rate, and is constantly increasing.

In view of this, the Economics for Nature (E4N) programme was built, led by the Green Economy Coalition and its partners, Finance Watch, the Green Growth Knowledge Platform, the Natural Capital Coalition and WWF France. The overarching aim of the project is to support development, economic and spatial planning processes to internalise the many values of nature. The programme is bringing together the communities working on natural capital with those working on green economy. The aim is not only to create a better understanding of how the two approaches interact, but to build intellectual and institutional ownership and create an open space for challenge and improvement of natural capital and green economy strategies: engaging policymakers, practitioners and civil society representing a broad spectrum of views.

In this context WWF France, through knowledge management, demonstration cases, narrative building, advocacy and influence, seeks to ensure that public policymakers, businesses and finance institutions in France and worldwide include natural capital in their functioning.

This guidebook provides WWF networks, their partners and all economic actors in general with information on tools dedicated to natural capital. These tools are designed to support decision-making on environmental issues, and are divided into six categories according to their main technical features: biodiversity footprint tools, mapping tools, qualitative and quantitative tools, monetary tools, "absolute" ecological performance tools, and integrated accounting tools.

The analysis of these tools was based on their technical documentation, and on various compilation publications (referenced in the bibliography). The works lead by the Natural Capital Coalition are among these. In particular, the Natural Capital Protocol and the Natural Capital Toolkit were of great help, as they propose a framework for the integration of natural capital into business strategies and a toolbox listing more than 50 natural capital tools, including some of those described in this guide.

This selection of tools is not intended to be exhaustive, but provides a broad, representative and up-to-date overview of the tools available to economic actors. Tools should meet a number of criteria: a strategic approach, an ecosystem-based approach (not limited to one environmental theme), a multisector approach, and a certain degree of formalisation.

The following table provides an overview of most of the tools presented, classified according to their main functionalities and their scope of application.

TOOLS	FEATURES: Measure of pressure / measure of impact	Mapping of ecosystems and/or ecosystem services	Qualitative assessment of ecosystems and/or ecosystem services	Biophysical assessment of ecosystems and/or ecosystem services	Economic assessment	Determination of ecological limits	SCOPE OF APPLICATION
PBF	✓						Product
BFFI	✓						Investment portfolios
GBS	✓					✓	Value chain
BIM	✓						
BFC	✓						
Bioscope	✓						
OPA	✓			✓		✓	
Future Fit Business	✓					✓	
SBTN	✓			✓		✓	
<IR>					✓		
EP&L	✓				✓		

✓ Available feature

✓ Planned feature / under development

TOOLS	FEATURES: Measure of pressure / measure of impact	Mapping of ecosystems and/or ecosystem services	Qualitative assessment of ecosystems and/or ecosystem services	Biophysical assessment of ecosystems and/or ecosystem services	Economic assessment	Determination of ecological limits	SCOPE OF APPLICATION
BBII	✓		✓				Value chain
TESSA			✓	✓			Company site / landscape
CEV				✓	✓		
GVces					✓		
CARE-TDL	✓			✓	✓	✓	
IBAT		✓					
ARIES	✓	✓		✓	✓		
InVEST	✓	✓		✓	✓		Territory / gobal scale
Co$ting Nature	✓	✓		✓			
ENCA				✓	✓	✓	
SEEA				✓	✓		

✓ Available feature

✓ Planned feature / under development

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BIODIVERSITY FOOTPRINT TOOLS

The biodiversity footprint tools help assess the impact generated by an economic activity on biodiversity, for purposes of reporting and/or strategic management. The specificity of these recent tools (some of which are currently under development), is to represent the impact of several types of pressures on an extended scope (product, value chain, share portfolio) through a common unit, generally linked to a unit of area.

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PRODUCT BIODIVERSITY FOOTPRINT (PBF)

DEVELOPERS

I Care & Consult, Sayari

PARTNERS

Ministry in charge of ecology, ADEME, Kering, Avril, L'Oréal

STATUS REPORT

First evaluations conducted in 2017, results published in early 2018. Second test phase conducted in 2018 - 2019.

METHOD USED

The PBF is an eco-design tool for companies aimed at improving the "biodiversity performance" of their products, through the identification and improvement of the most sensitive aspects of their life cycle, and the comparison of different variants.

The PBF is integrated into the ecosystem of LCA (Life-cycle assessment) tools (databases, assessment tools), incorporating biodiversity knowledge into the overall analytical framework. The method covers the 5 pressures on biodiversity identified in the Millennium Ecosystem Assessment (MEA), through the integration of scientific publications associated with each pressure and general databases available.

The comparison between the reference scenario and the variant(s) is based on an indicator reflecting the potential loss of species: the PDF*yr or "potential disappeared fraction of species within a year".

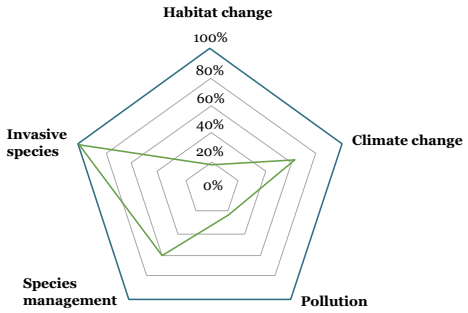
To carry out these measures, the PBF is organised into 3 modules: with the first module, one can carry out the life-cycle assessment with a spatial differentiation of the main assessed impacts, helping the user to visualise the most sensitive aspects (hotspots). The second module integrates data on actual practices and local contexts based on information collected by the user, leading to visualising and quantifying the benefits of different practices and locations, and comparing different scenarios for a given product. The third module provides a qualitative assessment and integrates the "invasive species" and "overexploitation" aspects, which are not taken into account in the LCAs.

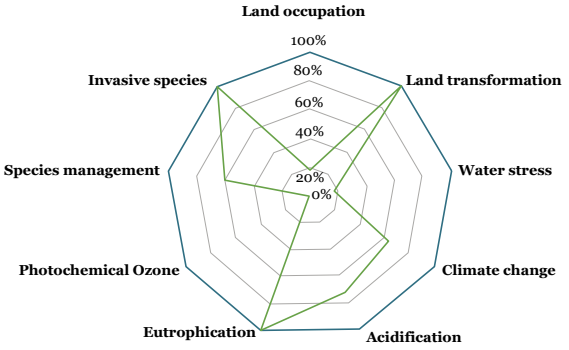
The results are presented on several levels: the first level shows a relative comparison of the biodiversity impact as per the 5 pressures of the Millennium Ecosystem Assessment (MEA, 2005) (with a value of 100% for the reference scenario), and the second level provides details for each pressure through a relative comparison and an absolute quantification, as illustrated in the figure below.

***Lammerant et Müller,** 2018*

Legend

Reference
Variant





PRODUCT BIODIVERSITY FOOTPRINT (PBF)

THE PBF CAN BE USED TO

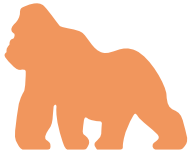
- Assess the impact on biodiversity of a product or service created from a production process
- Assist in decision-making: choice of material supply, change in the production practices, eco-design
- Communicate on the product, using convincing and scientifically based arguments to promote the benefits of the product on biodiversity

MORE INFORMATION

http://www.productbiodiversity footprint.com/

Lammerant et Müller, 2018. Assessment of biodiversity accounting approaches for businesses, Discussion paper for EU Business @ Biodiversity Platform – Draft Report 5th Sept. 2018.

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Integrates a complete product approach, incorporating its entire life cycle
- Provides the opportunity of revealing the impact of positive actions on biodiversity throughout the product's life cycle
- Can combine secondary data with primary data, reducing the need for the company to collect data and enabling comparison with an "average" product
- Takes into account all types of pressures on biodiversity

WEAKNESSES

- Has still to be tested and developed in many sectors (energy, mining, transport infrastructure in particular)
- Does not currently include cause-and-effect trajectories, for example with regard to ecotoxicity related to pollution, vulnerability, and so on
- Its interface could be improved to ease the geographical visualisation of impacts

BIODIVERSITY FOOTPRINT FOR FINANCIAL INSTITUTIONS (BFFI)

DEVELOPER

ASN Bank

PARTNERS

CREM and PRé Consultants

STATUS REPORT

First experiments conducted in 2016. Second version of the tool developed in 2017.

METHOD USED

The BFFI was designed to provide an overall assessment of the biodiversity footprint of the economic activities in which a financial institution is investing.

The quantitative method is based on three steps:

1) The first step aims at producing an overview of the economic activities in which the institution is investing. This step involves defining the activities of the companies in question (What does each company produce? Where does production take place?), defining the scope of the evaluation (supply chains, transport, etc.), and selecting the investments that will be included in the evaluation.

2) The second step aims at measuring the ecological pressure of the investments in question, by mobilising environmental data from the Exiobase input-output database. Exiobase helps to estimate numerous pressures generated by economic activities (water consumption and scarcity, GHG emissions, terrestrial ecotoxicity and acidification, land use and transformation, marine ecotoxicity, eutrophication and aquatic ecotoxicity), globally, by country and by economic sector.

3) The third step leads to calculating the ecological footprint of investments, using the ReCiPe method, which provides scientifically determined dose-response (pressure-impact) relationships (e.g. the effect of a 1° rise in temperatures on biodiversity). The unit used to express the impact on biodiversity is the PDF.ha.yr for “Potentially Disappeared Fraction of species per hectare/cubic metre per year”, and it is used to determine the biodiversity footprint in sqm per Euro invested for each investment category, and the total footprint in sqm for all investments.

Finally, a qualitative analysis is used to help read and use the results and use the footprint: limits of the evaluation, potential influence of the results on investment decisions and so on.

BIODIVERSITY FOOTPRINT FOR FINANCIAL INSTITUTIONS (BFFI)

THE BFFI CAN BE USED TO

- Calculate the biodiversity footprint of a portfolio of financial assets (limited to companies or economic sectors)
- Identify the main "hotspots" (the richest and most sensitive areas in terms of biodiversity) in a portfolio, and develop a strategy for zero net biodiversity loss
- Develop investment criteria for the financial sector

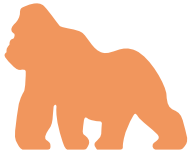
MORE INFORMATION

https://www.asnbank.nl/over-asn-bank/duurzaamheid/biodiversiteit/biodiversity-in-2030.html/

Berger et al., 2018. Common ground in biodiversity Footprint methodologies for the financial sector, Paris, 3rd October, 2018.

Lammerant et Müller, 2018. Assessment of biodiversity accounting approaches for businesses, Discussion paper for EU Business @ Biodiversity Platform – Draft Report 5th Sept. 2018.

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Covers a significant part of the causes of biodiversity loss (including pollution)
- Involves databases that are free to use
- Identifies the most sensitive areas from the point of view of biodiversity (hotspots)
- Can integrate specific data into the tool when available
- Provides an optimised interpretation of results through qualitative analysis

—

WEAKNESSES

- Mainly uses sector data (Exiobase input/output matrix)
- Does not include all the pressures on biodiversity (invasive species, overexploitation)
- Impacts on biodiversity are assessed on the basis of model data
- The impacts relating to land use are biased in favour of temperate regions (impacts in tropical areas are not as precise)

GLOBAL BIODIVERSITY SCORE (GBS)★

DEVELOPER

CDC Biodiversité

PARTNERS

'Businesses for Positive Biodiversity' Club (Club B4B+), comprised of over thirty members (companies and other stakeholders)

STATUS REPORT

First experiments conducted in 2018. Operational version of the tool available at the beginning of 2020.

METHOD USED

The GBS aims at quantifying all the impacts of a company - across its value chain - or an investment portfolio on biodiversity, through the use of a common unit (the MSA or "mean species abundance").

Measuring a company's biodiversity footprint via the GBS is a two-step process.

1) The first step consists in linking the company's activity to the pressures affecting biodiversity, with two possible approaches: life cycle assessment (LCA) results when available, or input-output matrix models (notably the Exiobase tool).

2) The second step consists in analysing the impact of these pressures on biodiversity and leads to quantifying this impact in MSA. The second step is carried out using the GLOBIO model, a model based on pressure-impact relationships, and spatialised on a global scale with a resolution of 50km x 50km. The pressures considered for terrestrial biodiversity are land use, fragmentation of natural areas, nitrogenous air deposition, infrastructure, trespassing on natural areas and climate change. The evolution of these pressures is modelled by the IMAGE model, and the assessment of impacts on biodiversity is carried out through a meta-analysis of about 300 scientific reference documents: each article, the results of which are translated into MSA, provides one or more points in the pressure-impact space specific to a biome and a given pressure.

Using the GBS in combination with an ecological limit specific to biodiversity is currently under consideration. The planetary "biodiversity" boundary (Steffen and al. 2015), converted into MSA units, would enable users not only to assess their biodiversity footprint, but also to set biodiversity conservation targets in line with scientific knowledge ("biodiversity budgets", similar to the carbon budgets defined under the method of the Science Based Targets initiative) and aimed at strong sustainability.

★ Cf p. 64-65

GLOBAL BIODIVERSITY SCORE (GBS)★

THE GBS CAN BE USED TO

- Assess a company's biodiversity footprint on its value chain for strategic management and/or reporting purposes
- Assess the biodiversity footprint of a financial portfolio
- Assess the biodiversity footprint of a territory

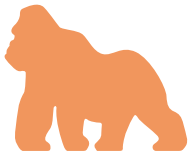
MORE INFORMATION

CDC Biodiversité, 2017. Global Biodiversity Score: measuring a company's biodiversity footprint. Biodiv' 2050 Outlook n°11, November 2017.

