

Entry

Sustainability in Motion: The Evolution of Global Environmental Policy from Commitments to Measurable Action

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Definition

Sustainability can be broadly understood as the capacity of human societies to operate within ecological limits while maintaining long-term social and economic stability. Within global policy frameworks, it has evolved from a normative ideal to a structured and measurable paradigm of governance. This article outlines the institutional and political evolution of sustainability, tracing how international agreements—from the 1972 Stockholm Conference to Agenda 2030 and the Paris Agreement—have transformed environmental concerns into quantifiable commitments. The modern concept of sustainability emphasises integration across sectors and scales, linking environmental protection with development, equity, and resilience. Understanding this trajectory is essential for interpreting current global governance mechanisms and for promoting coherent, data-driven approaches to sustainable development.

Keywords: sustainability governance; environmental governance; global policy; SDGs; sustainability

1. Introduction

It has been estimated that humanity has consumed one-third of the planet's available natural resources and continues to consume them at an increasing rate. Research shows that each year, humanity needs approximately 1.75 Earths—that is, one and three-quarters times the planet's biocapacity—to sustain our current consumption patterns, and by 2030, we will require two Earths to meet our needs [1]. It is easy to see that by continuing with the current model of production, consumption, and overall human activity, we are heading toward a triple dead end: environmental, social, and economic. Moreover, the recent COVID-19 pandemic has brought to the forefront the urgent need to implement policies that favour a transition to a different development model, that of sustainable development.

Sustainability is a social goal related to the ability of people to coexist safely on Earth in the long term [2]. Sustainability is commonly conceptualised through three interrelated dimensions: environmental protection, economic viability, and social equity [3]. The concept of sustainable development is not new; rather, it has existed in scientific literature and policy documents for more than 60 years.

The notion of sustainability has undergone a significant transformation over the past five decades, shifting from a largely normative or aspirational concept to a structured and measurable policy framework embedded within international governance systems. This evolution is not merely terminological; it reflects a deeper political and epistemological shift in how environmental challenges are framed, addressed, and institutionalised.



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Understanding this trajectory is essential for two reasons. First, it reveals how global environmental governance increasingly relies on quantifiable targets and time-bound commitments, empowering political action. From vague appeals to “balance development and environment” in the 1970s, we now have structured agendas, such as the SDGs, with indicators, deadlines, and accountability mechanisms. Second, this evolution provides a discursive and institutional counterweight to contemporary narratives of denialism or stagnation.

By reconstructing the path by which sustainability has become a concrete and operational objective, this study emphasises that climate action is not a speculative ideology but a historically grounded policy necessity. In this context, sustainability is not merely an environmental concern; it is a political statement about how systemic inefficiencies must be addressed through coordinated, data-driven strategies. This study argues that recognising the political genealogy of sustainability not only strengthens the case for action but also equips stakeholders with the tools to resist regression, navigate complexity, and drive transformation.

Methodological Note: This study adopts a historical–analytical approach to examine the evolution of sustainability governance from the early environmental initiatives of the 1970s to contemporary global policy frameworks. The analysis is based on a qualitative synthesis of key international agreements, institutional developments, and scholarly contributions addressing global environmental governance. Major policy milestones were identified through a review of United Nations documentation, international environmental treaties, and relevant academic literature. Rather than providing an exhaustive policy analysis, the objective is to highlight the institutional trajectory through which sustainability has progressively been translated into structured policy frameworks supported by indicators, targets, and monitoring mechanisms.

This study contributes to the literature by systematically tracing how sustainability governance has evolved from broad normative commitments to increasingly measurable and monitorable policy frameworks. While existing studies often examine individual agreements or specific policy instruments, this study adopts a historical–institutional perspective to highlight the progressive integration of indicators, targets, and monitoring mechanisms into global environmental governance. By examining key milestones—from early environmental diplomacy to the SDGs and the Paris Agreement—the analysis illustrates how sustainability has gradually been operationalised through quantifiable policy tools that enable monitoring, comparison, and accountability across national and international levels of governance.

2. Historical Evolution of Sustainability Policy

The historical evolution of sustainability policy reflects a progressive shift from fragmented environmental initiatives to integrated global governance frameworks. Table 1 summarises the major milestones in the evolution of sustainability governance, highlighting key international agreements and institutional developments that progressively shaped the global sustainability agenda.

