SEEA Ecosystem Accounting for Business

A quick introduction

United Nations

System of Environmental Economic Accounting

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The business accounting workstream aims to:

a) contribute to the alignment of natural capital accounting between the public and private sectors;
b) explore how to harness synergies between the public and private sectors in the collection and use of statistics and data for natural capital accounting; and
c) provide a technical methodological contribution at the level of methods or of indicators that promotes alignment.

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1 INTRODUCTION

Businesses are increasingly looking for ways to measure and value their impacts and dependencies on ecosystems. To offer businesses clarity and guidance on how to do this, efforts are taking place to standardize measurement and valuation approaches[1]. In addition to measurement and valuation, interest in environmental accounting is growing. Accounting for the value of nature in decision making is crucial to achieve the ambition of the United Nations 2030 Agenda for Sustainable Development. The 2030 Agenda recognizes the critical importance of a sustainable financial system and economy and the necessity of collaboration with the private sector. To fully embark on this journey, the business community is calling for holistic datasets, standardized methodologies and government regulations to ensure a level playing field, including through (mandatory) requirements on disclosure[2], that support the inclusion of the value of nature and people in their internal decision making and their external disclosure. Integrated datasets will also enable businesses to better understand how best to align their organizations with other societal ambitions such as the European Green Deal and other green COVID-19 recovery plans. In line with financial accounting, a number of businesses have started to explore environmental accounting approaches (see, for instance, Capitals Coalition's case studies on business applications[3], or the Value Balancing Alliance[4]), triggered by the increasing demand for more transparency based on a common set of rules on how to disclose non-financial performance.

Although developed for national and subnational application, the UN System of Environmental-Economic Accounting - Ecosystem Accounting (SEEA EA) has several elements that can be useful in the context of corporate natural capital accounting, particularly in terms of collecting and structuring natural capital data. This is true not only of companies that have a direct impact/dependency on ecosystems, but also applies to companies that interact indirectly with ecosystems (e.g. through their supply chains). First case studies on potential alignment between the SEEA EA and corporate natural capital accounting have proved to be instructive for involved companies[5]. Moreover, a workstream on business accounting has been established within an intergovernmental body, the UN Committee of Experts on Environmental-Economic Accounting (UNCEEA), with the hopes of further collaboration and alignment between the public and private sector. This document responds to a growing demand by businesses for more information on the SEEA EA and how it can be applied to the private sector. It has the following structure:

- Introduction
- What is the SEEA?
- What is specific to the SEEA EA?
- Why and how to apply the SEEA EA in a business context?
- The road ahead
- Useful links

[1] See Transparent project (Transparent - Capitals Coalition) and ALIGN project (Aligning Accounting Approaches for Nature - Capitals Coalition).
[2] See for example the recommendations from business on the post-2020 global biodiversity framework.
[3] See the Case study database from the Capitals Coalition.
[4] See Home – Value Balancing Alliance (value-balancing.com).
[5] See https://seea.un.org/content/business-and-natural-capital-accounting-case-study-ambuja-cement-india and https://seea.un.org/content/business-and-natural-capital-accounting-study-quarry-restoration-holcim-spain.

2 WHAT IS THE SEEA?

This section provides a first brief description of what the SEEA is. More detailed information is provided in Section 4.

The **System of Environmental-Economic Accounting** 2012—SEEA Central Framework (SEEA CF)[6], which was adopted by the United Nations Statistical Commission in March 2012, is the first international statistical standard for environmental-economic accounting. The SEEA CF is a measurement framework for compiling accounts that detail the relationship between the economy and the environment, and that describe natural capital stocks and changes in stocks of environmental assets[7] (e.g. water, energy, etc.).

The SEEA CF provides information related to a broad spectrum of environmental and economic issues including, in particular, the assessment of trends in the use and availability of natural resources, the extent of emissions and discharges to the environment resulting from economic activity, and the amount of economic activity undertaken for environmental purposes (e.g. environmental protection expenditures).

The SEEA CF is based on agreed concepts, definitions, classifications and accounting rules which are aligned with the System of National Accounts (from which GDP is derived). This alignment means that the SEEA can be used to derive other information such as environmental footprints or to decompose the effect of underlying pressures on the environment. As an accounting system, it enables the organization of information using accounting tables in an integrated and conceptually coherent manner. This information can be used to create coherent indicators and aggregates to inform decision-making and for a wide range of purposes. SEEA accounts can be both physical or monetary, and the accounts are typically compiled by government (in particular national statistical offices). It should be noted that accounting is related to, but very different from assessment (see Box 1).

Box 1: Accounting versus assessment

A key way in which accounting differs from assessment is that natural capital accounts are consistently and regularly compiled and do not function as one-off exercises. The Capitals Coalition applies the following definitions[8].