CDC Biodiversité, 2019. Global Biodiversity Score: a tool to establish and measure corporate and financial commitments for biodiversity - 2018 technical update. Biodiv' 2050 Outlook n°14, March 2019.

http://www.mission-economie-biodiversite.com/english/

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Covers the impacts caused by a company on a large part of its value chain (in particular on the consumption of raw materials, which is often a very significant segment)
- Integrates several types of pressures on biodiversity
- Offers a "default" approach - mobilising secondary data regarding the pressures entailed - which can be enriched by primary data when available

—

WEAKNESSES

- Is based on a model with pressure-impact relationships based on limited and fragmented scientific data (under-representation of some taxa and ecosystems)
- Does not take into account certain pressures on biodiversity (chemical pollution, overexploitation of resources, invasive species)
- Does not include impacts on marine biodiversity
- The default approach (using secondary data) leads to a relatively imprecise estimate of the biodiversity footprint

★ Cf p. 62-63

BIODIVERSITY IMPACT METRIC (BIM)

DEVELOPER

Cambridge Institute for Sustainability Leadership (CISL)

PARTNERS

Members of the Natural Capital Impact Group (Kering, ASDA, Mondi, Volac, Mars, The Crown Estate, Anglian Water, Yorkshire water, Primark), The Biodiversity Consultancy, UNEP WCMC, academics

STATUS REPORT

Beta version of the method launched in 2018.

METHOD USED

The BIM aims at measuring the impact on biodiversity of the production of raw materials, or land use, for the supply chains of global companies.

The measure of the footprint combines information on the areas required to produce each raw material with a series of coefficients to quantify the impact on biodiversity. More specifically, it helps to describe the impact of a company by weighting the land areas necessary for its production by, on the one hand, the proportion of biodiversity lost through the production process (quantity) and, on the other hand, by the relative importance of this biodiversity loss (quality). Determining these impact coefficients is based on the best available global data sources measuring the state of biodiversity stocks and the relative importance of these stocks in a given region.

The basic structure of the metrics is as follows:
Biodiversity impact = land area x quantity impacted x quality impacted
With:

- **Surface of land:** Area (Ha) of land required to produce raw materials. Is assessed with data regarding the quantity of materials, the location of their supply, and data on yields in the countries in question.
- **Quantity:** Proportion of biodiversity loss through the production of raw materials. Assessed in MSAs by land use type.
- **Quality:** Relative overall importance of lost biodiversity. Assessed from data regarding scarcity levels and raw material production, by ecoregion in each country concerned (e.g. IUCN Red List).

The BIM is particularly suitable for companies marketing products or services directly derived from raw materials, with global supply chains.

It helps in the decision-making process of the company by providing an assessment of biodiversity impacts in terms of its raw material supply, and by indicating where and how the company can reduce its impact. The method provides a basis for comparing different options in raw material supply, thus helping the company to compare different investment options.

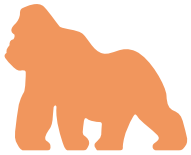
The raw materials in question are, for instance, cotton, rice, coffee, livestock, soya, palm oil and other agricultural raw materials. The sectors which are particularly concerned are the agricultural and agri-food industries, the cosmetics and pharmaceuticals industries, the forestry and forest products industries, as well as other sectors sourcing agricultural raw materials.

BIODIVERSITY IMPACT METRIC (BIM)

THE BIM CAN BE USED TO

- Establish the potential global impact of raw material supply
- Geographically identify the sources of the strongest potential impacts in terms of raw material supply chain
- Compare the potential impacts of different companies sourcing the same raw materials

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Is relatively easy to use and does not require the user to acquire large amounts of data (is based on model data sets)
- Provides a comparative method highlighting progress made by different industries
- Is complemented by similar impact measurement tools for soil and water. The long-term goal is to assess and monitor the impacts of land use on biodiversity, soil and water in each geographical area concerned through a “Healthy Ecosystem Metric”

—

WEAKNESSES

- Is based on model data and (in certain cases) on secondary data, limiting the reliability of impact assessment
- Focuses on the impacts associated with the production of agricultural raw materials
- Does not provide impact measurement on the entire value chain

MORE INFORMATION

Di Fonzo et Cranston, 2017. Healthy Ecosystem metric framework: Biodiversity impact, University of Cambridge Institute for Sustainability Leadership (CISL), Working Paper 02/2017

Lammerant and Müller, 2018. Assessment of biodiversity accounting approaches for businesses, Discussion paper for EU Business @ Biodiversity Platform – Draft Report 5th Sept. 2018.

BIODIVERSITY FOOTPRINT CALCULATOR (BFC)

DEVELOPER

Plansup

PARTNER

Wageningen Environmental Research (Alterra)

STATUS REPORT

Operational tool, implemented in several companies.

METHOD USED

The complete Biodiversity Footprint Methodology (BFM) calculates the impact of three of the most important pressures on land (land use, GHG emissions, water consumption) and one of the most important pressures on water (nitrogen and phosphorus dispersion) on the entire product life cycle and on the value chain of a company.

The BFC is a limited version of the BFM. Designed as an easy-to-use web tool, it is aimed at all companies wanting to know their main impacts on terrestrial biodiversity, and wanting to test the efficiency of different mitigation measures.

It assesses the impacts assignable to land use and to GHG emissions in three of the most important stages of the life cycle: raw materials, production process and transport.

The BFC uses the dose-response relationships of the GLOBIO model to assess the impact of products. It calculates the biodiversity footprint in multiple scenarios of the same product, prioritises mitigation measures, and determines which ones are the most economically efficient. The results are generated in real time in graphical or tabular format, and can be downloaded.

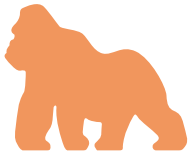
https://www.plansup.nl/biodiversity-footprint-calculator/

BIODIVERSITY FOOTPRINT CALCULATOR (BFC)

THE BFC CAN BE USED TO

- Assess the biodiversity footprint of a product, a company or an economic sector
- Calculate the impact of several scenarios, in order to compare the efficiency of different mitigation measures (implemented or potential)

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Covers several pressures on biodiversity and several life cycle stages
- Offers the possibility to use real company data
- Produces geographically specific results
- Weighting factors can be introduced to differentiate the state of ecosystems according to their protection status, protected species and so on

—

WEAKNESSES

- Does not take into account impacts on marine biodiversity
- Many pressures on biodiversity are not considered (overexploitation of resources, pollution, invasive species and so on)
- Several stages of the value chain are not taken into account (use, end of life and so on)

MORE INFORMATION

Van Rooij and Arets, 2017. Biodiversity footprint of companies - summary report.

https://www.plansup.nl/biodiversity-footprint-calculator/

BIOSCOPE

DEVELOPERS

PRé Sustainability, Arcadis, CODE

PARTNERS

BEE (Biodiversity, Ecosystems and Economy) platform, collaboration between IUCN NL and VNO-NCW funded by the Dutch Ministry of Economic Affairs

STATUS REPORT

Operational tool.

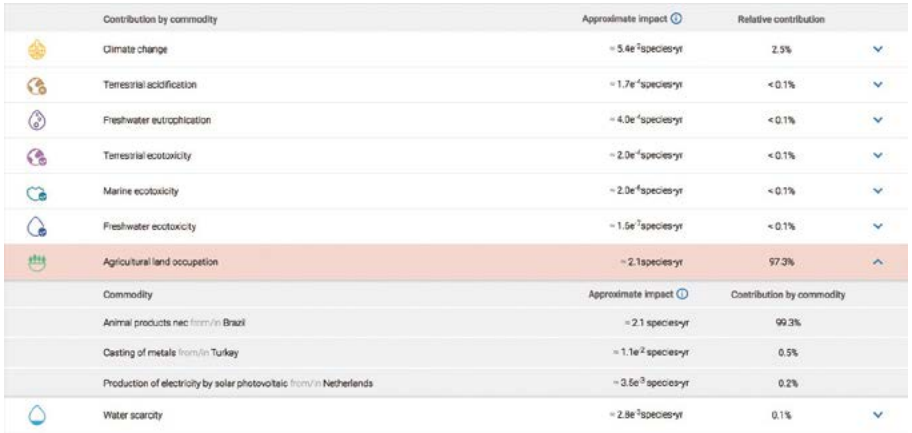
METHOD USED

Bioscope aims at providing companies with a simple, quick assessment of the most significant impacts on biodiversity that occur along their supply chain.

Like the BFFI, Bioscope uses Exiobase and ReCiPe to assess impacts on biodiversity. Exiobase assesses the consequences of numerous pressures on biodiversity caused by the company's activity (climate change, terrestrial ecotoxicity, land use, soil transformation, water consumption, eutrophication and so on). The resulting impacts are assessed using the ReCiPe method and expressed in PDF.m².yr and PDF.m³.yr ("Potentially Disappeared Fraction of species per square/cubic metre per year").

The results of the analysis should help companies identify the actions that could improve the assessment and reduce their impact on biodiversity.

https://www.bioscope.info/

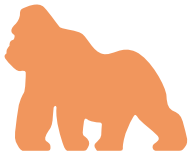


BIOSCOPE

BIOSCOPE CAN BE USED TO

- Determine the raw materials contributing most to the company's biodiversity impact
- Determine the regions in which the impacts on biodiversity are located
- Predict the impact of future purchasing policies on biodiversity

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Covers a wide range of the causes of biodiversity loss (including pollution)
- Involves databases that are free to use
- Identifies the most sensitive areas from the point of view of biodiversity (hotspots)
- Can integrate specific primary data into the tool when they are available

—

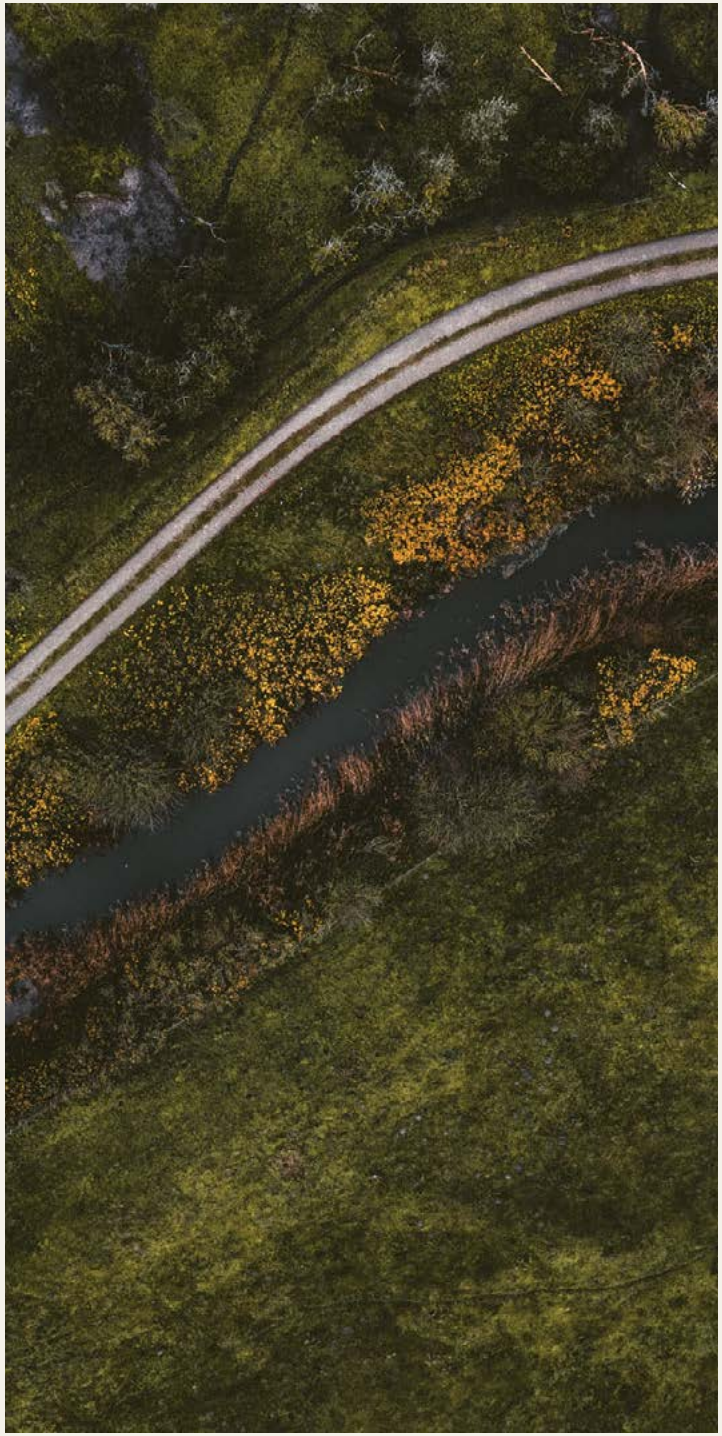
WEAKNESSES

- Mainly uses sector data (Exiobase input/output matrix)
- Does not include all the pressures on biodiversity (invasive species, overexploitation)
- Impacts on biodiversity are assessed on the basis of model data
- The impacts relating to land use are biased in favour of temperate regions (impacts in tropical areas are not as precise)

MORE INFORMATION

Pré Consultants, Arcadis, Platform BEE, 2016. Bioscope Methodology, Platform biodiversity, ecosystems & economy.

https://www.bioscope.info/



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MAPPING TOOLS

Mapping tools show the location and differentiation of ecosystems, and sometimes of ecosystem services and their beneficiaries, at different scales and via spatial modelling software. Some tools also provide a quantification of ecosystem services - biophysical or monetary - and a comparative assessment of the impacts of different management scenarios on ecosystems and ecosystem services.