Table 1. Milestones in climate and sustainable development.

Event	Year
Brundtland Report	1987
Montreal Protocol	1987
Intergovernmental Panel on Climate Change (IPCC)	1988
Basel Convention	1989

Table 1. *Cont.*

Event	Year
Rio Earth Summit	1992
Kyoto Protocol	1997
Millennium Summit and MDGs	2000
World Summit on Sustainable Development	2002
Copenhagen Climate Summit	2009
10th Conference of the Parties to the Convention on Biological Diversity	2010
UN Conference on Sustainable Development (Rio+20)	2012
1st UN Environment Assembly (UNEA-1)	2014
Agenda 2030 and Sustainable Development Goals (SDGs)	2015
Paris Agreement	2015
European Green Deal	2019
Fit for 55 Package: Delivering the European Green Deal	2021
5th UN Environment Assembly (UNEA-5)	2022
United Nations Climate Change Conference (UNFCCC COP 28)	2023

2.1. Early Environmental Awareness and Milestones (1960s–1980s)

As early as the 1960s and 1970s, Europe and the United States saw a notable rise in concerns that economic growth, the rise of consumerism, and the associated lifestyle undermined ecological balance, economic stability, and planetary safety [4]. Indicative events of this era’s societal context include the founding of the Environmental Protection Agency (EPA) in the USA and the emergence of activist pressure and action groups, such as Greenpeace, in the early 1970s. The decade laid the conceptual and institutional foundations for what would later become a global sustainability architecture, signalling a transition from isolated national actions to shared planetary responsibility.

2.1.1. Brundtland Report

On 27 April 1987, Norwegian Prime Minister Gro Harlem Brundtland chaired the World Commission on Environment and Development (WCED), which published a report entitled “Our Common Future,” which went down in history as the “Brundtland report”. This landmark report emphasised that the establishment of separate environmental institutions was insufficient because environmental issues are an integral part of all development policies [5]. Among the report’s other significant elements was the definition of sustainable development, described as “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs,” a definition that remains relevant today [6].

2.1.2. Montreal Protocol

The next milestone was the adoption of the Montreal Protocol on Substances that Deplete the Ozone Layer on 15 September 1987. This protocol, ratified by all United Nations member states, has played a decisive role in preventing global environmental crises. The 1987 Montreal Protocol is considered a landmark agreement that successfully reduced the global production, consumption, and emissions of ozone-depleting substances [7].

2.1.3. Intergovernmental Panel on Climate Change (IPCC)

Subsequently, in 1988, the Intergovernmental Panel on Climate Change (IPCC) was established as a new initiative to bridge the gap between science and policymaking. The

reports issued by the IPCC have provided key insights into climate change and the actions required to mitigate its impact [8].

2.1.4. Basel Convention

On 22 March 1989, the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal was adopted. The primary goal of the Basel Convention is to protect human health and the environment from the adverse effects of hazardous waste. The scope of the convention includes a wide range of wastes defined as “hazardous” based on their origin, composition, and characteristics [9].

The growing environmental awareness of the 1960s and 1970s laid the foundation for a more institutionalised approach to sustainability. The 1990s marked a decisive turn, as environmental concerns began to be embedded in international agreements, signalling a transition from isolated actions to structured global governance.

Together, these early initiatives marked the transition from fragmented environmental concerns toward a more coordinated framework of international environmental governance.

2.2. From Rio to MDGs (1992–2000s)

2.2.1. Rio Earth Summit

A pivotal moment in the evolution of sustainable development was the Rio Earth Summit, held from 3 June to 14 in 1992. This summit, also known as the Earth Summit, played a crucial role in placing equal importance on economic development and environmental protection. During the summit, Agenda 21—a comprehensive action plan for sustainable development—was adopted, along with the Rio Declaration on Environment and Development and the Statement of Forest Principles (also known as the Non-Legally Binding Authoritative Statement of Principles) [5].

2.2.2. Kyoto Protocol

Subsequently, the Kyoto Protocol was adopted on 11 December 1997, targeting developed countries. It includes a series of commitments to limit the emissions of environmentally hazardous gases. The Protocol also recognised the principle of “common but differentiated responsibilities”, acknowledging that countries have different capacities to combat climate change and bear different levels of responsibility for current and past greenhouse gas emissions.