- **Natural Capital Assessment** is the process of identifying, measuring and valuing natural capital impacts and dependencies. The scope can be broad and it is primarily about providing information to inform decisions rather than disclosure.
- **Natural Capital Accounting** is a framework or method that approximates financial accounting standards by collecting and systemizing information on natural capital. It can be used for disclosure either in national or business accounts.

[6] See https://seea.un.org/sites/seea.un.org/files/seea_cf_final_en.pdf.
[7] Contiguous spaces of a specific ecosystem type (e.g. forest, grassland, wetland, lake) characterized by a distinct set of biotic and abiotic components and their interactions.
[8] See https://naturalcapitalcoalition.org/wp-content/uploads/2017/11/21799_NCC_This-is-Natural-Capital_2017_WEB_04-12-17.pdf.

As accounting allows for compiling consistent, comparable and regularly produced data on natural capital, businesses applying a natural capital accounting approach will gain a better understanding on how impact drivers and/or state of natural capital evolve over time and will be able to track progress to targets.

The SEEA CF is complemented by the **SEEA Ecosystem Accounting**, which was adopted by the UN Statistical Commission in 2021. The SEEA Ecosystem Accounting (SEEA EA) constitutes an integrated and comprehensive statistical framework for organizing data about **habitats and landscapes**, measuring **ecosystem[9] health and services**, and linking this information to economic and other human activity in a spatially explicit way (i.e. through maps). The SEEA EA complements the SEEA CF by taking the perspective of ecosystems and enlarges the scope of services and assets included in the System of National Accounts to explicitly recognize the contribution of ecosystems. For instance, in the SEEA CF, forests are considered for their timber, whereas in the SEEA EA, they are considered for the ecosystem services they deliver—climate regulation, soil protection, etc. In addition, the SEEA EA takes a spatial approach which identifies the location and size of ecosystems, where ecosystem services are provided and the location of beneficiaries (households, businesses and governments).

Given the growing interest by the private sector on ecosystems and biodiversity, as well as the recent adoption of the SEEA EA, this document focuses on ecosystem accounting. Section 4 provides an overview of some key characteristics of SEEA EA.

3 WHAT IS SPECIFIC TO THE SEEA EA?

This section provides a short description of general concepts of ecosystem accounting, as applied in the SEEA EA. To make these more tangible for businesses, examples are included of how businesses can apply them in their own context. These examples are based on two pilot cases with Holcim, aimed at exploring potential synergies between business level natural capital accounting approaches and the SEEA.

The emphasis in ecosystem accounting is on recording **stocks and flows, and the changes in these stocks and flows over time**. The SEEA EA consists of five core stock and flow accounts which measure different aspects of ecosystems and their relationship to the economy, in both physical and monetary terms (figure 1). Ecosystem extent stock accounts form the basis of the SEEA EA and measure the size and location of ecosystems (often portrayed using maps). Ecosystem condition accounts build off ecosystem extent accounts to measure the health of these ecosystems. Ecosystem service flow accounts measure the flow of ecosystem services to the economy and society in both physical and monetary terms. Finally, ecosystem asset accounts show the monetary value of ecosystems based on their current and predicted future ecosystem service flows.

The SEEA EA also includes **thematic accounts.** These provide information for specific policy-relevant topics **including climate change (carbon), water and biodiversity (species occurrence)**. Thematic accounts

[9] The SEEA uses the definition of ecosystems of the Convention on Biological Diversity—"a dynamic complex of plant, anima land micro-organism communities and their non-living environment interacting as a functional unit".

may be compiled by extending or adapting existing SEEA EA accounts to provide more data on a specific theme. In addition, thematic accounts may focus on a particular geographical area (such as protected areas or urban areas) that has high management and policy relevance.

While the SEEA EA conceptual framework has not been widely applied by businesses, the concepts of stocks and flows in a business context is not new. It was already introduced by the Natural Capital Protocol (2016) as presented in Figure 2.

