

Mobilizing strong sustainability indicators to achieve global durability goals

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- ▶ The indicators used to monitor the **Global Biodiversity Framework (GBF)** and **the Sustainable Development Goals (SDGs)** do not adequately capture whether natural capital is preserved over time and, consequently, environmental sustainability.
- ▶ A solution would be to integrate **sustainability reference values** into the **United Nations System of Environmental-Economic Accounting (SEEA)**, particularly in ecosystem condition accounts.
- ▶ Many sources of sustainability reference values are available through indicator frameworks such as **Environmental Sustainability Gap (ESGAP)** or planetary boundaries.
- ▶ International negotiators have the opportunity to integrate **sustainability reference values** into the next SEEA revision cycle, thereby improving its utility for political monitoring of progress toward the vision of the GBF and the SDGs.

While the GBF and the SDGs pursue a vision of maintaining natural capital at a level that allows for sustainable socio-economic development, their monitoring systems do not use strong sustainability indicators that guarantee this vision.

From a strong sustainability perspective, environmental sustainability requires identifying the elements of natural capital to be preserved (**critical natural capital**) and defining the level at which they should be preserved (**sustainability reference values**). In this line, Usubiaga-Liaño and Ekins (2021a) proposed two criteria to assess whether an indicator set represents the strong sustainability perspective. First, **indicators** of strong sustainability (the annual quantities of woody biomass harvested from forests, for example) need to be related to the **functions of natural capital** (e.g. the capacity of forest ecosystems to maintain biomass production), since strong sustainability requires the functions of critical natural capital to be maintained over time. Second, the **indicators** need to have a **sustainability reference value** against which performance can be compared that reflects the conditions under which those functions are maintained (the maximum sustainable yield of biomass production from forests, for our example).

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Policy Brief

Strong vs. Weak Sustainability

Two distinct worldviews shape the relationship between the environment and the economy in the context of sustainable development: weak sustainability and strong sustainability. The main distinguishing feature between these two is the relationship between different types of capital (natural, manufactured, social and human), which are key determinants of human welfare. The first worldview, **weak sustainability**, assumes that the functions provided by natural capital can be replaced (that they are substitutable) by increasing those provided by other types of capital. The latter, **strong sustainability**, sees the economy as a subsystem of the environment and, therefore, views this relationship as one of codependence, rather than compensatory. Thus, the substitution capacity between the functions provided by natural capital and other types of capital is limited under this perspective. It is important to begin from a strong sustainability perspective to approach substitutability and non-substitutability situations, as ignoring the latter might result in non-reversible losses of natural capital, which is in clear conflict with the policy visions of the SDGs and the GBF.

1 The monitoring indicators for the Sustainable Development Goals (SDGs) and the Global Biodiversity Framework (GBF) do not capture environmental sustainability.

While there are no references to weak/strong sustainability or critical natural capital in the main document of the Agenda 2030 describing the SDGs^[1], their 17 goals, 169 targets and more than 230 indicators are intended to represent a vision that is, in principle, compatible with strong sustainability. In p. 4, the SDG's agenda envisions "[a] world in which consumption and production patterns and use of all natural resources—from air to land, from rivers, lakes and aquifers to oceans and seas—are sustainable." Since the vision of the SDGs largely refers to sustainability conditions, even if it does not explicitly mention strong sustainability or critical natural capital, measuring progress toward this vision requires monitoring indicators that are compared to sustainability reference values to control sustainability levels. However, although the SDGs include 169 targets, many of them are not quantitative or cannot be easily measured (ICSU and ISSC 2015). Moreover, most of the SDG indicators used by international institutions such as the UN, Eurostat or the OECD do not address natural capital or its functions, and only a minority incorporates sustainability reference values (Usubiaga-Liaño *et al.* 2024 and 2025).