The Kyoto Protocol’s main objective was to control the emissions of major anthropogenic (human-induced) greenhouse gases in ways that reflect the underlying national differences.

- (a) Greenhouse gas emissions;
- (b) Wealth;
- (c) The capacity to achieve reductions [10].

2.2.3. Millennium Summit and MDGs

On 8 September 2000 in New York, the member states of the United Nations adopted the Millennium Declaration, which was followed by the establishment of eight Millennium Development Goals (MDGs). This event, known as the Millennium Summit, marked a global commitment to address a broad range of issues, from poverty and hunger to environmental protection and equitable access to safe drinking water.

These eight goals (Table 2) aimed to reduce poverty and human deprivation through coordinated global action and were later succeeded by the 17 Sustainable Development Goals (SDGs) adopted in 2015 [11].

Table 2. The 8 Millennium Development Goals (MDGs).

MDG	Goal Description
MDG 1	Eradicate extreme poverty and hunger.
MDG 2	Achieve universal primary education.
MDG 3	Promote gender equality and empower women.
MDG 4	Reduce child mortality.
MDG 5	Improve maternal health.
MDG 6	Combat HIV/AIDS, malaria, and other diseases.
MDG 7	Ensure environmental sustainability.
MDG 8	Develop a global partnership for development.

2.2.4. World Summit on Sustainable Development

The World Summit on Sustainable Development was held in Johannesburg, South Africa, from 26 August to 4 September 2002. Johannesburg was selected as the summit venue because of its strong symbolism. It is particularly noteworthy that in the ten years since the Rio Summit, South Africa has made tremendous strides from apartheid to a secular, pluralistic democracy, which undoubtedly influenced the choice of location [12].

During the Johannesburg Summit, the “Johannesburg Declaration on Sustainable Development” was signed, a political document intended to clarify the vision for sustainable development and pave the way for new negotiations [12]. This 2002 summit marked another milestone in the evolution of sustainability, emphasising its three dimensions: economy, environment, and society [13].

As early institutional frameworks matured, the 2000s brought the need to reassess and expand global commitments. This led to a phase of recalibration, reflected in high-profile summits such as Copenhagen, CBD COP10, and Rio+20, which sought to update and refine sustainability goals in response to emerging global challenges. These developments collectively strengthened the institutional foundations of sustainable development and prepared the ground for more integrated global sustainability frameworks in the following decades.

2.3. From Copenhagen to Rio+20 (2009–2012)

2.3.1. Copenhagen Summit

The United Nations Climate Change Conference, also known as the Copenhagen Summit, was held in Copenhagen from 7 December to 18, 2009. The conference concluded with the “Copenhagen Accord”, a document that was controversial in terms of its effectiveness in reducing greenhouse gas emissions and for lacking binding commitments from participating countries.

Nevertheless, all major greenhouse gas emitters agreed under the Copenhagen Accord that the global average temperature increase should be kept below 2 °C [14], although the outcomes were deemed insufficient to drive significant changes in the international climate regime [15].

2.3.2. 10th Conference of the Parties to the Convention on Biological Diversity

In October 2010, the 10th Conference of the Parties to the Convention on Biological Diversity (CBD COP 10) was held in Japan. During the conference, the governments of participating countries adopted a strategic plan, setting biodiversity protection targets to be achieved by 2020.

The aim was to undertake effective and urgent action to halt the loss of biodiversity to ensure that ecosystems would be resilient and continue to provide essential services by 2020. This would help safeguard the diversity of life on the planet while contributing to human well-being and eradicating poverty [16].

2.3.3. United Nations Conference on Sustainable Development (Rio+20)

Twenty years after the landmark Rio Earth Summit, the United Nations Conference on Sustainable Development (Rio+20) was held in June 2012. During the conference, the document titled “The Future We Want” was adopted by the participants. This document offers general guidance for the formation of sustainable development policies but fails to provide legally binding agreements or realistic targets [17].

Furthermore, the participants in the negotiations agreed to launch a process for establishing new Sustainable Development Goals (SDGs), building on the Millennium Development Goals and laying the foundation for the post-2015 UN Development Agenda [17].