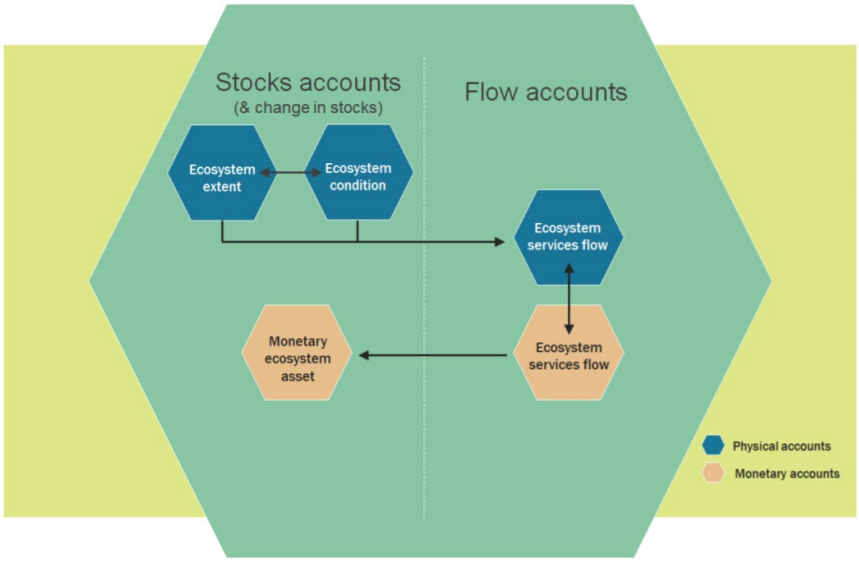


Figure 1: Connections between ecosystem and related accounts and concepts (Figure 2.2, white cover of SEEA EA)

Figure 2: Natural capital stocks, flows, and values (Natural Capital Protocol)

For accounting purposes, stocks of capital refer to the underlying assets that support production and the generation of income at a specific point in time. For economic accounting, these assets include fixed capital, such as machinery. For ecosystem accounting, the **stocks of primary focus** are the **ecosystem assets** delineated within **the area in scope of the accounts, i.e. the Ecosystem Accounting Area.** As the SEEA is implemented, the ecosystem accounting area is usually a country or region, but it can also be defined by any company that owns or manages land (or water), including within their value chain, and wants to monitor ecosystem condition and/or services. The ecosystem accounting area comprises multiple ecosystem assets, which are represented in the accounts in terms of different ecosystem types such as forests, lakes, desert, agricultural areas, wetlands, etc.

Ecosystem extent accounts record the changes in the occurrence of different ecosystem types within an ecosystem accounting area and are often disseminated in the form of maps. While the total area being accounted for will generally remain stable, the configuration of ecosystem assets and types, in terms of

their area, will change over time through natural changes and land use changes. Ecosystem extent accounts can systematically track, for example, ecosystem conversions and patterns of changing fragmentation of ecosystem assets. However, it should be noted that EAs do not overlap on a map—they are mutually exclusive (see figure 3).

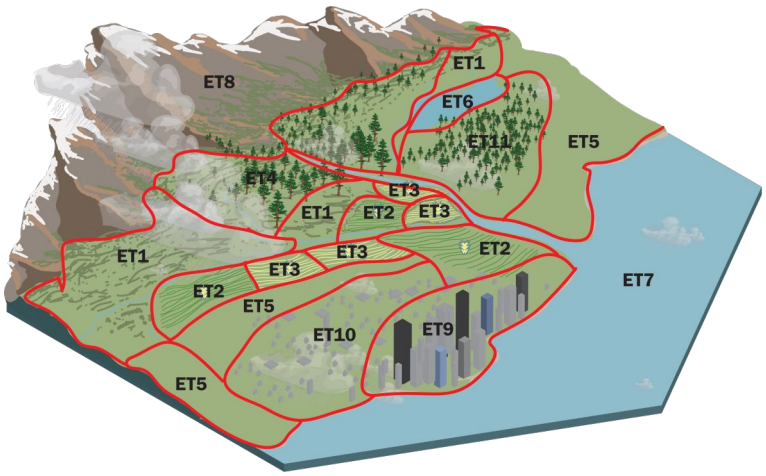


Figure 3: An ecosystem accounting area, with many ecosystem assets (delineated in red), classified into ten different ecosystem types (ET1-ET10) (UN Statistics Division)

Ecosystem assets are further characterized in terms of their condition. **Ecosystem condition accounts** record the condition (or health) and the changes in condition over time for ecosystem assets. These changes may be due to natural causes or human intervention. Recording the changes in ecosystem condition is a fundamental ambition of ecosystem accounting, as it allows compilers to understand whether ecosystems are undergoing degradation, if ecosystem restoration efforts are successful, etc. Compilers can choose which ecosystem condition indicators to use, though the choice of indicator is dependent on the ecosystem type in question[10]. For example, condition indicators relevant for forests will be less relevant for cropland. In addition, choosing condition indicators that align with the indicators applied in national level accounts could be useful for businesses, as this would enable businesses to compare the condition of their ecosystem assets to a benchmark. Indicators in the ecosystem condition account can also be chosen to reflect policy priorities (e.g. preservation of native habitat) and pressures on ecosystems (e.g. deposition levels of acidifying compounds versus critical loads for such compounds).

The **ecosystem condition account** also provides information on the **capacity of ecosystems to supply ecosystem services. Ecosystem services** are the contributions of ecosystems to the benefits that are used in economic and other human activity. Ecosystem services are recorded as flows between ecosystem assets and economic units (e.g. business, governments and households). Ecosystem services can be accounted for in **physical and monetary terms**.