Integrated Biodiversity Assessment Tool (IBAT) 22

Artificial Intelligence for Ecosystem Services (ARIES) 24

Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) 26

Co$ting Nature 28

INTEGRATED BIODIVERSITY ASSESSMENT TOOL (IBAT)

DEVELOPERS

Birdlife International, Conservation International, IUCN, UNEP-WCMC

STATUS REPORT

Operational tool, used by several dozen companies in different sectors.

METHOD USED

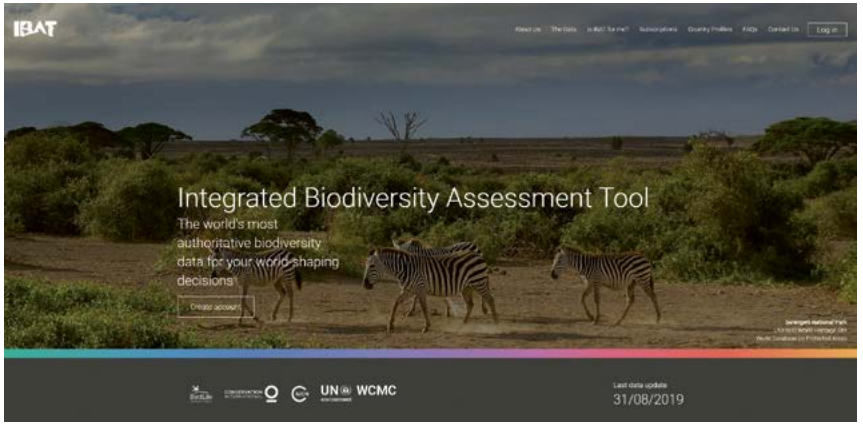
With IBAT one can map areas with ecological challenges within and around a company's area of activity. It is an interactive mapping tool which can be used via a web interface.

The interactive map integrated into the tool helps you to compare the scope of protected areas or areas of high ecological interest with the geographical boundaries of companies' future sites or projects. The tool contains an extensive database compiling information on remarkable biodiversity, threatened species, legally protected areas and priority conservation areas.

Information and guidelines are available online to help the user with the different uses of the tool, depending on the economic sector of the activity under consideration or on the stage of the project life cycle: strategic planning, implementation of action plans for environmental impact management, biodiversity reporting and so on.

The results are presented in the form of spatial or tabular data depending on the user's needs.

IBAT can thus help companies to integrate considerations regarding remarkable biodiversity in the key decisions regarding site and project planning and management, for example by reviewing potential investment projects, by analysing an action in a given region, by developing action plans to manage the impacts on a site's remarkable biodiversity, or by assessing the risks associated with the potential establishment in any given region.



https://www.ibat-alliance.org/

INTEGRATED BIODIVERSITY ASSESSMENT TOOL (IBAT)

IBAT CAN BE USED TO

- Identify protected areas or areas of ecological interest located near company sites
- Identify the risks and opportunities in terms of remarkable biodiversity in a project
- Develop action plans to manage the risks and impacts of sites on remarkable biodiversity
- Report on companies' performance regarding remarkable biodiversity

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Can be adapted to different spatial scales, from a corporate site to a global scale
- Centralises spatial data on remarkable biodiversity on a global scale
- Leads to a fast, efficient production of results
- Can be used by all sectors of activity

WEAKNESSES

—

- Only takes into account remarkable biodiversity
- Only provides information on internationally recognised protected areas and species on the IUCN Red List
- External data cannot be integrated by the user
- Is a paying service: 400 to 20,000 Euros, depending on the company's turnover

MORE INFORMATION

IBAT Proximity Report, 2018. Generated under licence from the Integrated Biodiversity Assessment Tool on 13/08/2018.

https://www.ibat-alliance.org/

ARTIFICIAL INTELLIGENCE FOR ECOSYSTEM SERVICES (ARIES)

DEVELOPERS

University of Vermont, Earth Economics, Conservation International, Basque Center for Climate Change

PARTNERS

Initial case studies carried on with partners from Madagascar, Puget Sound, and Veracruz, Mexico

STATUS REPORT

Operational and available tool since 2012.

METHOD USED

ARIES maps and quantifies ecosystem services on the scale of a territory, identifies their beneficiaries and manages the factors influencing the production of these services according to needs and priorities. The tool comes in the form of an online mapping modelling software.

The ARIES method combines spatially explicit modelling of ecosystem services (based on GIS data) and dynamic flow models, in order to describe the distribution of services and benefits derived from them in a given territory. For each ecosystem service, ARIES provides a cartographic model of the location of its production, its beneficiaries, as well as biophysical factors that may alter service flows.

Modelling the spatial links between ecosystems and social systems also helps assess the benefits derived by populations from ecosystem services, through economic valuation. ARIES helps the user understand and quantify the environmental factors influencing the value of services, for specific geographical areas and depending on the needs and priorities of the beneficiaries.

The software includes spatial data and data relative to nine types of ecosystem services (carbon sequestration/storage, flood regulation, coastal flood protection, aesthetic value and proximity of open spaces, water resource availability, sediment retention, fisheries, recreational services, nutrient regulation), produced and involved through case studies conducted by ARIES users. An international community of scientists contributes to the database through the various case studies conducted. Detailed tests of ecosystem services can be carried out on different spatial scales: local (e.g. corporate site), regional (e.g. watershed), or even national or continental. Depending on the user's needs and the model used, the results can be obtained in the form of cartographic data, modelled biophysical data, or economic data.

ARTIFICIAL INTELLIGENCE FOR ECOSYSTEM SERVICES (ARIES)

ARIES CAN BE USED TO

- Perform biophysical and economic analysis of ecosystem services
- Map the location of beneficiaries of ecosystem services and quantify their demand
- Assess the impact of land use, policies, or climate change on the production and value of ecosystem services
- Optimise payment systems for ecosystem services

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Gives a prospective analysis of the impacts of different scenarios on ecosystem services
- Is highly adaptable to local use
- Takes into account the uncertainty associated with the use of fragmented data or environments with complex ecological dynamics
- Online and stand-alone software, which does not require the installation of any other application

WEAKNESSES

- The quality of the results is strongly influenced by the availability and the strength of the input data to be configured
- Does not include default data
- Cannot be used on new case studies without coordination with the development team
- Requires expertise in geographic information systems

MORE INFORMATION

Villa et al., 2009. ARIES (ARtificial Intelligence for Ecosystem Services): A new tool for ecosystem services assessment, planning, and valuation, BioEcon 2009.

http://aries.integratedmodelling.org/

INTEGRATED VALUATION OF ECOSYSTEM SERVICES AND TRADEOFFS (INVEST)

DEVELOPER

The Natural Capital Project

PARTNERS

Stanford University, University of Minnesota, WWF, The Nature Conservancy

STATUS REPORT

Operational tool, several updates.

METHOD USED

InVEST is a string of patterns that help map and assess different ecosystem services, terrestrial, aquatic or marine, and describe the impacts of various development or planning scenarios on these services.

InVEST helps you to report on the supply, use and value of ecosystem services in a given territory. It also provides tools to measure and compare the value of several ecosystem services under different ecological conditions, and integrating conservation and human development issues.

InVEST currently contains 18 patterns corresponding to 18 ecosystem services. Ecosystem services include pollination, sediment retention, carbon storage and retention, water purification, recreation, coastal protection and biodiversity habitat services. Four levels of modelling complexity are available for each ecosystem service.

The patterns in InVEST are based on production functions defining how ecosystem structure and functions affect the flows and values of ecosystem services. The patterns take into account both the supply of services and the location and activities of the people benefiting from these services.

Via InVEST, cartographic tests can be carried out on territorial or higher scales. The results are delivered in the form of maps with associated data tables expressed in biophysical or economic terms according to the user's needs.

INTEGRATED VALUATION OF ECOSYSTEM SERVICES AND TRADEOFFS (INVEST)

INVEST CAN BE USED TO

- Conduct a biophysical and economic assessment of ecosystem services
- Carry out comparative tests of projects under different scenarios
- Provide for changes that may affect ecosystem services and biodiversity conservation
- Identify the areas where investments in natural capital will be the most efficient in terms of biodiversity and human development

MORE INFORMATION

Sharp et al. 2018. InVEST 3.7.0. User's Guide. The Natural Capital Project, Stanford University, University of Minnesota, The Nature Conservancy, and World Wildlife Fund.

https://naturalcapitalproject.stanford.edu/invest/#what-is-invest

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Considers a large number of ecosystem services, including some marine ecosystem services
- Assesses ecosystem services taking into account supply and demand
- Can be used even if data is insufficient, via simplified models
- Can carry out prospective tests of the impacts of different scenarios on ecosystem services
- Is recognised and widely used by the scientific community and is the subject of much feedback

—

WEAKNESSES

- Requires knowledge in GIS and programming for the most complex patterns
- Requires a significant amount of input data to obtain strong results
- Simplifies ecological dynamics in the context of biophysical assessment
- Cannot easily be used by companies due to its territorial geographical aspect

CO$TING NATURE

DEVELOPERS

King's College London, AmbioTEK, UNEP-WCMC

STATUS REPORT

Operational tool, second version released in 2011. Tool tested by several companies and academic organisations.

METHOD USED

Co$ting Nature is an online mapping tool analysing ecosystem services, identifying and locating the beneficiaries of these services, and analysing current environmental pressures, future threats and the priorities in terms of conservation. Users can then apply climate change, land use or land management scenarios, and examine the effects on ecosystem services and their consequences for the beneficiaries.

The tool contains over 80 data sets. The database includes global spatial data (GIS, remote sensing), data on different types of ecosystem services (supply, regulatory, cultural services) as well as data on different types of habitat (mountains, moors, grasslands, agricultural lands, woodlands, wetlands, floodplains, urban areas). The tool aggregates and interprets large volumes of data so the user can rely on the data already present in the tool but can also integrate his own data.

The tool can be used on different scales, from a territorial scale to a national or higher scale. Co$ting Nature has a resolution of 1 Ha over an area of 100 sqkm for local scale studies and 1 sqkm over an area of 1,000 sqkm for national scale studies.

The results delivered by the tool are available in GIS format or in the form of summary tables according to the user's needs.

CO$TING NATURE

CO$TING NATURE CAN BE USED TO

- Make projections based on different project scenarios or development policies, in order to anticipate their results and carry out comparative tests
- Spatially identify the areas to be protected in priority according to their supply of ecosystem services
- Improve decision-making in terms of ecosystem conservation and restoration

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Considers several components of biodiversity (species, environments, ecosystem services)
- Helps carry out mapping tests from a local scale to a continental scale
- Integrates a large amount of data, making it easy to use and to get results
- Facilitates comparison between different scenarios
- Does not require any GIS software to be used

WEAKNESSES

- Only takes into account three types of ecosystem services by default
- Requires GIS expertise to provide external data
- Is not suitable for use at the scale of a company site (the tool is functional on areas over 1sqkm)
- Cannot predict the evolution of a particular ecosystem service
- Does not offer monetary valuation of ecosystem services

MORE INFORMATION

Mulligan, 2010. User guide for the Co$ting Nature Policy Support System.

https://goo.gl/Grpbnb

http://www.policysupport.org/costingnature

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QUALITATIVE AND QUANTITATIVE TOOLS

Qualitative and quantitative tools help organisations to identify and describe their impact and their reliance on ecosystems and ecosystem services. This analysis aims at complementing conventional strategic tests and improving decision-making mechanisms by providing information on environmental risks and opportunities.

Natural Capital Protocol 31

Business and Biodiversity Interdependence Indicator (BBII) 33

Toolkit for Ecosystem Service Site-Based Assessment (TESSA) 35

NATURAL CAPITAL PROTOCOL

DEVELOPER

Natural Capital Coalition

PARTNERS

Collaboration with several dozen actors: experts, companies, federations, public administrations, research organisations, NGOs

STATUS REPORT

Operational tool, plenty of feedback and case studies available.

METHOD USED

The Natural Capital Protocol is a standardised decision-making framework assisting organisations, particularly companies, in identifying, measuring and evaluating their direct and indirect impacts and reliance on natural capital.

Understanding the complex relationship that organisations have with biodiversity and ecosystem services should enable organisations to make more informed decisions, through a detailed understanding of the risks and opportunities associated with them.

As the first set of "guidelines for companies to identify business risks and opportunities arising from ecosystem change", the Corporate Ecosystem Services Review provided one of the foundational and sources of inspiration for the Natural Capital Protocol.

The Natural Capital Protocol method is divided into four phases: Framing (Why?), Scope (What?), Measure and assessment (How?), Application (What to do next?). These phases are subdivided into nine sub-steps addressing more specific issues, as shown in the figure below.

The Natural Capital Protocol method is iteratively constructed and helps users to adjust and adapt their approach as they implement the conceptual framework. Depending on the user's needs, the assessment may be qualitative, quantitative or monetary, in order to reflect the importance, value, and utility of natural capital.

Thus the Protocol is a standard reference framework for the integration of natural capital into private decision-making rather than a tool per se. However, it relies on existing tools, guidelines, methods and instruments to identify, measure and assess natural capital.