As in the case of SDGs, the GBF does not explicitly mention strong sustainability or critical natural capital, although its long-term vision is aligned with strong sustainability in that it seeks that "by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people"^[2]. The GBF intends to monitor biodiversity by using "essential biodiversity variables" (EBV)

(Pereira *et al.* 2013). These EBV meet the first key criterion of strong sustainability indicators in that they are linked to natural capital functions (e.g., measuring the primary productivity of ecosystems to assess ecosystem functioning). They also align with most of the key targets of biodiversity monitoring in policy (for example, genetic composition and species populations in relation to policy objectives for the conservation of genetic diversity and endangered species). However, despite the potential of these EBVs to measure performance against the sustainability reference values needed to retain their essentiality, such reference values have not been defined. Across all indicators of the GBF, only a few headline indicators make references to a standard to measure against (e.g., the Red List of Ecosystems Index, which aims to verify the achievement of Target 1 to reduce biodiversity loss in protected areas), but quantitative reference values for sustainability conditions are not formulated in most cases (which value of the Red List of Ecosystems Index in a given country guarantees that biodiversity in protected areas remains sustainable?).

2 Improve the SEEA to enhance its potential to monitor the achievement of the environmental sustainability goals of the SDGs and the GBF.

The System of National Accounts and the SEEA, its environmental counterpart, represent the main international statistical standards for integrating economic and environmental statistics. Thus, the latter should, therefore, play an increasingly important role in promoting the use of environmental data in public policy decisions. But to date, the uptake of SEEA results in policy decisions is limited, suggesting that the SEEA needs to increase its policy relevance, for instance, contributing to the monitoring of SDGs and GBFs visions' achievement at the national level.

The **United Nations System of Environmental-Economic Accounting (SEEA) and its extension for Ecosystem Accounting (SEEA-EA)** is an international statistical framework designed to integrate economic and environmental data. It enables the measurement and monitoring of nature's contribution to the economy—including natural resources and ecosystems—using indicators and an accounting structure similar to that of the System of National Accounts (SNA). The SEEA-EA constructs its accounts by combining two types of data: first the **physical accounts of natural capital**, which quantify the **stocks** and **flows** of natural resources (e.g., cubic meters of water, hectares of forest), from which **monetary accounts of natural capital** can be derived, which assess the economic value of these resources (e.g., the cost of soil degradation, the value of ecosystem services). These accounts are organized into **standardized tables**, mirroring the structure of national accounts, and include: **(i) Asset accounts**, which record the status of resources; **(ii) Flow accounts**, which track resource use and degradation; and **(iii) Hybrid accounts**, which establish linkages between physical and monetary data.

[1] See UN (2015) Transforming our world: the 2030 Agenda for Sustainable Development. United Nations. <https://docs.un.org/en/A/RES/70/1>

[2] See p. 8 of CBD (2022) Monitoring framework for the Kunming-Montreal Global Biodiversity Framework. Convention on Biological Diversity

SEEA can provide the basis to compute several SDG indicators directly or to provide supplementary information for others. While doing so, it can increase data quality and the comparability of inter-country statistics. As such, the UN Statistical Commission has shown “strong support for using SEEA in compiling Sustainable Development Goal indicators^[3] (...)”.

Out of the 45 indicators provisionally chosen to monitor the GBF, 27 could be supported by the SEEA. Currently, only two headline indicators on ecosystem extent and ecosystem services have been compiled, based on the SEEA.

So far, the SDG and GBF monitoring systems use almost no SEEA indicators. **This could change in the future if the physical accounts of ecosystems in SEEA-EA were to integrate indicators for maintaining ecosystem conditions** (planned but rarely available to date). The SDG and GBF monitoring systems, therefore, could benefit from increased use of SEEA indicators that accurately measure the maintenance of natural capital.

3 Improve the policy relevance of the SEEA by integrating science-based environmental standards used for the ESGAP framework into its ecosystem accounts.

While the SEEA remains neutral when it comes to the weak and strong sustainability worldviews, opportunities exist to integrate strong sustainability approaches into the SEEA, particularly in Ecosystem Accounting (EA). Thus, the upcoming revision of the SEEA core framework provides an opportunity to increase its policy relevance by facilitating its use for monitoring environmental SDGs and the GBF vision.

To do so, negotiators should recommend that **science-based environmental standards** used to monitor environmental sustainability in the ESGAP framework (briefly mentioned in the SEEA manual) should also be used as **sustainability reference values** in SEEA-EA ecosystem condition accounts.