Monetary ecosystem service accounts can also be used to derive **ecosystem monetary asset accounts**, which record a monetary value of ecosystem assets in terms of the net present value[11] of the ecosystem services supplied by the asset. It is important to mention that monetary values in the SEEA EA are based

[10] The SEEA Ecosystem Condition Typology (ECT) distinguishes 3 groups of ecosystem characteristics (abiotic, biotic and landscape level) with specific classes per group: physical and chemical indicators for abiotic ecosystem condition, compositional, functional and structural state indicators for biotic ecosystem description and a range of specific indicators for landscape level ecosystem condition such as connectivity, mosaics, etc.

[11] The net present value (NPV) is the value of an asset determined by estimating the stream of income expected to be earned in the future and then discounting the future income back to the present accounting period. (SEEA Central Framework, para. 5.110)

on **exchange values**[12], which is important to be consistent with the System of National Accounts. The SEEA EA's primary focus is on instrumental values, but the full set of ecosystem accounts can also provide relevant information to support other value perspectives such as intrinsic or relational values. The SEEA EA emphasizes that monetary valuation will not be appropriate in all decision-making contexts and therefore suggests to also release associated biophysical data on stocks and flows.

Box 2 provides an example of how the SEEA EA has been applied to NCA accounts in the EU.

Box 2: Example: NCA accounts in the EU

In 2015, the EU launched a pilot project for an integrated system of ecosystem accounting, that resulted in the compilation of extent, condition and ecosystem services accounts. Some of the findings indicated a loss in extent of farmland and semi-natural ecosystems at the expense of urban ecosystems, which has important implications for the provision of ecosystem services (Vysna et al., 2021):

- The EU wide monetary value of the seven services that were assessed totalled EUR 172 billion in 2012 (see Ecosystem Services Supply Table below).
- Forests deliver 47.5% of the total supply of the measured ecosystem services, croplands contribute 36%, urban ecosystems less than 1%.
- Urban ecosystems showed a significant increase in extent of 5.8% between 2000 and 2018 at the expense of farmland and semi-natural ecosystem
- More than half of the societal demand for essential ecosystem services (e.g. pollination) in the EU is not met by ecosystems.

Economic value in million EUR provided by ecosystem services in the EU28, 2012

	Urban	Cropland	Grassland	Woodland and forest	Wetland	Heathland and shrub	Sparsely vegetated land	Rivers and lakes	Marine inlets and transitional waters
Crop provision	0	20 795	0	0	0	0	0	0	0
Timber provision	0	0	0	14 739	0	0	0	0	0
Crop pollination	:	4 517	:	:	0	:	0	0	0
Carbon sequestration	0	0	0	9 189	0	0	0	:	:
Flood control	89	1 015	3 129	11 388	333	357	1	:	:
Water purification	1 105	31 041	4 128	15 374	330	312	170	3 114	:
Nature-based recreation(1)	77	4 073	7 482	30 723	22 96	3 097	1 351	1 015	279

Source: JRC

Note: (:) not available.

(1) The scope of nature-based recreation was restricted to daily trips within 4 km from human settlements and the highest natural quality sites.

To conclude, asset accounts are designed to record information on stocks and changes in stocks (additions and reductions) of ecosystem assets. Stocks are measured at the beginning and end of each **accounting period** (e.g. the end of the financial year) and these measurements are aggregated to form a balance sheet for that point in time. **This includes accounting for ecosystem degradation and enhancement (or restoration)**. This approach allows for a better understanding of the potential for the stock to support the generation of ecosystem services into the future (ecosystem capacity). The **ecosystem monetary asset account** records this information in monetary terms, based on valuation of ecosystem services and connecting to information on ecosystem extent and condition.

[12] The values at which goods, services, labor or assets are in fact exchanged or else could be exchanged for cash.

4 HOW CAN THE SEEA EA INFORM BUSINESSES?

Both the overall concept of ecosystem accounting, as applied by the SEEA EA, and specific elements of it might be instructive for businesses that are interested in applying natural capital accounting. While the SEEA EA is a public sector framework, the conceptual framework can be used by businesses. In particular, a natural capital accounting approach which is in line with the SEEA EA conceptual framework may use the same or similar accounting structure, definitions and methods, and have a similar focus on measuring stocks and flows over time. In addition, it should be noted that a natural capital accounting approach in line with the SEEA EA can provide a complementary basis to the Natural Capital Protocol by providing a systematic way to measure natural capital at the business level over time.[13] Below, some suggestions are elaborated, many of them based on two pilot cases with HOLCIM that were carried out in 2020 – 2021[14]. These pilot cases analyzed alignment of business natural capital accounting approaches with the SEEA.