The Protocol is not prescriptive, a wide variety of tools and methods available on natural capital are compatible with its application, including those presented in the Natural Capital Toolkit. This toolbox, combined with the Natural Capital Protocol, guides companies towards the most appropriate tools for measuring and assessing natural capital (Phase 3 of the Protocol). To date, the toolbox lists more than 50 tools, including some of those described in this guide.

Stage	**FRAME**: Why?	**SCOPE**: What?			**MEASURE AND VALUE**: How?			**APPLY**: What next?	
Step	01 **Get started**	02 **Define the objective**	03 **Scope thew assessment**	04 **Determine the impacts and/or dependencies**	05 **Measure impact drivers and/or dependencies**	06 **Measure changes in the state of natural capital**	07 **Value impacts and/or dependencies**	08 **Interpret and test the results**	09 **Take action**
Question this will answer	Why should you conduct a natural capital assessment?	What is the objective of your assessment?	What is an appropriate scope to meet your objective?	Which impacts and/or dependencies are material?	How can your impact drivers and/or dependencies be measured?	What are the changes in the state and trends of natural capital related to your business impacts and/or dependencies?	What is the value of your natural capital impacts and/or dependencies?	How can you interpret, validate and verify your assessment process and results?	How will you apply your results and integrate natural capital into existing processes?

***Natural Capital Coalition**, 2016*

PRINCIPLES: Relevance, Rigor, Replicability, Consistency

NATURAL CAPITAL PROTOCOL

THE NATURAL CAPITAL PROTOCOL CAN BE USED TO

- Identify, measure, and value natural capital in terms of impact and reliance
- Help companies to take into account the risks and opportunities associated with their use of natural resources
- Improve internal decision-making for activity management
- Choose the tools best suited to the company's needs

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Can be implemented by companies in all sectors of activity
- Provides an international, standard framework
- Improves decision-making within the organisation and highlights environmental issues
- Is applicable at several levels in the organisation (product, value chain, site and so on)

—

WEAKNESSES

- Is not a stand-alone tool, and requires the use of other natural capital tools to produce results
- Proves complex to implement, and requires different types of disciplinary technical expertise

MORE INFORMATION

Natural Capital Coalition, 2016. "Natural Capital Protocol".

https://naturalcapitalcoalition.org/natural-capital-protocol/

https://naturalcapitalcoalition.org/

https://shift.tools/contributors/551

https://naturalcapitalcoalition.org/the-foundational-role-of-the-corporate-ecosystem-services-review-in-the-development-of-the-natural-capital-protocol/

BUSINESS AND BIODIVERSITY INTERDEPENDENCE INDICATOR (BBII)

DEVELOPER

Orée Association (Biodiversity-Economy working group)

PARTNER

Master's degree in Environmental Sciences and Engineering from the University of Paris Diderot

STATUS REPORT

Operational tool, plenty of feedback available.

METHOD USED

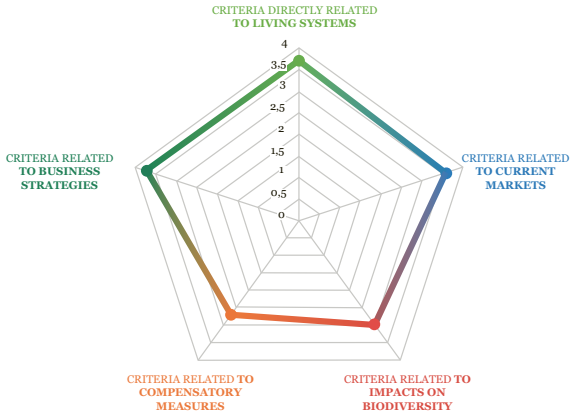
The BBII is a tool helping companies and communities self-assess their interdependence on biodiversity and ecosystem services based on multiple criteria.

The BBII is based on 23 criteria, classified into five main categories:

1) Criteria directly related to the living world;

2) Criteria related to current markets;

3) Criteria related to impacts on biodiversity;



***Houdet,** 2008*

4) Criteria related to impact compensation;

5) Criteria related to the organisation's strategies.

Each category is associated with different assessments and explanations, in order to qualitatively define the organisation's view of its interdependence with biodiversity.

The scope of the tool can range from the scale of the semi-finished or finished product to all of the company's activities, including the scale of the service, site, or activity.

The results of the BBII are shown in the form of a pentagram to visualise how the organisation views its interdependence with biodiversity and ecosystem services. With this characterisation the user can clearly identify their biodiversity issues.

BUSINESS AND BIODIVERSITY INTERDEPENDENCE INDICATOR (BBII)

THE BBII CAN BE USED TO

- Consult internal stakeholders and raise internal awareness about biodiversity
- Determine an organisation's impact and reliance on biodiversity and ecosystem services, and the associated risks and opportunities
- Define priority issues for the organisation
- Carry out comparative tests at a sector or organisation level

MORE INFORMATION

Houdet, 2008. Integrating biodiversity into business strategies. The Biodiversity Accountability Framework. Orée - Fondation pour la Recherche sur la Biodiversité.

http://www.oree.org/_script/ntsp-document-file_download.php?document_id=1063&document_file_id=1070

http://www.oree.org/en/presentation-of-the-guide-biodiversity.html

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Can be used by any type of organisation and in any sector of activity
- Gives a simple, instructive identification of an organisation's interdependence with biodiversity
- Allows multiple uses (assessments, comparisons)
- Does not require any particular external expertise

—

WEAKNESSES

- Produces subjective, preliminary results as they are based on the user's perception and sensitivity
- Suggests criteria that are not always adapted to the organisation's activity (ecological compensation for example)
- Is more or less relevant depending on the scope of the study (its use is more relevant for an activity than for a product or service, for example)
- Does not offer weighting between criteria and sub-criteria depending on the sector of activity and scope

TOOLKIT FOR ECOSYSTEM SERVICE SITE-BASED ASSESSMENT (TESSA)

DEVELOPERS

BirdLife, UNEP-WCMC, Anglia Ruskin University, University of Cambridge, RSPB, Tropical Biology Association

PARTNERS

AXA Research Fund, Darwin Initiative, Stockholm Resilience Centre, Cambridge Conservation Initiative, OPERAs, ESRC

STATUS REPORT

Operational tool.

METHOD USED

TESSA is a toolkit for assessing ecosystem services. It provides information on the quantification of ecosystem services, using information collected locally in protected areas or areas important for biodiversity, or at project sites.

Operating the tool is divided into six steps:

1) Defining the site and the context;

2) Identifying the ecosystem services on the scale of the site;

3) Defining the issue;

4) Selecting the method to be used;

5) Collecting data;

6) Analysing and communicating results.

Users are guided towards the most appropriate methods depending on the characteristics of the site. These are varied and range from household surveys to participatory mapping methods and the use of simple modelling software.

With TESSA you can therefore prioritise ecosystem services according to the challenges of the user organisation, assess the benefits of the users, and make comparisons with other land use scenarios.

The ecosystem services currently available in the tool are: global climate regulation, water services (supply, quality, flood reduction), wildlife, crop species, nature-based recreation, cultural services, pollination service, and coastal protection.

The toolbox comes in the form of a user manual, designed to be both online and on the site.

TOOLKIT FOR ECOSYSTEM SERVICE SITE-BASED ASSESSMENT (TESSA)

TESSA CAN BE USED TO

- Define priority ecosystem services on the scale of a site, from the developer's perspective
- Quantitatively assess ecosystem services on the scale of a site
- Conduct comparative studies on different scenarios and different phases of a site's evolution
- Improve local decision-making in terms of development

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Can be used by non-specialists
- Is applicable to all continents and all terrestrial and wetland habitats (excluding marine areas)
- Gives a first approach in terms of assessing ecosystem services, while producing scientifically solid information

—

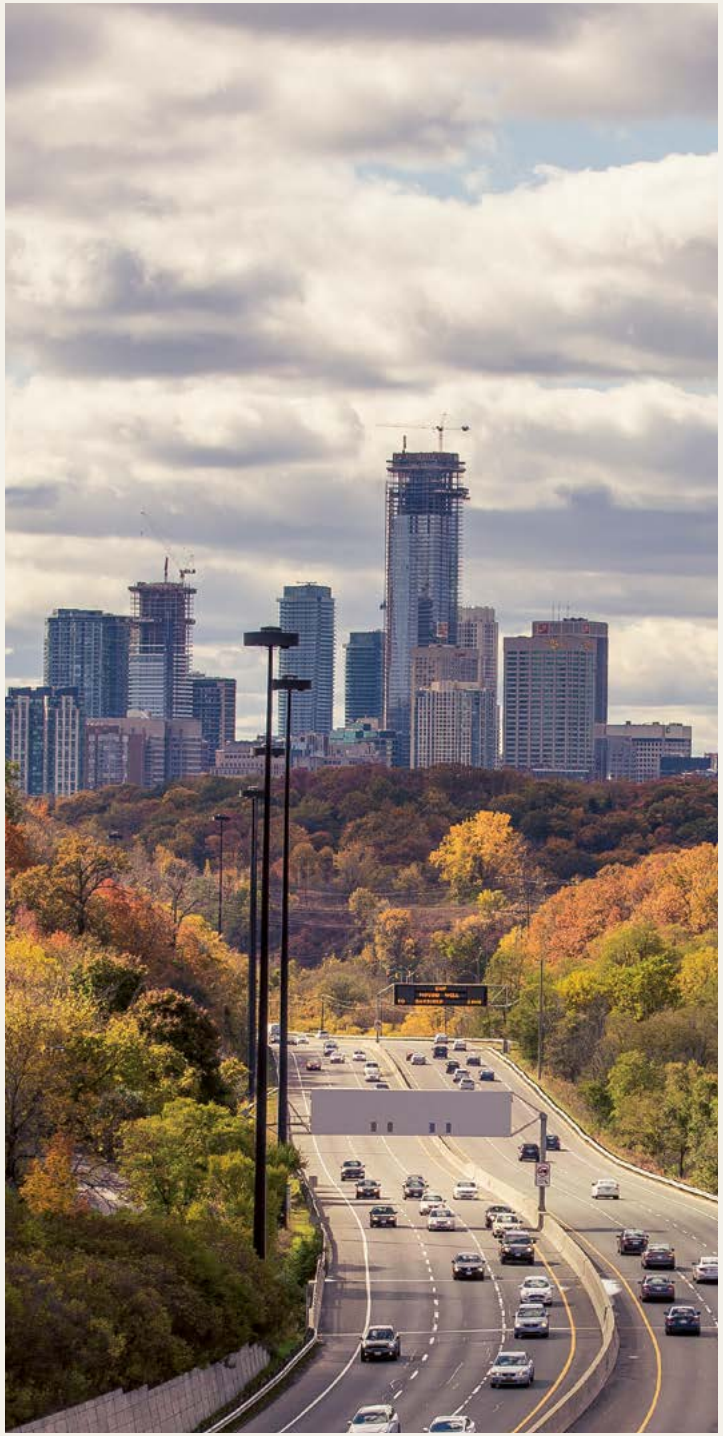
WEAKNESSES

- Gives a unique spatial scale of analysis, that of the site
- With a view to simplification, does not take into account the complexity of some ecosystem services
- Considers a limited number of ecosystem services

MORE INFORMATION

Peh et al., 2013. TESSA: A toolkit for rapid assessment of ecosystem services at sites of bioidversity conservation importance. Ecosystem Services, vol. 5, 51-57.

http://tessa.tools/



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MONETARY TOOLS

Monetary tools, like qualitative and quantitative tools, help organisations to define their impact and dependence on ecosystems and ecosystem services, but here the assessment takes the form of an economic valuation. Similarly, this analysis aims at improving decision-making mechanisms by providing information on environmental risks and opportunities, expressed in monetary units.

Guide to Corporate Ecosystem Valuation 38

Corporate Guidelines for the Economic Valuation of Ecisystem Services (GVces) 40

GUIDE TO CORPORATE ECOSYSTEM VALUATION (CEV)

DEVELOPER

WBCSD

PARTNERS

IUCN, ERM, PwC

STATUS REPORT

Operational tool.

METHOD USED

The CEV (Corporate Ecosystem Valuation) helps companies identify and economically assess their impact and dependence on ecosystem services, in specific ecological contexts. The results thus make it possible to determine the resulting risks and opportunities, and to assess how different scenarios for the management of ecosystems and ecosystem services may affect the company's performance.

The guidebook is divided into two parts. The first presents the key concepts, the situations in which a CEV analysis is appropriate, and the benefits the organisation can expect from it. The second outlines the methodological approach to the economic valuation of ecosystem services and associated cost-benefit analyses. The method of the tool is divided into five main steps:

1) Defining the scope: identifying the specific objectives for the company and determining the appropriate analytical context;

2) Planning: developing the implementation of the evaluation;

3) Valuation: listing the nine specific sub-steps for the economic valuation of ecosystem services;

4) Application: how to use and communicate results;

5) Integration: integrating the CEV approach into the company's current environmental practices.

The tool can be applied to different areas of the company: service, project, site, or incident.

Depending on the user's needs, the evaluation results can be formulated in qualitative, quantitative or monetary terms.