2.3.4. First United Nations Environment Assembly (UNEA)

Subsequently, from June 23 to 27, 2014, the First United Nations Environment Assembly (UNEA) was held in Kenya. More than 1200 participants attended, including environmental ministers, heads of international organisations, government representatives, civil society members, and business executives. The participants approved one resolution and 17 decisions, including the following:

- (a) Strengthening UNEP’s role in promoting air quality;
- (b) Enhancing the science-policy interface;
- (c) Addressing the illegal wildlife trade;
- (d) Tackling chemical waste;
- (e) Management of microplastics and marine litter [18].

Overall, this assembly represents an effort to reinforce the mission of the United Nations Environment Programme (UNEP).

Despite continued efforts, the lack of enforceable mechanisms and uneven implementation has revealed the limitations of earlier frameworks. This prompted the global community to shift toward a more ambitious, measurable, and inclusive model, culminating in the adoption of the SDGs and the Paris Agreement.

2.4. Agenda 2030 and the Paris Agreement (2015–Today)

2.4.1. Agenda 2030 and the SDGs

A milestone date for sustainable development is 27 September 2015, when the UN Member States adopted Agenda 2030. In September 2015, the international community endorsed the 2030 Agenda and the Sustainable Development Goals (SDGs). All 193 UN Member States adopted the 17 Sustainable Development Goals [19]. These goals (Table 3) cover a wide range of issues that constitute the key dimensions of sustainability, such as poverty, discrimination, climate change, environmental protection, education, and labour concerns [20].

In addition, Agenda 2030 introduced 169 specific targets to help countries track their progress toward achieving the SDGs [21–23].

The 2030 Agenda acknowledges that seemingly disparate issues, such as poverty, hunger, health, education, gender equality, and environmental degradation, are interlinked and must be addressed in an integrated manner [24].

The previous eight Millennium Development Goals (MDGs) primarily focused on development objectives aimed at developing countries, with more advanced nations providing financial and technological support. In contrast, the Sustainable Development Goals (SDGs) are more comprehensive in both thematic and spatial scope and are applicable to all countries [24].

Achieving these goals requires a coordinated global effort to ensure the well-being of both current and future generations, along with more integrated and cross-sectoral policies [25,26].

Table 3. The 17 Sustainable Development Goals (SDGs).

SDG	Goal Description
SDG 1	No Poverty
SDG 2	Zero Hunger
SDG 3	Good Health and Well-Being
SDG 4	Quality Education
SDG 5	Gender Equality
SDG 6	Clean Water and Sanitation
SDG 7	Affordable and Clean Energy
SDG 8	Decent Work and Economic Growth
SDG 9	Industry, Innovation and Infrastructure
SDG 10	Reduced Inequalities
SDG 11	Sustainable Cities and Communities
SDG 12	Responsible Consumption and Production
SDG 13	Climate Action
SDG 14	Life Below Water
SDG 15	Life on Land
SDG 16	Peace, Justice and Strong Institutions
SDG 17	Partnerships for the Goals

Since the adoption of the 17 SDGs, many positive developments have taken place. Countries have begun integrating these goals into their national plans and strategies, and many have created coordination structures for their implementation [27]. However, despite initial efforts, the world is not on track to achieve most of the 169 targets encompassed by the goals [28].

2.4.2. Paris Agreement

On 12 December 2015, the Paris Agreement was signed in Paris, which is regarded as the continuation and evolution of the Kyoto Protocol. The agreement was adopted by 195 UN member states at the conclusion of the 21st Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris. This has generated widespread enthusiasm for a collaborative global policy response to climate change [29].

Perhaps the most important element is that the Paris Agreement seemingly marks the beginning of a new era in international climate diplomacy, one characterised by a spirit of cooperation that many hope will continue in the coming years. This represents a shift away from the long-standing, highly polarised, circular, and largely unproductive rhetoric that has often defined global climate negotiations [30].

The core provisions of the Agreement include the global objective of keeping the rise in temperature well below 2 °C and pursuing efforts to limit the increase to 1.5 °C. It also sets the target of reaching peak global greenhouse gas emissions as soon as possible [30,31].