Individual companies interested in applying natural capital accounting can learn or benefit from the SEEA EA in many ways:

- The SEEA EA provides a logical and well-structured approach for ecosystem accounting, which might be beneficial to companies applying the Natural Capital Protocol. The SEEA EA and Natural Capital Protocol can be understood as complementary. The SEEA EA provides the measurement framework, with the Protocol applying the accounts into the decision-making processes of companies.

- Natural capital accounting provides a way to measure natural capital in a systematic way over time, allowing for a rigorous understanding of how business impact and are dependent on nature.

- Applying a natural capital accounting approach which is in line with the SEEA EA will increase credibility, as the SEEA EA is an internationally accepted and frequently applied approach by governments. In addition, as the SEEA EA approach includes the use of standard definitions and concepts, natural capital accounts in line with the SEEA EA allow the compilation of meaningful time series—one that can also be benchmarked to national level SEEA EA accounts produced by governments.

- An accounting approach in line with the SEEA EA facilitates 1/ land management decisions, including trade-off analysis and optimisation assessment, 2/ scenario and risk analysis (e.g. impacts of climate change), 3/ ecosystem footprint approaches, 4/ stakeholder engagement, by recognizing the spatial context and multiple values, 5/ non-financial reporting – e.g. corporate sustainability reports, 6/ ability to align with certification schemes (e.g. FSC), which could even lead to new revenue opportunities such as access to environmental markets (e.g. carbon credits, water credits) and green finance.

- As natural capital accounting includes a focus on natural capital stocks and dependencies, it provides a good link with business risks (business materiality).

- The concepts of an ecosystem accounting area and ecosystem assets are relatively easy to apply and map at a company level. This is particularly interesting for companies with large land footprints (e.g. forestry, agro-industrial companies, extractives, water supply companies).

[13] See https://capitalscoalition.org/publication/natural-capital-protocol-seea-toolkit-discussion-paper/.
[14] See https://seea.un.org/content/business-and-natural-capital-accounting-case-study-ambuja-cement-india and https://seea.un.org/content/business-and-natural-capital-accounting-study-quarry-restoration-holcim-spain

- The spatial (location specific) approach of the SEEA EA facilitates the analysis of direct impacts and dependencies on nature, for instance through sites owned / managed by companies. For a wider scope including impacts and dependencies that arise within value chains, sites of main trading partners can also be included.[15]

- The concepts of extent and condition accounts can be tailored to the specific company and locational context. As an example, in the mining sector, the respective quarries can be considered as 'ecosystem accounting areas' (EAA), i.e. the area in scope of the accounts, while the different ecosystem types or habitats within the quarry can be considered as 'ecosystem assets' and measured over time. Applying extent and condition accounts is an excellent way to track ecosystem performance, e.g. progress to biodiversity No Net Loss or Net Gain targets.

- The ecosystem services accounts, either in physical or in monetary terms or both, are an interesting approach for companies that are looking for ways to measure and demonstrate the societal benefits of their efforts in ecosystem restoration or nature-based solutions. The supply of ecosystem services generated by ecosystems owned or created by companies could be recorded as a positive externality (while their degradation would be a negative externality).

- Expressing ecosystem performance in monetary terms is interesting for companies that apply an Environmental or Integrated Profit & Loss approach (E P&L, I P&L). The SEEA EA also offers guidance on how to value ecosystem services in monetary terms.

Companies that already apply tools for measuring biodiversity at site level and with a regular periodicity can easily integrate this data into extent and condition accounts. Adding monetary ecosystem services accounts will increase insights into the links between ecosystem condition and ecosystem services value. This will improve the business case for investments in ecosystem restoration. A good example is mining companies that often have plenty of data on how ecosystem condition is evolving in its quarries – ranging from complete habitat loss during active exploitation to advanced rehabilitation afterwards.

In terms of natural capital data, a business consultation in 2019[16] confirmed that data collection is an expensive activity for companies. It's often hard for sustainability professionals within the industry to justify return of investment. Therefore, data sharing and open-source databases are very important for companies.[17] Companies generally have strong interest in increased access to more detailed, comprehensive, spatially referenced and regularly updated ecosystem accounts.

Companies that start exploring the SEEA EA will discover that governments have plenty of natural capital information, often at subnational level (e.g. watershed level, specific protected areas) which can help companies put their ecosystem performance in the right context. Although data granularity is still an issue for many business applications (e.g. lack of sufficiently detailed information to improve natural capital assessments at site level), it is expected that quality of natural capital data will rapidly improve over the next years. Moreover, if national statistics offices (NSOs) invest in making these natural capital data more accessible to businesses and tailoring them to the business needs (e.g. providing easily accessible data at high granularity, creating easily accessible and fit for purpose dashboards for businesses), this would be a major step towards strengthening corporate natural capital accounting and improving internal decision-making and external disclosure.