GUIDE TO CORPORATE ECOSYSTEM VALUATION (CEV)

THE CEV CAN BE USED TO

- Identify the ecosystem services most affected by a given activity, and those on which it depends most, in monetary units
- Estimate the total economic benefits associated with an ecosystem
- Compare several development scenarios taking into account the value of ecosystem services
- Assess the compensation attributable to certain stakeholders in the case of environmental damage
- Determine the remuneration to which certain stakeholders could be entitled, in the case of proposed payments for ecosystem services

MORE INFORMATION

WBCSD et al., 2011. Guide to Corporate Ecosystem Valuation. A framework for improving corporate decision-making.

https://www.wbcsd.org/contentwbc/download/573/6341

https://www.wbcsd.org/Programs/Redefining-Value/Business-Decision-Making/Measurement-Valuation/Resources/Guide-to-Corporate-Ecosystem-Valuation

STRENGTHS

WEAKNESSES

STRENGTHS AND WEAKNESSES OF THE TOOL

- Can be used by companies in all sectors
- Offers instructive, didactic support
- Can be firmly anchored into an organisation's current decision-making processes (cost-benefit analyses)

—

- Offers limited technical contribution, leading to the need for additional support (skills in environmental economics, access to databases and so on)
- Requires a significant amount of data to be mobilised, the absence of which may affect the accuracy of the results
- Considers biodiversity through the lens of ecosystem services alone, excluding ordinary and remarkable species and habitats from the analysis

CORPORATE GUIDELINES FOR THE ECONOMIC VALUATION OF ECOSYSTEM SERVICES (GVCES)

DEVELOPERS

Trends in Ecosystem Services (TeSE) business initiative - Center for Sustainability Studies of Getulio Vargas Foundation

PARTNERS

TEEB Regional Local, GIZ, Industry National Confederation of Brazil (CNI), Brazilian Environmental Ministry (MMA)

STATUS REPORT

Operational tool, second version released in 2014.

METHOD USED

The GVces tool aims at supporting companies in conducting simplified economic assessments of ecosystem services. Users are directly involved in the process of valuing ecosystem service dependence, impacts affecting them, and the externalities associated with them.

The tool provides quantification and economic valuation methods specific to each ecosystem service. These can therefore be assessed independently and selected according to their relevance to the user.

The tool is used in 4 steps:

1) Defining the study objectives and planning;

2) Selecting the method guidelines specific to the assessed service(s);

3) Identifying and collecting internal and external data required for the valuation;

4) Implementing the guidelines, and using the DEVESE calculation tool (available on the TeSE website) to obtain final estimates of the economic value of services.

The tool focuses on the assessment of eight ecosystem services based on *The Economics of Ecosystems and Biodiversity* (TEEB)*'s typology*: water supply, biofuel supply, water quality regulation, wastewater assimilation, global climate regulation, pollination, soil erosion regulation, tourism and recreation.

Descriptions of ecosystem services are based on their theoretical definitions, but have been adapted to make them more relevant to companies' environmental challenges. Methodological approaches have been designed to be accessible and to produce economically realistic estimates. The preferred approaches focus on actions to prevent and repair environmental damage.

CORPORATE GUIDELINES FOR THE ECONOMIC VALUATION OF ECOSYSTEM SERVICES (GVCES)

GVCES CAN BE USED TO

- Support companies' strategic decisions on environmental issues
- Report on the impact of companies on ecosystems and their level of dependence on services provided
- Have an economic estimate of the value of the ecosystem services related to their activity
- Report on the risks and opportunities associated with ecosystem services

STRENGTHS AND WEAKNESSES OF THE TOOL

STRENGTHS

- Can be used by any type of organisation and in any sector of activity
- Can be used autonomously by non-specialists
- Leads to economic valuations without using other resources
- Can be firmly anchored into an organisation's current decision-making processes

—

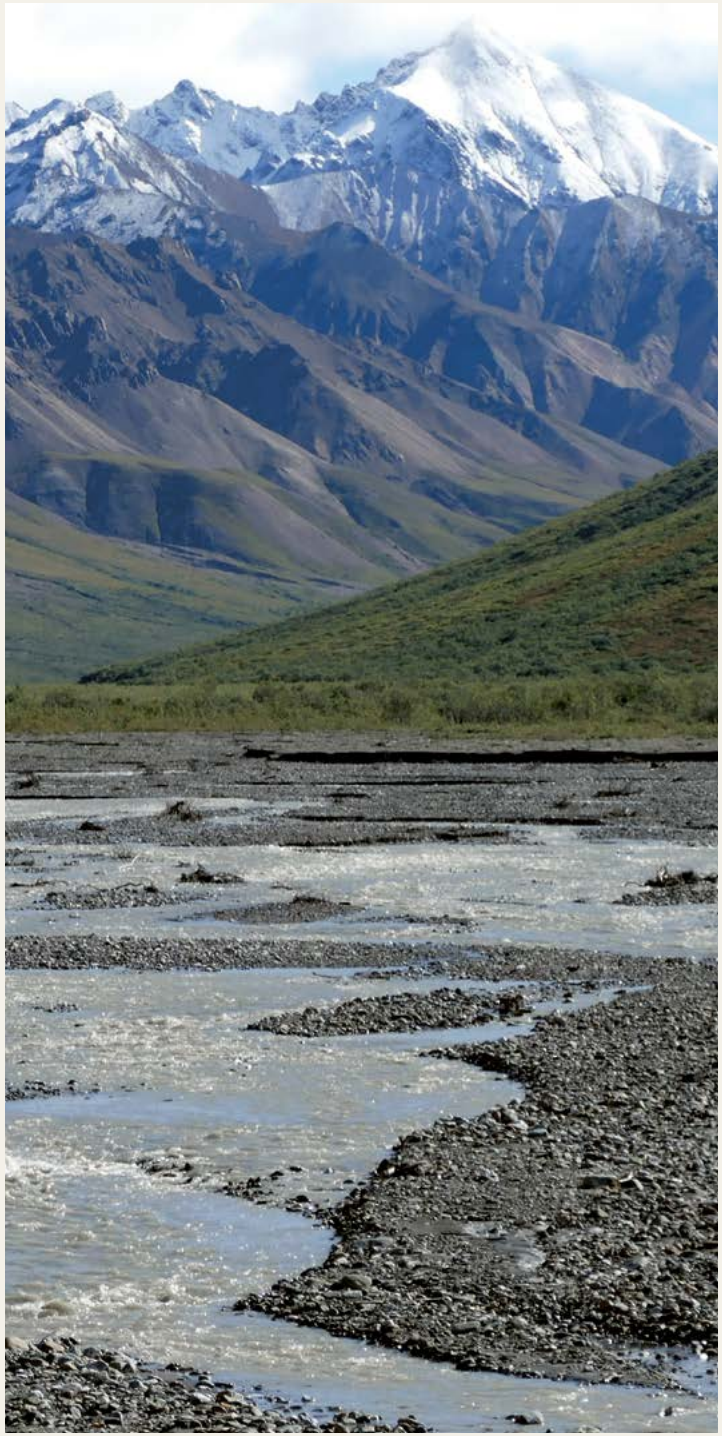
WEAKNESSES

- Leads to significant uncertainties in the economic evaluations produced (due to method simplification)
- Only considers eight ecosystem services
- Does not integrate interdependence relationships and ecological dynamics (isolated assessment of each ecosystem service)

MORE INFORMATION

Center for Sustainability Studies of Sao Paulo, 2016. Corporate Guidelines for the Economic Valuation of Provisioning Ecosystem Services. Center for Sustainability Studies of Sao Paulo Business Administration School at Getulio Vargas Foundation.

http://www.tendenciasemse.com.br/method-2?locale=en



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"ABSOLUTE" ECOLOGICAL PERFORMANCE TOOLS

Unlike the other categories, these tools use an ecosystem perspective to promote ecological conservation. After defining the conditions necessary for ecosystems to function well, they help to set coherent private environmental objectives.

One Planet Approaches (OPA) 43

Future Fit Business Benchmark 45

Science based Targets Network (SBTN) 47

ONE PLANET APPROACHES (OPA)★

DEVELOPERS

WWF NL, Ecofys, Eneco

PARTNERS

IUCN NL, Metabolic

STATUS REPORT

Finalised method, experimental implementation of different company cases.

METHOD USED

The One Planet Thinking programme aims at helping companies to define sustainability objectives in line with the biophysical capacities of the biosphere. The One Planet Approaches (OPA) report provides the theory and method for the development and implementation of the One Planet Thinking programme.

OPA synthesizes a set of methods, tools, reference frameworks, initiatives that share the common principle of measuring and limiting human impact regarding the biosphere’s absolute boundaries. It examines over 60 approaches to ecological boundaries (including planetary boundaries, see Steffen and al. 2015), and suggests mapping them according to their features, attributes, and functionalities. This review also defined an eight-step process for effectively transposing the biosphere’s boundaries into a level relevant to organisations:

1) The definition of the organisation’s sustainability goals: four types of goals can be adopted. The first three are anthropocentric - with goals defined to meet human needs - and are the most common: the Earth’s habitability, social justice, and preservation of resources. The fourth category has biocentric or ecocentric objectives.

2) Identification of processes to achieve the goals: under the framework of planetary boundaries, nineprocesses critical to the Earth’s habitability are identified (climate change, biodiversity loss, global disturbances of the nitrogen and phosphorus cycle, land use, ocean acidification, ozone depletion, atmospheric aerosols, freshwater use, and the introduction of new entities into the biosphere). Depending on the goals previously set, other processes may be included in the analysis.

3) Mapping the dynamics of the system under consideration: it helps to determine how alterations in key control variables affect the system. It consists in determining the interactions between the identified processes and the spatial and temporal scales at which they operate.

4) The definition of the boundaries within which human societies and organisations can operate: these boundaries are linked to the above mentioned processes, they represent the levels beyond which additional impacts would have a significant probability of disrupting the system.

5) Identifying the scope of the activity: establishing the contours of the activity in question is essential, in order to determine its impact on the processes taken into consideration. The activity can be reduced to the level of a production unit, a territory, or defined from an economic perspective on the value chain.

6) Quantifying the pressures attributable to the organisation in question: this consists in carrying out an inventory of the environmental flows/flow rates related to the organisation’s activities, in relation to the critical processes identified and the defined scope.

7) Measuring the impact on the operating scope: the conversion of previously assessed pressures into impacts is done first by establishing a causality chain, then by using databases (life cycle analyses, footprint methods) to estimate the impact of flows for each process.

8) Defining a distribution principle: once relevant ecological boundaries have been defined for each critical process, different allocation methods can be used to transpose these limits to the scale of the organisation in question. These allocation methods can be based on different principles: egalitarian, economic performance, economic efficiency, historical justice and so on.

The method ultimately leads to the creation of a management dashboard for managing the organisation’s environmental sustainability, also making it possible to report on its performance to stakeholders:

★ Cf p. 64-65

ONE PLANET APPROACHES (OPA)★

	FRESH WATER USE	TERRESTRIAL NITROGEN DEPOSITION	AQUATIC NITROGEN DISCHARGES	LAND USE	BIODIVERSITY
PRODUCTION SITE 1					
PRODUCTION SITE 2					
PRODUCTION SITE 3					

Activity respecting the ecological boundaries | Activity exceeding the ecological boundaries | Activity well above the ecological boundaries

Adapted from Metabolic and al., 2019

OPA CAN BE USED TO

- Define a sustainability strategy for an organisation
- Determine "absolute" environmental objectives, in line with the best scientific knowledge (including planetary boundaries)
- Manage activities and report on organisations' level of "absolute" environmental performance

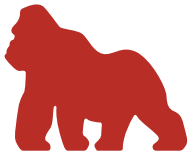
MORE INFORMATION

http://www.oneplanetthinking.org/home

Metabolic et al., 2017. One Planet Approaches – Methodology Mapping and Pathways Forword.

Metabolic et al., 2019. Setting science based targets for nature: A pilot to assess planetary boundaries for water, land, nutrients and biodiversity in Alpro's soy and almond value chains.

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Is based on the synthesis of the best scientific knowledge available on the subject of "absolute" sustainability (in particular on the concept of planetary boundaries)
- Helps implement goals in line with the best scientific knowledge (science-based) beyond climate aspects
- Offers a "centred ecosystem" approach, and the definition of specific boundaries at a local or regional level
- Integrates a systemic analysis of the interactions between critical processes, avoiding the perverse effects of mitigating certain impacts
- Helps the organisation to go beyond anthropocentric objectives

WEAKNESSES

- Requires technical support
- Is based on scientific knowledge that is sometimes incomplete with regard to ecosystem functioning, biosphere dynamics and the definition of ecological boundaries
- Deploys smoothly in local ecosystem contexts, but is more difficult to adapt at the value chain level

★ Cf p. 62-63

FUTURE FIT BUSINESS BENCHMARK ★

DEVELOPER

Future Fit Foundation

PARTNER

The Natural Step

STATUS REPORT

Operational tool. Second version published in 2017.

METHOD USED

The Future Fit Business Benchmark helps companies self-assess their environmental and social performance, and integrate “absolute” sustainability goals into their activities and strategy.

The Future Fit Business Benchmark is largely based on the United Nations Sustainable Development Goals (SDGs) framework to establish a framework for companies to improve their performance in terms of sustainable development.

The user is guided through a series of questions to identify the most relevant environmental and social goals for the resilience of the company, ecosystems, and the well-being of its employees. The standard includes 23 goals - including 10 environmental and 13 social goals - divided into 8 categories:

- energy;
- water;
- natural resources;
- pollution;
- waste;
- footprint;
- human life;
- governance.

These goals are defined on the basis of the best scientific knowledge and can be integrated into the various standards, reporting standards and sustainable development ratings currently in force.