Contrary to the Planetary Boundaries framework designed to monitor environmental sustainability at the global level, the ESGAP framework operates at the national scale, which is the geographical scale at which most SEEA accounts are implemented. Thus, ESGAP is the only strong sustainability indicator framework that operates on the same scale as most SEEA accounts. It has been applied to Europe and Japan, as well as several middle- and low-income countries.

“Environmental Sustainability Gap” (ESGAP)

The ESGAP framework measures performance against a sustainability target through different indicators that are relevant for environmental sustainability monitoring. In particular, it produces a composite index representing a dashboard of more than twenty environmental sustainability indicators linked to a set of four broad critical functions of natural capital. Thus, it aggregates indicators of source functions (such as biomass or water renewability), regulation functions (such as greenhouse gas absorption or pollutant recycling), life support functions (such as habitat provision or maintenance of biodiversity), and human health and well-being functions (covering non-economic uses of nature in relation to human health and other recreational, sporting, aesthetic, or cultural purposes).

In order to address the question of the level of functionality of natural capital that guarantees its long-term maintenance, the ESGAP framework uses quantitative **science-based environmental standards** (equivalent to **sustainability reference values**) to measure the performance of each indicator, thereby showing the distance to compliance with science-based environmental standard values. In a last step, the information is aggregated into a single value that represents a composite indicator (Usubiaga-Liaño and Ekins 2021a).

For its part, the SEEA central framework provides guidance to compile physical and monetary natural capital accounts. To inform strong sustainability, physical natural capital accounting, as described in the SEEA, needs to be used either to quantify the state of critical natural capital or the cost of maintaining its integrity. **We invite negotiators to improve the SEEA** by explicitly acknowledging the information needs for strong sustainability assessments and to provide guidance on how SEEA can support the quantification and state of those elements of natural capital that perform irreplaceable functions (critical natural capital). Since there is no agreement on all the elements of natural capital that are critical, as this can be context-dependent, **the focus should be set on defining sustainability reference values** for as many elements of natural capital as possible. It would then be up to the expert stakeholders, legislators and policy-makers to select the most critical elements of natural capital.

The SEEA Ecosystem Accounting (EA) reference manual offers some way to do so when it argues that relevant variables need to be compared with a reference value to ecosystem conditions. It suggests combining indicators of ecosystem conditions with information on ecological thresholds (e.g., concerning thresholds of change in ecosystem type) to assess the risk of change or the degree of resilience of ecosystems under pressures. But so far, the SEEA EA reference manual does not determine such thresholds. It only provides some guidance on how to establish them.

[3] See p. 18: United Nations Statistical Commission Report on the forty-ninth session (6–9 March 2018) Economic and Social Council Official Records. United Nations Statistical Commission. <https://unstats.un.org/bigdata/documents/reports/statcom-2018-49th-report-E.pdf>

The existence of **sustainability reference values** is a key criterion to monitor strong sustainability. Without such reference values, environmental sustainability could not be adequately quantified, as the indicators would provide information about the direction of change (i.e., whether the value is increasing or decreasing). **Thus, integrating sustainability reference values (similar to the science-based environmental standards used by the ESGAP framework) into the SEEA ecosystems condition accounts would be the most straightforward way to embed strong sustainability into the system and improve its policy use.**

Recommendations

- The next revision of the SEEA Central Framework should be more explicit in how the SEEA guides the development of sustainability indicators (including weak and strong sustainability indicators) and of aggregate indices.
- Ecosystem condition accounting based on the SEEA EA needs to be further promoted and developed, in order to provide qualitative information on the underlying ecosystem conditions that extent accounts alone cannot show.
- In order to increase the policy relevance of SEEA EA for monitoring the achievement of sustainability goals, more bridges should be built between SEEA improvement initiatives and international strong sustainability indicator frameworks, such as the Planetary Boundaries or the ESGAP framework. The latter is briefly mentioned in the Ecosystem Accounting manual^[4], and can be used to consistently integrate sustainability reference values into the SEEA.
- The post-2030 sustainable development framework and the GBF should better build on the SEEA, and plan to integrate the urgent improvement in the SEEA EA into the use of ecosystem condition accounts and sustainability reference values. With these SEEA EA improvements integrated into their monitoring system, the post SDG 2030 framework and the GBF could better monitor a vision of maintaining natural capital at a level that allows for sustainable socio-economic development.

[4] See p. 357 of the manual.

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