Multinational companies with sites in many countries would have an additional advantage in using natural capital data from NSOs. Natural capital data available from NSOs across the supply chain can be

[15] Pro-rated based on the volume of trade if suppliers have multiple trading partners. Care should be taken to avoid double counting (which may arise when these businesses themselves also report their direct impacts.
[16] See https://seea.un.org/sites/seea.un.org/files/business_consultation_public_version.pdf.
[17] See https://capitalscoalition.org/data-information-flow-project-update/.

expected to be standardized according to the SEEA EA. This means that multinational companies which utilize accounts from various countries data can expect to receive data that can be readily integrated across the supply chain.

Boxes 3 and 4 provide two examples of concrete applications of SEEA EA concepts and approaches by businesses. The example in Box 3 shows how ecosystem accounting can be applied to monitor progress of a quarry rehabilitation, in this case operated by HOLCIM Spain[18]. The example in Box 4 illustrates how a forestry company in Tasmania is applying ecosystem accounting.

Box 3: Rehabilitation of a quarry by HOLCIM Spain

Until a few years ago, Holcim used to restore quarries only after many years without mining activity, and restoration was mainly limited to planting monoculture forests of pine trees. Now, Holcim applies a new concept of quarry restoration with the main objective of restoring quarries into important biodiversity sites. To increase overall societal benefits, the approach not only aims to enhance intrinsic biodiversity values but also ecosystem services. Holcim Spain has developed a tailormade approach, based on combining BIRS (Biodiversity Indicator and Reporting System, developed by IUCN) and the LBI (Long-Term Biodiversity Index, developed jointly with WWF) with a monetization of ecosystem services. The approach has been tested on the Yepes – Ciruelos quarry. The approach allows for assessing biodiversity condition and ecosystem services in the different phases of the exploitation cycle, i.e. prior to, during and after exploitation, supporting decision-making for optimal development of both biodiversity and societal benefits. Figure 3 provides a map showcasing the cumulative number of different ecosystem services provided by different spots in the quarry. The eastern part of the quarry is the part with long natural succession. It provides a higher variety of ecosystem services compared to the western side that is still in use as agricultural land.

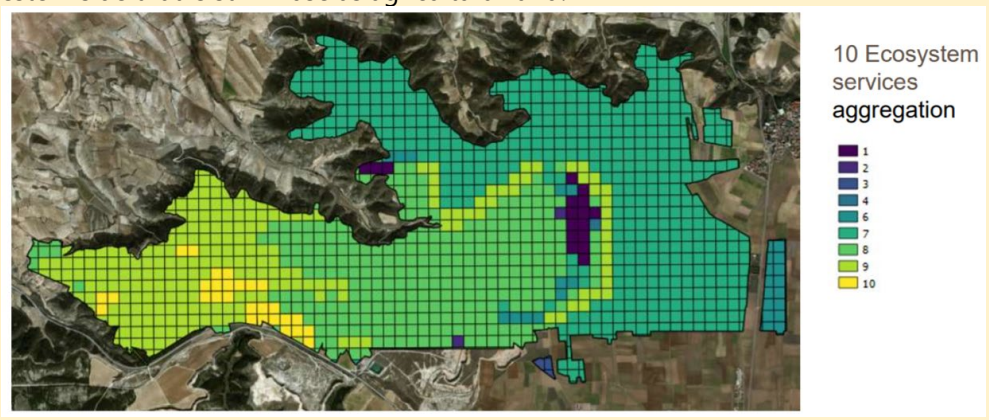


Figure 3: Cumulative number of different ecosystem services provided by different spots in the quarry

Although Holcim's approach doesn't refer explicitly to the concepts of ecosystem assets and ecosystem accounting area, it is applied in practice. Holcim's approach **at site level** has the following similarities with the SEEA EA:

- The respective quarries can be considered as 'ecosystem accounting areas' (EAA), i.e. the area in scope of the accounts. The specific occurrences of different ecosystem types or habitats within the quarry can be considered as 'ecosystem assets'.
- BIRS applies a spatial approach where different habitats (comparable to 'ecosystem assets') are measured in terms of extent and condition. The same applies to LBI. LBI also makes use of a spatial approach based on 'ecological units' – which are different from the BIRS habitats – and a condition appraisal. The LBI approach has much in common with the species occurrence account in the SEEA EA.

[18] See https://seea.un.org/content/business-and-natural-capital-accounting-study-quarry-restoration-holcim-spain.

- Holcim Spain's approach to add an ecosystem services dimension makes this picture complete: ecosystem services flows are expressed both in physical terms and monetary terms, which allows the compilation of ecosystem monetary asset accounts.