The tool helps companies monitor their progress with regard to the goals set, and stakeholders (employees, shareholders and so on) have an overview of progress made and improvements to be made.

https://www.un.org/sustainabledevelopment/fr/

★ Cf p. 64-65

FUTURE FIT BUSINESS BENCHMARK ★

THE FUTURE-FIT BUSINESS BENCHMARK CAN BE USED TO

- Prioritise the most relevant goals for organisations in terms of sustainable development
- Define sustainability goals in line with society expectations, sustainable development goals and scientific knowledge
- Manage activities and report on the level of environmental and social performance of organisations

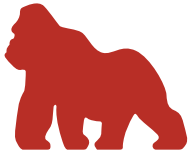
MORE INFORMATION

https://futurefitbusiness.org/

https://futurefitbusiness.org/wp-content/uploads/2019/06/FFBB-All-Documents-2.1.2.zip

Future-Fit Foundation, 2018. Methodology Guide – What the Benchmark is, Its scientific foundations, How it was developed. Release 2.04.

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Provides a consensual, international framework for the environmental and social performance of companies based on the SDGs
- Integrates many "absolute" sustainability goals directly into the referential, without the need for additional method
- Is highly standard
- Integrates social, societal, and governance concerns

WEAKNESSES

—

- Is based on a process of self-assessment and internal prioritisation of goals that may bias the relevance of the analysis from a sustainability point of view
- Contains several imprecise goals, leading to different interpretations and/or requiring additional studies
- Integrates few criteria related to biodiversity, ordinary biodiversity in particular is not considered

★ Cf p. 62-63

SCIENCE BASED TARGETS NETWORK (SBTN)★

DEVELOPERS

The Earth Commission, IUCN, Future Earth, WWF, WRI, The Food and Land Use Coalition, Conservation International, gef, Quantis, BSR, Alliance for Water stewardship, Systemic, Ocean Conservancy, The Biodiversity Consultancy, Global Convenant of Mayors for Climate & Energy, We Mean Business, Water footprint network, UNEP-DHI Partnership, Metabolic, The CEO Water Mandate, C40 Cities, PIK, ICLEI, EAT, ETH Zurich, UN environment, WCMC, Ocean Unite, IIASA, PIK, Natural Capital Coalition, CDP

STATUS REPORT

Tool under development (initiative launched in 2018).

METHOD USED

The SBTN initiative aims at supporting companies (and cities) in setting scientific environmental goals to halt the degradation and loss of biodiversity. The goals in question are qualified as “scientific” because they are based on a set of academic work and in particular on the methodological framework of planetary boundaries to maintain the viability of terrestrial and marine ecosystems and of the biosphere.

The main stages in the development of the tool, which is still under construction, are as follows:

- **2019-2020:** identification of methods and development of pilot projects with companies and cities, identification of ecological thresholds;
- **2020-2022:** development of methods, deployment to economic actors, consolidation of ecological thresholds;
- **2023-2025:** compliance with ecological thresholds, construction of a financially autonomous model.

At the time this guidebook was written, SBTN methods were structured in two dimensions: the first, divided into four thematic hubs, aims at developing methods and objectives specific to each of the themes in question; the other dimension - Network Hub - is cross-functional, coordinating and conciliating the different themes. The four thematic hubs include freshwater, biodiversity, oceans, and terrestrial systems.

For each theme, the construction of methods aims at defining scientific objectives of sustainability in relation to a reference state by integrating the different pressure factors. At the time this guidebook was written, the development of these methods could be summarised as follows (information that may change).

Depending on the themes under consideration, scientific objectives may be identified or defined at a global level and then transcribed at the landscape level. Each Thematic Hub develops a specific method and relies on its own scientific knowledge, but the SBTN initiative aims at developing a set of methods in line with sustainable development goals as well as other initiatives (e.g. *Future Earth Initiatives*).

A company’s participation in the SBTN initiative will be divided into four key steps:

1) Public commitment of a company to establish a scientific objective;

2) Setting one or more scientific objective(s) based on the guidelines provided by the Thematic Hub;

3) Validation of the target by third parties or by hub partners;

4) Monitoring the commitment with regular communication of progress made.

★ Cf p. 64-65

SCIENCE BASED TARGETS NETWORK (SBTN)★

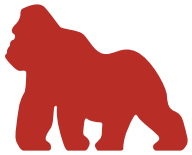
HUBS	PLAYERS	FACTORS TO CONSIDER	STATE	OBJECTIVES
Terrestrial systems (Land)	Companies	Land transformation and degradation	Terrestrial ecosystems	> Zero deforestation > Neutral land degradation
Fresh water (Water)	Companies	Water extraction and pollution	Freshwater ecosystems	> Regional water test results > Watershed quality goals
Oceans (Ocean)	Companies	Overfishing | Invasive plants | Pollution of the oceans | Habitat destruction	Marine ecosystems	In the process of being determined
Biodiversity (Biodiversity)	Companies	En cours de détermination	Terrestrial, aquatic and marine ecosystems	> Zero species loss

SBTN CAN BE USED TO

- Scientifically define ecological boundaries guaranteeing the proper functioning of ecosystems and the biosphere
- Design methods enabling economic actors to determine environmental goals in line with scientific knowledge
- Support companies in defining such environmental goals
- Provide validation and recognition of companies' commitment towards "absolute" sustainability

MORE INFORMATION

http://sciencebasedtargetsnetwork.org



STRENGTHS

WEAKNESSES

STRENGTHS AND WEAKNESSES OF THE TOOL

- Is developed in collaboration with a large number of stakeholders, to ensure the methods and goals defined are strong and operational
- Aims to cover all the planet's ecosystems
- Is based on a body of knowledge produced and validated by the scientific community

—

- Not yet available to companies (method under development)
- Requires a significant task in collecting and analysing scientific knowledge in order to define fair, relevant scientific objectives

★ Cf p. 62-63

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INTEGRATED ACCOUNTING TOOLS

Integrated accounting tools, like conventional accounting tools, fall into two categories: microeconomic tools, which apply to organisations, and macroeconomic tools, which are intended for territories.

Micro-economic integrated accounting tools aim at reporting on the use of natural capital (and in general other types of capital) by economic actors, and at improving its management. Depending on the tools, this reporting is carried out with varying degrees of integration into conventional financial accounting.

The purpose of integrated macroeconomic accounting tools is to account for the various components of natural capital, for monitoring, comparison with conventional financial accounts and management purposes.

Integrated reporting (<IR>) 50

Environmental Profit & Loss account (EP&L) 52

Comprehensive Accounting in Respect of Ecology - Triple Depreciation Line (CARE - TDL) 54

Ecosystem Natural Capital Accounts (ENCA) 56

System of Environmental Economic Accounting (SEEA) 58

INTEGRATED REPORTING (<IR>)

DEVELOPER

IIRC –International Integrated Reporting Council

PARTNERS

Collaboration with several dozen actors: experts, companies, federations, public institutions, research organizations

STATUS REPORT

Operational tool, many examples of implementation available.

METHOD USED

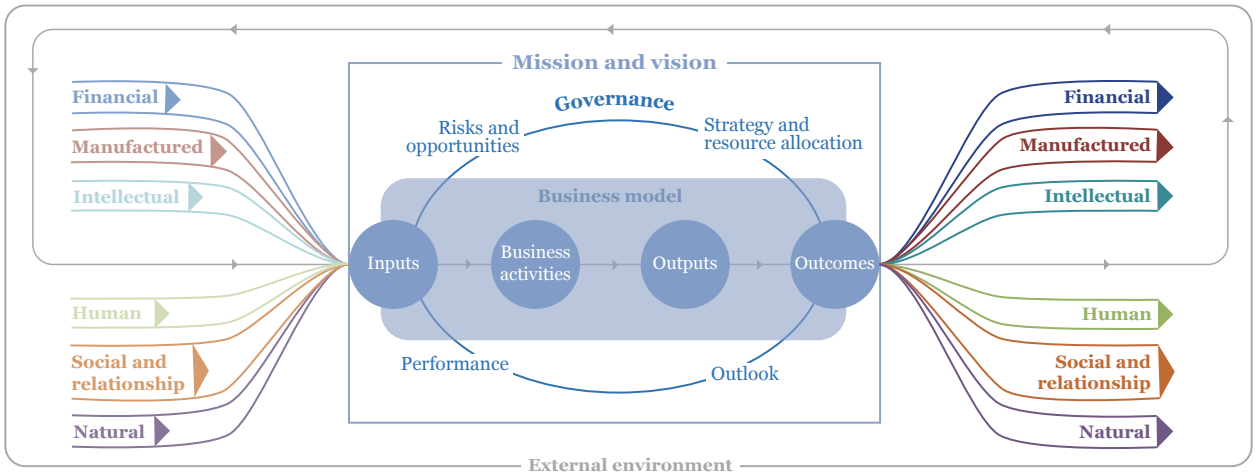
Integrated Reporting (<IR>) is an integrated management tool (financial, environmental and social) for companies. These management methods consist in acquiring a global vision of the relations and interdependence between the organisation's various functions and business units, as well as the capital it uses or alters. This is part of a broader effort to adapt capital allocation and corporate strategy to the broader objectives of financial stability and sustainable development. <IR> should contribute to improving the quality of information available to financial capital providers, in order to allocate capital in a more efficient and productive way.

The <IR> method includes eight components: the presentation of the organisation and its ecosystem, its governance, its economic model, the risks and opportunities, its performance, its perspectives, and the presentation modalities. These elements are presented in the form of questions, leading the organisation to exercise its judgement to define what information to report and how to present it.

This method is based on a variety of information sources, reflecting as accurately as possible the range of factors significantly impacting the organisation's ability to create value over time. <IR> is based on the concept of "information connectivity" to help the organisation collect the elements enabling it to trace as accurately as possible the path of its value creation, through the mobilisation of all its capital - financial, manufacturing, intellectual, human, social and societal, environmental - according to the following theoretical model.

Ultimately, <IR> is a concise message focusing on how an organisation's strategy, governance, performance and prospects, within the context of its external environment, lead to value creation in the short, medium and long term. It is based on qualitative and quantitative indicators in accordance with the organisation's needs and the context in which it operates. The data used may be sectoral or geographical, and the information may be presented in the form of ratios.

***IIRC**, 2013*

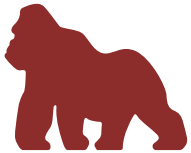


INTEGRATED REPORTING (<IR>)

<IR> CAN BE USED TO

- Better understand the factors having a significant impact on an organisation's ability to create value over time
- Promote responsible management of all types of capital through a better understanding of their interdependence
- Improve the quality of the information contained in conventional reporting

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Takes into account the diversity of sectors
- Helps to establish a comparison between different organisations applying the <IR> method
- Is compatible with most existing regulatory requirements on non-financial reporting

—

WEAKNESSES

- Does not offer a tangible integration of financial and non-financial information (does not lead to the production of an accounting balance sheet or an income statement)
- Is aimed exclusively at the private sector
- Is aimed mainly at shareholders, and does not provide information on the organisation's environmental performance

MORE INFORMATION

IIRC, 2013. International reference framework for integrated reporting <IR>.

https://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

https://integratedreporting.org/

ENVIRONMENTAL PROFIT & LOSS ACCOUNT (EP&L)

DEVELOPER

Kering

PARTNER

PwC

STATUS REPORT

Operational tool. Several examples of implementation available.

METHOD USED

EP&L consists in assessing and publishing the external environmental costs (externalities) of an economic activity over its entire value chain. These costs correspond to expenses incurred by third parties due to the company's polluting emissions and use of natural resources, which are not taken into account by the markets.

More specifically, EP&L is the assessment of the external costs associated with six large categories of environmental impacts of an organisation across its entire value chain: air pollution, GHG emissions, land use change, waste production, water consumption, and water pollution.

These impacts are at the root of environmental changes causing variations in people's well-being, which can be measured in monetary units (see table below).

After defining the scope of the analysis (site, product, production unit and so on), three main steps lead to producing results:

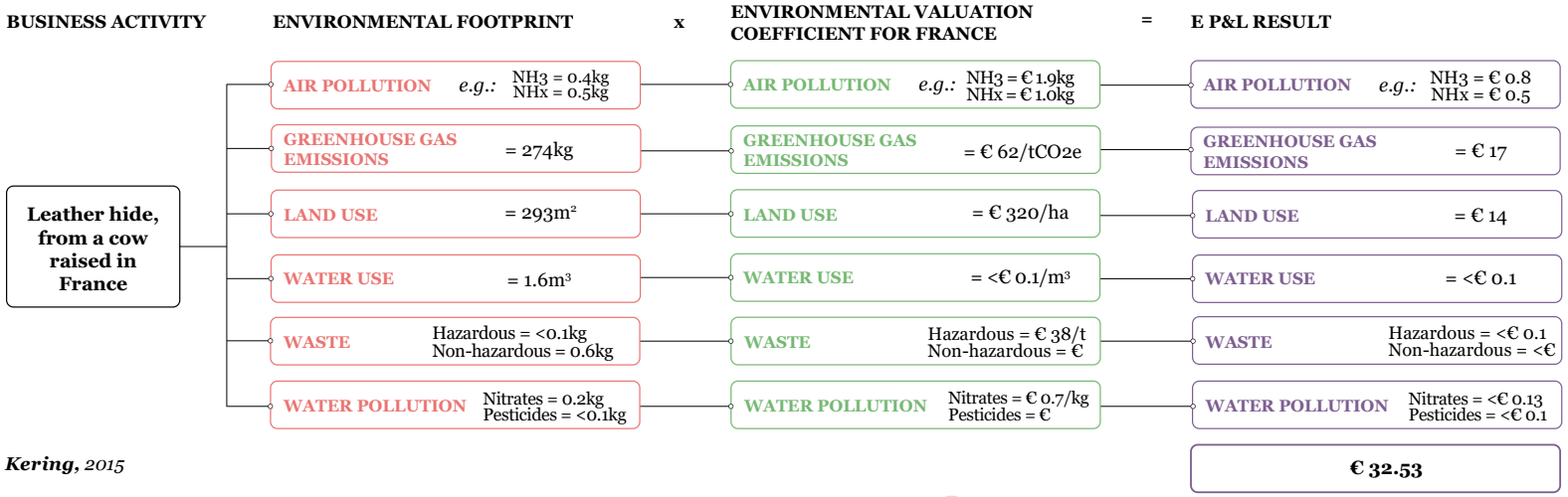
1) Collecting quantitative (biophysical) data associated with the impacts: teqCO_2 of GHGs emitted, sqm of land used, m^3 of water used and so on (primary and/or secondary data);

2) Identifying the most relevant economic valuation coefficients in scientific literature: value of the external cost associated with a unit of emission or resource use (€/teqCO_2 emitted, €/sqm of land used, €/m^3 of water used);

3) Calculating results: quantities emitted or used x economic valuation coefficient.