One notable aspect of the Agreement is that it—at least partially—moves beyond the strict differentiation of responsibilities between developed and developing nations. While developed nations are still expected to lead in reducing their emissions, they are also called upon to support developing countries [30]. In conclusion, the Paris Agreement establishes a fundamental triangle of obligations.

- a. Countries must undertake nationally determined, measurable, and progressive actions to mitigate the effects of climate change.

- b. These actions are supported by changes in financial flows, technology transfer, capacity building, education, and other measures to reduce GHG emissions.
- c. The success of these efforts depends on transparency, monitoring, adjustment, periodic reporting, public participation, and compliance mechanisms [32].

2.4.3. European Green Deal

It is also important to mention that in addition to the aforementioned international initiatives, summits, and agreements, the European Commission introduced the European Green Deal in December 2019. Europe, aspiring to become the first climate-neutral continent, proposed increasing its target for greenhouse gas emission reductions to at least 50%, aiming for 55% by 2030 compared to 1990 levels [33]. The European Green Deal includes the following areas of action:

- a. Clean energy;
- b. Sustainable industry;
- c. Sustainable building infrastructure;
- d. Farm-to-Fork strategy;
- e. Pollution elimination;
- f. Sustainable mobility;
- g. Biodiversity.

2.4.4. Fit for 55 Package: Delivering the European Green Deal

Within the European Union, the Fit for 55 legislative package, launched in 2021 as part of the European Green Deal, operationalises the EU's commitment to reduce net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The package includes a comprehensive suite of reforms, ranging from carbon pricing and energy efficiency to sustainable transport and forestry regulation, designed to align all sectors with the Union's climate-neutrality objective. Together with the EU Taxonomy for Sustainable Finance, adopted between 2021 and 2024, Fit for 55 institutionalises the transition toward a low-carbon economy by defining measurable criteria for green investment and strengthening transparency and accountability across member states [34].

2.4.5. Fifth United Nations Environment Assembly

The Fifth United Nations Environment Assembly (UNEA-5), convened in two sessions between 2021 and 2022 in Nairobi, reaffirmed the role of UNEP as the central forum for multilateral environmental governance. Through its landmark Resolution 5/14, member states agreed to launch negotiations for a legally binding global treaty on plastic pollution, an initiative that restored the Assembly's strategic relevance in translating global sustainability principles into concrete regulatory instruments. UNEA-5 marked a subtle but significant transition from broad normative frameworks to issue-specific governance, reflecting a growing emphasis on measurable and enforceable policy action. The decision to advance a plastics treaty also underscored the recognition of plastic pollution as a planetary threat to climate stability, ecosystems, and biodiversity [35,36].

2.4.6. 2023 United Nations Climate Change Conference (UNFCCC COP 28)

The 2023 United Nations Climate Change Conference (COP28), held in Dubai, represents a critical juncture in global climate governance. This marked the completion of the first Global Stocktake under the Paris Agreement, providing a comprehensive assessment of collective progress toward the 1.5 °C goal. The findings confirm that the world remains off course to meet this target, highlighting significant gaps between commitments and implementation [37]. Nevertheless, the conference reaffirmed the central role of nationally

determined contributions (NDCs) and underscored the need for a just, inclusive, and science-based transition. COP28 also placed renewed emphasis on climate finance, adaptation mechanisms, and the phasing down of fossil fuels, thereby signalling a gradual shift from voluntary pledges to more structured accountability within the multilateral system of climate governance.

The current phase, shaped by the implementation of the SDGs, the Paris Agreement, and subsequent frameworks such as COP28 and the EU's Fit for 55 package, marks the consolidation of sustainability as a measurable and enforceable paradigm of governance. However, the persistent gap between ambition and implementation underscores the complexity of translating global commitments into coordinated national action. Tracing this historical evolution offers critical insights into the structural challenges of contemporary sustainability governance and the pathways toward more coherent, accountable, and equitable transitions.

2.5. The Emergence of Sustainability Indicators and Monitoring Frameworks

A defining characteristic of contemporary sustainability governance is the increasing reliance on indicators and monitoring systems that translate broad policy goals into measurable outcomes. Early environmental agreements often articulated normative objectives—such as protecting ecosystems or balancing development with environmental protection—without clearly defined metrics for evaluating progress. Over time, however, international governance frameworks began to incorporate structured indicator systems designed to monitor implementation and compare performance across countries.