Holcim's Integrated Profit & Loss (IP&L) approach **at corporate level**, which is inspired by KPMG's True Value methodology (see Figure 4), relies on the concepts of a balance sheet and annual accounting periods which is similar to the SEEA. It also contains information on stocks (e.g. rehabilitated quarries) and flows (e.g. emissions of GHG) in physical and monetary terms.

Overall, this approach aligns with the SEEA EA in principle, as the environmental externalities can be recorded in the SEEA EA compliant physical accounts (see). However, the SEEA EA does not price these externalities.

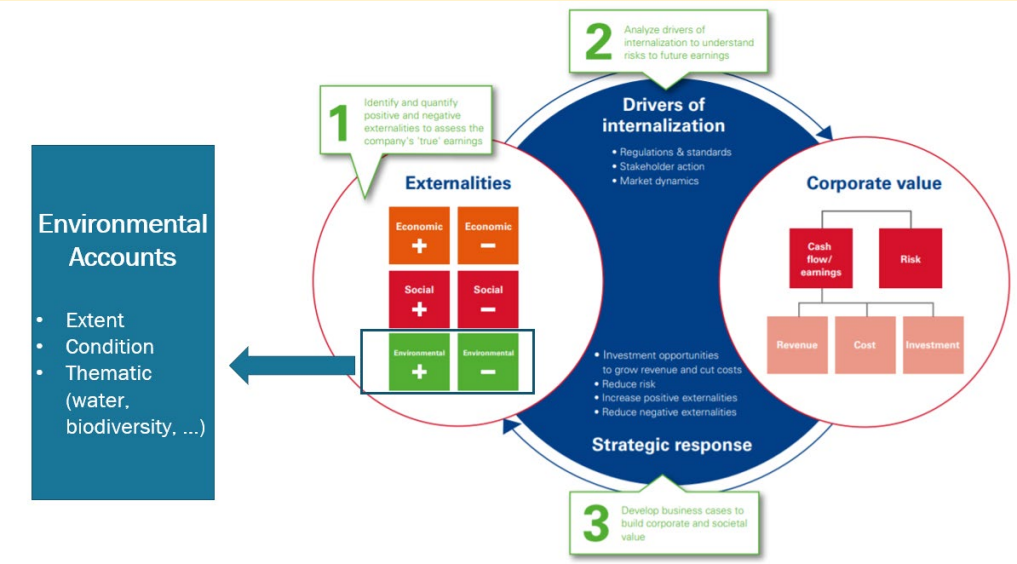


Figure 4: Link between KPMG's True Value methodology applied by Holcim and environmental accounting according to SEEA EA

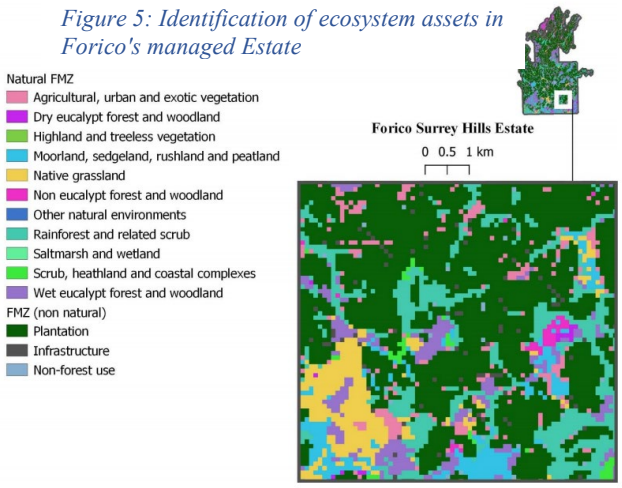
Holcim is reporting its annual surface of rehabilitated area at corporate level, but from a SEEA EA perspective, the ecosystem services generated by the ecosystems under control by Holcim can be interpreted as positive externalities and (after valuation) be included in the IP&L. At the same time, in case ecosystems decline in condition (e.g. when a new quarry is excavated), the resulting cost of degradation can be interpreted as a negative externality and included in the IP&L. Degradation costs and enhancement benefits are estimated in SEEA EA based on the change in the monetary ecosystem asset value that is the result of decline or improvement in (physical) condition.
Having monetary ecosystem asset value accounts would allow for a clear recording of changes in the monetary value of ecosystems over time due to:

- the typical sequence of degradation and rehabilitation in quarries, which includes both abrupt and gradual conversions between ecosystem types (e.g. agricultural land into open mine; open mine into grassland; grassland into forest);
- human-induced habitat restoration activities, aimed at optimizing biodiversity and ecosystem services values; and
- revaluations (due to changes in unit prices of ecosystem services).