EP&L's results are then published in an independent report, and are not linked to the company's financial results.

The following diagram shows an example of an EP&L result for a cow bred in France:



***Kering**, 2015*

ENVIRONMENTAL PROFIT & LOSS ACCOUNT (EP&L)

EP&L CAN BE USED TO

- Assess the environmental externalities generated by an organisation throughout its value chain
- Compare the environmental impacts of an organisation from the point of view of externalities, and identify priority impacts
- Compare the environmental performance of different companies, brands, production units, from the point of view of externalities
- Clarify decision-making and guide strategic choices (raw materials, processes, location and so on)
- Report to stakeholders

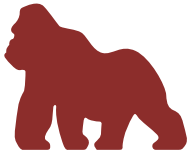
MORE INFORMATION

https://www.kering.com/en/sustainability/environmental-profit-loss/

Kering, 2015. Kering Environmental Profit & Loss (EP&L) – Methodology and 2013 group results.

Kering, 2019. Kering Environmental Profit & Loss (EP&L) – 2018 group results.

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Integration of environmental issues into the company's functioning and strategy
- Successful monetarisation of social costs, with constant improvement of the method
- Consideration of environmental impacts throughout the value chain (detailed understanding of impacts and identification of the most concerning areas on which priority action should be taken
- Transparent, bold disclosure (the assessed external costs could be assimilated to the company's "ecological damage")

—

WEAKNESSES

- Theoretical bases taken from the principle of weak sustainability, assuming that economic values and values associated with the environment (and those associated with humans) are interchangeable
- Partial monetary valuation of environmental impacts (absence of non-use values such as existence value)
- Significant uncertainties associated with economic valuations (due to the use of transfer methods)
- Does not integrate the results into the accounting system

COMPREHENSIVE ACCOUNTING IN RESPECT OF ECOLOGY TRIPLE DEPRECIATION LINE (CARE-TDL)

DEVELOPERS

Chair of Ecological Accounting (AgroParisTech, University of Paris-Dauphine, University of Reims Champagne-Ardenne)

PARTNERS

LVMH, Compta Durable, Ordre des Experts-Comptables de Paris Ile-de-France, CDC Biodiversité

STATUS REPORT

Tool under development. Several experimental implementation cases available in different sectors.

METHOD USED

The CARE-TDL integrated accounting model consists in extending the fundamental principle of capital conservation to natural and human capitals. This principle, which has long been applied in conventional accounting, ensures that financial capital is maintained before profit can be calculated. With a view to sustainability, CARE-TDL suggests extending this principle to all types of capital, enabling the organisation's financial, natural and human capitals to be maintained. CARE-TDL's anchoring in the concept of strong sustainability also implies the various capitals cannot be interchanged, and capital maintenance modalities are in line with the best scientific knowledge.

Thus CARE-TDL implies redesigning the capital and the company. Capital is defined as something - material or non-material - used and consumed by the company during its production process, and recognised as having to be maintained. Extra-financial capital - natural and human entities - are thus considered as liabilities and represent loans to be repaid, in other words ecological and social debts. Assets are represented by the use of this capital, they are consumed during the production cycle and constitute charges on the financial, natural and human capital.

Through CARE-TDL, natural and human capital is economically valued according to the "maintenance costs" approach, i.e. by determining the costs of maintaining or restoring the environmental and human functions used by the organisation. These costs are included in the annual financial statements in accordance with conventional accounting principles making it possible to preserve the financial capital - in particular depreciation - applied to all capital.

★ Cf p. 64-65

Thus in CARE-TDL ecosystems and employees are seen as sources of wealth for the company, which must be preserved to ensure the solvency and sustainability of the organisation.

Ultimately CARE-TDL calculates an integrated result, corresponding to the surplus after maintaining all the capital. It redefines the company's performance by completing the traditional financial analysis with the notion of capital preservation. The model reveals a new vision of intermediate management balances, and in particular of the company's added value.

Voluntarily implementing CARE-TDL within an organisation is a process that follows four steps:

1) Identifying the natural and human capital of the structure: defining the scope of application and identifying the capital, i.e. entities used by the organisation and which should be maintained.

2) Defining capital and their level of maintenance: establishing the variables representative of the various capitals (indicators), and assessing the desired level of conservation of these capitals (scientifically defined ecological limits).

3) Developing maintenance scenarios: comparing the current level of capital conservation and the target level of maintenance (measuring a possible sustainability gap), and building and quantifying action plans ensuring this target level is reached (maintenance scenarios and maintenance costs).

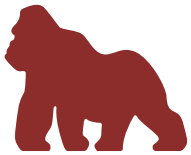
4) Constituting the integrated annual accounts: collecting accounting data, processing information, and constituting the three capitals within the integrated accounting balance sheet and the integrated income statement.

COMPREHENSIVE ACCOUNTING IN RESPECT OF ECOLOGY TRIPLE DEPRECIATION LINE (CARE-TDL)

CARE-TDL CAN BE USED TO

- Develop environmental (and social) goals and strategies in line with society's expectations
- Economically value the natural (and human) capital of organisations
- Rethink management and supervise the overall performance (financial, environmental and social) of organisations
- Communicate with key stakeholders through integrated financial accounting (balance sheet and income statement)
- Assess the sustainability of business models and ensure the environmental and social solvency of organisations

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Measures and oversees the environmental and social performance of organisations
- Highlights the environmental and social actions of organisations
- Provides a strong basis for directing investments towards public interest and for implementing efficient ecological taxation
- Has been the subject of a significant number of scientific publications

WEAKNESSES

—

- Was initially conceived as an evolution of accounting law, and its voluntary applications do not yet have a legal book value (use for internal management and non-financial communication purposes)
- Method for defining natural and human capital in development, not standardised
- Accounting model based on historical cost accounting principles (used in France in particular), not compatible with international accounting standards (IFRS)

MORE INFORMATION

https://www.chaire-comptabilite-ecologique.fr/

Rambaud et Richard, 2015. The "Triple Depreciation Line" instead of the "Triple Bottom Line": Towards a genuine integrated reporting. Critical Perspectives on Accounting, 33, 92–116.

Richard, 2012. Comptabilité et développement durable. Economica.

★ Cf p. 62-63

ECOSYSTEM NATURAL CAPITAL ACCOUNTS (ENCA)★

DEVELOPER

Convention on Biological Diversity

PARTNERS

European Environment Agency, Japan Biodiversity Fund, Indian Ocean Commission, French Ministry of Foreign Affairs

STATUS REPORT

Operational tool. Several implementations in territories completed or in progress.

METHOD USED

ENCA is a method integrating a set of physical and socio-economic data relating to the sustainability of a territory's ecosystems (on a local, national or global scale) and summarising it in a financial, multi-criteria and geo-localised way. The objective of ENCA is to compensate for the lack of economic consideration for the degradation of ecosystems and ecosystem services, by developing simplified natural capital accounts.

ENCA consists in recording and monitoring ecosystems in an accounting manner in terms of flows and physical stocks, and then assessing the depreciation that should be granted to maintain this natural capital. The key aspects of ENCA are the comparison of duly geo-referenced biophysical stocks of natural capital of all ecosystems in the territory in question between two dates, the description of their evolution resulting from natural renewal and resource use flows, and a diagnosis of the state of ecosystems both quantitative and qualitative.

ENCA gives priority to all continental and coastal ecosystems, natural or artificial to varying degrees. However, its framework can be extended to oceanic and atmospheric ecosystems. It provides the method basis for the implementation of geo-referenced biophysical accounting on a simplified ecosystem model, including four main types of accounts:

- **Land cover accounts:** The method inspired by CORINE Land Cover gives quantified and mapped statistics of changes in land use.
- **Water accounts:** Hydrological ecosystems are presented in their interaction with terrestrial ecosystems, with the locating of waterresources, measuring their state of health, sampling and artificial obstacles to drainage.
- **Biocarbon accounts:** The method records carbon stocks in different ecosystems (carbon in vegetation, soil, animal biomass), describes the capacity of ecosystems to produce biomass from primary production, and describes how it is used by crops, sterilised by infrastructure, or destroyed.
- **Ecological Infrastructure Functions and Services Accounts:** They measure the sustainable capacity of ecosystems to produce "intangible", regulatory and cultural services. This measure is done indirectly, combining data from the land account and properties of the condition or health of the ecosystem.

Within each account, sustainable use levels are determined (ecological boundaries), and these accounts are summarised through a composite index of "Total Ecosystem Capacity".

The information system offered by ENCA provides public decision-makers with information on the sustainable or unsustainable use of ecosystems and their renewable natural resources. It helps decision-makers have a diagnostic tool on the evolution of a territory's natural capital, in order to measure the sustainability of economic performance over time, identify potential and impacts, and clarify strategies and programmes. With ENCA one could also consider a system of national accountancy dedicated to the conservation and depreciation of natural capital (including the accounting of ecological debts, possible compensation systems and so on).

★ Cf p. 64-65

ECOSYSTEM NATURAL CAPITAL ACCOUNTS (ENCA)★

ENCA CAN BE USED TO

- Provide decision-makers with a diagnostic tool for assessing the evolution of a territory's natural capital
- Measure the sustainability of a territory over time
- Clarify the relevance of territorial strategies and projects
- Report on the implementation of obligations related to international environmental commitments
- Consider a system of national accounting dedicated to the conservation and depreciation of natural capital (ecological debts, compensation systems and so on)

MORE INFORMATION

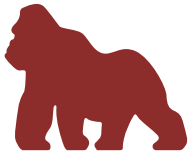
Weber, 2014. Ecosystem Natural Capital Accounts – A quick start package. CDB Technical Specifications No 77. Secretariat of the Convention on Biological Diversity.

https://www.cbd.int/doc/publications/cbd-ts-77-en.pdf

http://www.ecosystemaccounting.net/?page_id=128

https://www.ifdd.francophonie.org/ressources/ressources-pub-desc.php?id=783 (cf. chapter 15)

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

- Presents the overall evolution of a territory's ecosystems using a method that's transparent, adaptable, dynamic and comparative over time and space
- Gathers and synthesises the best knowledge available on natural capital and presents it in a user-friendly format for decision-makers
- Can be used as a basis for various regulatory or tax measures, or to create clearing banks enabling exchanges between debtors and creators of ecological assets

WEAKNESSES

- Requires many technical skills, depending on the level of accuracy required
- Requires access to - or acquisition of - a variety of environmental monitoring data, depending on the level of accuracy required
- For the economic valuation of natural capital degradation, there is limited knowledge of the real costs of restoration

★ Cf p. 62-63

SYSTEM OF ENVIRONMENTAL ECONOMIC ACCOUNTING (SEEA)

DEVELOPERS

SEEA - Central framework: United Nations, European commission, FAO, OECD, IMF, World Bank

SEEA-EEA: United Nations, European commission, FAO, OECD, World Bank

PARTNERS

SEEA-EEA: World Bank, European Union, The Economics of Ecosystems and Biodiversity (TEEB)

STATUS REPORT

SEEA - Central framework: international statistical standard, adopted in 2012

SEEA-EEA: A second development phase was launched in 2018. Results are expected by the end of 2020.

METHOD USED

SEEA - Central framework:

The central framework of the SEEA is a statistical framework that provides a multipurpose view of the interrelationships between the economy and the environment through the integration of environmental and economic data. The United Nations Statistical Commission recognised it as an international standard in 2012.

The SEEA - Central framework consists of three different accounts, expressed in monetary or biophysical units:

- The physical flow account (raw materials, products, residues);
- The environmental activity and corresponding flows account (eco-activities);
- The asset account, dedicated to stocks and flows associated with environmental assets (mineral and energy resources, biological, aquatic, soil, wood and water resources).

This central framework is completed by two other components:

- The Experimental Ecosystem Accounting, called SEEA-EEA, which is under development;
- The SEEA applications and extensions, which present different monitoring and analysis methods.

SEEA-EEA

The Experimental Ecosystem Accounting (SEEA-EEA) is a complementary component to the central framework of the SEEA. It provides a framework for measuring the state of ecosystems and ecosystem services in physical and monetary terms, and links them to human activities.