One of the most prominent examples of this shift is the indicator framework developed for the Sustainable Development Goals (SDGs), which includes 169 targets and more than 230 global indicators used to track progress across multiple dimensions of sustainability. These indicators allow international organisations and national governments to assess progress in areas such as climate mitigation, biodiversity protection, poverty reduction, and sustainable consumption. Similar monitoring approaches are also embedded in climate governance through nationally determined contributions (NDCs), greenhouse gas inventories, and global stocktake mechanisms under the Paris Agreement.

Despite their growing importance, sustainability indicators remain the subject of ongoing methodological debate. Scholars have highlighted challenges related to data availability, comparability across countries, and the risk of oversimplifying complex environmental processes. Nevertheless, the institutionalisation of measurement frameworks represents a significant transformation in sustainability governance, shifting the focus from aspirational commitments toward quantifiable and monitorable policy action.

3. Conclusions and Prospects

As demonstrated in the historical analysis presented in Section 2, the evolution of sustainability as a global policy framework reflects a profound transformation in humanity's understanding of environmental and developmental challenges. From its conceptual origins in the 1960s to the current architecture of the SDGs, sustainability has transitioned from aspirational rhetoric to structured, time-bound commitments that are integrated across sectors and levels of governance.

This trajectory reveals two critical dynamics: first, that global environmental governance is increasingly built upon quantifiable, monitorable targets, and second, that the legitimacy of sustainability policies rests on their ability to deliver systemic change in the face of rising environmental and socioeconomic uncertainty.

However, progress remains inconsistent at the international, national, and regional levels [28,38]. While frameworks such as Agenda 2030 and the Paris Agreement signal a strong

consensus, implementation often lags behind the ambition. This disconnect underscores the need for continuous tracking, public engagement, and political accountability. Strengthening participatory structures, transparency mechanisms, and multilevel coordination is essential to ensure a meaningful impact.

Beyond political commitments, the operationalisation of sustainability depends heavily on scientific innovation and the use of advanced data and digital tools [39,40]. Technologies such as satellite monitoring, environmental sensors, and AI-based analytics are transforming the ability of governments and stakeholders to monitor progress, assess policy effectiveness, and detect critical thresholds. The integration of data-driven strategies can substantially improve transparency and accountability while enabling evidence-based decision-making.

Equally important is the commitment to a just transition, ensuring that the shift toward sustainable development does not exacerbate inequalities but instead promotes social inclusion and equity [41,42]. Policies must be designed to protect vulnerable communities, workers in carbon-intensive sectors, and marginalised regions, particularly in the Global South, by integrating social justice principles into environmental action.

In addition, the broader geopolitical context should be acknowledged. Geopolitical instability, energy insecurity, and fragmented international relations have introduced new barriers to collective environmental action [43]. While global sustainability frameworks require cooperative approaches, rising protectionism and unilateralism threaten multilateralism's foundations. Therefore, maintaining global dialogue and institutional trust is as important as technical policy design in addressing climate change.

Another pressing need is to foster coherence between global objectives and local realities. Sustainability must be translated into actionable policies at the national level and across municipalities, regions, and communities [28,44]. Vertical integration—ensuring that local plans align with global goals—remains a weak link in current governance models and must be prioritised to deliver effective and inclusive outcomes.

Finally, as we look ahead, emerging paradigms such as the circular economy, nature-based solutions, and the planetary boundaries framework are poised to further redefine how sustainability is conceptualised and implemented. These innovations emphasise ecological regeneration, systems thinking, and long-term resilience, which are critical elements in navigating the complex challenges of the Anthropocene [45].

In conclusion, understanding the trajectory of sustainability policymaking enhances our collective capacity to counter climate scepticism, address systemic inefficiencies, and enable a just and resilient transition. This historical evolution serves not only as a record of progress but also as a strategic guide for future action grounded in equity, science, and global solidarity. As sustainability governance continues to evolve, the growing reliance on indicators, monitoring systems, and data-driven policy tools will increasingly shape how governments design, evaluate, and adjust sustainability policies. The challenge for policymakers will be to ensure that measurement frameworks not only improve accountability but also capture the complexity of ecological and social systems.

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