Box 4: Forico (Tasmania)

An example of how SEEA-EA based accounts can be used to shape and implement business-level NCA is Forico, a private forest management company which manages 181,000 hectares of plantation and natural forest land in Tasmania, Australia. Ninety thousand hectares of plantation are managed for wood fibre production, while 81,000 hectares of natural forest are managed for biodiversity and conservation purposes. In 2016, Forico engaged IDEEA Group to provide a theoretical proof of concept on an accounting framework to show the extent and condition of the ecosystem services from the Estate. This "Accounting for Forico's Forest Assets" project showed how the SEEA EA could be applied to measure the extent and condition of the Estate's ecosystem services. Specifically, this involved (i) accounting for the stock and changes in stock (including changes in condition) of ecosystem assets held by Forico and (ii) accounting for the flow of ecosystem services supplied by these assets (i.e. beyond plantation fibre production) and produced considerable spatially explicit physical information on ecosystem extent and services. The results showed that areas under Forico management provided significant provisioning services as well as carbon sequestration and habitat services (as shown in the maps below). It shows how the SEEA provided Forico with a structure to understand concepts of ecosystem extent, condition and services, and it introduced an impressive breath of data, tables and lists to support business-level decision making, for example through forest management planning, and to underpin delivery against sustainable forest management reporting, certifications and assessment protocols.

Figure 5: Identification of ecosystem assets in Forico's managed Estate



Whilst the SEEA-EA is impressive with its maps, comprehensiveness, and intent, Forico also wanted to find a way to succinctly and easily communicate its impacts and dependencies from nature to stakeholders. This led Forico to explore the Natural Capital Protocol and Integrated Reporting frameworks to translate its forest assets data into a message with balance and relativity. The principles-based Natural Capital Protocol framework instinctively aligned with the "Accounting for Forico's Forest Assets" project objectives of producing data that is pragmatic, scalable, timely, technically robust and auditable. Reporting the natural capital story was important to Forico's approach, and so they followed the Natural Capital Protocol framework which included scoping the Report using a materiality assessment to ensure it would maintain transparency while focusing messaging to key stakeholder on the most relevant metrics for decision-making. Forico's reports are quite innovative as they have integrated SEEA, Natural Capital Protocol and traditional Financial Reporting frameworks to value their most material ecosystem services which had been measured across the Estate and presented them in a format that resonates with financial markets and the business community. For Forico, the Natural Capital Protocol framework was a useful project management framework with terminology aligned to professional accounting concepts, that they could use to further develop their natural capital approach and reporting objectives.

Forico's two reports are publicly available on their website: https://forico.com.au/#ncr

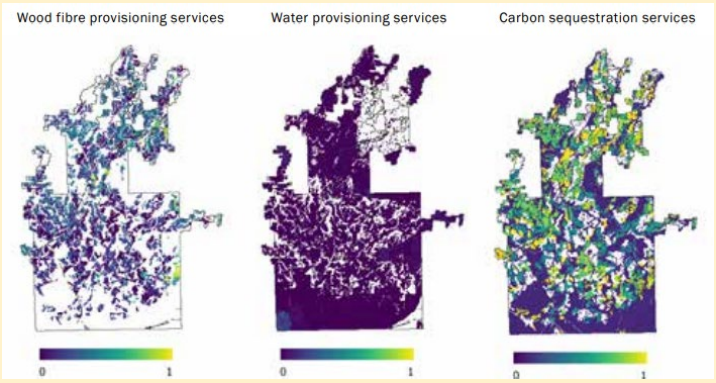


Figure 6: Ecosystem services flows at ecosystem asset level

5 THE ROAD AHEAD

Further work is required to further align private and public sector accounting of natural capital. Hereto, the UN Committee of Experts on Environmental Economic Accounting has endorsed a roadmap and set-up a working group that will focus on alignment of methodology, standards and presentation of data. This group will act as focal point for and seek active engagement with existing and emerging initiatives and stakeholders such as the Capitals Coalition, TNFD, Value Balancing Alliance, ALIGN, IFRS Foundation and others.

6 USEFUL LINKS

SEEA Ecosystem Accounting (white cover): https://unstats.un.org/unsd/statcom/52nd-session/documents/BG-3f-SEEA-EA_Final_draft-E.pdf)

Introduction to Ecosystem Accounting: https://seea.un.org/introduction-to-ecosystem-accounting

Combining Forces project: Combining Forces on Natural Capital - Capitals Coalition

SEEA Business Workstream: Business Accounting | System of Environmental Economic Accounting

Case study Ambuja Cement (India): https://seea.un.org/content/business-and-natural-capital-accounting-case-study-ambuja-cement-india

Case study Holcim (Spain): https://seea.un.org/content/business-and-natural-capital-accounting-study-quarry-restoration-holcim-spain

Government Dialogue project: https://capitalscoalition.org/project/government-dialogue/

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