While the central framework focuses on individual environmental assets and how these assets flow between the environment and the economy, the SEEA-EEA takes an ecosystem perspective. It examines how these environmental assets interact in specific space, delineated by a set of biotic and abiotic factors. The SEEA-EEA also aims to measure the ecosystem services that are provided by these assets.

The SEEA-EEA methodology is composed of several types of accounts:

- **The ecosystem extent account,** which tracks information on the area of different ecosystem types;
- **The ecosystem health account,** which measures the state and functioning of an ecosystem through a set of key indicators (Species richness, relative abundance, environmental status, etc.);
- **The ecosystem services accounts,** which measures the ecosystem services and links them to their corresponding beneficiaries;
- **The monetary asset account,** which estimates the value of ecosystem services over an accounting period.

In addition, several thematic autonomous accounts such as biodiversity, soil, water or carbon accounts, can be implemented.

The SEEA-EEA has been tested in different countries, and is the subject of several application projects:

- **The WAVES project** (*Wealth Accounting and the Valuation of Ecosystem Services*) initiated by the World Bank, which aims to integrate ecosystem services into national planning and accounting.
- **The ENCA** (*Ecosystem Natural Capital Accounting*) model, which is a strong sustainability accounting system (see dedicated tool worksheet p. 64).

SYSTEM OF ENVIRONMENTAL ECONOMIC ACCOUNTING (SEEA)

THE SEEA-CENTRAL FRAMEWORK CAN BE USED TO

- Establish a national accounting system that integrates the interactions between the economy and the environment
- Assist in the management of public policies
- Monitor and report on the achievement of national environmental objectives

THE SEEA-EEA CAN BE USED TO

- Monitor ecosystem conditions and associated changes
- Measure ecosystem services in biophysical or monetary units
- Integrate this biophysical or monetary data into national accounts and public decision-making

MORE INFORMATION

SEEA - Central framework:

https://seea.un.org/ ; https://seea.un.org/content/seea-central-framework

https://seea.un.org/sites/seea.un.org/files/seea_cf_final_en.pdf

United Nations et al., 2012a. System of Environmental-Economic Accounting 2012 - Central framework. UNO, 377 p.

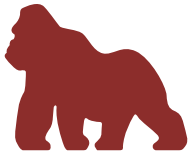
SEEA-EEA:

https://seea.un.org/ecosystem-accounting

https://seea.un.org/sites/seea.un.org/files/seea_eea_final_en_1.pdf

United Nations et al., 2012b. System of Environmental-Economic Accounting 2012 - Experimental Ecosystem Accounting. UNO, 177 p.

STRENGTHS AND WEAKNESSES OF THE TOOL



STRENGTHS

SEEA - Central framework:

- Represents a common framework recognized as an international statistical standard
- Is based on a finalized and accessible methodology
- Allows cross-country comparisons
- Offers the opportunity to be supplemented by extensions

SEEA-EEA:

- Adopts an ecologically relevant point of view
- Could allow cross-country comparisons
- Integrates a significant portion of natural capital components
- Offers a significant adaptability

WEAKNESSES

SEEA - Central framework:

- Integrates a limited number of natural capital components
- Does not take an “ecosystem centered” perspective
- Does not integrate the ecological limits’ issue

SEEA-EEA:

- Is still being structured
- Is not recognized as an international standard
- Requires access to - or acquisition of - a variety of environmental monitoring data

WWF FRANCE'S NATURAL CAPITAL PROGRAMME: STANDING STRONG TO MEET THE CHALLENGES

THE NATURAL CAPITAL PROGRAMME: PROMOTING STRONG SUSTAINABILITY AND ECOLOGICAL PERFORMANCE

WWF France started the Natural Capital Programme in 2018 with the support of the MAVA Foundation as part of the Economics4Nature consortium (WWF France, Natural Capital Coalition, Finance Watch, Green Economy Coalition, Green Growth Knowledge Platform).

This programme is part of a New Deal for Nature and People, with the main goal of obtaining an ambitious agreement on biodiversity from States, equivalent to the Paris Agreement on climate, at the COP 15 of the Convention on Biological Diversity in 2020. One of the central aspects of such an agreement should be the adoption of goals for biodiversity and ecosystem conservation, defined on the basis of the best scientific knowledge. These considerations have led WWF France's Natural Capital Programme to focus on understanding and integrating natural capital in line with the principle of strong sustainability[1] (Daly, 1995; Neumayer, 1999; Ackerman, 2003), and on tools aimed at ecological performance. Thus the programme's ambition is to demonstrate to decision-makers the capacity of economic actors to integrate environmental goals in line with the best scientific knowledge, in particular those relating to the ecological boundaries of ecosystems and the biosphere.

While the tools presented in this guidebook can be classified according to their technical features, as suggested above, they can also be ranked according to their strategic orientations. From this point of view, some of them appear to promote the economic performance of the organisations that set them up, while others promote the ecological performance and sustainability of ecosystems. Broadly speaking, the former aim at integrating environmental issues into the day-to-day functioning of economic actors, while the latter seek to integrate the activities of economic actors into the functioning of ecosystems.

Tools oriented towards economic performance show organisations their (potential) utilitarian interests related to the preservation of ecosystems: the benefits they derive from them and/or the losses

1 The economic interpretation of sustainable development - of sustainability - consists in ensuring that capital does not decrease (aggregation of financial, natural and human capital), over time and per individual. This general conception has led to two different approaches of sustainability. Under the weak sustainability approach, capital maintenance is based on the preservation of the aggregate value of the capital stock. The different types of capital are considered interchangeable and the degradation of one form of capital is harmless if it is compensated by the accumulation of another type of capital. Strong sustainability stipulates that the conservation of capital is based not only on its aggregate value but also on its composition, because of the particular properties of natural capital that other capital assets cannot replace (multiplicity of functions, irreversible changes and so on). Strong sustainability thus partially or totally rejects the hypothesis of capital substitutability, and introduces the concepts of threshold effect and scientific limits.

they may incur by failing to limit their pressures, through a traditional analysis of risks and opportunities. This type of approach may lead organisations to maintain or optimise natural capital, but on the condition that it is profitable under the usual conditions of their activity.

Ecological performance-oriented tools encourage organisations to operate within the ecological limits ecosystems can bear. In this context, the conservation of natural capital is not an option, but represents one of the fundamental rules of economic activity, and value creation is rethought in terms of the maintenance of natural capital. Depending on the economic sectors and organisations, this approach may require the reconsideration of current activities (production process, and more broadly economic model), in order to make material and energy flows compatible with ecological limits.

A WELL-INFORMED POSITIONING

Anchoring the Natural Capital Programme in strong sustainability and ecological performance is relevant for WWF and for organisations - private and public - beyond scientific considerations and the context of the New Deal for Nature and People: an increasing number of institutional actors, regulators, consumers and markets are moving towards similar choices.

International institutions and local governments are gradually adopting positions in line with the concept of strong sustainability: this is the case with the Sustainable Development Goals, the Paris Agreement, the regulations governing fishing quotas and the European Water Framework Directive. Many non-governmental actors are also following this movement. The WWF foundation in particular is at the forefront on these topics, with many emblematic projects focused on ecological performance such as the Science Based Targets initiative, the ecological footprint, or Earth Overshoot Day. Finally, public opinion, citizens and consumers are increasingly looking for the most rigorous guarantees in terms of sustainability for consumer products, services and public projects. This is reflected in the considerable boost in markets for green products and services, changes of behaviours regarding transport, and the high scores of green parties in recent elections.

While for some economic actors, the paradigm shift represented by strong sustainability and ecological performance may imply significant transformations in the economic model, the shift in the institutional context, opinions and markets also creates real opportunities such as: access to new high-growth markets, limiting the physical risks associated with environmental disruptions, brand image, attracting fresh talent, anticipating regulation. As a result, a growing number of forward-thinking companies are already engaged in experimentation projects or implementing instruments aimed at achieving strong sustainability goals.

INNOVATIVE, EFFICIENT, PROMISING TOOLS

Developing and promoting tools is at the heart of WWF France's Natural Capital Programme. The analysis carried out throughout this guidebook has identified a selection of tools complying with the principles of ecological performance and strong sustainability:

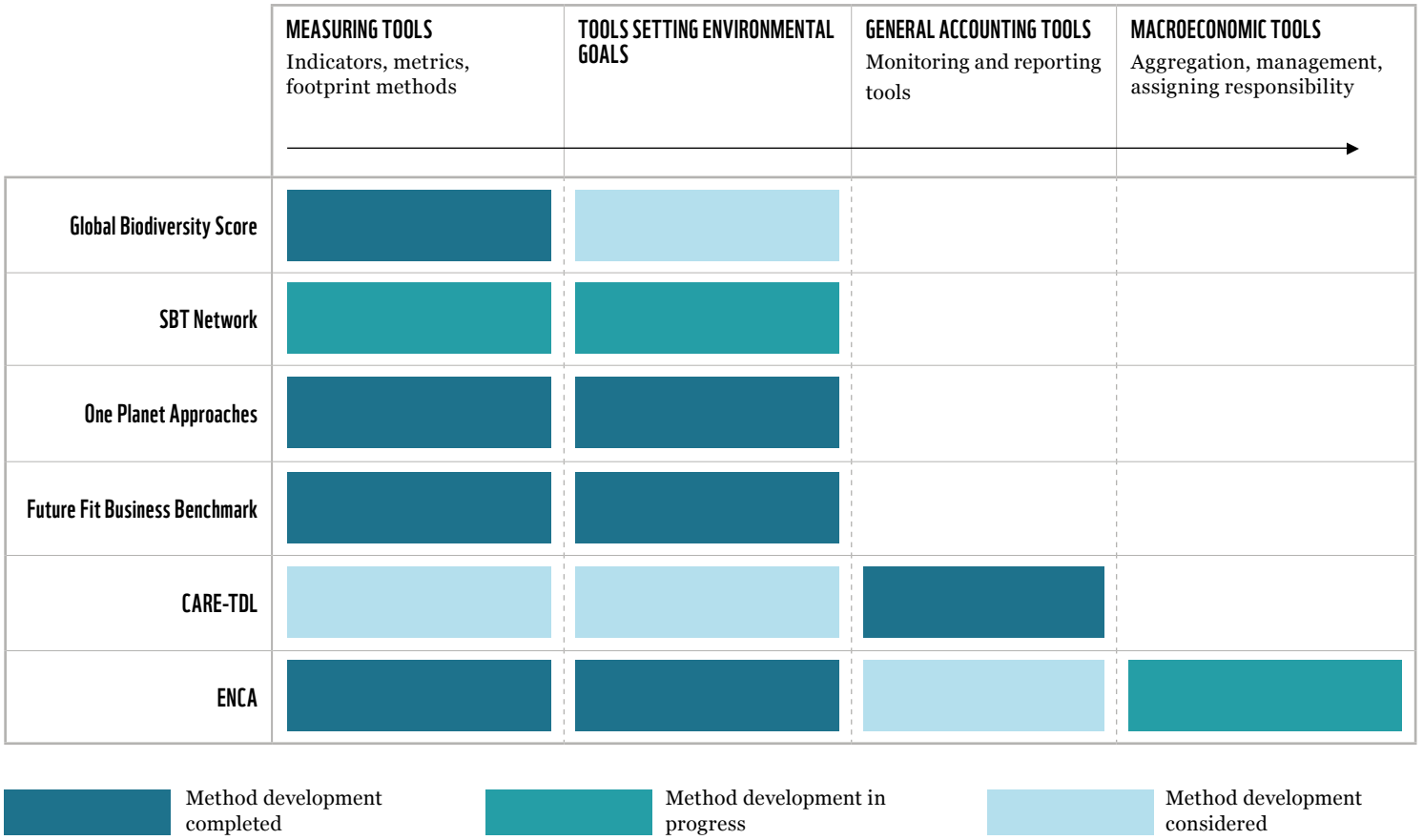
- The SBT Network initiative
- The One Planet Thinking Programme
- The CARE-TDL integrated accounting model
- The ENCA macroeconomic accounting model
- The Future Fit Business Benchmark approach
- The Global Biodiversity Score (with a view of coupling the method with the "biodiversity integrity" planetary boundary in the long run)

We could also add the recent S-GAP project developed by the French Agency for Development and the University College of London, aimed at producing an alternative macroeconomic indicator of strong sustainability.

These tools are somewhat complementary in terms of their technical features and their contribution to the ecological transformation of organisations. They can thus be represented as an ecosystem of "solutions" for the conservation of natural capital, with possible technical developments, as shown in the figure below.

It is important to note that this selection of tools is neither exhaustive nor definitive, other methods oriented towards strongsustainability and ecological performance may be the subject of interest and support from WWF France through its Natural Capital Programme.

★ Innovative, efficient, promising tool


MEASURING TOOLS
Indicators, metrics, footprint methods
TOOLS SETTING ENVIRONMENTAL GOALS
GENERAL ACCOUNTING TOOLS
Monitoring and reporting tools
MACROECONOMIC TOOLS
Aggregation, management, assigning responsibility
Global Biodiversity Score
SBT Network
One Planet Approaches
Future Fit Business Benchmark
CARE-TDL
ENCA
Method development completed
Method development in progress
Method development considered

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WWF FRANCE
in few numbers

100% RECYCLED

1973

year of creation of WWF's french office

117

employees of WWF France committed to passing on a living planet to our future generations

4 000

active volunteers in metropolitan France and overseas

1 000 000

donors of WWF France

Why we are here
To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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